# UNITED NATIONS EXPERT GROUP MEETING ON SOCIAL AND ECONOMIC IMPLICATIONS OF CHANGING POPULATION AGE STRUCTURES

Mexico City, 31 August – 2 September 2005

United Nations

**Department of Economic and Social Affairs**
Population Division

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# DESA

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# PREFACE

There is today great diversity in the age structures of different populations, but rapid change is taking place nearly everywhere. In most countries of Asia and Latin America the proportion of children has been falling and the proportion in the working ages has been rising, thus producing demographic conditions favourable for economic growth—a "demographic dividend". Developed countries already have relatively old populations and are coming to the end of the "dividend" period of rising proportions in the working ages. In contrast, many African countries still have rapidly growing populations with a high proportion of dependent children. However, over the next four decades, the proportion of older persons will increase rapidly in all regions of the world, with important implications for the pace of economic growth, the sustainability of pension and social security systems and the functioning and escalating costs of health systems.

To discuss the challenges and opportunities posed by these trends, the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, in collaboration with the Consejo Nacional de Población (CONAPO) of Mexico and with the support of the National Institute of Aging (NIA) of the United States of America, convened the Expert Group Meeting on the *Social and Economic Implications of Changing Population Age Structures*, which took place in Mexico City from 31 August to 2 September 2005. The present volume presents the proceedings of that meeting.

The Meeting brought together experts from different regions of the world to address the determinants, trajectories and consequences of changes in the age structures of populations for economic and social development and to discuss the policy implications of these changes, including policy options to take advantage of the demographic dividend and to mitigate the problems arising from changing age structures in different socio-economic and political contexts. Four main topics were discussed during the Meeting: the demographic dividend; intergenerational transfers in the context of changing age structures; the effects of population ageing at the macro level, including social security; and the impact of ageing on the health system.

Comments and suggestions on this report are welcome and may be addressed to Ms. Hania Zlotnik, Director, Population Division, Department of Economic and Social Affairs, United Nations, New York, N.Y. 10017, USA, fax number (1 212) 963-2147. This publication may also be accessed on the website of the Population Division at *www.unpopulation.or*g.

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## Explanatory notes

Symbols of United Nations documents are composed of capital letters combined with figures.

The following symbols have been used in the tables throughout this report:

> Two dots (..) indicate that data are not available or are not separately reported.
> An em dash (—) indicates that the amount is nil or negligible.
> A hyphen (−) indicates that the item is not applicable.
> A minus sign (−) before a figure indicates a decrease.
> A point (.) is used to indicate decimals.
> A slash (/) indicates a crop year or financial year, for example, 1994/95.

Use of a hyphen (−) between dates representing years, for example, 1990-1995, signifies the full period involved, including the beginning and end years.

Details and percentages in tables do not necessarily add to totals because of rounding.

Reference to "dollars" ($) indicates United States dollars, unless otherwise stated.

The term "billion" signifies a thousand million.

The following abbreviations have been used in the present document:

| | |
|---|---|
| ADLs | Activities of daily living |
| AFORE | Pension Fund Management Company (Mexico) |
| AHIP | Association-managed Health Insurance Plan |
| AIDS | Acquired Immunodeficiency Syndrome |
| ART | Antiretroviral treatment |
| CBR | Crude birth rate |
| CDR | Crude death rate |
| CONAPO | National Population Council (Mexico) |
| CONSAR | National Commission for the Retirement Savings System (Mexico) |
| CPF | Central Provident Fund |
| DPA | Hungarian Social and Demographic Panel Survey |
| EAP | Economically active population |
| ECLAC | Economic Commission for Latin America and the Caribbean |
| EPS | Employees' Pension Scheme |
| EU | European Union |
| GDP | Gross domestic product |
| GDP/N | Gross domestic product per effective consumer |
| GHIP | Government-managed Health Insurance Plan |
| HALE | Health-adjusted life expectancy |
| HIV/AIDS | Human Immunodeficiency Virus |
| HRS | Health and Retirement Study (United States of America) |
| IADLs | Instrumental activities of daily living |
| ILO | International Labour Organization |

| | |
|---|---|
| IMSS | Mexican Social Security Institute |
| INFONAVIT | National Workers Housing Fund Institute (Mexico) |
| ISSSTE | Social Security and Services Institute (Mexico) |
| KNSO | Korea National Statistical Office |
| LCIS | Long-term Care Insurance Scheme (Japan) |
| LFP | Labour force participation |
| NHIP | National Health Insurance Plan |
| NHIS | National Health Interview Surveys |
| NorLAG | Norwegian Life Course, Ageing and Generation Study |
| NPS | National Pension Scheme |
| NSDCP | National Statistical Data Collection Program |
| NSFIE | National Survey of Family Income and Expenditure (Japan) |
| NUJLSOA | Nihon University Japan Longitudinal Study of Aging |
| NUPRI | Nihon University Population Research Institute |
| OASIS | Old Age and Autonomy: The Role of Service Systems and Intergenerational Family Solidarity Study |
| OECD | Organization for Economic Cooperation and Development |
| PAYGO | Pay-as-you-go schemes |
| PPP | Purchasing power parity |
| PRSP | Poverty Reduction Strategy Paper |
| SABE | Survey on Health, Well-Being and Ageing in Latin America |
| SDR | Standardized death rate |
| SHARE | Survey of Health, Ageing and Retirement in Europe |
| TFR | Total fertility rate |
| PNAD | National Household Survey (Brazil) |
| SIEFORE | Investment Company Specializing in Pension Funds (Mexico) |

UNITED NATIONS
DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
POPULATION DIVISION


UNITED NATIONS EXPERT GROUP MEETING ON
SOCIAL AND ECONOMIC IMPLICATIONS OF
CHANGING POPULATION AGE STRUCTURES


## EXECUTIVE SUMMARY

The Population Division of the Department of Economic and Social Affairs (DESA) of the United Nations Secretariat, in collaboration with the Consejo Nacional de Población (CONAPO) of Mexico and with the support of the National Institute of Aging (NIA) of the United States, organized an expert group meeting on the Social and Economic Implications of Changing Population Age Structure, held in Mexico City from 31 August to 2 September 2005.

The meeting focused on four main topics: (i) the "demographic dividend" produced when the proportion of the population in the working ages rises during the course of the demographic transition; (ii) intergenerational transfers in the context of changing age structures; (iii) the macro-economic effects of population ageing, including effects on social security; and (iv) the impact of ageing on the health system. In addition to global overviews of trends and policy issues, experts presented studies focused on the demographic situation and policy responses to changing population age structures in a range of countries, including Mexico as well as several other countries in Latin America and the Caribbean, China, Hungary, Japan, the Republic of Korea and South Africa. Experts also considered the results of several recent studies examining evolving attitudes and practices with regard to intergenerational support in Europe and South-eastern Asia.

More than 120 observers from Mexican institutions and organizations attended the meeting, in addition to 19 invited experts, 5 staff members from the United Nations Department of Economic and Social Affairs and 2 representatives from CONAPO. Ms. Hania Zlotnik, Director of the United Nations Population Division/DESA, and Ms. Elena Zuñiga, Secretary General of CONAPO, chaired the meeting. Opening statements were made by Mr. Richard Suzman of the United States National Institute on Aging, Mr. Rodolfo Tuirán of the Mexican Ministry of Social Development, and Mr. Julio Frenk of the Mexican Ministry of Health.

The meeting reviewed global changes in population age structures and recent and anticipated efforts by the United Nations to address the many challenges posed by such changes, including the "bottom-up" process of review and appraisal of the 2002 Madrid International Plan of Action on Ageing (MIPAA). It was noted that although populations in the more developed regions were older than other parts of the world, the rapid fertility declines in much of Asia, Latin America and parts of Africa meant that less developed countries as a whole were ageing faster than their more developed counterparts. Whereas population ageing had once been seen as an issue primarily affecting the developed world, the MIPAA recognized that demographic changes would be greatest and most rapid in developing countries. Therefore they, too, needed to address the global force of population ageing and its implications for development.

The meeting's demographic overview showed that the ongoing transition from high to low levels of fertility and mortality had set in motion a major shift in population age structures all over the world. Countries and regions were currently at different stages of this transformation, though. In most developing countries, especially in Asia and Latin America and the Caribbean, fertility declines in recent decades had led to a decreasing proportion of children and an increasing proportion in the working ages, thus producing demographic conditions favourable for economic growth—a "demographic dividend". Developed countries were already at the end of the "dividend" period of rising proportions in the working ages and were embarking on a period during which the older population would continue growing while, in most cases, the absolute number in the working ages would fall substantially. In contrast, many African countries still had rapidly growing populations with a high proportion of dependent children, and were projected to experience the "dividend" substantially later than countries in other regions.

Participants recognized that demographic dependency ratios (the ratio of the number of persons in the working ages to the number of younger and older "dependents") provided only a crude indicator of the dependency burden within a society, since many older persons were still economically active while some people in the working age range were not. There was agreement about the usefulness of focusing on actual age patterns of consumption and production in the analysis of the economic effects of age structure changes. Experts presented new estimates of age profiles of consumption and production for selected more- and less-developed countries. This and related ongoing work on a system of National Transfer Accounts was expected to provide the basis for achieving a more realistic and nuanced assessment of the economic effects of changing population age structures.

Participants stressed that economic outcomes of demographic change depended on the policy environment. The demographic dividend was agreed to represent only a potential for enhanced economic growth, which might be diminished or even negated by unfavourable policies.

Meeting participants also discussed the possibility that population ageing would prompt a substantial increase in savings and wealth, giving rise to a second and more enduring demographic dividend. They noted, however, that the "second demographic dividend" was still mainly a theoretical proposition, and that a favourable environment for the productive investment of savings was a prerequisite for turning this potential dividend into a reality.

Regarding social security and old-age pensions, participants stressed that the challenges posed by ageing would require many changes in social policies and attitudes. In particular, they pointed the importance of reversing the trend towards early retirement in developed countries and noted that such a trend reversal was already emerging in some of those countries.

Participants agreed that in middle and low-income countries, the most prominent pension-related issue continued to be the low population coverage of current programmes. There was a need to extend coverage to excluded groups such as women, migrants, rural agricultural workers, and urban informal sector workers. There was some debate about using universal entitlements to help close the pension coverage gap. The effect of a universal pension option might be to lower the incentive to save for retirement, which could undermine the second demographic dividend. It was noted, however, that proponents of universal schemes generally advocated very modest amounts of per capita assistance that would not be expected to have a major disincentive effect on saving for retirement.

Participants argued that structural reforms in Latin America had overemphasized the private pillars of pension systems while neglecting the public pillars, which were the basis of the social protection system for those older persons who had limited opportunity to participate in the revamped systems. They noted that in many recently reformed pension systems in Latin America, coverage and contribution rates remained low and administrative fees were high.

There was a consensus that population ageing would inevitably affect labour market institutions and policies. In the Republic of Korea, for instance, the proportion of persons aged 50 or over among the total labour force was projected to rise from roughly one quarter to one half over the next 50 years. It was noted that an increase in the labour force participation rate of older workers could help to alleviate the potentially negative effects of declining labour force growth in the coming decades, provided that the quality of employment opportunities and working conditions for older workers improved. Likewise, studies in Japan suggested that a better utilization of older workers, in conjunction with an extension of the retirement age, could help offset rising pension and health system costs. Researchers had projected that the number of healthy or active Japanese older persons would increase from 19 million in 2000 to 30 million in 2025. Other promising responses to ageing discussed at the meeting included an enhanced role of women in the labour force and steps that would encourage more people to work up to the "normal" legal retirement age. In general, immigration was expected to have only a small effect on population age structures and was unlikely to compensate for a declining labour force in most developed countries.

With respect to health conditions, participants observed that poor access to health care had had a deleterious effect on the older population. In Hungary as well as in other countries with economies in transition, for instance, older people had been seriously affected by the loss of former rights and privileges with regard to health-care services. Participants also noted that in Latin America, although the relative importance of chronic diseases was rising as expected with changing population age structures, infectious diseases were still an important component of national health profiles. Furthermore, countries of the region would confront rapid population ageing with significantly lower income levels than those obtaining in most developed countries when they reached a comparable demographic stage.

The Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS) epidemic was also changing the age structure of mortality and of population in ways that earlier discussions of the epidemiologic transition had not envisioned. HIV/AIDS was taking its heaviest toll of those in the prime working and child-rearing ages. In considering the impact of HIV/AIDS and antiretroviral treatment (ART) on population age structure it was estimated that, when properly used, ART would extend life expectancy of those affected by 10-15 years on average. Because the impact of HIV/AIDS was greater among females than males, ART could benefit women especially. While such treatment would benefit families and the economy by permitting many of those infected to continue as active supporters of their families, there would also be a need for support services for a growing number of families and persons living with chronic AIDS and AIDS-related complications, and a need for welfare services to focus on the nutritional needs that must be met to ensure ART effectiveness.

One hindrance to the formulation and evaluation of sound health-care policies in many rapidly-ageing developing countries had been the shortage of detailed and comparable information about the health status of older persons. The meeting considered results from recent surveys that had focussed specifically on the health status of the older population in seven Latin American urban areas. Some notable findings were the relatively high prevalence of diabetes in Barbados and Mexico, and the high levels of obesity in several of the areas, reaching or exceeding 30 per cent in Chile, Mexico and Uruguay. As had also been found in other surveys, women consistently reported poorer health status than did men, and those with little or no education were the most likely to have disabilities and to be in poor health.

One session of the expert meeting provided an in-depth focus on social and economic implications of ageing in Mexico. Participants described and discussed several novel approaches that Mexico has taken in response to changes in its demographic, economic, health and socio-political realms. An example was the Seguro Popular, the operative arm of the Social Protection System in Health aimed at extending health insurance to all people not already covered, including older persons. It was reported that since the

inception of the Seguro Popular, the proportion of households experiencing catastrophic health expenditures had decreased markedly.

Data on per capita health costs in Mexico showed a pronounced rise with age after age 60, and projections of health expenditures as a percentage of GDP followed an upward trajectory similar to that seen in other countries of the Americas. However, studies had shown that the most effective health systems were not necessarily the most costly, suggesting that countries such as Mexico currently had an opportunity to invest in a more efficient health system.

Several problems were also discussed with respect to social security system in Mexico and other countries of the region, including low coverage, low contribution rates by workers, and high administrative fees. Solving these problems would require major revisions of the retirement savings system that would reduce foreseeable individual shortfalls and address gender inequalities within the system. It was also important to consider the distributional effects of social security reforms, particularly with regard to the goal of reducing poverty.

There was a consensus that many of the most important policy issues for an ageing society involved the interactions between public and private intergenerational transfer systems. Estimates of intergenerational reallocations in selected countries implied substantial intergenerational transfers, both public and private. Country analyses using generational accounting procedures suggested that significant intergenerational imbalances existed in some countries, such as Argentina and Brazil.

It was clear that informal, mostly intra-familial, support transfers were frequent between family members of different generations. Family-based support was agreed to be particularly important in developing countries, although family assistance to older relatives remained common in the developed countries as well. Although studies had found a preponderance of older persons receiving monetary transfers and material goods from their children, significant proportions of older people, especially the "younger-old," also provided material support to their children. Older persons also provided substantial amounts of care to grandchildren as well as other practical and emotional support.

One concern for policymakers was whether the provision of formal support served to "crowd out" rather than to complement family support for those needing assistance. Several lines of evidence suggested that family and formal support services primarily complemented rather than substituted for one another, and that availability of both sources of support allowed those with the greatest need to receive better care. A full consideration of this issue would require attention to the needs of caregivers and the costs to them of providing care, including opportunity costs. Programmes allowing older persons to remain economically and physically independent would also reduce stress on the family. Special attention was required with respect to the social integration and support of older people who could not count on family support, in particular the childless, who were expected to be of growing importance in the face of persistent low fertility.

# PART ONE

# REPORT OF THE MEETING AND INFORMATION PAPERS

# REPORT OF THE MEETING

The Population Division of the Department of Economic and Social Affairs (DESA) of the United Nations Secretariat, in collaboration with the Consejo Nacional de Población (CONAPO) of Mexico and with the support of the National Institute of Aging (NIA) of the United States, organized an Expert Group Meeting on the Social and Economic Implications of Changing Population Age Structure, held in Mexico City from 31 August to 2 September 2005.

The meeting was chaired by Ms. Hania Zlotnik, Director of the United Nations Population Division/DESA, and Ms. Elena Zuñiga, Secretary General of the Consejo Nacional de Población of Mexico. Mr. Kevin served as rapporteur. This report summarizes the presentations and discussion that took place during the six substantive sessions of the Expert Group Meeting. The meeting agenda and lists of participants and documents are annexed to the present report.

## A. OPENING REMARKS

The Meeting was opened by Ms. Elena Zuñiga. She pointed out the importance of understanding the complex relationships between demographic dynamics and development for the achievement of central objectives such as reduction of social inequality and eradication of poverty. She reminded participants of the significant declines in fertility and infant mortality experienced by the Mexican population since 1974 as a result of the population policy implemented by CONAPO.

Mexico, she indicated, was currently in the middle of a period of "demographic bonus" in which the share of the working-age population was increasing relative to the share of the population in the dependent ages (children and older persons). It was important for the country to take advantage of this particularly favourable period for economic and social development by making effective use of the productive potential of the working-age population.

However, she noted, the recurring crises and short periods of recovery that had characterized the Mexican economy during the past three decades had seriously constrained its capacity to create new jobs. As a consequence, informal employment had proliferated, in most cases involving low-productivity and low-income jobs, without links to the social security system. The lack of job opportunities in the formal sector of the economy also helped explain the escalation of out-migration from Mexico, together with the increasing demand of the United States economy for Mexican workers and the consolidation of strong bi-national social networks.

Ms. Zuñiga also referred to the challenges posed by the rapid population ageing that Mexico would face in the coming decades. The main concern was that in Mexico, as in many other developing countries, population ageing would occur in a context of development problems and social disparities. Thus, for the progress and well-being of Mexican society, it would be crucial to take advantage of the period of "demographic bonus" before population ageing intensified.

Ms. Hania Zlotnik, in her opening remarks, noted that population ageing had been identified by the United Nations Secretary-General as one of the priority areas for social and economic development. The international community had confirmed the importance of this issue by adopting the Madrid International Plan of Action on Ageing during the Second World Assembly on Ageing in Madrid in 2002. In addition, in 2007, coinciding with the fifth anniversary of the adoption of the Madrid International Plan of Action on Ageing, "the social and economic implications of changing population age structures" would be the special theme of the 40th session of the United Nations Commission on Population and Development. In this regard, the Commission was expected to benefit greatly from the conclusions of the present meeting.

Ms. Zlotnik affirmed that there was increasing evidence that most developing countries, including Mexico, could benefit from the proportional increase in the working-age population before population ageing intensified, if the right policies were put in place. In this case, the demographic context could contribute to faster economic growth and to improving general life conditions.

Mr. Richard Suzman of the United States National Institute on Aging emphasized the strong commitment of the NIA to promoting collaborative work on global ageing research through linkages between major projects now underway or in the planning stages. He highlighted the importance of one set of studies that had begun to yield important cross-national information on health, work, and well-being in older age, through the use of a harmonized survey design. These studies included the United States Health and Retirement Study, the English Longitudinal Study of Aging, the Mexican Health and Aging Study, and the 11-country Survey on Health, Aging and Retirement in Europe. The key features of these studies, he noted, were the multidisciplinary approach used in the study designs and the longitudinal nature of the surveys. These features would afford researchers a much fuller understanding of the dynamic nature of the ageing process than was possible from cross-sectional or sporadic data collections. The study designs also encouraged an experimental nature within surveys by permitting the use of topic-specific modules (for example, on time use, risk aversion, and nutrition) as well as innovative methods such as vignettes and biomarker assessment.

After stressing the important role of CONAPO and other academic institutions in the achievements of Mexican population policies, Mr. Rodolfo Tuirán of the Mexican Ministry of Social Development recalled that the changes in age structure that had opened the demographic "window of opportunity" for development in Mexico would start closing in about three decades. It would be crucial to continue mainstreaming demographic considerations into the political process of national development.

He recognized the importance of education, health and nutrition as instruments for breaking the cycle of intergenerational transmission of poverty and for creating the proper conditions to benefit from the period of "demographic bonus". The *Programa Oportunidades*, currently assisting about 5 million poor families around the country, was one example of Mexican Government intervention in this direction. Mr. Tuirán also identified population ageing as an enormous challenge for Mexico's development, emphasizing the unprecedented responsibilities and compromises that this process would impose on the Government and on the entire Mexican society.

Mr. Julio Frenk of the Mexican Ministry of Health reiterated the importance of population ageing for all dimensions of social organization. The ageing process would have particularly large implications for the area of health. The increasing number of cases of chronic diseases, which are more common among older persons, would impose enormous pressure on health systems around the world. These diseases are normally associated with higher treatment costs and more intensive use of health services.

Mr. Frenk stated that in order to prepare for the health implications of population ageing, the Mexican government had adopted two lines of action: first, preventive actions aimed at the younger population; and second, the extension of the social protection system, particularly towards the poorest segments of the population. As an example of this second line of action, Mr. Frenk mentioned the *Seguro Popular* programme that was the operational arm of the recently created Social Protection System. This system was conceived to be complementary to the traditional Social Security System that had been in place for the previous 60 years. The *Seguro Popular* was the subject of a further presentation at the Meeting, as is discussed below.

B. WORLD POPULATION AGEING

Fertility decline and urbanization arguably were the dominant global demographic trends during the second half of the twentieth century, much as rapid improvements in life expectancy characterized the early 1900s. As the twenty-first century unfolds, population ageing is poised to emerge as the pre-eminent worldwide demographic phenomenon.

The initial substantive session of the Meeting set the stage for subsequent presentations and discussion by providing an overview of global changes in population age structure, with an emphasis on the diversity of experience among major world regions. Consideration was given to trends in dependency ratios and to various factors that affect changes in age structure. The session also outlined recent and anticipated efforts by the United Nations to address the many challenges posed by large-scale demographic shifts.

Mr. Paulo Saad provided an overview of global trends in population age structure. He noted that the world's major regions were at very different stages of the demographic transition. Africa had the youngest age distribution, with more than 40 per cent of the population under the age of 15 and a mere 5 per cent aged 60 or over. Europe stood at the other end of the regional spectrum with 16 per cent of persons under age 15 and 21 per cent aged 60 or older. While Europe currently was the only region with more older persons than children, population projections suggested that older persons would outnumber children in all regions of the world, except Africa, before the middle of the twenty-first century. The median age of the population, that is, the age at which half the population is younger and half older, had, by 2005, reached 39 years in the more developed regions, and was projected to exceed 45 years by 2050. The median age in less developed regions, currently 26 years, was projected to reach 37 years by 2050. For countries identified by the United Nations as "least developed", the aggregate median age was still below 19 years. Many of the latter nations still had high levels of fertility that would keep their population age structure relatively young for many decades.

Mr. Saad discussed trends in demographic dependency ratios, which relate the size of population groups generally considered to be economically dependent, such as children under age 15 and older adults aged over 59 years, to the number in the age groups considered to be economically active (ages 15-59). The overall dependency ratio (children plus older adults relative to the working age population) in more developed regions had increased slightly between 1950 and 1975, and then began a decline to the present time. While fertility was low in those regions, the large absolute growth at older ages would, in the future, produce a rise in overall dependency ratio. In contrast, the dependency ratio in developing countries rose more significantly between 1950 and 1975, largely due to reduced childhood mortality. After 1975, however, a decline in the proportion of children due to declining fertility, coupled with a rising proportion of persons aged 15-59, led to major reductions in the child and overall dependency ratios. By 2050, the overall dependency ratio in less developed regions would be lower than it had been a century earlier, and the age composition would have shifted dramatically. By 2050, older persons would probably account for half of the dependency burden, as opposed to 15 per cent in 1950.

Several other important factors related to changing population age structures were noted. Although the more developed regions had older populations than other parts of the world, the rapid fertility declines in much of Asia, Latin America and parts of Africa meant that less developed countries as a whole were ageing faster than their more developed counterparts. Because women lived longer than men in virtually all countries, the ageing of populations was accompanied by a rising proportion of females. Women made up a large majority of the oldest-old. Also, increased longevity had led to the vertical extension of families; three- and four-generation families were increasingly common. This had implications for social support structures and intergenerational relations. Currently, older people in less developed regions

tended to live with their children while, in most developed countries, older persons typically lived alone or with a spouse only. This theme was explored more thoroughly in the final session of the Meeting.

Mr. Robert Huber continued the global overview by describing the 2002 Madrid International Plan of Action on Ageing, which was a major outcome of the Second World Assembly on Ageing. The Madrid Plan focused largely on developing countries, many of which would experience a rapid process of population ageing in the twenty-first century. Most of these countries would need to respond to rapid population ageing with fewer economic and social resources than were available in the more developed countries at a comparable demographic stage. The Madrid Plan had three primary foci: (1) older persons and development, a theme that, *inter alia*, promoted intergenerational solidarity by entailing active participation and integration of older persons in the development process while enabling income security and access to education; (2) health and well-being in old age, which emphasized that good health of a population was essential for national development, that good health was an individual's most important asset and that enjoyment of the highest attainable standard of health was a human right; and (3) building enabling and supportive environments, including intergenerational solidarity within social institutions (family, community, and State), generating greater access to services, resources, and the physical environment, and enhancing positive perceptions of the ageing process.

Mr. Huber noted that while the Madrid Plan laid out recommendations for what *could* be done to adjust to an ageing world, it was essential that countries design plans to implement the recommendations in their own national contexts. He described an evolving "roadmap" for implementation, emphasizing national capacity-building and the mainstreaming of ageing into national development agendas. There was a need to move away from a "welfare approach" to older persons, which overemphasized support, care and benefits, and towards a more inclusive and participatory framework emphasizing participation of older persons in formulating and monitoring the development agenda. With regard to review and appraisal, the Commission for Social Development had endorsed a "bottom-up" process linking local and national activities to United Nations regional and global intergovernmental bodies. This novel approach would rely on information from the grass-roots level to generate direct feedback on policies and programmes, thereby encouraging advocacy and awareness-raising.

During the discussion, it was pointed out that demographic dependency ratios provided only a crude indicator of the dependency burden within a society. Many older persons were still economically active or engaged in productive functions not captured in economic statistics. Likewise, some people in the 15-59 age range were not economically active, nor did they necessarily provide support to children or older persons. In addition, many adolescents and young adults attended school beyond age 15 and were still economically dependent. It also was noted that spending on children was often viewed partly as an investment, while support of older persons was more often viewed simply as a social expenditure.

Several participants remarked upon the need for better integration of demographic research with other scientific disciplines. It was noted that much of the public discussion about population ageing neglected gender considerations and socioeconomic disparities. The consideration of healthy, active life expectancy in addition to general life expectancy would be a useful step forward in terms of projections. Time-use surveys could help provide much-needed information on activities relevant to well-being of older persons and on cultural differences in the experience of older age, especially for women. It was stressed that today's cutting-edge survey research on the behavioural and social aspects of ageing was largely of a longitudinal nature and was informed by a multidisciplinary perspective.

Some participants asked what steps countries were taking towards implementing the Madrid Plan of Action on Ageing. It was noted that, in spite of the growing recognition of population ageing as a pre-eminent demographic phenomenon, there was no international organization devoted to older persons as there was, for instance, to children and workers. With regard to promoting the implementation of the

Madrid Plan, it was noted that a common way to elevate media and government attention was to present the situation of a disadvantaged group as a crisis. However, the principles of the Madrid Plan discouraged this approach. Older people, and other population groups, should not be regarded as consisting mainly of persons needing sympathy and care, but rather, as assets for social development.

## C. THE DEMOGRAPHIC DIVIDEND

From an economic perspective, changing population age structures entail shifting balances within societies between those who produce more than they consume and those who are net consumers. This session considered the implications of such shifting balances. The concept of demographic dividends arising from age structure changes formed the core of the discussion. Demographic changes in Brazil, the Republic of Korea and China were examined with an eye towards understanding related changes in labour force structure, economic output, and social security provisions. Considerable attention was given to the idea that the economic outcome of demographic change is policy-dependent, and that potential demographic dividends may be diminished or even negated by static and rigid public policies.

Mr. Andrew Mason launched the discussion on the relationship between demographic transitions and demographic dividends. He noted that one important aspect of changing population age structures was that virtually all countries in the world had experienced or would experience a large increase in the share of their population concentrated in the working ages. Other things being equal, this increase in the share of the working-age population should have a positive effect on growth of per capita income and governmental tax revenues, leading to what was commonly labelled a "demographic dividend", which Mr. Mason called the *first* demographic dividend. This dividend would last for decades in many countries, but as populations continued to grow older, the share of population in the working ages would eventually stop rising and begin decline, and the falling share of the working-age population would begin to have the opposite economic effects as during the dividend period.

Mr. Mason noted that the prospect of rapid growth of the non-working older population, with likely strains on public pension and health care systems, had led to pessimistic outlooks concerning future economic performance. Rather than being a source of economic decline, however, population ageing might give rise to a *second demographic dividend*. A major economic challenge for ageing societies was to provide for old-age consumption while the economically productive proportion of the population was declining:

"With a rise of the share of the elderly population on the horizon, consumption in the future can be maintained only through the accumulation of wealth in some form. One possibility is that individuals and/or firms and governments acting on behalf of consumers accumulate capital. If invested in the domestic economy, the result will be capital deepening and more rapid growth in output per worker. If invested abroad, the result will be an increase in the current account and in national income. In either case, per capita income will grow more rapidly than it would otherwise" (Mason, in this volume).

Thus, if population ageing were to prompt a substantial increase in savings and wealth, population ageing could give rise to a second demographic dividend, that is, an enhanced possibility for economic growth. Unlike the first demographic dividend, this second dividend need not be transitory in nature. Population ageing might in theory produce a permanent increase in capital and in per capita income.

Mr. Mason presented calculations for 228 countries/areas of the world, indicating that the duration of the first demographic dividend was 30-35 years in most industrial and transitional economies, but would be considerably longer in much of Asia and Latin America, and was likely to be longer still in sub-Saharan Africa. He also constructed estimates of both the first and second dividends so as to contrast regional experiences. One key conclusion was that the demographic dividends, if fully exploited, would

have contributed between one and two percentage points to income growth during the period 1970-2000 for most regions of the world.

The concept of demographic dividends was examined more specifically for the case of Brazil by Mr. Cassio Turra. It has been noted in the literature that demographic dividends are not automatic, and that the economic impact depends to a large extent on the existence of strong institutions and policies that transform favourable changes in population age structure into economic growth. For example, weaknesses in the governance and management of pension programmes (e.g., significant tax evasion or unsustainable increases in public pension benefits) might offset much of the potential benefits of the demographic dividend. Mr. Turra examined several factors bearing upon current and future social security finances in Brazil, specifically fertility and mortality change, related changes in the labour supply, and social-security-system benefit structure and contribution rates. His findings suggested that (1) most of the projected demographic effects were due to changes in fertility; (2) increases in labour supply were important to social security support ratios, but that effects were tempered by the fact that the rapid increase in female labour force participation had been highly concentrated in the informal sector, which contributed little to social security finances; and (3) Brazil's social security system was characterized by generous benefits and low contribution rates. Between 1984 and 2002, beneficiary rates increased for all age groups, the average age at retirement declined, and taxpaying rates declined. Among men in 2002, only half of those in the labour market made contributions to the system, compared to nearly two thirds 20 years earlier. In 2004, the public pension system transferred about 12 per cent of Gross Domestic Product (GDP) from the working-age population to older persons in Brazil, even though the population aged 65 or over constituted only 6 per cent of the total population. Mr. Turra concluded that policy in Brazil had overlooked the temporary nature of the demographic transition by granting new forms of benefits without requiring commensurate contributions, and had failed to implement reforms that would encourage payment of taxes.

The Republic of Korea has often been mentioned as a prime exemplar of the demographic dividend. Mr. Hanam Phang described the steep fertility decline that occurred in Korea between 1950 and 1985, noting the emergence of delayed marriage and decreasing marital fertility rates. Due to the baby boom after the Second World War, however, the country's population increased by 150 per cent between 1950 and 2000. During the same period, the share of the population in the main working ages (15-64 years) rose from 50 per cent to more than 70 per cent of the population. Thus, overall population growth was accompanied by a large increase in the proportion of people in the working ages. The demographic transition was accompanied by a significant investment in human capital. Average educational attainment doubled from 6 to 12 years between the early 1970s and 2000, and education levels grew in tandem with the growth rate of GDP until the mid-1980s. Since then, however, the trends lines for these variables had moved in opposite directions. Mr. Phang suggested that the divergence was, in part, due to an over-supply of educated labour relative to the productive capacity and industrial structure of the economy, and possibly to a decline in the quality of college education.

Given the rapidity of demographic change in the Republic of Korea, the nation would experience one of the world's fastest rates of population ageing in the future, with the percentage aged 65 or over doubling every 20 years between 2000 and 2040. With a large increase in the old-age dependency ratio on the horizon, more attention was being given to projected changes in the labour force. There would be a large increase in the number of persons aged 50-64 during the next 20 years, and over the next 50 years, the proportion of people aged 50 or over among the total labour force was projected to rise from roughly one quarter to one half. Such ageing of the labour force would inevitably affect labour market institutions and policies. Mr. Phang noted that the country's labour force participation rate at older ages was already among the highest in OECD nations, due in large part to the prominence of the self-employed sector. This relatively high participation rate of older workers should help to alleviate the potentially negative effects of declining labour force growth in the coming decades, provided that the quality of employment

opportunities and working conditions for older workers improved.  He also considered other factors that could influence the robustness of the future labour force.  Immigration was not seen as a solution for a declining labour force, given the large numbers of immigrants that would be required and the administrative difficulties that would be involved.  More promising were prospects for an enhanced role of women in the labour force.  Currently, female labour force participation rates were very low relative to other OECD nations, in spite of fairly high and increasing levels of education.  Policy changes and incentives could significantly increase the formal economic contributions of women. In conclusion, he noted that all population projections for the Republic of Korea indicated that the country was in the midst of a twenty-year grace period, lasting through 2020, during which the vestiges of the old developing economy would disappear.  During this period the population and labour force would continue to grow, albeit slowly, but by the year 2020 the post-war baby boom cohort would largely be retired and the smaller subsequent cohorts would form the core of a new labour force.

Mr. Feng Wang returned to the discussion of demographic dividends, focussing on the case of China.  He noted that there was considerable diversity in the way in which authors have used the term "demographic dividend", and emphasized the importance of considering both productivity and consumption when attempting to quantify the notion of demographic dividend. He presented estimates of support ratios for China, where the support ratio was defined as the ratio of the effective number of workers (the population weighted by age-specific productivity weights) to the effective number of consumers (the population weighted to allow for variation in consumption by age).  The economic implications of changing population age structure were examined by considering how the support ratio would change over time, given recently observed age patterns of production and consumption in China and projected demographic changes. Between 1982 and 2000, the demographic changes were highly favourable: the support ratio increased at an average annual rate of 1.3 per cent.  The first demographic dividend was estimated to have accounted for 15 per cent of China's economic growth during the period 1982-2000.  Between 2000 and 2013, the projected support ratio would continue to rise, but at a much slower annual rate of 0.3 per cent.  Thus, China already had enjoyed most of the gains from the first demographic dividend.  The support ratio would peak in 2013 and then gradually decline through 2050.

Mr. Wang then elaborated a stylized model of China's economy in order to consider a potential second demographic dividend.  Using a framework developed by Ronald Lee and others, he examined inter-generational resource flows from workers to children and from workers to older persons.  With the relatively young age structure of China in 1982, transfers were mainly in a downward direction from workers to children.  As population ageing proceeded, downward flows to children would decline and upward flows to older persons greatly increase, implying that China must experience a rapid growth in capital stock and/or a substantial expansion of public/private transfer programmes to avoid a decline in living standards among its older population. Echoing Mr. Turra's remarks about Brazil, Mr. Wang noted that the efficacy of institutional forms of resource allocation would be paramount, especially as China addressed the complexities of new market structures.

Discussion centred on the concept and use of the term "demographic dividend".  It was noted that there was no standard, commonly accepted definition of this and related terms such as "demographic bonus" and "demographic window of opportunity". Beyond this, participants agreed that the demographic dividend represented only a potential for enhanced economic growth, which would not necessarily be realized. Policymakers and others had sometimes referred to the demographic dividend without recognizing the concomitant need for job creation. A rise in the proportion of the working-aged population might not enhance economic growth in the context of high unemployment and underemployment.  A low participation rate in formal employment and polarized socioeconomic strata could also prevent societies from benefiting from otherwise favourable changes in the age structure.  Likewise, investments in education and job creation might not be effective in economic terms unless the age groups comprising the demographic dividend were integrated into other socioeconomic institutions.

Indeed, in some settings age-structural change might be better regarded as a challenge rather than as a bonus. There could be negative aspects to a rapid rise in numbers of working-age adults, such as an increase in crime.

Several participants wondered about how the first and second demographic dividends might evolve differently depending on social context. In societies with a high prevalence of HIV/AIDS, the disease may be killing off a large portion of the "first dividend". In such conditions, there was reason to question whether a second dividend was possible. More generally, in societies that have experienced an upswing in mortality (e.g., many economies in transition in Central and Eastern Europe), excess adult mortality could undercut savings and hence the second dividend. Social policy changes also could have effects on the magnitude of any dividends. The elimination of mandatory retirement ages, for example, might be expected to increase the first dividend and perhaps to decrease the second.

It was suggested that the potential for a second demographic dividend might be limited in some parts of the world. In societies where the formal social security system continued to be a pay-as-you-go structure, the incentives and ability to accumulate wealth may be relatively weak. Participants noted that at present, the second demographic dividend was still mainly a theoretical proposition. It needed to be part of the research agenda, and researchers would need to incorporate feedback effects into the modelling process.

There was strong agreement about the usefulness of focusing on consumption and production in the analysis of the economic effects of age structure changes. Estimates that took into account actual consumption/production relationship were viewed as preferable to those based on traditional demographic dependency or support ratios. By incorporating the age variable into national income and product accounts, researchers could generate life-cycle composites of consumption and production, and use these to produce estimates of intergenerational reallocations (including savings patterns, spending on public programmes, and family support systems for children and older persons). Researchers could construct complementary historical (and projected) time series of the age profiles of production, consumption, and lifecycle deficit, and examine how these were influenced by social, economic and demographic factors. It was noted that, as little as one year previously, the use of age-specific consumption/production profiles was uncommon, but with recent analytic advances yielding realistic estimates of such profiles, their use was rapidly being extended to the analysis of lifecycle variations in many national contexts.

## D. MACRO-ECONOMIC EFFECTS OF POPULATION AGEING, INCLUDING SOCIAL SECURITY

Public pensions have become the financial lifeline of older persons in many societies. While some European public pension systems date back to the end of the 19th century, current systems are the result of changes instituted largely after the Second World War. The most obvious and, to Governments, most worrisome consequence of projected population ageing will be an increase in budgetary outlays in the form of old-age pension payments, especially in those countries where public pensions are predominately financed on a pay-as-you-go basis. Many nations, both developed and developing, are now reconsidering their existing old-age security systems, often with an eye towards introducing or strengthening private pension schemes. This session considered some of the myths and promises surrounding social security provision, with the aim of identifying systemic shortcomings particularly in the context of Latin America.

Mr. Roland Sigg began the discussion by recognizing the threat that demographic ageing poses to many social security systems around the world. However, although shifts in age structure appeared daunting, he highlighted several myths that paint a gloomier picture of population ageing than was warranted by the facts. He noted that the very definition of "old" was to some extent socially determined. One misconception was that population ageing is an ever-growing problem, when in fact the period of especially rapid population ageing in industrialized countries is linked to the ageing of the "baby boom"

cohorts born after the Second World War. By the middle of 21st century, population projections suggested that an approximate demographic balance would obtain in most industrialized countries, with the projected percentage of older persons being relatively stable for decades thereafter. While many forecasters asserted that population ageing threatened economic growth, it should be borne in mind that economic growth was driven by many factors of which demography was only one. With regard to pension plans, a common fear was that ageing would overwhelm formal social security systems. To date, however, industrial societies had been sufficiently productive to generate enough wealth to provide for their older members, and it was not unrealistic to think that continued productivity growth would be able to cover the projected rise in pension and health-care spending. Another myth was that population ageing would destroy public pay-as-you-go social security schemes, which must therefore be converted to more privatized arrangements. Mr. Sigg noted that both pay-as-you-go and funded schemes required economic growth and wealth creation in order to remain sustainable; demographic change per se was not a strong argument for shifting towards funded pension regimes. Finally, he noted the often-voiced fear that growth of the older population would inevitably mean skyrocketing health care costs and increased frailty and dependency. In fact, most older persons were neither sick nor dependent, and older persons were enjoying a longer period of healthy life.

While rejecting alarmist views about the implications of population ageing, Mr. Sigg conceded that meeting the challenges posed by ageing would require many changes in social policies and attitudes in developed countries. He noted that it was important to reverse the trend towards early retirement and noted that such a trend reversal was already emerging in some developed countries. It was also important to combat ageism, as well as to encourage increased employment levels among younger men and, especially, women. Higher levels of immigration might also bring economic benefits to some rapidly ageing societies.

Mr. Sigg noted that there were a number of pension-related issues of particular concern to middle and low-income countries. The most prominent was the coverage gap and the need to extend coverage to excluded groups. He estimated that less than 25 per cent of the world's population currently had access to adequate social security coverage, and half of the population did not enjoy any form of social protection. The level of social security coverage in a country was related to indicators such as GDP, the percentage of persons employed in agriculture, and the share of the labour force that was self-employed. Population groups most often excluded from, or poorly served by, social security systems included women, migrants, rural agricultural workers, and urban informal sector workers. Several steps were recommended to reduce these coverage shortcomings. The foremost would be to modify the contributory principle by reducing contribution rates that were unaffordable to many low-income groups. In a related vein, entitlement conditions could be amended to take into account the particular circumstances of groups such as the self-employed and migrants. Universal entitlement schemes, in spite of the obvious funding problems, were gaining increased international attention as useful mechanisms both to extend nominal coverage and to reduce poverty rates for the young as well as the old. Other necessary steps involved the tightening of links between benefits and contributions, and painful but necessary improvements in the State's capacity to collect taxes and contributions and to manage them efficiently.

Mr. Fabio Bertranou focused his remarks on ageing and systems of social protection in Latin America. Endorsing a comment made earlier, he asserted that the major problem facing social protection systems in the region was low coverage. A comparison of pension coverage among older adults in 17 Latin American countries (circa 2001) revealed that, in 11 of the 17, under 25 per cent of the population had pension coverage. This overarching problem was associated with, and might result from, several other problems: inadequate definition of priorities in terms of which population groups to target; unstable system financing due to cyclical macroeconomic trends; deficiencies in the structure and capacity of institutions vis-à-vis administrative functions; and unequal social access to various protection schemes,

which perpetuated structural inequalities in many societies.  From one perspective, then, coverage gaps in social protection schemes might have the effect of increasing inequities within society.

Mr. Bertranou noted that concrete structural reform of pension systems had occurred or been legislated in 11 Latin American nations since the early 1990s.  Several other countries, including notably Brazil, had undertaken non-structural reforms. While the specifics of each reform were related to the national context, most of the reforms had emulated the so-called Chilean model, following reforms that were instituted in that country in 1981.  Also influential were the recommendations of the World Bank, as represented in a landmark 1994 volume, *Averting the Old Age Crisis*.  The defining characteristic of the reforms had been a shift from social to individual responsibility. Mr. Bertranou argued that structural reforms in Latin America had overemphasized the private pillars of pension systems while neglecting the public pillars.  The latter constituted the basis of any social protection system for the older population who had had little or no opportunity to directly participate in the revamped systems.

Mr. Roberto Ham discussed some of the pressing needs and social risks involved with overhauling retirement pension systems.  He emphasized the basic requirements for a successful and socially responsible pension system: providing protection for the whole population; granting uniform and equitable benefits; redistributing wealth in a manner that enhanced social solidarity; offering suitable and sufficient benefits; and financial, economical and social sustainability.  At present, he argued, none of the above conditions was being met in Latin America.  Furthermore, the element of financial sustainability was the only item that was receiving significant political attention.

A large share of the "pension problem" was said to lie in the relative generosity and unevenness of pension systems, and Mr. Ham presented different worker scenarios to illustrate this problem.  He used calculations of average salary contributions, retirement ages, and estimates of life expectancy for male Mexican workers and their spouses to determine the difference between the number of monthly salaries contributed to the pension system and the number of monthly benefits that were received in various programmes that were available to certain groups of workers.  In one scenario, this exercise suggested that 9 months of contribution could translate into 593 months of pension payments.  Mr. Ham contended that many of today's defined benefit plans were very expensive commodities that pensioners had never paid for in real terms, and further, that there were certain pension plans providing extremely generous privileges and payments.  When considering the conversion from defined benefit to defined contribution schemes, however, it was important to remember that all schemes represented a sharing of future production between workers and pensioners.  Hence it was critical to overhaul the excessive privileges that some plans provided, to integrate true savings incentives into pension systems, and to involve the younger generations in the current pension debate.

In the discussion, participants underscored that some proponents of structural pension reform were making huge assumptions about the level of worker knowledge with regard to contributions and benefits.  It was argued that the majority of workers did not understand the intricacies of individual accounts (including different investment options), had little idea of their life expectancy at retirement, and were ill-informed about the rationale for moving away from defined benefit programmes.

It was noted that there was currently a proliferation of different pension systems.  Ten years previously, the World Bank formulated its view of global pension reform based on three pillars: (1) a mandated, unfunded and publicly managed defined benefit system; (2) a mandated, funded, and privately managed defined-contribution scheme; and (3) voluntary personal retirement savings.  Many organizations and countries currently embraced the concept of a fourth pillar that could include non-traditional sources of retirement income such as work well beyond the "normal" retirement age, tapping into home equity, and income-protection and wealth-transfer mechanisms through products such as life insurance and long-term care insurance.  The World Bank had more recently conceptualized a five-pillar

system including a basic (zero) pillar to address issues of extreme poverty, and a non-financial fourth pillar to consider social policy concerns such as family support, access to health care, and housing.

There was some debate about using universal entitlements to help close the pension coverage gap. The effect of a universal pension option might be to undermine the second demographic dividend. It was noted, however, that proponents of universal schemes generally advocated very modest amounts of per capita assistance that would not be expected to have a major disincentive effect on saving for retirement. A means-tested minimum pension, on the other hand, could have a greater negative effect on incentives to save.

Participants raised several issues related to the movement away from defined-benefit plans and towards defined-contribution structures. It was mentioned that in Japan, public faith in the sustainability of the defined-benefit system had eroded to the point where many persons evaded their payments. Thus, one aim of define-contribution schemes was to reinstill confidence. It was noted that changes in emphases within systems could take many years to become politically and publicly acceptable; Sweden's recent pension modifications were the result of 10 years of debate. Concern was also expressed about the high administrative costs that often accompany the introduction of individual accounts.

Discussion also focused on policies meant to moderate observed or projected declines in the numbers of workers in various countries. It was noted that there had been a reversal of or stagnation in the decades-long decrease in labour force participation at older ages in numerous OECD nations. Whether an increase in the actual average age of retirement could be attributed to specific policy decisions was difficult to determine. An important policy consideration was to design an environment where most people would work up to the "normal" legal retirement age. This could have a larger impact than urging people to continue working after that age. With regard to policy levers intended to affect fertility, some participants considered that without reformulated family policies, birth rates would remain very low or continue to decline. Others argued that that previous policies aimed at increasing birth rates had largely been ineffective.

### E. MACRO-ECONOMIC EFFECTS OF LONGER LIFE, AND IMPACT OF AGE STRUCTURAL CHANGES ON THE HEALTH SYSTEM

As the average length of life increases and the number and proportion of older persons grow in most societies, a central question is whether population ageing will be accompanied by better health, an improved quality of life, and sufficient social and economic resources. The answer to this question lies partly in the ability of families and communities, as well as modern social, economic, political, and health service delivery systems, to provide optimal support to older persons. Participants contrasted the impressive achievements in some parts of the world with different social trajectories elsewhere, and discussed the development of new data sources and methodologies that were beginning to yield better information about health outcomes.

Mr. Naohiro Ogawa opened the session by observing that, in 2005, Japan had joined Italy as the nation with the highest percentage of population aged 65 or older. While the rapid ageing of the population was continuing, total population size was expected to start declining soon. Mr. Ogawa described the evolution of Japan's social security system, which encompassed both old-age pension schemes and medical plans, including a long-term care insurance scheme. Whereas pension benefits and medical benefits accounted for 22 per cent and 57 per cent, respectively, of total social security expenditures in 1965, by 2002 the figures were 53 per cent and 31 per cent, respectively. When Japan's pensions schemes were first established, they were organized on the principle of reserve financing. Between 1965 and 2002, the amount of reserved funds for all public pension schemes grew from near zero to roughly one third of GDP. Mr. Ogawa noted that these accumulated funds could be considered as

part of the second demographic dividend that was discussed earlier.  In spite of this capital accumulation, the combination of changes in the social security system and rapid population ageing had required the Government to shift away from reserve financing towards pay-as-you-go financing using general tax revenues.  As a result, Japan's public pension schemes had an increasing transfer component, raising questions of intergenerational equity and prompting further policy changes to make Japan's system more transparent to younger workers.

The absolute amount of financial resources allocated to medical care plans also had risen continuously, and this was reflected in improved population health and the world's highest average life expectancy.  While Japan's proportion of GDP allocated to medical services was still low by OECD standards, costs had escalated, in part because of the unusually high use of hospitalization.  Mr. Ogawa discussed empirical work suggesting two promising options to help offset the rising pension and health system costs.  Using longitudinal survey data to estimate trends in healthy life expectancy, researchers projected that the number of healthy or active Japanese older persons would increase from 19 million in 2000 to 30 million in 2025.  Better utilization of older workers, in conjunction with an extension of the retirement age, was one option. Another was making more effective use of financial and non-financial wealth of older persons.  Mr. Ogawa and colleagues estimated that the average 60-year-old owned assets of more than 50 million yen (US $500,000), not including the value of private pensions. With the dwindling attractiveness of real estate as an investment, older Japanese needed better information about alternative investment strategies that would not only enhance individual financial well-being but also would benefit the national economy.

Ms. Etelka Daroczi considered the health impact of population ageing in the economies in transition of Europe. She noted that many of those countries had experienced not one but two major socio-political transitions in a period of 75 years or less.  Prior to the transitions of the late 1980s and early 1990s, many regimes restricted access to information regarding public health, working conditions and worker health.  Hence, relatively few detailed studies of population health were available, and information on survival probabilities was less developed and less reliable than needed for policy purposes.  There clearly were spectacular improvements in mortality, especially at younger ages, during the two or three decades following the Second World War.  However, by the mid-1970s (in some cases the mid-1960s) the trend towards lower mortality had ceased or reversed in many transition countries.

A second wave of mortality increase, or in some cases stagnation, accompanied the transition period around 1990.  More recently the situation had improved in much of Northern and Central Europe, but not in most of the successor States of the former U.S.S.R.  Increasing middle-age mortality, particularly among men, was the major factor in halting the progress of overall life expectancy.  For the older population in transition countries, the loss of former rights and privileges with regard to health care had had a deleterious effect.

Ms. Mary McEniry presented results on health status of older persons based on a recent, first-of-its-kind cross-national study in seven Latin America and the Caribbean countries, the Survey on Health and Well-Being of Older Persons (SABE). Self-reported health status showed large inter-country variability, but the patterns by age and sex were similar to those found in other parts of the world.  Women consistently reported more health problems and poorer health status than did men. The proportion of older persons with at least one limitation in activities of daily living (ADLs, which include bathing, eating, toileting, walking, etc.) or instrumental activities of daily living (IADLs, e.g., shopping, managing money, using transportation) was also strongly related to age and gender.  The proportion with difficulty in carrying out IADLs also varied significantly across the seven survey sites, although the prevalence of difficulty with ADLs did not.  Self-reported health was only moderately related to ADLs and IADLs.

A comparison of SABE data with information from the United States Health and Retirement Study showed that the prevalence of at least one ADL was considerably higher in the United States, at least among women, but that the opposite was true for IADLs. SABE respondents reported lower average numbers of chronic conditions, but levels of diabetes were as high if not higher than found in the United States. Diabetes prevalence was highest in Barbados and Mexico. Levels of obesity were also strikingly high in several of the SABE samples, reaching or exceeding 30 per cent in Chile, Mexico and Uruguay.

Ms. McEniry observed that the relationship between health conditions in early and later life was the focus of much current research in developed countries. SABE data offered the opportunity to explore this issue in a developing-country context. Birth cohorts reaching age 60 after 1990 in Latin America and the Caribbean had received medical interventions that greatly increased their probability of survival through childhood, but frequently in the absence of significant improvements in standards of living. It was hypothesized that the exposure to the disease regimes that prevailed many years ago might have long-lasting deleterious effects on health of those entering old age now and during the next decades. Analyses of SABE data offered some support for this hypothesis insofar as the regional health profile of older persons showed a high prevalence of chronic disease and disability. However, the data provided only weak evidence of a relationship between individuals' early-life conditions and prevalence of diabetes in later life. Ms. McEniry concluded that definitive answers would require better indicators of early-life conditions, preferably from longitudinal cohort data. She also described an experimental use of so-called Waaler surfaces to infer expected relative mortality risks for persons according to height and weight. The obese sub-samples in SABE countries tended to have weight/height values that were associated, in the reference population, with higher mortality risk. Comparing across countries, both obese and non-obese older persons in Latin American and Caribbean countries had average height/weight values associated with higher mortality risk than did their counterparts in the United States.

The impact of HIV/AIDS and antiretroviral treatment (ART) on population age structure was considered by Mr. Jacques van Zuydam. He outlined the situation in the South Africa, where the older population was growing ever more rapidly, while the number of orphans was also rapidly rising. Current estimates suggested that 600,000 South African children had lost a mother due to AIDS. Prior population projections in South Africa and many other countries had focused on the impact of AIDS deaths on population size and age structure, typically by creating mortality scenarios that included and excluded deaths due to AIDS. Mr. Van Zuydam described a set of population projections that attempted to gauge the potential impact of ART on population size, life expectancy, and different illnesses. When properly used, ART was expected to extend a person's life expectancy by 10-15 years on average. In the projections, this would imply 450,000 fewer AIDS deaths in the year 2010 than expected in the absence of ART. For the population as a whole, ART could reverse the downward trend in average life expectancy by the end of the present decade, and produce an average life expectancy 10 years higher than in the non-ART scenario. Because the impact of HIV/AIDS was greater among females than males, ART could benefit women especially. Other socio-demographic impacts of providing ART could also be anticipated, including: (1) a growing number of persons living with chronic AIDS and AIDS-related complications, implying greater care and support needs for chronically ill persons and children in affected households; (2) urban/rural differences in effectiveness early in the implementation of ART provision, probably favouring urban areas during the initial rollout stages; (3) the need for welfare services to focus on the nutritional needs that must be met to ensure ART effectiveness; and (4) a need for income support for increased numbers of households depending on wage earners whose earning ability was diminished by chronic AIDS-related illness. The South African Government was considering bolstering a number of programmes for income support, including child support grants, care dependency grants, disability grants, and expanded poverty relief.

In the general discussion, participants considered several aspects of Government policy in Japan in the face of rapid population ageing. Despite projections of labour shortages, only 1 per cent of current

workers were foreign-born.  Japan had experienced decades of relatively restrictive immigration policy, but more liberal rules had recently been adopted with respect to labour migrants, especially in certain occupational categories (nurses, caregivers and lawyers).  Also discussed were the implications of high real estate ownership among Japanese older individuals, and whether this might eventually result in a major sell-off of these assets.  It was noted that one response had been an increasing prevalence of reverse mortgages. Another policy change had been the introduction of long-term care insurance.  Public demand for such insurance had been stronger than anticipated, and the high take-up rate might make this option more costly for the Government than originally envisioned.

Issues of family support and intergenerational transfers were raised in the context of Japan and Eastern Europe.  In Eastern Europe, there were few long-term policies regarding family support.  Japan had a long tradition of support flowing from married adult children to older parents, largely through co-residence.  However, more than 20 million single men and women now lived with their parents, and in many such cases co-residence represented support flowing from older to younger generations.

Participants recognized the desirability (and also the difficulty) of incorporating additional variables into projections of health care demands and costs.  It would be useful to include variables that might capture such factors as likely technological change, shifting balances in age-related health care demand (e.g., maternity services), and the impact of service usage (e.g., number of doctor visits).  It would also be desirable to compare countries and health systems in terms of qualitative outcomes rather than, or in addition to, health costs.  In particular, what was the impact in terms of patient outcomes and quality of care of the enormous international differences in doctor salaries, use of certain machinery, and other factors driving costs?

With regard to cross-national surveys, it was noted that international comparisons of self-reported health were problematic. Participants also noted the seeming paradox between reported health and longevity, in which men consistently reported better health than women, but consistently had higher mortality rates and lower life expectancy. This could be related to the higher prevalence of certain chronic conditions, such as arthritis, among women. In light of earlier remarks about the value of a multidisciplinary approach, it was suggested that demographic and health surveys collect more and better data on biomarkers as one means of improving understanding of health differences and trends.  Another desirable step in cross-national survey design would be to expand sample size to permit a systematic investigation of ethnic differences across societies.

### F. FOCUS ON MEXICO: TRANSFORMATIONS IN DEMOGRAPHIC STRUCTURE, INTERGENERATIONAL RELATIONS AND POLICY RESPONSES

Mexico is experiencing an interrelated set of transitions in the demographic, economic, health, and socio-political realms.  This session highlighted the implications of ongoing rapid changes with regard to fertility, mortality, epidemiology and migration.  Participants described and discussed several novel approaches that Mexico has taken in response to such changes, ranging from the projection of health service demand to changes to the pension system to the radical restructuring of the national health delivery system.

Mr. Virgilio Partida presented an overview of the demographic transition in Mexico.  The combination of high birth rates and declining death rates after the 1920s led to a steadily increasing rate of natural increase, which peaked at an annual rate of 3.5 per cent around 1965.  Since then, fertility declines had outpaced mortality declines.  In 2000, more than 70 per cent of women of reproductive age were using some form of contraception, the total fertility rate was approaching replacement level and the natural rate of population increase had declined to 1.3 per cent.  Life expectancy at birth more than doubled between 1920 and 2000, reaching 72 years for males and 77 years for females early in the

twenty-first century.  Mr. Partida attributed the rapid decline in mortality in the 1900s primarily to the expansion of the educational sector and improvements in public health, particularly sanitation.  The extension of health services also was important, as was the creation of the Mexican Social Security Institute in the early 1940s. International migration became significant after 1960, and net out-migration had reduced the population growth rate by approximately 0.4 per cent per year during the past 40 years. Fertility declines had resulted in a notable shrinking of the base of the population age-pyramid by the year 2000 relative to previous decades, and projections of age structure implied a fairly rapid transformation from a pyramid to a pillar shape as the population aged.

In considering the potential for a demographic bonus arising from changing population age structures, Mr. Partida emphasized the importance of population momentum, which could be analyzed by tracking changes in age-specific population growth rates, along the lines previously suggested by demographer Ian Pool. Mr. Partida noted that during the first 15 years of the present century, Mexico would need to create more than 800,000 jobs annually to accommodate the growth of the labour force.  Between 2015 and 2030, the labour force would continue to grow by roughly 500,000 persons per year. As the working-age population "age waves" moved through time, however, the extent of needed job creation would decline, and would likely turn negative in the years after 2040.  Whether the enormous labour force growth over the next 20 years proved to be a window of opportunity for Mexico would depend on investments in education, on the creation of productive employment and on bringing more workers into the formal sector.

Ms. Felicia Knaul discussed current work on projecting the demands for and costs of health care in Mexico, using social-security cost data in combination with CONAPO population projections and economic data from the World Bank.  This work was driven by recognition of the rapid epidemiological transition in Mexico during the past 30 years, and the heightened demand for hospitalization and outpatient care for persons aged 65 or older. Data on per capita cost structure from the Mexican Social Security Institute showed a pronounced rise with age after age 60, and projections of health expenditures as a percentage of GDP followed an upward trajectory similar to that seen in other countries of the Americas.

There were clear regional differences in mortality in Mexico, with lower rates in the north, intermediate rates in the centre of the country, and relatively high rates in the south.  This "epidemiological backlog" was closely correlated with the percentage of population with insurance coverage.  Data on insurance coverage by quintiles of expenditure per capita suggested that current coverage in Mexico was quite regressive.

Estimates using OECD data suggested that the most effective health systems were not necessarily the most costly, suggesting that countries such as Mexico currently had an opportunity to invest in a more efficient health system.  The three primary challenges to a more effective health system in Mexico were equity, quality and financial protection.  Ms. Knaul focused on the latter, and described a major reform undertaken in 2003.  Changes in the General Health Law resulted in the creation of the Social Protection System in Health. A central aim of this reform was to prevent catastrophic health expenses for uninsured individuals.

Mr. Emilio José García began his presentation by noting that the epidemiologic transition in Latin America had not followed the classical model first elaborated by Abdel Omran in 1971.  In the twentieth century, improvements in standards of living were not uniform within populations, and this had given rise to a multiplicity of transition variants.  And, while the prevalence of chronic diseases had risen as expected with changing population age structures, infectious diseases were still an important component of many national profiles in the region. Looking specifically at disability in Mexico, Mr. García noted that

the increases in overall life expectancy had not been accompanied by similar increases in healthy life expectancy.

Drawing on data from several sources (among them the Mexican Health and Aging Study and the SABE results described by Ms. McEniry), he explained that 6 per cent of Mexicans aged 65 or over were considered severely disabled as measured by the ability to perform activities of daily living, and nearly 13 per cent needed assistance with instrumental activities of daily living. Survey data showed that disability was related to age, sex, and access to health services, but was not related to place of residence. Most physical support to older disabled individuals was provided by women, and most economic support was provided by men. The prevalence of chronic diseases and disabilities among older persons was estimated to be higher in Mexico than in industrialized countries. Data from the SABE implied an inverse correlation between the level of education and levels of disability, depression and diabetes. Mr. García also described the development of a new index designed to indicate the biological age of older persons, as opposed to relying on chronological age as a major descriptor and predictor. The index was based on the existence of selected chronic health conditions and health behaviours, as well as self-perception of health. Initial applications of this index suggested that biological age was more closely linked to disability and mortality than was chronological age.

The characteristics and impact of Mexico's Seguro Popular were described by Mr. Rafael Lozano. Seguro Popular was the operative arm of the Social Protection System in Health, implemented in January 2004 as the result of a major structural reform of the national health system. One of the goals of reform was to provide affordable care to the entire population, especially those persons with limited financial resources. Towards this end, the objective of Seguro Popular was to extend health insurance to all people who were not covered by health insurance, and to do so within seven years. The programme was voluntary, and was aimed at all uncovered persons regardless of their ability to pay. Eligibility did not depend on pre-existing health conditions of those seeking to enrol. Programme financing consisted of three parts: a social share provided by the federal Government; a solidarity share based on contributions from both federal and state Governments; and a family share based on income level.

Seguro Popular had had a demonstrable impact since its inception. Current coverage exceeded 1.7 million families, more than 90 per cent of whose household income was in the lowest two deciles of the overall population income distribution. The age structure of enrolees was predominantly young, resembling the age structure of the non-insured population in general. Looking at programme outlays for older individuals (age 60 or over), the highest expenditures were for diabetes mellitus and chronic obstructive pulmonary disease. Mr. Lozano noted that since the establishment of Seguro Popular there had been a marked decrease in the proportion of households experiencing catastrophic health expenditures.

The discussion of social security and population ageing in Mexico was taken further by Mr. Alberto Valencia, who presented an analysis of individual savings accounts for retirement that constituted the mandatory component of many social security systems, including the Instituto Mexicano de Seguridad Social (IMSS) in Mexico. He began by noting that, as of 2004, about 16 million workers participated in a pension plan, but that more than 26 million workers (63 per cent of the labour force) did not. He discussed several problems with the Mexican system, including low coverage, low contribution rates by workers, and high administration fees. For workers earning a 5 per cent rate of return on contributions, and paying a 1.7 per cent administrative fee on contributions, the real rate of return on their contributions was negative for about 12 years, and then rose gradually to about 3.8 per cent after a period of 40 years.

Mr. Valencia explained that the value of individual accounts depended basically on three factors: the total amount of regular contributions; the length of time during which a worker made contributions; and the rate of return. With regard to the duration of contributions, he introduced an important concept called

the density of contributions, or the proportion of one's total working life during which retirement contributions were made.  Because available Mexican statistics did not allow an empirical calculation of this measure, he constructed estimates for Mexico based on survey data from Chile's Undersecretary of Social Prevision. By explicitly including consideration of contribution density, and combining this information with IMSS data on the distribution of workers by salary level, Mr. Valencia generated a model to assess the importance of individual savings outcomes for current IMSS-covered workers.  The key implication of this model was that, for those workers making between one and five times the minimum wage and who survived to age 65, roughly two-thirds would have insufficient resources for their retirement.  The figures for men and women were 60 per cent and 77 per cent, respectively.  Thus it seemed likely that many future retirees would require significant subsidies to compensate for the projected deficits in individual savings.  Mr. Valencia concluded that it was necessary for the Government to introduce major revisions of the retirement savings system that would reduce foreseeable individual shortfalls and address gender inequalities within the system.

In the discussion, participants were interested in the economic aspects of international migration, including levels of repatriated earnings and whether these were consumed or invested.  Such earnings might be construed as a positive outcome of age-structural changes, i.e., a part of the demographic dividend.  In the case of Mexico, it was estimated that approximately 1.5 million households received remittances from the United States.  It was believed that remittances were used primarily for consumption rather than investment, but the full impact, including indirect effects, was difficult to assess.

With regard to Mexico's Seguro Popular, it was noted that a similar non-contributory scheme existed in Costa Rica.  Participants wondered about the mechanisms being used to evaluate Mexico's programme, and how the programme's impact on health and mortality might be measured. The discussion pointed out that it was still too early to see visible effects on general health conditions and mortality, but that the programme design included a monitoring component that would eventually yield evaluative results.  There was interest in the quantity and quality of services offered under Seguro Popular relative to other health insurance plans, and whether there was enough existing health infrastructure to handle large numbers of new enrolees.  The programme offered incentives to expand and improve services, and would evolve in response to demand.   It was important to keep in mind that one aim of Seguro Popular was to reduce the use of services in the long run, through emphasis on preventive behaviours early in life.

## G. Intergenerational transfers in the context of age structural changes

The demographic forces that generate population ageing also affect the structure of the family and the social arrangements for supporting older persons.  Mortality decline means that the number of living generations within families increases, and lower fertility eventually means that care obligations are concentrated among fewer kin. The division of labour between public and family resource-transfer systems generally rests upon long-established social conventions, and is not necessarily motivated by concerns for efficiency or specialized competency.  Interactions between the two broad types of transfers systems—public and private—define many of the more important policy issues for an ageing society. This session examined some of the global diversity in living arrangements and transfer patterns, and considered ways of anticipating and measuring changes in system parameters.

South-eastern Asia contains some of the most rapidly ageing nations in the developing world.  In the face of sharply declining fertility throughout the region, Governments are being forced to recognize the implications of changing age structure for both younger and older citizens.  Ms. Mary Beth Weinberger presented work done by Ms. Angelique Chan on changes in formal and informal intergenerational support systems in South-eastern Asia. It was noted that previous research in many countries around the world showed a decline in multi-generational living arrangements, due not only to fertility change but also to migration, increased joint survival of spouses and changing preferences of younger generations. Data for

selected South-eastern Asian nations, however, continued to show high levels of co-residence: 68-88 per cent of older persons living with at least one child. Most Governments in the region viewed co-residence as the pre-eminent form of support, and some (e.g., Malaysia and Singapore) provided tax incentives to children living with older parents. Ms. Chan noted that, while information on living arrangements was relevant, more detailed information was needed to determine intergenerational transfer flows within families. As had been elaborated by demographer Albert Hermalin, it was important to understand the functional aspects of intergenerational dynamics rather than simply their form. Survey data for South-eastern data showed that, while in most countries a preponderance of older persons received monetary transfers and material goods, significant proportions of older people also provided money and goods to their children.

Formal public or private support appeared to be much less prominent than family support in those South-eastern Asian nations with available information. Survey data indicated that typically under 10 per cent of older adults had pensions as a major source of income. Ms. Chan characterized formal support for the current generation of older adults as insufficient and ineffective, although several Governments in the region were developing more cohesive policies on formal support mechanisms and were grappling with questions about the effectiveness of legislating family care requirements. A major concern was whether the provision of formal support served to "crowd out" family support. With regard to policy considerations, several areas were emphasized: the need to institute or enhance mechanisms that enabled families to support older members; a recognition of the burden on the growing number of middle-aged children supporting both an older and a younger generation; a focus on the emotional, financial and time constraints faced by caregivers; and the need for programmes that would allow older persons to remain economically and physically independent, thereby reducing stress on the family.

Ms. Gunhild Hagestad offered micro- and macro-perspectives on intergenerational relations and transfers in Europe. Because Europe has had a long history of population ageing, researchers have had many opportunities for exploring family consequences of dramatic social change, for contrasting families under different demographic and political regimes, and for comparing transfer patterns and mechanisms in different policy contexts. Ms. Hagestad observed that the term "generation" embraced three different concepts: (1) membership in an age category or age group; (2) a cohort anchored in historical time; and (3) a location in a vertical family lineage. Likewise, the term "transfers" referred to three broad types: (1) material transfers, such as money, food, housing, and physical objects; (2) in-kind transfers, including care, emotional support, and practical help; and (3) symbolic transfers, such as knowledge and skills. All of these transfer types could move both up and down generational lines, and might have both private and public components.

Ms. Hagestad noted that family structures in ageing societies were characterized by several factors, including verticalization (4 or 5 generations, labelled by Bengston as the "beanpole" family), co-longevity of members, and increased top-heaviness with the decline in the relative number of younger members. Data from recent cross-national studies in Europe showed that the proportion of persons aged 50-59 with at least one living parent ranged from 47 per cent to 62 per cent in ten nations, and at least one in seven people aged 60-69 also had at least one living parent. Data from another study showed that more than 30 per cent of adults aged 30-39 in Norway, England, Germany, and Spain had living grandparents. Among grandparents aged 50-59, between 11 per cent and 20 per cent also had a living parent (except in Spain; 7 per cent).

Ms. Hagestad introduced a multigenerational model of parent-child relations, with supporting data that showed substantial amounts of care and practical and emotional support flowing from older to younger generations. Recent survey data revealed that high percentages (50-80 per cent) of grandmothers helped care for grandchildren. Other data on reported transfers and potential support in Europe offered little evidence of an extensive burden on middle generations (the "squeeze" phenomenon), because the

middle generation's children were usually grown by the time older parents needed extensive care.However, there was a need for qualitative data to shed further light on this dynamic. Ms. Hagestad also considered the issue of crowding out of family support, which was manifested in the fear of many policymakers that family caregivers would stop providing services if publicly supported services were available. The "care substitution" hypothesis would predict that the amount of informal care received by disabled older persons would decrease when state or community care was increased. Ms. Hagestad pointed to several lines of evidence suggesting that social support services did not crowd out family care. In at least some settings, family and formal support services appeared to complement rather than substitute for one another, and availability of both family and formal services allowed those with the greatest need to receive better care. Some authors had even argued that the availability of social services had had the effect of "crowding in" family care, by permitting family providers to focus on the types of support, including affective support, that they were best qualified to provide. She also described several current research emphases in Europe, including investigations of the extent to which family transfers served a socially redistributive function, how intergenerational transfer patterns differed across income and wealth categories, and how the nature and flows of transfers were affected by major political changes such as those experienced by countries in transition. A final point of concern involved the social integration of childless people, an issue that would be of growing importance in the face of persistent low fertility.

Mr. Jorge Bravo presented profiles of consumption and labour income that illustrated the size, broad shape, and net direction of intergenerational reallocations in Chile, Mexico and El Salvador. These profiles were constructed using consumption and income data from household consumption/budget surveys in the three countries. The estimates suggested that there were substantial intergenerational transfers in these countries, representing between 36 per cent and 42 per cent of total labour income and between 30 per cent and 39 per cent of aggregate consumption. The data confirmed the expected positive relationship between younger population age structures and a relatively greater volume of transfers moving in the direction of younger dependents. A predominance of such "downward" transfers was to be expected in countries with a relatively young population and welfare systems for the old that were not highly developed. As populations aged, the aggregate profiles of consumption and labour income were expected to shift towards higher ages.

Mr. Bravo also reviewed available evidence on studies of intergenerational transfers and generational accounting in Latin America, noting that there had been an increasing awareness on the part of analysts and policymakers of the usefulness of age-specific measures of public spending and transfers. To date, though, only a few countries in the region had examined the distributive effects of taxes and public spending according to the age of the target groups. One such study in Mexico concluded that net transfers, both public and private, had reduced inequality in recent years. The most progressive programmes were said to be pre-school and primary school education programmes and broadly based health programmes. On the other hand, spending on state pensions and institutional health schemes tended to be regressive. Country analyses using the generational accounts procedure (measuring the present value of taxes paid over a cohort's lifetime net of benefits received from the public sector) suggested that significant intergenerational imbalances existed in Argentina and Brazil, due in part to the degree of population ageing but also to inherent insolvency in some aspects of national pension programmes. Conversely, in Mexico and Chile there was evidence that the overall fiscal position and transfer programmes were intergenerationally balanced and sustainable over time.

Mr. Andrew Mason presented highlights of ongoing collaborative work on National Transfer Accounts. The project aimed to measure at the aggregate level the reallocations of economic resources from one age group to another, using comparable standards in various countries. These transfer accounts, in addition to illuminating the age patterns of reallocations, would also quantify types of allocation according to age, including private inter-vivos transfers, bequests, public transfers and asset

reallocations[1]. Several of the participants at the present meeting were involved in this work. The age profiles of production and consumption discussed in several of the contributed papers were an important part of the full accounting system.

In the discussion, several participants pointed out the need for rigour in the analysis of income/consumption profiles. The reliability of income data, for example, was a major issue that affected the results. It would be useful to include information on in-kind transfers, both for consumption profiles and for poverty measurement. There was a call for enhanced research on the macro-economic demography of intergenerational transfers. The ongoing work on the National Transfer Accounts had the potential to explicate how such transfers related to the potential second demographic dividend that was discussed during the current Meeting.

Participants also returned to the question of whether public care tended to crowd out private family care of older persons. It was noted that most European countries, as well as many Asian nations, had family responsibility laws that included legal requirements for the care of older members. For example, Germany was experimenting with a cash voucher system for long-term care, but family members were expected to remain involved with care regimens. Some countries currently had pension tax credits for both child care and care of older persons. In some Northern European nations, long-term care had come to be seen as a public (State) responsibility. There was debate about the quality of care in such contexts, particularly with regard to psychiatric treatment and dementia care.

The phenomenon of persistent low fertility led some participants to wonder about its implications for future family structure. A rise in childlessness could eventually reduce the average number of living generations within vertically integrated families. Despite improvements in mortality, delayed marriage and childbearing could mean that fewer people would live to become great-grandparents. Even so, few people would predict the demise of the four-generation family.

## H. CONCLUSIONS

The rapporteur, Mr. Kinsella, reviewed the main points emerging from the presentations and discussion, focusing on new developments and next steps. He noted that the meeting had highlighted the great international variation in population age structures. Developed countries began the demographic transition earliest and currently had relatively high and increasing proportions of older persons. In contrast, most developing countries started the transition to lower fertility in the 1960s or later and still had relatively young age structures. However, those countries would undergo a faster process of ageing than had their more developed counterparts. The meeting had discussed the social and economic implications of the worldwide process of population ageing, including regional specificities as well as more general aspects of the ageing process such as the rising proportion of women and the vertical extension of families brought about by increasing longevity.

In the past, although many analysts noted that demographic dependency ratios provided only a crude indicator of the dependency burden within a society, the scarcity of comparable data on age patterns of production and consumption had generally meant that international comparisons relied purely on demographic dependency ratios. Thus, it was encouraging that authors at the meeting had presented new estimates of age patterns of production and consumption for a range of societies at different stages of economic development. A firmer empirical basis was developing for understanding the economic

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[1] See Mason and others (2005), *Population Aging and Intergenerational Transfers: Introducing Age into National Accounts,* working paper, National Transfer Accounts Database. Available at
http://www.schemearts.com/proj/nta/web/nta/show/Working%20Papers)

implications of changing population age structures, and ongoing work made it likely that there would be further progress in this regard.

Participants stressed that economic outcomes of demographic change depended on the policy environment. The demographic dividend was agreed to represent only a potential for enhanced economic growth, which might be diminished or even negated by unfavourable policies. In countries that had realized the most benefit from the demographic dividend, for instance, the demographic transition had invariably been accompanied by significant investments in human capital. On the other hand, a rise in the proportion of the working-aged population might not enhance economic growth in the context of high unemployment and underemployment. Indeed, a rise in the number and proportion of job seekers might at times be viewed more as a challenge for a society than as a bonus.

Conversely, rather than serving as a drag on the economy, population ageing might represent a potential for enhanced economic growth through increased investment. Participants at the meeting discussed the possibility that population ageing would prompt a substantial increase in savings and wealth, giving rise to a second and more enduring demographic dividend. However, further research on this concept was required; the "second dividend" remained a theoretical proposition. Better data on age patterns of production, consumption, savings and investment would help advance the investigation of these ideas. Projects such as the one on National Transfer Accounts held out promise in this regard.

There was a consensus that population ageing would inevitably affect labour market institutions and policies. In general, immigration was not seen as a solution for a declining labour force in developed countries, though migration might play a significant role in some settings. Promising responses discussed at the meeting included an enhanced role of women in the labour market and steps that would encourage more people to work up to the "normal" legal retirement age.

Although the impact of ageing on social security was already being felt in many developed countries where pension systems were reaching maturity, the most pressing issue in developing countries was to extend coverage to excluded population groups, mainly women, migrants, rural agricultural workers and urban informal sector workers. In many recently reformed pension systems in Latin America, coverage and contribution rates remained low and administrative fees were high. Estimates of intergenerational reallocations in selected countries implied substantial intergenerational transfers, both public and private. Country analyses using generational accounting procedures suggested that significant intergenerational imbalances existed in some countries, such as Argentina and Brazil.

Funding of health care for an ageing population was also a serious policy challenge. The Seguro Popular, the operative arm of the Social Protection System in Health of Mexico, was an example of a novel approach to the health challenges brought by the changing age structure in developing countries. The programme aimed at extending health insurance to all people not already covered, including older persons. Following its inception, the proportion of households experiencing catastrophic health expenditures had decreased markedly.

One impediment to informed policy on health care was that reliable and comparable information about health status of older persons in developing countries remained scarce. There had, however, been some recent progress in this regard, as was exemplified by the results for seven Latin American and Caribbean countries presented at the meeting. Health assessments had often been limited to qualitative ratings of self-reported health, for which international comparisons were problematic. Collection of data on biomarkers in conjunction with health surveys represented one promising means of improving understanding of health differences and trends.

It was clear that informal support transfers were frequent between family members of different generations, particularly—although by no means exclusively—in developing countries. Although studies had found a preponderance of older persons receiving monetary transfers and material goods from their children, significant proportions of older people, especially the "younger-old", also provided material support to their children. They also provided substantial amounts of care to grandchildren as well as other practical and emotional support.

A major concern for policy makers was whether the provision of formal support served to "crowd out" rather than to complement family support for those needing assistance. The issues were complex, since there were many dimensions of "care", which differed in degree of substitutability between family and formal services.  There was evidence from both developed and developing countries that family members continued to provide assistance even when formal assistance was available, and needy older persons were likely to benefit from having both types of assistance. A full consideration of the issues also required attention to the needs of caregivers and the costs to them of providing care, including opportunity costs. Programmes allowing older persons to remain economically and physically independent would also reduce stress on the family. Special attention should be given to the social integration and support of older people who could not count on family support, in particular the childless, who were expected to be of growing importance in the face of persistent low fertility.

# INFORMATION PAPERS

# AGENDA AND ORGANIZATION OF WORK

**Wednesday, 31 August 2005**

    I.       Opening of the Meeting

    II.      World population ageing

    III.     The demographic dividend

**Thursday, 1 September 2005**

    IV.     Macro effects of population ageing, including social security

    V.      Macro-economic effects of longer life, and impact of age structural changes on the health system

**Friday, 2 September 2005**

    VI.     Focus on Mexico: transformations in demographic structure, intergenerational relations and policy responses

    VII.    Intergenerational transfers in the context of age structural changes

    VIII.   Summary and conclusions

    IX.     Closing of the Meeting

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# PART TWO
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# THE DIVERSITY OF CHANGING POPULATION AGE STRUCTURES IN THE WORLD

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The world population is in the midst of an unprecedented transformation brought about by the transition from a regime of high mortality and high fertility to one of low mortality and low fertility. This demographic transition is responsible for the rapid and accelerating growth that the world population experienced in the twentieth century as well as for the slowing down of that growth and for the changes in the age distribution associated with those developments. Indeed, the demographic transition starts usually with a reduction of mortality, which results in longer survival, particularly of children who typically benefit the most from the reduction of the very high risks of death that they experience when mortality is high. As a consequence population growth accelerates and the proportion of children in the population increases, leading to a rejuvenation of the population's age structure. Partly in response to these changes, fertility begins to decrease because parents realize that they can have fewer children to ensure the survival of the number they desire. Sustained reductions of fertility slow down population growth and produce eventually reductions of the proportion of children in the population thus triggering the process of population ageing. As time elapses, if the reductions of fertility and mortality continue, they reinforce the ageing process because, over time, sustained fertility decline leads not only to decreasing proportions of children but also of young people and eventually of adults of working age. Furthermore, increases in longevity have generally the effect of accelerating the growth of the proportion of older persons more than those of young people or adults.

Thus, in terms of the effects of the demographic transition on population age structures, one can distinguish three distinct stages. During the first, there is a rejuvenation of the age distribution as the proportion of children increases. During the second, triggered by fertility reductions, the proportion of children begins to decline while the proportion of adults and older persons rise. During the third stage, reached usually after lengthy periods of fertility and mortality decline, the proportions of both children and adults of working age decline and only the proportion of older persons rises.

During the second stage of the transition, adults of working age constitute a significantly larger proportion of the total population than during the first stage of the transition, so that the number of adults of working age per dependent (that is, children and older persons) increases for a certain period until it reaches a maximum. During that period, a population is optimally placed to benefit from economically productive investment because its levels of economic dependency are low and there are relatively more potential workers to support persons in the non-productive ages (children and the older population). The terms "demographic dividend", "demographic bonus" or "demographic window of opportunity" have been coined to describe this stage of the transition and allude to the possibilities that it presents for raising a country's rate of economic growth per capita and its standard of living.

However, the benefits associated with the "demographic window of opportunity" are not automatic. For instance, the second stage of the demographic transition usually entails a rapidly growing population of young people (aged 15 to 24) who need to be educated and provided with gainful employment in order to become assets for society. The demographic bonus may provide an opportunity for speeding development, but realizing those benefits depends on the adoption of macroeconomic policies that promote productive investment, increase employment opportunities and in general ensure a stable social and economic environment propitious for sustained economic growth and sustainable development.

Although the period of the demographic bonus can last several decades, if fertility reductions are sustained it eventually gives way to the third stage of the transition, where the proportion of adults of working age ceases to rise and only the proportion of older persons continues increasing. This period of rapid population ageing poses new challenges for the adaptation of society to an unprecedented situation and requires the development of sound public policy to facilitate the adjustments that will be necessary in a variety of spheres, including the provision of health care and old-age support. The need for such adjustments raises questions of intergenerational equity in meeting the needs of persons at different stages of life and of the roles of the State, the private sector and the family in providing such support. Different approaches to solving those problems are likely to affect the distribution of wealth, opportunities and burdens that cut across age and gender groups within societies.

Today the major areas of the world are at different stages of the demographic transition. Europe is well into the third stage of the transition and its population, which is already the oldest in the world, is expected to age rapidly in the foreseeable future. Northern America and Australia/New Zealand also find themselves in the third stage of the transition but because their fertility levels have not fallen as low as those of Europe, they are expected to experience a somewhat slower ageing process. Asia and Latin America and the Caribbean find themselves in the second stage of the transition and are still in time to benefit from the demographic bonus. However, because these two regions experienced on average fairly rapid fertility reductions, they are expected to age more rapidly than Europe or Northern America did in the past. Lastly, Africa has only recently embarked on the second stage of the transition and still has a very young population with high dependency levels. Furthermore, because Africa is the major area most affected by the HIV/AIDS epidemic, its transition to low mortality has been interrupted and it is not clear whether the incipient fertility reductions experienced by countries in the region will accelerate or not over the short term. Even assuming that fertility reductions proceed at a moderate pace, Africa is expected to continue being the major area with the youngest population well into the twenty-first century.

This paper presents an overview of trends in population ageing, thus providing the demographic basis for the further examination of the social, economic and policy implications of the changes expected. Most of the data presented here are derived from the *2004 Revision* of *World Population Prospects*, the most recent version of the official United Nations population estimates and projections (United Nations, 2005a). In what follows, trends are generally discussed in terms of the following age groups: children (the population aged 0 to 14 years); young persons or youth (persons aged 15 to 24 years); adults of working age (aged 15 to 59); older persons (persons aged 60 years or over), and the oldest-old (those aged 80 years or over).

A. THE CHANGING AGE DISTRIBUTION OF THE WORLD AND THE DEVELOPMENT GROUPS

As described above, the different stages of the demographic transition give rise to various changes of the age distribution over time. At the world level, the population in 1950 was relatively young, having 34 per cent of its members under age 15 and barely 8 per cent aged 60 or over (table 1). Between 1950 and 1975, as mortality decline accelerated, particularly in the less developed regions, both the proportion under age 15 and that aged 60 or over increased, to reach 37 per cent and about 9 per cent respectively. Overall, therefore, the population of the world became slightly younger from 1950 to 1975. But after 1975, as fertility reductions in the developing world accelerated, the proportion of children at the world level began to decrease, so that by 2005 the population under age 15 accounted for just 28 per cent of the total. Given that fertility at the world level started declining in the 1970s, by 2000 there had also been a slight reduction in the proportion of the population aged 15-24, from 19 per cent in 1975 to 18 per cent in 2005. However, as expected, the proportion aged 25-59 had risen markedly, passing from 36 per cent in 1975 to nearly 44 per cent in 2005. These trends suggests that the world population is already well into the period in which the demographic bonus can be reaped. Furthermore, if fertility and mortality trends continue as projected in the medium variant of the official United Nations population projections, the

TABLE 1. POPULATION BY MAJOR AGE GROUP AND PERCENTAGE DISTRIBUTION BY AGE GROUP FOR THE WORLD AND THE DEVELOPMENT GROUPS, 1950, 1975, 2005, 2025 AND 2050

| Age group | Population (millions) | | | | | Percentage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1950 | 1975 | 2005 | 2025 | 2050 | 1950 | 1975 | 2005 | 2025 | 2050 |
| *World* | | | | | | | | | | |
| 0-14 | 864 | 1 498 | 1 821 | 1 909 | 1 833 | 34.3 | 36.8 | 28.2 | 24.2 | 20.2 |
| 15-24 | 459 | 757 | 1 159 | 1 211 | 1 225 | 18.2 | 18.6 | 17.9 | 15.3 | 13.5 |
| 25-59 | 991 | 1 469 | 2 812 | 3 593 | 4 051 | 39.3 | 36.1 | 43.5 | 45.4 | 44.6 |
| 60-79 | 192 | 318 | 586 | 1 032 | 1 574 | 7.6 | 7.8 | 9.1 | 13.1 | 17.3 |
| 80+ | 14 | 31 | 87 | 160 | 394 | 0.5 | 0.8 | 1.3 | 2.0 | 4.3 |
| Total | 2 519 | 4 074 | 6 465 | 7 905 | 9 076 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| *More developed regions* | | | | | | | | | | |
| 0-14 | 222 | 254 | 206 | 196 | 193 | 27.4 | 24.2 | 17.0 | 15.7 | 15.6 |
| 15-24 | 138 | 176 | 165 | 140 | 133 | 17.0 | 16.8 | 13.7 | 11.2 | 10.8 |
| 25-59 | 357 | 456 | 596 | 570 | 510 | 43.9 | 43.5 | 49.2 | 45.7 | 41.2 |
| 60-79 | 87 | 143 | 200 | 275 | 284 | 10.7 | 13.7 | 16.5 | 22.0 | 23.0 |
| 80+ | 9 | 18 | 44 | 68 | 116 | 1.0 | 1.8 | 3.7 | 5.4 | 9.4 |
| Total | 813 | 1 047 | 1 211 | 1 249 | 1 236 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| *Less developed regions* | | | | | | | | | | |
| 0-14 | 642 | 1 244 | 1 615 | 1 713 | 1 639 | 37.6 | 41.1 | 30.7 | 25.7 | 20.9 |
| 15-24 | 321 | 581 | 994 | 1 071 | 1 091 | 18.8 | 19.2 | 18.9 | 16.1 | 13.9 |
| 25-59 | 634 | 1 014 | 2 216 | 3 023 | 3 541 | 37.1 | 33.5 | 42.2 | 45.4 | 45.2 |
| 60-79 | 105 | 175 | 386 | 757 | 1 290 | 6.1 | 5.8 | 7.3 | 11.4 | 16.5 |
| 80+ | 5 | 13 | 42 | 92 | 278 | 0.3 | 0.4 | 0.8 | 1.4 | 3.6 |
| Total | 1 707 | 3 027 | 5 253 | 6 656 | 7 840 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

bonus will persist until at least 2025, since still by then it is projected that the proportion of the population aged 25-59 will continue to increase, albeit slightly.

These trends at the world level are mainly the result of the average trends for the less developed regions, where the age distribution also showed an increase in the proportion of children and youth between 1950 and 1975, followed by a decline in both proportions between 1975 and 2005. But just as at the world level, this decline is compensated by a marked increase in the proportion aged 25-59 which is expected to continue rising until at least 2025 and could remain almost unchanged until 2050 (at close to 45 per cent). In addition, the proportion aged 60 or over in the less developed regions has been rising steadily and is expected to pass from 8 per cent in 2005 to 13 per cent in 2025 and might reach nearly 20 per cent by 2050. That is, the ageing of the population of less developed regions is expected to accelerate, particularly after 2025.

In contrast with the less developed regions, whose population is still fairly young, the more developed regions have an older population. Already today, 20 per cent of the population in the more developed regions is aged 60 years or over, a proportion that might be reached by the less developed regions only by 2050. However, because of the very low fertility that the more developed regions have had since the 1980s, their age distribution today is somewhat more advantageous that the one projected for less

developed regions in 2050, in the sense that the proportion of persons aged 25-59 in more developed regions today is 49 per cent or 4 percentage points higher than the proportion projected for less developed regions in 2050.

Another way of assessing the implications of population distribution for economic and social development is to consider the number of persons aged 25-59 per 100 persons in other age groups. This ratio is a rough indicator of the number of persons in the economically productive ages to the number of persons of other ages who are more likely not to be productive, either because they are studying or because they are no longer economically active.[1] Table 2 shows the evolution of this ratio between 1950 and 2050 for the world and the development groups. The ratios indicate that since 1950, the more developed regions have had a considerably more advantageous ratio than the less developed regions. Especially today, there are 97 persons aged 25-59 in more developed regions to every 100 persons in the other age groups, whereas in the less developed regions that ratio, which is at an all time high, is just 73. Over the next 20 years, the situation in the less developed regions continues improving while the ratio for the more developed regions declines, but by 2025 both sets of countries are expected to have similar overall ratios. After 2025, the ratio for the more developed regions declines markedly while that for the less developed regions remains almost unchanged. This measure corroborates therefore that the less developed regions, as a whole, still have the opportunity to reap the benefits of the demographic bonus and some time to adapt to the rapid population ageing that they will experience once the bonus ends.

TABLE 2.  NUMBER OF PERSONS AGED 25-59 PER 100 PERSONS IN THE OTHER AGE GROUPS FOR THE WORLD AND THE DEVELOPMENT GROUPS, 1950-2050

|  | *1950* | *1975* | *2005* | *2025* | *2050* |
|---|---|---|---|---|---|
| World | 65 | 56 | 77 | 83 | 81 |
| More developed regions | 78 | 77 | 97 | 84 | 70 |
| Less developed regions | 59 | 50 | 73 | 83 | 82 |

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

It should be noted that although the proportion of the population aged 25-59 is expected to remain nearly constant in the less developed regions between 2005 and 2050, the age distribution of those potential workers is also expected to become older, as illustrated in figure 1. Thus, whereas in 1950 the age distribution of the working-age population in the less developed regions resembled a pyramid, with a broad base at the younger working ages and decreasing numbers at higher ages, by 2050 the distribution is expected to become closer to a rectangle, although the younger cohorts in the less developed regions still tend to be somewhat larger than the older cohorts. In the more developed regions, the distribution of the group aged 25-59 today is closer to an inverted pyramid, with the older cohorts being larger than the younger ones, and the expected distribution by 2050 also becomes considerably more rectangular. Furthermore, whereas in the less developed regions the population continues to increase until 2050 for every age group above age 10, the population of the more developed regions is smaller in 2050 than it is expected to be in 2025 for every age group above age 10.

**Figure 1**. **Age and sex distribution of the population, more developed and less developed regions,
1950, 2005 and 2050**
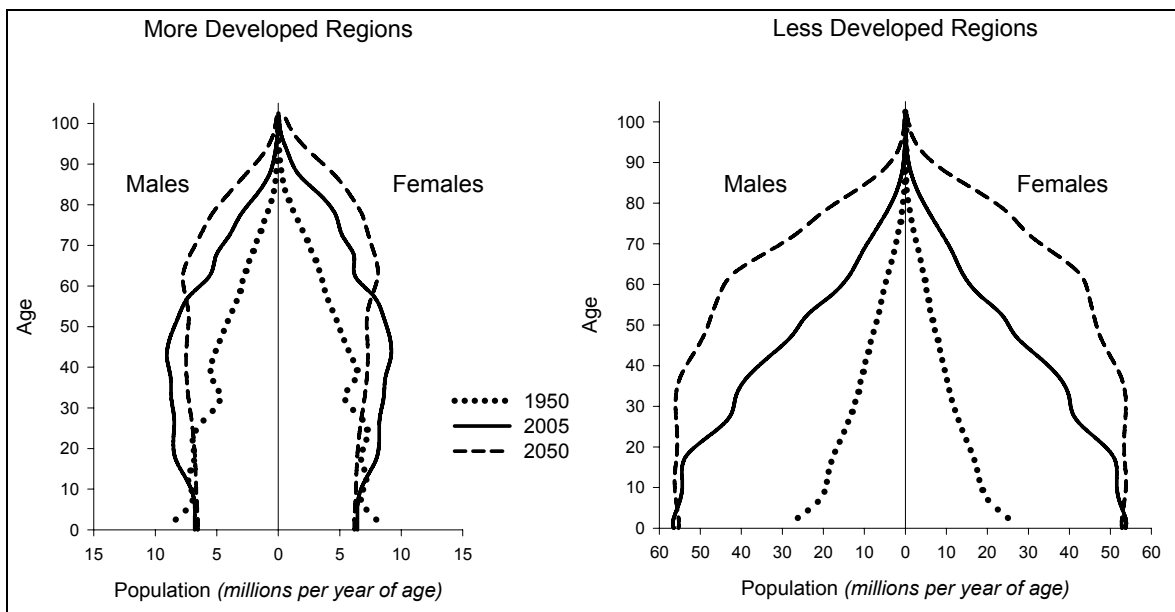
In sum, the world population as a whole is today in a relatively favourable position regarding the size of its population of working age relative to that of children and older persons. Furthermore, although the more developed regions are more advanced in the process of population ageing than the less developed regions, they are still in a relatively advantageous situation because they have a fairly high proportion of persons in the economically active ages and a moderate proportion of older persons (20 per cent). Their main concern, therefore, should be to make provisions for the rapid ageing that lies ahead. For the less developed regions as a whole, the situation is also propitious and the expectation is that it will improve further over the short term as fertility continues to decrease. However, this development will help accelerate the ageing process so that by mid-century the less developed regions are likely to be in a position similar to that of more developed countries today.

B. POPULATION AGEING IN MAJOR AREAS

The overall trends described above mask important differences among major areas and countries, resulting from variations in the timing of the demographic transition in each of them. Table 3 displays selected indicators of the changing age distribution in each major area and figures 2 and 3 show trends over time. Clearly Africa has today the youngest age distribution, with 41 per cent of the population under age 15 and just about 5 per cent of the population aged 60 years or over. In sharp contrast, Europe has a much older population, with just 16 per cent under age 15 and 21 per cent aged 60 or over. Therefore, in Europe the number of older persons has already surpassed the number of children.

TABLE 3. POPULATION BY MAJOR AGE GROUP AND PERCENTAGE DISTRIBUTION BY AGE GROUP FOR MAJOR AREAS, 1950, 1975, 2005, 2025 AND 2050

| Age group | Population (millions) | | | | | Proportion by age group (percentage) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1950 | 1975 | 2005 | 2025 | 2050 | 1950 | 1975 | 2005 | 2025 | 2050 |
| *Africa* | | | | | | | | | | |
| 0-14 | 94 | 187 | 376 | 495 | 556 | 42 | 45 | 41 | 37 | 29 |
| 15-24 | 42 | 79 | 189 | 270 | 350 | 19 | 19 | 21 | 20 | 18 |
| 25-59 | 76 | 129 | 294 | 494 | 838 | 34 | 31 | 32 | 37 | 43 |
| 60-79 | 11 | 20 | 44 | 78 | 173 | 5 | 5 | 5 | 6 | 9 |
| 80+ | 1 | 1 | 4 | 7 | 20 | 0 | 0 | 0 | 1 | 1 |
| Total | 224 | 416 | 906 | 1 344 | 1 937 | 100 | 100 | 100 | 100 | 100 |
| *Asia* | | | | | | | | | | |
| 0-14 | 509 | 949 | 1 086 | 1 067 | 954 | 36 | 40 | 28 | 23 | 18 |
| 15-24 | 263 | 455 | 712 | 701 | 650 | 19 | 19 | 18 | 15 | 12 |
| 25-59 | 529 | 832 | 1 743 | 2 254 | 2 382 | 38 | 35 | 45 | 48 | 46 |
| 60-79 | 90 | 148 | 327 | 623 | 996 | 6 | 6 | 8 | 13 | 19 |
| 80+ | 4 | 11 | 38 | 83 | 235 | 0 | 0 | 1 | 2 | 5 |
| Total | 1 396 | 2 395 | 3 905 | 4 728 | 5 217 | 100 | 100 | 100 | 100 | 100 |
| *Latin America and the Caribbean* | | | | | | | | | | |
| 0-14 | 67 | 133 | 168 | 163 | 141 | 40 | 41 | 30 | 23 | 18 |
| 15-24 | 31 | 63 | 106 | 110 | 99 | 19 | 20 | 19 | 16 | 13 |
| 25-59 | 59 | 105 | 238 | 323 | 354 | 35 | 33 | 42 | 46 | 45 |
| 60-79 | 9 | 19 | 43 | 86 | 148 | 6 | 6 | 8 | 12 | 19 |
| 80+ | 1 | 2 | 7 | 15 | 40 | 0 | 1 | 1 | 2 | 5 |
| Total | 167 | 322 | 561 | 697 | 783 | 100 | 100 | 100 | 100 | 100 |
| *Northern America* | | | | | | | | | | |
| 0-14 | 47 | 62 | 68 | 71 | 75 | 27 | 25 | 20 | 18 | 17 |
| 15-24 | 26 | 46 | 47 | 50 | 52 | 15 | 19 | 14 | 13 | 12 |
| 25-59 | 78 | 101 | 161 | 173 | 192 | 45 | 41 | 49 | 45 | 44 |
| 60-79 | 19 | 30 | 44 | 78 | 85 | 11 | 12 | 13 | 20 | 19 |
| 80+ | 2 | 5 | 12 | 16 | 33 | 1 | 2 | 4 | 4 | 8 |
| Total | 172 | 243 | 331 | 388 | 438 | 100 | 100 | 100 | 100 | 100 |
| *Europe* | | | | | | | | | | |
| 0-14 | 143 | 160 | 115 | 104 | 98 | 26 | 24 | 16 | 15 | 15 |
| 15-24 | 95 | 111 | 101 | 75 | 67 | 17 | 16 | 14 | 11 | 10 |
| 25-59 | 243 | 294 | 361 | 330 | 263 | 44 | 43 | 50 | 47 | 40 |
| 60-79 | 60 | 99 | 125 | 161 | 163 | 11 | 15 | 17 | 23 | 25 |
| 80+ | 6 | 12 | 26 | 37 | 63 | 1 | 2 | 4 | 5 | 10 |
| Total | 547 | 676 | 728 | 707 | 653 | 100 | 100 | 100 | 100 | 100 |
| *Oceania* | | | | | | | | | | |
| 0-14 | 4 | 7 | 8 | 9 | 9 | 30 | 31 | 25 | 21 | 18 |
| 15-24 | 2 | 4 | 5 | 5 | 6 | 16 | 18 | 16 | 13 | 12 |
| 25-59 | 6 | 8 | 15 | 19 | 21 | 43 | 40 | 46 | 45 | 45 |
| 60-79 | 1 | 2 | 4 | 7 | 9 | 10 | 10 | 11 | 17 | 18 |
| 80+ | 0 | 0 | 1 | 1 | 3 | 1 | 1 | 3 | 3 | 7 |
| Total | 13 | 21 | 33 | 41 | 48 | 100 | 100 | 100 | 100 | 100 |

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

**Figure 2. Percentage distribution of the population by broad age group for major areas, 1950-2050**
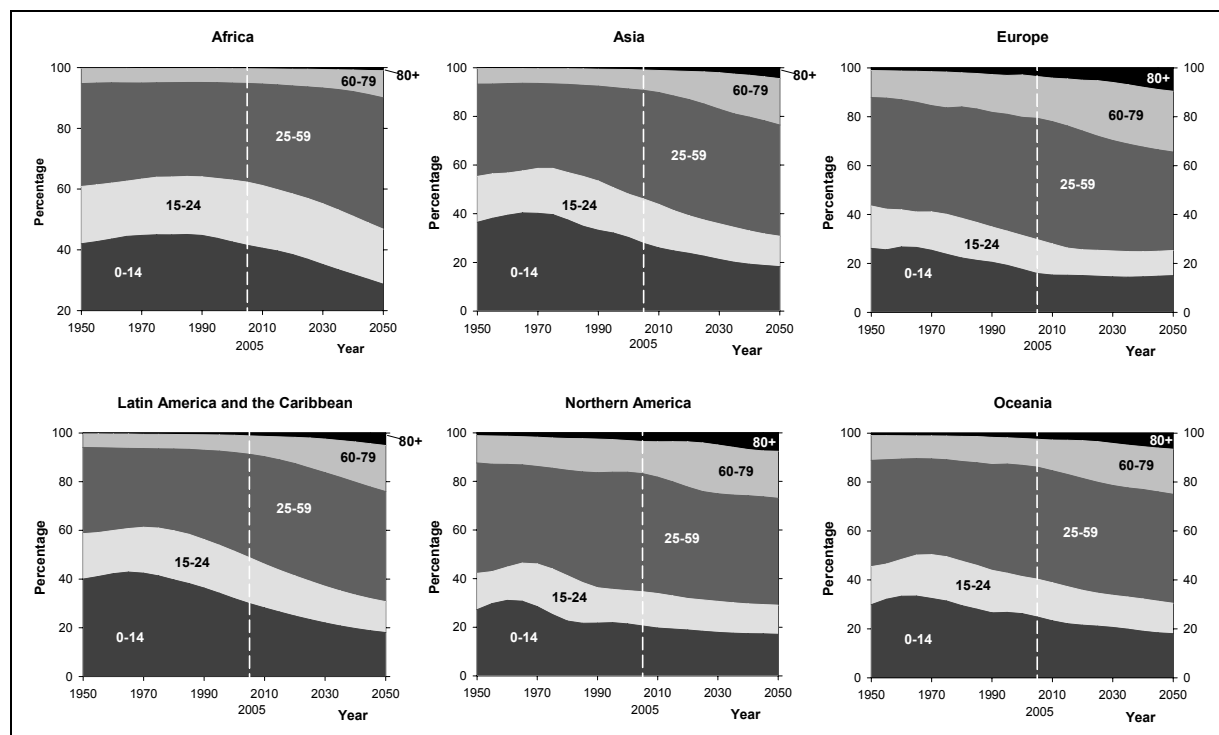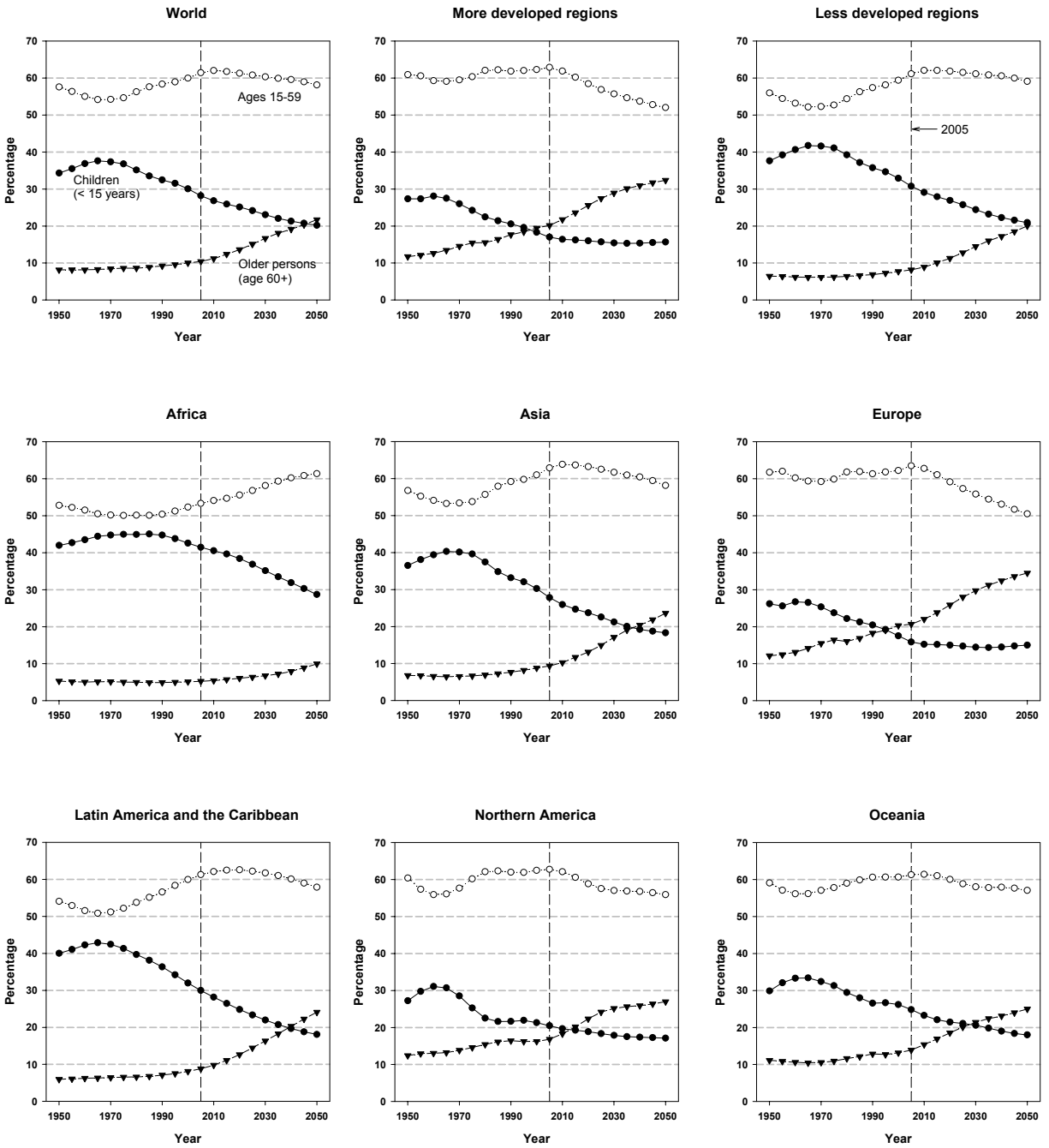


*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

Northern America is the second oldest area, with 20 per cent of the population under age 15 and 17 per cent aged 60 years or over. Oceania, where the developed countries of Australia and New Zealand account for most of the population, exhibits the next oldest population, with 25 per cent of children and 14 per cent of older persons. Asia and Latin America and the Caribbean follow. Both have about 9 per cent of the population aged 60 years or over, but Latin America and the Caribbean have a higher proportion of children than Asia (30 per cent vs. 28 per cent).

Although all major areas are expected to experience further ageing of their populations over the next 45 years, large differences in age structure will likely persist until 2050. By then, the proportion aged 60 years or over is likely to range from 10 per cent in Africa to 35 per cent in Europe. In all the other major areas, about a quarter of the population is expected to be 60 or over. Similarly, except for Africa and Europe, where the proportion of children is expected to be 29 per cent and 15 per cent, respectively, that of all other areas is expected to be between 17 and 18 per cent. This implies that in all major areas except Africa and Europe, the proportion of the population aged 15-59 is expected to be similar, ranging from 56 to 58 per cent. Europe would have by 2050 a much lower proportion in those ages (50 per cent), while Africa would have 61 per cent.

One important development expected over the next century is the continued ageing of the older population. That is, the proportion of persons aged 80 or over is expected to grow rapidly. Thus, whereas in 2005 that proportion amounted to just over 1 per cent of the world population, by 2050 it is expected to reach over 4 per cent. In Europe and Northern America, where the oldest old constitute today about 4 per cent of the population, they are expected to account for 10 per cent and 8 per cent of their respective

**Figure 3. Evolution of the proportion of the population in major age groups for the world and major areas, 1950-2050**



**World**

**More developed regions**

**Less developed regions**

**Africa**

**Asia**

**Europe**

**Latin America and the Caribbean**

**Northern America**

**Oceania**

*Source: World Population Prospects: The 2004 Revision,* Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.
NOTE:  Estimates and medium-variant projections.

populations in 2050. In Oceania the equivalent increase is expected to be from 3 per cent to 7 per cent. But it is in Asia and Latin America and the Caribbean where the increase is more remarkable: from barely 1 per cent in 2005 to 5 per cent in 2050. In contrast, the oldest old, which account for barely 0.4 per cent of Africa's population today, are expected to account for just 1 per cent in 2050, indicating that Africa's population will still be fairly young by mid-century.

Averages for major areas conceal large differences in the ageing process at the country level. Figure 4 shows the distribution of countries according to the percentages of children, adults of working age, and older persons, by major area in the developing world and for the more developed regions as a whole. The horizontal dark bars for each period indicate the central four-fifths of each distribution, the dot within the bars shows the median value, and the dots outside show the extreme values of each distribution (lowest and highest values observed). Focusing on the distributions relative to the proportion under age 15, a tendency for the bars and the highest value to move to the left is indicative of general reductions of the proportion of children and, therefore, of population ageing. Alternatively, a movement of the bars and lowest value to the right, indicates increases in the proportion of children and hence population rejuvenation. The diagrams thus make clear that many countries in Africa, Asia and Oceania, and Latin America and the Caribbean first experienced some rejuvenation of the population before ageing set in. For Asia and Oceania as well as for Latin America and the Caribbean the distributions begin to move to the left during the 1980s, but for Africa some leftward movement in the distribution occurs only after 2000. In all major areas, the initial movement of the distribution of the proportions of children to the left produces an elongation of the central bar, indicating that heterogeneity within the region increases as different countries embark on the transition to low fertility at different times. But, as time elapses, the length of the bar tends to diminish because more countries follow the path to ageing. Figure 4 shows clearly that there is greater homogeneity already among the more developed countries than in the developing regions. But both in Asia and Oceania and in Latin America and the Caribbean heterogeneity in terms of the proportion of children in the population is expected to decrease substantially by mid-century. The same is not expected for Africa, where even by mid-century there is likely to be considerable heterogeneity among countries in terms of their proportions of children.

The distributions of the proportion of persons aged 60 years or over contrast with those relative to the proportion of children because they tend to move in the opposite direction, as the proportions of older persons rise. In addition the diversity or variability among countries tends to increase as time elapses, so that, at least in the less developed regions, the dark bar is longer around 2050 than in earlier periods. It is noteworthy that the movement to the right of the distributions begins earlier in Latin America and the Caribbean than in Asia and Oceania, and that it is hardly noticeable in Africa before 2010. For the more developed regions, the movement to the right of the full distribution is steady and was already under way by the late 1960s. This pattern together with the relatively narrow central bars suggests that the ageing process is pervasive and relatively homogeneous in the more developed countries.

Lastly, the distributions of the proportion of persons aged 15-59 illustrate the movement of the population wave that eventually leads to rapid ageing. In the less developed regions, the proportions 15-59 tend to decline at first (moving the distribution to the left) as the population becomes younger when mortality decreases; then, as fertility declines, they increase and the distribution moves to the right. Later, at the third stage of the transition, the distribution moves again to the left as the proportions 15-59 decline in favour of the increasing proportions of older persons. In the less developed regions the distributions are still moving to the right as the proportions 15-59 generally increase. The movement to the left is not expected to occur before 2030 in Asia and Oceania nor in Latin American and the Caribbean. Furthermore, in Africa the movement leftward is not likely to occur before 2050. In sharp contrast, the movement to the left is just about to start in the more developed regions and is expected to be persistent over the coming decades.

**Figure 4. Distribution of the proportion of population aged under 15 years, 15-59 years and 60 years or over for major areas, 1950-2050**
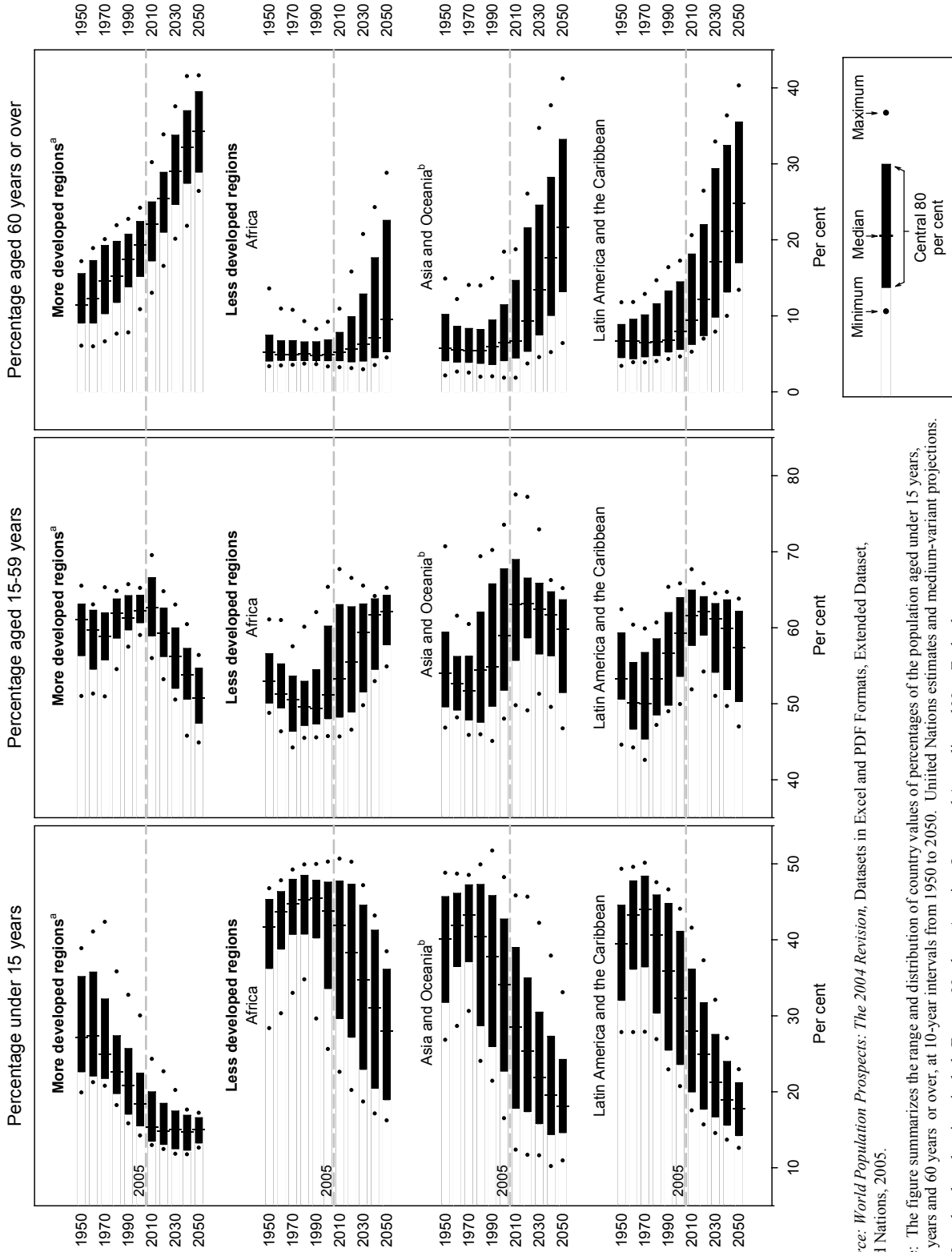
Note:  The figure summarizes the range and distribution of country values of percentages of the population aged under 15 years, 15-59 years and 60 years  or over, at 10-year intervals from 1950 to 2050.  United Nations estimates and medium-variant projections.

[a] More-developed regions include Europe, Northern America, Japan and Australia and New Zealand.

[b] Excluding Japan, Australia and New Zealand.

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Note that, especially in Asia and Oceania, there are some countries where the proportion aged 15-59 is projected to reach exceptionally high levels (above 70 per cent). The countries with these high proportions are mostly small and tend to be important destinations for migrant workers, such as the member States of the Gulf Cooperation Council. In addition to these countries, there are several others where the proportion aged 15-59 is already or is projected to be above 65 per cent. These include Algeria and Tunisia in Africa; Armenia, China, Iran, Mongolia, the Republic of Korea and Viet Nam in Asia; a number of the successor States of the former USSR including the Russian Federation, and several countries in Eastern and Southern Europe. All of these countries have experienced either sharp drops in fertility or long periods of very low fertility or both.

## C. POPULATION AGEING AT THE COUNTRY LEVEL

One useful indicator of population ageing is the median age of a population, that is, the age that separates the population into two equal halves. Increases in the median age are indicative of population ageing. Between 1950 and 2005, the median age of the world population increased from 24 to 28 years and it is projected to rise to 38 years by 2050 (table 4). More developed countries already have a median age of 39 years and it is projected to rise to over 45 years by mid-century. The less developed countries as a whole have a much younger population, with a median age that is currently 26 years and that is projected to be somewhat below 37 years in 2050. Particularly young populations are found in the group of 50 least developed countries whose overall median age is still under 19 years today and will likely not surpass 28 years over the next 45 years. These countries include most of those where fertility is still high and has shown no decrease or only an incipient decline.

At the level of countries, the youngest populations are those of Mali, Niger and Uganda, whose median ages in 2005 were at most 16 years. Countries with young populations typically have still or had until recently high fertility levels. The map in figure 5 indicates that the youngest populations are mainly concentrated in the countries of sub-Saharan Africa. Young populations also characterize countries in the Arabian Peninsula and a few countries in South-Central and Eastern Asia, including Afghanistan and Pakistan. Most countries in Central America also have young populations as do Bolivia and Paraguay in South America.

TABLE 4. MEDIAN AGE FOR THE WORLD, THE DEVELOPMENT GROUPS
AND THE MAJOR AREAS, 1950, 2005 AND 2050

| Regions and major areas | Median age (years) | | |
| --- | --- | --- | --- |
| | 1950 | 2005 | 2050 |
| World | 23.9 | 28.1 | 37.8 |
| More developed regions | 29.0 | 38.6 | 45.5 |
| Less developed regions | 21.4 | 25.6 | 36.6 |
| Least developed countries | 19.6 | 18.9 | 27.3 |
| Africa | 19.0 | 18.9 | 27.4 |
| Asia | 22.0 | 27.7 | 39.9 |
| Latin America and the Caribbean | 20.2 | 25.9 | 39.9 |
| Northern America | 29.8 | 36.3 | 41.5 |
| Europe | 29.7 | 39.0 | 47.1 |
| Oceania | 28.0 | 32.3 | 40.5 |

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

**Figure 5.  Median age by country, 2005**
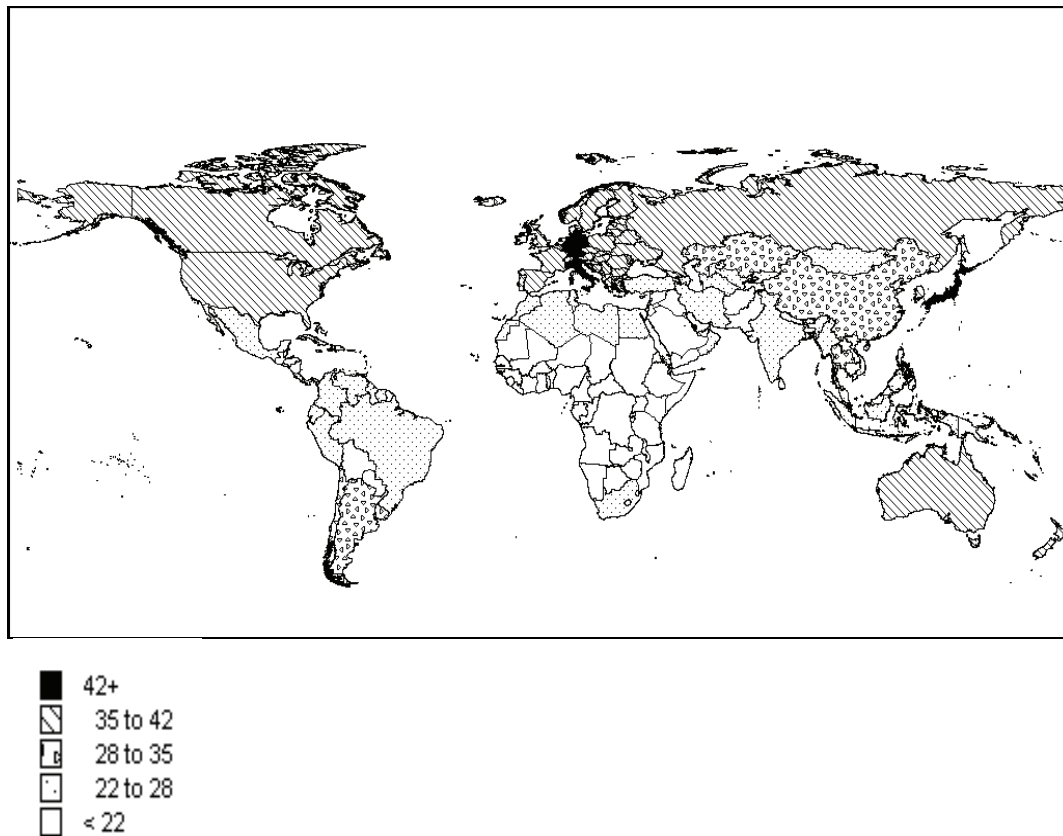


Legend:
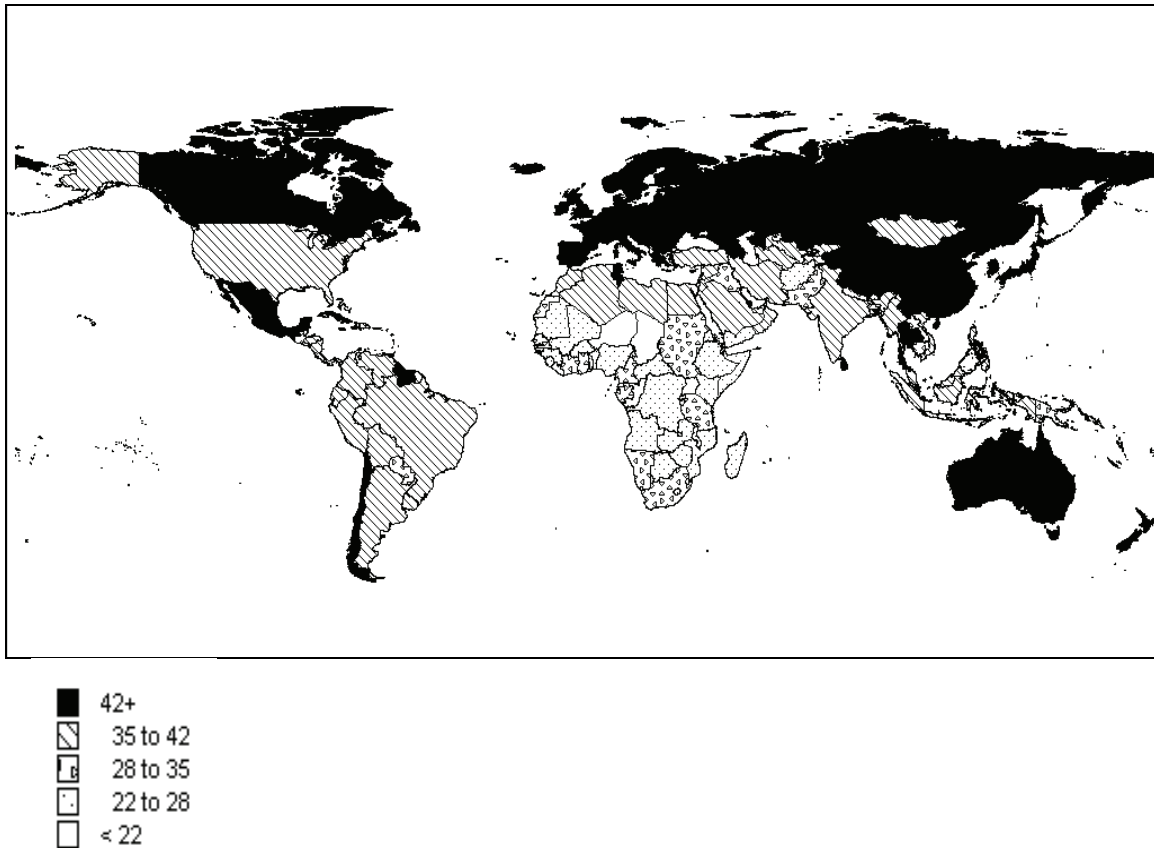- 42+
- 35 to 42
- 28 to 35
- 22 to 28
- < 22

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

At the other end of the spectrum, countries such as Germany, Italy and Japan already have median ages surpassing 42 years. Indeed, as figure 5 shows, all developed countries have median ages at or above 35 years. Among the developing countries, those with the oldest populations include Argentina, Chile, Cuba and Uruguay in Latin America and the Caribbean as well as China, Kazakhstan and Thailand in Asia but most of them still have median ages below 35 years.

Over the next 45 years, most countries will see their median ages rise markedly. As the map in figure 6 shows, by 2050 very few countries are expected to have median ages below 22 years. Burundi, Chad, Congo, Guinea-Bissau, Guinea, Liberia, Niger and Uganda are projected to have the youngest populations at that time. In sharp contrast, 17 countries are expected to have median ages higher than 50 years, the majority located in Europe (e.g., Bulgaria, the Czech Republic, Italy, Lithuania, Poland, Romania, Slovakia, Slovenia and Ukraine) or in Asia (Hong Kong SAR China, Georgia, Japan, and the Republic of Korea). As the map in figure 6 shows, by 2050 the median ages of all developed countries except the United States are expected to be equal or greater than 42 years, and a number of developing countries are also projected to have median ages in that range, including China, Chile, Cuba, Kazakhstan, Mexico, Thailand and Tunisia. Furthermore, with the exception of countries in sub-Saharan Africa, most of which continue to have relatively young populations in 2050, virtually all other developing countries are projected to have median ages at or above 35 years by mid-century.  Among developed countries, the United States maintains a relatively younger population because of international migration: without migration its median age in 2050 would be projected at 43.6 years instead of the 41.1 years projected with migration.

**Figure 6.  Median age by country, 2050**



42+
35 to 42
28 to 35
22 to 28
< 22

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

## D. IS POPULATION AGEING INEVITABLE?

So far, the discussion of future prospects has been based on the results of the medium variant of the official United Nations population projections (United Nations, 2005a). However, the projections include other projection variants aimed to illustrate the effects of different future paths of fertility change. In particular, the high and low variants differ from the medium variant in that their future fertility remains half a child above and half a child below that of the medium variant over the projection period (2005-2050). These differences imply that, whereas in the medium variant the fertility of most countries reaches 1.85 children per woman by the end of the projection period in 2045-2050, in the high variant it reaches 2.35 children per woman and in the low variant 1.35 children per woman. That is, both the low and medium variants project eventual fertility levels that do not ensure the replacement of populations and would therefore lead to declining populations, whereas the high variant projects fertility levels that, if sustained, would produce a continually growing population. These assumptions lead to vastly different populations in 2050: the low variant produces a population of 7.7 billion persons that is already declining; the high variant produces a population of 10.6 billion that continues to increase and the medium variant produces a population of 9.1 billion that is still increasing but very slowly. It is expected that future population trends will be within the range projected, particularly because if fertility at the world level would differ markedly from the trends projected the population would growth faster or decline earlier and more rapidly than projected, outcomes that would more likely be unsustainable.

What effects do the fertility levels projected in the high and low variants have on the age distribution expected by mid-century?  As table 5 indicates, at the world level the low variant projects a population where the proportion of children is 15 per cent and that of older persons is 26 per cent, while in the high variant the proportion under 15 is 25 per cent and the proportion aged 60 or over is 18 per cent. In comparison with today's figures of 28 per cent under age 15 and 10 per cent aged 60 or over, the low variant produces a population that is ageing very rapidly.  But even in the high variant, where fertility remains above replacement level and the population continues to increase, producing therefore only a small reduction in the proportion of children, the proportion of older persons nearly doubles, partly because of the expected continuation of mortality reductions, especially at older ages. Higher fertility as projected in the high variant is also insufficient to stop the ageing of the population of more developed regions, although it does increase somewhat the proportion under age 15 (it rises from 17 per cent in 2005 to 20 per cent in 2050). But the high variant still produces fairly marked ageing in the less developed regions. Thus, even under the assumption of continued population growth, population ageing seems inevitable.

TABLE 5. PERCENTAGE DISTRIBUTION OF THE ESTIMATED AND PROJECTED
POPULATION OF THE WORLD AND THE DEVELOPMENT GROUPS ACCORDING
TO DIFFERENT PROJECTION VARIANTS, 2005 AND 2050

| | *2005* | *2050* | | |
|---|---|---|---|---|
| *Age group* | *Estimates* | *Low* | *Medium* | *High* |
| *World* | | | | |
| 0-14 | 28 | 15 | 20 | 25 |
| 15-59 | 61 | 59 | 58 | 57 |
| 60+ | 10 | 26 | 22 | 18 |
| Total | 100 | 100 | 100 | 100 |
| *Number (billions)* | 6.5 | 7.7 | 9.1 | 10.6 |
| *More developed regions* | | | | |
| 0-14 | 17 | 11 | 16 | 20 |
| 15-59 | 63 | 51 | 52 | 52 |
| 60+ | 20 | 38 | 32 | 28 |
| Total | 100 | 100 | 100 | 100 |
| *Number (billions)* | 1.2 | 1.1 | 1.2 | 1.4 |
| *Less developed regions* | | | | |
| 0-14 | 31 | 16 | 21 | 25 |
| 15-59 | 61 | 60 | 59 | 57 |
| 60+ | 8 | 24 | 20 | 17 |
| Total | 100 | 100 | 100 | 100 |
| *Number (billions)* | 5.3 | 6.6 | 7.8 | 9.2 |

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

How about the effect of international migration?  In today's world, the more developed regions are net receivers of international migrants while the less developed regions are net senders.  The medium variant assumes that the direction of those flows will be the same in the future. Therefore, the medium variant already reflects the possible rejuvenating effect that migration may have on the population of the more developed regions. To gauge the size of that effect, projections assuming that there is no migration have been calculated.  They show that, without migration, the population of the more developed regions would be expected to have 15 per cent of the population under age 15, 50 per cent aged 15-59 and 35 per cent aged 60 or over.  That is, a net migration gain averaging 2.2 million persons per year during 2010-2050 would reduce the proportion aged 60 or over by 3 percentage points and increase the proportion of children by one percentage point, a fairly small contribution to the slowing down of the ageing process.

This finding is consistent with those of other studies that have examined international migration's effect on population age structures and have concluded that the effect is usually small, though not always negligible (see United Nations, 1998; 2001). Although migrants tend to be concentrated in the young adult ages and are often accompanied by young children, thus adding to the younger age groups, in order for migration to have a lasting effect on the age structure of a population, a sustained inflow of migrants over time is required. Simulations to calculate the level of international migration necessary to offset the reduction of population numbers in countries with below-replacement fertility, such as Italy, Japan or the Republic of Korea, have shown that the levels of immigration required would have to be much higher than those experienced by those countries in the 1990s (United Nations, 2001). To offset projected population decline in Europe, for instance, the net number of immigrants would need to be twice as high annually during 2000-2050 as it was during 1995-2000.  The levels of immigration needed to offset projected declines in the working-age population would be larger still.  Furthermore, even those levels of net immigration would not halt the process of population ageing. Indeed, enormous migration flows would be required in countries with below-replacement fertility to keep constant the ratio of persons over age 65 to the population of working-age. Such inflows would also result in very rapid population growth driven mainly by the new immigrants and their descendants. Such a scenario underscores the fact that the ongoing process of population ageing has a powerful in-built momentum that can only be halted by major population increases which would in all likelihood be unsustainable.

### E. THE COMPONENTS OF CHANGE OF THE AGE STRUCTURE

It is of interest to ascertain to what extent the changes in fertility, mortality and international migration expected in the future have an impact on the eventual age structure of the population. Following a procedure used in United Nations (1988) whereby different projections are made keeping all components of change constant, except one, so as to assess its effect, the estimates presented in table 6 were obtained. In general, the age distribution of a closed population is determined by the fertility and mortality to which the population has been subject. The initial age structure of the population also has an effect on the eventual age distribution, but this effect diminishes as the projection period increases. In addition, if the population experiences non-zero migration, the latter also affects the resulting age distribution.

As table 6 indicates, in the more developed regions the proportion of children aged 0-14 declined by 9.1 percentage points between 1950 and 2000 and is projected to decline further by 2.7 percentage points from 2000 to 2050.  During 1950-2000, fertility decline was responsible for most of the change observed. In the future, however, because fertility is expected to recover somewhat from the very low levels it has reached in most developed countries, its contribution to the proportion of children in more developed regions is expected to be positive. However, such contribution is more than counterbalanced by the negative contributions of mortality and of the initial age distribution. The contribution of mortality is negative during 2000-2050 because mortality levels are expected to decline faster among older persons than among children.

| | More developed regions | | Less developed regions | |
| --- | --- | --- | --- | --- |
| | *1950-2000* | *2000-2050* | *1950-2000* | *2000-2050* |
| *0-14 years* | | | | |
| Initial proportion (percentage) | 27.4 | 18.3 | 37.6 | 32.9 |
| Proportion at the end (percentage) | 18.3 | 15.6 | 32.9 | 20.9 |
| Absolute change | -9.1 | -2.7 | -4.7 | -12.0 |
| Fertility effect | -9.3 | 2.1 | -11.9 | -5.8 |
| Mortality effect | -0.1 | -1.0 | 2.8 | 0.2 |
| Migration effect | 0.3 | 0.6 | 0.1 | -0.1 |
| Effect of the initial age distribution | 0.0 | -4.4 | 4.3 | -6.3 |
| *15-59 years* | | | | |
| Initial proportion (percentage) | 60.9 | 62.3 | 55.9 | 59.4 |
| Proportion at the end (percentage) | 62.3 | 52.0 | 59.4 | 59.1 |
| Absolute change | 1.4 | -10.3 | 3.5 | -0.3 |
| Fertility effect | 5.2 | -0.4 | 9.9 | 3 |
| Mortality effect | -2.1 | -2.9 | -3.5 | -2.1 |
| Migration effect | 0.3 | 1.5 | -0.2 | -0.1 |
| Effect of the initial age distribution | -2.0 | -8.5 | -2.7 | -1.1 |
| *60 years or over* | | | | |
| Initial proportion (percentage) | 11.7 | 19.5 | 6.4 | 7.7 |
| Proportion at the end (percentage) | 19.5 | 32.4 | 7.7 | 20.0 |
| Absolute change | 7.8 | 12.9 | 1.3 | 12.3 |
| Fertility effect | 4.1 | -1.7 | 2.0 | 2.9 |
| Mortality effect | 2.2 | 4.0 | 0.7 | 2.0 |
| Migration effect | -0.4 | -2.2 | 0.2 | 0.0 |
| Effect of the initial age distribution | 1.9 | 12.8 | -1.6 | 7.4 |

In the more developed regions, fertility made a positive contribution to the growth the proportions 15-59 and 60 or over during 1950-2000, precisely because it had a negative effect on the growth of the proportion of children over the same period. Mortality made a negative contribution to the proportion 15-59 while it contributed positively to that 60 or over because it declined faster at older ages. Similarly, the initial age distribution contributed to reduce the share of the population aged 15-59 but it raised that of the older population. By contrast, migration had a small positive effect on the share of those aged 15-59 but a negative one on the share of the older population. During 2000-2050, the 2000 age distribution in more developed regions has by far the major effect on the changes expected in the proportions aged 15-59 and 60 or over. In addition, mortality has an important role, raising the proportion 60 or over while reducing that 15-59, and migration has a moderate effect in the opposite direction in both instances. Fertility, which has a positive effect on the proportion of children during 2000-2050, has consistently negative effects at ages above 15.

In the less developed regions changes in fertility are the dominant factor determining the change in the age distribution, followed by the effects of the initial age distribution, particularly with respect to changes in the proportion under 15 during 1950-2000 and in the proportion 60 or over during 2000-2050. The effect of mortality on the changing proportions under 15 and 15-59 is significant during 1950-2000 and it is expected to make a moderate contribution to the proportion of older persons in the future. In the less developed regions, international migration had a very small effect during 1950-2000 at its effect becomes virtually nil during 2000-2050.

In sum, fertility change was an important contributor to the change in the age distribution of both more developed and less developed regions in the past and is expected to continue having an important role in the less developed regions in the future. In addition, the effects of the 2000 age distribution on future development are substantial in both groups of countries but especially in the more developed regions. That is, much of the expected future ageing of today's population is already inscribed in its age distribution which itself is the result of the unprecedented and historical unique transition from high mortality and fertility to low levels of both.

F. DEPENDANTS AND WORKERS

Indicators of the potential effects of ageing for social and economic development are the so-called dependency ratios which relate the group of the population that is considered to be economically dependent to the group that is economically active. Since exact measures of the number of persons who are producers and those who are exclusively consumers are generally not available, proxies are used based solely on age ranges. Thus, it is generally assumed that children under 15 fall in the dependent category. It is also assumed that older persons are more likely to be at a stage of life where they are mainly consumers. In this paper, the older population has been defined as that aged 60 years or over. For consistency, that age group will be used here to calculate dependency ratios. Three types of ratios will be considered: (*a*) the child dependency ratio which relates the number of persons aged 0-14 to the number aged 15-59; (*b*) the old-age dependency ratio which relates the number of persons aged 60 or over to those aged 15-59, and (*c*) the overall dependency ratio which is the sum of the other two. All dependency ratios are expressed in terms of number of children or older persons or both per 100 persons aged 15-59.

Before proceeding to an analysis of trends in these dependency ratios, some caveats are in order. Clearly, in most populations people do not stop being economically active at age 60, nor is it true that all persons aged 15-59 are economically active. Furthermore, although old persons often require economic support from others, older persons in many societies are also providers of support to their adult children (Morgan, Schuster and Butler, 1991; Saad, 2001). In addition, not all persons aged 15-59 provide direct or indirect support to children or older persons (Taeuber, 1992). In particular, as the period of training for a productive life increases, most adolescents and young adults remain in school and out of the labour force, effectively extending the period of young-age dependency well beyond age 15. These observations suggest that, at best, trends in the dependency ratios considered here are indicative of the constraints that society may face as the population ages and unprecedented imbalances arise in the sizes of key age groups. However, estimation of the likely economic impact of such imbalances would require more appropriate measures of the number of workers and consumers in a population by age.

Table 7 shows the values of the three dependency ratios for selected years from 1950 to 2050 for the world, the more developed regions and the less developed regions. As expected, the overall dependency ratio for the world increases from 74 dependents per 100 persons aged 15-59 in 1950 to 83 in 1975, mainly as a result of the increase in the number of children relative to the working age population, as reflected in the rise of the child dependency ratio. Between 1975 and 2005, the overall dependency ratio declines from 83 to 63 dependents per 100 persons of working age, mainly because of the continued and major reductions in child dependency. However, this decline is expected to come to a halt in the coming

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decade so that, by 2025, the overall dependency ratio is projected to be 65, slightly higher than in 2005, and by 2050 it would reach 72. This projected increase in the overall dependency ratio is entirely due to the rise of old-age dependence since the ratio relative to children is expected to maintain its decreasing path (figure 7). It should be noted that these trends would be similar if the ratios considered used the population aged 15-64 as denominator and defined older persons as those aged 65 or over.

In the more developed regions, the overall dependency ratio increased slightly between 1950 and 1975 (from 64 to 66 dependants per 100 persons aged 15-59), and then declined to 59 in 2005, thus reaching a very low level and the minimum that it is expected to reach since a steadily increasing path is projected for the overall dependency ratio in the future. Such an increase results from the ever rising old-age dependency ratio. Indeed, by 2050 the old-age dependency ratio for the more developed regions is expected to reach 62, a value higher than today's overall dependency ratio and close to the overall ratio estimated for 1950. Adding the dependent children produces an overall dependency ratio of 92 in 2050, a level 45 per cent higher than the average dependency ratio prevailing in the more developed regions between 1950 and 2005. These trends confirm the earlier finding that the window of opportunity is essentially over for the more developed regions and that rapid ageing lies ahead.

The experience of the less developed regions and their prospects are quite different. First, their overall dependency ratio in 1950, at 79 dependents per 100 persons aged 15-59, was high compared to that of the more developed regions at the time and it was mostly due to the high level of child dependency (67 per 100). Between 1950 and 1975, as the proportion of children increased because of reduced mortality, both the child and the overall dependency ratios soared to 78 and 90 respectively. But the reduction in the proportions of children coupled with the rising proportions of persons aged 15-59 that occurred after 1975 led to a major reduction of the child and overall dependency ratios. By 2005, the overall dependency ratio in the less developed regions stood at 64 and is expected to keep on declining until it reaches 61 in 2015 before a slowly increasing trend sets in. Increases after 2015 are slow because the rapid rise expected in the old-age dependency ratio are counterbalanced by continued reductions in child dependency. By 2050 the less developed regions as a whole are expected to have an overall dependency ratio of 69, lower than it was in 1950, but with a very different composition than in earlier times since older persons are expected to account for about half of the dependency burden, up from 15 per cent in 1950 and 21 per cent today.

TABLE 7. THREE TYPES OF DEPENDENCY RATIOS RELATING THE POPULATION OF CHILDREN AND THE OLDER POPULATION TO THE POPULATION AGED 15-59 FOR THE WORLD AND THE DEVELOPMENT GROUPS, 1950-2050

|  | Type of ratio | 1950 | 1975 | 2005 | 2025 | 2050 |
|---|---|---|---|---|---|---|
| World | Overall | 74 | 83 | 63 | 65 | 72 |
|  | Child | 60 | 67 | 46 | 40 | 35 |
|  | Old-age | 14 | 16 | 17 | 25 | 37 |
| More developed regions | Overall | 64 | 66 | 59 | 76 | 92 |
|  | Child | 45 | 40 | 27 | 28 | 30 |
|  | Old-age | 19 | 26 | 32 | 48 | 62 |
| Less developed regions | Overall | 79 | 90 | 64 | 63 | 69 |
|  | Child | 67 | 78 | 50 | 42 | 35 |
|  | Old-age | 12 | 12 | 13 | 21 | 34 |

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

**Figure 7.  Trends in the three types of dependency ratios for the world, the development groups
and the major areas, 1950-2050**
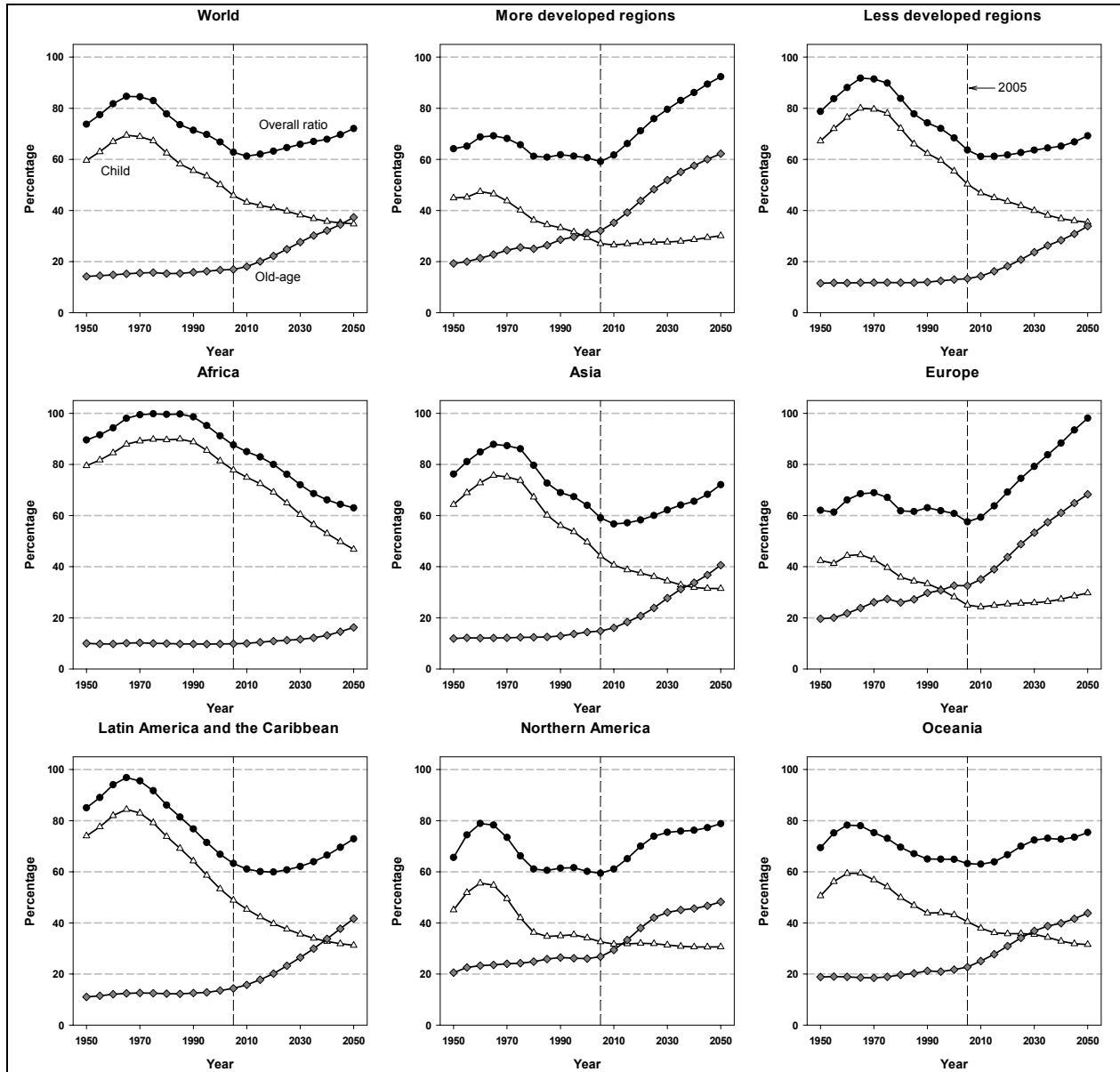
Figure 7 also illustrates the paths followed over time by the overall dependency ratio and its child and old-age components for each of the world's major areas. Between 1950 and 1975, Africa and Latin America and the Caribbean both had very high overall dependency ratios, hovering in the upper 90s but, whereas the overall dependency ratio for Latin America and the Caribbean had dropped markedly by 2005 (to 63), that of Africa remained very high (at 88). With respect to the future, the period of steady decline of the overall dependency ratio still lies ahead for Africa where it is expected to reach 63 by 2050. For Latin America and the Caribbean, in contrast, the expectation is for the ratio to stop declining around 2020 and then initiate a steady increase to reach a level of 73 by 2050. Furthermore, as figure 7 illustrates,

after 2040 much of the increase of the dependency ratio will come from the rising weight of the older population.

Asia's overall dependency ratio follows a path similar to that of Latin America and the Caribbean but at a lower level, so that it reaches a low value of 59 in 2005. The prospects for Asia are also mainly a steady though slow increase in the overall dependency ratio that sets in at around 2010. In Asia the old-age burden becomes higher than the child burden slightly earlier than in Latin America and the Caribbean but by 2050 both regions are expected to have similar overall dependency ratios (72 for Asia).

The other three regions, being part of the developed world, exhibit lower overall dependency ratios before 2005 than the major areas of the developing world. Europe in particular maintains very low overall dependency ratios during that period, especially because of its lower levels of child dependency. In addition Europe is the first region to exhibit a crossover of the child and old-age dependency ratios so that by 2005 the older population accounts for 57 per cent of its overall dependency burden which itself stands at 58 dependants per 100 persons aged 15-59. It is this early crossover that leads to a sharp rise in the overall dependency ratio of Europe, which largely parallels that of its old-age ratio. As a result, by 2050 Europe's overall dependency ratio is expected to be a high 98, similar to that of Africa in the 1960s but determined mainly by a high proportions of older persons instead of high proportions of children.

For Northern America and Oceania, the overall dependency ratios follow similar trends, having peaked at around 1960 at a level of 78-79 and then declined to 59 and 63, respectively, by 2005. In both regions the dependency ratios are expected to start increasing within the next decade to reach by 2050 a level of 79 in Northern America and 75 in Oceania. It is noteworthy, however, that the share of older persons in the overall dependency ratio is expected to surpass that of children earlier in Northern America (in 2015) than in Oceania (2030). In both major areas, as in Europe, the expected increase in the overall dependency ratio is mainly driven by the rising weight of the older population.

G. THE SIZE AND GROWTH OF MAJOR AGE GROUPS

So far the discussion has focused on the distribution of population by age group or the relative size of one group to another but one important consequence of the demographic transition is the veritable explosion of population growth and its eventual decline, processes that have affected differently the growth of the major age groups in the population. Overall, world population increased from 2.5 billion in 1950 to 6.5 billion in 2005, a gain of 4 billion, nearly 2.6 times as many people as were alive in 1950. But, as table 8 indicates, about 1.6 billion of this increase occurred between 1950 and 1975 and 2.4 billion during 1975-2005. During the first period, 60 per cent of the population increase was concentrated in the age groups 0-14 and 15-24. In contrast, between 1975 and 2005, 56 per cent of the increase occurred in the form of growth of the population aged 25-59 and during 2005-2025 that age group will also account for the largest share of the population increase expected (54 per cent). After 2025, however, 66 per cent or two-thirds of the expected growth will be concentrated in ages 60 or over.

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| Age group | Increase (millions) | | | | Average annual growth rate (percentage) | | | | Percentage distribution of the population increase by age group | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1950-1975 | 1975-2005 | 2005-2025 | 2025-2050 | 1950-1975 | 1975-2005 | 2005-2025 | 2025-2050 | 1950-1975 | 1975-2005 | 2005-2025 | 2025-2050 |
| | | | | | *World* | | | | | | | |
| 0-14 | 633 | 323 | 88 | - 77 | 2.2 | 0.7 | 0.2 | -0.2 | 41 | 14 | 6 | -7 |
| 15-24 | 298 | 402 | 52 | 14 | 2.0 | 1.4 | 0.2 | 0.0 | 19 | 17 | 4 | 1 |
| 25-59 | 479 | 1 343 | 780 | 458 | 1.6 | 2.2 | 1.2 | 0.5 | 31 | 56 | 54 | 39 |
| 60-79 | 127 | 267 | 447 | 542 | 2.0 | 2.0 | 2.8 | 1.7 | 8 | 11 | 31 | 46 |
| 80+ | 18 | 55 | 74 | 234 | 3.3 | 3.4 | 3.1 | 3.6 | 1 | 2 | 5 | 20 |
| Total | 1 554 | 2 391 | 1 440 | 1 171 | 1.9 | 1.5 | 1.0 | 0.6 | 100 | 100 | 100 | 100 |
| | | | | | *More developed regions* | | | | | | | |
| 0-14 | 31 | - 48 | - 10 | - 2 | 0.5 | -0.7 | -0.2 | -0.1 | 13 | - | - | - |
| 15-24 | 38 | - 11 | - 25 | - 7 | 1.0 | -0.2 | -0.8 | -0.2 | 16 | - | - | - |
| 25-59 | 99 | 140 | - 26 | - 61 | 1.0 | 0.9 | -0.2 | -0.4 | 42 | - | - | - |
| 60-79 | 56 | 56 | 75 | 9 | 2.0 | 1.1 | 1.6 | 0.1 | 24 | - | - | - |
| 80+ | 10 | 26 | 23 | 48 | 3.1 | 2.9 | 2.1 | 2.1 | 4 | - | - | - |
| Total | 234 | 164 | 38 | - 13 | 1.0 | 0.5 | 0.2 | 0.0 | 100 | - | - | - |
| | | | | | *Less developed regions* | | | | | | | |
| 0-14 | 602 | 371 | 98 | - 74 | 2.6 | 0.9 | 0.3 | -0.2 | 46 | 17 | 7 | -6 |
| 15-24 | 260 | 413 | 77 | 21 | 2.4 | 1.8 | 0.4 | 0.1 | 20 | 19 | 6 | 2 |
| 25-59 | 380 | 1 203 | 806 | 518 | 1.9 | 2.6 | 1.6 | 0.6 | 29 | 54 | 57 | 44 |
| 60-79 | 70 | 211 | 371 | 532 | 2.1 | 2.6 | 3.4 | 2.1 | 5 | 9 | 26 | 45 |
| 80+ | 8 | 29 | 50 | 186 | 3.6 | 3.9 | 3.9 | 4.4 | 1 | 1 | 4 | 16 |
| Total | 1 320 | 2 227 | 1 403 | 1 183 | 2.3 | 1.8 | 1.2 | 0.7 | 100 | 100 | 100 | 100 |

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

Trends at the world level are determined mainly by those of the less developed regions so that the two resemble each other. Hence, population growth in the less developed regions during 1950-1975 was concentrated in ages 0-24, but during 1975-2025 its concentration shifted to age group 25-59. After 2025, 61 per cent of the expected population growth in the less developed regions is concentrated in age group 60 or over.

More developed regions display a different pattern of growth by age group. During 1950-1975, age group 25-59 absorbed the largest share of overall population growth, 45 per cent, whereas groups 0-24 and 60 or over accounted for almost equal shares of overall growth (28 per cent). During 1975-2005, however, the population under age 25 declined and population growth was concentrated in both age groups 25-59 and 60 or over, with the former accounting for the largest share. But in future even the population aged 25-29 is expected to decrease so that any population increase will be concentrated at ages 60 or over. That is expected to happen between 2005 and 2025 and, remarkably, also between 2025 and 2050 when overall population growth is projected to be negative even as the population aged 60 or over still increases substantially.

The trends described above result from the movement over the life cycle of the large cohorts born when fertility was high.  In the developed world, they are related to the ageing of the "baby boom" generation, that is, the cohorts born from the late 1940s to the 1960s, when fertility rebounded. In the developing world it is the movement of the large cohorts born before fertility declined significantly in the late 1970s or early 1980s. The fact that fertility remains still high in an important part of the developing world, including most notably sub-Saharan Africa, produces a longer period of expected increases in the size of age groups 0-24 and 25-59. However, according to current projections, the child population in the developing world may start declining after 2025.

With regard to the speed of growth of different age groups, figure 8 displays the growth rates by five-year age group for the world and the development groups. The figure shows how, for the world and the less developed regions, rapid growth at the younger ages gives way to rapid growth at the adult ages and then to that at the older ages as time elapses. It is noteworthy that population growth at the oldest ages (above age 75 or 80) remains high throughout the 1950-2050 period.

For the more developed regions, figure 8 makes plain the pervasive trend toward the eventual reduction of the population which first makes its appearance after 1975 when the younger age groups (under 25) show negative growth. By 2005-2025 negative growth is expected for all age groups below age 55 and by 2025-2050 all groups below age 70 are expected to be decreasing in size.

Today the world has 1.8 billion children and just under 1.2 billion young persons aged 15-24, 88 per cent of whom live in the developing world. These numbers are not expected to change much during the coming decades (table 1). But their distribution among the major regions will experience important shifts. Thus, whereas today 60 per cent of the population under age 25 lives in Asia, 19 per cent in Africa 9 per cent in Latin America and the Caribbean, and 12 per cent in the more developed regions, by 2050 the share of Africa is projected to rise to 30 per cent, while those of Asia, Latin America and the Caribbean, and the more developed regions will drop to 52, 8 and 10 per cent respectively.

The population aged 15-59 is projected to increase by about one third between 2005 and 2050, passing from 2.8 billion to 4.1 billion (table 1). All of this increase is expected to take place in the less developed regions. In the more developed regions, the population of working age is projected to start declining after 2005, so that by 2050 it will be 15 per cent smaller than in 2005 (510 million compared to 596 million). The decline will take place mainly in Europe, where the population aged 25-59 is expected to be almost 30 per cent lower in 2050 than in 2005, and in Japan, where the decline will amount to one third of the current number. In Africa, by contrast, the population aged 25-59 in 2050 is projected to be almost two and a half times as large in 1950 as it is today:  838 million vs. 294 million (table 3).

The number of persons aged 60 or over is expected nearly to triple, passing from 672 million in 2005 to nearly 2 billion by 2050. The increase in the number of older persons is expected to be more marked in the less developed regions, where it may almost quadruple, passing from 428 million to nearly 1.6 billion during 2005-2050. The number of older persons will also rise in the more developed regions, but more moderately, passing from 244 million in 2005 to 400 million in 2050. As a result, whereas today 64 per cent of the population aged 60 or over lives in developing countries, by 2050 the equivalent proportion is expected to be nearly 80 per cent. Today, 54 per cent of the older population lives in Asia and 22 per cent in Europe. The shares of Africa, Latin America and the Caribbean, and Northern America

**Figure 8  Average annual growth rate of population in 5-year age groups, for four time periods during 1950-2050: world and development groups**
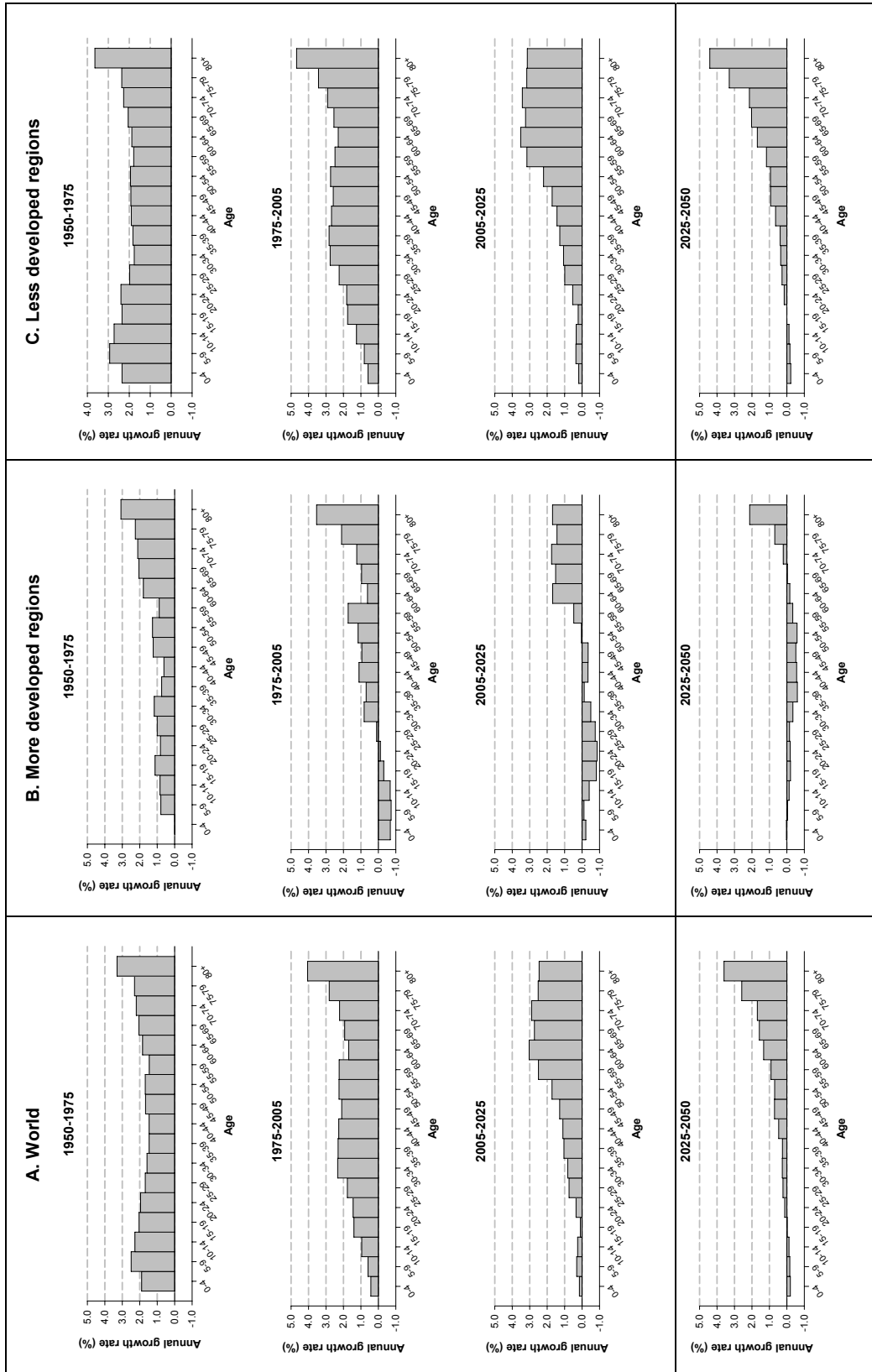
are about 7 per cent each. By 2050, Asia is expected to have the largest share of the older population (63 per cent), whereas Africa, Europe and Latin America and the Caribbean will have about 10 per cent each and Northern America's share would decline to 6 per cent.

A notable aspect of the global ageing process is the progressive demographic ageing of the older population itself.  In most countries, regardless of their geographic location or developmental stage, the population aged 80 or over is growing faster than any younger segment of the older population. At the global level, the average annual growth rate of persons aged 80 years or over in 2000-2005 (4.2 per cent) was more than twice as high as the growth rate of the total population aged 60 or over (2.0 per cent). Although those growth rates are expected to decline over the next 45 years, by 2045-2050 the growth rate of population aged 80 or over (3.0 per cent) will still be almost double that of the group aged 60 or over (1.7 per cent). Such high rates of growth produce in 2050 almost 400 million persons aged 80 or over, nearly five times as many as in 2005 (87 million). Currently, a slight majority of the oldest old live in the more developed regions. By 2050, over 70 per cent are projected to live in the less developed regions.

Although the proportion of the oldest-old is growing, they will remain a minority among older persons.  Today, just 12 per cent of the older population is aged 80 or over and in 2050 the projected numbers show that about 20 per cent could be in that age group.  Worldwide, in 2050, nearly half (47 per cent) of the older population will be aged 60-69 and one third will be aged 70-79.

## H. THE DISTRIBUTION BY SEX OF THE OLDER AGE GROUPS

Normally, more boys are born than girls and the average sex ratio at birth is a biological constant that varies little among populations (it usually ranges from 103 to 106 boys for every 100 girls). Hence, differences in the sex ratio by age are determined by differential mortality by sex. Because women usually have a survival advantage over men, they tend to outnumber men as age advances. Thus, whereas it is estimated that there are today 101 males per 100 females in the world population, the equivalent ratio is 82 men per 100 women among those aged 60 or over (table 9). This means that women aged 60 or over outnumber men in the same ages by about 67 million. Furthermore, the proportion of women in the older population grows substantially with advancing age.  In 2005, women outnumber men by almost 4 to 3 at ages 65 or older, and by almost 2 to 1 at ages 80 or over.

Mortality levels have dropped markedly since 1950. Between 1950-1955 and 2000-2005 the world population gained 18 years of life expectancy, but the gains were not equally shared by men and women (table 10).  In most countries, reductions in mortality have been greater for females than males, thus reinforcing the female survivorship advantage.  At the world level the female advantage in life expectancy at birth has increased from 2.8 to 4.5 years since 1950. Furthermore, in terms of life expectancy at ages 60 and 80, the female advantage has also risen. Consequently, not only are women more likely than men to survive to age 60 but, once they reach that age, they can expect to live considerably longer than men of the same age. These trends have contributed to maintain the low sex ratio of the world population aged 60 or over (82 men per 100 women). Furthermore, among those aged 80 or over, the sex ratio has decreased markedly, passing from 61 in 1950 to 55 in 2005.

Sex ratios at older ages tend to be lower in the more developed regions than in the less developed regions, partly because the sex advantage in female survivorship has been larger in the more developed regions, particularly after age 80.  As a result, there are today 72 men per 100 women aged 60 or over in the more developed regions and just 46 men per 100 women aged 80 or over. Furthermore, given that the female advantage in life expectancy in the more developed regions is expected to decline by 2045-2050, the sex ratio of their population aged 60 or over is projected to increase between 2005 and 2050, passing from 72 to 78 males per 100 females. Increases are also expected in the sex ratio of those aged 80 or over.

TABLE 9. SEX RATIO OF THE POPULATION IN SELECTED AGE
GROUPS FOR THE WORLD AND THE DEVELOPMENT REGIONS,
1950, 2005 AND 2050

| Age group | Sex ratio (males per 100 females) | | |
|---|---|---|---|
| | *1950* | *2005* | *2050* |
| *World* | | | |
| 0-14 | 104 | 105 | 105 |
| 15-59 | 100 | 103 | 104 |
| 60+ | 80 | 82 | 85 |
| 80+ | 61 | 55 | 61 |
| Total | 100 | 101 | 99 |
| *More developed regions* | | | |
| 0-14 | 103 | 105 | 105 |
| 15-59 | 90 | 100 | 103 |
| 60+ | 74 | 72 | 78 |
| 80+ | 58 | 46 | 57 |
| Total | 91 | 94 | 94 |
| *Less developed regions* | | | |
| 0-14 | 105 | 105 | 105 |
| 15-59 | 106 | 103 | 104 |
| 60+ | 86 | 88 | 86 |
| 80+ | 68 | 66 | 63 |
| Total | 104 | 103 | 100 |

*Source*: *World Population Prospects: The 2004 Revision*, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.

In contrast, in the less developed regions, sex ratios in both age groups are expected to decline, indicating that there will be an exacerbation of the imbalance between men and women at older ages in the developing world.

Among the world's major areas, Europe has today the lowest sex ratios at older ages: 69 men per 100 women aged 60 or over, and 42 men per 100 women aged 80 or over. These low ratios result from both large sex differentials in life expectancy and the long-term effects of the massive loss of young men during the Second World War.

TABLE 10. LIFE EXPECTANCY AT BIRTH AND AT AGES 60 AND 80 BY SEX FOR THE WORLD AND THE DEVELOPMENT GROUPS, SELECTED PERIODS

| | 1950-1955 | | | | 2000-2005 | | | | 2045-2050 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Both sexes* | *Female* | *Male* | *Difference* | *Both sexes* | *Female* | *Male* | *Difference* | *Both sexes* | *Female* | *Male* | *Difference* |
| | | | | | *Life expectancy at birth (years)* | | | | | | | |
| World | 46.6 | 48.0 | 45.3 | 2.8 | 65.4 | 67.7 | 63.2 | 4.5 | 75.1 | 77.5 | 72.8 | 4.7 |
| More developed regions | 66.1 | 68.5 | 63.5 | 5.0 | 75.6 | 79.3 | 71.9 | 7.4 | 82.1 | 85.0 | 79.1 | 5.9 |
| Less developed regions | 41.1 | 42.0 | 40.3 | 1.7 | 63.4 | 65.2 | 61.7 | 3.5 | 74.0 | 76.2 | 71.8 | 4.4 |
| | | | | | *Life expectancy at age 60 (years)* | | | | | | | |
| World | 14.8 | 15.5 | 13.9 | 1.5 | 19.2 | 20.7 | 17.5 | 3.2 | 22.4 | 24.3 | 20.5 | 3.8 |
| More developed regions | 18.0 | 19.6 | 16.2 | 3.4 | 21.0 | 23.0 | 18.7 | 4.3 | 25.0 | 27.3 | 22.6 | 4.7 |
| Less developed regions | 13.0 | 13.3 | 12.6 | 0.6 | 18.1 | 19.3 | 16.8 | 2.5 | 21.8 | 23.5 | 20.0 | 3.5 |
| | | | | | *Life expectancy at age 80 (years)* | | | | | | | |
| World | 5.7 | 5.7 | 5.4 | 0.3 | 7.5 | 8.1 | 6.7 | 1.4 | 9.0 | 9.9 | 7.9 | 2.0 |
| More developed regions | 6.7 | 7.2 | 6.1 | 1.1 | 8.3 | 8.9 | 7.2 | 1.7 | 10.4 | 11.5 | 9.0 | 2.6 |
| Less developed regions | 4.9 | 4.8 | 4.9 | 0.0 | 6.8 | 7.2 | 6.3 | 0.9 | 8.5 | 9.3 | 7.5 | 1.7 |

*Source: World Population Prospects: The 2004 Revision, Datasets in Excel and PDF Formats, Extended Dataset, United Nations, 2005.*

## I. THE CHANGING AGE STRUCTURES OF URBAN AND RURAL POPULATIONS

As populations around the world are growing older, they are also becoming more urban. The age structures of urban and rural populations usually differ appreciably, mainly because urban populations have generally undergone the transition to low mortality and low fertility earlier than rural populations. Therefore, urban populations are usually further along the path to population ageing than rural populations. However, urban areas are also major attractors of rural-urban migrants, who tend to be concentrated in the younger ages and would therefore help in moderating population ageing.

Using data gathered by population censuses supplemented in a few cases by information collected by nationally representative surveys it was possible to obtain the age distribution of the population classified by urban or rural area of residence for at least two points in time for 119 of the 192 countries or areas of the world that had in 2000 a population of 100,000 or more. For almost all the countries with data, the first data set refers to a date within the period 1960-1980 and the second to the period 1981-2005. Those periods were selected so as to make possible an assessment of changes in the age distributions of urban and rural populations from about 1970 to the 1990s. The countries with data available have a combined population of 5.2 billion in 2000, that is, they account for 85 per cent of the world population at the time. Table 11 presents the distribution of countries with data available by development group and major area. Note that coverage is somewhat better for developed than for developing countries (68 per cent vs. 60 per cent of countries have data, respectively) and that, in terms of major area, coverage ranges from 50 per cent of countries in Oceania to 68 per cent of those in Europe and Northern America.

To obtain the proportions of the population in each age group by rural and urban residence, the data available for countries within each major area were added up without adjustment for reference dates, completeness of coverage or variations in the definition of urban. In reporting the aggregates, the median reference date of the data in each aggregate is reported as an indicator of the reference date of the sum. Despite their deficiencies, the estimates obtained provide an indication of how age structures vary in urban and rural areas.

According to United Nations estimates (United Nations, 2004), the world population will become half urban before 2010. However, the proportion urban varies markedly among major areas. Despite the trend towards rapid urbanization, the populations of Africa and Asia remain mainly rural and the proportion urban in those areas is still a low 40 per cent in 2005. Latin America and the Caribbean, in contrast, is highly urbanized with close to 78 per cent of its population living in cities or towns. Europe, Northern America and Oceania are also highly urban, with Europe and Oceania being 73 per cent urban in 2005 and Northern America having 81 per cent of in population in urban areas. It is in this context that an examination of differences in the age structures of urban and rural populations is to be examined.

Given that urban populations the world over have been the first to benefit from improvements in sanitation, vaccines and new drugs that reduce mortality and that urban dwellers have been more adept at controlling their fertility, the transition to low mortality and low fertility usually starts much earlier in urban than in rural areas. Consequently, it would be expected that the urban population would be older than that in rural areas. However, as mentioned above, the age distribution of urban populations is also influenced by migration and because the net gains from rural-urban migration tend to be high at young adult ages, it is expected that urban populations may be somewhat younger than they would have been in the absence of migration.

| | Number of countries | | |
| Major area | Total[a] | With data | Percentage with data |
|---|---|---|---|
| World | 192 | 119 | 62 |
| More developed regions | 44 | 30 | 68 |
| Less developed regions | 148 | 89 | 60 |
| Africa | 54 | 31 | 57 |
| Asia | 50 | 31 | 62 |
| Latin America and the Caribbean | 35 | 23 | 66 |
| Europe and Northern America | 41 | 28 | 68 |
| Oceania | 12 | 6 | 50 |

[a] Only countries or areas with more than 150,000 inhabitants in 2000 are included.

Table 12 presents the age distribution of the urban and rural populations of the world and major areas by broad age groups. Two sets of data are presented in each case: one referring to the early 1970s and the second referring to the1990s or later. Note that, particularly for the most recent estimate, median reference dates vary from 1990 to 2001. In particular, considerably more recent data are available for the more developed regions than for the less developed regions.

Focusing first on change over time, it is clear that the proportion of children has decreased almost universally, whether in urban or rural areas  The sole exception is among the rural population of Africa and this finding is consistent with the delayed transition to low fertility in that major area. It is noteworthy, however, that a small reduction in the proportion of children is noticeable for the urban population of Africa, consistent with an incipient transition to lower fertility.

The proportion of the population aged 15-24 has also decreased in most areas over time. Exceptions arise again in the case of Africa but also for Latin America and the Caribbean where the proportion in age group 15-24 in urban areas remains unchanged and that in rural areas increases slightly. The effect of net rural-urban migration may contribute to the lack of change in the proportion for urban areas and because the data for Latin America and the Caribbean refer to earlier reference dates than those for Asia, the trends observed are consistent with a transition to low fertility that started in the 1970s and has not yet had an effect at ages above 15.

Regarding trends in the proportions aged 25-59 and 60 or over, increases are the rule except in Africa where the estimates show no change in the proportion aged 60 or over whether in rural or in urban areas and an increase in the proportion aged 25-59 in rural areas, indicative of the ongoing rejuvenation of the population as fertility remains high.

Overall therefore, the trend toward population ageing is evident in both the urban and the rural populations of all major areas except Africa. From around 1970 to the most recent reference date, the age distributions of the urban and rural populations of all areas except Africa shifted from the two younger age groups, especially from ages 0-14, to older ages, primarily as a result of declining fertility.

| Major area | Year | Percentage of the urban population in each age group | | | | Percentage of the rural population in each age group | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 0-14 | 15-24 | 25-59 | 60+ | 0-14 | 15-24 | 25-59 | 60+ |
| World | 1971 | 31 | 20 | 41 | 9 | 39 | 17 | 36 | 8 |
| | 1996 | 25 | 18 | 46 | 11 | 34 | 17 | 40 | 9 |
| More developed regions | 1970 | 24 | 18 | 44 | 13 | 27 | 15 | 41 | 16 |
| | 2001 | 19 | 15 | 49 | 18 | 20 | 14 | 45 | 21 |
| Less developed regions | 1972 | 35 | 21 | 38 | 6 | 41 | 18 | 35 | 7 |
| | 1994 | 28 | 20 | 44 | 8 | 35 | 17 | 39 | 8 |
| Africa | 1974 | 40 | 21 | 34 | 4 | 45 | 18 | 31 | 6 |
| | 1991 | 38 | 21 | 36 | 5 | 46 | 19 | 30 | 6 |
| Asia | 1971 | 32 | 21 | 41 | 7 | 40 | 18 | 36 | 7 |
| | 2000 | 25 | 19 | 47 | 9 | 33 | 17 | 41 | 9 |
| Latin America and the Caribbean | 1971 | 39 | 20 | 35 | 7 | 46 | 18 | 30 | 6 |
| | 1993 | 30 | 20 | 42 | 9 | 38 | 19 | 35 | 8 |
| Northern America | 1970 | 28 | 18 | 40 | 14 | 31 | 16 | 39 | 14 |
| | 2000 | 21 | 14 | 49 | 16 | 21 | 12 | 49 | 18 |
| Europe | 1970 | 22 | 18 | 46 | 14 | 26 | 15 | 42 | 17 |
| | 2001 | 18 | 15 | 49 | 17 | 21 | 14 | 43 | 21 |
| Oceania | 1972 | 29 | 17 | 41 | 13 | 36 | 16 | 38 | 9 |
| | 1990 | 23 | 17 | 45 | 15 | 29 | 15 | 44 | 11 |

*Source*: Authors' calculations.

Turning now to the level of urbanization of the population in each age group, the estimates derived from the countries with data available suggest that, at the world level, children 0-14 are less likely to be urban dwellers than persons in other age groups (table 13). This finding is consistent with the conclusions of earlier studies (United Nations, 1980; Hermanova, 1999). The proportions urban for other age groups are remarkably similar indicating that the population aged 25 or over is already 49 per cent urban.

In the more developed regions, the highest levels of urbanization are found among age groups 15-24 and 24-59, which are 75 per cent urban. Children are 72 per cent urban and older persons just 70 per cent. These estimates reflect mostly the pattern in Europe, where children and older persons also appear to be less likely than persons in other age groups to live in urban areas. However, the data for Europe may be biased toward the more rural countries in the continent since the overall level of urbanization for Europe shown table 13 is somewhat lower than the 73 per cent estimated for the whole population of Europe in 2000 (United Nations, 2004).

The estimates for the less developed regions also show that children and older persons are less likely to be urban dwellers than persons aged 15-59. This pattern results mainly from those prevalent in Africa and Asia because in Latin American and the Caribbean there is not a large difference between the proportions living in urban areas for ages 15-59 and 60 or over.

TABLE 13. PERCENTAGE OF THE POPULATION IN EACH AGE GROUP LIVING IN URBAN AREAS FOR THE
WORLD AND MAJOR AREAS, TWO REFERENCE DATES

| Major area | Year | *Percentage in urban areas* | | | | |
| | | *0-14* | *15-24* | *25-59* | *60+* | *Total* |
| --- | --- | --- | --- | --- | --- | --- |
| World | 1971 | 30 | 38 | 38 | 39 | 35 |
| | 1996 | 39 | 48 | 49 | 49 | 46 |
| More developed regions | 1970 | 63 | 70 | 67 | 62 | 66 |
| | 2001 | 72 | 75 | 75 | 70 | 74 |
| Less developed regions | 1972 | 23 | 29 | 27 | 24 | 26 |
| | 1994 | 35 | 43 | 43 | 38 | 40 |
| Africa | 1974 | 21 | 27 | 25 | 19 | 23 |
| | 1991 | 28 | 34 | 36 | 28 | 32 |
| Asia | 1971 | 21 | 27 | 27 | 23 | 24 |
| | 2000 | 32 | 41 | 40 | 37 | 38 |
| Latin America and the Caribbean | 1971 | 54 | 61 | 62 | 63 | 59 |
| | 1993 | 71 | 76 | 78 | 76 | 75 |
| Northern America | 1970 | 72 | 76 | 74 | 73 | 74 |
| | 2000 | 79 | 81 | 79 | 78 | 79 |
| Europe | 1970 | 56 | 64 | 62 | 55 | 60 |
| | 2001 | 66 | 70 | 71 | 64 | 68 |
| Oceania | 1972 | 77 | 81 | 82 | 85 | 81 |
| | 1990 | 79 | 84 | 83 | 87 | 83 |

*Source*: Authors' calculations.

In sum, aside from showing that the degree of urbanization varies by age group, the estimates available also show that the large majority of the child population in Africa and Asia lives in rural areas, as does the majority of the older population of those major areas (about 70 per cent in Africa and 60 per cent in Asia). It also appears that about a third of the child and the older population of Europe still lives in rural areas, though the countries with data available may be less urbanized than those excluded. Lastly, in Latin America and the Caribbean, Northern America and Oceania, very high percentages of the whole population but also of children and older persons are already urban dwellers. These differences by major areas have important implications for the strategies that society may adopt to adjust to the expected changes in age distribution.

## J. LIVING ARRANGEMENTS OF OLDER PERSONS

As this paper has documented, populations everywhere are growing older. Furthermore, not only are more people surviving to reach old age, but those who attain old age are living longer than ever before. As a consequence, families comprising three or even four generations have become common, considerably expanding the alternatives for living arrangements of older persons. At the same time, the social and economic transformations that many countries are undergoing are modifying many aspects of

day-to-day family life, including traditions favouring lifelong co-residence of parents and children as a basic means of ensuring support for young and old.

A recent study by the United Nations presents an analysis of the patterns in the living arrangements of older persons based on comparable data for more than 130 countries (United Nations, 2005b). The study finds that about one out of every seven older persons or approximately 90 million people live alone. The large majority of these people, some 60 million, are women. Worldwide, 19 per cent of women aged 60 or over live alone, compared with 8 per cent of men in the same age group (table 14). Older women are more likely than older men to live alone because less of them are currently married. Thus, about 45 per cent of women aged 60 years or over have a living spouse, whereas nearly 80 per cent of men in that age group do. Older women are also more likely to live with grand-children only or with relatives other than their children or grand-children, whereas older men are more likely to live with a spouse.

TABLE 14. PROPORTION OF PERSONS AGED 60 YEARS OR OVER
WHO LIVE ALONE: ESTIMATES FOR THE WORLD AND MAJOR
AREAS, BY SEX
*(Percentage)*

| Major area or region | Total | Men | Women |
|---|---|---|---|
| World ......................................... | 14 | 8 | 19 |
| Africa ........................................ | 8 | 6 | 11 |
| Asia .......................................... | 7 | 5 | 9 |
| Europe ....................................... | 26 | 13 | 35 |
| Latin America and the | | | |
| Caribbean ................................ | 9 | 7 | 10 |
| Northern America ...................... | 26 | 15 | 34 |
| Oceania[a] .................................... | 25 | 16 | 34 |

*Source:* United Nations (2005). *Living Arrangements of Older Persons Around the World.* (United Nations publication, ST/ESA/SER.A/240).
[a] Imputed on the basis of data that covered under half of the region's population.

In the more developed regions, about a quarter of older persons live alone, but in the less developed regions just under 10 per cent do so. The proportions living alone are lowest in South-Eastern and South-Central Asia, where about 5 per cent of older persons live alone, and highest in Northern and Western Europe, where about a third of older persons do so.

Whereas the likelihood of solitary living at older ages had been increasing in many developed countries, in recent years that trend has slowed down or halted in some countries, including Canada, Italy and the United States. The reasons for such slow down involve a combination of longer life, which tends to decrease the prevalence of widowhood, declines in the proportion who never married, and an upward trend in the age at which children leave home.

Older persons the world over are opting for independent living by either living alone or only with a spouse. This preference is pervasive in economically developed countries and it is growing in some developing countries. However, whereas the most common arrangement in developed countries is for older persons to live apart from their children, around 75 per cent of older persons in developing countries live with a child or grandchild (figure 9). In European countries, by contrast, just 25 per cent of older persons live with their children.

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**Figure 9. Living arrangements of older persons in more developed and less developed regions and selected major areas**
*(Persons aged 60 years or over)*



**More developed regions**

- Alone (25%)
- With spouse only (43%)
- With children/grandchildren (27%)
- Other relatives or non-relatives (5%)

**Less developed regions**

- With spouse only (13%)
- Alone (7%)
- With children/grandchildren (75%)
- Other relatives or non-relatives (5%)

**Africa**

- With spouse only (9%)
- Alone (8%)
- With children/grandchildren (74%)
- Other relatives or non-relatives (8%)

**Asia**

- With spouse only (16%)
- Alone (7%)
- With children/grandchildren (74%)
- Other relatives or non-relatives (4%)

**Latin America and the Caribbean**

- With spouse only (16%)
- Alone (9%)
- With children/grandchildren (62%)
- Other relatives or non-relatives (14%)

**Europe**

- Alone (26%)
- With spouse only (43%)
- With children/grandchildren (26%)
- Other relatives or non-relatives (4%)

*Source:* United Nations (2005). *Living Arrangements of Older Persons Around the World* (United Nations publication, ST/ESA/SER.A/240).
NOTE: Based on the population in households.

At the world level, the proportion of older persons who live with a child has been declining. This is so, even as the percentage of older persons who have living children has been increasing. In developed countries, older persons typically experience an "empty nest" phase of life, so that the percentage of older persons living with children declines substantially as age advances from the sixties to the seventies and the youngest children mature and leave home. By contrast, in many developing countries the percentage of older persons living with a child remains high at older ages, suggesting a predominant pattern of lifelong co-residence with at least one child.

Countries with higher levels of social and economic development have lower levels of co-residence with children. National levels of development explain much of the variation in living arrangements of older persons around the world. This suggests that, as levels of income and education rise, and as fertility decline leads to a smaller number of offspring, living arrangements in the developing countries might come to resemble those of the more developed regions. However, cultural factors may have long-enduring effects on living arrangements. For example, even after taking development levels into account, older Europeans are less likely to live with children than are older persons in the less developed regions.

Within developing countries, higher socio-economic status is often associated with higher, not lower, levels of co-residence with children. More specifically, in countries with low levels of development, co-residence with children tends to be associated with higher social and economic status. Among countries at moderate levels of development, these differentials tend to disappear or even reverse direction, and in economically advanced countries, older persons living as a separate couple tend to have a higher socio-economic status than those living with children.

Co-residence with children is an important element of the flow of support between family members. This is particularly so with respect to informal support that depends on physical proximity, such as providing assistance with basic activities of daily living. For older persons living with a spouse, support in performing activities of daily living is primarily provided by the spouse. Furthermore, it is wives rather than husbands who usually provide such support.

In many developed countries, institutional living has become an option for older persons who have difficulty managing on their own or who need specialized medical services. The issue of how to provide long-term care for older persons who need assistance and the escalating costs of providing such care have become pressing policy concerns in developed countries. In some countries, policies promoting community support so that it is possible to "age in place" appear to have halted or reversed earlier trends towards higher rates of institutionalization. The main factor accounting for differences in levels of institutionalization among countries appears to be a society's ability to support the costs of institutional care. Recent trends in a number of developed countries seem to indicate that institutional care is increasingly reserved for those with the greatest need for more intensive care, who tend to be the oldest and the frailest. In most countries, the level of institutionalization is higher for women than for men. Women's greater likelihood of being widowed is the main reason for their greater likelihood of institutionalization. Indeed, unmarried older men are usually more likely to live in an institution than unmarried women.

In countries with high rates of HIV infection, the proportion of older persons living with grandchildren, but not with children (skipped-generation households), has increased. In the countries where at least 10 per cent of adults have been infected with HIV, the proportion of older persons in skipped-generation households grew by 2.7 percentage points over a period averaging only seven years. Older women are more likely than older men to live in these skipped-generation households.

In developing countries, older persons living either alone or in skipped-generation households tend to be an especially disadvantaged group and older women are more likely than older men to live in those situations. Over 10 per cent of older women live in skipped-generation households in most countries of sub-Saharan Africa and in some of Latin America and the Caribbean. In Malawi, Rwanda, Zambia and Zimbabwe, between 21 per cent and 34 per cent of older persons live in skipped-generation households.

Overall, there is great variability in living arrangements involving older persons. For instance, the proportion of older persons living with a child or grandchild ranges from 4 per cent in Denmark to almost 90 per cent in Bangladesh, while the proportion living alone varies from less than 1 per cent in Bahrain to almost 40 per cent in Denmark. Living arrangements are both determined by and determine the well-

being of older persons. As populations continue to age, societies will have to develop novel ways of improving and promoting the self-reliance of older adults, perhaps by providing innovative services to permit older persons to remain living independently for as long as possible and by encouraging family cohesiveness and the continued involvement of family members in the care and well-being of the older generations.

## K. CONCLUSION

In 2005, most countries of the world are far advanced in the demographic transition. Developed countries have already reached the threshold of the third stage of the transition, when population ageing is pervasive and rapid. The majority of developing countries are in the second stage, when a favourable age distribution gives rise to a demographic bonus. There remain, however, some countries that are only at the start of the transition to low fertility and fewer still where fertility decline has not yet started. Those countries, most of which are located in Africa, are expected to continue having a youthful population for some time and may not enter the period of the demographic bonus until later in this century.

The changes set in motion by the demographic transition lead to an ongoing transformation of populations which entails both opportunities and challenges for development. In order to benefit from the demographic bonus countries need to adopt sound macroeconomic policies to foster investment and job creation. Already the cases of the "East Asian Tigers" prove that the demographic bonus can contribute to accelerate economic growth (Bloom and Williamson, 1998). The issue is whether other countries undergoing the transition can reap similar benefits.

In developing countries, the demographic bonus appears after a period of rapid population growth where the population becomes younger. Consequently, both the number and the proportion of children and young adults rises. Countries that are just entering the second stage of the transition also have to face the need to educate the large number of children and young adults in their population. At the world level, the number of persons aged 15-24 is at an all time high of nearly 1.2 billion and this number is not expected to decline before 2050. Nearly 9 out of every 10 persons aged 15-24 live in the developing world. Providing them and the 1.8 million children of the world with adequate education and health services to enhance their productive role in society remains a major challenge.

Equally important is the need to start planning for the time when the demographic bonus ends and population ageing accelerates. Already today, when developing countries have a relatively youthful population, 64 per cent of the population aged 60 years or over lives in developing countries. In 20 years time, developing countries will be the home of 71 per cent of the world's older persons. Although older persons will constitute just about 13 per cent of the population of the less developed regions in 2025, their numbers will soar to 850 million. Ensuring that these growing numbers of older persons have adequate support in old age, access to decent employment for those who need or want to remain economically active, and appropriate health care is also likely to prove challenging.

In the more developed regions, the rapid population ageing expected demands societal and economic adaptations to a new reality. Older people in developed countries remain in good health for longer than ever before and therefore have the potential to continue being productive. Increases in retirement age are already being instituted and will have to continue if mortality across the developed world keeps on falling as expected.

Future changes in age structure can be anticipated with considerable accuracy, partly because the older persons of mid-century have already been born. Policy makers and planners have therefore ample

warning of what lies ahead. Although population ageing is inevitable, its consequences will depend on the measures developed to address the challenges it poses.

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**IMPLEMENTING THE MADRID PLAN OF ACTION ON AGEING**


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> *"The world has changed almost beyond recognition since the first World Assembly on Ageing in 1982. Where once population ageing was mostly a concern of developed countries, today it is gaining real momentum in developing countries as well. And where once ageing may have been thought by some to be a stand-alone issue or an afterthought, today we understand that such a dramatic demographic transformation has profound consequences for every aspect of individual, community, national and international life".*

> *Kofi Annan*
> *Secretary-General*
> *United Nations*


### A. A DEFINITION OF AGEING

The United Nations identifies – exclusively for the purpose of demographic comparison –populations who have reached the age of 60 years as "older persons". Today, worldwide, there are around 690 million persons aged 60 years and over; this total will almost double by 2025 and is expected to reach nearly two billion by 2050 (United Nations, 2005). The vast majority of these older persons will reside in the developing world.

Ageing should be considered from two major perspectives: demographic and individual. From the demographic perspective, ageing is a population process, caused by declining fertility and mortality rates, which manifests itself in the growing number of older persons in society. Individual ageing is a process of individual progression through the life course, particularly its latest stages. It is important to consider both of these perspectives of ageing and the implications they carry for society and for the individual as well as his or her family.

From a demographic perspective, nothing short of a revolution is underway (United Nations, 2004, 2005):

- One out of every nine persons is now 60 years and over; by 2050, one out of five will be 60 years or over; and by 2150, one out of three persons will be 60 years or over.

- The older population itself is ageing. The oldest old (80 years or over) is the fastest growing segment of the older population. They currently make up 13 per cent of the age group 60 year or over and will grow to 20 per cent by 2050. The number of centenarians (aged 100 years or over) is projected to increase thirteen-fold from approximately 287,000 in 2006 to 3.7 million by 2050.

- The majority of older persons (55 per cent) are women. Among the oldest old, 64 per cent are women.

- Striking differences exist between regions. One out of five Europeans, but only one out of twenty Africans, is 60 years or older.

- The majority of the world's older persons (51 per cent) live in urban areas. By 2025, this is expected to climb to 62 per cent of older persons, although large differences exist between developed and less developed regions. In developed regions, 74 per cent of older persons are urban dwellers, while in less developed regions, which remain predominantly rural, 37 per cent of older persons reside in urban areas.

- While it is true that older persons comprise a larger proportion of the population in developed countries, sheer numbers are far larger in less developed countries.

Over the last half of the twentieth century, 20 years were added to the average lifespan, bringing global life expectancy to its current level of 66 years. Large differences exist between countries, however. In some less developed countries, and particularly those ravaged by conflict and disease, life expectancy continues to hover in the mid-40s. Men in least developed countries[1] who reach the age of 60 can expect only 15 more years of life, while women can look forward to 17 more years; in more developed regions[2], life expectancy at age 60 is 19 years for men and 23 years for women (United Nations, 2005).

The increase in the number of older persons will be greatest and most rapid in developing countries where, on average, the older population is expected to almost quadruple in the next 50 years. In Asia and Latin America, the proportion of persons classified as older will increase from 9 to 15 per cent between 2006 and 2025. In Africa, the proportion is expected to grow from 5 to 6 per cent during the period and to double to 10 per cent by 2050. However, in sub-Saharan Africa, HIV/AIDS and economic and social hardships will keep the percentages lower than that of the continent as a whole. The proportion of older persons in Europe will increase from 21 to 28 per cent, while in North America it will grow from 17 to 24 per cent during 2006-2025 (United Nations, 2005).

More people are living into old age and also spending more years than ever before in old age. This has important consequences for the types of social provisioning and the patterns of resource mobilization that will be required to meet the needs of ageing populations. In many developed countries, which have longer experience with ageing populations, one of the dilemmas is how to continue to provide the critically needed services for older persons without creating or exacerbating intergenerational inequity. In developing countries, where rapid rates of population ageing are occurring at the same time that social support is still mostly provided by extended families, such support – where it still exists – is becoming increasingly unreliable and inadequate; where no formal social safety nets exist for older persons, the challenge is to determine what basic services should be provided to those older persons who have no children or whose children lack resources to provide care, and how best to provide that care.

The issues that fill our later years clearly warrant careful attention but, at the same time, a focus on demographic challenges can mask the markedly different prospects that face older people in different parts of the world. Many people in some parts of the developing world – and even some people in parts of the wealthiest countries – face a troubling reality, as old age comes earlier for those worn down by the physical wear and tear of poverty and disease. While individuals in the majority of countries are within reach of extended life spans, life expectancy at birth has experienced alarming declines in some developing countries and countries with economies in transition suffering from the devastating effects of war, economic deterioration and HIV/AIDS.

B. THE SECOND WORLD ASSEMBLY ON AGEING

The international meeting held in Madrid, Spain in April 2002 brought together representatives of 156 countries to consider the global situation of older persons. A total of 173 speakers took the floor during the five-day general exchange of views at the Assembly's plenary. Four heads of State, one Vice-

President and 48 Ministers addressed the Assembly, and one thousand representatives of non-governmental organizations participated, with the United Nations' Secretary-General, Kofi Annan, opening the Assembly (United Nations, 2002).

Marking the twentieth anniversary of the First World Assembly on Ageing, the Second Assembly considered progress and setbacks that occurred in two decades and launched a global effort to address the demographic revolution that is taking place all over the world. The 1982 Plan of Action essentially considered ageing in the context of issues and concerns of the developed countries as, at that time, many developing countries did not consider the issue of ageing to be a pressing concern (United Nations, 1982). In Madrid, it was recognized that demographic changes would be greatest and most rapid in developing countries, and so they, too, must address the global force of population ageing and its impact on development. The Assembly considered ageing in the context of strategies for the eradication of poverty, as well as efforts to achieve full participation of all developing countries in the world economy.

Responding to growing concern over the speed and scale of global ageing, the Assembly adopted two main outcome documents – a Political Declaration and an implementation plan, the Madrid International Plan of Action on Ageing (United Nations, 2002). The contents of these documents promoted a new recognition that ageing is not simply an issue of social security and welfare, but of overall development and economic policy. These documents also stressed the need to promote a positive approach to ageing and overcome the negative stereotypes associated with it.

The primary responsibility for achieving the objectives of the Plan lies with governments, acting in partnership with organizations of civil society, the private sector and older persons. International cooperation through the United Nations system is essential. National and international follow-up measures should start with mainstreaming ageing and the concerns of older persons into national development frameworks. Research should be directed at the individual as well as the social and health implications of ageing, particularly in developing countries.

### C. THE MADRID INTERNATIONAL PLAN OF ACTION ON AGEING

The Madrid Plan clearly focuses on developing countries because they will experience the process of population ageing most strongly in the twenty-first century. More importantly, these countries will have to respond to the implications of ageing with fewer economic and social resources than are available to the developed world as it confronts its own ageing issues. The international challenge will be to assist developing countries to avoid experiencing the ageing of their societies as an additional problem, but to derive from it added value and opportunities to promote development.

*Perspectives and Objectives*

The Second World Assembly on Ageing was a turning point in international policy debate and action on ageing. The Assembly recognized ageing as a global developmental phenomenon and supported the inclusion of ageing into the international development agenda. This means that the ageing of society is recognized to have a strong impact on societal development – and provides an opportunity for that development – and that older persons are embraced as a resource. There has been a strong move away, at least at the level of rhetoric, from a welfare approach that categorizes older persons as merely in need of care and support to a developmental approach that recognizes that the vast new numbers of older persons will and necessarily must be engaged as continuing agents of development and change.

The Madrid Assembly stated that: "The potential of older persons is a powerful basis for future development. This enables society to rely increasingly on the skills, experience and wisdom of older persons, not only to take the lead in their own betterment but also to participate actively in that of society

as a whole". Societies will no longer be able to afford to consider their older citizens unproductive. Experience from many developing countries already indicates that the contributions of older citizens are fundamental to economic and social well-being.

The Plan is designed to guide policy formulation and implementation for successful adjustment to an ageing world. The success of this adjustment will be measured in terms of social development, improvements in quality of life for older persons, and the sustainability of the formal and informal various systems that underpin the quality of well-being throughout life.

*Overarching goals of the Madrid Plan of Action*

- Realizing the human rights and fundamental freedoms of all older persons. Ensuring the full enjoyment of economic, social and cultural rights, and civil and political rights of persons and the elimination of all forms of violence and discrimination against older persons;

- Achieving secure ageing. This involves reaffirming the goal of eradicating poverty in old age and building on the United Nations Principles for Older Persons;

- Empowering older persons to participate in the economic, political and social lives of their societies, including through income-generating and voluntary work;

- Providing opportunities for individual development, self-fulfillment and well-being throughout life as well as in late life through, for example, access to life-long learning and participation in the community while recognizing that older persons are not one homogeneous group;

- Achieving gender equality among older persons through, inter alia, elimination of gender-based discrimination;

- Recognizing the crucial importance of families, intergenerational interdependence, solidarity and reciprocity for social development;

- Providing quality health care, support and social protection for older persons, including preventive and rehabilitative health care;

- Facilitating partnership between all levels of government, civil society, the private sector and older persons themselves in translating the International Plan of Action into practical action; and

- Harnessing of scientific research and expertise and realizing the potential of technology to focus on, inter alia, the individual, social and health implications of ageing, in particular in developing countries.

The recommendations for action are organized in three priority directions: (i) older persons and development; (ii) advancing health and well-being into old age; and (iii) ensuring enabling and supportive environments.

The first priority is closely related to the overall task of reconciling societal ageing and development. The recommendations are based on a human rights approach to development, which emphasizes the right to development for people of all ages. Ensuring equity across generations is a prerequisite for persons of

all ages to participate in economic and social life and to share in its benefits. The Madrid Plan identifies eight "developmental" issues where policy actions are required: (i) active participation in society and development; (ii) work and the ageing labour force; (iii) rural development, migration and urbanization; (iv) access to knowledge, education and training; (v) intergenerational solidarity; (vi) eradication of poverty; (vii) income security, social protection and poverty prevention; and (viii) emergency situations.

The second priority is advancing health and well-being into old age. Here again, the developmental approach is evident from the emphasis the Plan places on good health of the population as vital for national development, and on individual good health as the most important asset and human right. To reach old age in good health requires the combined efforts of the individual, the community, government and civil society. In addition to the supportive environment provided by government, individuals have the responsibility to maintain a healthy lifestyle. Thus, this priority promotes a focus on both the broader life course and the social relationships inherent in maintaining good health.

To ensure the societal and particularly individual adjustment to ageing, enabling and supportive environments are required. The third priority is to ensure and sustain such environments. The Plan recognizes the need to build intergenerational solidarity in the family, community and institutions. The Plan promotes greater access to both the physical environment and to services and resources, including care and social protection. Finally, the Plan recommends enhancing positive perceptions of ageing in order to influence public values relating to social, cultural and economic exchanges between generations and to eliminate and prevent all forms of elder abuse. Policies and practices should be designed to encourage collaborative partnerships of governments and civil society in this area.

*Road map for implementation of the Madrid International Plan of Action on Ageing*

The road map[3] sets out a practical framework for implementation of the Madrid International Plan of Action on Ageing. The framework will assist countries to elaborate strategies for the implementation of the Madrid Plan of Action at the national level by helping them to set national priorities and select approaches. Simultaneously, the road map strives to stimulate international cooperation to assist Member States in their implementation efforts.

The road map takes into consideration the recommendations of the Plan for national action for its implementation and follow-up; it also incorporates the priorities for international cooperation on ageing formulated in the Plan. It is designed with the understanding that implementation of the Madrid Plan of Action is neither a linear nor a simultaneous process: the speed and direction of action are expected to vary between and within nations. Yet two universal and essential facets of the implementation process, particularly in developing countries and countries with economies in transition, may be identified: national capacity-building and mainstreaming of ageing into the national developmental agenda. The two facets are interlinked and interdependent.

The implementation of the Madrid Plan of Action is an evolving process. The strategy for its implementation should also evolve as a result of implementation activities and experience and ongoing communications between all relevant international and national actors. The role of the Department of Economic and Social Affairs Programme on Ageing as the United Nations focal point on ageing is to facilitate the evolving project of the road map through networking within and outside the United Nations system.

*National action*

The Madrid Plan of Action states that its implementation will require sustained action at all levels. The national level is where the success or failure of the implementation process will be determined and

the Plan of Action emphasizes the importance of national capacity-building for successful implementation. The international community has learned through mainstreaming initiatives – the most notable being gender mainstreaming – that without capacity-building, mainstreaming is unlikely to occur following the adoption of a plan of action.

National development goals will not be reached when a fast growing segment of the population remains excluded from the process of development.  Therefore, in order to support Member States in their implementation efforts, particularly in promoting and mainstreaming ageing into national development frameworks and poverty eradication strategies, the Department of Economic and Social Affairs is implementing a programme of assistance. One facet of the programme is the convening of national workshops that offer Member States the opportunity to focus on their implementation priorities within the context of the Plan, assess their implementation needs and available infrastructure, and identify resources. During these workshops, there are several issues that are explored and addressed within the national implementation process. These issues include:

- Benefits of, and obstacles to mainstreaming issues of ageing into the national development agenda;

- Role of national focal points and mechanisms on ageing in the development of national policy;

- Status of national age and sex-disaggregated data collection and analysis as the basis for successful mainstreaming. The task here is to pinpoint age and gender-based exclusion and inequality in order to influence policy design, monitoring and evaluation;

- Participation of older persons in the processes of formulation, implementation and monitoring of the development agenda; and

- Building and adjusting organizational capacity in order to achieve the understanding, commitment and capacity of staff to undertake age-sensitive analysis and initiatives.

*International action*

The Madrid Plan of Action established that the challenges of an ageing society must also be addressed through global development agendas and that policy responses to ageing must be mainstreamed in cross-sectoral policies, programmes, objectives and priorities at the international level. According to the Plan, mainstreaming ageing into global agendas is essential and requires that ageing be linked to other frameworks for social and economic development and human rights.

Mainstreaming ageing at the global level requires a systematic process and strategy to incorporate ageing into all facets of development programmes and policies. It requires different thinking about respective mandates and institutional frameworks, and the reduction of compartmentalization. A crucial starting point would be to incorporate ageing in the elaboration of United Nations Common Country Assessments and subsequent Development Assistance Frameworks at the country level. Mainstreaming should not create separate or new programmes where implementation becomes hindered by lack of resources. Rather, it should integrate ageing into existing processes and work programmes of the United Nations system organizations and development budgets and should include older persons in policy implementation and evaluation as a matter of course.

Strategic plans and policies specifically targeted to older persons are still critical, but not enough to address the global reach of the ageing issue. Successful adjustment to an ageing society should not merely

address the linear ascent into old age but should promote broad-scale adjustments throughout life and across social, economic and political institutions. Ageing needs to be linked to global agendas that address the following: (i) poverty – to include older poor people; (ii) children and youth – to include intergenerational issues; (iii) advancement of women – to include older women; (iv) rural development – to include issues of ageing in rural and remote areas; and (v) HIV/AIDS – to include its impact on older persons and to recognize the vital contribution of older persons in keeping families and communities together in the face of HIV/AIDS.

The link between ageing and poverty has been neglected in the global debate on poverty reduction strategies owing to the lack of hard statistical evidence on poverty levels of older persons and knowledge about the intergenerational transmission of poverty. This neglect is most evident in the case of the Poverty Reduction Strategy Papers (PRSPs), formulated by governments in association with the Bretton Woods institutions and in relation to the poverty-reduction targets and social and economic development objectives contained in the Millennium Development Goals. As societies age, integrating ageing into internationally agreed outcomes would help institutions to keep pace with the changes induced by demographic trends. It is important to start with the action programmes of the Goals and to integrate ageing and other social groups into procedures governing the PRSPs so that the potential of pro-poor policies is realized to the fullest.

The global actions to achieve the Millennium Development Goals and implement PRSPs are providing opportunities for the involvement of all sectors of civil society and government. An incremental approach may best incorporate ageing by setting achievable, practical targets that utilize existing data to establish policy now, rather than waiting for later when the data finally convince policymakers of the urgency of the issue. Nonetheless, the lack of age-disaggregated data in many countries remains a serious hindrance to policy formulation and development.

*Modalities for review and appraisal*

The Commission for Social Development was designated as the intergovernmental body responsible for periodic review and appraisal of the implementation of the Madrid International Plan of Action on Ageing.  At its 41st session in 2003, the Commission agreed to establish a "bottom-up approach" to review and appraisal.

The bottom-up approach is defined as an open-ended, participatory process that seeks to incorporate and link local and national activities to United Nations regional intergovernmental bodies and global processes of review and appraisal (United Nations, 2003). A bottom-up participatory approach is expected to offer governments several advantages, including the following: (i) broadening the sources of information available to policymakers by complementing statistical and other data with qualitative information; (ii) providing policy-relevant information when statistics or other data do not exist and cannot be gathered on short notice; (iii) establishing priorities for policies and programmes that reflect peoples' interests; (iv) monitoring and evaluating the implementation of policies and programmes and re-orienting them if needed; (v) providing an opportunity for people, particularly those who are excluded or marginalized, to articulate their conditions and their needs.  In 2004, the Commission decided to undertake the review and appraisal every five years, with each cycle to focus on one of the priorities identified in the Madrid Plan of Action.

The review and appraisal process should start by raising awareness at the national and local levels about the Second World Assembly on Ageing and the recommendations of the Madrid Plan of Action. In order for people to be able to participate in a review-and-appraisal activity, they must first be informed of the content of the Plan of Action.  The ultimate goal of this initial stage, therefore, is to inform older persons – they being the "primary" stakeholders – of their rights, responsibilities and opportunities, as

defined in the Madrid Plan and to establish a notion of local ownership of its implementation and follow-up. Mobilization through the provision of information, education and communication activities can help older persons to understand that they have a critical role in the bottom-up approach.

Gathering relevant information is the core of review and appraisal. The essence of the participatory method is to listen to stakeholders and give them a chance to state their views at different stages of the process. This allows a different type of information to emerge, which may be more qualitative in nature, to complement quantitative monitoring. Given the heterogeneity of issues related to ageing and the corresponding policy responses as well as the entry points of information for evaluation, the review and appraisal needs to draw on many types and sources of evidence and not be confined to a single method. Gathering of primary information will be undertaken at the local level (community, village, district). Information could be collected within regular focus groups consisting of older persons, frontline service workers, service user groups, family caregivers, older volunteers and other informants on how well policies have been realized. Periodic feedback to a national body is necessary so that the review and appraisal can occur at the national level. Watchdog groups, such as district coordinating committees, can be established to review the impact of different policies and programmes on older persons. A group monitoring process can be organized, taking advantage of existing community groups or organizations and involving persons of all ages. Mini-surveys based on representative samples can also bring interesting local findings to light.

It is important that the "distillation" of gathered information occur at all levels of the process. Normally, verification of findings has to be undertaken in situ, particularly since locally detected issues require local clarifications. At the same time, the distillation needs to be coordinated so as not to discount the heterogeneity of older population and the diversity of the information gathered. In order to achieve this, partnerships involving major stakeholders are required to collate the information and provide it to the appropriate channels. Information, once analyzed and "distilled", needs to be fed simultaneously back down to the community and up to the national level.

The national level of review and appraisal is where the findings must be translated into recommendations for improving policy and programme design in order to promote better implementation of the Madrid Plan of Action in local and national contexts. The process of review and appraisal should be facilitated at the top government level and supported by national legislation. The role of government is crucial for ensuring sustainability and continuity of the appraisal process, including through provision of financial assistance to the local level.

D. CONCLUSION

Demographers note that if current trends in ageing continue as predicted, a demographic revolution, wherein the proportions of the young and the old will undergo a historic crossover, will be felt in just three generations. Globally, the proportion of persons aged 60 and over is expected to double, from 11 to 22 per cent, between 2006 and 2050 whereas the proportion of children younger than 15 years is projected to drop by a third, from 30 to 20 per cent. In certain developed countries and countries with economies in transition, the number of older persons already exceeds the number of children and birth rates have fallen below replacement levels. In some developed countries, the number of older persons will be more than twice that of children by 2050. Developing countries are also projected to age swiftly in the first half of the twenty-first century as the proportion of older persons rises, on average, from 8 to 20 per cent between 2006 and 2050 and the proportion of children will fall from 33 to 21 per cent. This portrait of change in the world's population parallels the magnitude obtained during the industrial revolution, which is traditionally considered the most significant era of social and economic breakthrough in the history of humankind since the Neolithic period. It marked the beginning of a sustained movement towards modern economic growth in much the same way that globalization is today marking an unprecedented and

sustained movement toward a "global culture". The demographic revolution, it is envisaged, will be at least as powerful.

Quoting from the Madrid International Plan of Action on Ageing, "population ageing is a universal force that has the power to shape the future as much as globalization". The power of ageing is real and rising. The Madrid Plan of Action calls us to embrace the potential of the ageing population as a basis for future development at the global scale. The United Nations Secretary-General, Kofi Annan, noted in Madrid that "ageing is definitely no longer just a 'first world' issue. What was a footnote in the twentieth century is on its way to becoming a dominant theme in the twenty-first century".

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NOTES

[1] Least developed countries as defined by United Nations General Assembly, as of 2004, include 50 countries, of which 34 are in Africa, 10 are in Asia, 1 is in Latin America and the Caribbean and 5 are in Oceania. They are included in the less developed regions, which comprise all regions of Africa, Asia (excluding Japan) and Latin America and the Caribbean and the regions of Melanesia, Micronesia and Polynesia.

[2] More developed regions comprise all regions of Europe and Northern America, Australia/New Zealand and Japan.

[3] The road map is contained in the 2003 Report of the Secretary-General, Follow-up to the Second World Assembly on Ageing (A/58/160).

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# DEMOGRAPHIC TRANSITION AND DEMOGRAPHIC DIVIDENDS
# IN DEVELOPED AND DEVELOPING COUNTRIES

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Both the developed and developing countries are experiencing substantial changes in their age structures with potentially important implications for economic growth. The timing of the changes varies, but essentially every country in the world has experienced or will experience a substantial rise in the share of their population concentrated in the working ages. On its face, this development has a direct, favourable effect on per capita income. Given fixed output per worker, labour force participation rates, and unemployment rates, a rise in the share of the working-age population will lead, as a matter of simple algebra, to an increase in output per capita – the first demographic dividend.

The first demographic dividend typically lasts for decades, but it is inherently transitory in nature. As population ageing begins to dominate demographic trends, the share of the population in the working ages will decline. The first dividend will turn negative as population growth outstrips growth in the labour force. Eventually, the share of the population in the working ages may be no greater than before the dividend period began.

The same demographic forces that produce an end to the first dividend, however, may lead to a second demographic dividend (Mason and Lee, forthcoming). A key economic challenge for ageing populations is to provide for old-age consumption for older persons who typically have substantially reduced labour income. Some societies are trying to meet this challenge by relying on transfer systems – either public programmes or familial support systems. Other societies are responding by increasing their saving rates and accumulating greater physical wealth or capital. It is in this latter response that prospects for more rapid economic growth are enhanced.[1] Moreover, the second dividend is not transitory in nature. Population ageing may produce a "permanent" increase in capital and thus on per capita income (Lee, Mason and Miller, 2001, 2003).

The renewed interest in the macroeconomic consequences of population change can be traced to new evidence that comes in two forms. First, a series of empirical studies based on aggregate level panel data conclude that demographic factors have a strong, statistically significant effect on aggregate saving rates (Bloom, Canning and Graham, 2003; Schmidt and Kelley, 1996; Kinugasa, 2004; Williamson and Higgins, 2001) and on economic growth (Bloom and Canning, 2001; Bloom and Williamson, 1998; Kelley and Schmidt, 1995). In contrast, earlier studies based on shorter time series found little statistical support for strong demographic effects (Kelley, 1988). Second, detailed case studies of the miracle economies of Eastern and South-Eastern Asia provide compelling and consistent evidence that the demographic dividend was an important contributor to that region's economic success (Bloom and Williamson, 1998; Mason, 2001b; Mason, Merrick and Shaw, 1999). Bloom and Williamson (1998) use econometric analysis to conclude that about one-third of Eastern and South-Eastern Asia's increase in per capita income was due to the demographic dividend. Mason (2001a) uses growth accounting methods to estimate that the dividend accounted for about one-fourth of the region's economic growth.

Although age structure variables have predictive power and can "explain" (in the statistical sense) a significant portion of economic growth, the relationship between demographic variables and the economy is not deterministic. Rather, the economic outcome from demographic change is policy dependent. The experience of the Asian Tigers provides very clear evidence in support of this view. A successful export-oriented growth strategy produced more than enough jobs to absorb the rapidly growing workforce. A stable macroeconomic environment – until the financial crisis of the late 1990s struck – was attractive to investment. Large-scale pay-as-you-go pension programmes that undermine saving and work incentives were avoided. These and other policies worked in concert with demographic change to produce high rates of saving and investment, rapid growth in employment, and spectacular economic growth. In the absence of complementary economic policies, the demographic dividend cannot be counted on to produce favourable economic results.

This paper presents a formal approach to quantifying the two demographic dividends drawing on a recent paper by Mason and Lee (forthcoming). Estimates of the first and second demographic dividend are constructed for all countries of the world for which the United Nations World Population Prospects (2005) provides estimates and projections. Country estimates are aggregated into appropriate country groups and used to compare the experience of the developed and the developing world and to contrast important variations within the developing world.[2]

## A. THE DEMOGRAPHIC DIVIDENDS

The first demographic dividend arises and dissipates as changes in age structure interact with the life cycle of production and consumption. Children and the elderly produce much less than they consume, whereas adults of working age, on average, produce much more than they consume. Countries with heavy concentrations of populations in the working ages have an inherent advantage to produce high levels of per capita income. Child and old-age dependency ratios are often used to capture the key features of the economic life cycle, but more detailed and precise estimates are becoming available. Estimated age profiles of production and consumption for the United States in 2000 are shown in the upper panel of figure 1. The values are broadly consistent with general characterizations of the economic life cycle, but certain features of the United States profiles are striking. First, the ages of dependency are not very close to those often used to delineate the dependent ages (under 15 and 65 or older). In 2000, United States residents under the age of 24 and over the age of 57 were economically dependant in the sense that they consumed more than they produced. Estimates for Taiwan Province of China, for example, are quite similar – residents under the age of 22 and over the age of 56 consumed more than they produced in 1998 (Mason and others, 2005). Second, the estimates in figure 1 imply a gradation of dependency. Those who are 25 or those who are 60 are economically dependant, but to a smaller degree than those who are 18 or those who are 75.[3]

The manner in which the economic life cycle interacts with the age distribution is illustrated in the lower panels of figure 1, which display the age distributions of the United States and of Mexico in 1950, 2000, and 2050. These two countries, although neighbours, have very different demographic histories. Changes in the age distribution of the United States are dominated by the baby boom of 1946 to 1964 and its echoes. Changes in the age distribution of Mexico are dominated by fertility decline. Both are influenced by steady improvements in life expectancy. Although differences are important, both countries experienced a significant decline in the share of their populations under the age of 15, and a significant rise in the share of the population in the productive ages between 1950 and 2000 – giving rise to their first demographic dividends. Both countries show a clear shift in their population age distribution from the productive ages to older ages between 1950 and 2000. As this change proceeds, the advantage derived from having a population concentrated in the productive ages will dissipate as that concentration disappears.

**Figure 1. Age distribution of production and consumption in the United States in 2000, and age distribution of population in the United States and Mexico in 1950, 2000, and 2050**
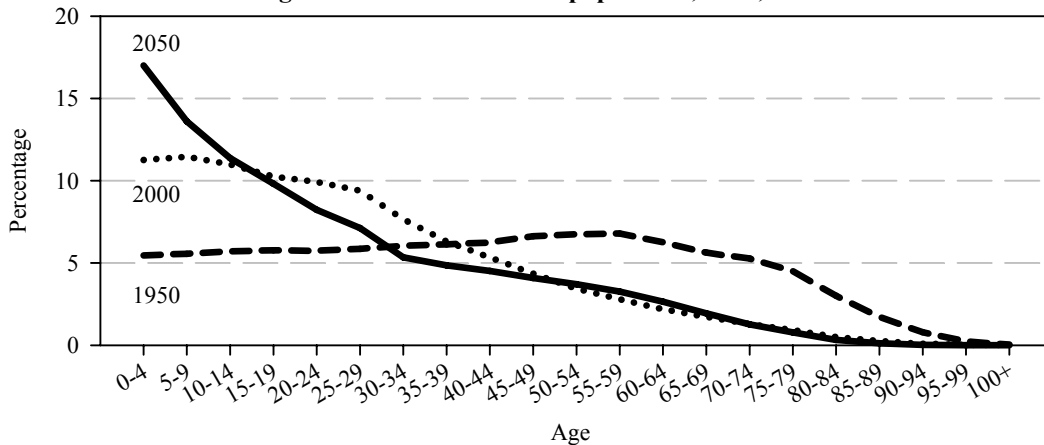
### A. Age profiles of production and consumption, United States, 2000
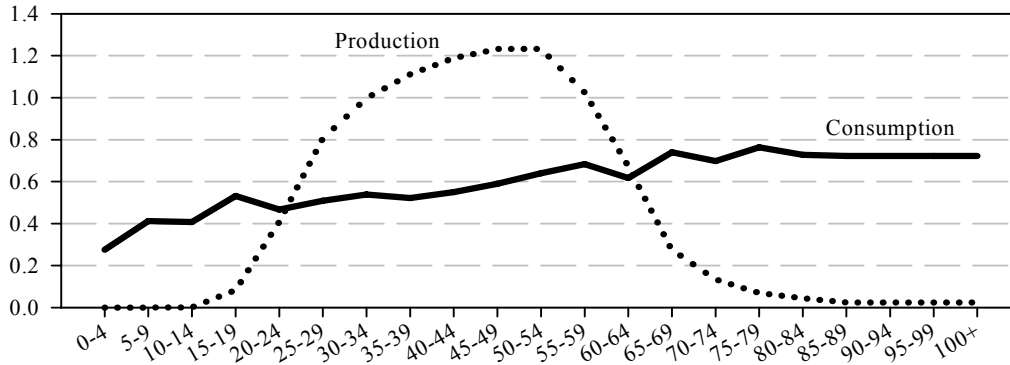


### B. Age distribution of United States population, 1950, 2000 and 2050
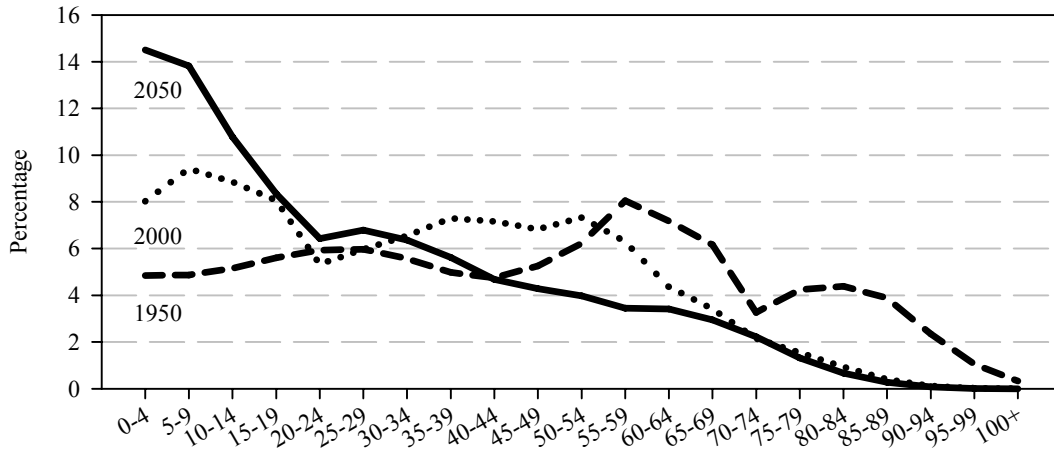


### C. Age distribution of Mexico population, 1950, 2000 and 2050



*Source*: Panel A: author's calculations; Panels B and C: United Nations (2005).
NOTE: Values in panel A are relative to average level of production at ages 30-59. See text.

The second demographic dividend arises to the extent that consumers and policymakers are forward-looking and respond effectively to the demographic changes that are foreseen. With a rise in the share of the elderly population on the horizon, consumption in the future can be maintained only through the accumulation of wealth in some form. One possibility is that individuals and/or firms and governments acting on behalf of consumers accumulate capital. If invested in the domestic economy, the result will be capital deepening and more rapid growth in output per worker. If invested abroad, the result will be an improvement in the current account and an increase in national income. In either case, per capita income will grow more rapidly than it would otherwise.

The first and second dividends are formalized in Mason and Lee (forthcoming). If the effective number of consumers is denoted by N and the effective number of producers by L and

$$
\begin{aligned}
N(t) &= \sum_a \alpha(a)P(a,t) \\
L(t) &= \sum_a \gamma(a)P(a,t)
\end{aligned}
\tag{1}
$$

where $P(a,t)$ is the population aged a at time t and $\alpha(a)$ and $\gamma(a)$ are age-specific coefficients reflecting relative levels of consumption and production, respectively. Output per effective consumer ($Y/N$) is given by:

$$
\frac{Y(t)}{N(t)} = \frac{L(t)}{N(t)} \times \frac{Y(t)}{L(t)},
\tag{2}
$$

Equation (2) is readily converted from levels to rates of growth by taking the natural logarithm of both sides and taking the derivative with respect to time so that:

$$
\dot{y}^n(t) = \dot{L}(t) - \dot{N}(t) + \dot{y}(t).
\tag{3}
$$

Thus, the rate of growth in output per effective consumer ($\dot{y}^n$) is the sum of the rate of growth of the support ratio ($\dot{L}(t) - \dot{N}(t)$) and the rate of growth of output per worker ($\dot{y}$). The first dividend is then defined as the rate of growth of the support ratio. The second dividend operates through productivity growth by inducing the accumulation of wealth and capital-deepening as discussed more extensively below.

*The first demographic dividend*

The support ratio and the first dividend have been calculated for countries of the world for which the United Nations Population Division reports estimates and projections by age and sex in its most recent release of *World Population Prospects* (United Nations, 2005). The support ratios are calculated using the production and consumption weights presented in figure 1. The equivalence values for production have been scaled to average one for ages 30-59. Thus, a value of 0.5 indicates that members of that age group are 50 per cent as productive as persons aged 30-59. The equivalence values for consumption have been scaled so that the 1950 population of the world has a support ratio of 1.0. A value of 0.9 indicates therefore that the effective number of producers per consumer is 90 percent of the world-wide value for 1950.

**Figure 2. Support ratio and first demographic dividend in the United States and Mexico**
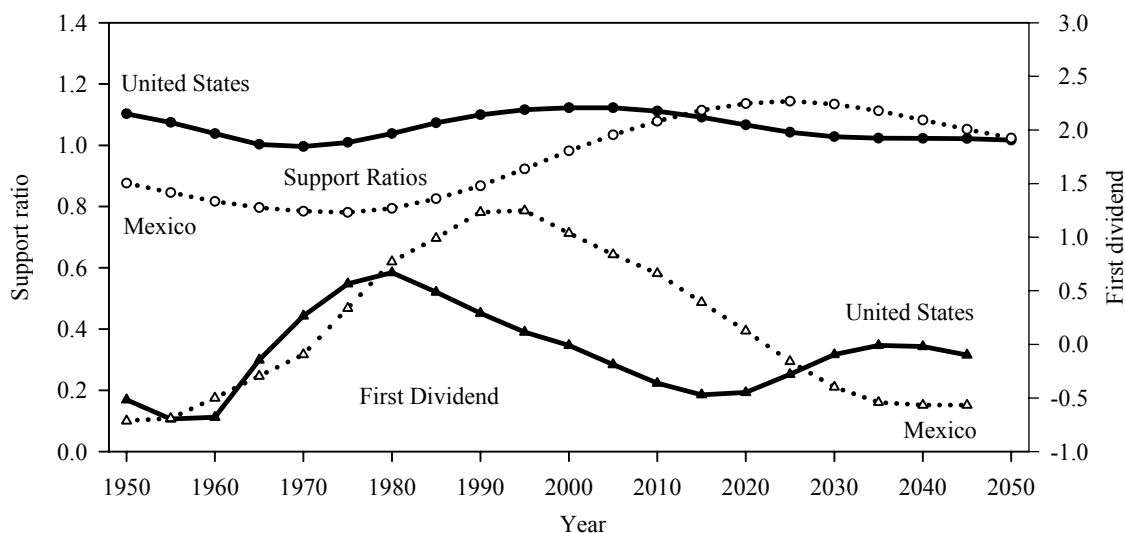


*Source*: Author's calculations.

Before turning to regional comparisons, the experience of Mexico and the United States sets the stage. Figure 2 shows the support ratios for both countries and the first demographic dividend calculated as the rate of growth of the support ratio for each of the five-year periods following year *t*.

The support ratio for the United States in 1950 exceeded 1.1 effective workers per effective consumer as compared with a support ratio in Mexico of less than 0.9. Thus, the United States had a significant advantage in 1950—an advantage that is expected to persist until 2015. During the 1950s and the 1960s, the support ratio was deteriorating in both countries because high fertility and, especially in Mexico, declining child mortality were leading to an increase in the number of children. The support ratio began to rise, in the United States in 1970 and in Mexico in 1975, as a result of fertility decline. The United States support ratio reached its peak in 2000. In total, the support ratio and hence output per effective consumer increased by 12.7 per cent during the thirty-year period. The Mexican support ratio is projected to reach its peak in 2025. From 1975 to 2025, output per effective consumer in Mexico will increase by 46.4 per cent – a gain substantially larger than experienced in the United States.

The first dividend measures the relationship between changing age-structure and economic growth. When the dividend is positive, the support ratio is increasing and, given productivity gains, it leads to more rapid growth in output per effective consumer. On average, output per effective consumer grew by an additional 0.4 percentage points per year between 1970 and 2000 in the United States and by an additional 0.76 percentage points per year between 1975 and 2025 in Mexico because of changes in age structure. At its peak, the dividend contributed 0.67 percentage points per year to economic growth in the United States (1985-1990) and 1.25 percentage points per year to economic growth in Mexico (1995-2000).

The similarities and differences between Mexico and the United States are worth emphasizing: (i) the first demographic dividend became positive at about the same time – in the 1970s – in both countries; (ii) the period over which the first dividend was positive was shorter in the United States than it is expected to be in Mexico – thirty years in the United States versus fifty years in Mexico; (iii) both the total impact and the annual impact of the dividend are and will, expectedly, be substantially higher in Mexico than in the United States; and, (iv) Mexico gained relative to the United States because it began with a relative

disadvantage. The projections for Mexico anticipate that it will eventually catch the United States by achieving a support ratio of 1.14 in 2025 as compared with the maximum United States support ratio of 1.12 in 2000.  As is shown below, similar points of comparison distinguish the developed from the developing countries, but the experience of countries within the developing world is quite varied.

The comparisons presented here focus on eight country groups that have been defined to capture commonalities in economics, geography and demography.  The eight groups are the Pacific Islands, transitional economies, the Middle East and North Africa, sub-Saharan Africa, Latin America and the Caribbean, South Asia, East and South-East Asia, and the industrial countries.  The values presented are simple averages of the values for countries belonging to each group.  The appendix provides a full listing of the countries belonging to each group.

The dividend period, that is, the period over which the first dividend is positive, began first in the industrial countries in 1970 and, soon thereafter, in the Pacific Islands, the transitional economies, the Middle East and North Africa, Latin America and the Caribbean, and East and South-East Asia (figure 3). The onset of the first dividend was substantially delayed only in South Asia – to around 1985 – and sub-Saharan Africa – to around 1995.

The duration of the first dividend was relatively short in the industrial countries (approximately thirty years), and in the transitional economies (almost thirty-four years).[4] The duration in other groups of countries varies from about forty-seven years in East and South-East Asia to more than sixty years in South Asia.  Unfortunately, the durations reported in figure 3 are downwardly biased for some groupings, because the dividend period begins prior to 1950 for a few countries and extends beyond 2050 for many countries and the data available cover only the 1950-2050 period.  The duration of the dividend for sub-Saharan Africa, in particular, is affected by the truncation in 2050 and it would be reasonable to expect a duration as long or longer for that region as for South Asia. Table 1 provides information about the extent to which time series are truncated.

**Figure 3. Timing of the first demographic dividend in selected regions and groups of countries**
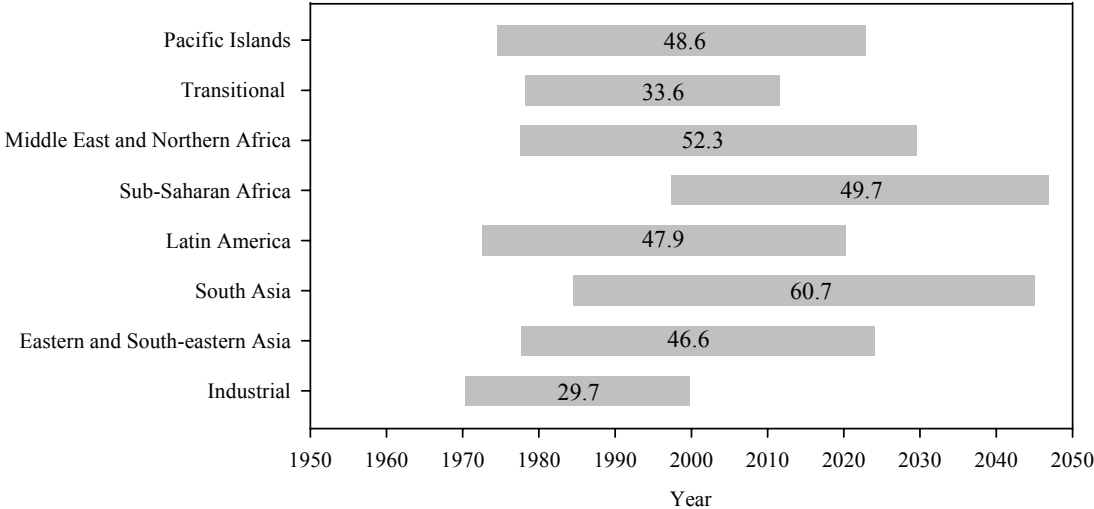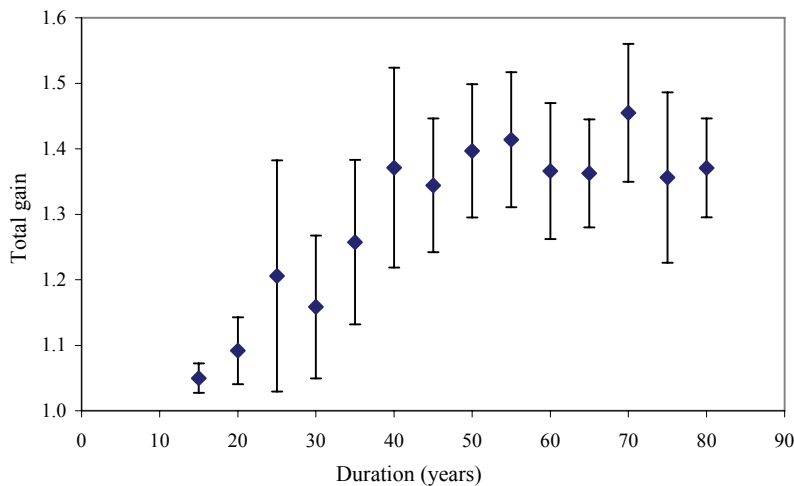


Source: Author's calculations.
NOTE: Values within bars indicate duration (in years) of the first dividend.

| Region | Number of countries | Bonus Period | | | |
|---|---|---|---|---|---|
| | | Started before 1950 | Ended by 2005 | Ended between 2005-2050 | Not ended by 2050 |
| Industrial | 37 | 2 | 31 | 6 | — |
| East Asia and Southeast Asia | 16 | — | 1 | 13 | 2 |
| South Asia | 7 | — | — | 7 | — |
| Latin America | 46 | — | 8 | 37 | 1 |
| Sub-Saharan Africa | 50 | — | 2 | 5 | 43 |
| Middle East and North Africa | 22 | 1 | 1 | 17 | 4 |
| Transitional | 28 | 2 | 8 | 20 | 6 |
| Pacific Islands | 22 | 1 | 6 | 10 | — |
| Total | 228 | 6 | 57 | 115 | 56 |

*Source*: Author's calculations.

**Figure 4. Duration and total gain from the first demographic dividend**



*Source*: Author's calculations based on estimates for 228 countries.
NOTE: Values are relative to ratio of expected output per effective consumer at the end to output at the beginning of the first dividend.

What are the implications of the duration of the dividend period for the magnitude of the dividend? Mexico enjoyed both a longer dividend and a greater annual dividend than the United States, but how will the dividends in South Asia and sub-Saharan Africa compare with those in Latin America and East and South-East Asia?

This question is addressed by figure 4, which plots the magnitude of the dividend - the support ratio at the end of the dividend period divided by the support ratio at the beginning of the dividend period - against the duration of the dividend. The high and low points plotted for each dividend value represent the mean, plus and minus one standard deviation, for each group of countries.

**Figure 5.  Total gain by duration of the first demographic dividend, regional averages**

**Figure 6. Average annual gain by duration of the first demographic dividend, regional averages**
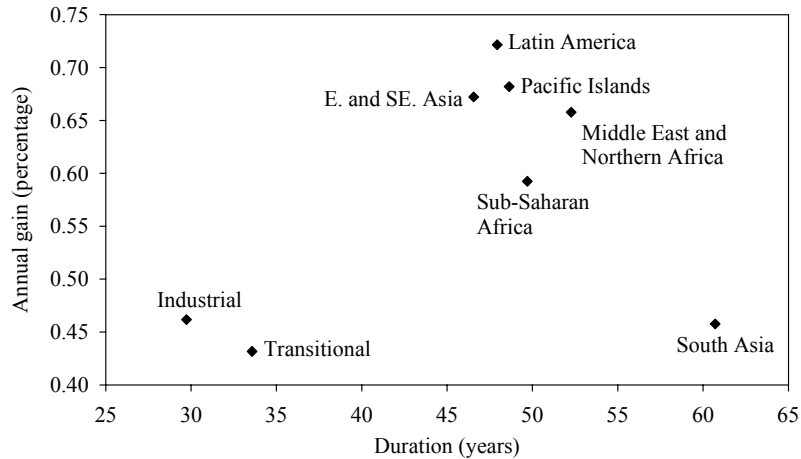
For countries with a dividend period lasting less than forty years, the total gain from the dividend and the duration of the dividend are closely linked.  If the dividend period is only fifteen years, for example, the support ratio rises by only 5 per cent from the beginning to the end of the dividend period.  If the dividend period lasts thirty-five years, in contrast, the support ratio rises by 25 per cent between the beginning and the end of the dividend period.  On average, the transitional economies and the industrial countries have relatively short dividend periods with relatively small total gains.

For countries with a dividend period lasting forty years or more, there is no apparent relationship between the magnitude and the duration of the dividend.  The total increase in the support ratio from the beginning to the end of the dividend period averaged about 35 per cent and 40 per cent.  Countries with slow transitions, mainly those in South Asia and sub-Saharan Africa, can eventually reap a dividend as large as countries with rapid transitions, such as those in Latin America and the Caribbean or in East and South-East Asia.  However, because the gains are spread over a much longer period, the annual boost to economic growth during the transition period is much shorter in the countries with slow fertility declines.

The total gain and the average annual gain for each region are plotted against the average duration for the region in figures 5 and 6. The total gain is lowest for the industrial countries and transitional economies – between 15 and 20 per cent. The developing regions are clustered at a considerably higher total gain ranging from a low of 31 per cent for South Asian countries to a high of 40 per cent for countries in Latin America and the Caribbean or in the Middle East and North Africa. Note that the total gains for South Asia and sub-Saharan Africa are downwardly biased because the population projection to 2050 does not cover the entire dividend period. The actual values should be located somewhere to the northeast of those plotted.

The country groupings conceal a considerable degree of heterogeneity. Thus, table 2 presents the annual increase in the support ratio and the total increase in the support ratio for the top ten and the bottom ten countries. Only countries with a population exceeding 3 million in 2000 are included in the table. The top ten countries in annual increase are drawn primarily from South-East Asia or the Middle East and North Africa. Singapore ranks first with a first dividend just exceeding 1 per cent per year. Jordan ranks second and Viet Nam, third. Among Latin American countries, only Mexico makes the top ten. All of the bottom ten countries but Uruguay are European, either industrial countries or transitional economies.

Countries in the Middle East and North Africa have a large presence in the top ten countries because of the total increase in their support ratio. The United Arab Emirates is ranked first with an increase of 64 per cent. Nicaragua and Mexico in Latin America are on the list of the top ten. No country from South, East or Southeast Asia makes it to the top ten list. Again, except for Uruguay, the bottom ten consists of either industrial countries or transitional economies

*The second demographic dividend*

Changes in population age structure also produce a second demographic dividend that depends on how the accumulation of wealth is related to population ageing. First, there are compositional effects. During the later stages of the transition to low fertility, a growing share of the population consists of individuals who are nearing the completion or who have completed their productive years. These individuals must have accumulated wealth in order to finance consumption in excess of labour income for many of their remaining years. Second, there are behavioural effects. The rise in life expectancy and the accompanying increase in the duration of retirement lead to an upward shift in the age-profile of wealth.

This wealth can take different forms, however (Lee; 1994a, 1994b). One possibility is that retirees will rely on transfers from public pension and welfare programmes or from adult children and other family members. In this case, individuals are accumulating transfer wealth as a method of financing consumption during their retirement years. A second possibility is that individuals will accumulate capital during their working years and that this capital will serve as the source of support during the retirement period. Both of these forms of wealth can be used to deal with the life cycle deficit at older ages, but capital also influences economic growth, i.e., the productivity term in the economic growth model presented above (equation (3)). The pro-growth effect of capital accumulation is the source of the second demographic dividend.

The second dividend is more complex to estimate than the first dividend, in part because the accumulation of wealth is intrinsically forward looking. Individuals accumulate wealth in anticipation of future needs to support consumption, to finance bequests, and to respond to other uncertain events. The

| *Annual increase in the support ratio (%)* | | | | | |
|---|---|---|---|---|---|
| *Top 10* | | | *Bottom 10* | | |
| 1 | Singapore | 1.02 | 124 | France | 0.26 |
| 2 | Jordan | 0.94 | 125 | Croatia | 0.26 |
| 3 | Viet Nam | 0.90 | 126 | Serbia and Montenegro | 0.26 |
| 4 | Algeria | 0.85 | 127 | Bulgaria | 0.25 |
| 5 | United Arab Emirates | 0.83 | 128 | Lithuania | 0.23 |
| 6 | Thailand | 0.82 | 129 | Belgium | 0.22 |
| 7 | Tunisia | 0.79 | 130 | Greece | 0.20 |
| 8 | Armenia | 0.79 | 131 | Hungary | 0.20 |
| 9 | Syrian Arab Republic | 0.79 | 132 | Sweden | 0.16 |
| 10 | Mexico | 0.76 | 133 | Uruguay | 0.15 |

| *Total increase in the support ratio (%)* | | | | | |
|---|---|---|---|---|---|
| *Top 10* | | | *Bottom 10* | | |
| 1 | United Arab Emirates | 64 | 124 | Italy | 6 |
| 2 | Syrian Arab Republic | 54 | 125 | Georgia | 5 |
| 3 | Jordan | 53 | 126 | Croatia | 5 |
| 4 | Algeria | 53 | 127 | Serbia and Montenegro | 5 |
| 5 | Yemen | 50 | 128 | Bulgaria | 5 |
| 6 | Tunisia | 48 | 129 | Russian Federation | 5 |
| 7 | Nicaragua | 48 | 130 | Uruguay | 5 |
| 8 | Kenya | 48 | 131 | Hungary | 4 |
| 9 | Mexico | 46 | 132 | Lithuania | 4 |
| 10 | Uzbekistan | 46 | 133 | Sweden | 3 |

*Source*: Author's calculations.

NOTE: Includes countries with population of 3 million or more in 2000 and that will complete their dividend period by 2050.

analysis presented here emphasizes the life cycle motive, i.e., the accumulation of wealth over the lifetime necessary to finance future consumption in excess of future labour income. The relevant demography is captured by the projections of the equivalent numbers of consumers and producers for each cohort. Each cohort's life cycle wealth increases as the future person-years of consumption rise relative to the future person-years of production, both appropriately discounted.

A technical problem is immediately apparent. Constructing complete life cycle wealth estimates in year $t$ requires a population series that extends many decades into the future. These data are not available for individual countries. Moreover, there is enormous uncertainty about long-range population projections. Fortunately, the nature of the economic life cycle provides assistance with this problem. For the most part, capital accumulation is concentrated among older working-age adults who are approaching their peak earnings and have completed their child-rearing responsibilities. Thus, we use the wealth held by those age 50 and older to measure the effect of demography on life cycle wealth and the second demographic dividend.

Let $N (\leq b, t + x)$ be the number of effective consumers born in year $b$ or earlier and who are alive in year $t + x$. Letting $b = t - a$, where $a$ is age, then $N (\leq b, t + x)$ is the effective number of consumers $a$ years or older in year $t$ who are still alive in year $t + x$. If the relative per capita cross-sectional age profile

of consumption is fixed and shifting upward at rate $g_c$, then the total consumption of the cohort born in year $b$ or earlier in year $t + x$ is equal to $\overline{c}(t)e^{g_c x}N(\leq b, t+x)$, where $\overline{c}(t)$ is consumption per effective consumer in year $t$.[5] Given discount rate $r$, the present value of the future lifetime consumption of the cohort born in year $b = t - a$ or earlier is:

$$\overline{c}(t)\,\mathrm{PVN}(< b, t) = \overline{c}(t)\sum_{x=0}^{\omega - a} e^{(g_c - r)x}N(\leq b, t + x). \tag{4}$$

In similar fashion, if the shape of the per capita cross-sectional age profile of production is fixed and shifting upward at rate $g_y$, then the total production of the cohort born in year $b$ or earlier at time $t + x$ is equal to $\overline{y}^l(t)e^{g_y x}L(\leq b, t + x)$ where $\overline{y}^l(t)$ is production or labour income per effective producer. The present value of the future lifetime production of the cohort born in year $b = t - a$ or earlier is:

$$\overline{y}^l(t)\,\mathrm{PVL}(< b, t) = \overline{y}^l(t)\sum_{x=0}^{\omega - a} e^{(g_y - r)x}L(\leq b, t + x). \tag{5}$$

In the absence of bequests, the lifetime budget constraint insures that the wealth in year $t$ of those born in year $b$ or earlier equals the difference between the present value of future lifetime consumption and future lifetime production, i.e.,

$$W(\leq b, t) = \overline{c}(t)\,\mathrm{PVN}(\leq b, t) - \overline{y}^l(t)\,\mathrm{PVL}(\leq b, t). \tag{6}$$

Algebraic manipulation yields an expression for the ratio of wealth to total income of workers, $w(< b, t) = W(< b, t)/Y^l(t)$:

$$w(\leq b, t) = [C(t)/Y^l(t)]\mathrm{PVN}(\leq b, t)/N(t) - \mathrm{PVL}(\leq b, t)/L(t), \tag{7}$$

or, alternatively:

$$w(\leq b, t) = [\overline{c}(t)/\overline{y}^l(t)]\mathrm{PVN}(\leq b, t)/L(t) - \mathrm{PVL}(\leq b, t)/L(t). \tag{8}$$

$\mathrm{PVN}(\leq b, t)/L(t)$ is the present value of future lifetime effective years of consumption for all persons born in year $b$ or earlier per effective producer in year $t$. $\mathrm{PVL}(\leq b, t)/L(t)$ is the present value of future lifetime effective years of production of all persons born in year $b$ or earlier per effective producer in year $t$.

Under golden-rule, steady-state growth[6] equation (7) can be readily evaluated: the ratio of consumption to labour income is equal to 1 and drops out; the rate of productivity growth and the rate of growth of equivalent consumption, $g_y$ and $g_c$, are constant and equal to each other.

The situation is more complex under the dynamic conditions that characterize the current world. If the ratio of wealth to income is rising over time because, for example, it is below its steady-state level, the ratio of consumption to labour income will be less than 1 and $g_c$ will exceed $g_y$. In addition, the rate of growth of labour income will be varying in response to changes in the capital intensity of the economy. Interest rates may be declining as the ratio of wealth to labour income rises. Whether, and the extent to

which, these variables change will depend on whether or not the economy is open or closed to capital flows and whether or not it is large enough to influence world capital markets. To fully incorporate all of these complexities would require a detailed, country-specific simulation model. The calculations here abstract from these many complexities and emphasize only the demographic trends.

To calculate the second dividend, $g_y$ and $g_c$ are assumed to equal 0.015, the rate of interest, $r$, to equal 0.03, and the ratio of consumption to labour income to equal 1.0. The ratio of wealth of those 50 and older to total labour income in the United States is used to approximate the ratio of total wealth to total labour income.[7]

The results for 1950 to 2000 are summarized by figure 7, which shows regional averages of the ratio of life cycle wealth (of those 50 or older) to output. In 1950 the wealth output ratios varied from a high of 2.2 for the industrial countries to a low of 0.5 for the Pacific Islands and sub-Saharan Africa. All of the country groupings in the developing world had wealth ratios below 1. The transitional economies were in an intermediate position with a wealth ratio of 1.6.

Between 1950 and 2000, the wealth ratios grew substantially in most regions of the world. The industrial countries continued to lead with a life cycle wealth ratio exceeding 4 on average in 2000. Sub-Saharan Africa continued to lag behind, with a life cycle wealth ratio below one. The rapid gains are particularly evident for East and South-Eastern Asia and for Latin America and the Caribbean.

The increase in the life cycle wealth to output ratio was not evenly distributed across the second half of the twentieth century. Between 1950 and 1975, the most rapid growth occurred in the industrial countries. After 1975, the most rapid growth occurred in the developing world (figure 8). Particularly impressive is the average rate of increase for the countries of East and South-East Asia – just under 3 per cent per year between 1975 and 2000.

As emphasized above, the economic implications of the rise in life cycle wealth induced by population ageing depends on the form of wealth. Intergenerational transfer policy involves the holding of a proportion $\tau(t)$ of total wealth W(t) as transfer wealth at each point in time, so that the capital stock at time t is:

$$K(t) = (1 - \tau(t))W(t) \qquad \tau(t) \le 1. \qquad (9)$$

If proportion of life cycle wealth held is constant, the rate of growth of the capital stock will be equal to the rate of growth of wealth. Likewise, capital deepening will be determined by the rate of growth of wealth. However, if intergenerational transfer policy is undergoing change, and $\tau(t)$ changes over time, capital deepening will occur more rapidly or more slowly than the underlying change in wealth (Lee, Mason and Miller, 2003).

The relationship between life cycle wealth, capital, and economic growth can be clarified further by assuming that output depends on capital and effective labour only and that the production function is Cobb-Douglas.[8] Under these conditions it is straightforward to show that the growth in output per worker is proportional to the growth in the ratio of capital to labour income, $\dot{k}$ :

$$\dot{y} = \frac{\beta}{1-\beta} \dot{k} \qquad (10)$$

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**Figure 7. Ratio of wealth at ages 50 or over to output, regional averages, 1950 – 2000**
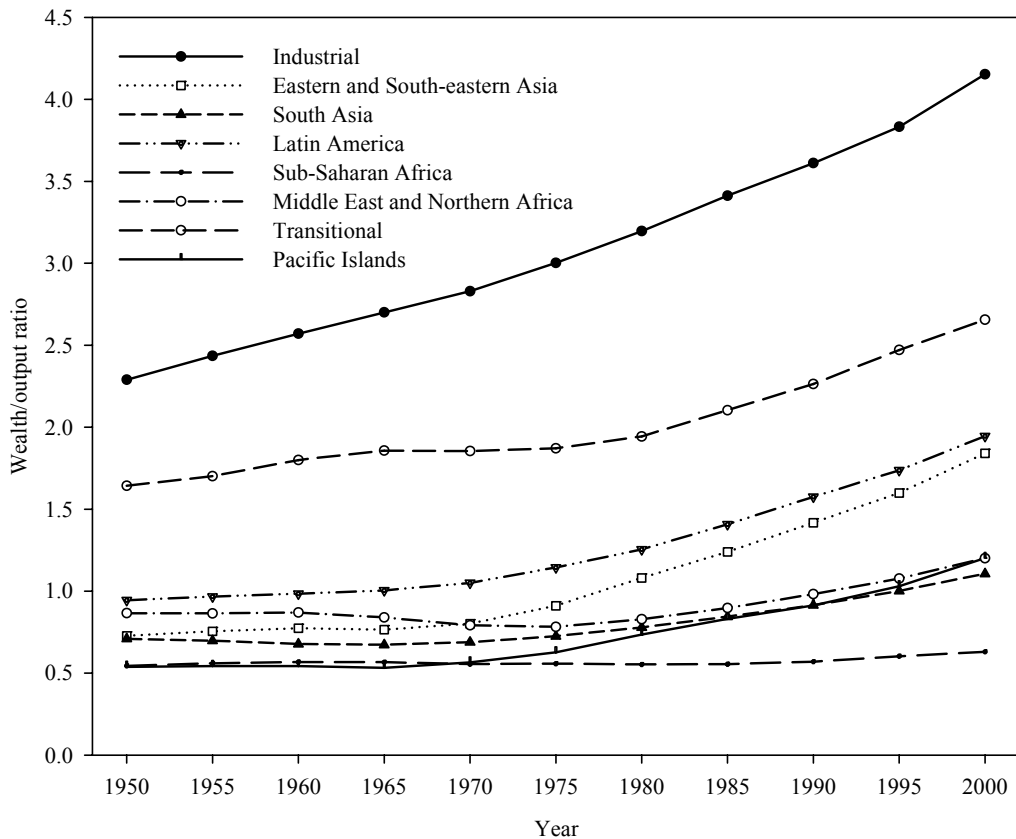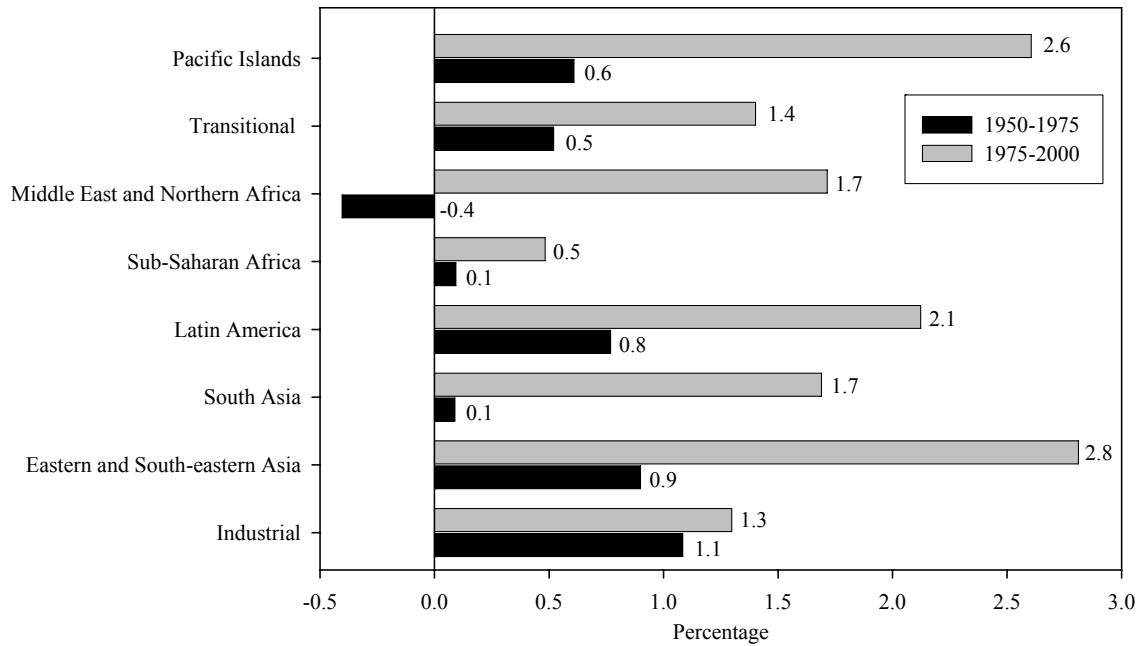


*Source*: Author's calculations.

where *β* is the elasticity of output with respect to capital (Solow, 1956). Note that capital deepening in this formulation is measured as an increase in capital relative to labour income rather than capital relative to labour. Given a typical value for *β* of one-third, an increase in the growth rate of ratio of capital to labour income by one per cent yields an increase in productivity growth (and growth per effective consumer) of 0.5 per cent. A more general formulation of the production process that incorporates human capital does not alter estimates of the effect of capital deepening (Mankiw, Romer and Weil, 1992).

Estimates of the second dividend are calculated, holding the transfer policy constant, so that the growth rates of the capital and life cycle wealth are equal, and assuming that the elasticity of labour income with respect to capital is 0.5. Regional estimates for the 1970-2000 period are presented in table 3 and compared to estimates of the first dividend for the same period. The second dividend is positive for all regions and substantially larger than the first dividend for the period in question. In East and South-East Asia, the second dividend was 1.31 per cent per year in additional income growth – the largest of any region. The second dividend was also very large in the Pacific Islands and in Latin America – 1.15 and 1.08 per cent per year, respectively. In the Middle East and North Africa, South Asia, and the industrial countries, the second dividend was about 0.70 per cent per year. Only in sub-Saharan Africa was the second dividend small at 0.17 per cent per year.

What path should the second dividend take in the future? Will it turn negative as the first dividend? Or is it likely to persist? Answering these questions requires longer-term population projections than the

**Figure 8. Annual growth in the ratio of wealth at ages 50 or over to output, 1950–1975 and 1975–2000**



*Source*: Author's calculations.

TABLE 3. ESTIMATES OF THE FIRST AND SECOND DIVIDENDS AND THE ACTUAL GROWTH IN GROSS
DOMESTIC PRODUCT PER EFFECTIVE CONSUMER (GDP/N)
1970-2000

| Region | Demographic Dividends | | | Actual growth in GDP/N | Actual - Dividend |
|---|---|---|---|---|---|
| | *First* | *Second* | *Total* | | |
| Industrial | 0.34 | 0.69 | 1.03 | 2.25 | 1.22 |
| East Asia & Southeast Asia | 0.59 | 1.31 | 1.90 | 4.32 | 2.42 |
| South Asia | 0.10 | 0.69 | 0.80 | 1.88 | 1.08 |
| Latin America | 0.62 | 1.08 | 1.70 | 0.94 | -0.76 |
| Sub-Saharan Africa | -0.09 | 0.17 | 0.08 | 0.06 | -0.02 |
| Middle East and North Africa | 0.51 | 0.70 | 1.21 | 1.10 | -0.11 |
| Transitional | 0.24 | 0.57 | 0.81 | 0.61 | -0.20 |
| Pacific Islands | 0.58 | 1.15 | 1.73 | 0.93 | -0.79 |

*Source:* Author's calculations.

ones employed in this paper, but several studies relying on long-term population projections conclude that the second dividend does not turn negative to any important degree (Lee, Mason and Miller, 2003; Mason, 2005). The explanation for this lies in the demographics. The bulge in the working ages, which drives the first dividend, is a transitory feature of demographic transitions. The rising share at older ages, which drives the second dividend, is a "permanent" state of affairs. If populations stabilize at replacement fertility and high life expectancy, the demand for life cycle wealth will stabilize at a high level. If life expectancy continues to increase and populations continue to age, the demand for life cycle wealth will continue to rise. If the population age distribution stabilizes, the second dividend will be zero. It is

possible for the demand for life cycle wealth to overshoot the steady-state level producing periods during which the second dividend is negative. In simulations carried out to date, the overshoot has been modest and the period of decline relatively unimportant. The key point is that population ageing leads to a permanent increase in the demand for life cycle wealth. To the extent this is satisfied by capital accumulation, the result is a permanent increase in the capital intensity of the economy and a permanent increase in output per worker.

The complexity of the relationship between the demographic dividends and economic performance is brought home by comparing the total dividend to the actual growth of gross domestic product per effective consumer (GDP/N). In three regions, countries were able to achieve economic growth that exceeded the demographic dividend. In the industrial countries and South Asia, GDP/N grew faster than the dividend by 1.22 per cent and 1.08 per cent, respectively. In East and South-East Asia, GDP/N grew faster by a striking 2.42 per cent per annum (table 3).

The picture is very different in other parts of the world where per capita output growth was less than the dividend. Latin America and the Pacific Islands, in particular, failed to exploit their demographic potentials. Growth in GDP/N was less than the dividend by 0.76 per cent in Latin America and by 0.79 per cent in the Pacific Islands. In sub-Saharan Africa, the transitional economies, and the countries of the Middle East and North Africa, growth in output per effective consumer was relatively close to the total dividend. However, one should not, on the basis of this simple comparison, conclude that growth rates in these three regions were determined by the sizes of the dividend.

## B. QUALIFICATIONS

Changes in age structure have potentially very important implications for macroeconomic performance. There are, however, many important caveats and qualifications that should be considered.

First, all of the analysis presented here is concerned with the relationship between age structure and per capita income or variants of per capita income. However, per capita income is not a reliable indicator of welfare and the effects of age structure on per capita income may be quite different than their effects on welfare.

Second, calculations of the first and second dividend both assume that the cross-sectional profiles of consumption persist into the future. In a sense, we are assuming that the costs (or benefits) of ageing are anticipated and shared across generations in the same manner as they are at present. Capital accumulation rises, transfer programmes expand, families provide more support, and the elderly adjust their needs to the demographic realities. Alternative scenarios are clearly possible. As the elderly become more numerous, they might use their political power to increase their consumption relative to working-age adults and children. Taxpayers and families might renege on their intergenerational contracts and solve the ageing problem by reducing support for the elderly. The calculations presented here do not capture the costs that these possible generational crises would impose on societies.

Third, the relationship between the demographic dividends and income growth is very policy dependent. This point is emphasized in the introduction but bears repeating. The first dividend arises in part because the working age population is growing rapidly. The economic gains can be realized only if employment opportunities expand as rapidly as the numbers seeking new jobs. The second dividend arises in part because prime age adults save more to provide for their retirement. Their ability or willingness to save, however, may be undermined by poorly developed financial markets or overly generous publicly funded pension programmes. The changes in age structure define possibilities but, by themselves, do not determine the outcome.

TABLE 4. SENSITIVITY ANALYSIS: DEMOGRAPHIC DIVIDENDS
BASED ON TAIWAN PROVINCE OF CHINA, 1998

| Region | Demographic dividends | | | Actual growth in GDP/N | Actual - Dividend |
|---|---|---|---|---|---|
| | First | Second | Total | | |
| Industrial | 0.42 | 0.70 | 1.12 | 2.25 | 1.13 |
| East Asia and Southeast Asia | 0.66 | 1.19 | 1.85 | 4.32 | 2.47 |
| South Asia | 0.14 | 0.58 | 0.73 | 1.88 | 1.15 |
| Latin America | 0.71 | 1.00 | 1.71 | 0.94 | -0.77 |
| Sub-Saharan Africa | -0.06 | 0.11 | 0.05 | 0.06 | 0.01 |
| Middle East and North Africa | 0.57 | 0.58 | 1.15 | 1.10 | -0.05 |
| Transitional | 0.30 | 0.57 | 0.87 | 0.61 | -0.26 |
| Pacific Islands | 0.63 | 1.03 | 1.66 | 0.93 | -0.73 |

*Source*: Author's calculations.

TABLE 5. IMPLICATIONS FOR SECOND DIVIDEND OF VARYING SEVERAL ASSUMPTIONS

| Region | $C/Y=1.0$ | $C/Y=0.9$ [a] | $g_c=g_y=0.02$ | Using Taiwan Province of China profiles |
|---|---|---|---|---|
| Industrial | 0.69 | 0.74 | 0.69 | 0.70 |
| East Asia and Southeast Asia | 1.31 | 1.56 | 1.29 | 1.19 |
| South Asia | 0.69 | 0.85 | 0.68 | 0.58 |
| Latin America | 1.08 | 1.27 | 1.05 | 1.00 |
| Sub-Saharan Africa | 0.17 | 0.26 | 0.16 | 0.11 |
| Middle East and North Africa | 0.70 | 0.91 | 0.68 | 0.58 |
| Transitional | 0.57 | 0.61 | 0.57 | 0.57 |
| Pacific Islands | 1.15 | 1.40 | 1.10 | 1.03 |

*Source*: Author's calculations.

[a] Growth of consumption is set at 0.017 while growth of productivity at 0.015.

Finally, the calculations presented here require many simplifying assumptions and are based on highly stylized models of the economic growth process. Because of the imprecision and uncertainty surrounding the calculations, this paper emphasizes broad regional trends and differences. Some of the assumptions have been subject to sensitivity analysis. Tables 4 and 5 report these results based on the following: (i) using the support ratio on Taiwan Province of China rather the United States; (ii) assuming that the initial ratio of consumption to labour income is 0.9 (C/Y=0.9) rather than 1.0; and (iii) assuming that both productivity and consumption growth rates are 2 per cent per year ($g_c=g_y=0.02$) rather than 1.5 per cent per year. None of the broad conclusions or generalizations appears to be sensitive to variation in the assumptions.

## C. CONCLUSIONS

This paper has several objectives. The first is to explain the demographic dividends in a conceptual and formal way. This draws on earlier work that identifies two demographic dividends (Mason and Lee,

forthcoming). The first dividend arises because changes in age structure influence the share of the population concentrated in the working ages. The second dividend arises to the extent that anticipated changes in the share of the population concentrated in the retirement ages induce individuals, firms, and/or governments to accumulate capital.

The first dividend is inherently transitory. Demographic transition around the world has led to an increase in the share of the working-age population that has lasted for many decades. But when large cohorts of prime age adults pass into their retirement years, the first dividend ends. The share of the population in the working ages begins to decline and the first dividend turns negative. The first dividend can have a lasting effect on economic growth if the gains in per capita income are used to create human capital by investing in health and education, to accumulate physical capital, to support technological innovation, to create growth-inducing institutions, etc.

The second dividend is permanent in nature because it is driven by the rising share of the elderly in our populations. It is not self-evident that life cycle wealth would necessarily continue to rise as the share of the retired population increases. The estimates presented here do not extend beyond the year 2000 but detailed simulations to 2150 show that, for the United States and Taiwan Province of China, life cycle wealth stabilizes at a high plateau or continues to increase depending on the mortality assumptions employed (Lee, Mason and Miller, 2003). Long-term simulations for India, Japan, and the United States using the United Nations long-term population projections show that wealth continues to rise relative to income and that the second dividend is positive for the foreseeable future and beyond (Mason, 2005). Thus, the second dividend does not turn negative as the demographic transition proceeds.

The second objective of the paper is to construct estimates of the first dividend from 1950 to 2050 and of the second dividend from 1950 to 2000 so as to compare and contrast diverse experiences around the world. These calculations support several important generalizations. First, the demographic dividends are potentially quite important throughout the world. For the 1970-2000 period, the demographic dividends – if fully exploited – would have contributed between one and two percentage points to growth in income per equivalent consumer in the industrial countries, East and South-East Asia, Latin America, the Middle East and North Africa, and the Pacific Islands. Most of this potential gain comes from the second rather than the first dividend. In every region, the second dividend exceeds the first. In the industrial countries, East and South-East Asia, transitional economies, and Pacific Island nations, the second dividend was twice the size of the first dividend. In South Asia, the second dividend amounted to 0.69 percentage points of growth per year as compared with only 0.10 for the first dividend.

Second, favourable (or unfavourable) demographics do not automatically translate into strong (or weak) economic growth. This is clear on a priori grounds. In the many ways delineated heretofore, policy interacts with demographic change to generate economic outcomes. This point is reinforced by comparing the potential effects of demography with actual economic experience. For example, between 1970 and 2000, the combined effects of the first and second dividend were very favourable in East and South-East Asia, Latin America, and the Pacific Island nations but, in Latin America and the Pacific Islands, economic growth fell well short of the demographic dividends.

Third, the experience in the developing countries has been quite distinct from the experience in the developed countries and the transitional countries. The dividend was substantial in the industrial countries and the transition economies while it lasted. However, the duration was much shorter and the total gain was much less than in the developing countries. The greater gains in the developing countries reflect the fact that they were greatly disadvantaged in their age structure in 1950.

Fourth, the experience within the developing world is quite varied. For many countries, both the first and second dividends became important in the 1970s, but in other parts of the world – sub-Saharan

Africa, for example – the dividend period is just beginning. The duration and intensity have also varied in the developing world.  In East and South-East Asia and Latin America, in particular, the duration of the dividend was relatively short and intense.  In other parts of the world – South Asia, for instance – the dividend was realized over a more extended period and had a smaller growth effect in any particular year.

Changes in age structure had an enormous influence on the macroeconomic environment during the second half of the twentieth century in both the developed and developing world.  Age structure will most likely be an equally important force during the next fifty years.  How economic growth, poverty, and other features of the macro-economy are shaped by demographic change will depend, however, on how policies and institutions respond to the challenges and opportunities the future holds.

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ANNEX

LIST OF COUNTRIES BY COUNTRY GROUPINGS

**Industrial**
Andorra, Australia, Austria, Belgium, Bermuda, Canada, Channel Islands, Denmark, Faeroe Islands, Finland, France, Germany, Gibraltar, Greece, Greenland, Holy See, Iceland, Ireland, Isle of Man, Italy, Japan, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, New Zealand, Norway, Portugal, Saint-Pierre-et-Miquelon, San Marino, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States of America

**East Asia and Southeast Asia**
Brunei Darussalam, Cambodia, China, China, Hong Kong SAR, China, Macao SAR, Dem. People's Rep. of Korea, Dem. Republic of Timor-Leste, Indonesia, Lao People's Dem. Republic, Malaysia, Myanmar, Philippines, Republic of Korea, Singapore, Thailand, Viet Nam

**South Asia**
Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka

**Latin America**
Anguilla, Antigua and Barbuda, Argentina, Aruba, Bahamas, Barbados, Belize, Bolivia, Brazil, British Virgin Islands, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Falkland Islands (Malvinas), French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands, United States Virgin Islands, Uruguay, Venezuela

**Sub Saharan Africa**
Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Dem. Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Réunion, Rwanda, Saint Helena, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Togo, Uganda, United Republic of Tanzania, Zambia, Zimbabwe

**Middle East and North Africa**
Afghanistan, Algeria, Bahrain, Cyprus, Egypt, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Morocco, Occupied Palestinian Territory, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates, Western Sahara, Yemen

**Transitional**
Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Mongolia, Poland, Republic of Moldova, Romania, Russian Federation, Serbia and Montenegro, Slovakia, Slovenia, Tajikistan, TFYR Macedonia, Turkmenistan, Ukraine, Uzbekistan

**Pacific Islands**
American Samoa, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Micronesia (Fed. States of), Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna Islands

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NOTES

[1] Changes in age structure may have additional important effects (Bloom, Canning and Sevilla, 2002). Recent studies suggest that demographic change may have favourable human capital effects (Jensen and Ahlburg, 2001; Montgomery and Lloyd, 1996) although the effects on education are uncertain (Ahlburg and Jensen, 2001; Kelley, 1996).

[2] Detailed country estimates are available on the author's website: www2.hawaii.edu/~amason.

[3] Additional information about estimating the economic life cycle is described in detail in www.ntaccounts.org.

[4] The dividend period is defined as the longest time interval during which the dividend is positive. In the event of two periods of equal length, the first period is used. The duration is the number of years elapsed from the beginning of the first period to the end of the last period. For some countries, the dividend was underway in 1950 and for other countries, the dividend period was not completed until after 2050. In these cases, the calculations are based on a dividend period beginning in 1950 or ending in 2050.

[5] For the sake of simplicity, it is assumed that the rate of growth of per capita consumption and the interest rate are constant. Although this is a standard steady-state assumption, there is no reason to expect this to be the case during periods of transition. To treat g and r as endogenous is not a tractable alternative without employing a detailed, country-specific simulation model (Lee, Mason, and Miller, 2000, 2003). A more general formulation that allows for changing growth rates is provided by Mason and Lee (forthcoming).

[6] Under golden-rule growth the consumption-time profile is at its maximum (Phelps 1965).

[7] As can be seen in Figure 1, labour income substantially exceeds consumption from the mid-twenties. However, the preponderance of this surplus for child-rearing adults is devoted to transfers to children rather than to capital accumulation. The calculations of the second dividend depend on the growth rate of wealth rather than the level. Hence, they are unaffected if wealth of those over age 50 is a constant proportion of total wealth. As populations age, wealth of those over age 50 is likely to increase as a proportion of total wealth and, consequently, the use of wealth over age 50 probably errs on the side of understating the magnitude of the second dividend. This issue will be explored further in research that is underway.

[8] An alternative approach would be to assume a constant rate of return to wealth. This would be more consistent with the assumption that interest rates are established in global markets and not influenced by the amount of wealth or capital supplied in an individual economy. However, this would overstate the effect of increased wealth on national income if rates of return to capital decline as the economy's capital intensity increases. The approach employed here is adopted because it yields more conservative estimates of the income gains associated with the second dividend. A complete general equilibrium economic model, however, would also incorporate the

effects of declining interest rates on saving. This is a drawback of the simple approach employed here, but it should also be noted that empirical research usually concludes that saving rates are quite insensitive to changes in interest rates.

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# BEFORE IT'S TOO LATE: DEMOGRAPHIC TRANSITION, LABOUR SUPPLY, AND SOCIAL SECURITY PROBLEMS IN BRAZIL

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One of today's central debates about the demographic transition focuses on the relationships that connect changes in population age structure to economic growth. Demographers and economists alike are interested in examining the extent to which interactions between population age structure and both fertility and mortality declines yield increases in aggregate income levels. This phenomenon, usually called the *demographic dividend* or *demographic bonus*, has recently been presented as a combination of two separate dividends (see Mason, in this volume, and Mason and Lee, forthcoming). The *first dividend* is usually related to a temporary increase in the share of the population that is of working age and can be effectively measured by increases in the ratio of producers to consumers in the population (Mason and Feng, 2005). The *second dividend,* which has gone virtually unnoticed among most scholars, follows after the first dividend and is related to the creation of wealth that arises in response to population ageing. The magnitude of this effect depends largely on how wealth is created. Rapid capital accumulation or larger transfers from younger generations, private and public, can meet consumption demands of an increasing older population. Only in societies where capital deepening prevails will the effects of population ageing ultimately increase the output per effective consumer (Lee, Mason and Miller, 2003).

The demographic dividends are not automatic; they depend on institutions and policies to transform changes in population age structure into economic growth (Bloom and Canning, 2001). Therefore, it comes as no surprise that some emerging economies that could benefit substantially from the demographic transition are also the ones that are more likely to fail in taking advantage of this process. Rigid labour market regulations, low investments in human capital, tax evasion, socioeconomic inequality, and lack of well regulated capital markets are some of the constraints that limit the ability of developing countries to benefit from changes in population age structure. Despite consensus among scholars about most of these issues, additional research is still needed on the linkages between the policy environment and demographic transition.

Among the critical policy areas are social security and other forms of old-age support based on pay-as-you-go (PAYGO) schemes. Weaknesses in the governance and management of PAYGO pension programmes lead to negative effects for the demographic dividends. For example, if greater tax evasion or real increases in social security benefits offset increases in the share of working age population, the fiscal capability of governments to invest in human capital will be reduced. In turn, efficiency loss may lower the effect of the demographic transition on both future productivity and economic growth. At the same time, declining social security support ratios (i.e., the ratio of social security taxpayers to beneficiaries) can represent a fiscal burden for future working age population, reducing the ability of workers to save for future consumption and thus putting at risk the second demographic dividend.

Brazil provides an important context for elaborating linkages between demographic transition and public policies. In a recent analysis of the first demographic dividend, Rios-Neto (2004) used income data from Brazilian municipalities to demonstrate that the association between growth of working age

population and income growth was positive and significant during the period 1991-2000. It remains unclear, however, how much greater the economic growth would have been if Brazil had stronger institutions and more appropriate policies in place.

Brazil is distinct because, compared to other emerging economies, a relatively large public sector coexists with a rapidly ageing population. Public welfare support, across all levels of government, reached about 21 per cent of GDP in 2002 (Brasil, 2003), an amount that is comparable to social expenditures in most developed countries. While social security benefits and other forms of old-age support represented about 12 per cent of GDP, public expenditures on education and health amounted to 5.5 per cent and 3.5 per cent of GDP in 2002, respectively (Camargo, 2004). The size of the public sector and, in particular, the amount of transfers to older persons suggests that economic implications of demographic changes depend to a great extent on how public policies are designed.

In an influential study published a decade ago, Carvalho and Wong (1995) pointed out the need for policymakers to respond ahead of time in order to boost the benefits of temporary increases in the working age population in Brazil. In a more recent analysis, Turra and Rios-Neto (2001) combined several age schedules of public and family transfers with population forecasts to demonstrate that fiscal gains from demographic changes are transitory and may not last for more than ten years. While the political arena has been slow to act upon this information, the debate on the dividend continues among social scientists. Despite the lack of appropriate economic policies, however, some improvements in public education have been made as a result of lower fertility rates. Literacy levels and measures of enrolment and educational attainment have significantly improved in the last decades (Saboia, 1998). Literacy rates jumped from 60 per cent in 1960 to 87 per cent in 2000 (Pinto and others, 2000) and in the last five years almost all children aged 7-14 have been enrolled in school (Schwartzman, 2003). Unfortunately, public education suffers from competition for resources with public programmes for the older population (Turra and Queiroz, 2005). Budget constraints have limited the government's ability to improve the quality of schooling and to reduce grade retention and school drop-out -- problems that might reduce potential productivity growth.

This paper provides empirical evidence to support the thesis that the absence of appropriate policies can mitigate temporary benefits of population changes and aggravate adverse effects of population ageing. By demonstrating that the Brazilian social security system works less efficiently than desired, this paper intends to contribute to the debate on how critical policy areas might reduce the potential economic impact of demographic changes. Although the study does not directly test for the effects of the financial adequacy of social security on economic growth, it aims to shed light on the roles played by demographic policy and economic changes on social security problems and, in turn, on potential limits for the demographic dividends by using counterfactual projections of the social security support ratios. In addition, the study addresses the following issues: (i) to what extent fertility and mortality declines have favoured the social security system through temporary increases in the working-age population; (ii) how the effects of population age structure mitigate the adverse effects of population ageing; and (iii) how changes in labour supply as well as both social security contributions and benefits preclude or favour the effects of demographic changes. In order to demonstrate potential policy applications, the study also offers a snapshot of what the social security support ratios in Brazil would look like if social security rules of the United States were applied in Brazil. Motivations for comparing the U.S. with Brazil are manifold. First, as in many other developed countries, compliance with social security requirements is high in the U.S. (Manchester, 1999), thus providing valuable insights on the performance of the social security system in Brazil. Second, despite socioeconomic differences between the two countries, Brazil shares some similarities with the United States, including a relatively young population, unequal distribution of wealth, large expenditures on public pensions, and the dominance of public transfers directed towards the elderly. Finally, data are readily available for the U.S., which makes the analyses feasible.

The pension system in Brazil consists of three main segments: (i) the general system (private workers), (ii) the civil servants system, and (iii) other several private funded systems. Most pension systems are based on the PAYGO scheme. The country also has a large non-contributory system with means-tested eligibility that provides benefits for low-income older persons.

The social security system for private workers (general system) is an unfunded defined-benefit programme. There is still debate regarding when it began. In 1888, some measures were taken to provide pension benefits to postal workers and employees of the national press. In the following years, retirement benefits were extended to railroad workers, employees of the Ministry of Finance and the Ministry of the Interior, and army forces. In 1923, a legislation (Lei Eloi Chaves) was approved to regulate social security for both civil servants and private workers. This law decentralized the pension system, as each company was responsible for its own employees. The first reform happened in 1933, when the pension funds became structured by professional category (Leite, 1983). The general pension system was centralized only in 1966, when the House of Representatives approved the Social Security Ordinary Law. The National Social Security Administration (INPS) incorporated all the revenues and expenditures from sector-specific programmes as well as its assets and liabilities. Another major change during this time was in the scheme of the programme, which changed from a capitalization system to a PAYGO schemes (Leite, 1983).

The last major change in regulation happened with the 1988 Constitution, which extended mandatory social security coverage to most of the excluded groups, including rural workers, without requiring equivalent increases in revenues from contributions. There were other measures that made the system more generous than before, such as establishing the minimum wage as the lowest benefit paid by the system, indexing all pensions to the minimum wage, and reducing the minimum age of retirement (Stephanes, 1998).

Until 1998, full pension benefits were granted to all workers who had contributed for 10 years to the system, had reached normal retirement age through the old-age pension benefit (65 years for men and 60 years for women), or could prove that they had been working for a certain number of years under the length of service pension benefit (35 years for men and 30 years for women, but without the requirement of contribution for the same period of time). In addition, special retirement schemes existed that granted proportional retirement benefits for men who had worked for 30 years and for women who had worked for 25 years. The benefits were computed based on the last 36 months of activity (Brasil, 2002). The level of benefits was relatively high, with the recipients of old-age benefits receiving, on average, 3 times the minimum wage, and with the length of service benefits being 2.5 times higher than the old-age benefits (Queiroz, 2005).

In 1998, after years of political debate, a significant reform was approved in order to help solve the programme's fiscal imbalance. The main change was the introduction of a new methodology to calculate pension benefits based on an actuarial rule. The new benefit computation is based on the Swedish Notional Defined Benefit Programme and takes into account longer earnings history, the life expectancy at the age of retirement, and a coefficient that creates disincentives to early retirement. However, a minimum retirement age has not yet been approved for workers in the private sector. (Brasil, 2002).

The general system was conceived when rapid population growth and low life expectancy combined to sustain the programme. In recent years, however, the system has been facing budget shortfalls, which have gradually increased after the changes implemented in the early 1990s. In 1996, the deficit was equal to 0.1 per cent of the GDP, but it increased to 1.7 per cent in 2004 (Giambiagi and others, 2004). The

implicit debt, a long-term measure of the system's financial adequacy, was also large and amounted to about two times the GDP (Bravo, 2001).

Alongside the general pension system, civil servants have their own pension programme, which is also an unfunded PAYGO defined-benefit programme. Although smaller in absolute numbers when compared to the general programme, expenditures of the civil servants programme are not trivial, reaching 4.7 per cent of GDP in 2002 (Medici, 2004). According to Medici, the programme is a complex chain of federal, state and local systems, including special programmes for different civil servant categories. Benefits are more generous in the civil servant system than in the general system as the replacement rates are higher and the period of contribution to receive full pension benefits is shorter. The programme deficit is high and has been increasing over the past decade, having reached about 3.6 per cent of the GDP in 2004 (Giambiagi and others, 2004).

## B. METHODS

To estimate what the social security support ratios (i.e., the ratio of social security taxpayers to beneficiaries) in Brazil would look like under different demographic and economic scenarios, we projected the population of 1970 using the cohort-component method of projection in five-year intervals of time and age (Shryock and Siegel, 1973; Preston and others, 2001). We then calculated taxpayers and beneficiaries at the beginning of each five-year period by applying age- and sex-specific (i) labour force participation rates, (ii) taxpayer rates, and (iii) beneficiary rates. In this paper, taxpayer rates are defined as the proportion of workers in the labour force who pay social security taxes by age and sex while beneficiary rates are defined as the proportion of individuals receiving any social security benefit from the general system by age and sex.

To capture the full effects of demographic transition on social security support ratios, the projection period was extended to the year 2045. Actual demographic and economic rates were used from 1970 to 2000 while the projected rates were applied for the period 2000-2045. For purposes of this exercise, it was assumed that the Brazilian population was closed to migration during the period of analysis. It was further assumed that demographic and economic rates were independent and, therefore, did not affect each other. Such models that focus on first-order effects have been used in previous demographic analyses (e.g., White and Preston, 1996).

The first question was how changes in fertility and mortality rates (demographic effects) impact on social security support ratios. This estimate was made by projecting forward the social security support ratios under the actual and projected fertility and mortality rates, but assuming that economic rates were fixed at the 1970 levels. Both the total demographic effects – mortality and fertility rates varying together – and the separate effects for each demographic variable are presented. To highlight the effects of population momentum on dependency ratios, an additional set of projections is shown, using the age distribution of stable-equivalent populations for each five-year interval. The stable equivalent populations are the underlying populations that would emerge had the fertility and mortality rates for each time interval remained constant for a long period of time (Preston, Heuveline and Guillot, 2001).

Next, the effects of changes in the labour force participation (LFP) rates on the support ratios were examined. To do this, the social security support ratios were projected forward under the actual and projected LFP rates, but assuming that demographic rates and the other economic rates were fixed at the 1970 levels. Given the well-documented sex differentials in LFP rates, the effects were separated by sex. Then, the so-called "evasion effect", which is the impact of changes in taxpayer rates on the support ratios, was estimated. The definition of tax evasion refers to that of Manchester (1999). The term is broadly defined to include both tax evasion and tax avoidance by working in the informal sector. The estimate was made by projecting forward the social security support ratios under the actual and projected

taxpayer rates, but assuming that demographic rates and the other economic rates were fixed at the 1970 levels. Further, it was estimated the impact of changes in beneficiary rates on the support ratios in a manner analogous to that previously described for the other components. It was called the "generosity effect". Together, the "evasion" and the "generosity" effects reflect the rules that have governed the social security system in Brazil. In order to emphasize the idiosyncrasies of the social security system in Brazil, a final scenario was projected using actual and projected demographic and LFP rates for Brazil and beneficiary rates for the United States in 2001, and assuming that 95 per cent of the workforce contributes to the system.

The hypothetical scenarios discussed in the foregoing were compared to two main time series: one that uses actual and projected demographic and economic rates, and the other that keeps all rates fixed at the 1970 levels.

## C. Data

The actual and projected mortality and fertility estimates used in the counterfactual projections were prepared by the Population Division of the United Nations (2003) and the United States Census Bureau (2005). In addition, population figures for 1970 were taken from the 5 per cent sample census data for Brazil available in the Integrated Public Use Microdata Sample (Sobek and others, 2002).

Data from the Pesquisa Nacional por Amostra de Domicilio (National Household Survey) or PNAD (Instituto Brasileiro de Geografia e Estatística, 2005) were used to estimate actual social security taxpayer rates and beneficiary rates. To estimate projected rates, it was assumed that rates remained fixed at the 2002 levels. The PNAD is a nationally representative stratified random sample of the Brazilian population collected annually since the late 1970s. The PNAD contains a comprehensive and comparable set of demographic and socioeconomic variables, including detailed information on employment status, occupation, income, and education for all members of the household. The survey asks respondents whether they contribute or not to the social security system and whether they receive social security benefits. Data limitations prevented the analysis of the different types of social security benefits. For example, for those receiving retirement or survival benefits it was not known whether the retirement benefit was due to old age, length of service, disability, or social assistance. However, the conclusions are assumed not to be substantively affected by these limitations. A comparison of estimates with those based on official data from the Social Security Administration Office in Brazil showed that the two sets of estimates produced the same conclusions regarding the levels and trends of social security support ratios.

Both census (Sobeck and others, 2002) and household survey data (PNAD) were used to estimate labour force participation rates. The projected labour force participation rates were prepared by the International Labour Organization (ILO, 2005) and the Economic Commission for Latin America and Caribbean (ECLAC, 1999). Labour force participation rates are defined by ILO as the proportion of the population, usually between ages 16 and 65 years, who are able to work and are either working or actively seeking work.

### D. Trends for various projection components

#### *Demographic variables*

The panels of figure 1 display some of the main features of demographic changes that have occurred in Brazil over the last decades. Figure 1 also depicts future demographic scenarios. The demographic transition started with mortality improvements in the 1930s, which were followed by fertility declines in the later 1960s. Despite the delayed onset, the demographic transition in Brazil has been characterized by rapid demographic changes (Wong and Carvalho, 2005).  The total fertility rate has declined by more than

half since 1970 (from 5.3 to 2.13 children per women in 2000), and life expectancy at birth has improved steadily from 57.5 years in 1970 to 70.3 years in 2000. These trends have interacted to transform the population age structure. From a young quasi-stable age structure in 1970, the age distribution has gradually shifted to an older distribution. Until 2000, the most important changes were the decline in the share of the young and a rise in the share of the working-age population. Significant increases in the elderly population are expected to occur only in the next decades. The projections indicate that by 2050, the population aged 65 and older will represent about 16 per cent of the total population compared to 3 per cent in 1970. These shifts in the age structure can be seen in the dependency ratios, which follow a well-documented pattern: the total dependency ratio will decline until 2010 due to the decline in the young dependency ratio. The trend will then shift upwards as increases in the old-age dependency ratio became more important.

**Figure 1. Demographic transition in Brazil, 1970-2050**
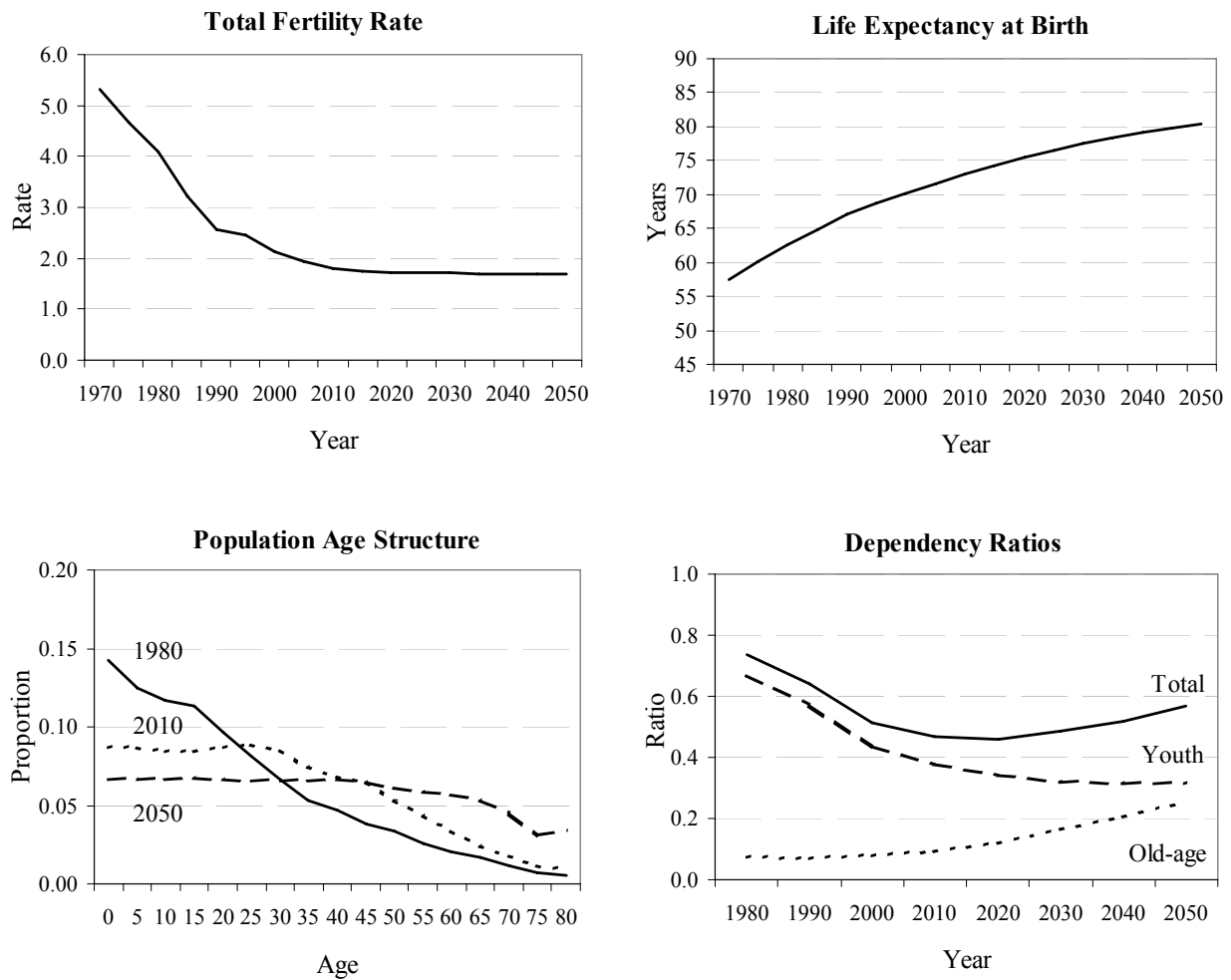


*Sources:* Instituto Brasileiro de Geografia e Estatistica (2005); United Nations (2003); Sobek (2002).

Figure 2 depicts some of the changes in the age- and sex-specific LFP rates since 1970. For men, it is clear that the length of working life has fallen over time due to both increases in educational attainment (younger workers) and changes in retirement behaviour (older workers). In 1970, almost 76 per cent of the male population aged 60-64 years was in the labour force; this number declined to 65 per cent by 2000. The fall in economic participation was even greater for older workers (65 and over), of whom 30 per cent were in the labour force in 2000 compared to 60 per cent in 1970. Indeed, a summary indicator of early retirement, defined as the age in which less than 50 per cent of the population is out of the labour force, shows that the median retirement age for males declined from 69 years in 1960 to 63 years in 2000, a decline of 1.5 years on average per decade[1] (Queiroz, 2005).

Among women, LFP rates showed a different trend, increasing steadily from 13.5 per cent in 1950 to 44 per cent in 2000. As shown in figure 2, the rapid increase in female rates was driven mainly by rising participation of prime-age women (aged 20-60), while LFP at the youngest and oldest ages changed little between 1970 and 2000. Economic development, higher educational levels, decline in fertility rates, and changes in social norms towards women are some of the factors that explain this pattern (Rios-Neto and Wajnman, 1994; Costa, 1990). However, the rapid increase in female LFP was highly concentrated in the informal sector, so that the impact of female labour force on social security finances would be smaller than what one might otherwise expect (Wajnman and others, 1998).

In fact, another important aspect of the labour market in Brazil is the decline in the share of workers in the formal sector, which is defined as the sector that complies with labour market regulations. The formal market declined from 70 per cent in the mid-1980s to about 60 per cent in 2000. In general, labour market segmentation and/or economic recession explain the increase of the informal sector in developing economies. In Brazil, during the 1980s, the size of the informal sector was negatively correlated with the economy's growth rate, following closely the business cycle in that decade. The informal sector increased during the recession years as workers looked for work in the informal sector, while decreased during

**Figure 2. Labour force participation rates by age and sex, Brazil, selected years**
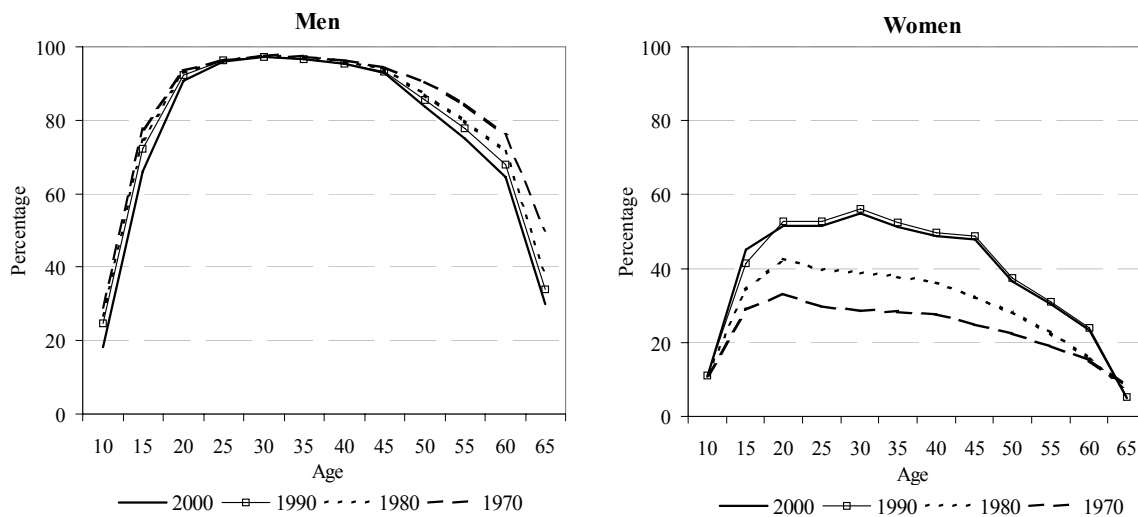


*Source:* ILO (2005).

economic expansion when part of the labour force was absorbed by the formal labour market. The 1990s, on the other hand, observed a structural growth of the informal sector, a behaviour that is inconsistent with traditional economic theory (Loayza, 1997; Carneiro and Henley, 2001; Soares, 2004). The segmentation of the labour market is clear; a formal sector and an informal sector coexist, as in many developing countries. Only those employed in the formal market, or the registered workers, are covered by labour market regulations, including social security coverage. Workers in the informal sector work without formal labour contracts and normally do not pay taxes and are not covered by welfare regulations[2] (Soares, 2004; Ulyssea, 2005).

### Social security participants

Social security benefits are the most important sources of income for older Brazilians. As discussed above, the system has been characterized by generous benefits and low contribution rates. About 77 per cent of the population aged 60 or over received some sort of pension benefits by 2002. Figure 3 reveals important trends over the last decades. On the one hand, beneficiary rates increased for all age groups. At age 50, for example, about 20 per cent of the population received benefits in 2002 compared to 17 per cent in the early 1980s, which corroborates the finding that the average age at retirement has declined. On the other hand, taxpayer rates declined for both men and women. Among men, only 50 per cent of those in the labour market made contributions in 2002 compared to 65 per cent twenty years earlier. These results also hold true for women, in general, even though their LFP has increased.

### E. RESULTS

### Demographic effects on social security support ratios

Not surprisingly, if all economic and demographic rates had remained at the 1970 levels, social security support ratios would be roughly constant throughout the period of analysis, declining slightly from 3.33 in 1970 to 2.85 in 2045 because of the initial effects of the demographic transition (figure 4 and

**Figure 3  Age- and sex-specific tax payer and beneficiary rates, Brazil, selected years**
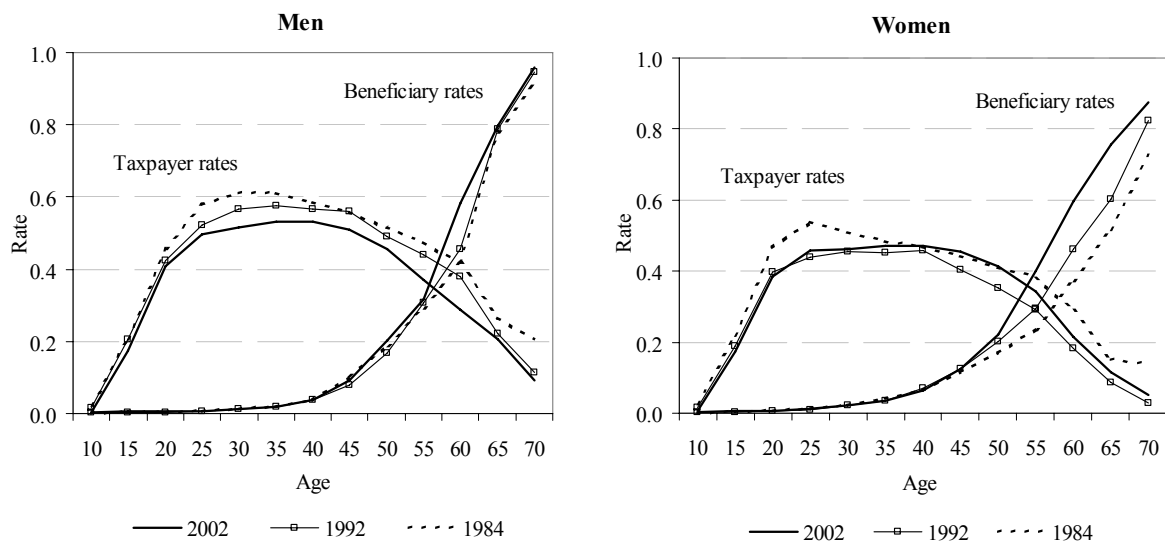


*Source:* Pesquisa Nacional por Amostra de Domicilios.

table 1). If, instead, the demographic rates had varied, holding everything else constant, increases in the share of the working-age population would initially produce a demographic bonus in the social security system that would last for about 20 years (1970-1990). Although the bonus looks small – the ratio would be about 5 per cent higher than when demographic rates are held constant – it is not negligible, given the size of the social security programme in Brazil and the challenges that it will face in the future. Eventually, demographic changes would have a negative impact on the support ratios, which would decline to 2.86 in 2000 and reach 1.0 in 2045, because of fertility and mortality reductions alone. However, the estimates based on stable-equivalent populations suggest that the effect of these changes would be noted much earlier if past fertility and mortality had not played a central role. Without the effects of population age structure, support ratios would reach 2045 levels (0.8 taxpayers for each beneficiary) between 2005 and 2010. Expectedly, most of the demographic effects are due to changes in fertility. Table 1 shows that the effect of mortality declines on social security support ratios is minimal, indicating that the proportionate impact of mortality improvements on the population age structure is fairly neutral during the period of analysis.

A comparison of the "all rates" and "only demographic rates" scenarios in figure 4 also shows that actual support ratios would have been declining faster than expected if based only on changes in the demographic rates. The reasons for this pattern are discussed in the following sections.

**Figure 4. Social security support ratios, Brazil, 1970-2045: demographic effects**
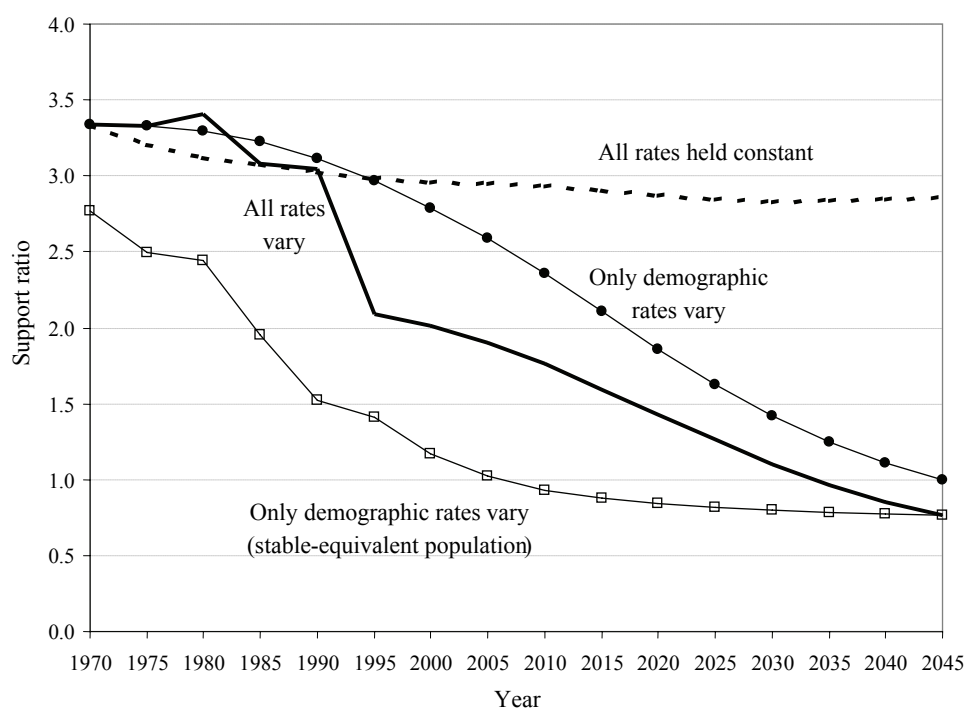


*Source*: Authors' calculations.
    NOTE:   The demographic rates are mortality and fertility rates; the economic rates are labour force participation rates, taxpayer rates and beneficiary rates.

TABLE 1. SOCIAL SECURITY SUPPORT RATIOS UNDER DIFFERENT SCENARIOS - BRAZIL, SELECTED YEARS

| | | | Demographic Effects | | | | Changes in Labor Supply | | Institutional Effects | | Policy Simulations (US Social Security Rates) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All rates vary | All rates held constant | Only fertility rates vary | Only mortality rates vary | Both rates vary | Both rates vary (stable equivalent) | LFP rates vary | Only female LFP rates vary | "Evasion" Effect | "Generosity" Effect | All rates vary | All rates held constant |
| 1975 | 3.33 | 3.21 | 3.21 | 3.21 | 3.33 | 2.50 | 3.21 | 3.21 | 3.21 | 3.21 | 7.22 | 6.92 |
| 1980 | 3.41 | 3.13 | 3.13 | 3.12 | 3.29 | 2.45 | 3.23 | 3.23 | 3.13 | 3.13 | 7.29 | 6.68 |
| 1985 | 3.08 | 3.08 | 3.08 | 3.09 | 3.23 | 1.95 | 3.22 | 3.22 | 3.03 | 2.84 | 7.10 | 6.51 |
| 1990 | 3.05 | 3.03 | 3.03 | 3.04 | 3.12 | 1.53 | 3.21 | 3.21 | 2.78 | 3.04 | 6.80 | 6.36 |
| 1995 | 2.09 | 2.98 | 2.96 | 2.99 | 2.96 | 1.41 | 3.22 | 3.20 | 2.41 | 2.42 | 6.46 | 6.28 |
| 2000 | 2.01 | 2.96 | 2.86 | 2.97 | 2.79 | 1.17 | 3.26 | 3.22 | 2.41 | 2.37 | 6.12 | 6.27 |
| 2005 | 1.90 | 2.95 | 2.71 | 2.97 | 2.59 | 1.02 | 3.30 | 3.25 | 2.40 | 2.36 | 5.75 | 6.29 |
| 2010 | 1.76 | 2.94 | 2.51 | 2.97 | 2.36 | 0.93 | 3.35 | 3.29 | 2.39 | 2.35 | 5.30 | 6.28 |
| 2015 | 1.60 | 2.91 | 2.28 | 2.96 | 2.11 | 0.87 | 3.37 | 3.30 | 2.36 | 2.33 | 4.77 | 6.20 |
| 2020 | 1.43 | 2.87 | 2.04 | 2.94 | 1.86 | 0.84 | 3.39 | 3.31 | 2.33 | 2.30 | 4.21 | 6.10 |
| 2025 | 1.26 | 2.85 | 1.81 | 2.94 | 1.62 | 0.82 | 3.42 | 3.32 | 2.31 | 2.28 | 3.68 | 6.00 |
| 2030 | 1.10 | 2.83 | 1.60 | 2.94 | 1.42 | 0.80 | 3.40 | 3.31 | 2.31 | 2.27 | 3.16 | 5.97 |
| 2035 | 0.96 | 2.84 | 1.42 | 2.96 | 1.25 | 0.79 | 3.41 | 3.31 | 2.31 | 2.27 | 2.74 | 6.00 |
| 2040 | 0.85 | 2.85 | 1.28 | 2.99 | 1.11 | 0.77 | 3.42 | 3.33 | 2.32 | 2.28 | 2.41 | 6.04 |
| 2045 | 0.77 | 2.85 | 1.16 | 3.01 | 1.00 | 0.76 | 3.43 | 3.34 | 2.32 | 2.28 | 2.14 | 6.05 |

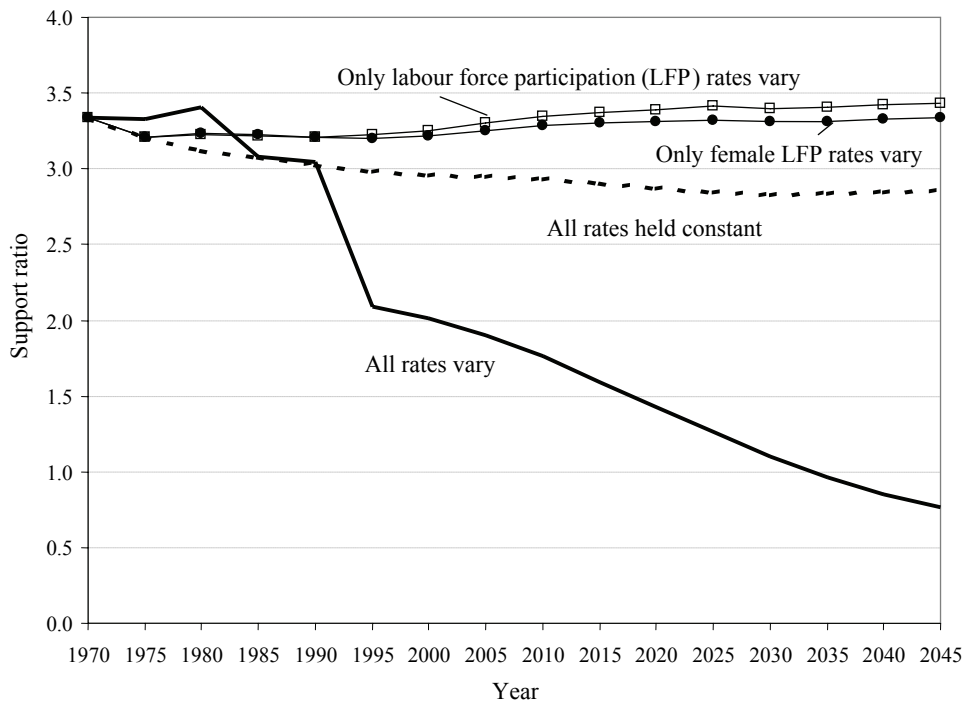*Source*: Authors' calculations.

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*Effects of changes in labour supply on support ratios*

A comparison of the support ratios for the scenario that assumes that only LFP rates varied (holding everything else constant) with the two baseline models – (i) all rates held constant, and (ii) all rates vary – indicates the significance of increases in labour supply to the social security system. The results are shown in figure 5. Changes in LFP would increase the support ratios by about 5 per cent in the first three decades (1980 to 2010), while they would produce support ratios 20 per cent larger in the last decades of the analysis (2025 to 2045). Most of the effect comes from increases in female LFP, reflecting structural aspects of the labour market that were discussed previously. Although increases in labour supply have favoured social security by slightly augmenting the demographic bonus (results not shown) as well as by mitigating the adverse effects of population ageing, the magnitude of these effects is much smaller than that of the demographic effects.

*Effects of changes in taxpayer and beneficiary rates on support ratios*

Have public policies and institutions improved the financial adequacy of the social security system in recent decades? Unfortunately, neither policies nor institutions have been able to ameliorate social security finances. Figure 6 shows what the social security ratios would look like if only the taxpayer rates had varied, holding everything else constant. Following the growth of the informal sector, support ratios would decline steadily until 2000 due to the declining share of the population in the labour force paying social security taxes. The "evasion effect" would reduce support ratios significantly, by about 30 per cent, from 3.33 in 1970 to 2.41 in 2000. In addition, when changes in tax rates are projected together with demographic changes, the bonus is shortened by five years, ending in 1985 (results not shown). Because

**Figure 5. Social security support ratios, Brazil, 1970-2045:
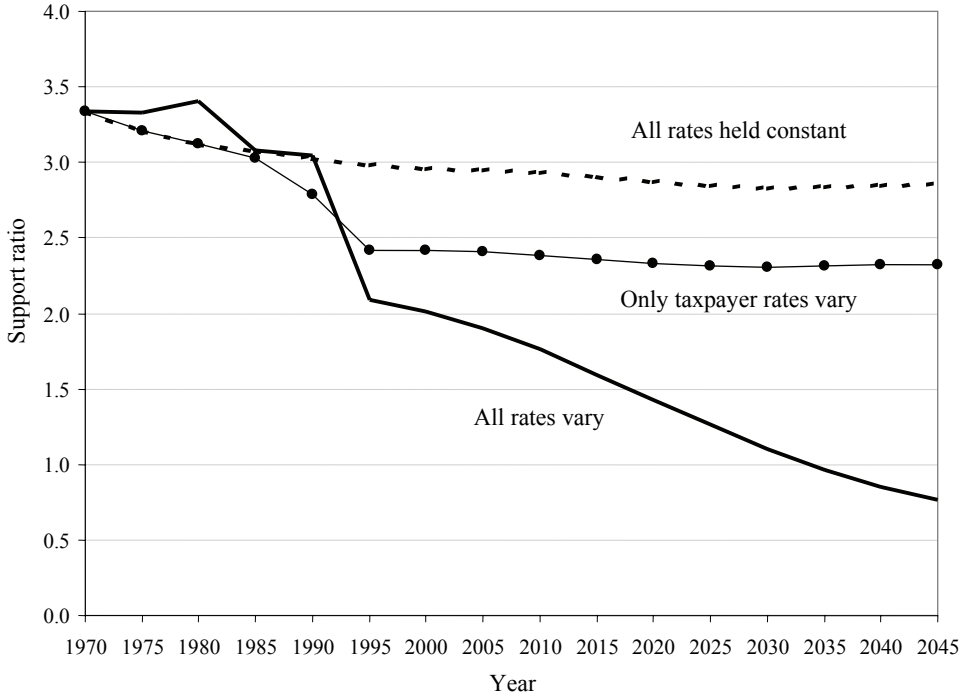effect of changes in labour supply**



*Source:* Authors' calculations.

NOTE: The demographic rates are mortality and fertility rates; the economic rates are labour force participation rates, taxpayer rates and beneficiary rates.

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the projected taxpayer rates are assumed to be fixed at the 2000 levels, the counterfactual projections are not very informative for years thereafter. Yet, it is indisputable that tax evasion will play a key role in social security deficits over the next decades. Given the low rates of tax paying, legislation to stimulate the formalization of the labour market could mitigate substantially the effects of population ageing.

The simulation described above has been repeated, this time varying only beneficiary rates and holding everything else constant. A comparison of the support ratios under this projection is informative in showing that the new regulations approved in the 1988 Brazilian Constitution worsened the social security support ratio and consequently, the fiscal balance[3]. Figure 7 shows that the "generosity effect" is very similar in magnitude to the "evasion effect" (figure 6). As a consequence of the "generosity effect", ratios would decline from 3.33 in 1970 to 2.37 in 2000. Together, the "evasion" and "generosity" effects would be responsible for having reduced potential social security support ratios by about 50 per cent since the late 1990s.

To the extent that the "evasion" and "generosity" effects were already high in 1970 compared to international standards, the results presented in the previous simulations would underestimate the true effects. Thus, a final set of projections for social security support ratios in Brazil were prepared, by applying the beneficiary rates for the United States in 2001 and assuming that 95 per cent of the work force pays social security taxes (figure 8). The results are striking. If both tax evasion and early retirement were eliminated in Brazil, social security ratios would change drastically. For example, in 2000, the ratio would be about 3 times higher than the actual ratio. In addition, the ratios would remain above 2 until the year 2045, despite the negative effects from changes in demographic rates. Finally, the demographic bonus would have been two times larger had appropriate policies been in place in Brazil since 1970.
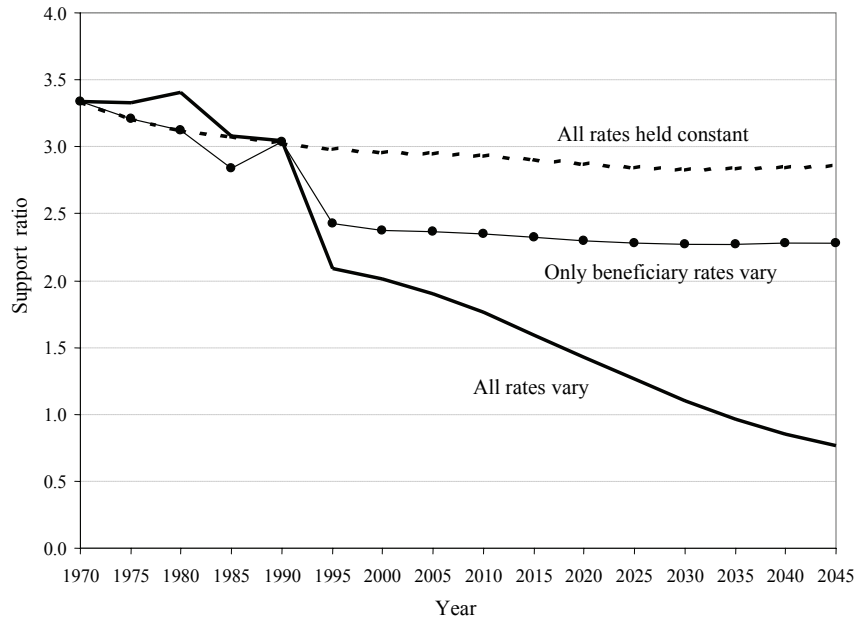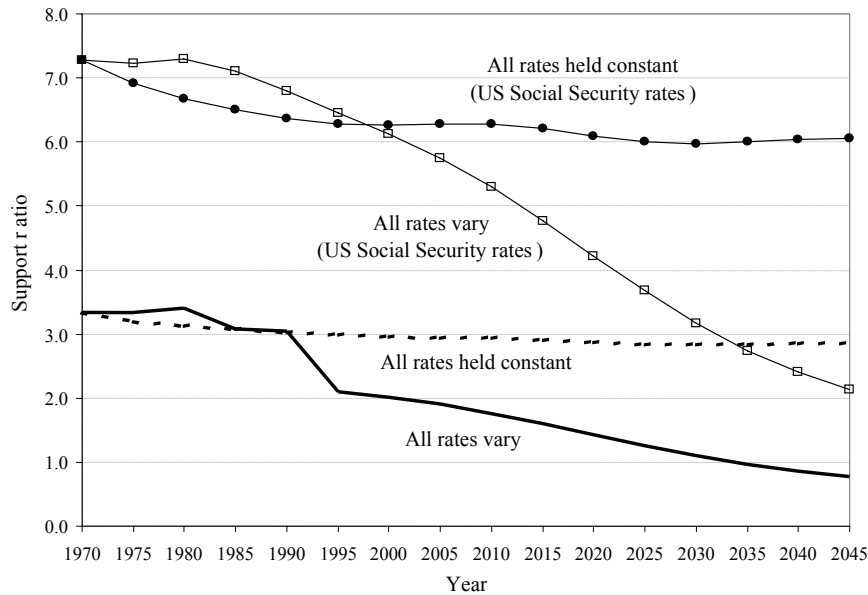
**Figure 6. Social security support ratios, Brazil, 1970-2045, given change in taxpayer rates: "evasion effect"**



*Source:* Authors' calculations.

NOTE:  The demographic rates are mortality and fertility rates; the economic rates are labour force participation rates, taxpayer rates and beneficiary rates.

**Figure 7.  Social security support ratios, Brazil, 1970-2045, given change in beneficiary rates: "generosity effect"**



All rates held constant

Only beneficiary rates vary

All rates vary

*Source*: Authors' calculations.
NOTE:  The demographic rates are mortality and fertility rates; the economic rates are labour force participation rates, taxpayer rates and beneficiary rates.

**Figure 8.  Social security support ratios, Brazil, 1970-2045:  policy simulations**



All rates held constant
(US Social Security rates )

All rates vary
(US Social Security rates )

All rates held constant

All rates vary

*Source:* Authors' calculations.
NOTE: The demographic rates are mortality and fertility rates; the economic rates are labour force participation rates, taxpayer rates and beneficiary rates.

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## F. CONCLUDING REMARKS

A growing literature has examined the importance of changes in population age structure for economic growth. Although there is evidence to support the view that the demographic transition leads to an income boost, the gains from this association depend on several conditions, including the ratio between producers and consumers, the degree of capital deepening, and the existence of appropriate institutions and economic policies. In this paper, it was argued that some developing countries have been neglecting the opportunities that changes in population dynamics can bring to the economy by maintaining domestic policies that are less efficient than desired. In that sense, the case of Brazil is remarkable because of the historically low levels of educational attainment and the increasingly large pay-as-you-go pension systems. In 2004, the public pension systems transferred about 12 per cent of the GDP from the working age population to the elderly in Brazil, a significant amount for a country where only 6 per cent of the population is aged 65 years or over.

The analysis examined social security support ratios under several counterfactual scenarios to provide insights into how institutional and policy issues reduce the potential economic impact of population changes. The findings revealed that Brazilian policymakers have made decisions that are poorly grounded on a technical basis and overlooked the temporary nature of the demographic transition. By granting new forms of benefits without requiring contribution (e.g., inclusion of rural workers in 1988) and by not approving reforms to encourage tax payments, policymakers have reduced the benefits of the demographic transition and aggravated financial issues from population ageing. This myopic view has also buffered fiscal gains from increases in labour supply.

Two other findings in the present analysis should be interpreted as warning signs. First, the effects of age structure on the pace of population ageing (i.e., population momentum) provide an extra time of about 30 to 40 years for social security until support ratios reach levels that would be too low to avoid a financial crisis. Second, policy simulations suggest that increasing the minimum age at retirement and eliminating evasion could boost social security support ratios, help honour obligations, and create future conditions for economic growth by producing surpluses to be invested on human capital and relieving the burden facing future generations. However, implementing these changes will not be an easy task in Brazil. For example, reducing tax evasion requires law enforcement measures, the flexibility of the labour market and a thorough reform of the social security system to encourage participation among workers who were left in the informal sector. Answers for these challenges facing Brazil should be increasingly discussed in the political arena, if old-age security for current and future retirees is to be preserved without putting economic growth at risk.

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### NOTES

[1] Similar measure for females is not very informative because of different trends in labour force participation rates over the period of analysis.

[2] Despite the increase in tax evasion, however, low-income workers from the informal sector can still claim retirement benefits when they become old in Brazil.

[3] Some small variations were found in the beneficiary rates, particularly, a decline in the rates during the period 1980-1985 (see figure 7). Although there is no apparent reason for these changes, it may be explained by a combination of factors including the macro-economic environment (recession and high inflation in the 1980s) and data quality issues in the PNADs (e.g. weights). These variations are of a too small magnitude, however, to affect the conclusions about the "generosity effect".

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# DEMOGRAPHIC DIVIDEND AND LABOUR FORCE TRANSFORMATIONS IN ASIA: THE CASE OF THE REPUBLIC OF KOREA

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The demographic transition in the Republic of Korea has been extremely rapid. It will turn one of the youngest populations in the Organization for Economic Cooperation and Development (OECD) into one of the oldest by the middle of the twenty-first century (OECD, 2002), unless policy intervention and demographic behavioural change significantly alter the present course.

In less than half a century, the fertility and mortality regimes in the Republic of Korea have changed from the typical developing-country pattern to one characteristic of developed countries. The demographic transition began immediately after the Korean War in the early 1950s, when fertility rates were still very high. Official records indicate that the size of the baby-boom cohort born during the 1950s was around 8 million. This baby-boom generation and its offspring "echo generation" have a powerful "population momentum" that will largely shape the demography of the Korean population through the mid-twenty first century and beyond. The story of Korea's rapidly declining fertility followed by rapid population ageing revolves around the members of the baby-boom cohort – their demographics, culture, attitudes, behaviour as adults, and ultimately, their retirement from the labour force.

As the large baby-boom generation enters old age and life expectancy continues to increase, the age structure of the Korean population will change radically in the coming decades. Soon, the Republic of Korea will be facing the issues of a rapidly ageing population and decreasing labour force that are typical of developed countries. The "demographic dividend" that has benefited the Korean economy is expected to turn into a "demographic debt", as the baby-boom cohort claims its credit back from younger generations. This changeover from demographic dividend to debt raises serious issues of intergenerational equity with respect to economic growth and welfare distribution. During the first part of the twenty-first century, pension and health costs of retirees from the baby-boom generation will exert an unsustainable pressure on the social security system and the economy in general, at a time when the labour force will be relatively small.

The present paper describes the major patterns of the past demographic transition in Korea and discusses the future trends of the Korean population. In particular, it examines how and to what extent the Korean economy benefited from the demographic dividend generated by the demographic transition and evaluates the assumptions regarding future fertility rates in the population projections of the Korea National Statistical Office (KNSO) and the United Nations Population Division. In addition, the paper addresses some policy initiatives that might mitigate the possible adverse repercussions of population ageing in order to keep Korea's economic growth and development on a sustainable path.

## A. DEMOGRAPHIC TRANSITION IN THE REPUBLIC OF KOREA, 1950-2000

Demographic transition in Korea has been characterized by a rapid decline in fertility and a consistent and more gradual decrease in mortality. Figure 1 shows trends in crude birth (CBR) and death rates and total fertility rate (TFR) over the period 1950-2000. The CBR peaked at about 45 per thousand in 1955-1960 and decreased to 14 in 1995-2000. By the 1950s, improvement in public health and hygiene had already lowered the crude death rate (CDR) from about 35 per thousand in 1910 to about 17 per thousand in 1950-1955, and had increased life expectancy at birth from about 23 years in 1905-1910 to about 50 years in 1950-1955 (T.H. Kim, 2004). The CDR decreased further to 6 per thousand in 1995-2000. Following the implementation of an aggressive Government campaign for family planning, the TFR

declined dramatically, from 5.0-6.0 children per woman during the 1950s and 1960s to 1.7 in the mid-1980s.[1] This decrease of more than 3 children per woman in a period of about 2 decades has rarely been matched in world demographic history (Kwon, 1997). The fertility rate continued to fall into the 1990s and recently hit a record low of 1.2 in 2002 and 2003.

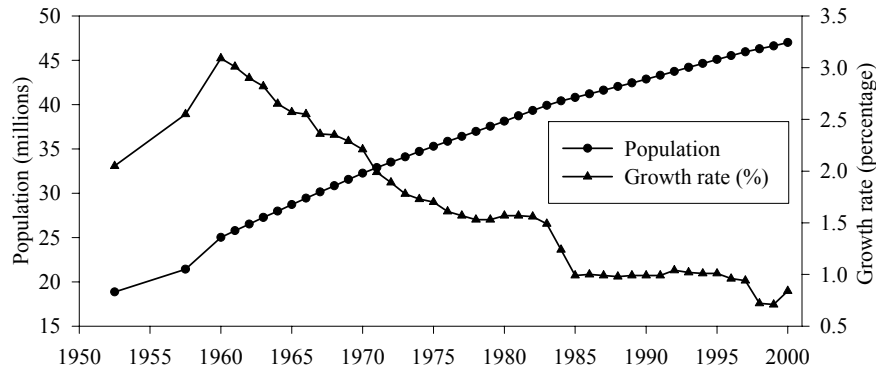**Figure 1. Crude death rate (CDR), crude birth rate (CBR) and total fertility rate (TFR), Republic of Korea, 1950-2000**
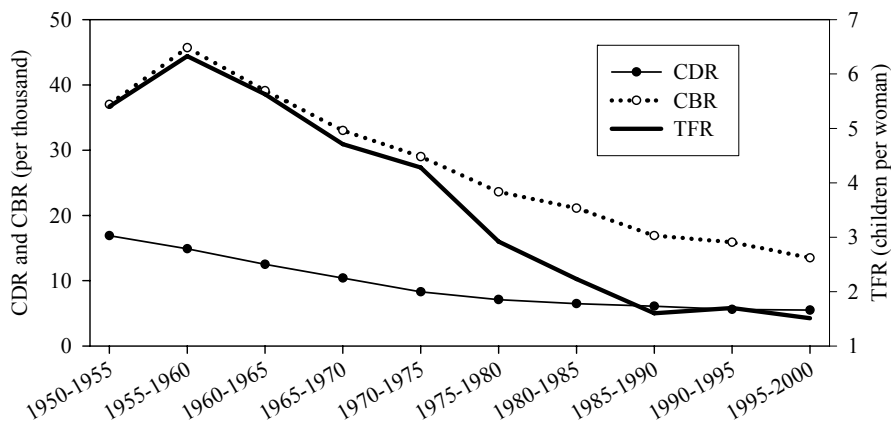


*Source*: United Nations (2005).

In half a century, the Korean population increased by a factor of 2.5 from about 19 million in 1950 to 47 million in 2000. The population growth rate peaked at 3.1 per cent per year in 1960 and then declined rapidly, reaching 1.0 per cent in the mid-1980s (figure 2). Until the mid-1970s, Korea's fertility pattern was similar to the average in the less developed regions. Thereafter, Korea's TFR swiftly converged to the level observed in the more developed regions (figure 3). The consistent decline of TFR results from the overlapping of childbearing patterns in different cohorts. For women born in 1950, the completed fertility rate was 2.9 children per woman. The 1970 cohort was the first to attain significantly below-replacement fertility, with 1.7 children per woman. The completed fertility rates of the 1970 through 1985 cohorts are of particular importance, as they will determine the TFR of the early twenty-first century in Korea. Based on observed and projected data, the completed fertility rates of the 1975, 1980 and 1985 cohorts will be about 1.5, 1.4 and 1.3 respectively, which implies the prevalence of well below-replacement fertility levels throughout the period 2000-2025 (table 1).

The demographic transition in Korea took place in the midst of rapid economic development and the transformation of the socio-economic system from a rural agrarian to an urban industrialized society (Doo-Sub Kim, 2004). The steep and consistent decline in fertility during 1950-1985 can be viewed as an outcome of socio-economic change at the macro-level, operating through choices made at the household (micro) level. The convergence of Korea's TFR to that of more developed countries after the mid-1980s may have been dictated by parents' rational choice based on the cost-benefit calculation of bearing and rearing children and parents' aspirations for upgrading the standard of living at the micro-level (Doo-Sub Kim, 2004). Parents began investing in the quality rather than the quantity of their children. Investment in children as human capital can be understood as a rational choice given the high returns to education made possible by Korea's growing economy and modernizing society (Becker, Murphy and Tamura, 1990).

**Figure 2. Population size and growth rate, Republic of Korea, 1950-2000**

**Figure 3. Total fertility rate in Japan, Republic of Korea and development regions, 1950-2000**
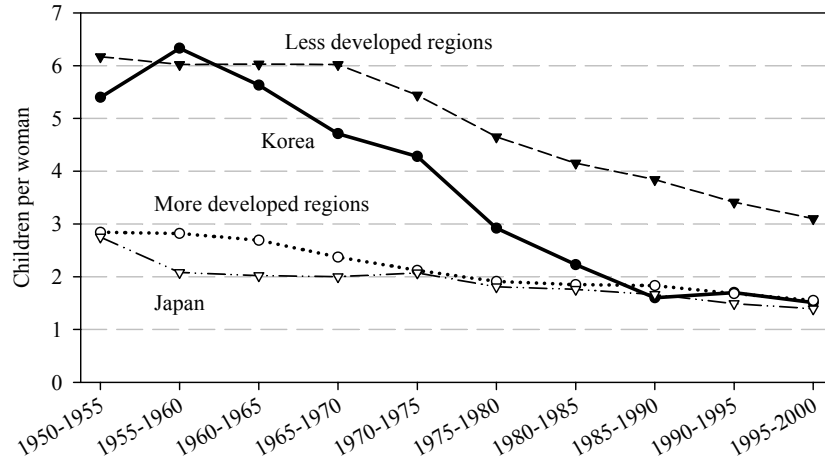
TABLE 1: COHORT COMPLETED FERTILITY RATES IN REPUBLIC OF KOREA

| Cohort | Prime childbirth period (Age 25-40) | Completed fertility rate |
|---|---|---|
| 1950 | 1975-1990 | 2.87 |
| 1955 | 1980-1995 | 2.27 |
| 1960 | 1985-2000 | 2.08 |
| 1965 | 1990-2005 | 1.98 |
| 1970 | 1995-2010 | 1.70 |
| 1975 | 2000-2015 | 1.49 |
| 1980 | 2005-2020 | 1.39 |
| 1985 | 2010-2025 | 1.32 |

The changing fertility regime has been realized both through an increasing proportion of young men and women in their 20s remaining unmarried and through lower marital fertility. For instance, figure 4 shows a conspicuous decline in marriage rates among women aged up to 25 and men aged up to 30 during the period 1970-2004. In contrast, but to a lesser extent, marriage rates of men and women aged 30 and over have gradually been increasing over that period. As shown in table 2, the average age at first marriage has consistently increased over recent decades. In 1972, it was 22.6 years for women and 26.7 for men. As of 2004, it had increased to 27.5 years for women and 30.6 for men. Delayed marriage means a shortened period for women to bear children. Thus, unless age-specific marital fertility rises, the total fertility rate is expected to decline.

In fact, some social surveys indicate that the young generation may not be giving up marriage for good but just delaying it for their work careers (Byun, 2004). The discrimination against married women that is characteristic of the traditional male-dominated corporate culture in Korea has been a major barrier so far to the extension of female labour force participation. The current trend of delayed marriage among young women reflects their behavioural adaptation to this situation in the job market.

Although the trend towards later marriage might have a negative effect on future fertility levels, it could also have a positive effect on the Korean labour force and economic growth, by increasing the workforce's proportion of highly educated women who can remain attached to their careers for a longer period. On the other hand, getting married late does not necessarily mean a reduced number of children. The young generation might catch up since, even with marriage occurring so late, most couples would be physically able to have several children if they chose.

**Figure 4. Age-specific marriage rates by sex, Republic of Korea, 1970-2004**
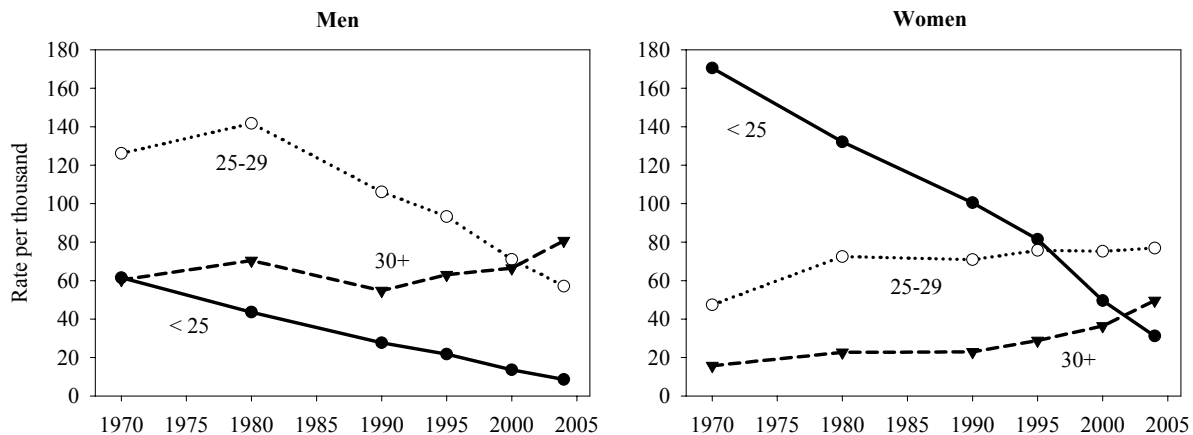


*Source*: KNSO (2003).

TABLE 2:  AVERAGE AGE AT FIRST MARRIAGE BY SEX
IN REPUBLIC OF KOREA, 1972-2004

|        | *1972* | *1975* | *1981* | *1985* | *1990* | *1995* | *2000* | *2003* | *2004* |
|--------|------|------|------|------|------|------|------|------|------|
| Male   | 26.7 | 26.8 | 26.4 | 27.0 | 27.8 | 28.4 | 29.3 | 30.1 | 30.6 |
| Female | 22.6 | 22.8 | 23.2 | 24.1 | 24.8 | 25.4 | 26.5 | 27.3 | 27.5 |

*Source*: KNSO (2003).

The "demographic dividend" refers to the opportunity for economic growth brought about by the increasing proportion of the working-age population during the demographic transition. According to Bloom, Canning and Sevilla (2002), while population growth has a negative effect on per capita income (other things being equal), this effect is counteracted by the positive effect of the growth of the economically active population. They argue that the demographic dividend was essential to East Asia's "economic miracle". Mason (2001) presents a counter-argument by proposing a reverse causal mechanism. Rapid economic development and the accompanying social change (modernization, urbanization, and changes in behaviour), might have induced or facilitated demographic transition. However, when the two processes (economic development and demographic change) take place almost simultaneously in a relatively short period of time, it may be futile to try to apportion the causal flows precisely.

Leaving aside the issue of the cause of the initial economic and demographic changes, once change began, the demographic transition and economic growth in Korea epitomize the "demographic dividend" as described by Bloom, Canning and Sevilla (2002). In Korea's demographic transition, mortality decline preceded the fertility decline. The lag between the two generated a "bulge" in the number of births and population growth, the baby-boom generation. The baby-boomers grew up to form a large and young labour force, which contributed to an unprecedented economic growth. Bloom, Canning and Sevilla estimated that the dividend could explain one-third of the region's economic growth. Rapid socio-economic modernization and development led to rapid changes in the generation's fertility behaviour, which led to a rapid decrease in fertility levels. In turn, the decline in fertility reinforced the economic growth by lowering the dependency and welfare burden and allowing for higher investment in human capital.

However, as stressed by Bloom, Canning and Sevilla (2002), the demographic dividend is not automatic. If timely policy initiatives are not adopted and correctly applied, the opportunity could be missed. Conversely, if a sound policy environment is put in place, then the population dividend will be delivered through enhanced labour supply, savings and human capital. The following sections illustrate how the Republic of Korea benefited from the demographic dividend.

*Population growth and labour force*

Over the second half of the twentieth century the Korean population increased at an average rate of 1.8 per cent per year, from about 19 million in 1950 to 47 million in 2000 (table 3). During the first phase of the demographic transition (1950-1975), the average growth rate of the population (2.5 per cent per year) was significantly higher than the 1.1 per cent observed during the second phase of the transition (1975-2000). The proportion of the population in the working ages (15-64 years) remained relatively stable at around 55 per cent during the initial phase of the transition but started increasing in the mid-1970s to reach more than 70 per cent in 2000 (table 3). This outcome resulted not only from the large baby-boom cohort born at the onset of the fertility transition (1950-1960) but also from the relatively large number of the baby-boomers' descendents, the "echo cohort"; that is, the large number of baby-boomers led to a temporary resurgence of births even though fertility rates had already started declining by the time the baby-boomers reached the reproductive ages.

The total dependency ratio was relatively high between 1950 and 1975, due to the high youth dependency ratio resulting from the high levels of fertility. At that time, the old-age dependency ratio was low. Until the mid-1980s, those aged 65 or over made up less than 4 per cent of the population. Starting in the mid-1970s, however, the total dependency ratio declined rapidly—to reach a level below that of the more developed countries by the mid-1980s, when the Korean economy was entering a more mature stage

of economic development. At the same time, the median age of the Korean population, which had remained between 19 and 20 years from 1950 to 1975, jumped to about 22 years in 1980, 27 years in 1990 and 32 years in 2000 (table 3).

These changes in population size and age structure certainly contributed to economic growth by supplying a growing and young labour force to the economy. Demographic transition may also have contributed to economic growth by providing women an increased opportunity to participate in the labour market. Women became more likely to enter the workforce in great part because of the smaller number of children to take care of. According to national statistics, labour force participation of women of childbearing age has increased consistently. Especially impressive was the increase in the labour force participation rate of women aged 20-29, from below 45 per cent in 1980 to almost 65 per cent in 2004. Women still remain a promising source of the future labour force as younger cohorts become more educated, more inclined to participate, and more attached to their own work career through postponed marriage. Their increasing labour force participation is expected to add to labour supply, reinforcing the effect of the demographic dividend.

### Population growth and savings rate

According to Bloom, Canning and Sevilla (2002), demographic transition also contributes to economic growth by increasing savings, which improves a country's prospects for investment and growth. The young and old consume more than they produce, whereas the working-age population tends to have both a higher level of economic output and a higher level of savings (Higgins, 1998). Improved health and longevity make saving easier and more attractive: a healthy population must plan far in advance if it is to maintain its standard of living through decades of retirement (Lee, Mason and Miller, 2000). Thus, as baby-boomers reach middle age (their 40s and 50s) national savings are expected to rise and contribute to capital accumulation, provided that savings are invested into productive activities.

### Demographic transition and investment in human capital

The demographic transition may have also a significant effect on investment in human capital. Decreased mortality and improved health cause parents to invest more in their children's human capital, as the wage premium for higher education increases and lower mortality means that the benefits last

TABLE 3:  DEMOGRAPHIC CHANGES IN REPUBLIC OF KOREA, 1950-2000

| Year | Population (thousand) | Percentage 15-64 | Population growth (percentage) | Median age (years) | Dependency ratio |
|------|------|------|------|------|------|
| 1950 | 18 859 | 55 | 2.6 | 19 | 81 |
| 1955 | 21 422 | 57 | 3.1 | 20 | 76 |
| 1960 | 25 003 | 55 | 2.6 | 19 | 83 |
| 1965 | 28 530 | 53 | 2.3 | 19 | 87 |
| 1970 | 31 922 | 54 | 2.0 | 19 | 83 |
| 1975 | 35 281 | 58 | 1.6 | 20 | 71 |
| 1980 | 38 124 | 62 | 1.4 | 22 | 61 |
| 1985 | 40 806 | 66 | 1.0 | 25 | 52 |
| 1990 | 42 869 | 69 | 1.0 | 27 | 45 |
| 1995 | 45 007 | 71 | 0.8 | 29 | 41 |
| 2000 | 46 779 | 72 | 0.4 | 32 | 40 |

*Source*: Korea National Statistical Office (http://kosis.nso.go.kr); United Nations (2005).

**Figure 5. National savings and Gross Domestic Product (GDP) growth rates, Republic of Korea, 1971-2004**
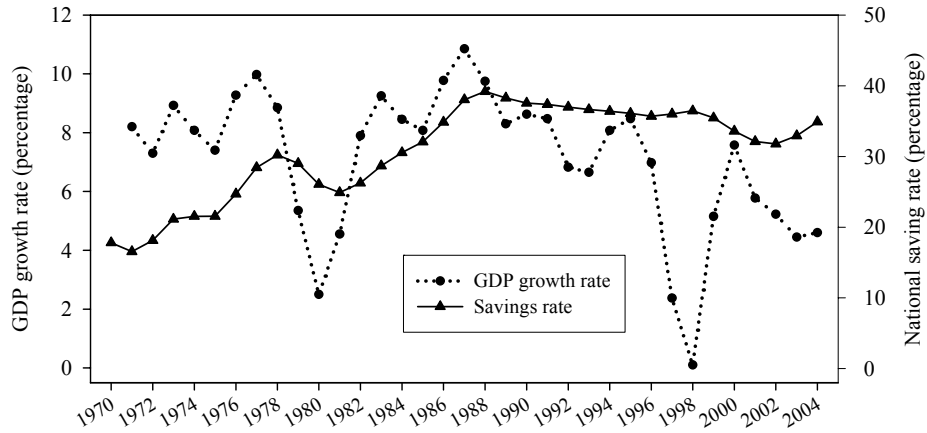
**Figure 6. Education level and population, labour force and GDP growth rates, Republic of Korea, 1971-2004**
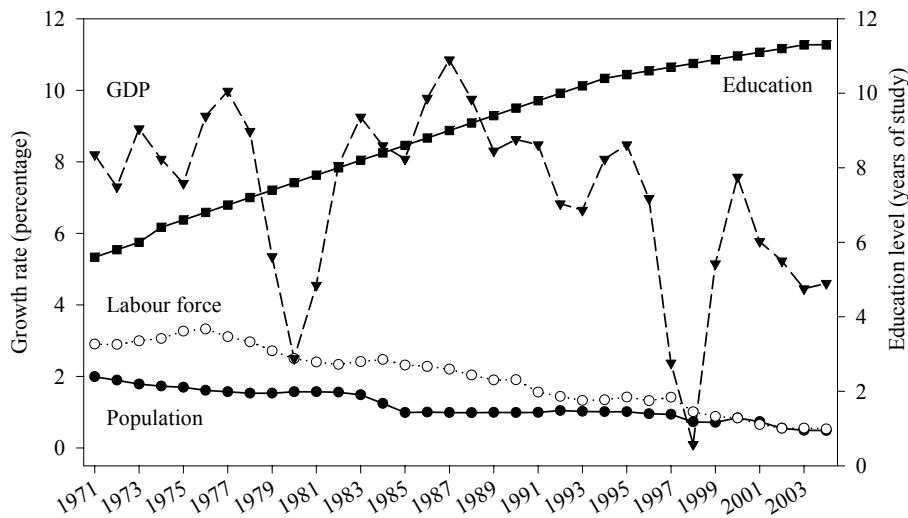
longer. With fewer children, it becomes easier to devote more time and money to each child. As a result, the labour force becomes more productive, in turn promoting higher wages and better standard of living.

Figure 6 shows the trends in population, labour force and GDP growth rates along with the average educational level of the population. An examination of the long-term trend lines for these rates shows that the GDP growth rate moves in closer parallel with the growth rate of the labour force than with the total population. The trend in GDP growth lags that in growth of the labour force by about 10 years. The growth rate of the labour force peaked in 1977 at 3.3 per cent and then decreased, while the growth rate of

GDP peaked in 1987 at about 11.0 per cent and decreased thereafter. Particularly noteworthy is the parallel trend in the decreasing growth rates of the labour force and the GDP since the late 1980s.

From 1971 to 2003, the educational level of the population increased linearly from an average of less than 6 years of study to almost 12 years. According to Lee (1997), the miracle economic growth of Korea could be attributed to the rapid growth of human capital stock at least for the first 3 decades (1960s-1980s) of its economic development. Since the late 1980s, the economic growth rate has consistently fallen while the level of educational attainment has continued to increase. According to D.I. Kim (2004), while the supply of the college-educated labour force consistently rose over the past decades, its quality deteriorated after the start of the rapid yet unregulated expansion of college education. This implies a falling rate of return to investment in education due either to oversupply of highly educated labour or to declining quality of college education, as is documented in recent analyses of the Korean labour market (Lee and others, 2005). Thus, part of the falling rate of economic growth since the late 1980s may be explained by the deteriorating quality of the human capital among new entrants to the labour force as well as by the decreasing population growth rate.

In summary, the demographic changes in Korea have produced a demographic dividend, spurring economic growth during the second half of the twentieth century in the context of a favourable policy environment.[2] However, there remains the question of what will happen to the population and labour force in the coming decades of the twenty-first century. Even though fertility has already fallen to a level far below that needed for replacement of successive generations, the Korean population is projected to continue growing until 2020, when the baby-boom and its "echo generation" will have passed through their reproductive ages. After that, a period of negative growth is expected to begin. Thus, the population momentum created by the baby-boom cohort at the beginning of the demographic transition will last about 70 years, after which the Korean population is projected to grow older at full speed.

## C. KOREAN POPULATION IN THE FUTURE: PROJECTIONS OF THE KOREAN NATIONAL STATISTICAL OFFICE AND THE UNITED NATIONS

The future of Korean population ageing, labour force, economic growth and the social welfare system depend critically on the course of fertility change. The critical question is whether fertility will stay at the current below-replacement level or will rise as many policy-makers and optimistic demographers expect. In early 2005, the United Nations Population Division issued the 2004 Revision of its estimates and projections of population. Also in 2005, the Korean National Statistical Office (KNSO) issued a revised version of its original 2001 population projections, which were based on the 2000 census. The reason for the 2005 revision was to reflect the radical drop in fertility rate since 2000. The following paragraphs compare the population projections and demographic assumptions adopted by KNSO (1996, 2001 and 2005) and by the United Nations (2005). The major demographic indicators and assumptions adopted in each population projection are summarized in table 4.

Because fertility rates are notoriously hard to predict (Bongaarts, 1998), there is significant variation in this variable across projections. In its original projection issued in 2001, KNSO pictured a very smooth and stable development of future fertility and assumed a TFR for 2005 of 1.37, which was expected to gradually increase to 1.40 by 2030 and to stay at that level until 2050. The observed TFR was 1.47 for 1998, 1.42 for 1999 and 1.47 for 2000, averaging 1.45 for the period 1998-2000. Thereafter, the TFR abruptly dropped to 1.30 in 2001, 1.17 in 2002 and 1.19 in 2003. The decline in TFR during 2001-2003 prompted KNSO to revise its 2001 decennial projection. The 2005 revision assumed a TFR of 1.19 for 2005, 1.28 for 2030 and 1.30 for 2050. On the other hand, the 2004 revision of the United Nations projection assumed a gradual increase in TFR from 1.21 in 2005 to 1.56 in 2030 and 1.77 in 2050, according to the medium variant (table 4). The United Nations also presented low- and high-fertility variants, which assumed that TFR after 2010 would be, respectively, one-half child below and one-half
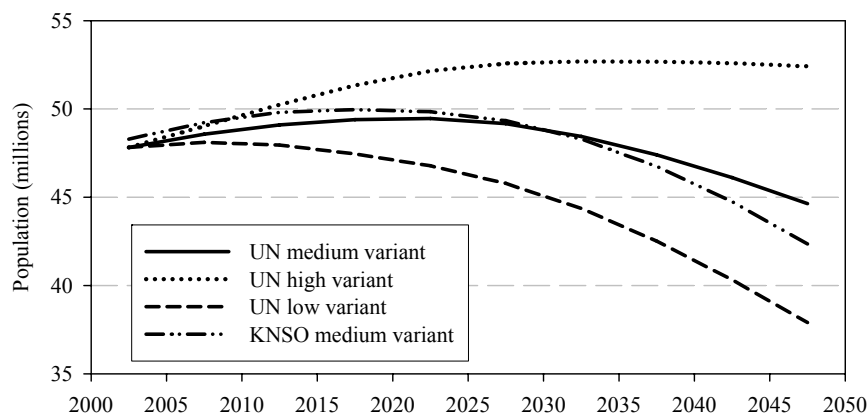
child above the levels assumed in the medium variant. Figure 7 presents the population projections from the 2005 KNSO revision (medium-fertility variant) and the 2004 United Nations revision (low-, medium- and high-fertility variants). According to the KNSO projection, the Korean population will grow to about 50 million by 2020 and then decrease to less than 43 million by 2050. This result is similar to the medium variant of the United Nations, which projects a slightly larger population of about 45 million for 2050. What is most striking, however, is the large difference in the total population resulting from the United Nations high- and low-fertility variants. While the high variant projects that the population will increase until 2030 and then reach a plateau at around 53 million, the low variant projects a long-term decline from the current 48 million to about 37 million by 2050. Thus, depending on the future course of fertility, the Korean population could follow completely different courses during the first half of the twenty-first century. Considering that past projections have generally over-estimated fertility rates, as was the case with Japan (Atoh, 2000), it may be that the future population will be more like that projected by the low variant than that by the high variant.

TABLE 4. DEMOGRAPHIC COMPONENTS OF POPULATION PROJECTIONS
FOR THE REPUBLIC OF KOREA

| Variables | Year | Korean National Statistical Office | | | United Nations |
| | | 1996 | 2001 | 2005 | 2004 |
|---|---|---|---|---|---|
| Total population *(thousands)* | 2005 | 47 275 | 48 461 | 48 294 | 47 817 |
| | 2030 | 52 744 | 50 296 | 49 329 | 49 161 |
| | 2050 | - | 44 337 | 42 348 | 44 629 |
| Total fertility rate (*children per woman*) | 2005 | 1.71 | 1.37 | 1.19 | 1.21 |
| | 2030 | 1.80 | 1.40 | 1.28 | 1.56 |
| | 2050 | - | 1.40 | 1.30 | 1.77 |
| Life expectancy (Male, Female) *(years)* | 2005 | (72.3, 79.7) | (74.4, 81.2) | (74.8, 81.5) | (74.0, 81.0) |
| | 2030 | (75.4, 82.5) | (78.4, 84.8) | (79.2, 85.2) | (78.4, 86.4) |
| | 2050 | - | (80.0, 86.2) | (80.7, 86.6) | (80.8, 88.5) |

*Source*: Korean National Statistical Office (http://kosis.nso.go.kr); United Nations (2005).

**Figure 7. United Nations (UN) and Korean National Statistical Office (KNSO) population projections, Republic of Korea, 2000-2050**



*Source:* Korea National Statistical Office (http://kosis.nso.go.kr); United Nations (2005).

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Given the lack of information on which to base predictions about future fertility in Korea, it is useful to consider the experience of other countries that went through the demographic transition earlier. In this regard, Japan would be the best reference as both countries belong to the same Asian culture of family formation and values concerning children. Japan has also been a forerunner of modern demographic transition among the East Asian countries. In fact, demographic changes in Japan and Korea during 1950-2000 have been remarkably similar in their pattern and pace with about a quarter-century time lag (table 5 and figure 8). The trend lines for Korea are below those for Japan in figure 8, because of the swiftness of Korean fertility decline during the 1970s and 1980s, from 2.92 to 1.60. Other than that, the long-term trend in both total fertility and population growth rates are approximately parallel for the two countries, except for the projected TFR in Korea. While in Japan, after reaching the below-replacement level the TFR gradually but consistently decreased to 1.39 in 1995-2000, in Korea the TFR is projected by the United Nations to increase to this same level by 2020-2025. Thus, the question is whether the steep

TABLE 5:  FERTILITY AND POPULATION GROWTH TRENDS
IN JAPAN AND REPUBLIC OF KOREA

| Period (years) | | Total fertility rate (children per women) | | Population growth (percentage) | |
|---|---|---|---|---|---|
| Japan | Korea | Japan | Korea | Japan | Korea |
| 1950-1955 | 1975-1980 | 2.75 | 2.92 | 1.4 | 1.6 |
| 1955-1960 | 1980-1985 | 2.08 | 2.23 | 0.9 | 1.4 |
| 1960-1965 | 1985-1990 | 2.02 | 1.60 | 1.0 | 1.0 |
| 1965-1970 | 1990-1995 | 2.00 | 1.70 | 1.1 | 1.0 |
| 1970-1975 | 1995-2000 | 2.07 | 1.51 | 1.3 | 0.8 |
| 1975-2080 | 2000-2005 | 1.81 | 1.23 | 0.9 | 0.4 |
| 1980-2085 | 2005-2010 | 1.76 | 1.21 | 0.7 | 0.3 |
| 1985-2090 | 2010-2015 | 1.66 | 1.28 | 0.4 | 0.2 |
| 1990-1995 | 2015-2020 | 1.49 | 1.35 | 0.3 | 0.1 |
| 1995-2000 | 2020-2025 | 1.39 | 1.42 | 0.3 | 0.0 |

*Source*: United Nations (2005).

**Figure 8.  Trends in total fertility rate (TFR) and population growth rate
for Japan and the Republic of Korea in a time-lag framework**



*Source*: United Nations (2005).

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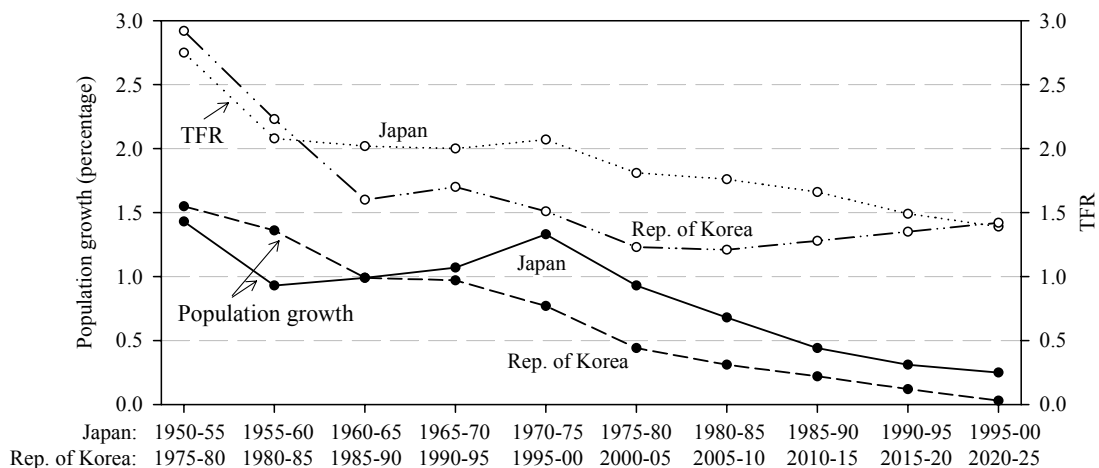
downward trend of Korean fertility will continue into the first decade of the twenty-first century following the Japanese trend observed between 1970 and 2000 or will trend upward to converge to the level of Japan for the reference time point.

## D. POPULATION AGEING AND FUTURE LABOUR FORCE

### *Ageing of the labour force*

Korea is likely to experience one of the fastest demographic transitions from an "ageing" to an "aged" society. As a consequence, its work force is also expected to undergo an intense transition. Korea has already entered the stage of an ageing society as of 1999, with more than 7 per cent of its population aged 65 or over. In 2019, Korea is expected to become an aged society with over 14 per cent of its population aged 65 or over, which is projected to rise further to 20 per cent by 2026 (KNSO, 2001). This pace of transition is extraordinary compared to the past experience of Western societies. For example, France took 115 years to move from 7 to 14 per cent aged 65 or over, while the United States took 75 years (table 6). Among the industrialized countries, Japan has experienced the fastest transition to an aged society. However, Korea is expected to surpass Japan.

Korea will also experience a rapid increase in the old-age dependency ratio, from below 40 people in dependent ages (under age 15 and 65 years or over) per hundred working-age people (ages 15-64) in 2000 to about 82 dependent-age people per hundred of working age in 2050 (table 7). As has occurred in many other countries, the dependency ratio is shifting from a predominance of young- to old-age dependency as the demographic transition proceeds (Mirkin and Weinberger, 2000).

As the median age of the population rises from 32 years in 2000 to a projected 43 years in 2020 and 54 years in 2050 (table 7), the labour force will also get older. For instance, the proportion of workers aged 50 and over among the total labour force is projected to increase from about 25 per cent in 2000 to more than 50 per cent by 2050 (Phang, 2004). As observed from the past experience of advanced countries, increasing old-age dependency and ageing of the labour force usually happen hand in hand, which might exacerbate the negative effects on the economy and society.

### *Labour force participation at older ages*

The future size of the labour force will depend not only on demographic change but also on age-specific participation rates. The trend in participation rates at higher ages will be particularly important given that the older age groups will be growing significantly in both relative and absolute size (OECD, 2002). Currently, the participation rates of those aged 25-49 years in Korea are lower than the average rates for the European Union (EU) and the OECD countries, particularly among women. Conversely, the participation rates of men and specially women aged 50-64 years are higher in Korea than in the OECD and EU member-countries, although they are significantly lower than in Japan (table 8).

Thus, older persons in Korea tend to remain in the labour market in higher proportions than do those in Western industrialized countries, which makes the Korean pattern resemble that of Japan more than that of EU or OECD member countries. This, in turn, implies a possibility that the future pattern of labour force participation and withdrawal of the Korean older population might differ from that of advanced Western societies, which exhibit a secular trend of early voluntary withdrawal from the labour force (Jacobs, Kohli and Rein, 1991).

TABLE 6: TRANSITIONS FROM AGING TO AGED SOCIETY IN SELECTED COUNTRIES

| Country | Year in which proportion of population aged 65 or over reaches | | | Time (years) for proportion to increase from | |
|---|---|---|---|---|---|
| | 7 per cent | 14 per cent | 20 per cent | 7 to 14 per cent | 14 to 20 per cent |
| Republic of Korea | 2000 | 2019 | 2026 | 19 | 7 |
| Japan | 1970 | 1994 | 2006 | 24 | 12 |
| Spain | 1942 | 2013 | 2028 | 71 | 15 |
| Germany | 1932 | 1972 | 2012 | 40 | 40 |
| United Kingdom | 1929 | 1976 | 2021 | 47 | 45 |
| Italy | 1927 | 1988 | 2007 | 61 | 19 |
| France | 1864 | 1979 | 2020 | 115 | 41 |

*Source*: Korean National Statistical Office: News Release on Population Projections, 2001.

TABLE 7: DEPENDENCY RATIOS AND MEDIAN AGE OF POPULATION IN THE REPUBLIC OF KOREA, 2000-2050

| Year | Dependency ratios | | | Median age (years) |
|---|---|---|---|---|
| | Total | Youth [a] | Old age [b] | |
| 2000 | 40 | 29 | 10 | 32 |
| 2010 | 39 | 24 | 15 | 38 |
| 2020 | 41 | 20 | 21 | 43 |
| 2030 | 55 | 19 | 36 | 48 |
| 2040 | 71 | 20 | 52 | 51 |
| 2050 | 82 | 19 | 63 | 54 |

*Source*: Korean National Statistical Office: News Release on Population Projections, 2001.
[a] (population aged 0-14)x100 / population aged 15-64.
[b] (population aged 65+)x100 / population aged 15-64.

TABLE 8: LABOUR FORCE PARTICIPATION RATES BY AGE AND SEX IN SELECTED COUNTRIES, 2000
*(percentage)*

| Countries | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | 25-49 | 50-64 | 25-49 | 50-64 | 25-49 | 50-64 |
| Republic of Korea | 92.4 | 78.0 | 58.2 | 50.7 | 75.5 | 64.3 |
| Japan | 97.2 | 89.1 | 66.1 | 56.8 | 81.8 | 72.6 |
| European Union[a] | 94.0 | 66.1 | 73.9 | 42.3 | 84.0 | 54.0 |
| USA | 92.4 | 75.6 | 77.3 | 61.0 | 84.7 | 68.0 |
| OECD[a] | 93.7 | 72.8 | 69.0 | 48.4 | 81.3 | 60.3 |

*Source*: OECD, Labour statistics (http://www.oecd.org/statsportal).
[a]Average.

The high participation rate of the older population in Korea may be attributable, in part, to the sizeable self-employed sector, including 40 per cent in agriculture, which is the largest among the OECD

member-countries. Among workers aged 55-64, about 60 per cent are classified as self-employed. Among those aged 65 or over, 77 per cent of men and 76 per cent of women are self-employed. Since the self-employed tend to work longer than wage workers, this partially explains the relatively high rate of labour force participation of older Koreans. The relatively high participation rate of the older population can help alleviate the negative effect of decreasing labour force on economic growth in the coming decades. Thus, one of the most important and challenging policy initiatives is to create quality employment opportunities for older persons so that they can remain active in the labour market at least until normal retirement age. To achieve this, the quality of employment and working conditions of older workers need to be improved.

### *Future labour force projections*

In a recent study, D. I. Kim (2004) simulated the growth rate of the future labour force according to six fertility scenarios. The scenarios varied from one of "very low" fertility, in which a TFR of 1.0 would be reached by 2050, to one of "very high" fertility, in which a TFR of 2.1 would be reached by 2050. The results indicate that the total labour force would grow to 24.8 million by 2019, and then start decreasing to approximately 19 to 17 million in 2050, depending on the target fertility level assumed.

Figure 9 presents an international comparison of the changes in labour force growth between 1980 and 2050 under the assumption of constant participation rates at the 2000 levels. Although labour force growth will be more rapid in Korea than in most other OECD member countries between 2000 and 2020, the slowdown compared with the growth in the previous period (1980-2000) will be especially marked in Korea. Japan and the EU may already be experiencing a decline in the absolute size of their labour forces. Over the period 2020-2050, the growth of the labour force in Korea will reverse and, along with Japan, Korea will experience one of the steepest falls in the size of the labour force.

**Figure 9: Annual average labour force growth in selected periods between 1980 and 2050, for selected countries and groups of countries**
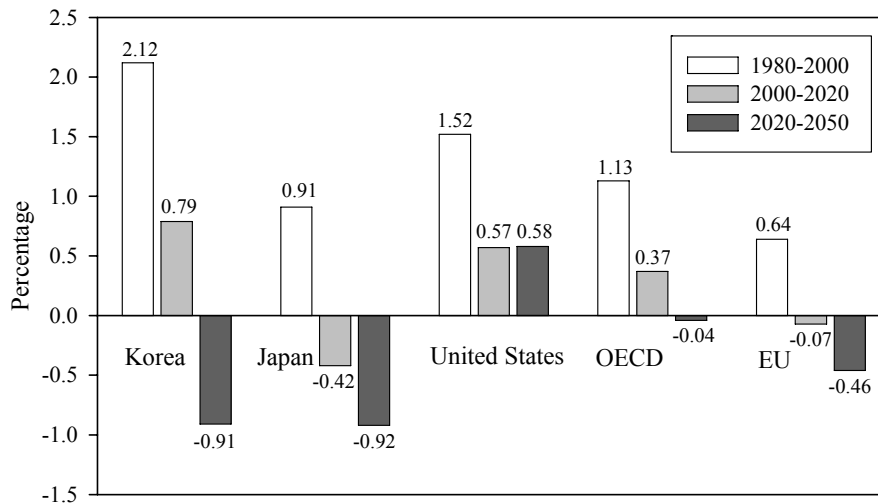


*Sources*: KNSO (2005); OECD (2002).
NOTE: The projections of labour force growth over the period 2000-2050 assume that participation rates by sex and 5-year age group remain constant at their 2000 levels.
OECD = members of the Organization for the Economic Cooperation and Development.
EU = members of the European Union.

In general, however, labour force projections in Korea do not properly take into account the changes in participation rates that are expected in the course of population ageing. For instance, social security programmes, especially those related to retirement pensions, tend to affect the labour force participation of older persons, while higher educational levels and smaller numbers of children could increase the participation rates of women. From a policy perspective, it is thus important to consider the possible effects of future labour force participation rates. In this respect, it worth noting the projections for the next half century of the Korean labour force made by OECD (2002) based on alternative assumptions about age-specific participation rates. But this simulation is also limited as no fertility variation is taken into account.

In general, the OECD projections are slightly less pessimistic about the future labour force growth than most studies in this area. According to its "maximum participation" scenario, the labour force in Korea is projected to reach 24 million in 2050, whereas it does not exceed 20 million in any scenario of any other study. In all studies, however, Korea's labour force is projected to grow at slower rates until 2020 and then to start shrinking.

## E. THE IMPACT OF AGEING POPULATION ON ECONOMIC GROWTH

The Korean economy enjoyed a high growth rate of about 7 per cent on average during the last two decades. This rapid economic growth was mainly due to the size and quality of labour and capital accumulation rather than to increasing growth in total productivity (Hahn and others, 2002). The considerable drop in the economic growth rate from 8.3 per cent during the 1980s to 6.0 per cent during the 1990s, which was mainly due to the decreasing growth rate of the working population, is indicative of the potentially detrimental effects of rapid population ageing on economic growth in the coming decades.

There is still more debate than consensus among researchers regarding the effect of population ageing on economic growth. According to the pessimistic view, upheld by the majority of scholars (Bloom, Canning and Sevilla, 2002; Borsch-Supan, 2000; OECD, 1998; World Bank, 1994), population ageing driven by low fertility and longer life expectancy has negative effects on economic growth through a set of inter-related mechanisms: (i) decreasing labour input due to low population growth and ageing; (ii) decreasing savings rate and capital accumulation due to an increasing dependency ratio and the cost of prolonged care of the aged; (iii) decreasing investment into human capital of the young generation due to increasing social welfare costs; and (iv) increasing foreign debt due to falling interest rates.

In contrast, some scholars point to the possibility of positive effects of low population growth and population ageing on economic growth, such as development of labour-saving technology and increased investment in human capital. The latter is posited to compensate for the decline in economic growth arising from the quantitative decrease in labour input. Scarth (2002), for example, asserts that population ageing could lead to productivity growth by motivating increased investment in human capital as labour becomes a relatively scarce factor of production. In a cross-national comparative study using panel data, Cutler and others (1990) concluded that decreasing labour force growth results in increasing labour productivity.

Thus, one of the fundamental measures to counteract adverse effects of an ageing population and shrinking labour force will be improving the productivity of the labour force. If consistent growth in labour productivity and increasing labour force participation among women can be achieved in coming decades, then the negative effect of population ageing could be mitigated (Phang and others, 2004; Cho, 2000).

The question is whether it is feasible to raise labour productivity to a level capable of compensating for the decreasing labour force, particularly after 2020. The prospect is rather discouraging. Long-term

projections in Korea usually predict labour productivity growth at around 0.2-0.4 per cent (Choi and others, 2003; Dae-Il Kim, 2004), a much lower level relative to the average 2.0-4.0 per cent during the last thirty years. According to Dae-Il Kim (2004), underlying the decline in future labour productivity is the changing population age structure and the decreasing quality of higher education.

In another study, Dong-Suk Kim (2004) simulated future economic growth (measured by the real GDP growth rate) using different assumptions about future fertility changes and total factor productivity. His projection is based on a Cobb-Douglas production function and takes into account long-term changes in savings and capital stock, an index of human capital and the size of the work force. Table 9 shows the predicted contribution of different factors to the economic growth rate based on the particular assumption that total fertility rate will recover to 1.4 and that total factor productivity will grow by 2 per cent annually. Overall, Korea's economic growth rate is expected to remain around 5 per cent during the first two decades of this century, and then decrease to 3.5 per cent during the 2020s, 2.2 per cent during the 2030s and 1.5 per cent during the 2040s.

In a similar vein, H. H. Lee (2001) has predicted that population ageing in Korea will result in a substantial decrease in future economic growth due to a lower savings rate and slower-to-negative labour force growth. He projects that the economic growth rate will fall from 8.8 per cent in 2000 to 4.1 per cent in 2010, 3.1 per cent in 2020, 2.2 per cent in 2030, 1.3 per cent in 2040, and 1.0 per cent in 2050.

## F. POPULATION AGEING AND INCREASING COST OF OLD-AGE INCOME SECURITY

The projected demographic transition to an aged society will have serious economic and social impacts. Among other things, it will create a severe strain on public finances. Health care and other social assistance expenditures are expected to rise significantly with the increasing number of older persons. However, the main component of the rise in public spending will be the increasing expenditure for old-age pensions. In 2000, public expenditure on old-age pensions in Korea was 2 per cent of GDP, the lowest among OECD countries, but between 2000 and 2050 Korea is expected to experience the greatest increase in pension expenditures (figure 10). The National Pension System in Korea is projected to accumulate a huge amount of hidden liability as it matures, which will be transferred to the next generation of workers. This extra burden on the future workforce will also have a negative effect on the national economy during the next few decades.

In the Korean context of rapid population ageing and increasing costs of supporting the older population, the pension system is particularly important because of the scarcity of complementary programmes for old-age income security. For instance, Korea's National Basic Livelihood Protection Programme is intended to provide social assistance to ensure a minimum income, but its coverage is limited. Employed workers can receive, as they leave the firm, a retirement allowance equivalent to one month's salary for each year of service. However, this programme covers under 40 per cent of workers and, in general, the lump sum tends to be spent over the working life rather than being preserved until retirement age, because the work career of most Korean workers is characterized by multiple and relatively short-term jobs.

The rise in taxes and social security contributions that will be required to finance the increasing public expenditures associated with population ageing may give rise to intergenerational inequities and tensions. Much of this extra burden of taxation will fall on the working-age population who, at the same time, will lose political power in terms of votes to the growing number of older people. This may make it difficult for Korea to carry out the necessary adjustments to cope with an ageing society (OECD, 2002).

| Period | Growth rate [a] (percentage) | Contributing factors | | | |
|--------|------------------------------|-----------------------|---------------|---------------|-----------------------------|
| | | Work force [b] | Human capital | Capital stock | Total factor productivity |
| 2000-2010 | 5.1 | 0.7 | 0.8 | 1.7 | 2.0 |
| 2010-2020 | 4.8 | 0.3 | 0.6 | 1.9 | 2.0 |
| 2020-2030 | 3.5 | -0.4 | 0.5 | 1.4 | 2.0 |
| 2030-2040 | 2.2 | -0.9 | 0.3 | 0.8 | 2.0 |
| 2040-2050 | 1.5 | -1.0 | 0.1 | 0.4 | 2.0 |

*Source*: Kim, Dong-Suk (2004).

[a] Measured by real GDP growth rate.

[b] Total fertility rate is assumed to increase to 1.4 by 2050.

**Figure 10. Public old-age pension expenditures (as percentage of GDP) in OECD countries, 2000-2050**



*Source*: OECD (2001).

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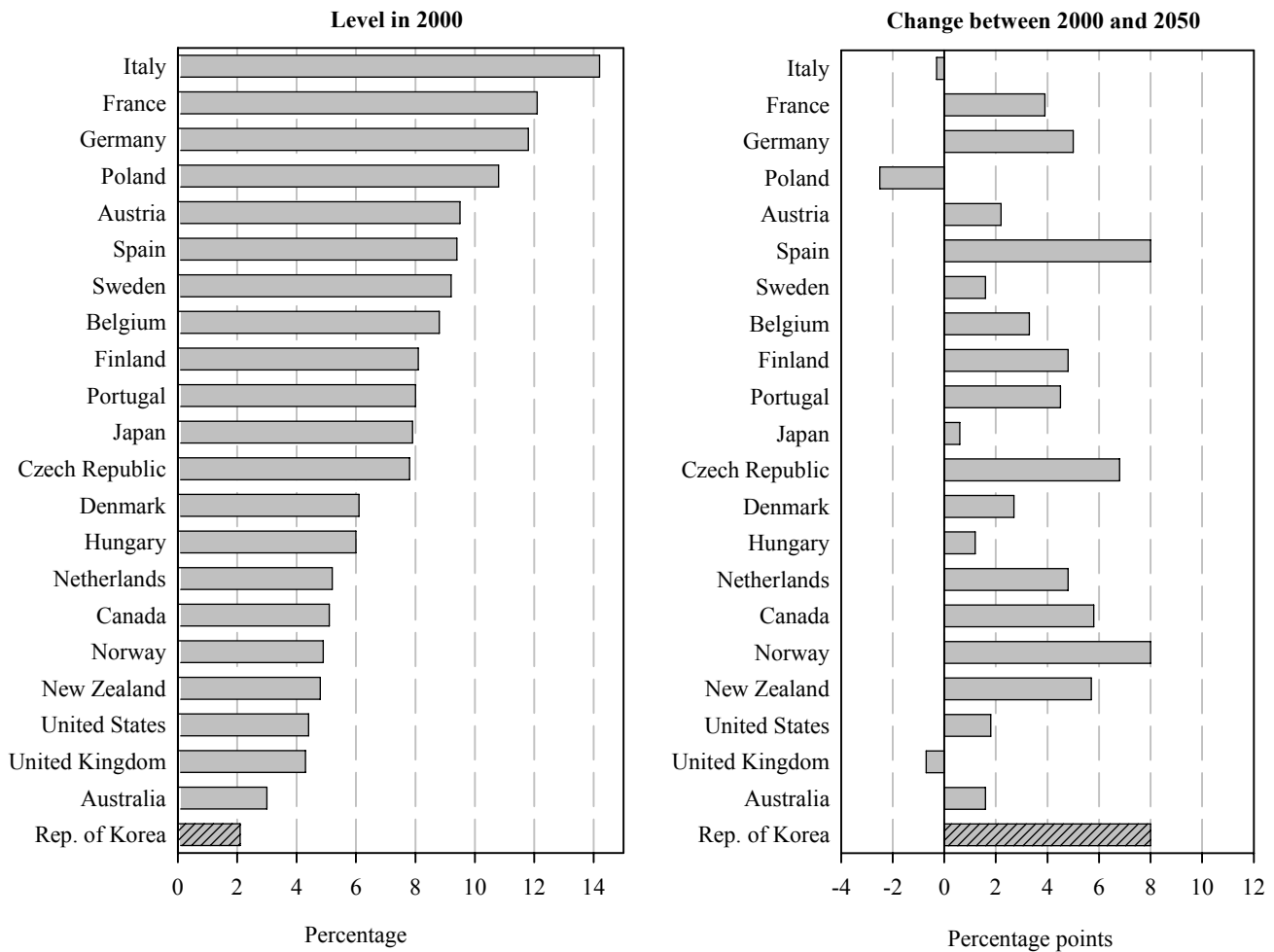
G. SOME POLICY CONSIDERATIONS

*"More Children" policy*

As previously discussed, fertility is the most critical demographic variable in determining future population and economic growth in Korea. The size and composition of the population and labour force, the status of the economy and future social well-being all depend on future fertility trends. It is thus understandable that the Government has implemented a pronatalist "More Children" policy, which has introduced new, or reinforced existing, "work-and-family-friendly" measures for working women (MOHW, 2004) and has started providing married couples with direct financial support in the form of tax breaks or cash allowances for each additional child. Underlying this policy initiative is a recognition of the high cost of rearing and educating children and the difficulty that married women with children confront in trying to combine work and family—the barriers being both institutional and cultural.

The current generation of young women seems already to have decided to pursue their work careers even if this entails delaying marriage and family formation. With effective means for controlling fertility readily available, couples can easily limit the number of children they have. On the other hand, in the Asian culture of family and kinship, remaining childless is still an unpopular option; one or two children is considered to be ideal. At the same time, with a still-ingrained preference for a son, Korean couples have successfully pursued parity-specific sex control for their additional children. The sex ratio for the third child was almost 180 boys per hundred girls in 1995 and 144 in 2000, whereas the ratios for the first and second child were 105 and 107, respectively (KNSO, 2003).

There are few who believe that the Government's pronatalist campaign based on direct financial incentives will by itself have a sizeable impact on the demographic behaviour of the young generation. Rather, more fundamental reforms should be pursued on a long-term basis to lower the cost of rearing and educating children, to make more work opportunities available to married women with children, and to build up a social-institutional system free of gender discrimination. Sleebos (2003), on examining the effect of the pronatalist policies of many European countries, concluded that, while these policies are often very costly, they tend to fall short of affecting fertility behaviour to a significant degree. It may therefore be advisable for the Government of the Republic of Korea to invest more in the quality than in the quantity of children and the future labour force.

*Immigration policy*

Another important policy for dealing with an ageing population and shortage of workers is to increase the working population through immigration (Visco, 2001). Most immigrant workers are relatively young, and immigrants often have higher fertility than that of the residents, so that immigration could also contribute to increasing fertility. Nevertheless, immigration cannot solve the problem of an ageing population and low population growth (Tapinos, 2000; United Nations, 2000, Choi and others, 2003). Apart from difficult issues of social integration and border control, the number of immigrants needed to compensate for the prospective decline in labour force would be huge, and the flow would need to be sustained in order to have a lasting effect on the age structure: immigrant workers get old too.

*Labour market and employment policy*

The size of the Korean labour force in the future will depend not only on fertility but also on participation rates. In particular, the participation of older persons and women could be greatly influenced by institutional settings and policy initiatives. Even though labour force growth will turn negative after 2020 in all of the OECD scenarios, the magnitude of the decline will be lower if there is a general rise in participation rates. For instance, under the baseline scenario, labour force growth over the period 2000-

2020 is projected to average 0.8 per cent per year, down from 2.1 per cent per year during the two previous decades. If participation rates for the older population were to decline—in response, for example, to public pensions becoming more extensively available—then, all else constant, annual labour force growth over the period 2000-2020 would be even lower at only 0.5 per cent. Under the maximum scenario, the increase in labour force would be 1.4 per cent per year (OECD, 2002).

Policy should therefore aim to encourage participation and employment for the older work force (OECD, 2002). Up to now, participation rates of the older population, especially males, have been high in Korea. However, with limited employment opportunities in the formal sector and with the involuntary early retirement currently practiced in Korean firms, it might become increasingly difficult for older persons to find employment in the future. Rapid technological change and the demand for increased skills that will characterize the future labour market also could exacerbate the employment problem of older workers. Therefore, on the demand side, employment contracts including mandatory early retirement policies should be changed gradually to adjust to the ageing of population and of the labour force. On the supply side, workers' initiative and choice should be directed toward lowering the cost of long-duration employment contracts, such as seniority wage and retirement allowance, so that long tenure (normal retirement) with a productivity-based wage system could gradually replace a system of short tenure (early retirement) and high wages (Phang, 2004).

Women's labour force participation has been low in Korea relative to other advanced countries (see table 8), in particular for young women with higher education. In fact, women could be the most valuable resource for Korea's future labour force. In this respect, the Government should strengthen its policy to assure that entry to the labour market following school-leaving, and re-entry to the labour market after childbearing, can be achieved at low transition costs. In addition, Korean labour market institutions and practices need to be reformed to enable working women to harmonize work and family and to enhance the development of their work careers.

## H. FINAL REMARKS

The Korean economy and society have benefited from the demographic transition that produced a relatively young population and growing labour force during the second half of the twentieth century. The result was rapid and consistent economic growth and social development. The baby-boom generation born in the early stage of the demographic transition conferred a demographic dividend that helped drive the nation's "miracle" economic development.

Social structural changes at the macro-level that accompany rapid economic development often induce radical changes in individuals' demographic behaviour. In Korea, there have been rapid changes in marriage and childbearing among the generations that followed the first baby-boom cohort. Recent cohorts are marrying much later and bearing fewer children. At the same time, the baby-boom generation that carried out the work of Korean economic development is getting older. These ongoing demographic changes are leading to a rapidly ageing population. Korea's population and labour force are expected to continue growing during the first two decades of this century although at a much slower rate than before. By 2020, however, the large baby-boom cohort will be almost completely retired from the labour force and its smaller group of descendents will make up the core of the workforce.

In order to confront the social and economic challenges of an older population and an older labour force, it is advisable that the Government of the Republic of Korea pursue a wide range of policy reforms in a consistent and efficient manner. In particular, reforms should centre on labour market institutions and the social welfare system so that the Korean economy can continue on a path of sustainable growth. Currently, the labour market in Korea remains in a stagnant state under the long shadow of the economic crisis that affected several Asian countries in the late 1990s. As a consequence, employment opportunities

for older persons as well as for youth have been curtailed due to the structural-adjustment and lean-management policies practised in many large organizations and firms. Thus, the Government of the Republic of Korea faces the need to redouble its effort to prepare for an older society while still recovering from the current economic recession. Yet the task should not be deferred. To quote Denton and Spencer (2003): "The 'problems' of an aging population, or 'challenges' if one prefers, are not going to go away in a few years, to be replaced by others. They will be with us for a long time. Short-term 'solutions' should be suspect. Think long."

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NOTES

[1] Before 1950, the total fertility rate in Korea was 6.4 in 1925-1930; 6.1 in 1930-1935; 6.2 in 1935-1940; 6.1 in 1940-1945; and 6.0 in 1945-1950.

[2] The policy environment was fundamental for the realization of the demographic dividend by increasing flexibility in the labour market to allow the expansion of the labour force, creating adequate saving mechanisms and providing good health and high-quality education.

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# DEMOGRAPHIC DIVIDEND AND PROSPECTS FOR ECONOMIC DEVELOPMENT IN CHINA

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During the last 25 years, the People's Republic of China has undergone demographic as well as economic changes of historic proportions. Demographically, China has transformed itself from a "demographic transitional" society, where reductions in mortality led to rapid population growth and subsequent reductions in fertility led to a slower population growth, to a "post-transitional" society, where life expectancy has reached new heights, fertility has declined to below-replacement level, and rapid population ageing is on the horizon. In the not-too-distant future—in a matter of a few decades—China's population will start to shrink, an unprecedented demographic turn in Chinese history in the absence of major wars, epidemics or famines. In this process, China will also lose its position as the most populous country in the world.

Economically, China has completed its transition from a socialist, centrally-planned economy to a market-based economy. From a socialist economy that was closed to the outside world and plagued by low efficiency and stagnation, China has become, in the last two decades, one of the most dynamic and fast- growing economies in the world. In less than twenty years' time, between 1982 and 2000, China's real GDP per capita, as adjusted for purchasing power parity (PPP adjusted), quadrupled – a record unmatched elsewhere in the world.[1]

At the start of these historical transformations, China's leaders adopted the improvement of the standard of living of the Chinese population as its new political mandate and the basis for political legitimacy. They accordingly formulated two basic national policies: (i) developing the economy and (ii) controlling population growth. The Government of the People's Republic of China announced its one-child-per-couple policy in 1980, an unprecedented act of governmental intervention in population. Such an extreme policy came about even though the fertility level in China had already more than halved during the previous decade, and was already at a level not much above the replacement level (Lee and Wang, 1999; Wang, 2005).

The rationale for China's one-child policy was a neo-Malthusian perspective on the relationship between population and development—a view largely dismissed by mainstream economists. While the architects of China's population policy could argue that the country's remarkable post-reform economic record presents an evidence of the success of the policy, this assertion could be questioned on two grounds. The first is the extent to which the transition to low fertility was accelerated by the one-child policy (Wang, 2005). The second, which is considered in this paper, is the extent to which the decline in fertility, the slowdown in population growth, and the changes in age structure contributed to China's economic success. In light of the recent and future changes in China's age structure, the paper shall also examine and prognosticate on how changes in China's population age structure can affect the country's prospects for economic development during the rest of the twenty-first century.

This paper is organized as follows. The first section reviews briefly the recent and projected changes in China's population age structure. The second and third sections evaluate the impact of changes in the age structure on China's economy in the past two decades and in the near future, respectively. The evaluations are based on calculations of two types of demographic dividends: (i) a dividend associated

with a relative increase in the population of the labour force age due to fertility decline and (ii) a dividend associated with population ageing (Mason and Lee, forthcoming; Wang and Mason, 2004).

## A. CHINA'S CHANGING POPULATION AGE STRUCTURE

While, in some ways, changes in China's population age structure resemble the transformations experienced elsewhere in the world, those of China are different in other ways. The changes in the age structure in China, as in other countries, are driven by declining mortality and fertility. During the last half century, mortality decline in China resulted in a near doubling of life expectancy from 42 and 46 years for male and female, respectively, around 1950 to 71 and 75 years in the year 2000. Mortality decline was especially rapid during the two decades after the early 1950s when life expectancy increased by more than a year annually on average (Banister and Preston, 1981). Fertility decline started as early as in the 1950s in parts of urban China. By the beginning of the 1970s, it had extended to the whole country (Lavely and Freedman, 1990; Wang, 2001). Assisted by the birth control programme of the government that called for later marriage, longer birth intervals and fewer births, China's fertility level was more than halved within a decade. From 5.8 children in 1970, total fertility rate (TFR) dropped to 2.3 in 1980. Despite the newly implemented one-child policy, the fertility level in China fluctuated around the replacement level of 2.1 in the 1980s (Feeney and others, 1989; Feeney and Wang, 1993). In the 1990s, however, China's fertility reverted to its downward trajectory. By the end of the twentieth century, fertility was well below the replacement level, or around 1.6 children per woman (Retherford and others, 2005).

China's population age profile contains some unique characteristics, resulting from its history of social and demographic changes. Two such special characteristics are of particular importance to changes in the population age structure. The first is the drastic fertility decline within a relatively short time period, rarely seen elsewhere in the world. The second is a sharp increase in mortality and a plunge in fertility caused by the Great Leap Forward famine of 1959-1961. The famine resulted in an estimated 30 million premature deaths and 33 million lost or postponed births (Ashton and others, 1984; Kane, 1988). Later, however, a sharp rebound in the birth rate became evident and lasted for several years in the 1960s.

China's population age structure reflects the effects of these underlying demographic forces. Figure 1 shows the population age pyramids for China based on the 1982 and 2000 censuses and the authors' projections for 2030. At the start of China's economic boom in 1982, the population age structure was largely a bottom-heavy one, which is characteristic of a young and growing population. The population deficits brought by the famine (those aged 20-24 in 1982) and the impact of the decline in the fertility during the 1970s (affecting ages below 10 years) were clearly visible. In contrast, by 2000, China's population age structure was that of a mature population, where the largest shares are found in the working-age population. Projected only thirty years ahead, with assumptions of a further moderate improvement in life expectancy and a continuation of the current fertility level, China's population age structure will be a very old one. It seems that, within half of a century, China's age structure will have moved from a young and growing population to one that is old and declining. The next sections of the paper thus attempt to address this question: what are the likely effects of these profound demographic changes on China's economy?

## B. FERTILITY DECLINE AND THE FIRST DIVIDEND

The demographic transition interacts with a fundamental feature of any economy—its lifecycle variation in consumption and production. Human beings have an extended period of economic dependency at the beginning of their lives and in modern industrial societies, at the end. During these ages of dependency or production-deficit ages, individuals consume, on average, more than they produce. During the prime working ages or surplus ages, individuals produce more than they consume. Detailed

**Figure 1. Population age structure in China, 1982, 2000 and 2030**
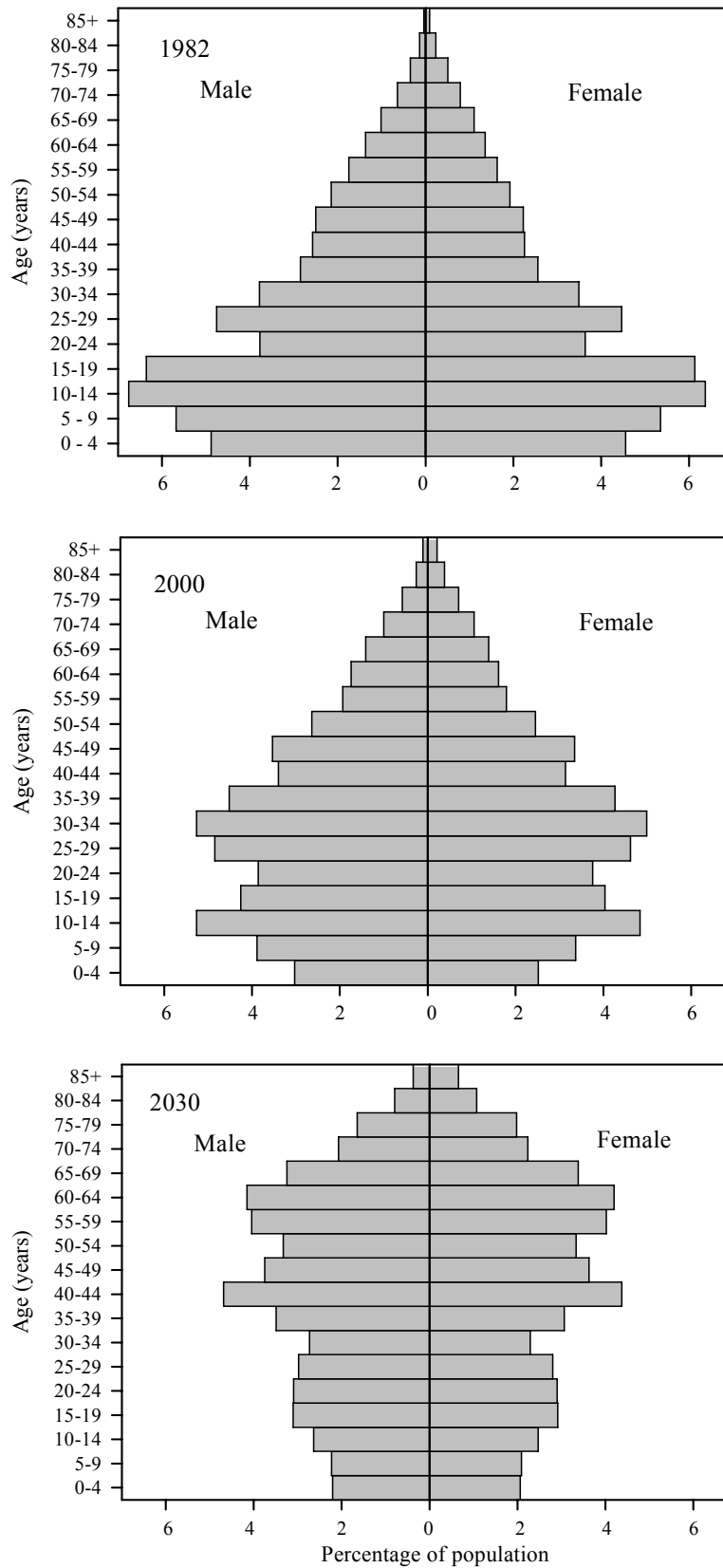


*Source*: For 1982 and 2000: Population Censuses; for 2030: authors' projection.

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**Figure 2. Life-cycle variation in consumption and production in urban China, 2000**
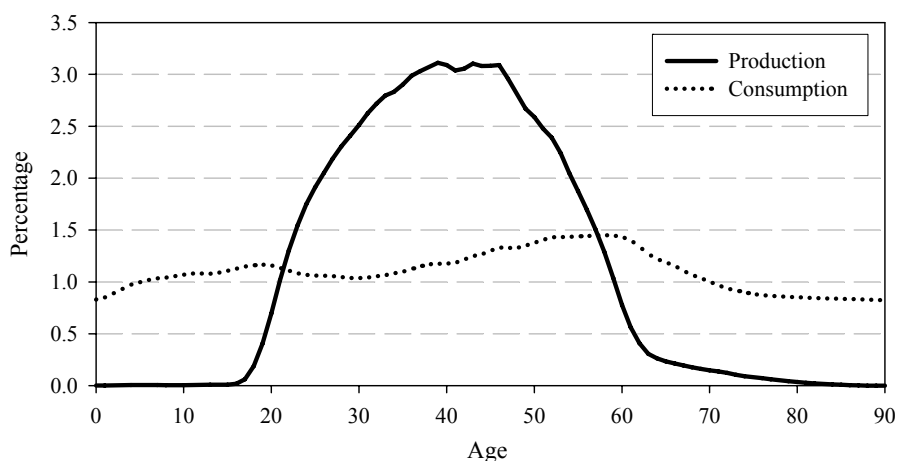
information about the lifecycle of production and consumption in China is limited. However, the estimated production and consumption profiles for urban China in 2000 (figure 2) are similar to those found in other countries.[2]

The divergence between production and consumption interacts with changes in population age structure to generate what is called a demographic dividend (Bloom and Williamson,1998; Mason, 2001; Bloom and others, 2002) which more recently has been described as two demographic dividends (Mason and Lee, forthcoming). The *first* dividend arises because the demographic transition induces changes in population age structure that increase the share of the population concentrated at the productive ages. The *second dividend* arises as individual behaviour and public policy respond to anticipated changes in population age structure, for example, the increase in the need to provide for retirement, as discussed further in this paper. An important point that is emphasized below is that the demographic dividends are dependent on the policy environment in which population change is occurring, especially in China.

The first dividend refers to increases in the growth rate of income per capita that come about when the productive population grows at a faster rate than the total population. However, this period must eventually come to an end. As the demographic transition proceeds, growth in the working-age population will eventually become slower than that of the total population, as the proportion in the older ages rises. The effect will be to depress growth in per capita output and per capita consumption.

Analysis that emphasizes only the variation in productivity with age is incomplete. Consumption also varies with age. If age groups with low productivity and high consumption increase, the aggregate effects are magnified in comparison to growth in an age group with low productivity and low consumption. Thus, the analysis presented here uses the support ratio to quantify the first dividend (Mason and Lee, forthcoming). The support ratio is the ratio of the effective number of producers to the effective number of consumers. The effective number of workers is weighted by age-specific productivity factors while the effective number of consumers is weighted to allow for variation in consumption by age (Cutler and others, 1990).[3] The first dividend is positive if the support ratio is increasing. Given constant age profiles of productivity and consumption, output per effective consumer increases at the same rate as the support ratio grows, which depends, in turn, entirely on changes in population age structure.

**Figure 3. Estimated first demographic dividend in China, 1982-2050**
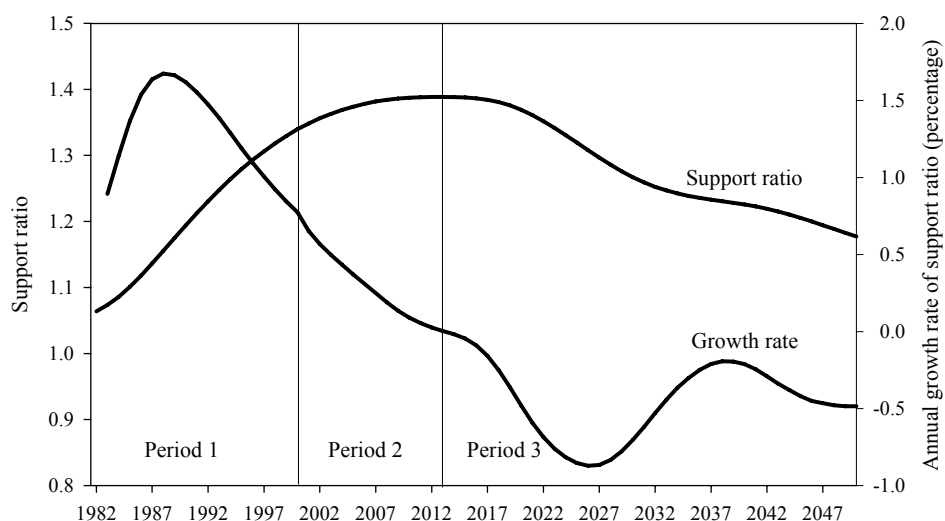
For China, the magnitude and sign of the first dividend vary substantially over three periods (figure 3). From 1982 to 2000, the demographic situation was especially favourable as changes in the support ratio had a strong positive effect on output per worker. The support ratio increased by 28 per cent or at an average annual rate of 1.3 per cent. During the same period, real GDP per capita (PPP adjusted) grew at an annual rate of 8.4 per cent per year (World Bank, 2004). Thus, the first demographic dividend accounted for 15 per cent of China's economic growth between 1982 and 2000.

For the most part, the gains from the first demographic dividend have been reaped in China. Between 2000 and 2013, the support ratio is projected to continue to rise but at a much slower pace. For the entire period, the first dividend yields an increase in output per capita of 4 per cent—an annual growth rate of 0.3 per cent. The support ratio is projected to reach a peak in 2013 and then begin a sustained, gradual decline. By 2050, the projected support ratio will be only 85 per cent of the level reached in 2013. Growth in output per capita will be reduced by 0.45 per cent per year between 2014 and 2050 as a result of changing age structure as the first demographic dividend passes.

Trends in the support ratio combine the changes in the effective labour force and the effective number of consumers that are of interest in their own right. These components are shown separately in figure 4. The growth rate in the effective labour force—producers—peaked in the late 1980s and early 1990s at 3 per cent per annum. Currently, the rate of growth is about half, or 1.5 per cent per annum, and is declining steadily. Labour-force growth will cease altogether by 2020 and turn strongly negative thereafter.

China's experience is similar to that of other East Asian economies (Mason and Lee, forthcoming). In order to compare China's demography with that of others, support ratios were constructed by using the productivity and consumption weights employed in the analysis for China, and demographic data for each of the economies shown in table 1. Taiwan Province's pattern is very similar to mainland China's although Taiwan's transition occurred somewhat earlier. Japan also experienced a dividend, but it came much sooner than in other East Asian countries. Between 1982 and 2050, Japan's support ratio will decline—depressing growth in per capita output by 0.4 per cent per annum. Many western countries

experienced rapid growth in their support ratios primarily because of the baby boom in the 1940s and 1950s, but many, as illustrated by the experience of France and the United States, are now in a period of decline (table 1).

In China and elsewhere, the first dividend is a persistent but ultimately a transitory phenomenon. In China, output per capita is projected to be higher by about 10 per cent in 2050 than in 1982 due to the first dividend. If the projection were extended further into the future, the net effect would be smaller. The contribution to annual growth in output per worker during the roughly seven decades tracked is negligible. However, output per capita is substantially elevated over the demographic transition. This is an event of considerable economic significance during the era of the transition. Moreover, the first dividend can have long-lasting effects if the increased income is re-invested in the form of physical or human capital and/or institutional development. This possibility is explored in more detail in the next section.

**Figure 4. Effective producers and consumers in China, 1982-2050**
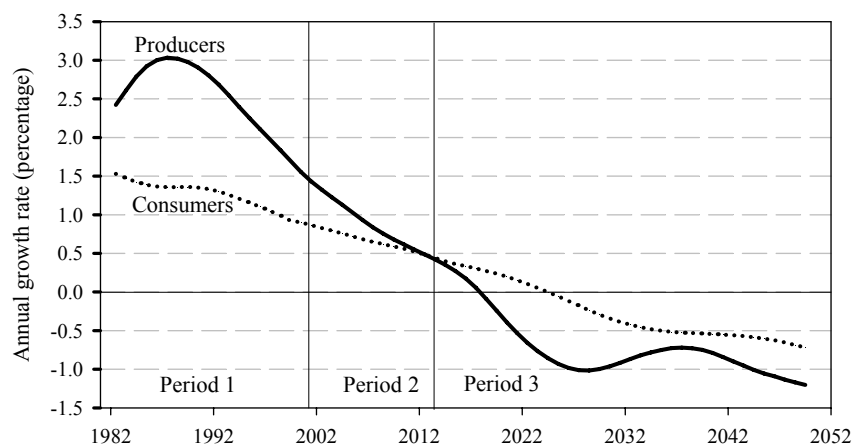


Source: Authors' calculations.
NOTE: Calculations are based on age-profiles of household consumption and labour income estimated from the 2000 Urban Income and Expenditure Survey.

TABLE 1. AVERAGE ANNUAL GROWTH RATE OF THE SUPPORT RATIO
IN CHINA AND OTHER SELECTED COUNTRIES, 1982-2050
(percentage)

|  | 1982-2000 | 2000-2013 | 2013-2050 | 1982-2050 |
|---|---|---|---|---|
| China............................................. | 1.28 | 0.28 | -0.45 | 0.15 |
| Taiwan Province, China.............. | 1.07 | 0.01 | -0.60 | -0.04 |
| Japan............................................ | -0.18 | -0.24 | -0.60 | -0.42 |
| United States of America.............. | 0.44 | -0.46 | -0.04 | 0.01 |
| France .......................................... | 0.40 | -0.41 | -0.17 | -0.06 |

Sources: For China's population data, see text; for Taiwan Province's population data, China, Taiwan Province (various years); for Japan, United States and France, United Nations (2003).
NOTE: All values calculated using the income and consumption profiles for urban China in 2000; single year of age data interpolated using Sprague multipliers.

As shown above, China's rapid fertility decline in the 1970s has brought to the country a substantial demographic dividend. The arrival of the demographic dividend coincided with its recent economic boom, thus further fuelling an already rapidly growing and dynamic economy. An abundant labour supply, combined with relatively small shares of younger and older dependents, not only helped to make China become the world's factory at the turn of the twenty-first century, but also contributed to increasing output per capita and thus, the standard of living. Such a dividend, as we have discussed in the foregoing, is transitory and will soon be exhausted. China's unusually rapid fertility decline means that it will also undergo a more rapid and severe process of ageing. China's 2000 census revealed that the shares of the older population had increased, specifically from 7.6 per cent in 1982 to 10.5 per cent in 2000 for those aged 60 and above and from 4.9 per cent in 1982 to 7.1 per cent in 2000 for those aged 65 and above. China's rapid fertility reduction and its recent low fertility levels and improved life expectancy will accelerate China's ageing process in the near future.
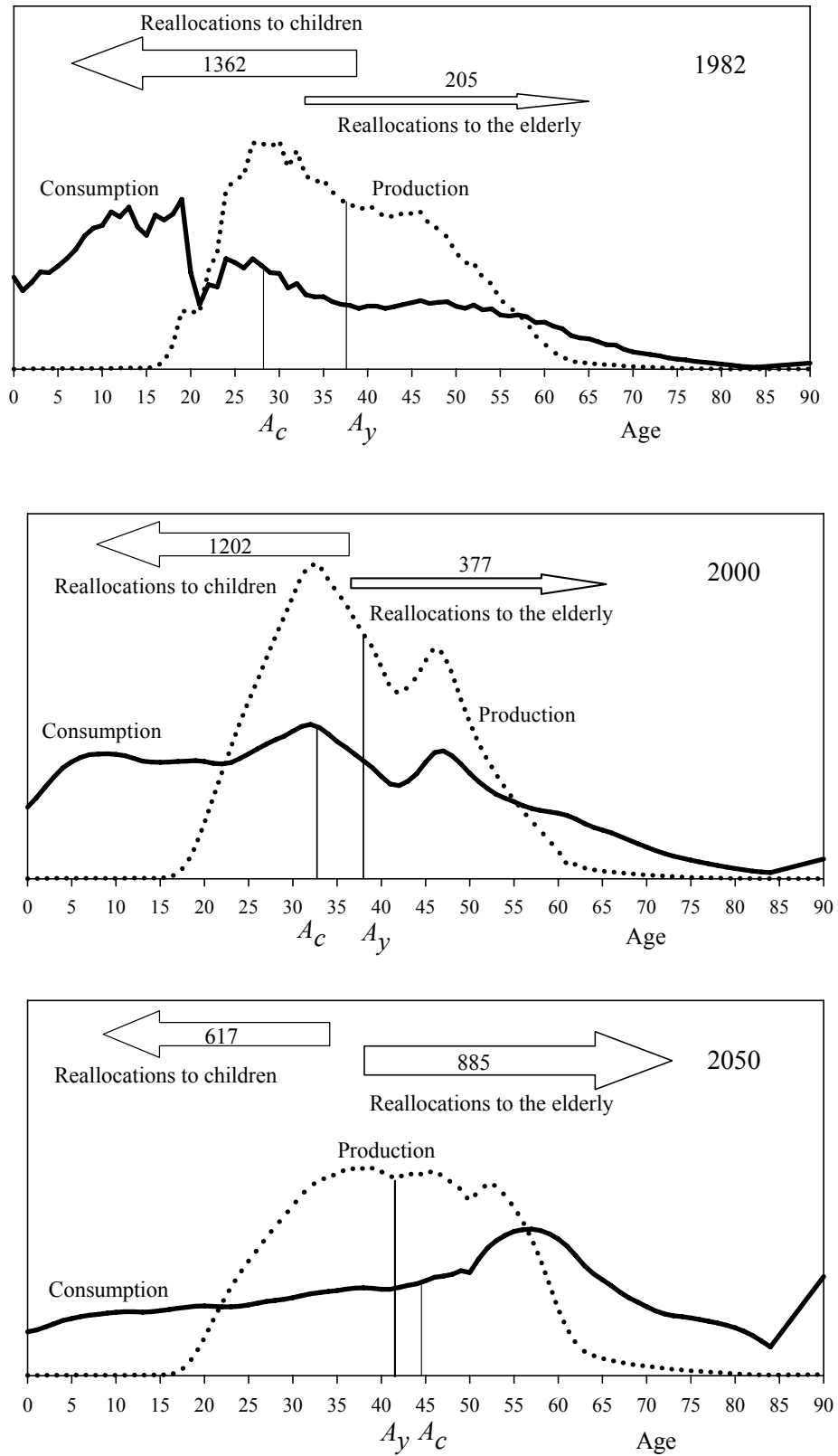
Yet population ageing, with the appropriate policy and institutional arrangements, may bring China a second demographic dividend. The first demographic dividend, as previously discussed, quantifies the effects of changes in the support ratio, assuming unchanged output per worker. A second demographic dividend may arise because changes in age structure can influence the processes that lead to the creation of wealth. A possibility—one that has been realized in other East Asian economies—is that population ageing will lead to rapid accumulation of capital. When this occurs, the capital intensity of the economy will raise labour productivity or output per worker. Traditionally, the effect of population on capital deepening is considered in the standard neo-classical economic model that assumes that the saving rate is constant (Solow, 1956). The approach taken here, however, builds on elaborations of the neo-classical model that treat saving and wealth as endogenous (Tobin, 1967; Mason, 1987; Willis, 1988; Lee, 1994).

With increases in life expectancy, the expected duration of retirement rises. Individuals must accumulate additional wealth or face substantial reductions in standards of living during old age. The wealth can come in several forms, however. One possibility is the accumulation of additional capital. The other is the accumulation of transfer wealth—increases in the obligations of future generations to provide old age support either through public pension plans or as part of familial support systems. Either form of wealth can meet the retirement needs of a growing older population, but increases in capital influence the level of output and economic growth, while increases in transfer wealth do not (Lee, 1994). A third possibility is that neither transfer wealth nor capital is accumulated. In this case, favourable effects on productivity are not achieved and standards of living of the older persons deteriorate.

The analysis presented here relies on a highly stylized model of the economy (Mason, 2005). Suppose that the cross-sectional age profiles of production and consumption—the shape but not the level—are held constant. The profile of production reflects persistent effects of experience and obsolescence. It abstracts from changes in labour force behaviour, e.g. changes in retirement behaviour and changes in returns to experience related to increases in educational attainment or other forces. The profile of consumption reflects preferences about own consumption and the consumption of others reflecting altruism or political processes.

Under these conditions, changes in population age structure lead to a substantial decline in the resources that must be reallocated from working generations to children and a substantial increase in the resources that must be shifted from workers to the elderly. The shift is quite evident in figure 5, which shows the distributions of aggregate consumption and labour income by age for 1982, 2000, and 2050 and the associated age reallocations. These charts are constructed using the profiles and population age distributions shown in figure 1.[4]

**Figure 5. Consumption and production profiles in China, 1982, 2000 and 2050**



Reallocations to children

1362

205

Reallocations to the elderly

1982

Consumption

Production

$A_c$    $A_y$

Age

Reallocations to children

1202

377

Reallocations to the elderly

2000

Consumption

Production

$A_c$    $A_y$

Age

617

Reallocations to children

885

Reallocations to the elderly

2050

Production

Consumption

$A_y$ $A_c$

Age

*Source*: Authors' calculations.
NOTE: Production refers to labour income. $A_c$ = mean age of consumption; $A_y$ = mean age of production.

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Two inter-age flows—from workers to children and from workers to the elderly—are summarized by the arrows shown in figure 5. The foot of the arrow in each of the panels in figure 5 is located at the mean age of the outflow from workers and the head of the arrow is at the mean age of the inflow to recipients. For the 1982 panel, for example, the mean age of the outflow from workers to children is 37 years while the mean age of the inflow to children is 9 years. The width of the arrow is the per capita reallocation. Given the assumption of golden rule, steady state growth, the area of each arrow is equal to aggregate life-cycle wealth that must be maintained to support each age reallocation (see Lee, 1994 and Lee, 2000 for an explanation). In the case of downward flows, that is, flows from older to younger-age groups, the life-cycle wealth is negative. It is negative because those who are alive are obligated to make transfers to those who have not yet been born.  The obligation is not a legal one.  Rather, it is a social obligation to provide support to the next generations of children. The actual level of that support is unknown but, under the simplified assumptions followed here, children are supported at the same level relative to adults in the future, as has been the practice in the past.

The effects of age structure on life-cycle wealth are quite pronounced (table 2). In 1982, transfers are strongly downward from workers to children and total life-cycle wealth is more than nine times total labour income and negative. As population ageing proceeds, flows to children decline and are surpassed by flows to the elderly. By 2050, steady state life-cycle wealth will be 2.6 times labour income. Steady-state life-cycle wealth required to support consumption by the elderly will rise to 7.1 times labour income. The important implication of table 2 is that population ageing in China must lead to rapid growth in the capital stock, to an enormous expansion of public or familial-based transfer programme, or a significant decline in the living standards of the elderly.

The magnitude of the second demographic dividend depends on the particular mechanisms used to reallocate resources. Economic reform adds complexity to the picture in China because the institutions and mechanisms used to achieve reallocations are a fundamental feature of reform. Resources can be reallocated from surplus ages to deficit ages in different forms and relying on different institutions (table 3). In China's post-reform economy, three forms became available: capital, transfers and credit. Capital can be accumulated at surplus ages; later, at deficit ages, it yields capital income and can be liquidated. An important point to note is that capital held by individuals can only be used to reallocate resources from younger to older ages. Secondly, those in deficit ages can rely on current transfers from those in surplus ages. Thirdly, individuals can rely on credit markets. Those at surplus ages can lend to children, relying on loan repayments later in life when they are at deficit ages. Credit markets play a small role in inter-age reallocation systems, however, because of constraints on indebtedness.[5]

TABLE 2. LIFE-CYCLE WEALTH IN CHINA
1982, 2000 AND 2050

|  | 1982 | 2000 | 2050 |
|---|---|---|---|
| Mean age of consumption | 28.0 | 32.5 | 44.4 |
| Mean age of production | 37.3 | 37.8 | 41.8 |
| Ratio of life-cycle wealth to labour income |  |  |  |
| Total | -9.2 | -5.3 | 2.6 |
| Support of child dependants | -11.2 | -7.8 | -4.5 |
| Support of elderly dependants | 2.0 | 2.5 | 7.1 |

NOTE:  Calculations use age-profiles of household consumption and labour income estimated from the 2000 Urban Income and Expenditure Survey. Estimate of life cycle wealth for the support of child dependants is based on the mean age at childbearing in 2000 from the projections for China. Life-cycle wealth calculations assume golden rule, steady-state growth.

TABLE 3. REALLOCATION SYSTEM

| | Institution | | |
|---|---|---|---|
| Form | Family | Market | State |
| Capital | Housing<br>Consumer durables<br>Education | Factories<br>Inventories<br>Farms | Public infrastructure<br>State owned enterprises<br>Funded pension plans |
| Transfers | Childrearing costs<br>Support of elderly<br>Bequests | Public debt | Public education<br>Public health care<br>Unfunded pension plans |
| Credit | Familial loans | Consumer credit | Student loans |

Source: Adapted from Lee (1994).

In a market economy, three institutions are involved in reallocations. In many societies, the *family* is the principal institution responsible for reallocating resources across age groups, and in virtually all societies, families dominate reallocations to children. Two other institutions, the *market* and the *State*, vary in their importance depending on the economic system. In pre-reform China, market institutions played little or no role and the State played a dominant role. In post-reform China, the emergence of a market economy and the recognition of private property have expanded the mechanisms available for resource reallocations with important economic implications.

Suppose that the reallocation system for the elderly relied entirely on capital throughout the entire history under consideration. Prior to reform, this would assume that the State was implicitly funding pensions by investing in state enterprises. After reform, capital accumulation became a combined responsibility of the family, the market, and the State. A complete assessment of the economic implications of these changes would require a simulation model that could be used to track the complex dynamics involved. However, an indication of the importance of the demographic change can be assessed by using a highly stylized model of the economy that involves steady-state, golden-rule growth. The population is assumed to be in a stable equilibrium, i.e., no changes in the age structure, the saving rate and the ratio of capital to total output is constant, all economic growth arises because of exogenous improvements in the productivity of workers, and the interest rate is equal to the rate of economic growth. Under these conditions, the path of consumption over time is at its maximum in the sense that consumption in no period can be increased without reducing consumption in some other period. Demographic conditions in 1982, under steady-state golden-rule assumptions, would imply a capital-output ratio of 2.0. Demographic conditions in 2050, again under steady-state golden-rule assumptions, imply a capital-output ratio of 7.1. Given simple assumptions, an increase in the capital-output ratio of this magnitude would lead to a doubling of output per worker.[6] The impact on the rate of growth of output per worker depends on the time frame over which capital deepening occurs. Evenly spread over a century, output per worker would have to grow at 0.7 per cent per year. Spread over 50 years, output per worker would grow at 1.4 per cent per year as a result of capital deepening.[7] Such a dividend, if materialized, is by no means trivial. It has roughly the same magnitude as the first demographic dividend China reaped in 1982 - 2000, when China experienced its historically fastest growth in per capita income.

These calculations are suggestive, and there are many complexities that are not addressed. One is that, in pre-reform China, a large portion of life-cycle wealth, perhaps all, was held as transfer wealth rather than as capital. Life-cycle wealth represented the pension obligations or the implicit debt of future generations as embodied in the State and its organs, e.g., state-owned enterprise. To an unknown extent, economic reform destroyed that life-cycle wealth.

A continuing issue in China will be through what mechanisms and to what extent life-cycle wealth should be replenished. Transfer wealth will necessarily play a major role, because the greatest obligations are to those who are near or who have already reached retirement. For them, accumulating capital is not

an option, only transfer wealth. The question then is the extent to which pension obligations are absorbed by the State (taxpayers), shifted to private firms as well as state-owned enterprises (SOEs) that are privatized or shifted to families.

A second complication for China is separating the transitional issues associated with economic reform from the ongoing issues that arise with population ageing. Establishing a large-scale pay-as-you-go (PAYGO) pension system would most readily meet the short-term objective of fulfilling obligations to current pensioners. Such a strategy, however, could commit China to a path that foregoes the second demographic dividend.

Direct econometric support for the existence of a second demographic dividend comes in the form of studies of the effect of demographic factors on aggregate saving. Saving rates must rise above their equilibrium level to produce an increase in the capital-output ratio. There is no doubt in East Asia that aggregate saving rates are well above equilibrium, but there are many competing hypotheses about why saving rates are so high in East Asian economies. A number of studies have found evidence to support the view that saving rates have been influenced by changes in age structure (Mason,1987; Mason, 1988; Kelley and Schmidt, 1996; Higgins and Williamson, 1997; Deaton and Paxson, 2000) and life expectancy (Bloom and others, 2003; Kinugasa, 2004). The magnitudes of estimated effects are sensitive to the methods and data employed.

## D. CONCLUDING REMARKS

The available evidence supports the conclusion that the demographic transition has led to more rapid growth in output per capita in many East Asian countries where the demographic transition has been especially rapid. China has clearly enjoyed significant gains in output per effective consumer as a result of the first dividend. Whether or not China will enjoy a second dividend remains to be seen. Demographic change offers an opportunity for significantly more rapid economic growth, but only if the policy environment is supportive. It would be a serious error, however, to reach any welfare conclusions about demographic change in general, and fertility decline in particular. Two reasons for this are particularly important to emphasize. The first is that capital deepening is achieved by foregone consumption. The resulting growth in output per worker is not without any opportunity cost, but comes at the expense of reduced material standards of living among those who are saving at such high levels. The second point is that rapid fertility decline in China may have involved an enormous sacrifice on the part of parents that are forced to have a single child. It is unknown how many children would have been born in the absence of the one-child policy or how to value the costs imposed by the loss of reproductive freedom.

In many ways, China has always been a demographic early-achiever. Its mortality declined early and rapidly under a socialist planned economy and public health system. In this regard, China was much more successful than most other countries at similar income levels. China's fertility also declined much more rapidly and earlier in the development process than elsewhere, due partly to a government birth control programme that finds no equal for the extent to which it intruded on the reproductive decisions of couples.

Such a compressed demographic transition positioned China to reap a relatively large demographic dividend at an opportune time. China's first demographic dividend, deriving from fertility decline, materialized at the same time that China underwent its most radical economic transitions and faced the strongest unemployment pressures. The demographic factor, thus, was a favourable factor in China's economic growth during the last quarter century.

Being an early achiever brings with it a cost. As consequences of such a forced demographic transition, China will soon enter a long period of decline in labour supply and will face a rapid increase in the older population that cannot be reversed easily and quickly. Whereas this ageing process may bring

with it a second demographic dividend, such an event depends heavily on the right institutional environment. State-enforced fertility decline has also resulted in the deterioration of the accuracy of the collection system for birth statistics. This has caused a sustained and sharp increase in the sex ratio at birth and in excess female mortality at young ages and has forcefully altered the kinship structure for many Chinese families. These social costs are not only severe but are also long lasting.

Moreover, the general assessments of the economic impact of changing demographics in China conceal important sub-national variation. China's economic growth in the last two and one-half decades has been highly uneven geographically, with most of the growth concentrated in its cities and coastal areas. China's rapid ageing process will also take place unevenly across the country, due to the State's differential birth control policies in the past. Assuming current fertility and a moderate improvement in mortality, China's urban population in twenty years' time will be as old as that of Japan or Italy today, with one-fifth of the population having the age of 65 or over. In contrast, China's rural population will not reach this level of ageing until the middle of the twenty-first century. The extent to which the Chinese economy will be able to benefit from the capital accumulation associated with an ageing population depends not only on the institutional forms of resource allocation, but also on the allocation and utilization of such sources among its citizens.

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NOTES

[1] China's best record prior to the current growth period was between 1952 and 1972, when its economy grew by 64 per cent per decade, a record far below the recent one. Comparable fast-growing periods in other countries are: Germany during 1880 and 1914, with a 33 per cent per decade; Japan between 1874 and 1929, with 43 per cent per decade; and the Soviet Union between 1928 and 1958, 54 per cent per decade (Meisner 1999, 417- 418).

[2] The production and consumption values in figure 2 are estimated from the 2000 Urban Family Income and Expenditure Survey for China. Both profiles are normalized to aggregate to 100. Production is an estimate of the economic value of labor based on reported earnings and self-employment income. Consumption is based on detailed information on family expenditure on food, clothing, housing, entertainment, recreation, transportation and communication, etc. Housing consumption includes the imputed value of owner-occupied housing. The methods employed are comparable to those used in Mason (2005) and described in more detail in Lee and Mason (2005).

[3] The effective number of producers is measured using the age-profile of productivity shown in figure 2 to weight the population. The effective number of consumers uses the age-profile of consumers. Rural profiles are not currently available.

[4] For a detailed discussion of the theoretical underpinnings of intergenerational transfers see Lee (1994).

[5] Credit could, in theory, play an important role if children financed their own consumption by borrowing from adults with a lifecycle surplus. The debt would be repaid when children reached lifecycle surplus ages and their creditors reached lifecycle deficit ages. When children's consumption is financed through transfers from parents and, to a lesser extent, the state, there is little demand for credit for lifecycle purposes.

[6] Given a Cobb-Douglas production function, the relationship between output per worker and the capital-output ratio is:

$$\frac{Y}{L} = \left(\frac{K}{Y}\right)^{\frac{\beta}{1-\beta}}$$

Given an elasticity of output with respect to capital ($\beta$) of 0.35, a widely used estimate, a rise in the capital-output ratio from 2.0 to 7.1 would produce essentially a doubling of output per worker.

[7] See Lee, Mason, and Miller (2003) for a dynamic simulation analysis of Taiwan Province of China. The simulated transition from a low to a high capital-intensive economy required closer to fifty than to 100 years.

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# A GLOBAL OVERVIEW ON SOCIAL SECURITY IN THE AGE OF LONGEVITY

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One of the key challenges confronting countries with an ageing population over the coming years is to guarantee to the whole older population an adequate level of income without placing excessive demands on younger generations and on national economies. This dilemma has direct implications for social security systems and their ability to achieve their goals.

An increasing number of countries are affected by population ageing, which has triggered increasing concern over the future of social security, both for its sustainability and for the capacity of these societies to extend coverage to the often large section of the population excluded from receiving social security benefits. Debate on pension reform and on controlling health-care expenditure centres mainly on the financial viability of retirement and health-care plans in ageing societies. Our ability to gauge the future of such societies is inextricably linked to the sustainability of their social protection programmes over the next few decades. There is a need to consider not only the economic dimension, but also the social dynamics of an ageing population. Can free choice and individual responsibility be promoted in a way that avoids social segmentation and instability? Can social security be extended to the non-formal sectors of the economy? It remains to be seen what path social security systems can take to meet the challenges and opportunities of population ageing. How can social protection be secured and extended in a way that is efficient and fair? The future of ageing societies depends on their governments' ability to adopt a comprehensive approach to social security that is both economically and socially viable.

Despite the vast number of issues yet to be tackled by social policies, this paper argues that social security systems do have the capability to adjust to the emerging needs of workers and citizens in the unprecedented demographic, social and economic environment of ageing societies (or to use a more positive term, "long-life societies"). It further argues that new tools exist to allow governments in the least wealthy societies to provide basic social security to all.

## A. SETTING THE PICTURE

Since the mid-1990s, there has been much talk of the threat that population ageing poses for social security programmes, more specifically pension and health-care schemes. The statistics are quite striking. Demographic forecasts show that, in roughly fifty years' time, the percentage of over-60s in industrialized countries will have grown from 20 per cent to 35 per cent of the overall population. The increase will be even more staggering in the developing world, from 8 per cent to 20 per cent, representing a fourfold rise in the proportion of older people. By 2030, the number of over-60s living in the People's Republic of China is expected to have reached 350 million, equal to the total population of the European Union (EU) before its recent expansion.

Another indicator frequently highlighted is the ratio of pensioners to people of working age (or economically active). In industrialized countries, current forecasts see that ratio shifting from today's level of 4 or 5 potential workers aged 15-64 for every pensioner to just 2 potential workers for every pensioner by 2050.

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[*] The responsibility for opinions expressed in this paper rests solely with the author, and does not constitute an endorsement by the ISSA of the opinion expressed in it.

Drawing on linear estimates of population growth and changes in social expenditure, a number of international financial institutions have concluded that, if current trends hold, public spending on pensions will increase dramatically in all parts of the world over the next fifty years. The outlay in countries of the Organization for Economic Cooperation and Development (OECD) is now 10 per cent of GDP, but is forecast to stabilize at 17 per cent within thirty years, amounting to a 70 per cent increase. It is hard to see how these costs could be met. A United Nations Population Division report calculated that today's ratio of working-age population to every non-worker could only be sustained through to 2050 if mass immigration were fostered (e.g., 12.7 million workers per annum to the EU, over 30 times the current net migration flow) or the retirement age were increased to over 75 years (United Nations, 2001). Both options are clearly unrealistic. Is the only alternative urgent and rapid reform, or indeed the disbanding of pension and health-care schemes? Is that, ironically, the only way to salvage an income for future pensioners and to safeguard future economic growth, which is threatened by the ageing crisis, as suggested by the World Bank (1994)?

The facts appear merciless. Today, population ageing and an attendant social security crisis seem inevitable. To make matters worse, there is doubt in political, media and other influential circles about the State's ability to tackle this problem effectively.

On a less pessimistic note, other experts contend that population ageing is not the foremost threat facing social security systems, despite the worrying shift in dependency ratios (Economic Policy Committee, 2000; Mullan, 2000). The past fifty years have seen efficient old-age protection schemes introduced, which have slashed poverty rates among older people without jeopardizing economic growth. Experts argue that the same truth still holds today: the bottom line is the capacity of a society – and its economy – to provide all its citizens, irrespective of age, with a decent standard of living by ensuring steady production levels. In other words, population ageing is only a cause for concern if a society's lifeblood, not least its productive activity, fails to expand.

*Beyond the myths of population ageing*

Before examining possible ways of easing the pressure caused by population ageing, we first need to look at the evidence. There is no denying that the number of older people is increasing. However, the ensuing impact on society, the economy and, of course, social security expenditure is by no means as clear-cut. The negative connotations that tend to permeate such debate are striking.

While it is generally recognized that longer life expectancy is one of the greatest achievements of the twentieth century, emphasis tends to be placed on the looming pension crisis and sustainability of economic growth. Whereas increased life expectancy is highly valued at an individual level, the prospect of an ageing society and the associated social and economic implications engender nothing but doom and gloom.

Focused on the so-called ageing crisis, this debate has contributed to the perception that older persons are generally economically dependent and thus a considerable burden on society. However, it needs to be recognized that older people contribute in various ways to the economic and social development of their communities. All over the world, most older persons continue to work, in both paid and unpaid jobs. There is no economic or biological basis for retirement at a fixed, socially determined, "old" age. For instance, in national economies dominated by the agricultural sector, older farmers, men and women, carry on working in farm production until the limit of their physical capacity. And in industrialized countries today, there is a growing recognition that older people should be fully enabled to work as long as they desire.

Gloomy scenarios concerning ageing are based on the projected impact that population ageing will have on pension and health-care schemes over the next 40 to50 years. These projections are often based on misconceptions and underestimate the social and economic changes that the next fifty years might bring. What forecasts could have been done in 1955 about the state of the world today? There is no reason to suppose that we will not continue to witness the same degree of change as over the past half a century. It is probably just as difficult for us now as it was then to foresee what our world will be like in another fifty years' time. Many of today's forecasts assume that social security systems will remain virtually unchanged in the future. However, pension and health-care systems are undergoing major reforms, and these changes will make their mark over the next twenty to thirty years. More reforms can be expected, and this should be taken into account.

## B. STRENGTHENING THE SUSTAINABILITY OF SOCIAL SECURITY SYSTEMS

It is important to dispel some of the myths about the implications of ageing populations. The intention is not to dismiss the real difficulties that social security schemes may face in future, but to put into perspective the doomsday scenarios that permeate debate in this area.

The trend of ageing population is usually presented as a major threat to the economy. Particularly in industrialized countries, there is a growing concern about the cost to society of providing pensions and health care for older people and whether costs could be reduced by opening social protection to more private sector competition. It is often argued (see in particular World Bank, 1994), that moving from a pay-as-you-go scheme towards a funded one will resolve adverse demographics. As demonstrated by several scholars (see Barr, 2002; Orszag and Stiglitz; 2001, Thompson, 1998), there is no evidence, from an economic point of view, that demographic change is a strong argument for a shift towards funding.

Indeed, one could argue that the shift from pay-as-you-go systems to funded systems is merely a matter of pure reallocation of financial burden between generations. Furthermore, different opinions exist as to whether one of these systems is superior to the other in terms of improving the general economic framework and generating wealth, not only through the link between pension funds, saving and capital formation, but also through various externalities (impacting labour and capital markets).

In fact, the factors to guarantee the sustainability of social security systems all revolve, in one way or another, around employment.

### *Job promotion*

Job promotion is just as crucial as economic growth to the future of social protection systems. A wide range of recent studies has shown that the drop in labour supply triggered by population ageing could be partially offset by higher labour-market participation, at least over the next twenty-five years. This type of corrective measure is chiefly needed in European countries. Each country's starting point – that is, its potential for increasing employment – varies according to its rate of unemployment, the number of working women, the average retirement age, its birth rate and the number of immigrant workers. In many OECD countries, the share of the population of prime working-age (20-64 years) is projected to decline substantially over the next fifty years. Thus, if nothing is done, the ratio of older inactive persons per worker will almost double from around 38 per cent in 2000 to just over 70 per cent in 2050. Ageing on this scale would place substantial pressures on public finances and lead to slower economic growth, especially in per capita terms, unless the countries adapted their employment and social policies to demographic realities. Concretely, policies which encourage a higher labour force participation rates among older people and younger age groups, especially among women and older workers, must be implemented in order to offset the negative consequences of ageing.

Hence job promotion is a vital instrument in reducing the economic cost of population ageing and in fostering overall prosperity. The problem is that, for years, many countries have been grappling with acute unemployment and underemployment, and the policies implemented to tackle these issues have failed, leaving little hope of higher employment rates. Some experts believe that the dismal results of employment policies implemented in most European countries, and their relatively low employment levels, have exacerbated the implications of population ageing. If a substantial proportion of the working-age population is jobless, those in employment are called upon to support a larger number of dependent citizens. More optimistic specialists argue that this trend might ultimately prove to be an asset, as the resulting labour-market reserve could be used to boost job rates, whereas high-employment countries would find it hard to increase their workforce further.

In most European countries, high unemployment is combined with a shortage of skilled workers in some sectors, with the situation set to worsen once the sizeable ranks of the baby boom generation retire. The effectiveness of job creation policies in these countries will therefore depend on their ability to bring the jobless (back) into the labour market. To that end, greater investment must be channelled into the education and vocational training of jobseekers to align their qualifications and skills more closely with companies' needs.

Greater female participation in the labour market is often perceived as one of the key answers to population ageing. As can be seen in Nordic countries, relatively high fertility rates do not necessarily rule out an increased female presence in the workforce, although the State must provide families with benefits and social services, and employers must offer both parents working conditions that enable them to reconcile professional and family lives. It should be noted that the impact of higher female employment is contingent not only on the number of women in paid work, but also on the type of jobs they hold. If most women entering the workforce are in part-time, unstable jobs, the benefits could be limited, despite a nominal rise in overall employment.

Increased female participation in the workforce is not only an effective way of safeguarding families, particularly single-parent families, against poverty. It also fosters greater financial security for retired women, most of whom will live much longer than men. Low wages, career breaks and the skewed division of unpaid work mean that older women are not always entitled to a pension, and if they do receive one, it is generally lower than that accruing to men. Bolstering the number of women in the labour market will therefore have the dual advantage of restoring balance to the ratio between workers and dependants and securing women a higher income during retirement.

Other categories of "non-workers" could be tapped to boost labour supply, subject to the right policies being implemented. Cases in point are the long-term unemployed and the considerable number of people drawing disability pensions, many of whom could return to employment through reintegration policies (workplace adjustments, change in attitudes, legislative incentives, etc.).

Together with economic growth, job creation is vital in safeguarding the future of an ageing population. The viability of social protection systems and personal retirement savings schemes is largely contingent on society's ability to right the balance between workers and dependants in a fair and effective manner.

*Reversing the trend towards early retirement and combating ageism*

Reversing the trend towards early retirement is another cornerstone for any strategy designed to make social security systems viable (Sigg, 2005). Measures to this end would correct a paradoxical situation, in which older people live longer and enjoy better health, yet the effective retirement age has fallen drastically over the past thirty years. Despite a recent reversal in many countries, the effective retirement

age is still, on average, significantly lower than the statutory threshold. Many companies still use early retirement as a relatively inexpensive and socially acceptable way of downsizing. That policy, however, carries a hefty price tag for society in general, which is called upon to fund the social benefits accruing to those taking early retirement and to shoulder the related loss of human capital and productive capacity.

Harnessing older workers' productive capacity for a longer time would strengthen the viability of pension schemes in three ways: (i) goods and services produced by a larger workforce would bolster economic growth; (ii) payment of pensions, unemployment and disability benefits would be postponed for those remaining in employment; and (iii) increased tax revenue and social security contributions would help fund pensions and other benefits. In other words, it would be in the interests of government authorities to take measures to align the effective retirement age much more closely with the legal pension age rather than raising the latter.

A move away from early retirement would require a major change in socio-cultural models and attitudes, however. In many societies, early withdrawal from the labour market is currently seen as both desirable and acceptable, even for people in full possession of their faculties and in sound health. This view is linked to workplace dissatisfaction, the negative image associated with older workers and the labour-market discrimination they suffer.

In other words, reversing early retirement means taking steps to combat age discrimination in the workplace. It is often claimed that older workers are less productive than their younger colleagues. However, there should also be due recognition of their extensive professional experience, built up throughout their careers. Companies shedding older workers are squandering human resources. In a few years' time, when skilled workers are in short supply, such an attitude will seem incomprehensible. A growing number of companies and governments have now acknowledged the advantages to be gained from hiring and retaining older workers, and have acted accordingly to foster employment in that age bracket. Further training policies should enable workers, in particular older workers, to adjust continuously to the labour market by updating their skills and qualifications.

Employing older workers is not just an economic imperative. It is also a good way of enhancing their well-being. Work is still one of the best means of social integration. In the best cases, it can enable older workers to integrate with new social groups, feel more confident and fulfilled, and maintain their physical and mental skills. However, it should be borne in mind that jobs can also sap an individual's well-being and health, often through poor working conditions and stress. Hence, there is a direct link to better working conditions for all, one of the chief goals pursued by the International Labour Organization (ILO).

Future generations of older workers in the major industrialized countries are likely to be better suited to working longer than their predecessors. Better qualified and healthier than their parents, they will have the potential to extend their working lives by a few more years.

Even if the effective retirement age is still lower than the statutory threshold in most OECD countries, it seems that the national social security institutions have understood the importance of retaining older workers in the labour market. Consequently, almost all the OECD countries have undertaken, over the past ten years, reforms to counteract the move toward early retirement and foster employment amongst the over-55.

The broadness and the characteristics of the measures depend on the specific choices of the countries but, generally speaking, measures aimed at adapting pension schemes are primarily geared towards curbing the "generosity" of public pensions. Restrictive measures such as raising the retirement age, increasing the number of years for which contributions are to be paid or altering the formula used to calculate pensions have lightened the financial load on pension schemes and adjusted them to reflect

demographic pressures and budgetary resources. Governments introducing such reforms also hope that they will delay retirement by making pensions less attractive. More rarely, "carrot" approaches have also been adopted that enable pensions to be combined with income from employment or that offer financial incentives for continuing to work after the retirement age.

Another series of measures directly targets the workforce exodus. Restrictive measures have been adopted, with many countries curtailing or even cutting off access to early retirement schemes. Tighter access to disability annuities and unemployment benefits (in particular, for workers aged 50 and above, who often enjoy special conditions) is geared towards the same goal—that of keeping people in the labour force longer. More innovative measures foster a flexible end to working life, including phased retirement, an adjustable retirement age, or part-time work in the run-up to retirement. For example, many countries have moved away from a mandatory retirement age, which has been replaced by a period of years (usually between 60 and 70) during which various options are possible.

A third set of measures focuses on employment, in order to better integrate older workers into the labour market rather than sidelining them. Myriad provisions are designed to persuade employers to adapt end-of-career working conditions and extend further training to older employees. Other measures set up incentives, subsides and specific work-measures (e.g., quotas, restriction on laying-off) in order to enable older workers to come back to work. Another approach has been to publicize the importance of keeping mature workers in jobs through information campaign and codes of good practice for firms. On a broader note, a number of countries in North America and Europe have ratified legislation banning all forms of age discrimination.

These measures appear to have had an important effect in the majority of the OECD member-countries. According to the OECD statistics, most OECD member-countries (21 out of 30) have increased their employment rate for workers aged 55-65 since 1995. Figure 1 shows averages for men for the OECD member-countries and the European Union. After a long period of decline, the percentage of older workers remaining in the labour market is now increasing.

**Figure 1. Employment rate for OECD countries and European Union, 1970-2004, for men aged 55-64**
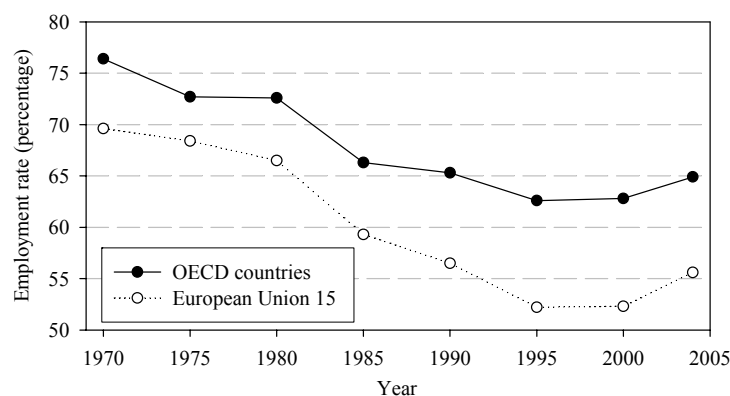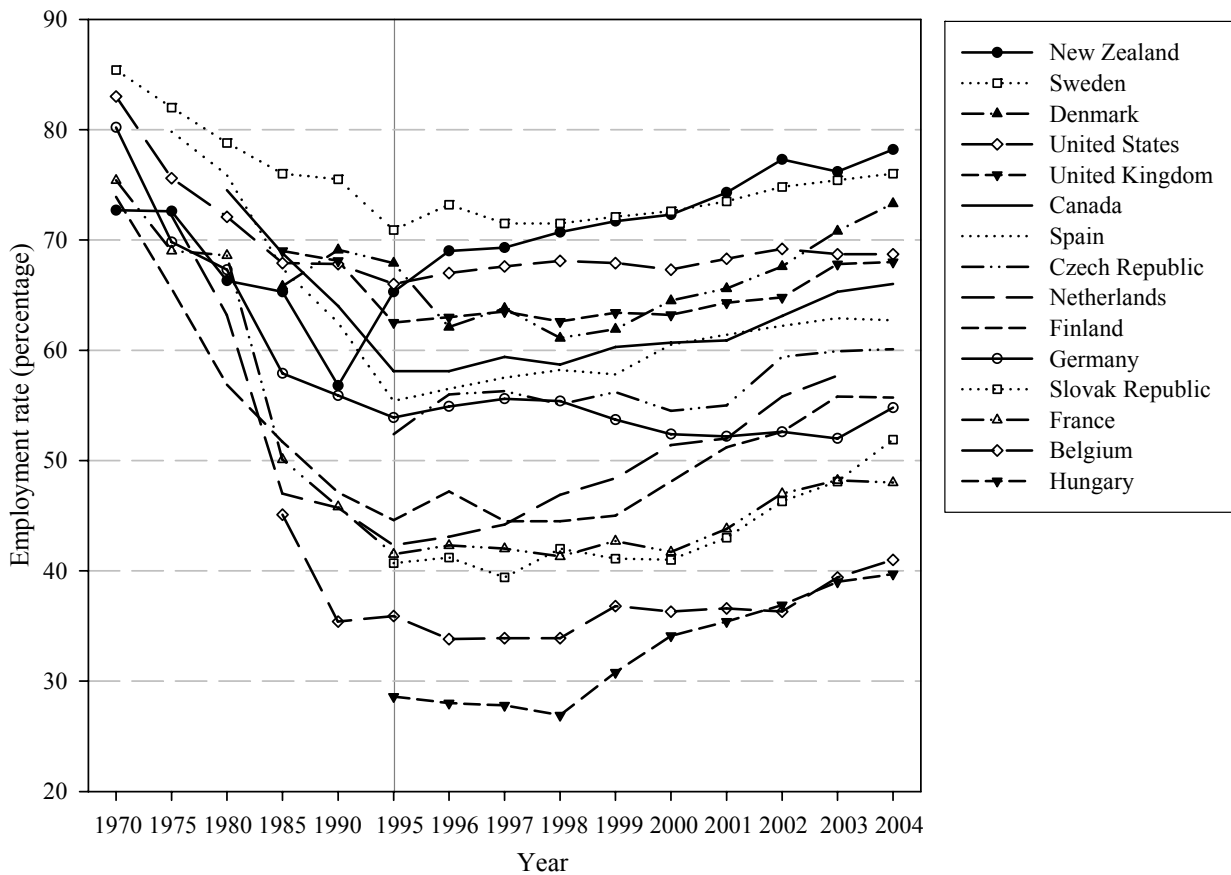


*Source*: OECD Database on Labour Force Statistics.

Figures 2 and 3 show more details about trends in the employment rates for older men in a selection of OECD member-countries. Figure 2shows some of the countries where the rates have increased since 1995. The year in which the rate began to rise varies but is usually in the second half of the 1990s. On

average, the shift occurred in 1995 (figure 1). Even though the majority of OECD member-countries have increased their rates since 1995, few have returned to the high levels of the 1970s and the 1980s. It is also important to stress that the current rates differ greatly between the countries. France and Belgium, despite an increase of 5-6 percentage points between 1995 and 2004, recorded a rate lower than 50 per cent in 2004. In this context, it is worth recalling that the European Union has set an important objective for 2010: the employment rate in the European countries for older workers should reach the threshold of 50 per cent (Stockholm target). It is also important to note that there is a minority of countries that recorded a decline in the employment rate of older workers since 1995. This category includes two types of countries: (i) those where the employment rate for older workers remained high even after the decline, such as Switzerland and Japan; and (ii) those where the rate was already low and the decline has worsened the situation, as for example in Italy, Turkey and Austria (figure 3).

**Figure 2. Employment rate for a range of OECD countries, 1970-2004, for men aged 55-64**



*Source*: OECD Database on Labour Force Statistics.

Nonetheless, for the majority of the countries the trend has been reversed, even if it is difficult to pinpoint the exact reasons for this shift. It may be driven by demand (job creation and an upbeat economic climate) or supply (fewer incentives to take early retirement). Be that as it may, economic performance has been modest over the past few years. One thesis is that countries recording increases in rate are those that recently adopted proactive policies to help people work longer, pointing to a positive

**Figure 3. OECD countries in which rate in 2004 was lower than in 1995, for men aged 55-64**
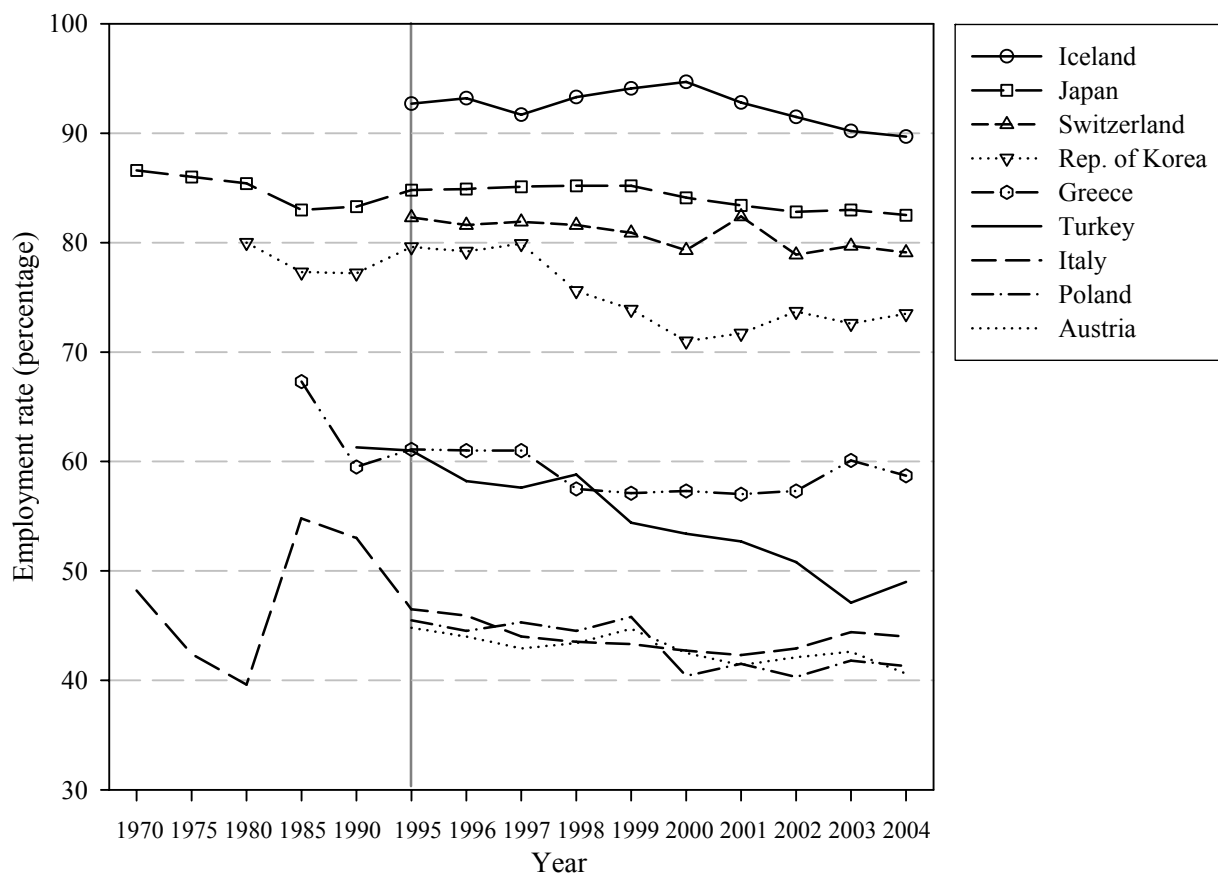


*Source*: OECD Database on Labour Force Statistics.

correlation between such policies and effective retirement age. However, adopting the employment such measures is not enough. Probably, the best way to increase the employment rate of older workers effectively and for the longer term is to implement a global reform, which implies changes not only in the labour market, but on a larger scale. Among the OECD countries, Finland, the Netherlands, the United Kingdom and Denmark took up important measures to facilitate longer working lives and gradual retirement by means of reforming the labour market and the rules of social security. These countries have adopted what Reday-Mulvey (2005) calls "a global policy or a holistic approach" aimed at increasing participation of older workers in the labour market, and they have obtained positive outcomes concerning the increase of the employment rate of those aged 55-64 since 1995. Other countries have taken specific steps in order to increase the employment rate of the older workers, but their policies are not yet global (France, for example). However, some positive results can be noticed, which confirm the positive tie between policies and increase of employment rate among older workers. Finally, the lack of policies for older workers may explain the decline or stagnation of the employment rate in some important OECD countries, as for example in Japan, Italy and Switzerland.

*Tackling the challenge of atypical employment*

Employment is not only essential for enabling social security schemes to meet the challenges of population ageing. It also has a direct bearing on the level of social protection afforded to individuals.

Unstable employment, part-time and temporary work, career breaks, unemployment and low wages all increase the risk of not receiving an adequate pension, ultimately perpetuating insecurity of income post-retirement. Such risks have been exacerbated by recent reforms to contributory pension schemes, which have strengthened the link between contributions and benefits and, by extension, between people's careers and the income they receive upon retirement.

Securing a stable income during retirement is a particular concern for people in atypical employment[1], those working in subsistence farming and those in the informal sector, particularly in developing countries but, increasingly, in middle-income countries too. People employed in the informal economy are generally excluded from all public social security schemes and therefore have little coverage for illness, disability, pregnancy, unemployment and old age. Similarly, "new" freelancers, that is, employees passed off as freelancers to reduce social security charges, will see their entitlements to benefits drastically reduced. Growth in self-employment is being spurred by relatively high and persistent levels of unemployment and by employers' interest in outsourcing or sub-contracting work previously done by employees to what may be called the "pseudo-self-employed". These workers are similar to employees in that many are highly dependent economically on a single client and they do not employ staff. Employer costs are markedly reduced since such workers are not considered to be employees and, therefore, employers may avoid paying social contributions as well as providing other employment-based pay and benefits (Levinsky, 2005).

Giving these workers full access to public social protection schemes would significantly benefit society as a whole. Individual workers and their families would enjoy better protection against life's risks, and increasing the number of people covered by and therefore contributing to social insurance would ensure that the financing of social expenditure was more evenly shared within society. Given the rapid expansion of informal economies in so many countries over the past few years, there is a need to extend social security coverage to the workers affected.

If social protection systems are to offer pensioners a sustainable and stable income, they must provide an adequate level of protection to those in atypical employment and the informal economy. A key step in this connection would be to award a basic pension to all people unable to pay in sufficient contributions during their working lives, as recommended in the International Plan of Action on Ageing adopted at the Madrid World Assembly on Ageing. Whether it is part of the general pension scheme or separate, universal pension coverage would have to be carefully planned. Clearly, the sums paid out would have to be high enough to enable beneficiaries to avoid the poverty trap and enjoy a decent standard of living.

*Lessons for the future*

A host of studies have recently been published exploring the ramifications of population ageing, usually focussing on the period up to year 2050. Each has come up with theories on growth rates, the evolution of productivity, the potential for increasing the workforce and labour-market participation, and prospects for higher immigration flows, albeit with vastly different social security implications (Sigg, 2002).

A recent study of the International Labour Office (ILO) (Cichon and others, 2003) suggested that industrialized countries could only achieve a real increase in per capita growth over and above productivity growth by boosting labour-market participation and fostering immigration. If growth targets are substantially higher than productivity rates, the number of immigrant workers required will rise dramatically. For host countries, such a trend would raise serious social and political concerns regarding integration, while the brain drain could hamper economic growth of sending countries. More specifically, econometric forecasts made for the countries of the European Union before its expansion show that, other things being equal, if the rate of economic growth is to exceed recent productivity growth by 0.5 per cent,

and labour-market participation increased by 15 per cent, new immigrants would need to account for roughly 20 per cent of the population by 2050 (Cichon and others, 2003).

In summary, there is no panacea in terms of policy implications. Immigration alone cannot fill the population gap. Similarly, a massive rise in labour-market participation will help increase employment rates, but will not offset the fall in the number of workers. Higher birth rates are also an option, albeit a long-term one. Ultimately, these and other factors will have to be combined to attain growth levels on a par with those recorded over the past twenty years (2.0-2.5 per cent per annum in OECD countries) and provide young and old alike with a decent standard of living. The measures set out below should at least be considered in countries with a particularly poor demographic structure (for example, in mainland Europe):

• Bolster labour-market participation by at least 15 per cent, by integrating more non-workers and encouraging people to work longer;

• Agree to share wealth with a significantly higher number of immigrants, who could account for a much larger proportion of the population than today;

• Maintain a high rate of productivity increase (roughly 1.5 per cent, which has been the average in industrialized countries over the past twenty years), to be achieved through technological improvements and more efficient work structures;

• Examine family policy options, in particular those that reconcile work and family life, enabling women to have as many children as they want. For example, contrary to the general trend in OECD countries, in France the total fertility rate has continuously increased over the last ten years, from 1.66 in 1994 to 1.92 in 2005 (Pison, 2006), showing that higher rates can be achieved;

• Revise purchasing power expectations, which cannot measure up to levels recorded over the past few decades. Real income growth of 1-2 per cent might, however, be possible. Although the outlook is not as bleak as it seems, a radical change of attitude will be required. That is the challenge that population ageing presents over coming years.

## C. ADDRESSING THE CHALLENGES OF AGEING IN LOW-INCOME AND MIDDLE-INCOME COUNTRIES

Most of the issues raised in Section B relate to industrialized countries, where the populations are already relatively old. To date, low-income (LICs) and middle-income countries (MICs) have been assumed to be relatively well protected from these problems, or at least to be spared for some time to come until demographic pressures become more acute. However, nearly all countries, including LICs and MICs, now face mounting socio-demographic pressures. Irrespective of their level of development, countries can ill-afford to ignore the challenges presented by the rapid pace of demographic change. Whereas in some OECD countries it took seventy-five years or more for the percentage aged over 65 years to double from 7 to 14 per cent, in some LICs and MICs it is projected that this same transition will take under thirty years. These changes will constitute a very harsh test of the capacity of these societies to adapt, especially in countries with a rapidly declining fertility rate.

Communicable and non-communicable diseases, including the AIDS pandemic and malaria, place further strains on the ability of many societies to cope with the ageing of the population. In cases where the working-age population has been decimated, the general productive capacity of society is severely reduced and it becomes much more difficult to support children and frail older persons.

In many LICs and MICs contributory social security schemes protect only a small proportion of the population, with coverage being mainly confined to civil servants and employees in the formal labour market. Workers in informal employment often do not have any access to social protection, and therefore face destitution in the event of the temporary or permanent loss of their earnings capacity. The extension of social security coverage, especially with respect to health care and old-age pensions, is therefore a vital element in improving the well-being of these workers. Building effective social safety nets, for example through the institution of basic universal or means-tested, tax-financed old-age pensions, can help to prevent destitution for those many people with no means of contributing to a social security scheme.

Traditionally, a major asset of many LICs and MICs has been strong family and community networks that offer mutual support to their members. In countries where formal social security schemes are not well developed, these networks can be essential for coping with the ageing of the population, especially since they provide transfers of resources in cash and in kind from the active to the inactive members of the community. The notions of mutual support and reciprocity have been central to the functioning of these relationships. While older people may receive money, nutrition or other goods, it should be recognized that they play an important and irreplaceable role in the family and the community.

But the strength and robustness of family and community networks should not be overestimated. Increased geographical mobility, as a result of urbanization and migration, changing family patterns, diseases, natural disasters, as well as underemployment, poverty and destitution, is placing major strains on the capacity of mutual support networks. It is therefore questionable whether families and communities will continue to be strong enough to cater for all members of society, and it is likely that a growing proportion of the population will be excluded from these traditional forms of support.

Family and community networks are not a substitute for formal social security schemes but, together with such schemes, they constitute an important element of a comprehensive social protection strategy. Formal and informal support mechanisms can be mutually reinforcing. Formal schemes can step in when major contingencies occur that would overstretch self-help capacities, while at the same time strengthening such capacities. A combined approach can therefore provide a basis for social protection that takes into account needs and capacities. A well-balanced approach would offer social security transfers and services to those who are in need, but would take care not to disrupt existing support networks. For example, the provision of childcare should not deprive older persons of their role in caring for young children, but it could integrate them in the provision of these services (Apt, 2002). This is an example of an innovative approach to building social protection in low-income and middle-income countries that is both economically and socially sustainable.

Concerns about the sustainability of old-age pensions and health care schemes in industrialized countries should not discourage the further development of social security in low-income and middle-income countries. Using the policy experiences of other countries with similar levels of socio-economic development, LICs and MICs should develop and implement social security policies appropriate to their national specificities. Even if the possible policy options remain limited, it is increasingly accepted that successful economic development requires the development of a viable social security system.[2]

*Assessing the coverage gap*[3]

Among the specific issues relating to developing countries outlined above, the one that gives rise to most concern is the very low access to social security their populations have. Indeed, at the start of the twenty-first century, less than 25 per cent of the world's population has access to adequate social security coverage, and no more than half of the population benefits from some form of social protection (Van Ginneken, 2003). A close connection can be found between a country's level of economic development and social security coverage. While, at one extreme, OECD countries have near-universal coverage of

around 90 per cent of the population, at the other extreme, in sub-Saharan Africa and South Asia, coverage commonly extends to less than 10 per cent of the population.

Further analysis shows a relationship between the level of social security coverage and per capita GDP, the proportion of people employed in the agricultural sector, the percentage of the economically active workforce who is self-employed, and the estimated percentage of GDP generated in the informal sector. A relationship between the level of social security coverage and whether the social security system is national, or comprised of sector- or occupation-based schemes can be observed as well.

It can be said that coverage is generally lower in those countries where demographic ageing is not yet an issue, typically LICs. In this sense, such countries arguably have a window of opportunity to improve social security today, while it is more financially viable to do so. In these countries, challenged by health and disease problems, improving social security coverage today is perhaps an essential foundation for improving economic productivity, which in turn can ensure sustainable social protection in the future. Extension of social security coverage is therefore a vital issue for developing countries both today, and with an eye to demographic changes ahead.

If coverage is defined in terms of being in receipt of an old-age pension, a study by the International Labour Organisation (ILO, 2000) shows that large proportions of the population in many regions of the world do not enjoy any social protection, or have only very limited coverage. While in industrialized countries coverage ranges from around 70 per cent (e.g., United Kingdom) to almost 100 per cent (e.g., Finland), coverage in MICs is estimated to vary between 17 per cent (e.g., Mexico) and 88 per cent (e.g., Czech Republic). In LICs, estimates of coverage range from 4 per cent (e.g., Thailand) to 47 per cent (e.g., Morocco).

If coverage is based on whether people of working age currently contribute to pension schemes or are covered by a residence-based or universal scheme, an average of 84 per cent of the current working age population in industrialized countries can be regarded as covered by a state pension. In MICs, approximately half of future recipients were covered. In LICs, an average 12 per cent of people of working age were contributors to pension schemes of any kind.

While the figures presented for the first two groups of countries show the proportion of people who are covered by the main national pension scheme, they do not show all those who are in receipt of a retirement benefit of one type or another. Each of these countries relies upon a mix of some or all of statutory contributory, non-contributory, non-contributory means-tested and private schemes to provide income security in old age. Ideally, coverage would have been broadly defined in order to include receipt of any eligible benefit for a specific risk. The requirement to work with published data, however, meant that it was not possible to assess the number of people who were actually in receipt of any one of these benefits. Simply summing the numbers in receipt of each benefit for a given risk would be subject to multiple counting of people.

If survivor benefits, occupational and private pensions and means-tested social assistance are taken into account, it is estimated that each of the industrialized countries provides social security in old age for over 95 per cent of the population. In many of the MICs, it is likely that most people are covered for old-age pensions if survivor benefits and social assistance are included. However, in all countries, nominally high coverage rates under non-contributory means-tested schemes may disguise actual take-up.

Describing the recent trends in coverage is difficult, due to the diversity of situations. For instance, coverage by social insurance may be declining in countries such as the Czech Republic and Hungary, while coverage for old age in both Mexico and Uruguay either stagnated or declined during the middle and second half of the 1990s. By the end of the decade, coverage in Mexico had returned to the level it

had been prior to the 1995 economic crisis. However, while Uruguay still had one of the two highest pension coverage rates in Latin America, there was a downward trend in coverage between 1999 and 2001, while non-compliance steadily rose between 1996 and 2000.

## Key characteristics of excluded groups

Exclusion is "non-random". There are, across countries, systematic similarities in who are least likely to be covered by social security: women, migrants, and agricultural and urban informal sector workers. These groups are unprotected largely because of the interface between their labour market position and the role and design of contributory schemes, which lie at the heart of most countries' social security systems. These findings have important implications for the design of policies to extend coverage of social security.

### The agricultural and urban informal sectors

The agricultural and the urban informal sectors present particularly acute challenges to those seeking to extend coverage of social security. Nearly half of the world's labour force is employed in agriculture, while over the past two decades, globalization and structural adjustment have increased employment in the informal sector in all regions of the world (Charmes, 2000).

Even where agricultural and informal urban sector workers have rights and entitlements to social security, low educational qualifications and lack of trade unionism may prevent some groups from accessing their rights. Many informal sector employers avoid paying contributions for their employees, while in many LICs, the State does not have effective institutional mechanisms to detect, affiliate and collect contributions from self-employed, micro-enterprise and informal sector workers.

Where schemes are available on a voluntary basis, the proportion of those who join is often very low. This may be because many workers in the agricultural and urban informal sectors have immediate needs for food, shelter and clothing and may be unable or unwilling to set aside a relatively high proportion of their current incomes to meet future needs. Many may lack coverage because of fluctuations in their incomes. The absence of a contributing employer may also reduce the incentive of self-employed workers to contribute.

### Women

Coverage for old-age pensions has an important gender dimension. Only in universal schemes are retired women as likely to receive a pension as men. A partial explanation for the high coverage rates for women in some countries may lie with contribution credits granted in those countries to people who are temporarily outside the workforce. In most MICs, men were about one-third as likely to receive an old-age pension as women, whereas in industrialized countries, men were about one-quarter again as likely as women to receive a pension. Amongst LICs in the few cases where male and female figures were available separately, men were almost four times more likely to receive a pension than women. Public pension systems have been designed with an expectation that men would be the primary economic providers: "despite their larger numbers, women receive less old-age support from public programmes than men do because they are less likely to have been in the formal labour force. Pensions for women are in effect linked to the contributions of husbands." (UNFPA, 2000, p.44).

### Migrants

Another group of people who may be disproportionately represented among informal workers are migrants. In some cases, migrants may not be legal residents and consequently may not have any

entitlement to benefits. Moreover, many countries have nationality or residence conditions attached to at least some old-age pensions or health-care services that may exclude migrants who are legally resident. Those who are not excluded by nationality and residence conditions may have work histories that do not conform to the long-term formal sector employee model and may not have paid sufficient contributions to build up an entitlement to a full pension. Migrants may be discriminated against and may also be reluctant to assert their rights.

*Policies to extend coverage*

Policymakers tasked with extending the scope of coverage must decide which programmes or combination of programmes are likely to best meet the aim of providing social security for all parts of society and foster institutions at the national, local and community level that are able to deliver the selected benefits and services.

*Choice of programme*

While contributory systems may provide a high level of protection for members, they are exclusive and not open to outsiders. Our findings show that the contributory social insurance model developed in Europe, based on employment status where individuals have an earnings and employment record, has proven to be ineffective in extending social security beyond the urban elites in LICs and some MICs where agriculture remains labour intensive and the urban economy is largely informal.

Indeed, as contributory schemes have a strong connection with the labour market and are intended primarily for people with secure, long-term jobs in the formal economy, they are not entirely suitable or relevant to developing countries, where a majority of the people have little or no capacity to contribute to a pension scheme. They fail, especially, to cover the poorest sections of society that may need social security most. As an ILO (2000) report states: "In many developing countries, the proportion of the labour force in formal sector employment is small and, recently, has even fallen, partly as a result of structural adjustment programmes. If they opt for social security coverage, the self-employed and those with no easily identifiable employer have to pay the full contribution themselves and, generally speaking, feel unable to afford this."

In addition, the administration of social security schemes in many developing countries has been so weak that satisfactory compliance rates have often not been achieved even among the limited groups of workers who should legally be covered by the scheme This has made governments, social security institutions and workers already covered by the schemes reluctant to support measures to extend coverage. Another factor that adds to this reluctance is the low contributory capacity of the workers outside the formal sector, which implies that they have to be supported with cross-subsidies.

These findings have important implications for the extension of social security coverage, suggesting that it will be necessary to move beyond conventional social insurance to expand coverage to groups that are currently unprotected. Options to extend social security coverage to unprotected groups include:

- Tighten the link between benefits and contributions

The direction of policy in some countries, especially in industrialized countries, has recently seen a tighter link between benefits and contributions as they introduce multi-pillar systems with a large defined-contribution component (see box 1), usually accompanied by a modest redistributive public pillar. It is argued that this tighter link is a precondition for financially sound expansion of coverage, ensuring that revenue covers obligations and so making the system more sustainable for those who are included (James, 1999; World Bank, 1994).

While proposals to increase the availability of second- and third-tier pensions may provide greater security and maintain high income levels in retirement for those in stable, formal employment situations, it is very unlikely that these policies will be more inclusive of groups who are currently legally or de facto outside the scope of existing provisions. Indeed, where such schemes are expanded at the expense of basic state pensions, they may even increase the number of people who are without social security coverage.

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BOX 1. THE THREE PENSION PILLARS

Pension pillars can be defined in different ways, trying to capture the key dimensions in the design of national pension systems. The following elements are important in describing pension systems:

- Coverage: is it universal?
- Participation: is it mandatory or voluntary?
- Contributions: where is the system within the spectrum moving from a general revenue-financed (perhaps means-tested) benefit, to some form of earnings-based formula –defined benefit scheme, ending with a pure individual lifetime account scheme, called defined contribution?
- Benefits: to what extent do benefits (annuities) reflect the life expectancy of the retiree at retirement?
- Funding: to what extent do assets cover future liabilities?
- Management/ownership/governance: is it public, private or some mix?

In 1994, the World Bank on an influential report titled Averting the Old-Age Crisis   defines the three pillars in this way:

*Basic pension*: the first pillar is an anti-poverty pillar that is non-contributory and guarantees a minimum income in old age. It is intended to protect the elderly from absolute poverty.

*Forced savings*: the second pillar is a forced savings pillar that provides benefits only to contributors, and, in general, provides the most benefits to those who contribute most.

*Voluntary savings*: the third pillar is available to anyone who cares to supplement the retirement income provided by the first two pillars.

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- Modify the contributory principle

The findings show that contributory insurance schemes, in their current form, do not work for large sections of the population in many countries. As previously stated, these systems limit the number of covered people. Open to the formal-sector workers, they do not normally cover people who do not earn an income from work. Furthermore, people who do have incomes from work but are outside the formal sector are typically not able or willing to contribute a relatively high percentage of their incomes to finance social security benefits that do not meet their immediate priority needs. Therefore, many groups of people remain unprotected because of their position in the labour market, and many people reach old age with no pension entitlements, including almost all of those who have been poor during their working lives.

Coverage of contributory schemes could be extended to groups who are presently excluded by reducing contribution rates that are unaffordable to many people with low incomes, and amending

entitlement conditions to take into account the particular circumstances of selected groups such as the self-employed and domestic servants, women and migrants. Policies likely to improve pension coverage for women will modify contribution requirements and ensure that schemes provide adequately for survivors. For migrants, the contributory principle could be modified similarly to provisions that have been considered for women, for example, to allow migrants to select "best years" contributions. This option requires contributors or the State to subsidise previous non-contributors and requires them to be perceived as legitimate claimants by contributors and/or taxpayers. Hence, it may be more difficult to extend this approach to groups that are often perceived as "outsiders", such as migrants.

- Move beyond the contributory principle

Another option, which may be combined with either of the two previous options, is to introduce a tax-financed safety net to help cover the gaps that arise in a contributory scheme. It has been suggested that the Australian means-tested system (see box 2) provides a model for countries that cannot afford or do not wish to go down the social insurance route.

However, there is evidence from several countries that means-tested social assistance does not always reach the intended population and nominally high coverage rates under non-contributory means-tested schemes may disguise actual take-up.

Non-take-up refers to the fact that some social benefits are available but not used by eligible recipients. In policy debates, this is generally not considered to be a serious issue. This comes from the presumption that only very few people entitled to social benefits will fail to receive them because people will seek their profit and will not intentionally renounce a financial gain. Nevertheless, many studies show that only in a few rather specific cases are non-take-up rates less than 20 per cent (Nicaise, 2001). The reasons for non-take-up appear to be many and varied, such as personal choices, lack of knowledge, administrative complexity, and fear of being stigmatised in case of claiming means-tested benefits. Non-take up of means-tested benefits may exclude more women than men.

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BOX 2. AUSTRALIA'S PENSION PILLARS – KEY CHARACTERISTICS

Unlike most other high-income countries, Australia has never had an earnings-related social insurance pension system. Its social security retirement income system combines two components.

The first is known as the Age Pension, which is a flat-rate pension funded out of general government revenues, and which, although means-tested, is received by the majority of the nation's retirees. The age pension is about one third of average full-time earnings and serves primarily to guarantee a minimum standard of living.

The second component is a mandatory defined-contribution savings programme, called the *superannuation guarantee*. Since 1992, it has provided a second pillar for most people. It was introduced in part to reduce government expenditures for old-age pensions. Employers must participate in this scheme or pay charges that are larger than the contributions. Employees are not required to contribute but can make voluntary contributions for themselves and their spouses. As a result, the number of workers in occupational schemes has risen from 39 per cent in 1986 to over 90 per cent today.

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- Universal entitlement

For those seeking to close the coverage gap, universal non-contributory schemes are of major interest in principle because, by definition, they cover the whole target population and can therefore make a major impact on coverage rates. The entitlement is regardless of any assets, income and/or other pensions from defined contribution schemes. Every pensioner is entitled to the same amount, rich and poor alike. It is basically this feature that distinguishes the universal pension from the means-tested pension. The latter is selective and provides reduced benefits, or none at all, for those whose income or assets exceed a specified level. It is intended to keep costs down and reduce any "deadweight" that may have resulted from supporting those who already have sufficient individual resources. In practice, however, means-testing often does not produce the desired results because of high administrative costs and non-take up (ILO, 2000).

Contrary to the widespread view that LICs cannot afford universal pension schemes, examples from a number of LICs and MICs show that the provision of universal pensions are feasible and affordable (Barrientos, 2003). Universal pension schemes cost governments more but have a number of advantages worth considering. Unlike selective schemes, they do not discourage workers from contributing to social insurance and to private pension schemes, since these contributory benefits will not adversely affect their entitlement to the basic non-contributory pension. Furthermore, they are much more feasible from an administrative point of view, particularly in developing countries where it is often difficult to obtain reliable details about people's incomes and assets. In addition, they tend to receive political support from all sections of the community, as all will receive the benefit in old age. Generally speaking, they enjoy a high level of public confidence as, unlike selective schemes, they offer little opportunity for fraud or favouritism (ILO, 2000).

The role that such schemes can play in both rapidly extending social security coverage and alleviating poverty is gaining wider international interest. It is acknowledged that these schemes not only provide social security benefits especially to older people and, in some cases, also to the disabled but, the cash benefits have wide poverty-alleviating impacts for recipients' family members and dependants. Indeed, studies of several countries in sub-Saharan Africa and Latin America have concluded that non-contributory pension programmes can make a significant contribution to improving the well-being of older people, reducing poverty, and facilitating economic development basis (see box 3). For universal and means-tested non-contributory schemes as well, the key issue is how best to deliver and finance such schemes on a sustainable way.

*Administrative capacity and governance*

When considering policy options, the State's capacity for intervention is crucial. In industrialized countries and, to a varying degree, in MICs, the State has the institutional capacity to collect taxes and contributions, which provides the scope to extend existing public-based coverage to excluded groups.

However, in LICs, the State's capacity to collect taxes and contributions and to deliver benefits and services is much smaller. From this perspective universal benefits and services may be the most realistic choice of policy instrument for extending coverage, as these require far less administrative machinery than contributory or means-tested benefits and services. Nevertheless, whatever the choice of programme, it will be necessary for LICs and some MICs to build the capacity and commitment of the State to gather taxes and contributions and deliver benefits and services to the target populations.

BOX 3. NON-CONTRIBUTORY OLD-AGE PENSION SCHEMES IN SELECTED COUNTRIES

*Universal schemes*

*Namibia:* Old-age pension schemes in Namibia were inherited from the colonial South African regime at the time of independence in 1990. The National Pension Scheme (NPS) – otherwise known as the Universal Pension Scheme – is a social pension, which provides a flat-rate benefit, non-contributory and non-taxable. During the apartheid years, the system was characterised by extreme inequalities. White Namibians received substantially higher social pension payments than blacks. After the country's transition to democracy in the 1990s, the government brought about harmony and alleviated these racial discriminatory practices and put all beneficiaries as equals. Currently, everyone who is a Namibian citizen residing in Namibia and is above the age of 60 years is entitled to the old-age pension. This entitlement is regardless of any assets, income and other pensions from defined contribution schemes. According to studies, the social pension affects its recipients, their families and local communities in a variety of ways including contribution to household incomes, poverty reduction and food security, and education of grandchildren.

*Mauritius:* Since the mid-1970s, Mauritius has had a dual universal and social-insurance pension. Every elderly resident of Mauritius receives income support from a system of non-contributory pensions, subject to a minimum residency requirement (12 years from age 18 for citizens; 15 years from age 40 for non-citizens). The scheme dates from 1950 and became universal in 1958, following abolition of a means-test. In the fiscal year 2002-2003, the amount of the pension was Rs 1,700 (US$58). Moreover, a generous pension is provided to all residents over the age of 90 and 100 years. Those who are disabled receive additional benefits. These basic pensions are not income-tested. However, they are taxable as ordinary income. Hence, those who continue to work or have other sources of income, return some of their pension to the government in the form of tax. Contributory pensions began to operate only in 1978. Participation is mandatory for workers older than 18 years of age, with the exception of employees with very low earnings, the self-employed, and public sector employees.

*Bolivia:* In 1996, Bolivia established the Bono Solidario (BONOSOL), a universal pension programme providing a cash transfer to all Bolivians over 65 years of age. Created as part of the ambitious social and economic reforms implemented by the Government of Bolivia during the mid-1990s, the Bonosol pension programme was conceived with three primary objectives. First, it was a mechanism for returning the equity held in Bolivia's recently "capitalized" state enterprises to the Bolivian people. Second, it would serve to cover the large majority of elderly people with no access to the old pension system. Third, it was intended to help reduce poverty by targeting a particularly poor and vulnerable segment of the population. Instead of being funded through the budget, the base pension is financed through the country's 50 per cent ownership in partially privatized state-owned enterprises. The BONOSOL was first paid in May 1997 in the amount of US$248. Between 1998 and 2000, the transfer programme was suspended while a new administration debated the viability and use of the programme's resources. The BONOSOL payment was reinstituted in 2001 and 2002. Even though the BONOSOL is open to all Bolivians over 65 years of age, the benefits it pays out are primarily tailored to the rural regions of Bolivia, where 99 per cent of all elderly people currently live below the poverty line. The BONOSOL programme may be seen as an innovative, potentially important instrument for alleviating old-age poverty in a country which is marked by extreme inequalities and social exclusion.

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*Means-tested schemes*

*South Africa:* The pension is a means-tested benefit granted to women from age 60 and men from age 65. The programme began in the early 1900s as a means of providing a basic income in retirement for whites and coloureds who lacked an occupational pension (van der Berg, 2001). Subsequently, the programme was extended to blacks (1944), but with more stringent conditions for entitlement and lower benefit levels. After the fall of apartheid, parity in the provision of the social pension was instituted, at a lower level than that previously enjoyed by the whites. Blacks are now the main beneficiaries. The scheme is funded through general taxation and pays relatively generous pensions (around $3 per day). Benefit entitlements are means- tested on the income of the individual beneficiary, and his/her partner if married, but not on the income of other household members. The benefit produces a significant redistribution of income in a country where, on average, the incomes of whites remain ten times that of Africans.

*Brazil:* In Brazil, non-contributory pensions serve mainly to complement contributory pensions, benefiting primarily those who, particularly in rural areas, have not contributed to social security during their active lives. Social security benefits equivalent to the minimum wage are paid out to rural workers from the age of 60 (men) and 55 (women), on condition that they can prove at least 10 years of rural activities (whether or not they have previously contributed to the system). The rural old-age pension is very important in that it ensures a minimum retirement income to those who have worked in family agriculture, restoring the elderly to the status of assets, instead of the liabilities they had come to be to their families in the past. In March 2001, 6.5 million rural benefits were granted (33 per cent of the total), which represents an annual expenditure of about 1 per cent of GDP. The urban non-contributory old-age benefits are much less common and less developed. This is because, firstly, the urban population has much better access to government contributory mechanisms than does the rural population and, secondly the conditions of entitlement are more stringent in urban than in rural areas. The maximum family income requirement is very low and the minimum age of entitlement high (67 years or older).

It may be particularly difficult to deliver health care services to isolated rural areas due to low population density and dispersion, lack of infrastructure and medical professionals, illiteracy, language and ethnic barriers, cultural prejudices against modern medicine, and lack of trust of the user in the quality of the services available. Good governance is crucial to the effective and efficient use of resources and to gain confidence in the credibility and integrity of the programme. There are examples of good practice within MICs. For example, specific strategies of reforms in Costa Rica include improving governance by increasing the participation of the community in decisions about health policy at the local level, while at the same time lowering the cost of providing basic health care services by improving the coordination of relevant agencies.[4]

## *Options for the future* [5]

If the policy aim is to extend social security to all parts of society, then policymakers must decide which programmes or combination of programmes are likely to best meet this objective. The direction of policy in some countries is to replace social security programmes that exhibit a redistributive element with programmes having direct equivalence between individual contributions and benefits. If the policy aim is to extend coverage, it is very unlikely that this route will be successful. Our findings suggest a link between funding method and coverage. Coverage appears to increase the further the scheme moves away from a direct equivalence between individual contributions and benefits and towards a social security scheme that redistributes resources.

The relationship between redistribution and coverage is perhaps not surprising. While schemes that are based on equivalence between individual contributions and benefits can provide security in old age and sickness for "insiders", they are closed to those who may need social security the most. In many cases, it is not feasible to bring the excluded within the scope of contributory benefits. Providing adequate social protection for these groups will necessitate a complete or partial decoupling of contributions and benefits and a redistribution of resources.

In some parts of the world, the coincidence of limited financial resources with large-scale need conspires against implementing an effective universal social security system. In the general and likely continuing absence of universal solutions, especially in lower-income developing countries, the short- to medium-term task at hand appears to be one of examining all possible avenues for building creative organizational linkages between existing contributory and non-contributory social security programmes and other forms of voluntary social protection to increasingly provide at least a basic degree of security. In the longer term, and labour market conditions permitting, the policy objective must remain one of significantly increasing the numbers of people covered by, and guaranteeing the right to benefits under, mandatory social security. To this end, all efforts that aim to promote more stable and more secure patterns of employment globally should be encouraged.  By raising productivity, the improvement of employment prospects will also help to secure the sustainability of social security in the longer term.

Is this a feasible route for low- and middle-income countries in today's global economy? Heater (1990) argues that the growing economic and monetary interdependence of the world undermines any argument for operating a policy of distributive justice within the strict confines of the nation State:

> "If economic mechanisms are transnational, so too should be economic justice."

The key political challenge that closing the coverage gap poses is to secure legitimacy at both the national and the global level for the sharing of risks and redistribution of resources so that a commitment can be made to providing and maintaining social security for all, not just a few. One such example is the Global Social Trust Initiative suggested by the ILO (Cichon, 2003).

D. CONCLUDING REMARKS

Population ageing will unquestionably be one of the key factors shaping social and economic development across the world over the next few decades. Each society will need to find a viable adjustment strategy. The Second World Assembly on Ageing, held in Madrid in 2002, underscored the active role that older people can play in society. Active ageing is increasingly portrayed as a promising model for the future. This idea acknowledges the contribution that senior citizens make to society and promotes their active involvement in all areas.

The World Health Organization (WHO) defines active ageing as:

> "The process of optimizing opportunities for physical, social and
> mental well-being throughout the life course, in order to extend
> healthy life expectancy, productivity and quality of life in older
> age."

One of the cornerstones of active ageing is employment, in the broadest sense of the term. In other words, active ageing includes unpaid activities, community work, helping to raise children, involvement in charities, etc. Active ageing has a direct impact on an individual's health and physical and mental well-being. The strategy is mainly geared towards social integration, but also seeks to foster autonomy, dignity and freedom. It is worth noting that active ageing is relevant for all age brackets, not just older citizens.

Increased life expectancy will become the hallmark of our societies in coming years, often in conjunction with the economic development of countries. In "long-life societies", people will switch between paid employment and voluntary work throughout their lives and will be more active in old age than previous generations.

Social security should be an integral component of any active ageing strategy to ensure an adequate standard of living for all those unable to earn an income, owing to age, disability, poor health or other constraints. Pension levels should be ample and stable enough to enable older people to live out their final years free from financial worries. That is a prerequisite, if they are to remain in employment or active and useful to society. However, it is equally important that older people be fully integrated into society, enjoy the same rights as other citizens, and have access to health services and high-quality, long-term care. In this connection, there is some doubt as to whether the current trend towards greater individual responsibility, in particular shifting cost to the individual, will guarantee a sufficient degree of social protection to provide the standard of living required for a full, active and socially useful old age.

A long-life society must cater to young and old alike. Population ageing makes it more important than ever to provide families with decent conditions in which to raise and educate their children. More specifically, families should be guaranteed the financial resources needed to shield them from poverty and give them access to education, health-care, and childcare facilities. Economic globalization makes spending on education an even more crucial investment for a country's competitiveness and productivity over the coming years.

Education should increasingly be perceived as an investment, in both country's economy, since it improves workforce qualifications, and its citizens, who earn a decent wage and are ultimately able to secure better social protection. Education should be a permanent feature of a long-life society, enabling people of all ages to remain fully fit for work and, in due course, be more active and autonomous in old age.

The real quest over the next few years will be to devise an integrated strategy to tackle impending social and demographic changes. The strategy needs to be based on a realistic assessment of the situation. Population ageing affects a wide range of policy areas, including the labour market, economy, education, social security, and health. These areas are generally managed by a variety of stakeholders reporting to different ministries, which are guided by their own specific rationale. For example, many countries have introduced policies enabling employers to encourage early retirement as a way of reducing staff levels. However, early retirement undermines efforts to curb pension spending. An integrated strategy would seek to avoid such inconsistencies and foster a coherent, efficient approach in the future.

Social security institutions might find it even more difficult to achieve an integrated approach. A range of different funds and government departments are often involved in areas such as old-age, disability, unemployment and family, making it hard to ensure a coordinated or coherent attitude towards the people concerned. A number of trials involving "one-stop-shops" and using current information technology resources prove that some degree of integration is possible and very much in the interests of both scheme members and other social security beneficiaries.

Societies have proven their remarkable ability to adjust to change, and there is no reason why they should not do likewise in respect of population ageing. Adjustment could be made easier by focusing on policies to bolster employment and productivity, with due regard for the needs of all population groups. Only in this way can we guarantee citizens of all ages a just and fair society.

NOTES

[1] The term *atypical employment* is commonly used to refer to a large and growing area of relatively new types of employment, including jobs which are not permanent and/or not full-time such as part-time and fixed-term work, temporary-agency work, working from home, tele-work, "on call" work, seasonal work, student jobs, subcontracted work and the "pseudo-self-employment" of workers who are, in practice, bound to a single employer.

[2] This is the case, for example, in many South-Eastern Asian countries.  See Gough, 2002.

[3] This section is based on a study commissioned by ISSA and reflected in Roberts and others, 2004.

[4] See http://info.worldbank.org/etools/docs/reducingpoverty/case/27/summary/CostaRica-El-Salvador%20Summary.pdf.

[5] For more detailed proposals, see McKinnon, 2005.

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# POPULATION AGEING AND SOCIAL PROTECTION SYSTEMS
# IN LATIN AMERICA


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Of all the world's regions, Latin America has the most unequal pattern of income distribution. This fact is reflected in many socio-economic phenomena, including demographic changes and social protection systems. Thus, social protection should, in theory, be adapted not only to the region's changing age structure, but also to the changes observed in the labour market and the economy as a whole. Moreover, institutions and their evolution play a significant role in determining how these systems will actually perform and how well they can adapt to new circumstances.

Socio-economic insecurity is one of the most worrisome features of daily life for Latin Americans. This circumstance affects people in all social strata, but especially those living in poverty or working in the informal economy. The core problem with social protection systems in the region is that their coverage is low in terms of the number of workers and dependants included in protection schemes and programmes, on the one hand, and the range of contingencies covered and the quality of the protection provided, on the other. This situation stems from multiple and closely interrelated causes.

Approximately two out of every three people in the region do not have access to basic, high-quality coverage for the most common social risks, such as illness or loss of income due to old age, disability, survivorship or unemployment. Generally speaking, access to certain old-age benefits – retirement and other pensions – is broader. At least one out of every two older persons[1] receives old-age benefits, but this statistic reflects the experience of only a small group of countries. A simple average for all the countries of the region indicates that one out of every three older persons has access to old-age benefits. While older persons have higher rates of coverage than the rest of the population, they are also exposed to certain risks that are harder to cope with financially: those that create a need for health-care services. In addition, recipients of old-age benefits are generally among those individuals who have enjoyed the most advantageous position in the labour market, since access to pension systems is largely based on contribution levels. Demographic changes have played a key role in imposing new financial constraints and redefining traditional sources of protection: the family, the market and the State.

The growth of the over-60 population will speed up in the coming decades, producing an increase in old-age indices and old-age dependency ratios. This raises important questions about the social protection models that countries should adopt and about how they should finance these systems.

This paper is intended to provide a stylized summary of some of the principal trends observed in these factors in Latin America, highlighting their interactions and possible effects, as well as the main public policy challenges for the coming years. Adaptations in Latin America's social protection systems have generally lagged behind social and labour-market changes. Shortening this delay in the adaptation process is crucial for optimizing the use of the social resources set aside for protecting against social risks, thereby enhancing social welfare, particularly in the context of the demographic changes that the region will undergo in the next few decades.

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The paper is structured as follows. First, the principal demographic trends in Latin America are summarized and their chief implications for social protection systems are highlighted. Second, the characteristics and problems of these systems in Latin America are summarized, without losing sight of the major differences observed between different groups of countries, which reflect their varying degrees of socio-economic development. Third, the discussion focuses on one of the most important areas of social protection reform: retirement and pension systems. Lastly, the primary challenges are examined in the light of demographic trends and the current context of social protection systems: the need to restructure the social protection model, taking into account financing issues and the increasing role of non-contributory programmes; the feminization of the older population and the gender dimension in relation to pension systems; and the labour market for older persons.

A. DEMOGRAPHIC TRENDS IN LATIN AMERICA AND THEIR IMPLICATIONS

According to the estimates of population trends in Latin America by the United Nations (2005) and the Economic Commission for Latin America and the Caribbean (ECLAC, 2004), the region is now at a stage of declining fertility, which was preceded by a decrease in the mortality rate. The fertility rate fell sharply in the 1970s, while the mortality rate has been declining since the first half of the twentieth century. Since the 1960s, Latin America's under-15 population and total population have grown more slowly, resulting in a decrease in the ratio between the under-15 population and the working-age (15 to 64 year-old) population.

Today, the region is experiencing a pronounced slowdown in the growth of the working-age population and a relative increase in the over-15 population. The number of children and youths under-15 per working-age person has continued to decline, while the number of older persons per working-age person has begun to increase, slowly at first but later much more rapidly.

In absolute terms, the region's over-60 population will expand from 42.3 million to 100.7 million between 2000 and 2025. This growth will speed up between 2025 and 2050 during which time this age group is expected to increase by a further 88 million, bringing the number of older persons in the region to 188.3 million. This group's five-year growth rate, which stood at 3.2 per cent in 1995-2000, will increase to 3.7 per cent in 2020-2025; this contrasts with the five-year growth rates of 1.6 per cent and 0.9 per cent, respectively, for the total population during these periods. Accordingly, the proportion of older persons out of the total population, which was 8.1 per cent in 2000, will reach 14.5 per cent by 2025 and 24.1 per cent by 2050. In other words, by 2050, one out of every four Latin Americans will be an older adult. Consequently, the population's median age will rise by 15 years between 2000 and 2050, with the result that, by 2050, half the population will be over the age of 40.

The most striking aspect of this overall process of change in the age structure and acceleration of the ageing of the region's population is the wide variation observed across different countries. On the basis of the region's current ageing profile, ECLAC (2004) has grouped the countries into four categories.[2] This makes it possible to analyse demographic variables in conjunction with other social and institutional variables that affect the performance of social protection systems.

The first group of countries is the one with advanced population ageing. Argentina, Chile, Cuba and Uruguay are in this group, together with a number of Caribbean islands, such as Barbados, Guadeloupe, Martinique, Netherlands Antilles, Puerto Rico and the Virgin Islands, which are not considered in this paper. In these countries, the proportion of older persons exceeds 10 per cent.

The second group consists of countries with moderate to advanced population ageing, where the proportion of older persons now ranges from 8 per cent to 10 per cent. In these countries, the proportion

of older persons will increase rapidly (to between 25 per cent and 30 per cent) in the coming years. Brazil is the only country in the region that fits this description.

The third group consists of countries with moderate population ageing. In these countries, the percentage of people aged 60 or over now ranges from 6 per cent to 8 per cent and is expected to exceed 20 per cent by 2050. The countries in this group are Venezuela, Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Panama and Peru.

Lastly, the group of countries with incipient population ageing consists of the Dominican Republic, Guatemala, Haiti, Honduras, Nicaragua and Paraguay. In these countries, older persons account for a relatively small percentage of the total population (between 5 per cent and 7 per cent), and this percentage is expected to increase to no more than 15 per cent to 20 per cent by 2050. The population ageing process in these countries could speed up in the coming years if the trend towards lower fertility rates intensified.

What are the most significant implications of these demographic changes for the Latin American countries? Without attempting to draw up an exhaustive list, it may be mentioned that, in the area of public policymaking, and especially the allocation of public resources, social policy priorities and objectives will have to be redefined. This is particularly important in that other population groups, such as children and adolescents, are more vulnerable to poverty and extreme poverty. Another consideration is related to the way in which social insurance is provided – that is, the way in which social risks are "pooled" – and to patterns of intra- and intergenerational transfers, especially those triggered by retirement and pension systems. Moreover, the population ageing process will coincide with other socio-demographic changes related to the increase in women's labour-force participation and to the various kinds of family arrangements and adjustments that have resulted from the higher incidence of separation and divorce over the life cycle.

Another important consideration is the speed at which the ageing process is progressing. As noted earlier, the over-60 is the fastest-growing population group in the region. Even more important, however, is the speed of the shift in the age structure. A process that has taken six to ten decades in the developed countries is occurring in two or three decades in Latin America (Bravo, 2000). This means that the countries of the region will have to move even faster than the developed countries in adapting their social protection systems.

## B. CHARACTERISTICS AND PROBLEMS OF SOCIAL PROTECTION SYSTEMS

Protection for older persons should be provided by way of schemes and programmes that are more or less integrated into a wider social protection system. However, most Latin American countries do not have a protection "system" as such; rather, they have an assortment of schemes and programmes which, because they were established at different times and for different purposes, tends to be poorly coordinated. This paper will outline the principal characteristics and problems of social protection systems in general, and then focus on income protection programmes for older persons, particularly retirement and pension systems.

The concepts of social security and, more recently, social protection are constantly evolving and can be interpreted in a number of different ways. The traditional concept of social security includes any regime or programme based on legislation or any other statutory obligation which guarantees protection, through the provision of benefits in cash or in kind, in the event of work accidents, occupational diseases, unemployment, maternity, illness, disability, old age, retirement, survivorship or death, and encompasses, inter alia, benefits for children and other family members and benefits for the purposes of health care, prevention, rehabilitation and long-term care. The term may include social insurance, social assistance, mutual benefit schemes, social insurance funds and other special regimes. The concept of social

protection is even more comprehensive, as it refers to the whole spectrum of actions taken by public and private entities to help households and individuals cope with a series of life contingencies or risks (Cichon and others, 2004). Accordingly, this definition reflects the modern view of social protection based on three pillars: (i) access to basic goods and services; (ii) protection and prevention; and (iii) promotion of opportunities.

In practice, the social protection systems currently in place in the various countries of the region, regardless of per capita income, consist of a mix of non-contributory and contributory schemes and programmes. Social protection models and their performance reflect the particular way in which their components have been developed over the years, as well as the prevailing institutional framework, which, in turn, is influenced by different political and organizational factors in different countries.

The biggest problem and challenge facing social protection systems, particularly in Latin America, is low coverage (ILO, 2002; Mesa-Lago, 2004) understood in terms of: (i) the percentage of the population – active and inactive alike – covered by these systems, and (ii) the depth or quality of the protection itself. From this standpoint, low coverage is not an isolated feature; it is bound up with a whole series of economic, institutional and political problems. Thus, the six main constraints and general problems (figure 1) and the associated challenges are as follows:

Figure 1. Constraints and problems in social protection systems
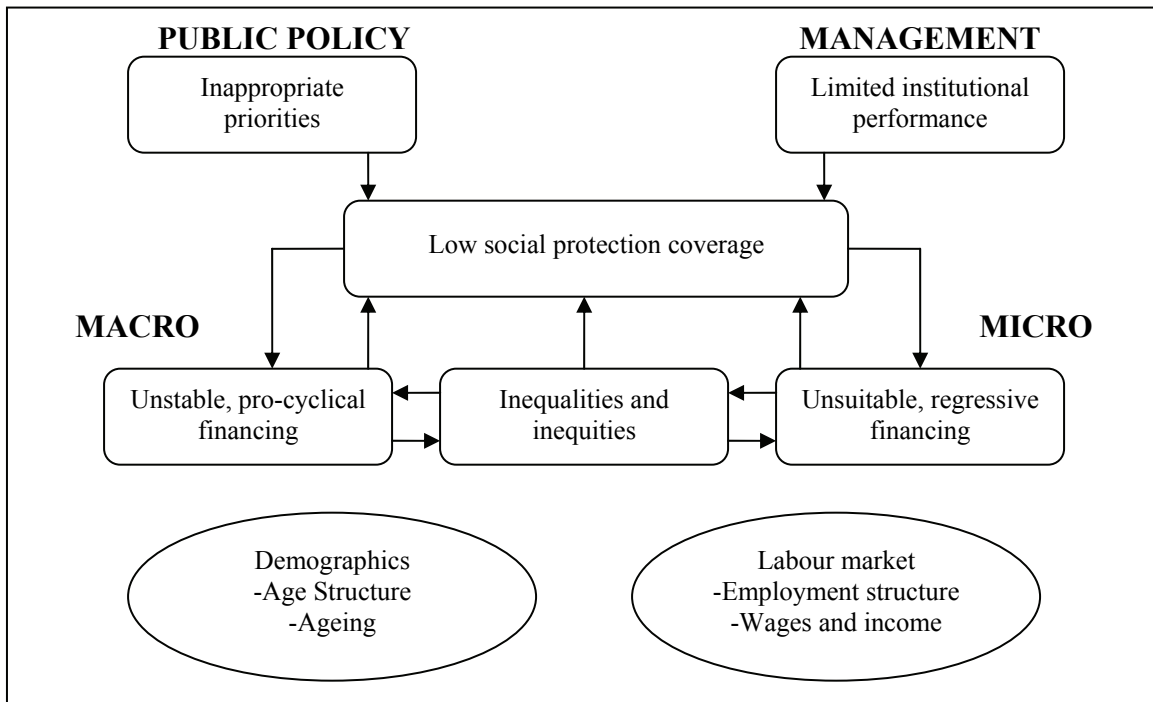


- *Low coverage*: In general, both the extent and the quality of coverage under the various social protection programmes are low. It can be said that there is a "protection paradox" in the sense that the least vulnerable population groups are the ones that have the most and best protection. This results from a variety of factors, but a major one is that workers with the highest-quality jobs, e.g. civil servants and employees of big companies, are the ones whose coverage is the most extensive and also of highest quality.

- *Inappropriate priorities*: The priority-setting process is deficient in determining the target populations and priority risks to be covered. One major challenge is to identify the most cost-effective social protection instruments and to generate or adapt instruments to take into account the heterogeneity of the labour market, the variety of employment arrangements, and the population structure.

- *Insufficient, unstable, pro-cyclical financing*: The social protection system is financially dependent on the macroeconomic cycle, with the result that revenue flows do not behave in accordance with the funding levels of benefit programmes; rather, the reverse is true. The challenge is to generate complementary, counter-cyclical financing mechanisms by means of a prudent fiscal policy and to increase the overall volume of resources allocated to social protection.

- *Unsuitable, regressive financing*: The current financing model for social protection is inappropriate to the region's social situation and labour markets and has a regressive effect on income distribution. The challenge is to change key parameters of the financing model for social protection so that it will promote, or at least not inhibit, job creation. The definition of these parameters is not neutral in terms of incentives for job creation. Basically, two financing mechanisms can be identified: payroll contributions and general taxes. In practice, these two "pure" mechanisms are used in combination and varying proportions by most countries of the region. Under the traditional Bismarckian scheme, which is still followed in many countries, payroll contribution is the main source of financing for social protection benefits. However, this mechanism must be used with care. Although the linkages between the level of contribution and the level of employment are not completely clear, it may be assumed that the correlation will, in general, be negative. Financing based on general taxes will have less impact on the labour market and its impact on efficiency and equity will depend on the particular design of a country's tax system. Because this type of financing is tax-based, it is generally pro-cyclical.

- *Limited institutional performance:* There are deficiencies in the organizational structure and functioning of the relevant institutions. The challenge is to strengthen these institutions with a view to optimizing the management of social protection. Here again, it is necessary to identify cost-effective ways to improve institutions.

- *Sharp inequalities and inequities*: Differences between individuals' work histories and access to social protection generate significant inequalities and inequities. Moreover, the problems outlined above tend to perpetuate – and sometimes exacerbate – situations of inequality. The challenge is to reduce inequalities and inequities in social protection systems by broadening coverage and standardizing programmes, using advocacy and cooperation to open a dialogue on reform, and eliminating regressive financing mechanisms.

Table 1 illustrates the magnitude of the problem by indicating the proportion of workers that contribute to social security and the proportion of the older adult population that receives a significant form of social security coverage, i.e. old-age benefits. Among other things, this table highlights the wide disparities between different countries in the region, which reflect their different social and labour-market situations. These coverage gaps, in turn, stem from the very significant problems caused by unequal eligibility criteria for access to benefits, together with the resulting inequalities and inequities. Levels of employer-provided coverage differ considerably between the population groups in the first and fifth household income quintiles. In some countries, this difference is extraordinarily wide. This situation, in turn, is reflected in disparities in access to social protection in old age. Some countries use non-contributory programmes to try to offset the biases in coverage that contributory

TABLE 1. LATIN AMERICA: RETIREMENT AND PENSION COVERAGE
*(Percentage)*

| Country | Employer-provided coverage | | | Indicator of inequality of coverage (QV/QI) | Coverage of older adult population |
|---|---|---|---|---|---|
| | Total | Quintile I | Quintile V | | |
| *Incipient ageing* [a] | | | | | |
| Dominican Republic (2003)............... | . . | . . | . . | . . | 10.9 |
| Guatemala (2000)........................... | 19.9 | 1.8 | 42.5 | 23.6 | 11.3 |
| Nicaragua (2001)........................... | 19.4 | 3.1 | 33.1 | 10.6 | 4.7 |
| Paraguay (2003)............................. | 13.9 | 0.1 | 38.7 | 387.0 | 19.6 |
| *Moderate ageing* | | | | | |
| Bolivia (2002)............................... | 10.9 | 0.5 | 36.4 | 72.8 | 14.7 |
| Colombia (1999)........................... | 26.9 | 3.2 | 59.5 | 18.6 | 18.6 |
| Costa Rica (2003)........................... | 63.4 | 22.9 | 83.2 | 3.6 | 36.6 |
| Ecuador (2004)............................... | 27.6 | 12.1 | 52.2 | 4.3 | 15.2 |
| El Salvador (2003)......................... | 31.8 | 6.7 | 63.2 | 9.4 | 14.5 |
| Mexico (2002)............................... | 28.4 | 1.4 | 53.1 | 37.9 | 19.2 |
| Peru (2003).................................... | 15.2 | 1.3 | 42.6 | 32.8 | 23.7 |
| Venezuela (2004)........................... | 36.8 | 5.4 | 57.1 | 10.6 | 23.9 |
| *Moderate to advanced ageing* | | | | | |
| Brazil (2002)................................. | 48.3 | 13.7 | 72.7 | 5.3 | 85.9 |
| *Advanced ageing* | | | | | |
| Argentina (2004)........................... | 39.4 | 2.1 | 66.7 | 31.8 | 68.3 |
| Chile (2003).................................. | 64.7 | 40.1 | 73.6 | 1.8 | 63.8 |
| Uruguay (2004).............................. | 57.3 | 13.7 | 78.9 | 5.8 | 87.1 |

*Source*: Prepared by the author on the basis of Rofman and Lucchetti (2005), Rofman (2005) and other sources.
[a] No data were available for Haiti or Honduras.

systems tend to exacerbate. However, the compensatory effect of these efforts is limited, and differences in the availability and quality of coverage are often only partially corrected. This issue will be examined in a subsequent section.

When the countries are classified according to their stage of population ageing, it becomes apparent that the levels of coverage – through employment and in the older adult population – are usually higher in countries where this process is more advanced. This implies that as the age of the population in a country gets older, higher priority in resource allocation is given to the economic security of older persons. It should be noted, however, that the "greyest" countries are generally the ones with the highest per capita income and that this is a major reason for their higher coverage levels, given that social protection is a superior good. In terms of equity, the "protection paradox" is clearly apparent in countries at the incipient stage of population ageing, since coverage is disproportionately greater in the highest-income quintile than in the lowest-income quintile. This situation explains why the formal protection systems in these countries have a credibility problem. The formal protection systems in these countries are seen as a luxury enjoyed by a privileged few.

Retirement and pension systems in Latin America have a long history and they vary widely in terms of their organization, financing, and performance. Demographic changes and the precarious fiscal situation in the countries of the region were compelling arguments for changing these programmes. As a result, this has probably been one of the most intensive and controversial areas of social policy reform in the past two decades.

Since 1981, at least ten Latin American countries have adopted structural reforms; that is, reforms that have not only changed the financing regime by introducing a fully or partially pre-funded (defined contribution) scheme, but have also involved private management of pension funds. All these reforms have also included or entailed reforms defined as parametric, meaning those designed to improve the systems' financial viability through changes in eligibility criteria (such as the retirement age) or financial parameters (such as contribution rates). Reforms in other countries have been non-structural, although they have introduced major changes which, like structural reforms, have required significant economic policy initiatives and negotiations among social stakeholders.

The countries that have implemented structural reforms are Chile (1981), Peru (1992), Colombia (1993), Argentina (1994), Uruguay (1996), Mexico (1997), El Salvador (1997), Bolivia (1998), Costa Rica (2000) and Dominican Republic (2003). Nicaragua (2000) and Ecuador (2001) have passed legislation introducing structural changes but have not implemented the reforms because of legal and administrative reasons. Among the countries with non-structural reforms, the most representative (and therefore most visible) case in the region has been Brazil, which introduced reforms for private-sector workers in 1999 and for public-sector workers in 2003-2004. Another country that implemented this type of reform is Panama, which in 2005 introduced non-structural changes, but the new legislation was submitted for further review. Colombia deepened certain aspects of its reform in 2003 and Peru made some additional changes in 2004. Accordingly, in recent years, the trend among the countries that have adopted reforms is to avoid wide-ranging structural reforms but rather, to pursue parametric reforms. In some cases, like those of Colombia and Peru, the reforms have been made by introducing a private component during the 1990s.

Structural reforms have mirrored many of the features of the 1981 Chilean reform. Another common denominator is that the reforms have reflected the dominant paradigm of the 1990s advocated by the World Bank (1994) in its proposal on multi-pillar systems. Despite these similarities, the specific characteristics of the reforms have varied widely from one Latin American country to another. For example, structural reforms have followed different paths. According to the typology put forward by Mesa-Lago (2004) in a number of studies, three models can be identified: substitutive, parallel and mixed. Under the substitutive model, a fully-funded (individual account) scheme completely replaces the defined-benefit, pay-as-you-go scheme. In other words, the contributions paid by workers entering the labour market are allocated in their entirety to the new fully-funded scheme. Under the parallel model, workers have a choice between contributing to a fully-funded scheme or to a publicly-managed defined-benefit, pay-as-you-go scheme. The mixed model is a combination of the other two models; its financing and benefit parameters have also been subject to reforms. Figure 2 summarizes this typology, which is consistent with the one proposed by Mesa-Lago. However, it includes, as a type of mixed model, the Argentine system, in which workers can opt to keep all their contributions in a defined-benefit scheme.

**Figure 2. Types of retirement and pension reform by allocation of contributions under the reformed system**

Allocation of mandatory retirement and pension contribution by type of system

| Fully funded | Pay-as-you-go (PAYG) | Fully funded | PAYG | Fully funded | Fully funded |
|---|---|---|---|---|---|
| | | | PAYG | | PAYG |
| • Bolivia<br>• Chile<br>• El Salvador<br>• Mexico<br>• Dominican Republic<br><br>All contributions go to fully-funded individual accounts. | • Colombia<br>• Peru<br><br><br>Workers can choose to pay into individual accounts or the pay-as-you-go system. | | • Argentina<br><br><br>Contributions go into a pay-as-you-go system that provides a basic pension. For the complementary pension, workers can choose between individual accounts or pay-as-you-go. | | • Costa Rica<br>• Uruguay<br><br><br>Contributions for the minimum pension go into a pay-as-you-go system; those for the complementary pension go only to individual accounts. |

Source: *Gill and others (2005).*

What do Latin America's pension systems look like in the wake of this reform process? An important point is that, although the reforms have radically changed many aspects of the social security systems' financing and organization, they have continued to assign a major role to public institutions, primarily in regulation and oversight as well as in management. In doing so, the reformed systems are of a mixed nature. For instance, in Chile, where the purest form of substitutive strategy has been adopted, the State has been involved not only with these functions but also with the administration of the old system during the transition period. Moreover, it plays a significant role in many of the system's components, particularly the provision of non-contributory benefits as well as basic or minimum benefit guarantees.

In a labour market with an occupational structure dominated by informal jobs and a large proportion of non-wage-earning workers, a contribution-based social security system generates wide disparities in coverage. However, these gaps have been partially closed through non-contributory programmes particularly in countries where social security systems are more highly developed as a result of their economic development and the history of their social institutions. The Latin American countries whose social security systems best exemplify this kind are the so-called social security pioneers in the region. These are Argentina, Brazil, Chile, Costa Rica and Uruguay (Mesa-Lago and Bertranou, 1998). Other countries, such as Colombia, have introduced such schemes more recently, while Bolivia has devised an innovative system of universal benefits for older persons known as Bonosol (World Bank, 2004).

Table 2 sums up certain features of the Latin American countries in terms of the stage of the population ageing process, level of coverage, type of pension system, and poverty rate of the over-60 population. This information indicates that, despite the pronounced trend towards social security "privatization" in the region, the dominant model incorporates a significant public-sector role. Accordingly, the systems have been grouped into four categories: mixed, mixed-private, mixed-parallel and public.

This section offers a brief discussion of some of the principal challenges that demographic changes pose for social protection systems. The three main issues covered are the need to restructure the social protection model; the feminization of the older population and the gender dimension in relation to retirement and pension systems; and the labour market for older persons.

*Need to restructure the social protection model*

The process of redefining the social protection model has two important and overlapping dimensions: financing, on the one hand, and eligibility criteria for coverage and benefits, on the other. The main task in the area of financing is to determine the mix of financing sources, which essentially consist of payroll contributions, taxes or a combination of the two. In the case of pension systems that have switched to a fully-funded regime, the rate of return on the accumulated funds also becomes important, but because these systems' financing is based primarily on payroll contributions, the returns depend not only on the amount of those contributions but also on the stage of the individual's work history at which they are paid. Another important consideration, which is related to the system's contributory or non-contributory nature, is whether beneficiaries are required to meet minimum standards in terms of the amount of time for which they have paid into the system or for which they have worked in jobs covered by social security, even if the level of contributions does not fully finance the programme.

*Financing*

The basic question in this regard is what the limits of contributory financing are in a context marked by certain special features. Wage employment has little room to grow in the region. Moreover, liberalization and globalization have curtailed the possibility of increasing payroll contributions, which are generally perceived as a labour cost that undermines the competitiveness of companies that produce internationally tradable goods. In addition, in many of the countries the wage bill as a proportion of gross domestic product (GDP) has remained relatively constant or has decreased. Thus, completely "genuine" sources of financing for contribution-based social security systems are limited. Owing to the difficulty of financing all outlays from contributions, social security systems have gradually incorporated tax-based financing. This move was prompted not only by internal and external labour-market constraints, but also by the weaknesses that were apparent in the systems prior to the reforms: loose eligibility requirements, deficient technical bases for the calculation of reserves and poor management of the investments that support them.

The current configuration of the region's social security systems evinces a strong trend towards contributory financing; that is, their financing and/or the eligibility criteria for receiving benefits are based on the contributions made by the individuals covered. However, the composition of this financing differs from one country to another and depends in part on the system's maturity and the type of reform implemented. The most mature systems in countries at an advanced stage of population ageing derive a sizeable share of their financing from general tax revenues. This is the case in Argentina and Uruguay, which have also pursued more aggressive policies of reducing employers' contributions and have therefore had to replace this source of revenue with taxes. Thus, the Latin American countries' social security systems are hard to compare because the composition of their sources of financing has been exogenously altered by the transition processes triggered by the reforms and the financing methods chosen.

The desired level of protection, in terms of both its extent (number of people covered) and quality (amount of benefits), is a parameter that must be considered with a view to setting contribution rates that balance commitments (outlays) with the resources needed to finance them. However, these theoretical

TABLE 2. LATIN AMERICA: SOCIO-DEMOGRAPHIC AND SOCIAL SECURITY PROFILE

| Stage of the population ageing process | Country | *Socio-economic and institutional characteristics* | | | |
|---|---|---|---|---|---|
| | | Pension coverage among older persons[a] | Type of pension system | Per capita income[b] (US$) | Poverty rate of over-60 population[c] (per cent) |
| Advanced | Argentina | High | Mixed-integrated | 6 055 | 9.48 |
| | Chile | High | Mixed-private | 5 952 | 7.89 |
| | Cuba | High | Public | 3 965 | 8.67 |
| | Uruguay | High | Mixed | 4 946 | . . |
| Moderate to advanced | Brazil | High | Public | 4 340 | 10.33 |
| Moderate | Bolivia | Very low | Mixed-private | 938 | 36.59[d] |
| | Colombia | Low | Mixed-parallel | 2 277 | 29.20[d] |
| | Costa Rica | Medium | Mixed | 3 762 | 30.38[d] |
| | Ecuador | Low | Public[f] | 1 776 | 38.39[d] |
| | El Salvador | Low | Mixed-private | 1 761 | 30.35 |
| | Mexico | Low | Mixed-private | 4 690 | 30.50[d] |
| | Panama | Medium | Public | 3 123 | 21.71 |
| | Peru | Low | Mixed-parallel | 2 376 | 18.32 |
| | Venezuela | Low | Public | 2 796 | 20.85[d] |
| Incipient | Guatemala | Low | Public | 1 554 | 45.90[e] |
| | Haiti | Very low | . . | . . | . . |
| | Honduras | Very low | Public | 713 | 24.27 |
| | Nicaragua | Very low | Public[f] | 484 | 18.25 |
| | Paraguay | Low | Public | 1 477 | 24.35 |
| | Dominican Rep. | Very low | Mixed-private | 2 133 | 38.09[d] |

*Source*: Prepared by the author using data from the sources cited below.

[a] Coverage: High: over 50 per cent; medium: 30-50 per cent; low: 15 -30 per cent; very low: less than 15 per cent.

[b] Economic Commission for Latin America and the Caribbean (2002). Social Panorama of Latin America.

[c] The poverty rate in old age is defined as the proportion of the over-60 population whose per capita household income is equivalent to less than 50 per cent of the median income. The equivalencies are those used by the Organisation for Economic Cooperation and Development (OECD): 0.5 + (0.5 x Number of adults) + (0.3 x Number of children up to age 16). Source: Gill and others (2005), pp. 202 and 203.

[d] Denotes that the poverty rate is higher in the over-60 population than in the population as a whole.

[e] The poverty rate indicated for Guatemala is for the population aged 65 or over.

[f] Structural reform legislation has been passed but not implemented.

"equilibrium" rates are likely to be politically and economically unsustainable, particularly in countries with mature systems and relatively high coverage. Accordingly, the countries that are revamping their systems have opted for mixed financing.

*Eligibility criteria for old-age benefits and other support from social protection systems*

All the social security reforms carried out, whether structural or only parametric, needed adjustments in eligibility criteria for old-age benefits to make the systems financially viable and to adapt them to new demographic circumstances, including the longer life expectancy of the older adult population. The consequence of this policy has been an increase in the proportion of older persons without coverage, as eligibility for benefits is now more restricted. This poses a significant challenge, especially since broadening coverage is now an issue of great interest and the subject of a vigorous campaign in the region. In the past, social security coverage was extended through the loosening of eligibility criteria; however, given the relatively fixed level of resources, this strategy proved to be unsustainable over time.

The solutions, from a fiscal standpoint, were to change the system's parameters by requiring more years of contributions, enforcing this requirement, and raising the legal retirement age.

Another problem with this tightening of eligibility requirements is that it has resulted in more limited access to other social security benefits such as health insurance. In some cases, this situation is perhaps even more serious than the issue of monetary transfers, given the potentially catastrophic risk that adverse health events can entail for older persons. Thus, the coverage expansion dilemma must also involve the consideration of access to a series of benefits that go beyond the welfare pension or minimum pension paid out by social security systems. The financing of a basic benefits package for older persons to cover the most important catastrophic risks is unquestionably a factor that could compromise the social protection system's financial viability as the population ageing process advances.

*The role of "non-contributory" programmes and tax-financed pensions*

One of the primary justifications for structural reforms was the argument that a closer link should be established between contributions and benefits. Individual accounts, it was said, would give rise to increased coverage, since people would have a greater sense of responsibility and more incentives to keep contributing to the system. However, for a number of reasons, the reformed systems have not brought about an increase in coverage. In fact, in some countries, the coverage of pension schemes based on mandatory contributions and of social security, in general, has declined. One of the main reasons for the stagnation or decline in the coverage of contributory pensions is the sharp downturn in the labour market. When the social security reforms were implemented, it was implicitly assumed that workers would have long-lasting, stable employment and that the retirement process was normal and irreversible. Nonetheless, the informal segment of the labour market currently employs about half the region's labour force. Moreover, as a result of labour deregulation, a growing number of formal-sector workers are hired under precarious employment conditions. Accordingly, pensions financed from general tax revenues have been considered as an instrument for supplementing the coverage of contributory pensions and broadening overall social security protection (Bertranou, van Ginneken, and Solorio, 2004).

Tax-financed pension programmes provide modest, relatively uniform monetary benefits to provide protection against the contingencies of old age, disability and death. In some countries these programmes also cover illness and are a means of access to other benefits such as family allowances. The programmes generally represent a form of social assistance, since they target poor people who have little or no capacity to pay contributions. In Argentina, Brazil, Chile, Costa Rica and Uruguay, these tax-financed programmes benefit a significant proportion of older persons and persons with disabilities. In Brazil and Costa Rica, among other countries, welfare pension benefits are financed in part with cross-subsidies from contributory programmes.

In 2001-2002, non-contributory pension programmes in Argentina, Brazil, Chile, Costa Rica and Uruguay, the five Latin American countries with the most advanced social security systems, had some 8.8 million beneficiaries (including Brazil's rural pensions, which are actually semi-contributory schemes). Some 56 per cent of these beneficiaries were receiving old-age benefits. Various evaluations of the impact of these programmes on poverty, as compiled in Bertranou, et.al. (2004), have found that tax-financed pensions are powerful means of combating these scourges and an effective instrument of social reintegration for people who have traditionally been excluded from social security and subject to economic vulnerability and insecurity. This conclusion is valid despite the various problems identified in the design and administration of these programmes, as well as their potentially negative impact on incentives to work and on social security contributions.

All five of the above-mentioned countries use some method of targeting the fiscal subsidy for these benefits. With varying degrees of efficiency, they have achieved dissimilar but relatively satisfactory

outcomes. The programmes are still limited in scope and have only slightly narrowed the coverage gaps left by contributory programmes. Nonetheless, this effort to protect the most vulnerable members of the older adult population has been significant in certain countries, including Chile and Brazil.

In Chile, in the 1990s the growth of benefit coverage for the over-65 population was attributable essentially to the expansion of the welfare pension programme, while benefit coverage under the contributory system declined slightly. In 1992, contributory benefits covered 67.1 per cent of the over-65 population; by 2000, this percentage had decreased to 64.4 per cent. The coverage of welfare pensions, meanwhile, rose from 8.3 per cent to 14.7 per cent over the same period.

In Brazil, rural pensions account for a substantial share of the increase in coverage over the past decade, but in recent years the growth of their coverage has merely kept pace with that of the over-60 population. Whereas the total population grew by 5.7 per cent between 2000 and 2004, the over-60 population grew by 11.8 per cent. Over the same four-year period, rural old-age pensions grew by 11.2 per cent, while welfare benefits jumped by 36.6 per cent.

A special case is that of Bolivia's Bonosol programme, which follows the model of non-contributory pensions. The programme is not financed through payroll contributions yet seeks to achieve universal coverage. Although this programme suffers from many design problems and financial viability challenges (World Bank, 2004), it was at its inception the only universal programme implemented by a Latin American country to meet the need for transfers to older persons. In 1996, the authorities established a collective capitalization fund that received a transfer from the Government representing 50 per cent of the shares of the capitalized firms formerly owned by the State. The fund was valued at 22 per cent of GDP and provided for the payment of a life annuity to all Bolivians aged 65 or over who had been born before 1975. The benefit amount was set at US$250, which represents about 10 per cent of the average wage and is also equivalent to 50 per cent of the per capita income of the poorest sector of the population. On the basis of population estimates, it was originally projected that the number of beneficiaries would reach 300,000; in 1997, however, the number stood at 364,000. It is believed that part of this discrepancy is due to fraudulent age reporting. The programme's total annual cost is about US$100 million. Although questions have been raised about the programme's viability owing to liquidity problems of the fund used to finance it as well as the administrative problems in weeding out fraudulent claims, this policy of universal benefits is nonetheless noteworthy. Bolivia's experience also demonstrates how a programme that is usually treated in the literature as having the advantage of being relatively easy to administer can turn out to be highly complex in the absence of an appropriate institutional framework.

*The feminization of the older population and the gender dimension*
*in relation to pension systems*

With rising life expectancy, the face of old age is, increasingly, a female face. Today, coverage for older women consists primarily of survivor's benefits and non-contributory benefits, since, in the past, most women were not active in the labour market. This is changing rapidly, however. Women are entering the labour market in growing numbers so that in the future they will receive more and more benefits in their own right and not by way of their spouse. At the same time, women's access to the labour market and the problems of inequality and occupational segregation they face have given rise to significant disparities between their income and that of men. Differences in income due to different types of jobs and work histories translate into coverage gaps in pension systems. Moreover, changes in pension systems have generated further inequities, even as they have partially remedied existing ones.

There are other socio-demographic changes that are relevant in this context and that have significant gender implications. Family organization has changed considerably. Couples and their relationships have become more unstable. Most social protection systems were designed in the course of the twentieth

century, especially in the early part of that period, when men's and women's roles in the family and the workplace reflected cultural norms that differ significantly from those prevailing today. In the past three or four decades, divorce and separation rates have soared, with profound repercussions for divorced and separated women in terms of income security in old age, especially in the case of women who have not personally contributed to a pension programme through their jobs. For example, if a woman's former spouse remarries, she can lose all or part of her entitlement to a survivor's pension.

As mentioned earlier, the pension-system reforms of the 1990s were based on the "multi-pillar" paradigm. This approach encouraged the introduction of principles that followed the logic of private insurance, in which benefits are tailored to individual or household risks. This principle went hand in hand with the introduction of defined-contribution regimes and individual savings accounts. Benefits are determined on the basis of individual/family risks, identified according to the beneficiary's sex and the family's composition (spouse and dependent children). Under defined-benefit regimes, such as those traditionally provided by public pay-as-you-go systems, benefits are calculated using a formula that establishes a rate of replacement of the labour income that was subject to contributions prior to retirement (the average of the past 10 years' earnings, for example). Usually, these benefits are also adjusted according to the number of years for which the person paid contributions. This formula does not have any parameters that explicitly take gender into account. Differences between the benefit amounts paid to men and women arise as a result of different retirement ages or due simply to differences between individual work histories. Clearly, a significant degree of redistribution from men to women is implicit in the system, since women generally outlive men and receive income at higher effective replacement rates owing to minimum benefit rules. One way to assess this factor is to compare the estimated present value of the contributions made with the amount of benefits received throughout the life cycle. The result of this comparison is, on the average, favourable to women since they generally pay contributions for a shorter period than men (because their retirement age is usually lower) and their retirement lasts longer owing to their longer life expectancy.

The most striking change in social security regimes was the introduction of benefits based on individual savings, which are paid according to a formula that explicitly includes gender-related parameters. The life annuities received as from the retirement age are directly linked to age- and sex-specific life tables. This was characteristic of all the structural pension reforms carried out in Latin America.

A prominent feature of the new social security legislation in Latin America is the establishment of "joint annuities", for which benefits are calculated on the basis of not only the age and sex of the direct beneficiary, but also those of his or her dependants. The concept of joint annuities does not mean that the spouses' savings are "pooled" to determine the benefit amount. Rather, the amount depends on the risk parameters associated with the insured; that is, whether the insured has potential survivors. This way of calculating benefits results in some degree of redistribution within the family, since any discrimination against the woman on account of her longer life expectancy is offset by the lower benefit received by the man because he has a spouse. Accordingly, the biggest differences are observed between the benefits received by single men and women with similar work histories. In the case of spouses, the effects of sex-specific life tables tend to be offset because, by law, women are entitled to survivor's benefits upon the death of their spouse – which entitlement reduces the value of the benefits received by married men – whereas men are less likely to receive survivor's benefits, given their shorter life expectancy.

Rofman and Grushka (2003) evaluate the gender impact of the structural social security reform in Argentina. They estimated the replacement rates that would be generated by all representative benefit levels for male and female workers. With respect to benefits under the fully-funded scheme, they observed two factors that have a differential impact on the two sexes: differences in life expectancy and

the impact of the flat fees charged by pension fund managers on the capacity for social security saving, since these fees are more onerous for low-paid workers, the majority of whom are women.[3]

The results of the empirical estimates of replacement rates show that, once the system has matured (that is, for workers who retire in or after 2040), women will generally receive replacement rates that are somewhat higher than those of men under the pay-as-you-go option for the second pillar. This is due to the indirect effect of the universal basic benefit and the neutrality of the amounts paid out as defined benefits. Under the fully funded scheme, however, this effect is the opposite, since the advantage obtained by way of the universal basic pension is more than offset by the smaller life annuity.

As noted earlier, the determination of benefits under the fully funded regime has two specific features. For life annuities, the sex of the insured and the existence of eligible dependants are taken into account. Since benefits are reduced in the case of those who are expected to live longer (women) or to generate survivor's pensions upon their death (men who are married and/or have dependent children), these population groups are at a clear disadvantage. Rofman and Grushka (2003) calculate the representative cases of married and unmarried men and women who retire at the legal retirement age (65 and 60, respectively). With the same level of accumulated funds, for example $100,000, and assuming that the man is five years older than the woman, a man will receive a life annuity of $552 if he is married and $724 if he is single, whereas a woman will receive $583 if she is married and $621 if she is single.

Another important consideration is the contribution period required in order to obtain public benefits or minimum pension guarantees; this period is generally long in all the countries. This restriction affects men and women differently because women's contribution density is likely to be lower than men's, limiting their ability to qualify for coverage under these programmes.

As a result of the systems' history and of more recent changes, social protection in old age, measured in terms of the payment of old-age pensions, is generally lower for women than it is for men in Latin America. This is because the systems are eminently contribution-based, as discussed earlier, and because men and women tend to have different work histories. Women continue to have lower labour-force participation rates and lower incomes, which means that their social security savings and entitlement to public benefits and guarantees are also lower.

One phenomenon that runs counter to this trend is the opportunity that fully-funded systems provide for people who have paid contributions for short periods of time. Such individuals can recoup their contributions plus the returns earned on them. Under the old pay-as-you-go systems, these contributions were lost at the level of individual contributors, particularly in the case of women whose participation in the formal labour market was brief and unstable. Thus, the "individual profitability" of these contributions has risen substantially because they can be fully recouped; this situation works to the advantage of people with very low contribution density.

*The labour market and older persons*

For many households that include older persons, the labour income of such persons represents either the sole source of household income or a sizeable share of it. This situation is reinforced by the limited coverage of social security benefits or the modest level of benefits received through pension systems. On the basis of household surveys, Rofman (2005) reports that, in households that include at least one person over the age of 65, the average share of social security income out of total household income ranges from 38.4 per cent in Peru to 70.6 per cent in Argentina; in households consisting solely of persons over the age of 65, the share of retirement and pension benefits out of total income ranges from 52 per cent in Peru to 89 per cent in Brazil.

Labour-force participation trends among older persons (60 or over) and their linkage to social protection, particularly retirement and pension programmes, have attracted considerable attention in the past decade in developed countries, but little attention in Latin America. The stylized facts observed in many OECD countries show that the trend towards early retirement from the labour force has declined or held steady (Auer and Fortuny, 2002). Moreover, it appears that the older population's economic activity rate has stopped falling. These circumstances, together with a new ageing paradigm that emphasizes the need for "active ageing", have given rise to a debate as to whether these trends have reversed themselves and what public policies should be implemented to reflect this process, in a context of strong pressure to extend the period of economic activity and restrict early access to social security benefits, in the light of financing problems.

In Latin America, studies on the labour situation of older persons are few and far between because public policy initiatives have tended to focus on other population groups, such as young people. The economic and social problems accompanying the population ageing process have made it necessary to pay more attention to the labour situation of older persons, particularly in countries that are at an advanced stage of population ageing or where the ageing processes will progress rapidly in the next two decades. In other countries, the debate is just beginning since the demographic transition is, for them, a new phenomenon.

Figure 3 shows the close correlation between older persons' social security coverage and their labour-force participation, based on cross-sectional data of the older population in twelve countries of the region. Lack of social security coverage is not the only determinant of labour-force participation, but it seems to be a significant factor in explaining it. Differences within the region (such as those between Brazil and Uruguay) are probably due, in large part, to differences in benefit amounts, as well as to socio-cultural factors and labour regulations influencing the labour-force participation of the over-60 population.

**Figure 3. Labour-force participation and social security coverage
of the population aged 60 or over in 2000-2003**
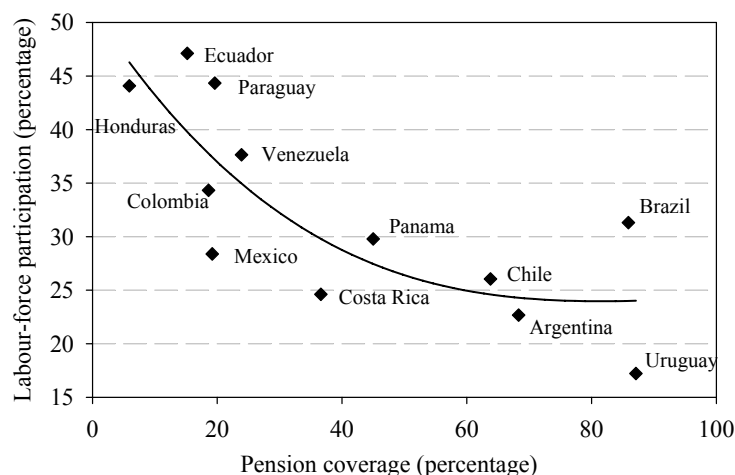


*Source:* Prepared by the author on the basis of data from Bertranou and Velasco (2005) and Rofman (2005).

Overall trends in labour and social protection indicators since the early 1990s for older persons in twelve Latin American countries reveal the following stylized facts (Bertranou and Velasco, 2005): (i) participation rates have tended to rise, owing primarily to the increase in women's participation; (ii) the over-60 population has low but rising unemployment rates; (iii) most workers over the age of 60, especially men, find employment in the informal sector; (iv) wage employment is relatively uncommon

among older persons and is on the decline; and (v) employed persons over 60 gradually work fewer hours as they get older. Another important consideration is the way in which workers make the transition from employment to retirement, since there are institutional factors that either encourage or discourage labour-force participation of older persons. As noted earlier, the pension-system reforms of the 1990s have "toughened" the eligibility requirements for pensions, with the result that older persons with social security coverage tend to receive their benefits later in life.

As in the case of all other socio-economic variables in the region, these findings represent general trends and do not reflect the wide variety of workforce participation patterns and employment trends among people at or near the retirement age. As an example of this, figures 4 and 5 compare the participation levels of different population groups that are either approaching or beyond the age of 60. To illustrate this point, the two figures contain information on the situation in two countries, Uruguay and Honduras.  These countries are at opposite ends of the curve in figure 3, which shows the proportion of older persons with pension coverage and their participation rates. The most noteworthy findings are the following: (i) in both countries, the labour-force participation rate is high among men, although in Uruguay the rate drops sharply as workers become older, from 90 per cent initially to 10 per cent among men over the age of 70; (ii) women's participation rate is higher in Uruguay and also declines markedly as women get older, from 70 per cent to 10 per cent (2003), whereas in Honduras women's participation is lower and declines from 45 per cent to 15 per cent in the same age groups; and (iii) there were no major changes in men's participation rates between the early 1990s and 2003, but participation rates for women of all ages increased in both countries during the period.

**Figure 4.  Labour-force participation by age group for men and women aged 50 or over in Uruguay, 1991 and 2003**
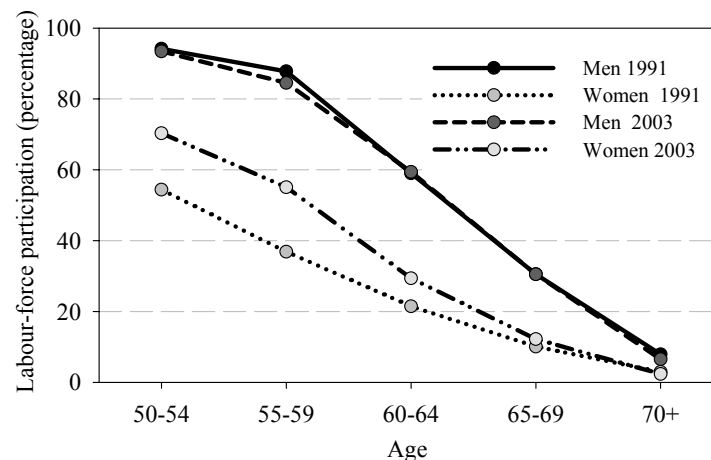


Source: Bertranou and Velasco (2005).

Lastly, it should be mentioned that there is not enough empirical evidence to account for trends in the labour supply of older persons in the Latin American countries or to identify or predict the effect of regulatory changes in terms of encouraging or discouraging economic activity on the part of this population group. Traditionally, labour policies have reflected the deep-rooted belief that older persons' withdrawal from the labour market leaves more room for the employment of young people; however, the evidence in this regard is not conclusive, particularly in labour markets as segmented as the ones found in most of the Latin American countries. A considerable amount of work is needed on the study and design of interlinked, consistent policies on the labour-force participation and social protection of older persons.

**Figure 5.  Labour-force participation by age-group for men and women
aged 50 or over in Honduras, 1990 and 2003**
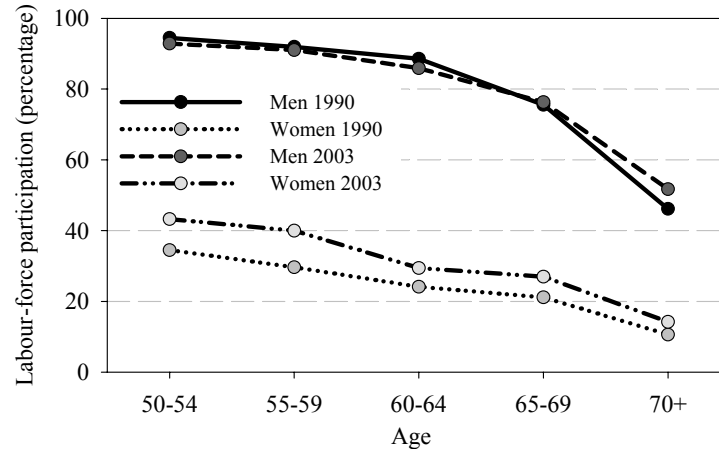


*Source:* Bertranou and Velasco (2005).

## E. FINAL REMARKS

A sizeable share of the social protection received by workers and their families in Latin America comes from contributory schemes. This means that individuals' eligibility to receive benefits largely depends on their history of contribution payments to social security programmes, with the result that access hinges on each worker's employment conditions throughout his or her working life. The upshot, for the region, is a "social protection paradox": the workers with the best employment conditions are the ones who receive the most and best protection. An overview of coverage rates among older persons confirms this: those with the best coverage are the ones who had the best opportunities and performance in the labour market during their working lives.

Conversely, the availability and scope of non-contributory, welfare-based social protection programmes are more limited, with the result that the coverage gaps left by contributory programmes are not being closed by non-contributory schemes. This situation is best exemplified by old-age, disability and survivor's benefits. In the case of health-care coverage, there is a better balance between the contributory and non-contributory components, since many benefits are financed out of general revenues and are not contingent on the beneficiary's history of social-security-covered employment. Thus, employment in the formal sector does not guarantee coverage, but it does significantly increase a worker's likelihood of receiving a number of employment and social benefits.

Accordingly, the configuration of the social protection system for old age will continue to exhibit certain undesirable characteristics such as fragmentation and lack of standardization. However, it is possible to strengthen approaches such as universality, which would involve giving all workers access to at least a basic level of social protection, and solidarity and equity, which would mean that workers would contribute to the programmes' financing according to their capacity to pay.  To introduce such changes in the medium term, steps will need to be taken towards the design of a uniform, universal first pillar.  This alternative is viable in some countries, such as Argentina, Chile, Costa Rica and Uruguay, where the structure and scope of minimum pensions and welfare pensions might be redefined conceptually.  In countries that have less fiscal capacity to expand social expenditure on older persons and that also have other important social policy priorities, the first pillar (poverty alleviation) will undoubtedly have to be more limited and better targeted. Since population ageing in such countries has not yet reached significant proportions, the expansion of the coverage of this first pillar can be achieved more easily and gradually.

The most important point in relation to the general concept of social policy and the restructuring of the retirement and pension system is unquestionably the resulting balance between the individual and collective responsibilities that must be assumed by stakeholders in order to cope with the contingencies of old age, disability and death. Strictly contributory schemes funded through individual contributions are based on individual responsibility. This means that the "premiums" and/or benefits are adjusted in accordance with each individual's work history and risks. These new features are also having a significant gender impact. Alternatives to this extreme contributory/individual scheme transfer part of the responsibility to a more collective level (company, State). In recent years there seems to have been a growing interest in partially restoring the balance between individual and collective responsibility, or at least not deepening reforms that reinforce the contributory/individual aspect of social protection.

Another issue concerns the need to conceive of the social protection system as a whole, instead of taking a fragmented approach to the social risks faced by each individual in the course of his or her life cycle. Given the increase in life expectancy, for older persons the greatest risk inherent in this increased longevity is, to a growing extent, the inability to pay for health care rather than the inability to generate or replace income. In the near future, the design of social protection systems should not be fragmented into health insurance, disability insurance and old-age insurance. Indeed, old age is just a time of accelerating health and disability risk (Shiller, 2003). Thus, it is important to address not only the contingency of old age itself, as traditionally conceived, but also the whole range of risks that increase in the final stage of life.

Lastly, the legal retirement age is a key variable of pension systems, given its impact on the systems' financial viability at the aggregate level and on the degree of coverage at the individual level, particularly in cases where benefits are derived from individual savings. In terms of public financing, increasing the legal retirement age could be technically the easiest variable to manage in a reform, but politically the most difficult one, as it is likely to meet the most resistance. Moreover, women are negatively affected by the different legal retirement ages for men and women under systems that have introduced individual accounts; however, socially this is not a major issue on the future reform agenda.

Along with the discussion on the legal retirement age in terms of its significant potential as a means of adapting retirement and pension systems to the countries' new demographic profile, the labour market for older persons must be taken into account. The labour supply consisting of workers over the age of 60 is expanding, for various reasons. Policymakers should therefore consider the need for a comprehensive approach that ensures consistency between labour and social security policies, with a view to strengthening the protective role of income and the productive potential of the labour force in the final stage of the life cycle.

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NOTES

[1] In this paper, "older persons" means individuals aged 60 years or over, unless otherwise specified.

[2] The country classification in ECLAC (2004) was based on the total fertility rates and ageing indices observed in the countries of the region in the 1990s. For this paper, some of the countries were reclassified according to estimates published more recently in United Nations (2005). Some countries may change categories if new census data result in significant corrections of the estimates.

[3] These fees were subsequently eliminated in Argentina.

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# AGEING IN JAPAN:  THE HEALTH AND WEALTH OF OLDER PERSONS

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World population growth has been slowing down, primarily as a result of the reduction in fertility in the majority of countries, both developed and developing. In 1970-1975 there were just 19 countries with below-replacement fertility, but by 2000-2005 there were 65. Over the same time period, the number of countries having very low fertility─that is, a total fertility lower than 1.3 children per woman─passed from zero to 17. Today about 40 per cent of the world's population lives in countries with below-replacement fertility and 13 per cent lives in the countries with very low fertility.

In parallel to the decline of fertility, mortality has fallen considerably in most countries over the past decades. In some developed countries, life expectancy at birth for females has already exceeded or is now approaching 85 years and it is not showing any signs of slowing down.

Because of these rapid transformations, population age distributions are changing markedly as the number of older persons increase and there is a relative decrease in the number of younger persons. Thus, the twenty-first century is projected to be the century of population ageing, and even the size of the population is expected to decrease considerably in a number of countries over the coming decades (Lutz, Sanderson, and Scherbov, 2004; United Nations, 2005).

The demographic changes leading to population ageing are documented elsewhere in this volume. The changes expected raise interest in the policy responses they elicit or might elicit (McNicoll, 2002). Undoubtedly, these policy responses will influence economic growth and the prevalence of poverty, intergenerational equity, and social welfare in the future. A key question is whether economic productivity can be sustained with an ageing labour force or with a decreasing population. How are transfers between age groups to be managed in a way that they remain equitable? What are the roles of the public sector, the market, the family, and individual life-cycle saving strategies in providing answers to the problems that ageing poses? Can or will fertility levels rise again to near replacement level? What role can immigration play and will it be acceptable?

These policy relevant issues are particularly important for a number of countries in Eastern Asia. At present, Eastern Asia has the lowest fertility in the developing world (1.66 children per woman) and only the regions of Europe have lower average levels (United Nations, 2005; McDonald, 2005). Virtually all countries in Eastern Asian have undergone an extremely fast demographic transition and are now experiencing unprecedented changes in their age structures. In these countries, the child dependency ratio has declined rapidly, generating an important demographic dividend, and the rise in old age dependency has created significant new policy challenges.

Among countries in Eastern Asia, Japan has the oldest population. In fact, by some estimates, Japan is expected to become the oldest population in the world sometime during 2005 (Ogawa, forthcoming; Ogawa and Takayama, forthcoming). This paper discusses policy-relevant issues relative to population ageing in Japan, with particular emphasis on the implications of improving health and rising wealth among the older population of the country and the contributions it can make to its economic dynamism. We begin by highlighting some of the key features of Japan's demographic dynamics since 1945 and those expected until 2025. We then relate these demographic trends, both past and future, to Japan's long-term economic growth performance, by focusing on the "demographic dividends". We turn next to a description of key dimensions of Japan's socio-economic system, which have already been substantially affected by rapid population ageing and are likely to affect the welfare of older persons in the future. We

conclude by considering the changing health environment and its implications for older persons in Japan, and the growing wealth of older persons as a means of mitigating the formidable challenges that population ageing may pose over the foreseeable future.

Although the paper focuses on the Japanese experience, the policy responses discussed could serve as model for other countries undergoing rapid population ageing, particularly in the context of Eastern Asia because, despite its rapid economic development, Japan has retained many of its traditional cultural values, thus providing a good model for policy makers who may wish to combine the best of traditional and modern approaches to ensure adequate support to older persons.

A. THE CHANGING AGE DISTRIBUTION OF JAPAN AND THE DEMOGRAPHIC DIVIDENDS

*Demographic trends: past and future*

Japan was the first non-Western country to experience a decline in fertility after the Second World War and that decline was more rapid than it had been in any of the industrialized countries of the time. Following a short-lived baby boom (1947-1949), Japan's fertility dropped dramatically (Hodge and Ogawa, 1991; Ogawa and Retherford, 1993). Between 1947 and 1957, total fertility declined by more than half, from 4.54 to 2.04 children per woman. Nowhere before had the fertility of a large population decreased so rapidly. After this drop, fertility levels fluctuated around replacement level until the first oil crisis hit in 1973. Since then, total fertility has been declining, reaching 1.29 children per woman in 2004, an all-time low in post-war Japan. As in other countries of Eastern Asia that have reached very low fertility levels, Japan's low fertility has been attracting a great deal of attention, both domestically and internationally (Retherford and Ogawa, 2005).

By contrast, the unprecedentedly rapid reduction of mortality has attracted less attention. Age-specific mortality rates have declined markedly since the war. During 1947-1965, Japan's life expectancy at birth rose from 50.1 to 67.7 years for men and from 54.0 to 72.9 years for women. When Japan joined the OECD at the end of 1964, Japan's life expectancies for both men and women were the lowest among all the OECD Member States of the time (Mason and Ogawa, 2001). By the mid-1970s, however, life expectancy in Japan had become one of the highest among all OECD countries. In 2004, male life expectancy at birth reached 78.6 years to become the second highest in the world, following that of Iceland, and female life expectancy reached 85.6 years, the highest in the world. Moreover, between 1964 and 2004, life expectancy at age 65 increased substantially, from 12.2 to 18.2 years for men and from 14.8 to 23.3 years for women, thus implying a marked lengthening of life after retirement and of the joint survival of husbands and wives.

As a result of these demographic transformations, as shown in table 1, the age structure of the Japanese population has been shifting to a pronounced degree. Table 1 also shows the projected values for total population size and indices relative to the age structure, computed from a population projection produced from the most recent version of the population, economic and social security model constructed by Nihon University Population Research Institute (NUPRI).

TABLE 1. POPULATION CHANGE IN JAPAN, 1950-2025

| Year | Total population (1000 persons) | 0-14 (per cent) | 15-64 (per cent) | 65 or over (per cent) | Total dependency ratio[a] | 75 or over/65 or over (per cent) | Familial support ratio[b] |
|------|------|------|------|------|------|------|------|
| 1950 | 83 200 | 35.4 | 59.7 | 4.9 | 67.5 | 25.7 | 1.8 |
| 1955 | 89 276 | 33.4 | 61.3 | 5.3 | 63.1 | 29.2 | 1.8 |
| 1960 | 93 419 | 33.0 | 64.2 | 5.7 | 60.4 | 30.4 | 1.8 |
| 1965 | 98 275 | 25.6 | 68.1 | 6.3 | 46.8 | 30.3 | 1.8 |
| 1970 | 103 720 | 23.9 | 69.0 | 7.1 | 44.9 | 30.2 | 1.7 |
| 1975 | 111 940 | 24.3 | 67.8 | 7.9 | 47.6 | 32.0 | 1.6 |
| 1980 | 117 060 | 23.5 | 67.4 | 9.1 | 48.4 | 34.4 | 1.5 |
| 1985 | 121 049 | 21.5 | 68.2 | 10.3 | 46.7 | 37.8 | 1.4 |
| 1990 | 123 611 | 18.2 | 69.7 | 12.1 | 43.5 | 40.1 | 1.3 |
| 1995 | 125 570 | 16.0 | 60.5 | 14.6 | 50.4 | 39.3 | 1.1 |
| 2000 | 126 926 | 14.6 | 68.1 | 17.4 | 46.9 | 40.9 | 0.9 |
| 2005 | 127 449 | 13.8 | 66.2 | 20.0 | 50.6 | 45.1 | 0.8 |
| 2010 | 127 013 | 13.0 | 64.0 | 23.0 | 55.6 | 48.0 | 0.7 |
| 2015 | 125 603 | 12.1 | 61.0 | 26.9 | 63.2 | 48.4 | 0.6 |
| 2020 | 123 235 | 11.0 | 59.5 | 29.5 | 67.6 | 52.1 | 0.6 |
| 2025 | 120 094 | 10.2 | 58.8 | 31.0 | 70.0 | 60.0 | 0.6 |

*Sources:* Statistics Bureau, Population Census, various years; Nihon University, Population Research Institute Population Projection, 2003.
[a] Number of persons aged 0-14 years or 65 years or over per hundred persons aged 15-64 years
[b] Number of women aged 40-59 years divided by the total population aged 65-84 years.

First, the proportion of those 65 or over increased from 4.9 per cent in 1950 to 17.3 per cent in 2000, and it is expected to exceed 20 per cent in 2005, implying that the Japanese population will become the oldest population in the world during 2005, surpassing that of Italy (Ogawa, forthcoming). In addition, the proportion of those 65 or over is projected to be higher than 31 per cent in 2025, suggesting that Japan's population will continue to be the oldest in the world. More importantly, Japan will reach the world's highest level of ageing at an unprecedented rate (Ogawa and Retherford, 1997; Ogawa and others, 2003). Thus, Japan's older population constituted 10 per cent of the population only by 1985, long after other industrialized countries had reached that level. Yet, the proportion of older persons then doubled in just 21 years. Compared with such European countries as Norway or Sweden, Japan's population is ageing three times as fast.

Second, Japan's population grew from 83 million in 1950 to 127 million in 2000, with its annual growth rate declining substantially over time. Data recently released by the Statistics Bureau of Japan indicate that the male population of the country has been declining since March 2005 and the female population is expected to follow suit so that by the end of 2005 the overall population of Japan will be decreasing, a trend that is expected to continue until at least 2025 when the population is projected to be 120 million. The prospects of imminent population decline have raised grave concern at many levels of Japanese society (Ogawa and Retherford, 1997).

Third, the proportion of those aged 75 or over among those aged 65 or over has been increasing almost continuously, passing from 24 per cent in 1950 to 41 per cent in 2000, as displayed in table 1. During 2000-2025, the pace of growth of that proportion is expected to accelerate so that it will reach 60 per cent by 2025. In comparison to the projections for other countries, in 2025 Japan will still be the country having the highest proportion of the population aged 75 or over among those aged 65or over, followed by Sweden with 52 per cent and Italy with 50 per cent (United Nations, 2005). This marked upward shift in the age distribution of Japan is prone to generate a substantial increase in the demand for medical and long-term care services, both formal and informal.

Fourth, although the total dependency ratio in Japan (i.e. the population aged 0-14 and that aged 65 or over, divided by the population aged 15-64) declined almost continuously, from 67.5 dependents per 100 persons of working age in 1950 to 43.5 in 1990, it has been increasing since 1990 and is expected to peak at 70.0 in 2025 (table 1). Japan's total dependency ratio in 2025 will then be the highest in all industrialized countries. Furthermore, over the next two decades, the pace of increase in the total dependency ratio in Japan is the fastest among all industrialized countries, suggesting that Japan is likely to face more imminent adjustment problems in reallocating resources among various age groups.

Fifth, the familial support ratio, that is, the ratio of the number of women aged 40-59 to the total population aged 65-84, is expected to decline substantially between 2005 and 2025. Its value, which was 1.30 women per elderly person in 1990, is projected to decrease to 0.65 in 2010, a decline of 50 per cent. That is, the potential support that adult daughters might give to elderly parents drops rapidly, especially after 2009 when the large cohort of "baby boomers" born during 1947-1949 passes out of the 40-59 age group. It is therefore likely that the traditional extended family system that has traditionally provided support to older persons may weaken over time. Although the Government of Japan established in 2000 a Long-term Care Insurance Scheme (LCIS) to alleviate the burden on families taking care of older parents at home, the number of households without caregivers younger than 60 is expected to rise, implying that the effectiveness of the LCIS may decline over time.

It is worth noting that according to the United Nations population projections (United Nations, 2005), Japan's familial support ratio (0.79) became in 2004 the lowest in the entire world, followed by those of Italy (0.80) and Greece (0.81). Projections of these ratios over the next 30 years are highly reliable because the persons involved are already born.

*Demographic dividends*

Demographic trends in Japan and their effects on the age distribution of the population have been closely intertwined with economic growth during the post-war period (Ogawa, Kondo, and Matsukura, forthcoming). As Mason and Lee have argued, when a country's fertility falls, a first dividend may accrue because the proportion of children in the population declines as the proportion of persons in working ages increases or, to be more precise, because declining fertility produces an increasing proportion of people in ages where production exceeds consumption (Mason, 2001, 2005; Mason and Lee, forthcoming). The first dividend is positive if the rate of output growth per effective consumer exceeds the rate of output growth per effective producer. In fact, the difference between these two rates is equivalent to the support ratio (Mason, 2005).

Figure 1 depicts the age-specific profiles of consumption and production in Japan, derived from the National Survey of Family Income and Expenditure (NSFIE) carried out in 1999. By using the estimates displayed in figure 1 as weights for the population by age, we have calculated the annual growth rate of output per effective consumer and the annual growth rate of output per effective producer over the period 1920-2025 (see figure 2). Clearly, the indicators presented in figure 2 are calculated under the assumption that the 1999 age-specific profiles of consumption and production have remained constant over that period. Similar results are obtained if the production and consumption profiles are derived instead from the 1994 round of NSFIE.

Figure 2 shows that Japan's first dividend was positive over a short period in the second half of the 1930s and then for 45 years, from 1949 to 1994. Furthermore, its magnitude was large during the period of rapid economic growth in the 1960s, suggesting that the unprecedented decline in fertility that occurred after 1949 played an important role in boosting the growth of income per capita over that period. It is also thought that in Japan the first dividend was heavily invested and contributed to increase physical capital instead of leading just to higher consumption. A similar process seems to have occurred in the newly
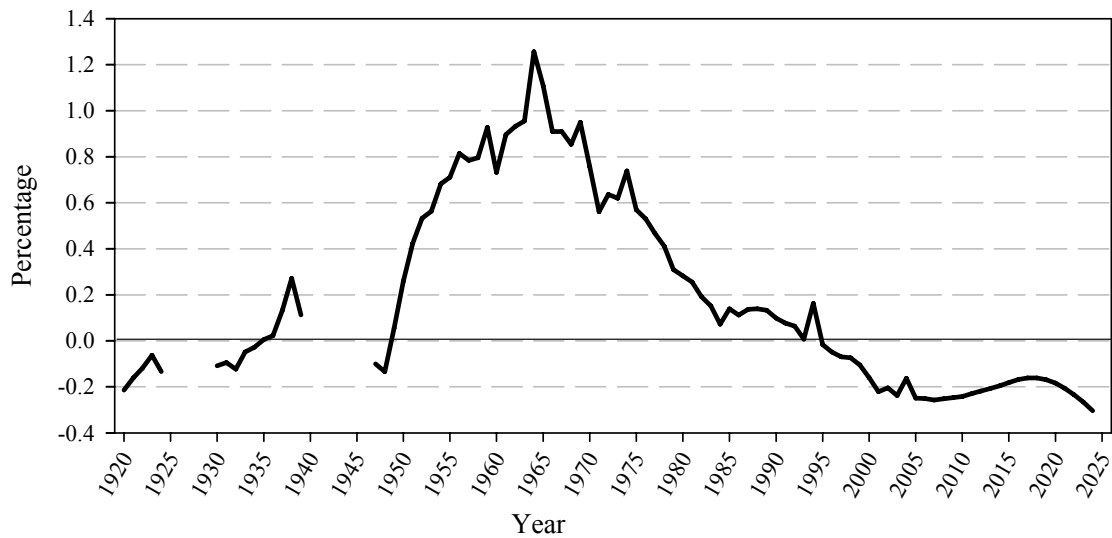
industrializing countries of Eastern and South-eastern Asia during their period of economic boom in the1980s and 1990s.

**Figure 1. Age specific profiles for labour income and consumption in Japan, 1999**
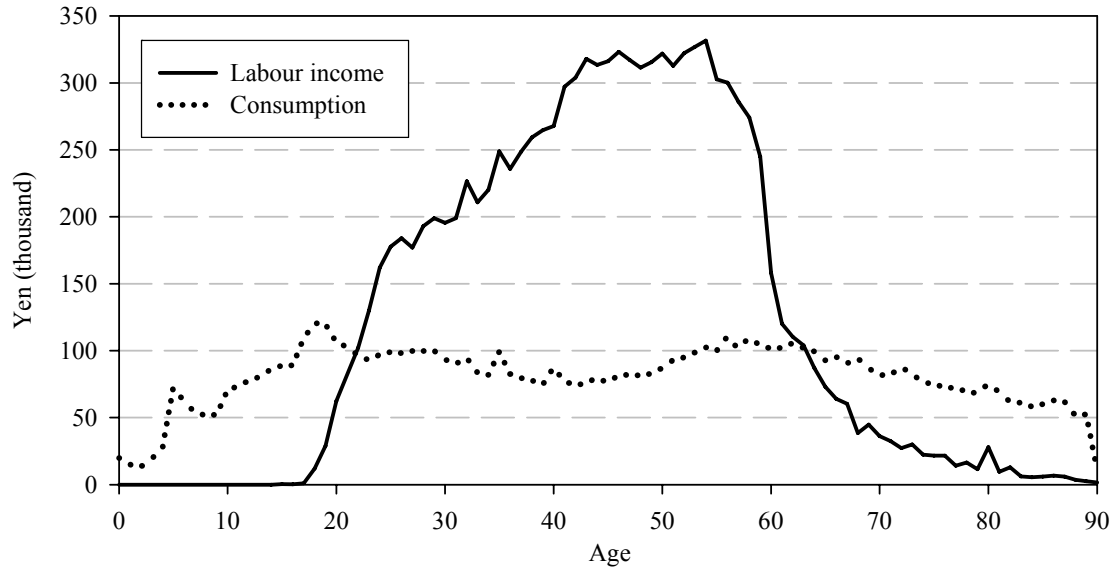
**Figure 2. Trend in first dividend in Japan, 1920-2025**

Mason (2005) has also argued that the shift to an older age structure caused by fertility and mortality declines can lead to a second demographic dividend which arises in response to the prospect of having

more people surviving longer than ever before. Therefore, in countries that rely on capital accumulation to meet the retirement needs of the older population, population ageing provides a powerful incentive to accumulate wealth. It is important to note, however, that in countries that rely on transfers, both public and familial, to meet the retirement needs of older persons, the second demographic dividend may not materialize. While the first dividend arises purely from the favourable age distribution of the population, the second dividend depends on both compositional and behavioural effects (Mason, 2005). Thus, the second dividend is affected not only by the numbers of older persons relative to younger persons, but also by the extent to which consumers and policy makers are forward-looking and respond effectively to the demographic changes that are anticipated for the years ahead. Increasing longevity, in particular, may spur greater savings and thus the accumulation of wealth which, if invested productively, can lead to a permanent increase in income.

Estimating the magnitude of the second dividend is considerably more difficult than estimating the first dividend. Figure 3 illustrates changes in the household savings rate during 1955-2003 and thus provides partial evidence of the existence of a second dividend based on the fact that the household savings rate increased substantially until the mid-1970s, a period over which life expectancy was also improving at a remarkable pace.

**Figure 3. Change in the household savings rate in Japan, 1955-2003**
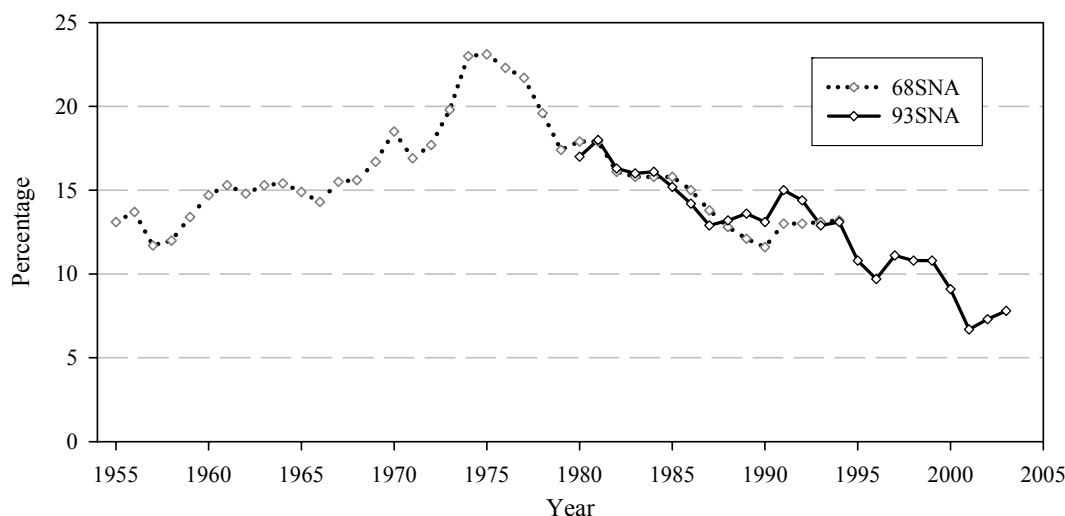
B. ECONOMIC GROWTH PERFORMANCE AND SUPPORT SYSTEMS IN JAPAN

*Economic growth in post-war Japan*

During the Second World War, Japanese productive capacity was utterly shattered. In 1950, Japan's per capita GNP was only US$153, lower than that of Mexico (US$181) or the Philippines (US$172) at the time. However, by the end of the 1950s, Japan's per capita income had recovered to pre-war levels and during the 1960s it grew at a phenomenal rate of about 11 per cent per year. As mentioned above, the first dividend contributed markedly to this growth and because a substantial part of the first dividend was

saved and invested, it helped to strengthen the country's infrastructure and to increase the productive capacity of firms.

The actual impact of the first dividend on economic growth, although related to changes in the age structure, depends also on economic policy and the socio-economic and political environment. During the 1960s, the Government of Japan promoted an export-oriented development strategy in an era when the international trading environment was favourable. In addition, government functionaries demonstrated outstanding leadership by importing an optimal mix of advanced technology from other industrialized countries. Investments in education and the availability of a well educated and highly trained labour force as early as the 1950s also contributed to this success. Lastly, the political stability that Japan has enjoyed since 1950 also provided a further incentive for investment.

As indicated in figure 2, the magnitude of the first demographic dividend declined gradually during the 1970s. In addition, the oil crisis of 1973 triggered a series of changes that led to the restructuring of the Japanese economy. As a consequence, its economic growth became less impressive than it had been during the 1960s. During the 1980s, Japan's average annual rate of GDP growth was 4.2 per cent, still considerably higher than in many other industrialized countries but considerably lower than at the peak.

After the 1985 Plaza Accord, the Japanese economy experienced a bubble and the investment boom that ensued ended abruptly in the second half of the 1990s. As a result, a number of leading banks and other financial institutions declared bankruptcy. It was a tragedy that the Government used inappropriate macroeconomic policies to rectify these unfavourable economic conditions and delayed recovery. Although many of these economic problems were also attributable to the increasing globalization of the world economy, the Government of Japan regarded them mainly as part of the normal business cycles and tried to address them by increasing government spending to boost economic growth but without much success. It took the Government several years to realize that major restructuring policies were needed to make the Japanese economy more competitive in international markets. This delayed response by the Government caused what some economists call "Japan's lost decade" (Yoshikawa, 2001). It is worth noting that the timing of the burst of the economic bubble coincided with the time when the first dividend turned negative. Although changes in the population age structure cannot be held responsible for the economic bubble and the banking crisis, an interesting question arises: would the duration of Japan's lost decade have been shorter if the first dividend had been positive for longer?

In 1979, Ezra Vogel's well-known book *Japan as Number One: Lessons for America* was published, and in the 1980s, Japan's management style was highly praised by international business communities. Unfortunately, Vogel's description of Japan in the late 1970s contrasts markedly with the Japan of more recent times, mired in recession and deflation. In the 1990s, the famed Japanese management strategy lost effectiveness and numerous government regulations or restrictions were modified or abolished.

Despite these major changes in the Japanese economy, its mandatory retirement policies still remain as exceptional among industrialized countries. In fact, the proportion of firms having mandatory retirement rules has been increasing, not declining. In 2003, the average retirement age for large-scale businesses was 60 years, markedly low in comparison to other industrialized countries and especially given Japan's high life expectancy (Clark and others, 2004). One of the main obstacles preventing a change in the mandatory age at retirement is a wage system based on seniority under which an increase in the age at retirement produces higher wage bills. The other deterrent is the provision of lump-sum severance benefits which are a function of the duration of employment. In 2003, an employee with more than 35 years of service received severance pay equivalent to 46 months of his or her final monthly salary. A substantial proportion of business firms have their own accumulated funds to cover such payments or have already incorporated such lump-sums into pension benefits provided by employers. Hence, these funds can be regarded as part of the second dividend. Furthermore, this lump-sum severance

pay has been drawing attention from financial institutions because the "baby boom" generations are about to begin retiring.

Another feature of Japan's labour market is a high labour force participation rate among older persons. Figure 4 shows that Japan stands out among industrialized countries because of its high labour force participation rates for men and women aged 65 or over. In 2000, 30 per cent of Japanese men in that age group were in the labour force compared to less than 10 per cent in the industrialized countries of Europe or 18 per cent in the United States. Similarly, older Japanese women are also more likely to continue working than older women in Europe or the United States.

**Figure 4. Labour force participation rates for men and women aged 65 or over in selected countries, 2000**
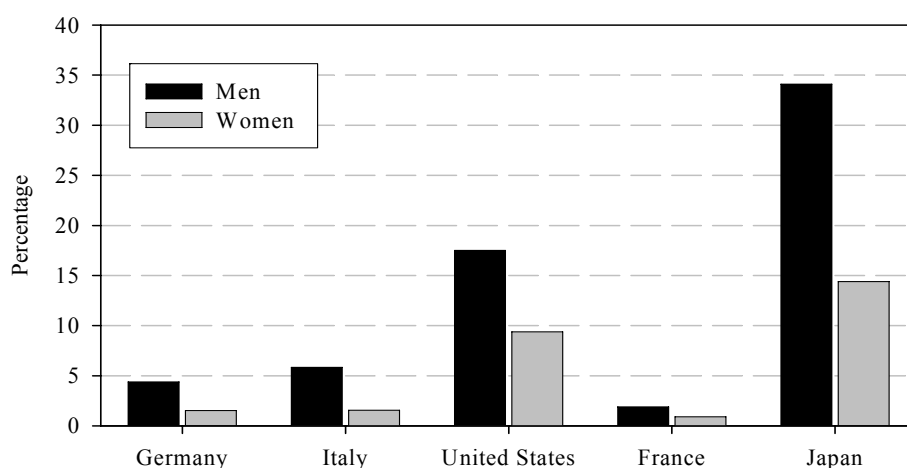


*Source:* ILO, Yearbook of Labour Statistics 2002, 2003.

*Changing social security programmes*

As argued above, the evidence suggests that in Japan the first dividend played an important role in generating the outstanding economic dynamism that characterized the country from the late 1950s to the late 1960s. As a result, Japan managed to establish universal pension and medical care plans in 1961. Since then, Japan's social security system has grown remarkably. Between 1961 and 2002, social security benefits increased from 5 per cent to 23 per cent of national income (Social Insurance Agency, 2004). Moreover, the proportion of the social security expenditure allotted to the older population increased from 26 per cent in 1975 to 56 per cent in 2001. However, individual contributions to the social security system have increased less rapidly than benefits and general tax revenues have had to be used to cover the growing difference between benefits and contributions.

Japan's social security system encompasses both old-age pension plans and medical plans, as well as the Long-term Care Insurance Scheme (LCIS) and other smaller programmes. The share of social security expenditures accounted for by the first two components has changed substantially over time. Pension benefits and medical benefits represented, respectively, 22 per cent and 57 per cent of total expenditures in 1965, and 53 per cent and 31 per cent of total expenditures in 2002 (Social Insurance Agency, 2004). The major shift toward pension benefits has occurred because of population ageing, the maturation of the pension system, and major changes in medical plans intended to reduce the rapid growth of health costs.

Another reason for the shift is that pension benefits are more closely related to population ageing than medical benefits, because every person, regardless of age, is entitled to the latter.

Public pension schemes were initially established for specific occupational groups, with some groups covered earlier than others. There are currently six different public pension schemes. Two of these, the Employees' Pension Scheme (EPS) and the National Pension Scheme (NPS), cover approximately 90 per cent of the work force. The EPS was established in 1941. The NPS was established in 1961 to cover workers not already covered by the other public pension schemes. Thus, 1961 marks the start of pension coverage for all workers in Japan.

A major difference between the EPS and the NPS is that paid employees working for a firm with at least five regular workers belong to the EPS, whereas farmers, other self-employed workers, employees of small firms with less than five regular workers, and certain other categories belong to the NPS. The two schemes also differ in levels and methods of contribution. In the EPS in 2005, the equivalent of 13.934 per cent of a worker's total annual earnings including bonuses is contributed to the Government, with contributions evenly split between the employee and the employer. In the NPS, the Government collects a flat contribution from enrolled members, most of whom are self-employed. In 2005, that contribution was 13,580 yen (about US$125) per month. Because the contributions to the NPS are lower than to the EPS, beneficiaries under NPS receive considerably lower benefits than those under the EPS. In both the NPS and EPS, the level of benefits began to vary automatically with changes in the consumer price index only in 1999.

Reforms enacted in 1994 mandated the elimination by 2013 of inter-scheme differences in the minimum age at which beneficiaries are entitled to a pension. That age is gradually increasing in the different pension schemes until it reaches 65 years for all workers in 2013. An unresolved problem once the minimum age for pension entitlements reaches 65 years for all workers is that many firms currently require employees to retire at or before age 60, thus leaving an intervening period where retired persons will not be entitled to any pension either from their employer or from the social security system.

When Japanese pension schemes were initially established, they were organized on the principle of reserve financing so that large amounts of reserve funds were accumulated to cover the payment of old-age benefits for future retirees. Figure 5 shows the long-term growth of reserve funds accumulated in all the public pension schemes combined from 1965 to 2002. These accumulated funds would be the basis of the second dividend associated with population ageing. However, although some of these funds have been used to promote economic development in Japan, mainly by financing public works such as highways or bullet trains, they have not always been used productively and the interest rates paid on them, which have been set by the Government, have been unreasonably low.

As a result, over time the reserve funds have become insufficient to cover current benefit payouts and have required that the Government shift away from reserve financing toward pay-as-you-go financing via subsidies to the social security system covered by general tax revenues. Unlike reserve financing, pay-as-you-go financing is directly affected by the age composition of the population. As shown in figure 5, the rate of growth of the accumulated reserve funds has been slowing down markedly, especially since the second half of the 1990s, precisely when the increase in the proportion of older persons accelerates. Consequently, Japan's public pension schemes, which were meant to be fully funded, have increasingly come to depend on transfers. Under these circumstances, projections of the expected costs of the pension schemes suggest that intergenerational equity considerations are likely to become an increasingly divisive social issue over the coming decades (Ogawa and Retherford, 1997). Owing to the gloomy long-term prospects for the pension system in Japan, an increasing proportion of the population enrolled in the NPS has stopped paying contributions to the scheme. In 2004, 36.4 per cent of all participants in that scheme had not paid their contributions.

**Figure 5. Growth of reserve funds for all public pension schemes combined
in Japan, 1965-2002**
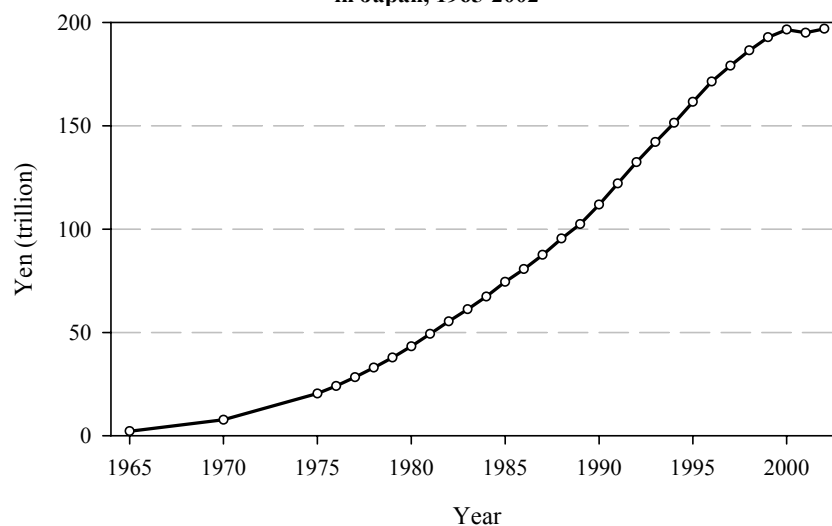
In 2004, another major pension reform was made. One of the primary objectives of the 2004 pension reform was to fix the level of future contributions to make the programme more transparent for younger workers and as a means of reducing benefits for future generations of retirees. Thus, the Government introduced a mechanism to balance benefit levels according to future changes in the population age structure. The goal of this strategy was to avoid repeated reforms and to restore the trust of younger generations in social security. These changes indicate a paradigm shift in Japan's social security provisions because, although its public pension schemes are now sustainable from a financial point of view, they no longer assure adequacy of benefits (Sakamoto, 2005).

As a result of the 2004 reform, the replacement rate for Japanese public pensions declined considerably. According to OECD, an average beneficiary of a pension scheme in Japan is expected to receive 59 per cent of the average earnings of a male worker at retirement, lower than the average for all OECD member States, which was estimated at 69 per cent (OECD, 2005a). According to the 2004 reform, the expected pension is projected to fall to 50 per cent of the average earnings of a male worker by 2023 and will then remain largely unchanged until 2050.

Medical benefits constitute the second major component of social security benefits. Five major plans exist and all the population is covered by one of them since 1961. The Association-managed Health Insurance Plan (AHIP), the Government-managed Health Insurance Plan (GHIP), and the National Health Insurance Plan (NHIP) are the three major plans and together they cover 87 per cent of the population. Employees of large-scale enterprises are enrolled in the AHIP while employees of small or medium-sized businesses are enrolled in the GHIP. Persons not covered by other plans are enrolled in the NHIP. The age structure of members is older in the NHIP than in the other plans, primarily because a large proportion of NHIP members are self-employed owners of small businesses or farmers.

Just at the pension system, the medical insurance plans of Japan have been revised several times. As a result of the rapid economic growth in the 1960s, a free medical care programme for those aged 70 or over was adopted in 1973 but was discontinued in 1983 because of the lacklustre performance of the

economy during the 1970s. As of 1984, older persons requiring medical care became subject to a co-payment, amounting to 10 per cent of the cost of the service received. Since 1984, co-payment levels have been modified several times and have risen to 20 per cent in 1997 and to 30 per cent in 2003.

Despite these changes, the public financial resources allotted to medical care services have been rising. As a result, the health status of the Japanese population has been improving, as reflected by the remarkable rise of life expectancy. Furthermore, between 1950 and 2003, the average age at death of the 50 persons dying at the most advanced ages has been increasing steadily for both sexes (figure 6), and for both sexes that average age has been rising faster since 1973 when the medical care programmes were substantially upgraded, especially by providing free health care to those aged 70 or over. These increases in longevity have prompted people to save more for their longer life after retirement, thus contributing to make the second dividend a reality.

**Figure 6. Change in average age of death among the 50 oldest persons in Japan, by sex, 1950-2003**
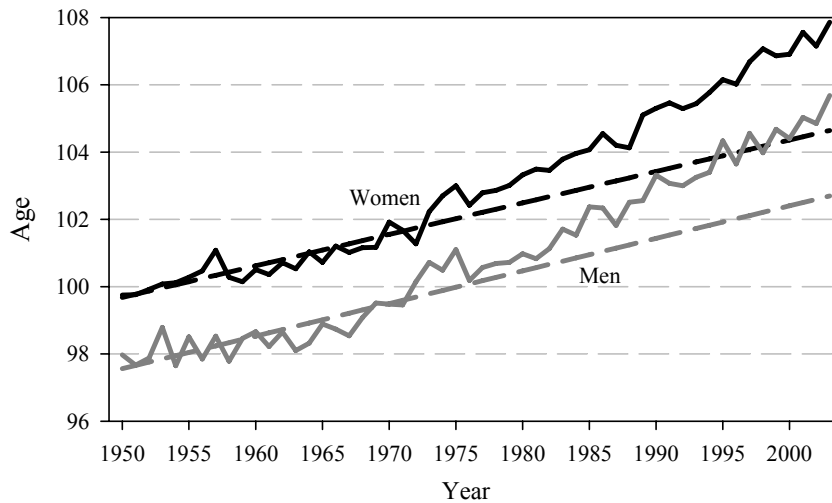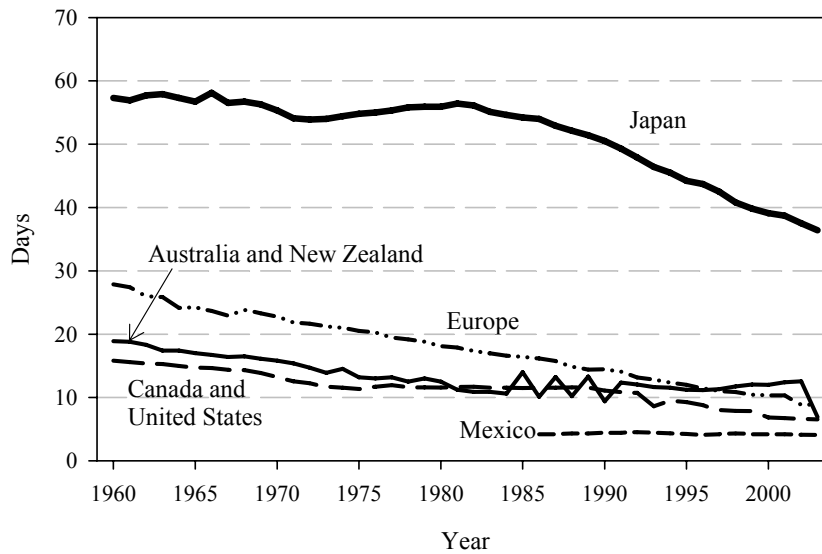


*Source*: Ministry of Health, Labour and Welfare, Vital Statistics, various years.
NOTE: Straight lines show historical trend.

In Japan in 1995, 4.5 per cent of GDP was allocated to medical care services but that proportion grew to 5.8 per cent by 2003 (OECD, 2005b). Despite this rise, the level of medical expenditures in Japan is still considerably lower than in most other industrialized countries. For instance, in 2001, 10.3 per cent of GDP was allocated to medical care in the United States, 8.7 per cent in Switzerland, 7.3 per cent in Germany and Iceland, 7.1 per cent in Denmark and 7.0 per cent in Sweden.

In Japan, the average length of hospitalization per patient is very long and this is one of the factors causing the rapid growth of medical costs in the country (figure 7). No other OECD country has average lengths of hospitalization that even approach the level in Japan. Thus, in 2003, average length of hospitalization was 36.4 days in Japan, whereas it was just 4.1 days in Mexico, 6.2 days in Sweden, 6.5 days in the United States, 7.6 days in Italy, 10.9 days in Germany, and 13.4 days in France (OECD, 2005b). There are several reasons for Japan's unusually long average length of hospitalization (Ogawa and Retherford, 1997). A major one is that institutions for long-term care for older persons are a fairly recent development and they are still in relatively short supply given the rising demand for such services. In addition, because of the Confucian tradition of filial piety, the majority of Japanese families prefer placing a frail elderly family member in a hospital than in an institution for older persons.

**Figure 7. Trend in average days of hospitalization in OECD countries, 1960-2003**



*Source:* Ministry of Health, Labour and Welfare, Vital Statistics, various years.

In order to curb the rise in medical care costs by reducing the average length of hospitalization, the Government of Japan established in 2000 the Long-term Care Insurance Scheme (LCIS), hoping to reduce long stays in hospital by facilitating at-home care of older persons. The LCIS is expected to alleviate the care-giving burden placed on families, especially in regard to the responsibilities of middle-aged daughters or daughters-in-law (Ogawa and Retherford, 1997).

Overall expenditures for both medical plans and the LCIS are projected to grow very rapidly (Ogawa and others, 2003). Consequently, further reductions will eventually need to be made to the benefits paid by the social security system and such "downward adjustments" of benefits will imply an increase in the responsibility placed on families to take care of elderly relatives. These changes pose major challenges to both the smaller families of the future and society at large.

### *Deteriorating familial support*

Multi-generational households are still fairly common in Japan (Ogawa and Ermisch, 1996; Ogawa, Retherford, and Matsukura, forthcoming). According to the 2001 round of the International Survey of Lifestyles and Attitudes of the Elderly (Cabinet Office, 2002), 22 per cent of persons aged 60 or over were living in three-generation households in Japan. By contrast, only 2 per cent of the older population in the United States did so, 1 per cent in Germany, and less than 0.5 per cent in Sweden. However, given the rapid demographic shifts that have already taken place in Japan and the rapidly changing lifestyles of both younger and older generations, the percentage of older persons living in multi-generational households has been declining, passing from 37 per cent in 1981 to 32 per cent in 1991 and probably to under 22 per cent today (figure 8). Although the Government of Japan views the persistence of multi-generational households as an asset that can be tapped to offset the adverse effects of population ageing on the sustainability of the social security system, the validity of this view has increasingly been called into question in view of the trends observed.

Because co-residence of older persons with younger relatives facilitates the exchange of resources between generations, the declining trend in the prevalence of multi-generational households has affected various aspects of the post-retirement lifestyle of older persons in Japan. One salient consequence is the

changing trend in the place of death of older persons. Whereas in 1965, 86.5 per cent of the deaths of all persons aged 65 or over occurred at home, by 2003 just 13.5 per cent did so (figure 9).

**Figure 8. Change in the proportion of those aged 60 or over living in three-generation households in selected countries, 1981-2001**
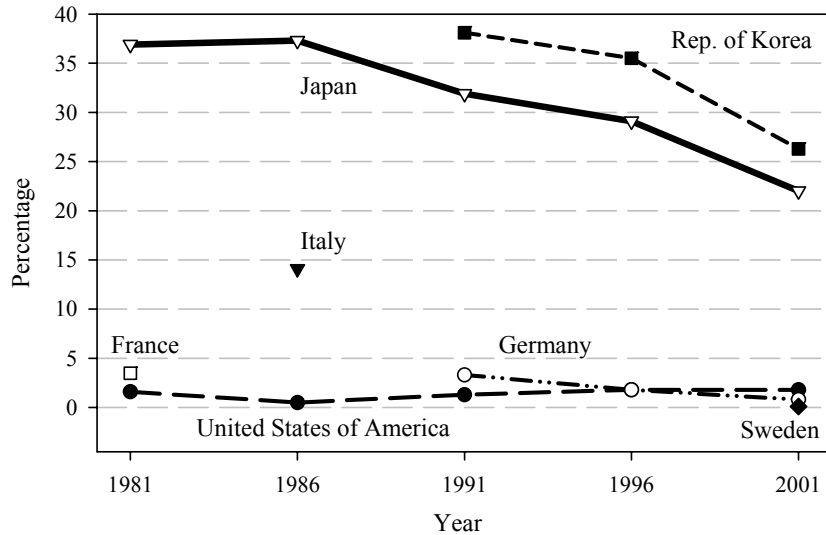


*Source:* Cabinet Office government of Japan, Fifth round of the International Survey of Lifestyles and Attitudes of the Elderly, 2002.

**Figure 9. Change in the place of death among the elderly in Japan, 1965-2003**
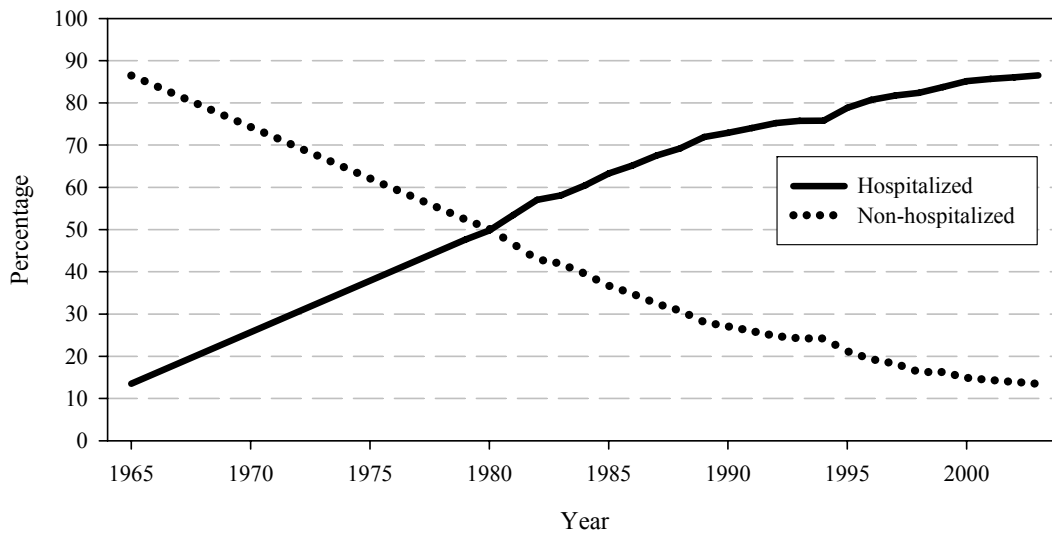


*Source*: Ministry of Health, Labour and Welfare, *Vital Statistics,* various years.

Another important change is the declining trend in the familial support ratio (the ratio of women aged 40-59 to the population aged 65-80), which was 1.3 women per older person in 1990 but is expected to be just about half, 0.65 women per older person, in 2010. These changes suggest that the demographic potential of familial support for older persons by adult children is diminishing rapidly, with the decline

being particularly rapid after 2009 when the last members of the large cohort born during 1947-1949 will reach age 60.

In addition to these demographic shifts, there have been major and dramatic changes in the lifestyles and values of Japanese society. Data gathered in a series of National Surveys on Family Planning, undertaken every other year since 1950 by Mainichi Newspapers (Population Problems Research Council, 2000), provide evidence in this regard. Since the first round of the survey and with the exception of just a few rounds, a question regarding expected dependence on children for old-age security has been posed to currently married women of reproductive age who have at least one child. The pre-coded responses are: (*a*) "expect to depend on children"; (*b*) "do not expect to depend on children"; and (*c*) "never thought about it." The percentage of respondents who responded that they "expect to depend on children" declined almost continuously from 1950 to 2004 (figure 10). Whereas in 1950 almost two thirds of married women in Japan said they expected to depend on their own children for old-age security, by 2004 just 11 per cent did so. These changed expectations are undoubtedly closely connected with the rapid improvement of old-age pension schemes that took place mainly during 1961-1990.

**Figure 10. Trends in norms and expectations about elderly care in Japan, 1950 -2004**
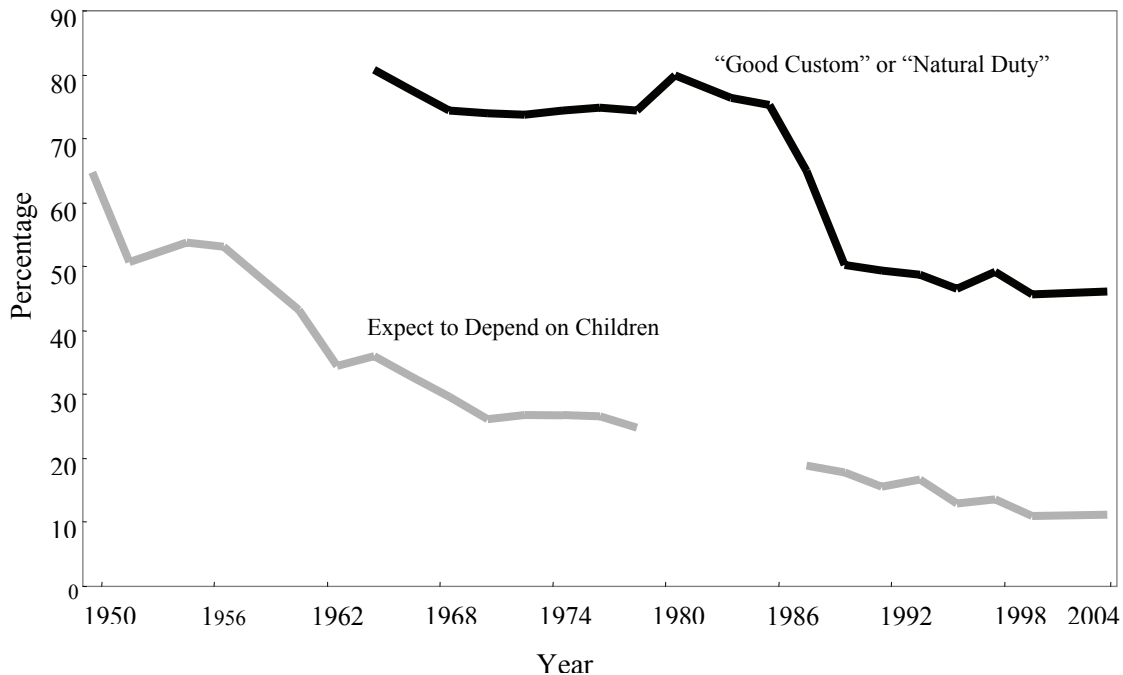
*Sources:* Mainichi Newspapers of Japan, Summary of Twenty-fifth National Survey on Family Planning, 2000; Mainichi Newspapers of Japan, Summary of the 2004 round of the National Survey on Population, Families and Generations, 2004.

Since 1963 the Mainichi Newspapers surveys have also included a question on what the married women interviewed thought of the expectation that children would take care of their aged parents. The pre-coded responses were: (*a*) "good custom"; (*b*) "natural duty as children"; (*c*) "unavoidable due to inadequacy of public support resources"; and (*d*) "not a good custom". Figure 10 presents a plot of the percentage of married women who chose one of the first two responses, (*a*) or (*b*). Between 1963 and 1986, the percentage of respondents who felt that providing care for older parents was either a good

custom or a natural duty remained fairly stable but from 1986 to 1988 a dramatic drop occurred and since then that percentage has been decreasing.

In addition, results from a recent international comparative survey covering high school students in China, Japan and the United States further reinforce the above findings (figure 11). The surveys show that in Japan just 43 per cent of high school students aged 15 said they would take care of their parents, should their parents fall ill, compared to 84 per cent in China and 68 per cent in the United States (Japan Youth Research Institute, 2005). These responses suggest that the decreasing trend in familial support implied by the responses of women of reproductive age may continue unabated for the next decade or so.

**Figure 11. Proportion of high school students willing to take care of parents under any circumstances, when their parents get older and need some help in their daily lives due to poor health in Japan, United States and China, 2005**
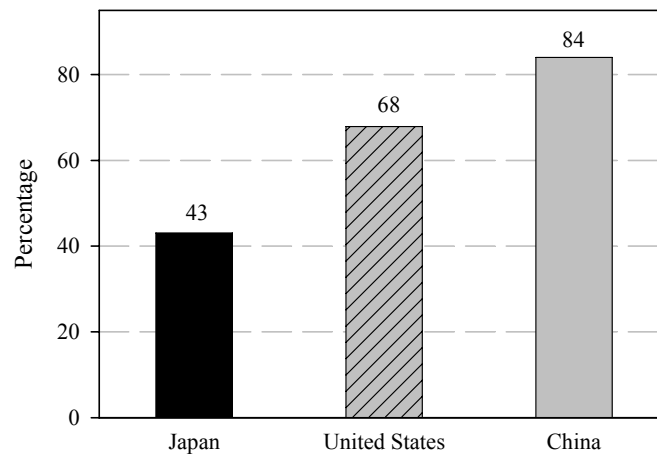


*Source:* Japan Youth Research Institute (2005).

### C. THE INCREASING HEALTH AND WEALTH OF OLDER PERSONS IN JAPAN

What can Japan do to cope with the difficulties arising because of its rapidly ageing population? In recent years, demographers and scholars in other disciplines have discussed a variety of policy options (MacKellar, 2003; Onofri, 2004). Among them, Sinding (2002) has described the following four alternative outcomes in relation to policy responses: (*a*) a slow fadeout of the population in a scenario where there is no policy intervention and the population continues to age and decrease; (*b*) a healthy ageing scenario in which public policy recognizes the necessity of increasing the labour force participation and effectiveness of older persons; (*c*) a replacement migration scenario where migration is used to slow down population ageing, and (*d*) successful pronatalism, a scenario where policy intervention manages to increase total fertility to retard ageing.

Bongaarts (2004) has recently analyzed the impact of population ageing on public pension plans and has discussed the following policy options: (*a*) counteracting population ageing by encouraging higher fertility and admitting more migrants; (*b*) increasing labour force participation; (*c*) raising the retirement age, and (*d*) reducing public pension benefits.

We examine below the following two policy options for Japan: (*a*) increasing both the labour force participation among older workers and the age at retirement, and (*b*) making more effective use of the

financial and non-financial wealth of older persons. A discussion of other policy options can be found in Ogawa (forthcoming).

*Health and work among older persons*

The first two rounds of the Nihon University Japan Longitudinal Study of Aging (NUJLSOA) provide data that allow the estimation of the health status of persons aged 65 or over. The NUJLSOA is designed to be comparable in many respects with the United States Longitudinal Study of Aging. The first round of the NUJLSOA was conducted in November 1999. It covered an initial sample of 6,700 persons aged 65 or over. Proxy respondents were allowed to answer questions in cases where the selected respondent was not competent to answer or was not available at the time of interview. The total number of completed interviews was 4,997. Persons aged 75 or over were over-sampled by a factor of two. When analyzing the data, therefore, weights need to be used to calculate measures relative to the total population aged 65 or over in Japan. Despite strenuous efforts to include persons in institutions in the NUJLSOA, they remain underrepresented in the survey. The second wave of the survey was conducted in November 2001. It covered a sample of 4,621 persons including 631 new respondents.

To study health status, a person is considered healthy and active it he or she did not have any difficulties in performing all seven activities of daily living (ADLs) and all seven instrumental activities of daily living (IADLs) at the time of the survey. A person was considered to have poor health or be inactive if he or she was unable to perform at least one ADL or IADL. The seven ADLs are bathing, dressing, eating, transferring from or to a bed or a chair, walking inside the house, going outside, and toileting. The seven IADLs consist of preparing one's own meals, shopping for personal items, managing money, making a phone call, doing light house work, going out alone by using public transportation, and taking medication.

By using the multi-state estimation method "IMaCh" (Le Lièvre and Brouard, 2003) in conjunction with data from the two rounds of the NUJLSOA, Le Lièvre and Saito (2005) have estimated annual transition probabilities among the following three states: (*a*) healthy and active, (*b*) in poor health or inactive, and (*c*) dead. In figure 12, the transition from the healthy and active state to the one of poor health or inactivity is labelled "incidence of disability"; that from the healthy and active state to death is labelled "mortality from active state"; the transition from poor health or inactivity to a healthy and active state is labelled "recovery of health", and that from poor health or inactivity to death is labelled "mortality from inactive state". Transition probabilities are estimated by age and sex. Incorporating these transition probabilities in the most recent version of the NUPRI model, we have projected the number of healthy and active older persons and the number of those who are expected to be in poor health or inactive from 2000 to 2025 (figure 13). In doing so, the transition probabilities were assumed to remain constant over the projection period. An attempt to include education as a covariate showed that education is not statistically significant and was therefore not included in the final model.

According to the projection, the proportion of older persons who are in poor health or inactive would increase, passing from 13.8 per cent in 2000 to 18.7 per cent in 2025. However, the number of healthy and active older persons would also rise substantially, going from 18.9 million in 2000 to 30.3 million in 2025.

These projections suggest that Japan's productive capacity could expand considerably if older persons who remain healthy and active keep on being economically active and gainfully employed. In order to assess such potential, a base run plus two simulated scenarios have been calculated for the period 2005-2025. In Simulation 1, it is assumed that all healthy older persons remain in the labour force over the projection period. In Simulation 2, the labour force participation rates for both men and women aged 60-64 over the projection period are set equal to those of persons aged 55-59. That is, Simulation 2 assumes

that the mandatory retirement age is raised from 60 to 65 years, that companies comply with that change and that the labour force participation rates for both men and women aged 65 or over are higher by 10 percentage points than those currently observed. The most recent version of the NUPRI model is used to calculate the relevant projections.

**Figure 12. Estimated annual health-status transition probabilities in Japan among persons aged 65 or over**
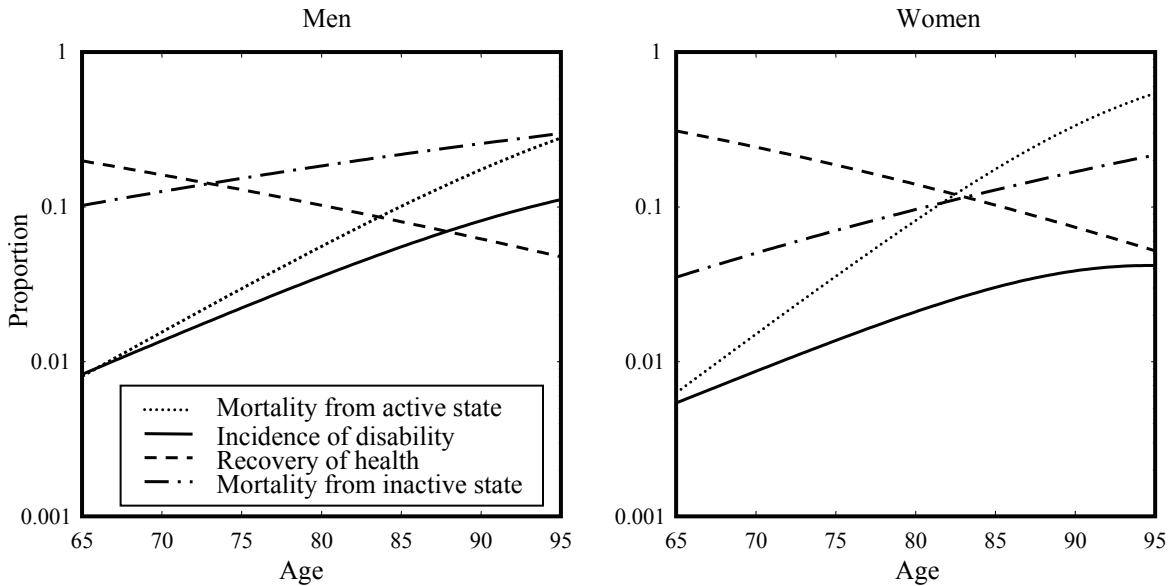


*Source*: Le Lièvre and Saito (2005).

**Figure 13. Projected population aged 65 or older by heath status, Japan 2000-2025**
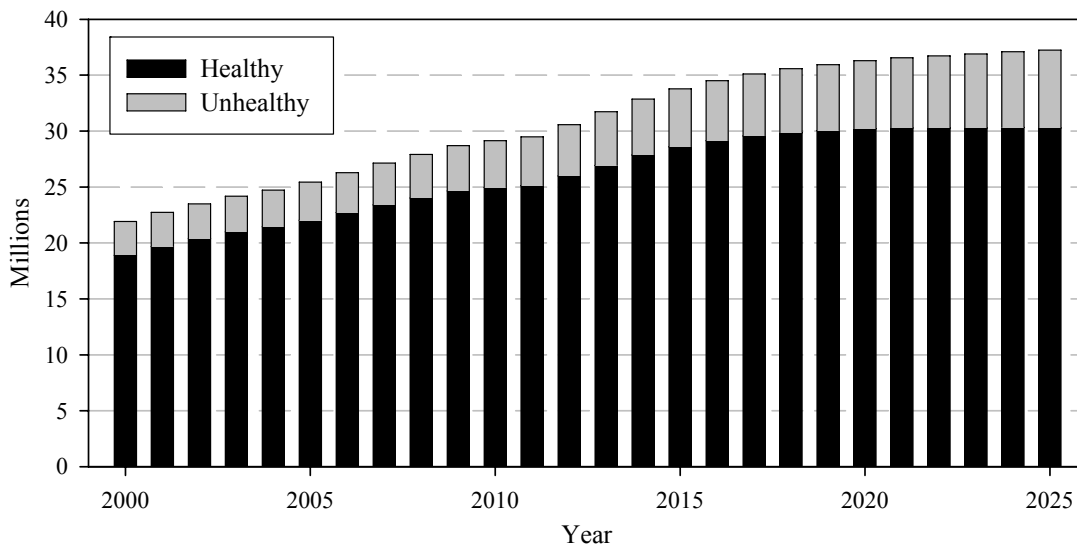


*Source*: Authors' calculations based on health-status transition rates in figure 12.

According to Simulation 1, real GDP (in 1990 constant prices) by 2025 would be 27.8 per cent higher than in the base run if all healthy older persons continued to work. In addition, GDP per capita would be 26.7 per cent higher than in the base run (table 2). In Simulation 2, the assumed change in the labour force participation rates of older persons would produce, in 2025, a 12 per cent higher real GDP than in the base run and a similar gain in real GDP per capita.

If the health status of Japanese older persons continues to improve and life expectancy at age 60 continues to increase, it is highly likely that more Japanese over age 60 will want to remain in the labour force. These two simulations suggest that if industrial relations and retirement policies change so as to allow older persons to remain economically active, the contribution that they can make to the economy can be substantial. Note that the larger work force generated by higher labour force participation among older healthy persons would produce a considerable increase in the first demographic dividend, though it may also reduce the second dividend because people would expect a shorter period of life in retirement and might therefore save less.

TABLE 2. SIMULATION EXERCISES FOR ALTERNATIVE LABOUR PARTICIPATION
RATES AMONG OLDER PERSONS IN JAPAN, 2005-2025

| NUPRI model projection | Base run | Simulation 1[a] | Simulation 2[b] |
|---|---|---|---|
| Potential GDP (trillion yen) | | | |
| 2005 | 561.2 | 653.8 (16.5%) | 576.4 ( 2.7%) |
| 2015 | 600.6 | 747.2 (24.4%) | 661.8 (10.2%) |
| 2025 | 619.1 | 791.3 (27.8%) | 692.3 (11.8%) |
| | | | |
| Potential GDP per capita (million yen) | | | |
| 2005 | 4.4 | 5.1 (16.5%) | 4.5 ( 2.9%) |
| 2015 | 4.8 | 5.9 (23.9%) | 5.3 (10.8%) |
| 2025 | 5.1 | 6.5 (26.7%) | 5.7 (12.3%) |
| | | | |
| Labour force (1 000 persons) | | | |
| 2005 | 66 958 | 86 803 (29.6%) | 70 386 ( 5.1%) |
| 2015 | 62 827 | 89 107 (41.8%) | 73 938 (17.7%) |
| 2025 | 59 172 | 87 880 (48.5%) | 70 921 (19.9%) |

NOTE: Numbers in parenthesis refer to the percentage increase relative to the base run.
[a] Simulation 1: Assumes that all healthy persons aged 65 or over will participate in the labour force throughout the projection period.
[b] Simulation 2: Assumes: (i) that the labour force participation rates of those aged 60-64 are raised to those of aged 55-59, and (ii) that the participation rates of those aged 65 or over are raised by 10 percentage points above the current rates.

### Accumulation of wealth among older persons

In recent years, many financial institutions in Japan have been paying increasing attention to the generation of baby boomers and their accumulated wealth. In Japan, persons born from 1947 to 1949 are approaching the mandatory age of retirement. It is estimated that these baby boomers hold today total financial assets worth 130 trillion yen (US$1.3 trillion) or nearly 10 per cent of the nation's overall assets (The Nikkei Weekly, 2005).

As discussed earlier, both a first and a second demographic dividend have been generated over the course of Japan's demographic transition since 1945. The second dividend is tied to the amount of wealth accumulated by older persons. Estimates of the value of real and financial assets held by older persons in Japan can be obtained from the 1999 round of the National Survey of Family Income and Expenditure (NSFIE) and are shown in figure 14. For comparison, that figure also shows the present value of the expected future stream of public pension benefits. To be consistent with the estimates of the value of real and financial assets, the present value of expected public pension benefits refers to 1999. In calculating

that present value, account has been taken of the changes in contributions and benefits established by the provisions adopted in 1999 and 2004 on pension reform. The discount rate used is 1.25 per cent, representing the average interest rate for long-term government bonds over the period 1999-2004.

The estimates obtained show that older persons in Japan are wealthy. At age 60, the total amount of assets an average person owns is higher than 50 million yen or $US 0.5 million. In fact, the wealth of older persons is higher than these estimates suggest because private pensions have not been included in the calculation, nor has it included the various types of transfers from children to parents.

**Figure 14. Age profile of assets and pension wealth in Japan, 1999**
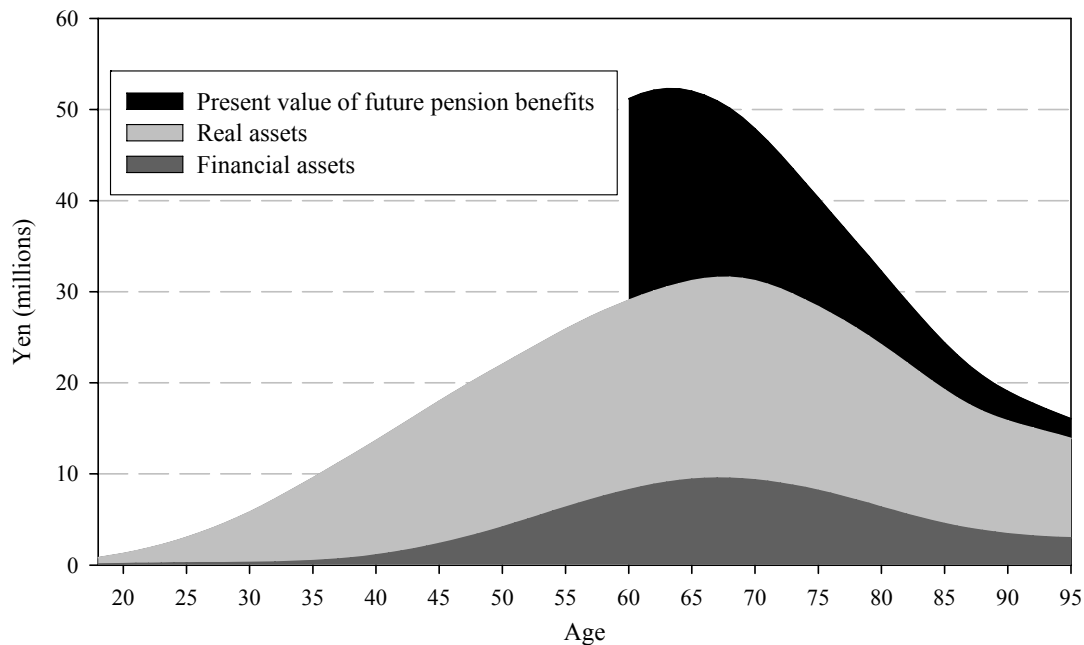
Note that the expected amount of public pension benefits is greater than accumulated real assets at the early stages of retirement life, but the latter exceeds the former by a large margin at later stages of life. Consequently, it would appear that the liquidation of real assets, including land and housing, may be crucial for the support of consumption in very old age, particularly for persons who live alone and cannot count on familial support. To facilitate the use of those real assets, appropriate financial instruments may have to be developed, such as reverse mortgage plans. One such programme is the Musashino City Scheme which provides reverse mortgages on the real estate property of older persons (Martin, 1989). However, such financial arrangements are still rare in Japan.

Future generations of older persons in Japan may not have similar accumulation of real estate assets because, as a result of Japan's lost decade and the drop of real estate prices, Japanese people no longer have a strong preference for land as an investment. According to the National Opinion Survey on Land Issues conducted by the Ministry of National Land and Transportation in 2004, the proportion of persons aged 20 or over who think that land is a better investment than financial assets, such as savings and securities, declined from 62 per cent in 1993 to 33 per cent in 2004. This trend suggests that Japanese of all ages, but particularly older Japanese, may need more information and education regarding investment

opportunities and the management of financial assets. Currently, knowledge in those areas is poor. According to a recent OECD report (OECD, 2005c), 71 per cent of the population aged 20 or over in Japan had no knowledge of how to invest in equities or bonds, 57 per cent had no knowledge of financial products in general, and 29 per cent had no knowledge about insurance, pensions or taxes.

Provided that older persons in Japan gain more knowledge about the dynamics of financial markets, they may decide to invest their accumulated assets productively, possibly outside Japan. Given that the timing of the first demographic dividend in nearby Asian countries has varied considerably (Cheung and others, 2004), their economies are likely to continue benefiting from favourable demographic conditions at a time when older persons in Japan are ready to invest their accumulated assets. For instance, China is expected to benefit from the first dividend between 1990 and 2030, whereas the first dividend for Japan is already exhausted. The healthier and wealthier older Japanese may thus be able to invest their assets in other dynamically growing economies in the region, including China, so as to benefit also from the effects of the first demographic dividend on other populations. Clearly, to make such an investment strategy possible, international transactions must be allowed and proper institutional and legal arrangements need to be developed to offer protection against asset mismanagement.

To conclude, a word of caution is in order. Recent evidence shows that income disparities have been expanding rapidly in Japan, not only among the population in general but also among older persons (Time, 2005). This worrying trend must be studied in more detail so that measures to stop or reverse it may be taken soon. Otherwise, inequality may exacerbate the problems associated with the rapid increase in the number of older persons.

## D. Conclusion

This paper has reviewed the evidence supporting the existence of a first and a second demographic dividend in Japan and concluded that the first demographic dividend did contribute to improve the economic performance of the country, particularly during the late 1950s and the 1960s. There is also considerable evidence suggesting that the conditions for making the second dividend a reality exist. Today older persons in Japan are and will likely remain healthier and wealthier than ever before. Being healthier, they may continue to be productive as part of the labour force, thus being an important asset in any strategy to save Japan from a future economic stagnation or financial crisis. Being wealthier, they may be able to invest their accumulated assets more productively than heretofore and either help spur further economic growth in Japan itself or, if willing and capable of investing abroad, perhaps help finance the development of other Asian countries which may themselves be benefiting from demographic dividends of their own.

In this way, older persons in Japan may themselves become key actors in ensuring healthy ageing and the continued dynamism of their country's economy. However, such positive outcomes are highly dependent on the adoption of government policies that promote the continued labour force participation of older persons and that facilitate the productive investment of their accumulated wealth. Provided such policies are implemented, older persons in Japan will cease being considered liabilities and become themselves important assets for society.

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# AGEING AND HEALTH IN THE TRANSITION COUNTRIES OF EUROPE
## WITH FOCUS ON THE HUNGARIAN CASE

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During the twentieth century, the transition countries of Europe[1], as they are known today, experienced two upheavals. First was the communist take-over between 1917 and 1949. The period of communism lasted 77 years for the first member-republics of the Soviet Union and about 40-50 years in other transition countries (Magyar Nagylexikon, 2003). The second period of turbulence came in 1989-1991, when those regimes collapsed. Their peoples regained political independence and had to face the difficulties associated with establishing new, democratic institutions and transforming the command economies into market-oriented ones.

From a global perspective, these countries can justifiably be regarded as a distinct group. They formed an ideological, political, economic and partly military totality, separated from free capitalist Europe by the "iron curtain". Beyond the iron curtain, however, and despite all efforts at homogenisation, their diverse climatic and geographical conditions, deep historical roots, manifold cultures, languages, ethnicities and religions as well as the wide range of their modes of production, distribution and consumption have left imprints that are perceptible in their demographic behaviour, family and community lifestyles. This diversity is reflected in various features of these countries' demographic transition. Fertility has declined in all, but there has been much variation in timing, duration and speed of that decline. Total fertility rates (TFR) in 2003 ranged from 1.1 in Armenia, Bulgaria, Latvia, Russia and Slovenia to 3.0 in Tajikistan, while life expectancy at birth in 2002 ranged from 56 years in Kazakhstan and Turkmenistan to 73 years in Slovenia among males, and from 63 years in Tajikistan to 81 years in Slovenia among females (WHO, 2005).

During the second half of the twentieth century, increases in life expectancy at birth resulted mainly from reductions in infant and child mortality, particularly due to infectious diseases. For about 30 years from the late 1960s, there was little improvement in life expectancy of adults. In the 1970s and 1980s, survival probabilities of the middle-aged were relatively low and even worsening in the case of males. Following the change in political systems, there were further declines in life expectancy during the 1990s (Watson, 1995; Bobak and Marmot, 1996; Velkova, Wollesswinkel-van den Bosch and Mackenbach, 1997; Carlson, 1998; Marmot and Bobak, 2000; McKee and Shkolnikov, 2001; Meslé, 2002; European Communities and WHO, 2002; Nolte, McKee and Gilmore, 2004).

Recent improvements in mortality at higher ages have made longevity a new component of the demographic dynamics in transition countries, giving a new impetus to the ageing process in these countries. Little attention, however, has been paid to the health of the older population living in Central and Eastern Europe. On the one hand, international comparative studies on the health of older persons seldom include the former communist countries. On the other hand, studies on health in transition countries tend not to focus on the older population (Caselli and Lopez, 1996; Arnaudova and Charpak, 2004).

In view of this situation, the objectives of the present study are twofold: first, to provide a cross-national descriptive analysis of population ageing and health conditions of older persons in selected European countries, including transition and non-transition countries; secondly, to present a comprehensive picture of the health status of the older population in Hungary.

Ten transition countries and three non-transition countries of Europe have been included in the comparative analysis developed in the first part of the study.   From among the former communist countries, Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia were chosen based on the principle of the "closest neighbour". These countries cover a contiguous area stretching from the Baltic to the Adriatic and the Black Sea and share a similar historical and cultural heritage. Except in Romania, their transition from socialism to capitalism was peaceful. By 2005, their economies had more or less recovered, some of them from deep crises. From the point of view of demographic transition, they form a relatively homogeneous group, in contrast with most other Eastern European or Central Asian post-Soviet republics. The selection of three non-transition countries, namely Austria, Finland and Portugal, was based on a similar premise. Austria and Finland are immediate neighbours, and have historical, cultural and economic ties with at least one transition country. Portugal represents a "virtual closest neighbour" of the transition countries, having parallel experiences in post-war levels of economic development, enclosure and isolation during the fascist era, and belated improvements in mortality.

The cross-national comparative review includes indicators of demographic ageing, underlying fertility and mortality trends, total and healthy life expectancies at birth and at age 60, and selected causes of death at age 65 and above. The data were taken from two major sources: the Council of Europe's demographic yearbook *(Recent Demographic Developments in Europe),* and the *European Health for All database* of the World Health Organization Regional Office for Europe.

The data used in the second part of the study on the health status of the Hungarian older population were taken from several sources, including population censuses, vital statistics, outpatient and inpatient services, dispensaries, and registers of specific diseases. In addition to these regular statistics, relevant results from two recent sample surveys—the National Health Interview Survey (NHIS) and the Hungarian Social and Demographic Panel Survey (DPA)—were also employed. These surveys do not focus explicitly on the older population, and only the first is a health survey.  Nevertheless, most results are available by age categories, providing insights into the health status of the Hungarian older population.

A.  AGE COMPOSITION AND OLD AGE HEALTH IN COMPARATIVE PERSPECTIVE

*Population ageing*

There are no significant "system-specific" differences between transition and non-transition countries in terms of the proportion of population aged 65 or over. Among the post-communist states, Slovakia has the lowest proportion of older persons among both men and women (9 and 14 per cent respectively), while Bulgaria has the highest proportion of older males (15 per cent) and Latvia the highest proportion of older females (20 per cent). The proportion of people aged 65 or over in the three non-transition countries—Austria, Finland, and Portugal—is 18-19 per cent for women and 12-14 per cent for men (figure 1).

The current old-age "burden" can be assessed by referring to the first column of the dependency ratios in table 1. Only Slovakia and Poland have a ratio of population aged 65 or over to that aged 15-64 that is below 20 per cent. Seven countries have ratios above 22 per cent, with Bulgaria at 25 per cent. Immanent changes in old-age dependency are indicated in the second column of table 1, which shows the ratio between those entering old age (60-64 years old) and those entering working age (ages 15-19). These figures are affected by the different sizes of cohorts born in 1938-1942 and 1983-1987, as well as by differing national levels of mortality. The combined effect of these factors varies considerably from country to country. During the early twenty-first century, population ageing is expected to be relatively less intense in the Baltic States and Slovenia, but it will accelerate in Hungary. In the somewhat longer run, as indicated by the dependency ratio between older persons and children in the third column of

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table 1, ageing will become particularly rapid in Portugal and Bulgaria, and relatively less so in Slovakia and Poland.

The age composition of the older population is gaining increasing importance as longevity increases and much of the old-age dependency involves the need for care or support of the oldest. Table 2 shows that particularly for women, the proportion aged over 85, among those aged 65 or over, is highest in the non-transition countries and better-off transition countries. Thus, even though those countries do not stand out from the others in terms of the proportion aged 65 or over, the economically better-off countries do stand out with respect to the oldest-old.

**Figure 1. Proportion of population aged 65 and over, by sex, January 2002**
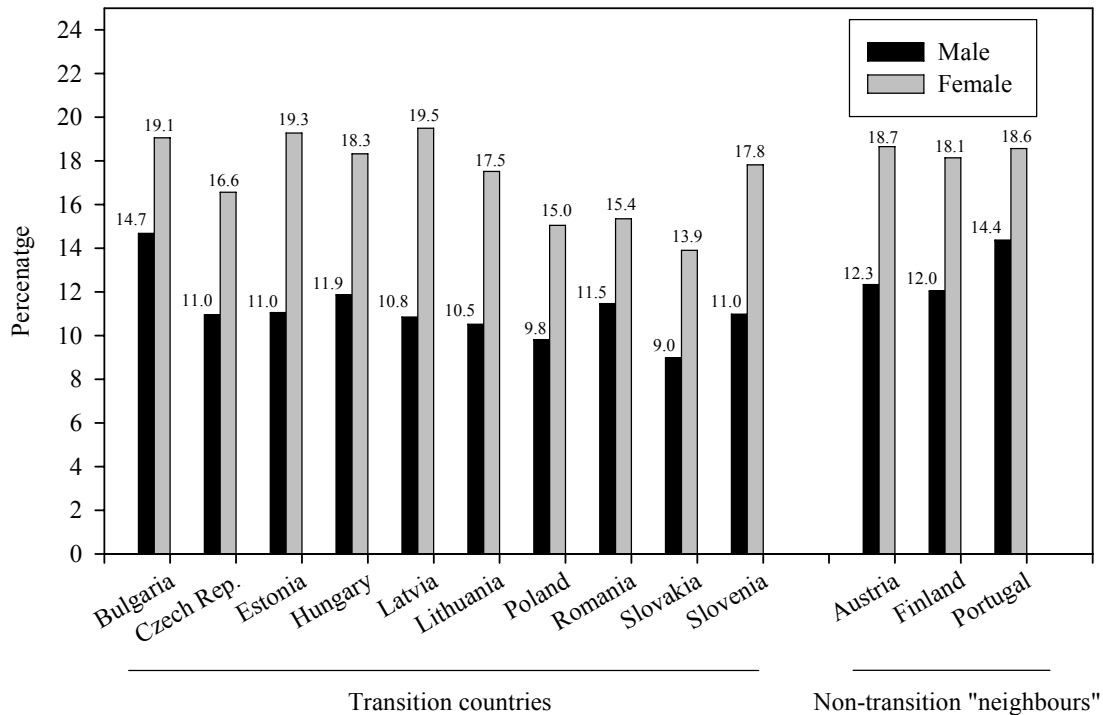
*Fertility rates*

Past fertility levels are reflected in the present proportions of women aged 65 and over. There is a clear correlation, for example, between total fertility rates (TFR) in 1960 and the shares of older women in 2002 (r = -0.48). In 1960, fertility was just at or was below the replacement level of 2.1 in Latvia, Estonia, Hungary and the Czech Republic. In 2002, except for Czech Republic, these countries had the largest share of older women. For men, the correlation between past fertility and ageing is less salient, probably because male mortality rates are higher and more diverse across countries than female mortality rates.

TABLE 1. DEPENDENCY RATIOS, JANUARY 2002[a]
*(Percentage)*

| Ages 65 or over relative to ages 15-64 | | Ages 60-64 relative to ages 15-19 | | Ages 65 or over relative to ages 0-14 | |
|---|---|---|---|---|---|
| Slovakia…………………. | 16 | Latvia………………….. | 50 | Slovakia………………. | 60 |
| Poland…………………. | 18 | Finland…………………. | 50 | Poland…………………. | 69 |
| Romania[b]……….............. | 20 | Estonia…………………. | 67 | Romania[b]………………. | 75 |
| Czech Republic………….. | 20 | Lithuania………………... | 73 | Lithuania………………. | 75 |
| Slovenia …...…………….. | 21 | Slovenia………………... | 74 | Finland…………………. | 85 |
| Lithuania………………… | 21 | Romania[b]………………. | 78 | Czech Republic……….... | 87 |
| Hungary………………….. | 22 | Bulgaria………………… | 79 | Estonia…………………. | 90 |
| Finland………………….. | 23 | Czech Republic………… | 81 | Latvia………………….. | 93 |
| Latvia……………………. | 23 | Slovakia………………... | 81 | Hungary………………... | 93 |
| Austria ………………….. | 23 | Portugal………………... | 81 | Slovenia……………….. | 94 |
| Estonia ……………........... | 23 | Poland………………….. | 82 | Austria………………..... | 95 |
| Portugal ………………….. | 24 | Austria…………………... | 83 | Portugal………………... | 104 |
| Bulgaria …………………. | 25 | Hungary………………… | 100 | Bulgaria………………... | 113 |

*Source:* Council of Europe, *Recent Demographic Developments 2002.*
[a] Countries are listed in increasing order of their respective ratios.
[b] January 2001.


TABLE 2. PROPORTION AGED 85 OR OVER AMONG PERSONS AGED 65 OR OVER, JANUARY 2002[a]
*(Percentage)*

| Males | | Females | |
|---|---|---|---|
| Bulgaria…………………………………….. | 4.5 | Bulgaria…………………………………………….. | 5.9 |
| Estonia…………………………….............. | 5.0 | Romania[b]…………………………………………… | 6.6 |
| Romania[b]…………………………………… | 5.1 | Slovakia……………………………….................. | 7.7 |
| Latvia………………………………………. | 5.1 | Poland……………………………………………… | 8.2 |
| Slovenia……………………………………. | 5.1 | Lithuania…………………………………………… | 8.5 |
| Poland………………………………………. | 5.2 | Hungary…………………………………………….. | 8.7 |
| Czech Republic……………………………... | 5.2 | Latvia……………………………………………… | 9.0 |
| Slovakia……………………………………... | 5.4 | Slovenia……………………………………………. | 9.1 |
| Lithuania…………………………………… | 5.8 | Czech Republic……………………………………. | 9.1 |
| Hungary……………………………………... | 5.9 | Estonia…………………………………………….... | 9.4 |
| Finland………………………………............. | 6.2 | Portugal……………………………………………. | 10.1 |
| Portugal…………………………………….. | 7.1 | Finland……………………………………………… | 12.6 |
| Austria………………………………………... | 7.6 | Austria……………………………………............. | 13.5 |

*Source:* Council of Europe, *Recent Demographic Developments 2002.*
[a] Countries are listed in increasing order of their respective ratios.
[b] January 2001.


In spite of the general downward trend of fertility (figure 2), some steep upward changes took place in the past in transition countries as a result of either direct or indirect pronatalist State interventions. For instance, rigourous censorship over abortion and contraceptives in Romania in 1967-1968 and pronatalist financial incentives in Hungary around 1968 and 1975 resulted in sudden spikes in the number of births.[2] These Government regulations produced only transient increases in period fertility so that completed fertility levels have remained almost unaffected. The resultant changes in the numbers of births in

successive years have long-term repercussions that will eventually become evident when "spike" cohorts start entering retirement age.

At the beginning of the 1960s, there was significant variation in TFRs among countries included in this study (Andorka, 1978; Tekse, 2005). By the end of the twentieth century, the cross-country variation had considerably decreased (figure 2). Convergence was largely due to general changes in norms and values, usually referred to as the second demographic transition. Convergence also resulted, in part, from the negative impact on births of political and economic crises and uncertainties. In Finland, Austria and Portugal, the total fertility rate in 2001 was almost the same as in 1988. In contrast, fertility rates declined significantly in most of the post-communist countries. The smallest post-transition change in TFR occurred in Slovenia—0.42 fewer children per woman—while the largest decline took place in Romania—more than one child per woman. In 2001, only Finland and Portugal had a TFR approaching or exceeding 1.50 children per woman. The other countries ranged between 1.14 (Czech Republic) and 1.34 (Estonia).

**Figure 2. Trends in total fertility rate (TFR), 1960-2000**
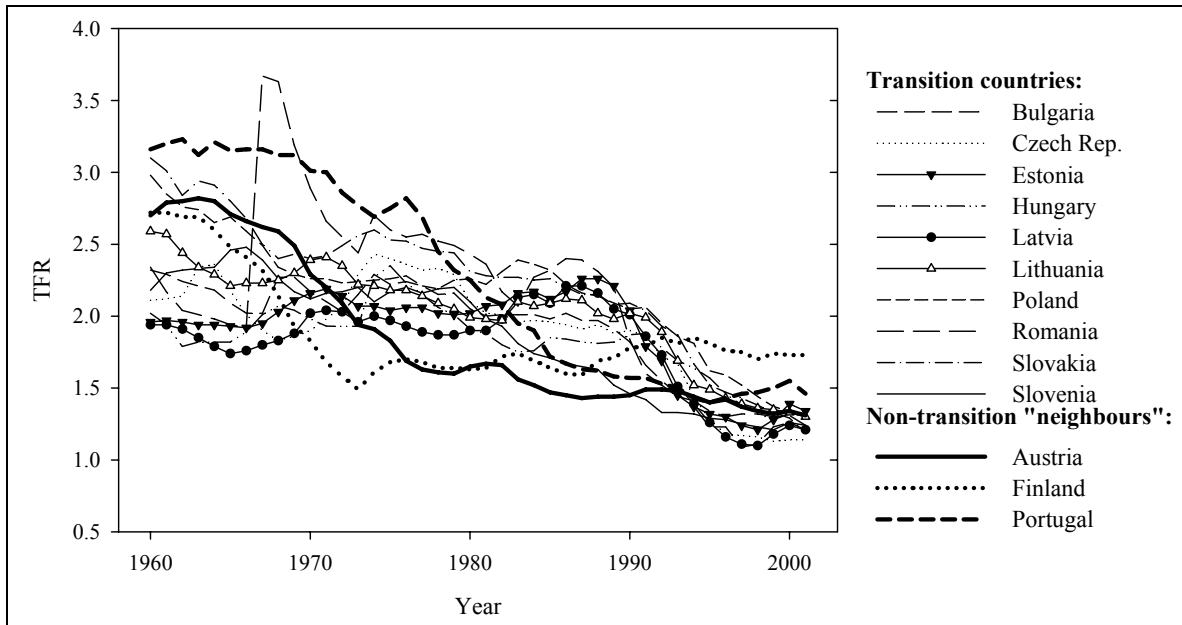


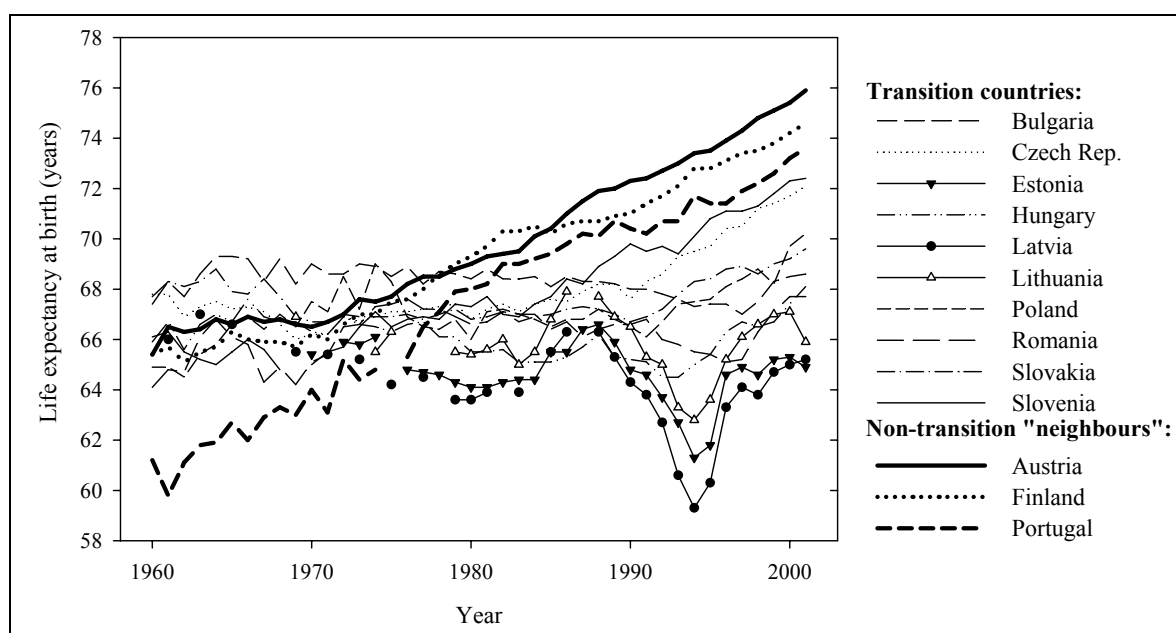*Source*: Council of Europe, *Recent Demographic Developments 2002*.

*Life expectancy at birth*

Trends in life expectancy at birth among the countries included in this analysis vary considerably. With respect to male life expectancy at birth, in 1960 nine countries had values in a narrow range between 64 and 68 years, with transition countries such as Bulgaria, Czech Republic and Slovakia ranking the highest (figure 3). By the end of the 1970s, Portugal caught up with the others and soon left all transition countries behind. During the late 1980s, Estonia and Lithuania progressed remarkably while Hungary made up some of its previous losses. The turbulent years of transition around 1990, however, led to divergence in levels of male life expectancy. In 1985, the range within the 13 countries was 5.3 years, between Austria and Hungary. In 2001, the range increased to 11 years (between Austria and Estonia). The ex-Soviet Baltic republics were the major losers of the post-transition period. Male life expectancies

at birth decreased by 4 to 6 years in a span of six calendar years. By 2001, these countries had not regained their 1988 levels of male life expectancy.

Trends in female life expectancy at birth have shown fewer and smaller reversals (figure 4), and in recent years the range of values across these countries has become narrower for female than male life expectancy. Data for 1960 on female life expectancy are not available for Estonia, Lithuania, or Latvia. Among the remaining ten countries, at that time eight had values in the range of 70.0 years to 73.5 years, with Romania (67.6 years) and Portugal (66.7 years) lagging behind. By 1980, ten countries clustered together within a narrow range of 73.8-76.0 years.  The three outliers were Finland at the top with 77.8 years and Hungary and Romania at the lower end with 72.7 years and 71.8 years respectively. The period of transition had much less impact on female than on male life expectancies. The Baltic States experienced reductions in women's life expectancy during this period, although the decline was much smaller than for men. Between 1987-1988 and 1994, the Baltic States experienced a loss of about 2.5 years in female life expectancies at birth, but by 2001 all of them had surpassed their pre-transition levels.

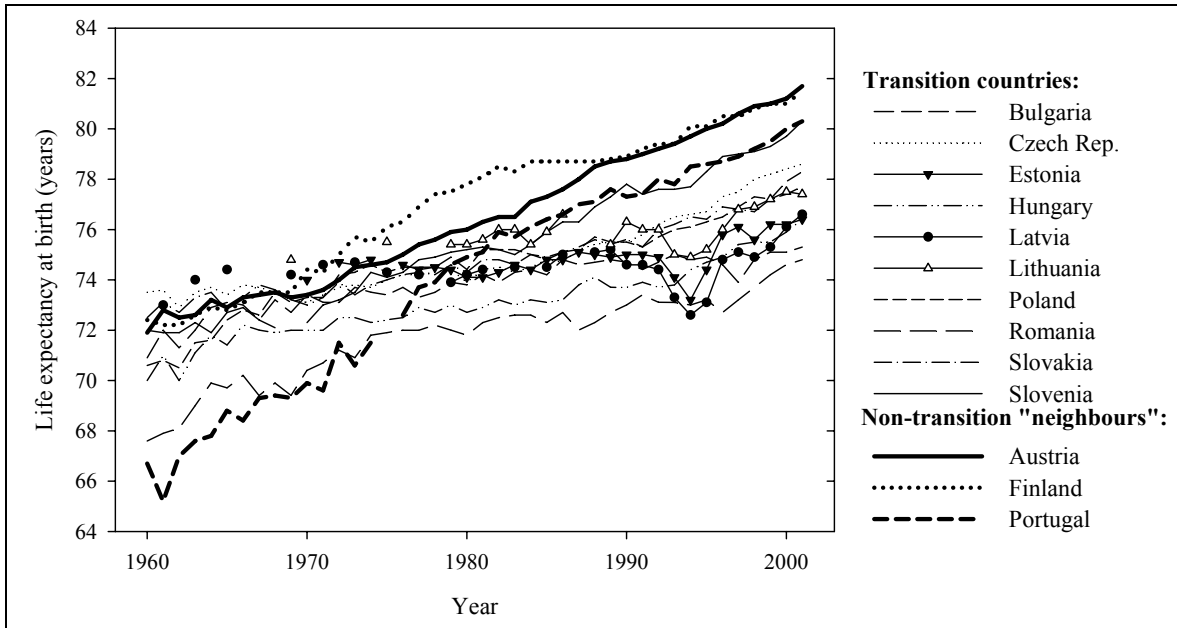**Figure 3. Trends in male life expectancy at birth, 1960-2000**

*Life expectancy at age 65*

Trends in life expectancies at age 65 differ from those in life expectancies at birth in that improvements at higher ages typically began later. Over the period since 1960, life expectancies at age 65 have diverged among the countries examined here, as some countries have shown remarkable gains in old-age survival, while others have experienced smaller improvements or even, in some cases, a regression for men.

Improvements in old-age life expectancy began earlier for women than for men (figures 5 and 6). There was little trend for women during the 1960s. During the 1970s, Austria, Finland and Slovenia progressed rapidly, while Poland and Slovenia experienced a negative change during the early 1980s. Three distinct groups of countries emerged around the mid-1980s: Finland, Lithuania, Austria and
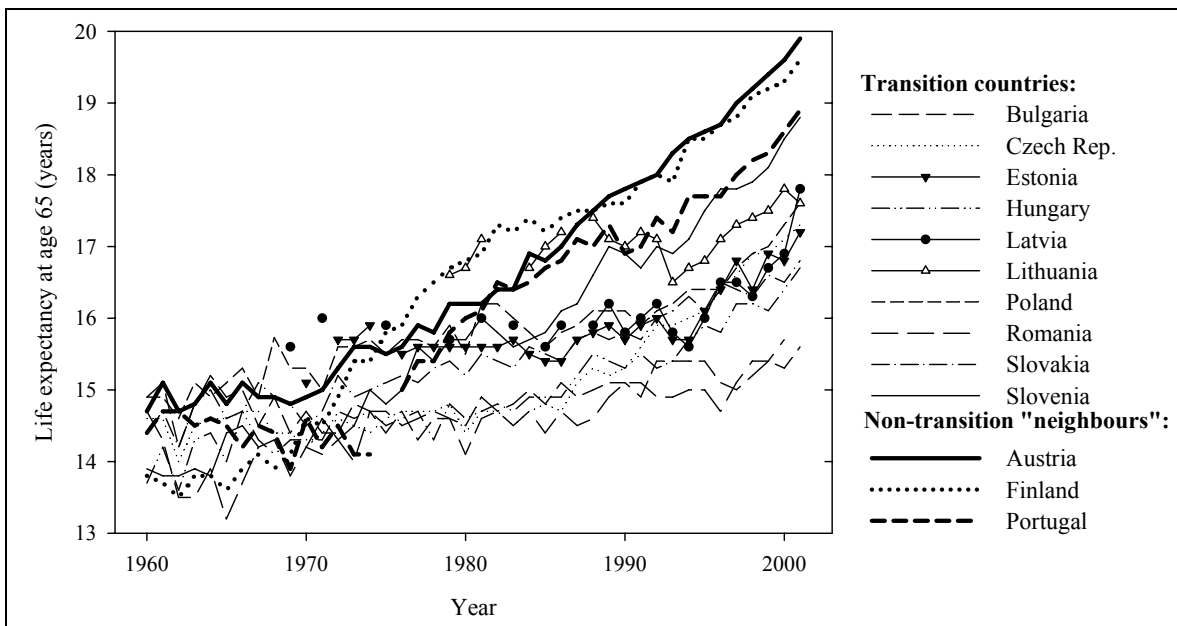
Portugal at the forefront; Slovenia, Latvia, Poland and Slovakia in the middle; and Bulgaria, Hungary, the Czech Republic and Romania at the bottom. The critical years of the 90s had little impact on older women's life expectancies.

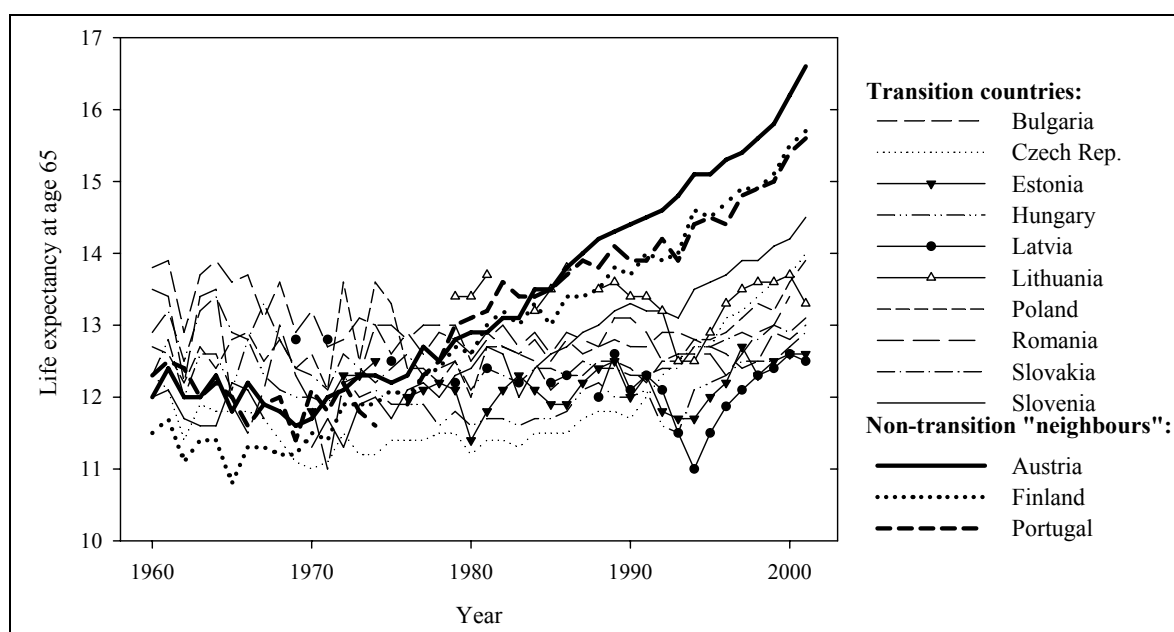**Figure 4. Trends in female life expectancy at birth, 1960-2000**

**Figure 5. Trends in female life expectancy at age 65, 1960-2000**

**Figure 6. Trends in male life expectancy at age 65, 1960-2000**

Male life expectancy at age 65 remained within the limits of 11-14 years from 1960 up to the late 1980s. In non-transition countries and in Slovenia, old-age survival of men started to improve rapidly in the 1980s, and the trend accelerated in the 1990s. In most transition countries, however, downward movements and stagnation during the early years of transition indicate that the epidemiological crisis was not confined to middle-aged men, but also affected old-age mortality. Between the periods 1987-1989 and 1991-1994, life expectancy of men aged 65 decreased by 0.6-1.6 years in Romania, Hungary, Estonia, Lithuania, and Latvia. Bulgaria, Slovakia and Poland experienced smaller decreases, while there was a slight improvement in the Czech Republic.

Over the whole period 1960-2001, there were large improvements in old-age mortality for women in most transition countries. Slovenia achieved remarkable progress, with female life expectancy at age 65 being almost 5 years longer at the end of the period than at the beginning. The non-transition comparison countries also achieved large gains (from 4.5 years in Portugal to 5.8 years in Finland), while in most of the other transition countries the gain was in the range of 1-3 years. Male life expectancy at age 65 also improved in most transition countries over the whole period, with Slovenia again showing the largest gain of 2.5 years.  The latter improvement, however, fell short of the gains of 3.3-4.6 years observed in the non-transition comparators. Poland and the Czech Republic were the only other countries to experience gains of over one year in male life expectancy at age 65.

*Health in old age*

As more people survive to old age, a major concern is whether the additional years of life will be lived in good or in poor health. Assessment of health status cross-nationally and over time is difficult, because it is not easy to separate out the underlying health differences from effects of incomparable measurement, such as differences in diagnostic standards and in responses to survey questions.  It should be noted that the information about health in old age that is available for the transition countries is relatively limited and should be regarded with caution.

Health-adjusted life expectancies (HALE) at age 60 can be compared to total life expectancies at age 60 in order to assess the portion of time spent in poor health and good health when people grow old (table 3). Although a single-year, cross-country comparison cannot provide a complete picture of the situation, it can provide some insight into the relationship between longevity and health.

There is a positive correlation across countries between the total number of years of life to be expected at age 60 and the portion to be spent in good health—based on table 3, the longer the life over 60, the larger the share spent in good health. However, the correlation is of only moderate strength (r = 0.46 for females and 0.60 for males). This cross-national relationship does not apply across genders. Although male healthy life expectancy at age 60 is lower than that for females in each country studied, with the unweighted averages being 12.2 years for males and 15.4 years for females, the proportion of time in good health shows no consistent difference by gender. If a three percentage-point difference between female and male values is considered to be significant, older men appear to be healthier than older women in Finland, Austria, Bulgaria and Poland, while the reverse is true in Hungary, Lithuania and Latvia. It is unknown to what extent these variations reflect reality and to what extent they show uncertainties in measurement and estimates of health[3]. In any case, the unweighted averages of the relative lengths of healthy life expectancies at age 60 in the 13 countries (72.7 per cent for men and 72.2 per cent for women) conceal important differences between countries. Some health surveys report that women are less healthy than men, both physiologically and psychologically (European Opinion Research Group, 2003a and 2003b). Details on Hungary regarding this phenomenon are discussed later in this paper.

TABLE 3. TOTAL AND HEALTHY LIFE EXPECTANCY AT AGE 60, 2000-2001

| Country | Male | | | | Female | | | |
|---------|------|---|---|---|--------|---|---|---|
| | Life expectancy at age 60 [a] (years) | Healthy life expectancy at age 60 [b] (years) | Number of years in ill health | Time in ill health as percentage | Life expectancy at age 60 [a] (years) | Healthy life expectancy at age 60 [b] (years) | Number of years in ill health | Time in ill health as percentage |
| Austria……………….. | 19.4 | 15.7 | 3.7 | 80.9 | 23.9 | 18.5 | 5.4 | 77.4 |
| Bulgaria………………. | 15.5 | 11.5 | 4.0 | 74.2 | 19.6 | 13.9 | 5.7 | 70.9 |
| Czech Republic………. | 17.0 | 12.8 | 4.2 | 75.3 | 21.2 | 16.0 | 5.2 | 75.5 |
| Estonia……………….. | 15.3 | 11.1 | 4.2 | 72.5 | 21.0 | 15.0 | 6.0 | 71.4 |
| Finland……………….. | 18.7 | 15.2 | 3.5 | 81.3 | 23.5 | 18.1 | 5.4 | 77.0 |
| Hungary………………. | 14.9 | 10.4 | 4.5 | 69.8 | 19.6 | 14.4 | 5.2 | 73.5 |
| Latvia………………… | 15.8 | 10.0 | 5.8 | 63.3 | 20.8 | 14.4 | 6.4 | 69.2 |
| Lithuania…………….... | 17.1 | 11.0 | 6.1 | 64.3 | 22.0 | 14.8 | 7.2 | 67.3 |
| Poland……………….... | 16.8 | 11.9 | 4.9 | 70.8 | 21.5 | 14.6 | 6.9 | 67.9 |
| Portugal………………. | 18.0 | 13.4 | 4.6 | 74.4 | 22.3 | 16.2 | 6.1 | 72.6 |
| Romania………………. | 15.4 | 11.1 | 4.3 | 72.1 | 18.9 | 13.5 | 5.4 | 71.4 |
| Slovakia………………. | 16.0 | 11.5 | 4.5 | 71.9 | 20.9 | 14.6 | 6.3 | 69.9 |
| Slovenia………………. | 18.0 | 13.3 | 4.7 | 73.9 | 22.3 | 16.6 | 5.7 | 74.4 |

*Source*: WHO, Healthy Life Expectancy (HALE) in all Member States, estimates for 2000 and 2001 (www.who.int/countries).
[a] in 2000.
[b] in 2001.

Another indirect way to review health in old age in a cross-national perspective is to look at cause-specific standardized death rates (SDRs). Diagnostic practices change over time and vary by country. In addition, the unreliability of cause-specific mortality data increases with age due, for instance, to multiple pathologies and routine diagnoses. In order to minimize the impact of these problems, cause-specific SDRs were examined for two leading groups of causes: diseases of the circulatory system and malignant neoplasms. In addition, the group of external causes was also considered, as these may be especially sensitive to social and economic stresses. Age-standardized death rates of the male and female population aged 65 or over were compared over time, from 1985 to 2002, and across countries. Three-year averages of annual SDRs taken from the European Health for All database were used to smooth fluctuations.

Focusing first on SDR for all causes, old-age mortality decreased in each country between 1985-1987 and 1990-1992 as well as between 1995-1997 and 2000-2002 (table 4). Improvements were larger in the latter period, when even high-mortality transition countries such as Latvia, Poland and Hungary achieved considerable progress. Nevertheless, regional variations were not reduced because old-age mortality continued to fall in better-off countries such as Finland, Austria and Portugal. Changes in male old-age mortality between 1990-1992 and 1995-1997 varied between countries. In Finland, Czech Republic and Poland the rates declined significantly, while in Latvia, Lithuania, Romania and Bulgaria the rates increased. The splitting of transition countries into these two groups reflects the health consequences of the more or less successful, or rather the more or less painful, early stages of transition in the respective States.

TABLE 4. THREE-YEAR UNWEIGHTED AVERAGES OF STANDARDIZED DEATH RATES (ALL CAUSES)
FOR THE MALE POPULATION AGED 65 AND OVER
*(Per 100,000)*

|  | *1985-1987* | *1990-1992* | *1995-1997* | *2000-2002* |
|---|---|---|---|---|
| Austria…………………….......... | 7 252 | 6 567 | 6 006 | 5 281 |
| Bulgaria……………………………… | 8 627 | 8 216 | 8 720 | 8 122 |
| Czech Republic…………………….... | 9 592 | 9 047 | 7 840 | 7 166 |
| Estonia……………………………… | 8 961 | 8 844 | 8 629 | 8 213 |
| Finland……………………………… | 7 587 | 7 066 | 6 422 | 5 787 |
| Hungary…………………………….... | 9 030 | 8 886 | 8 411 | 7 630 |
| Latvia……………………………….... | 8 699 | 8 586 | 8 995 | 8 152 |
| Lithuania………………………….. | 7 484 | 7 396 | 7 637 | 7 281 |
| Poland…………………………….. | 8 851 | 8 411 | 7 802 | 7 010 |
| Portugal……………………………… | 7 626 | 7 043 | 6 581 | 5 897 |
| Romania…………………………… | 8 373 | 7 969 | 8 292 | 7 626 |
| Slovakia………………………….... | 8 180 | 8 159 | 7 921 | 7 713 |
| Slovenia…………………………… | 7 979 | 7 564 | 7 089 | 6 657 |
| | | | | |
| Maximum………………………….. | 9 592 | 9 047 | 8 995 | 8 213 |
| Mininum………………………….. | 7 252 | 6 567 | 6 006 | 5 281 |
| Range……………………………….... | 2 340 | 2 480 | 2 989 | 2 932 |
| Standard deviation………………..... | 682 | 763 | 905 | 922 |
| Standard deviation, percentage………………………..... | 8.2 | 9.6 | 11.7 | 12.9 |

*Source*: European Health for All Database (www.euro.who.int).

TABLE 5. THREE-YEAR UNWEIGHTED AVERAGES OF STANDARDIZED DEATH RATES (ALL CAUSES)
FOR THE FEMALE POPULATION AGED 65 AND OVER
*(Per 100,000)*

|  | 1985-1987 | 1990-1992 | 1995-1997 | 2000-2002 |
|---|---|---|---|---|
| Austria…………………………… | 4 879 | 4 352 | 3 938 | 3 549 |
| Bulgaria…………………………... | 6 786 | 6 240 | 6 615 | 6 104 |
| Czech Republic…………………… | 6 480 | 5 869 | 5 297 | 4 842 |
| Estonia…………………………… | 5 958 | 5 693 | 5 320 | 4 885 |
| Finland…………………………… | 4 654 | 4 380 | 3 981 | 3 612 |
| Hungary………………………….. | 6 190 | 5 957 | 5 541 | 4 999 |
| Latvia……………………………. | 5 897 | 5 594 | 5 507 | 5 044 |
| Latvia……………………………. | 5 131 | 4 834 | 4 906 | 4 464 |
| Poland…………………………… | 5 820 | 5 501 | 5 225 | 4 558 |
| Portugal………………………… | 5 118 | 4 822 | 4 374 | 3 911 |
| Romania…………………………. | 7 032 | 6 415 | 6 317 | 5 756 |
| Slovakia…………………………. | 5 561 | 5 425 | 5 258 | 5 070 |
| Slovenia…………………………. | 5 339 | 4 913 | 4 468 | 3 958 |
|  |  |  |  |  |
| Maximum………………………... | 7 032 | 6 415 | 6 615 | 6 104 |
| Minimum………………………… | 4 654 | 4 352 | 3 938 | 3 549 |
| Range……………………………. | 2 378 | 2 062 | 2 677 | 2 555 |
| Standard deviation……………….. | 705 | 646 | 775 | 746 |
| Standard deviation, percentage………………………... | 12.2 | 12.0 | 15.1 | 16.0 |

*Source*: European Health for All Database (www.euro.who.int).

Changes in female old-age mortality are more complex. As in the case of males, the rates decreased in each country between 1985-1987 and 1990-1992 as well as between 1995-1997 and 2000-2002 (table 5). However, accelerated improvements were not observed in all countries. While Estonia, Poland, Slovakia, Hungary, and Slovenia showed rapid progress, in Austria and the Czech Republic, improvements have gradually decelerated. During the late 1990s, several countries with high mortality (such as the Baltic States, Poland, the Czech Republic, Hungary, Romania, and Bulgaria) reported larger reductions in female old-age SDRs than did Finland or Austria. During the early 1990s, this was already the case in the more advanced transition countries such as the Czech Republic, Hungary, and Slovenia while, in others, female old-age mortality showed little improvement (Slovakia), no change (Latvia, Lithuania, and Romania), or increase (Bulgaria). For both males and females, the variation in SDR among the 13 countries increased during the final decades of the twentieth century, as is indicated by the standard deviations in tables 4 and 5.

Diseases of the circulatory system represent the most important causes of death in old age. For males in 2000-2002, these diseases' relative weight ranged from 40-46 per cent in Finland, Portugal and Slovenia to over 70 per cent in Romania and Bulgaria, within all causes of death at ages 65 or over. Circulatory diseases caused 47-50 per cent of older women's deaths in Finland, Portugal and Slovenia, and 70 per cent or more in Latvia, Lithuania, Slovakia, Romania and Bulgaria. Some of these variations may reflect dissimilarities in coding practices, but there appear to be substantial inter-country differences in mortality due to these causes.

Male old-age mortality levels due to diseases of the circulatory system (figure 7) exhibit a clear-cut divide, with non-transition countries and Slovenia showing low levels and decreasing trends and all other transition countries showing high levels. The latter group can be further split into those with significant advances in the control of cardiovascular disease and hypertension (Estonia, Poland, Hungary, and the

Czech Republic), and those with modest improvements (Latvia, Lithuania, Slovakia, Romania, and Bulgaria). It is not surprising that the first group is composed of more developed transition economies and the second of the less developed transition economies. Trends are similar for women, though the SDRs for women are lower than for men.

Malignant neoplasms represent the second most important group of causes. Cross-country differences in SDR levels for this group of causes are smaller than in the case of circulatory diseases but still significant. Bulgaria and Romania show surprisingly low old-age cancer mortality levels for both women and men (figure 8). Diagnostic practice may be the main reason. During the period studied, Finland and Austria showed sustained improvements in both female and male old-age mortality due to this group of causes. At the opposite extreme are the Baltic States, Poland, Slovakia and Romania where both female and male old-age SDRs due to cancer have been increasing, particularly among men. In Slovenia, cancer mortality has been rising only among older males while stagnating among older females. Stagnation or little change is seen for both men and women in the Czech Republic, Hungary, Portugal and Bulgaria.

Deaths due to external causes make up a small fraction of all deaths. However, significant changes in their levels are hypothesized to reflect societal turbulence (abrupt increase) or stability (steady decrease). The relative weight of external causes within all deaths of those aged 65 and over ranged between 2.0 per cent and 5.5 per cent among men and 1.0 per cent and 5.9 per cent among women during the four time periods considered in the analysis (figure 9). The lowest proportions were found in Poland, Portugal, Bulgaria and Romania and the highest in Finland, the Baltic States, Hungary and Slovenia. The dividing line between these two groups of countries does not appear to be either economic or political but rather, cultural-geographical.
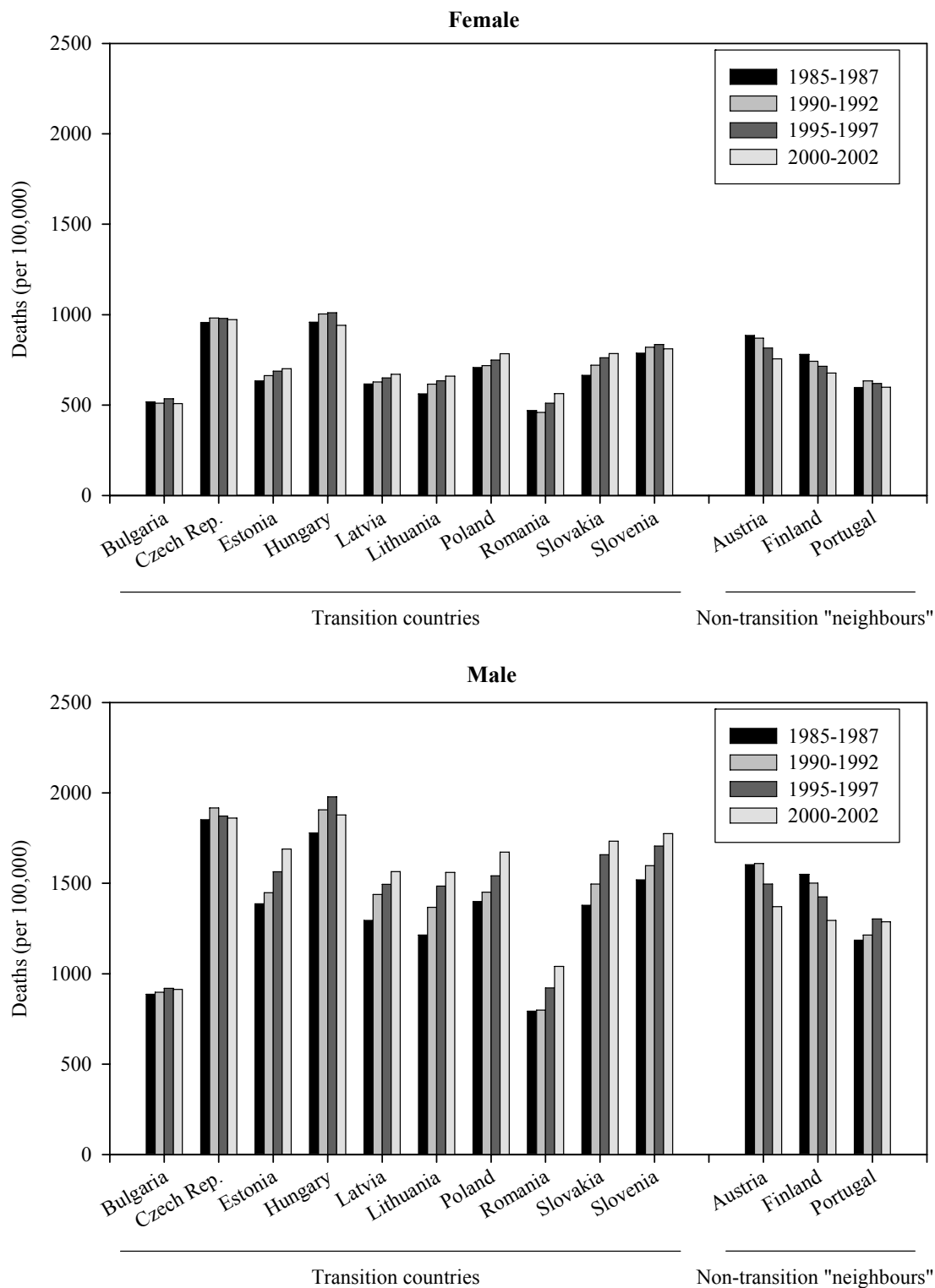
Over time, the general trend is a decline or stagnation in the levels of SDR due to external causes for those aged 65 or over. Among non-transition countries, Austria and Portugal reinforced their favourable position while Finland experienced very little improvement. Important declines occurred in the Czech Republic, Hungary and Slovenia where both male and female old-age mortality due to external causes was outstandingly high during the 1980s. In the three Baltic States, however, the change was in the opposite direction. In 2000-2002, levels of old-age mortality due to external causes were much higher than in 1985-1987, but only among men. Thus gender differences increased considerably. Male excess mortality at ages 65 or over due to external causes has remained high in Finland and Slovenia; moderate in Slovakia, Hungary, Portugal and Bulgaria; and relatively low in Poland, Austria, the Czech Republic and Romania.

**Figure 7. Three-year unweighted averages of standardized death rates due to diseases of the circulatory system for male and female population aged 65 and over**
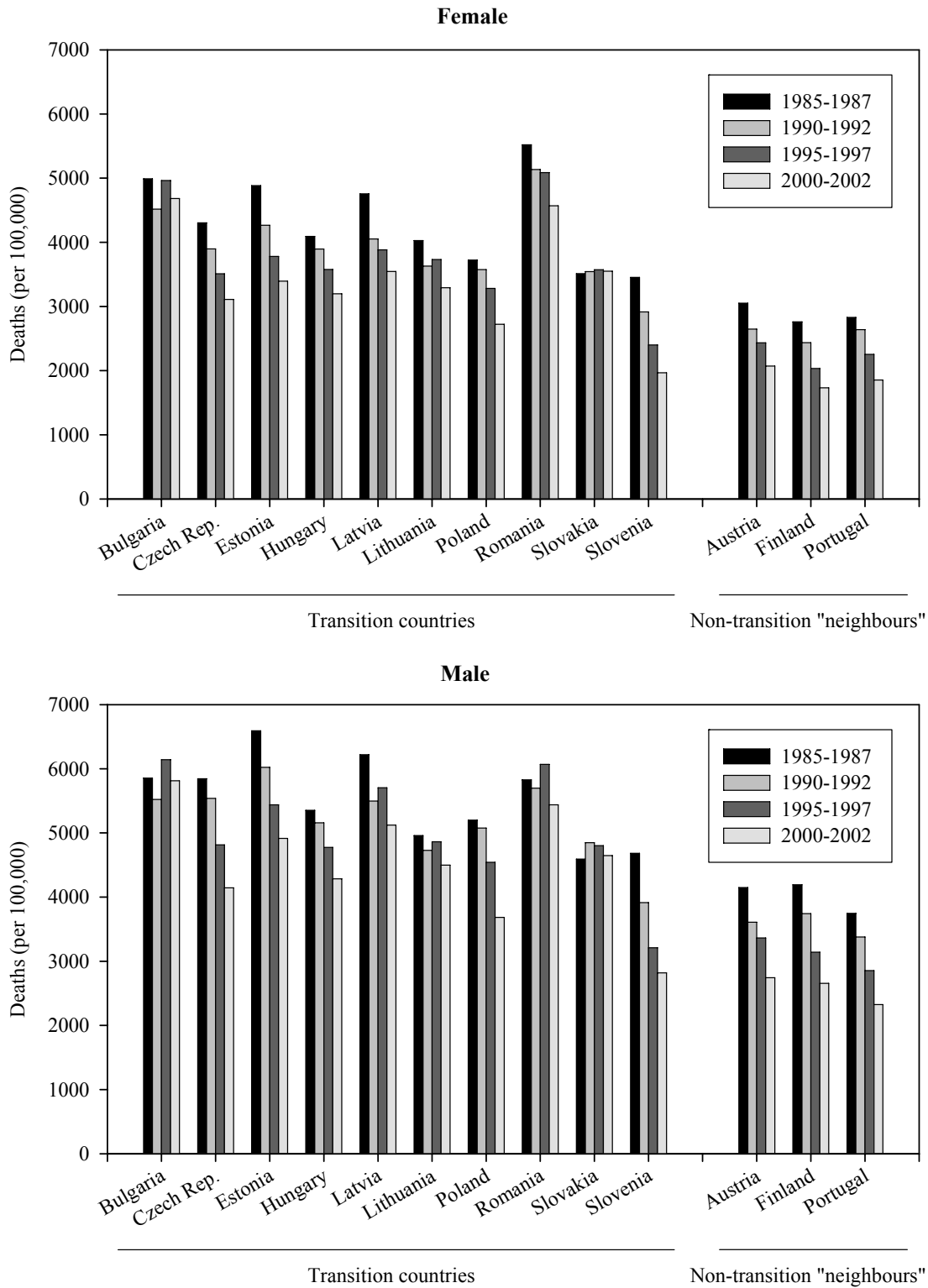


**Female**



**Male**

**Figure 8. Three-year unweighted averages of standardized death rates due to malignant neoplasm for male and female population aged 65 and over**



**Female**

Deaths (per 100,000)

Legend: 1985-1987, 1990-1992, 1995-1997, 2000-2002

Countries: Bulgaria, Czech Rep., Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, Austria, Finland, Portugal

Transition countries | Non-transition "neighbours"

**Male**

Deaths (per 100,000)

Legend: 1985-1987, 1990-1992, 1995-1997, 2000-2002

Countries: Bulgaria, Czech Rep., Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, Austria, Finland, Portugal

Transition countries | Non-transition "neighbours"

*Source*: European Health for All Database (www.euro.who.int).

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**Figure 9. Three-year unweighted averages of standardized death rates due to external causes for male and female population aged 65 and over**
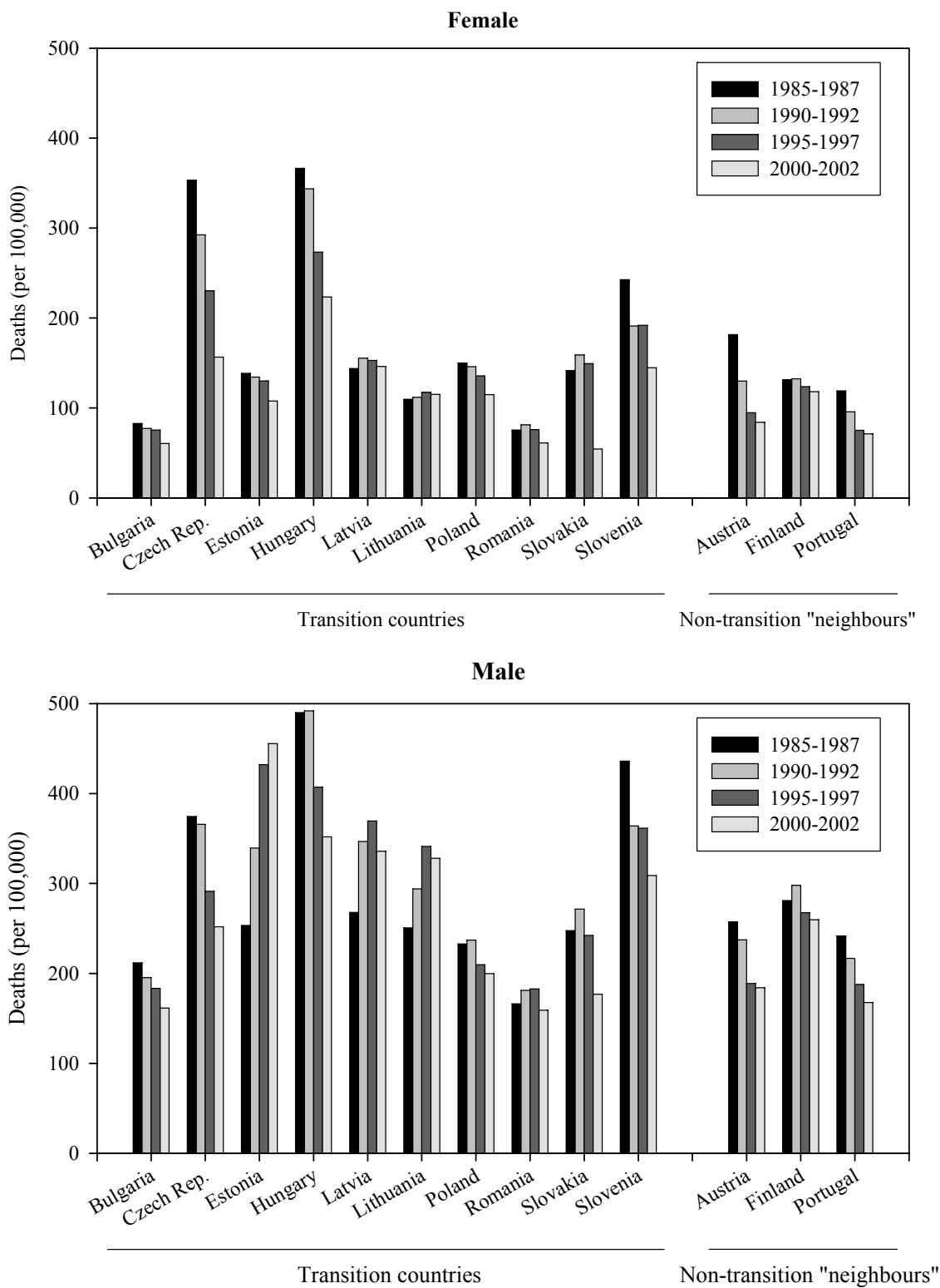


*Source*: European Health for All Database (www.euro.who.int).

*Discussion*

In contrast with the long-standing fertility decline, falling old-age mortality is a more recent contributor to demographic ageing in the transition countries of Europe. The decline in old-age mortality became evident first among females, as in other countries. The calendar year from which female life expectancy at age 65 constantly surpassed its 1960 level by at least one year was 1972 in Finland, 1976 in Slovenia, and 1977 in Austria and Portugal. In Poland, the Czech Republic, Slovakia and Hungary, this moment was deferred to dates between 1981 and 1991, and in Romania, to 2001; in Bulgaria, it is yet to come. The time series available for the Baltic countries are shorter. From 1986 onwards, in Estonia and Latvia the absolute changes in female life expectancy at age 65 are similar to developments in Slovakia and Hungary, while the Lithuanian trend is closer to Romania's and Bulgaria's.

Male old-age mortality has shown less improvement. Slovenia surpassed its 1960 level of male life expectancy at age 65 by at least one year as late as 1988, the Czech Republic in 1998 and Poland in 2001. This has still not occurred in Slovakia, Hungary, Bulgaria and Romania or (to judge from their post-1986 trends) in the Baltic States.

The figures presented above show that the decline in life expectancy at birth during the turbulent years of the early 1990s was not solely due to increased mortality levels during the working ages; life prospects in old age were also affected. The downturns were more pronounced in the post-Soviet States than in other transition countries and were steeper for men than women. However, improvements from the mid- or late 1990s onwards also point to a new, swifter process of demographic ageing.

Healthy life expectancy at age 60 could be examined at only one time, specifically 2000-2001, when the East-West divide was no longer definite. In Austria, Finland, Portugal, Slovenia and the Czech Republic, men and women can expect to live longer in good health, with an average of 12.8-15.7 years for men and 16.0-18.5 years for women. In contrast, in the other eight transition countries, healthy life expectancy at age 60 was in the range of 10.0-11.9 years for men and 13.5-15.0 years for women. There was a positive correlation cross-nationally between the total number of additional years to be expected at age 60 and the percentage expected to be spent in good health. In several countries elderly men spend larger portions of their total life expectancies in good health than women while in several others it is the reverse.

In the post-transition group, only Slovenia seems to have completed the cardio- and cerebro-vascular revolution. In Estonia, Latvia, Poland, the Czech Republic and Hungary, the levels of SDR due to circulatory system diseases have improved but remain high. Little or no progress has been made in Lithuania, Slovakia, Romania and Bulgaria. As for malignant neoplasms, only Finland and Austria achieved substantial improvements in old-age mortality for both males and females. In all other countries, including Portugal, the levels either stagnated or increased.

In the Baltic States for older males, particularly in Estonia, SDRs due to external causes rose sharply between 1985-1987 and the mid- or late 1990s, and then stagnated. In the Czech Republic, Hungary and Slovenia, on the contrary, the previously high levels of old-age mortality due to external causes were significantly reduced for both men and women.

In summary, abrupt changes in old-age mortality appear to be over in the transition countries of Europe, where recent improvements in the health of the older population are likely to continue. However, the pace and rhythm of the process may vary in ways that are hard to predict, depending on underlying socio-economic, cultural and political factors.

B. Health status of the older population in Hungary

In order to assess the health conditions of older Hungarians, information on health and health-related indicators was taken from four sources: the 2001 Population Census; the General Practitioners' Database; the 2001 and 2003 National Health Interview Surveys (NHIS); and the 2001/2002 Hungarian Social and Demographic Panel Survey (DPA). Although none of these sources has an explicit focus on the older population, they all provide information disaggregated by sex and age.

*Population Census*

Between 1980 and 2005, the population of Hungary decreased from 10.7 million to 10.1 million inhabitants. During this same period, however, the number of people aged 60 or over continued to grow. The 2001 census found more than two million older persons in Hungary, 805,000 men and 1,277,000 women. According to the Central Statistical Office, between 2001 and 2005, the number aged 60-74 increased by only one per cent while the number aged 75 or over grew by 8.6 per cent for men and 10.1 per cent for women. During this four-year period, the population aged 80-84 increased by almost 50 per cent. This resulted mainly from the "generation effect" or the postponement of births owing to the First World War and ensuing accumulation during the 1920s. At the beginning of 2005, Hungarians aged 65 and over represented 18.9 per cent among females and 12.0 per cent among males, and dependency ratios amounted to 23 per cent for age group 65 or over relative to age group 15-64, and 100 per cent for age group 65 or over relative to age group 0-14.

The last two Hungarian censuses included a single item about health, which concerned disability and impairment. In 1990, this item was ascertained from a random sample representing 20 per cent of the total population while in 2001 it was addressed to all the participants in the census together with other questions for which answers were optional. Although the refusal rate was only 2 per cent, it should be noted that the information is based on self-assessment with no medical certificate requested. In addition, "it has remained unclear whether older people define themselves as 'old', or regard the locomotion disorders, hearing and vision impairments that came with age as disabilities."[4] Despite these limitations, the data clearly indicate that disability prevalence increases with age. In 2001, 5.7 per cent of the total population reported some kind of disability. Among people aged 60 or over those with disability numbered 12.4 per cent.

TABLE 6. DISABILITY PREVALENCE RATES FOR MEN AND WOMEN AGED 65 AND OVER,
BY AGE AND TYPE OF DISABILITY, HUNGARY, 2001
*(Percentage)*

| | Age | | | | | |
|---|---|---|---|---|---|---|
| *Type of disability* | *60-64* | *65-69* | *70-74* | *75-79* | *80+* | *65+* |
| | | | *Male* | | | |
| Corporal impairment | 5.8 | 6.5 | 7.2 | 7.8 | 7.7 | 7.1 |
| Vision impairment | 1.2 | 1.5 | 1.8 | 2.5 | 4.0 | 2.2 |
| Mental impairment | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Hearing/speech impairment | 1.1 | 1.5 | 1.9 | 2.7 | 4.8 | 2.4 |
| Other disability | 2.3 | 2.0 | 1.9 | 2.0 | 1.9 | 1.9 |
| | | | *Female* | | | |
| Corporal impairment | 4.3 | 5.4 | 6.6 | 7.7 | 7.9 | 6.7 |
| Vision impairment | 1.2 | 1.6 | 2.1 | 2.9 | 4.5 | 2.6 |
| Mental impairment | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.4 |
| Hearing/speech impairment | 0.7 | 0.9 | 1.2 | 1.9 | 3.5 | 1.7 |
| Other disability | 1.6 | 1.6 | 1.7 | 1.7 | 1.9 | 1.7 |

*Source*: 2001 Hungarian Census.

Table 6 displays disability prevalence rates among the older population by age, sex and aggregate groups of disability. Corporal impairment, including locomotion disorder (which accounted for 80 to 90 per cent of this group of disabilities), is the most prevalent kind of disability among older persons. Its frequency increases rapidly between 60 and 80 years of age, while vision and hearing impairments have steep gradients above age 80.

The quality of life of older persons, particularly those with disability, is usually affected by their living arrangement. According to the 2001 census, 40 per cent of the 3.1 million Hungarian households included at least one older person, either living alone or with another person or persons. Of older persons living alone, 37 per cent were aged 60-69, 45 per cent were aged 70-79, and 18 per cent were aged 80 or over. The proportion living in institutions represented about 8 per cent of those living alone. In 2001, there were approximately 14,000 men and 30,000 women living in institutions. Among the institutionalized, 82 per cent of men and 85 per cent of women lived in long-term care social (community) homes. About 38 per cent of those living in such homes were at least 80 years old, 37 per cent were between 70 and 80 years old, and about a quarter were aged 60 to 69.

As for informal support, people living with a spouse or partner and those with living children are the most likely to have someone to rely on in case of disability, illness, psychological problems or need for emotional support. According to the 2001 census, 23 per cent of men and 63 per cent of women aged 60 and over lived without a spouse or partner. The number of living children is unknown, but about 38 per cent of older persons had no children or only one child born during their lifetime. Table 7 displays the number and percentage of those living without a spouse/partner in 2001 and with no children or one child ever born. Due to excess male mortality, almost one in four women aged 60 and over belongs to this group while only one in every nine men does. Since older women outnumber older men, this means that about 80 per cent of older persons who belonged to this particularly vulnerable group were women.

TABLE 7.  NUMBER AND PROPORTION OF OLDER PERSONS LIVING WITHOUT A SPOUSE
OR A PARTNER AND HAVING NO CHILDREN OR ONLY ONE CHILD EVER BORN
HUNGARY 2001

| Age group | Men | | Women | |
| --- | --- | --- | --- | --- |
| | Number of persons | Percentage | Number of persons | Percentage |
| 60-64 | 22 238 | 9.7 | 53 457 | 17.5 |
| 65-69 | 18 848 | 9.3 | 59 583 | 20.7 |
| 70-74 | 17 860 | 10.6 | 66,724 | 24.8 |
| 75-79 | 15 144 | 12.8 | 65 773 | 29.9 |
| 80-84 | 7 419 | 15.0 | 35 816 | 34.2 |
| 85-89 | 5 258 | 20.2 | 24 460 | 38.6 |
| 90-94 | 1 911 | 25.2 | 8 668 | 40.1 |
| 95-99 | 467 | 27.1 | 1 583 | 37.1 |
| 100 + | 129 | 35.9 | 198 | 34.7 |
| Total | 89 274 | 11.1 | 316 262 | 24.8 |

*Source*: 2001 Hungarian Population Census.

Another group of older persons facing particular difficulties are those living in small settlements. Villages with fewer than 200 inhabitants have no local general medical practitioner. Data from the Central Statistical Office show that only 8 per cent of villages with 200-499 people and 45 per cent of those with 500-999 population have a doctor. In the census year of 2001, 9 per cent of older persons lived in small settlements with fewer than 1,000 inhabitants where they made up on average 24 per cent of the

total number of local residents. This involved about 131,000 persons aged 60-74 and 55,000 aged 75 or over.

For several reasons, the health conditions of more educated people tend to be better than those of less educated people. In general, more educated people have higher living standards, are less exposed to environmental risks both at home and in the workplace, are better informed about healthy lifestyles, have easier access to health services and have stronger self-assertion. In Hungary, the gap in health conditions between people with and without a secondary school certificate is particularly large (Klinger, 2001; Daróczi, 2005). It is therefore of interest to examine the educational profile of the older population.

The number of illiterate persons in Hungary is insignificant. In 2001, around 1 per cent among people aged 75 and over had not attended school (table 8). Among those aged 60-64, 89 per cent of men and 85 per cent of women had successfully completed at least eight years of school. Substantially lower proportions—32 per cent and 27 per cent, respectively—had a secondary school certificate, and only 13 per cent and 7 per cent, respectively, had a college or university degree. Since college enrolment rates have increased significantly since the 1990s, it is likely that the educational composition of the older population, particularly that of females, will change dramatically in the future.

TABLE 8. PERCENTAGE DISTRIBUTION OF OLDER POPULATION BY AGE, SEX AND LEVEL OF EDUCATION, HUNGARY, 2001

| Schooling | Age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 60–64 | | 65–69 | | 70–74 | | 75–79 | | 80+ | |
| | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| None | 0.8 | 1.0 | 0.9 | 1.1 | 0.7 | 1.2 | 0.7 | 1.5 | 1.1 | 1.7 |
| 1-7 classes | 9.9 | 14.2 | 18.3 | 30.0 | 28.0 | 44.7 | 43.9 | 62.4 | 50.7 | 65.5 |
| 8 classes | 57.4 | 57.4 | 52.0 | 50.0 | 41.9 | 40.2 | 30.1 | 26.2 | 25.3 | 24.2 |
| Secondary | 18.5 | 20.8 | 14.9 | 14.0 | 15.3 | 10.4 | 13.9 | 7.6 | 12.1 | 6.7 |
| Tertiary | 13.4 | 6.6 | 13.9 | 4.8 | 14.0 | 3.5 | 11.5 | 2.3 | 10.9 | 1.9 |

*Source*: 2001 Hungarian Census.

### General Practitioners' Database

Most information on health and morbidity is provided by the staff of medical institutions such as general practitioners, specialists, dispensaries or hospitals, as required by the National Statistical Data Collection Program (NSDCP). Despite their limitations[5], data provided by general practitioners every second year are those, among all regular NSDCP health data, most suitable for reporting on the health status of older persons.

The analysis that follows—based on the latest general practitioners' data available (2003)—is disaggregated into 3 age groups (55-64, 65-74 and 75+) and considers the top ten groups of diseases among the population aged 75 and over:

1. Hypertensive diseases
2. Ischaemic heart diseases
3. Disorders of bone density and structure
4. Spondylopathies
5. Diabetes mellitus
6. Cerebrovascular diseases
7. Disorders of lipoprotein metabolism and other lipidaemias

8. Chronic lower respiratory diseases
9. Malignant neoplasms
10. Transient cerebral ischaemic attacks and related syndromes

In general, the relative frequency of these diseases was found to increase with age. Diabetes mellitus and disorders of lipoprotein metabolism and other lipidaemias were the exceptions. Their prevalence was smaller among those aged 75 and over than in the next younger age group (65-74), and this holds for women and men alike (table 9).

TABLE 9. PREVALENCE RATES OF MAJOR DISEASES REGISTERED BY GENERAL PRACTITIONERS,
BY SEX AND AGE, HUNGARY, 2003
(*Percentage*)

| Diseases[a] | Male | | | Female | | | Male/Female ratio | | |
|---|---|---|---|---|---|---|---|---|---|
| | 55-64 | 65-74 | 75+ | 55-64 | 65-74 | 75+ | 55-64 | 65-74 | 75+ |
| Hypertensive diseases | 37.2 | 49.8 | 58.0 | 40.7 | 50.9 | 55.7 | 0.9 | 1.0 | 1.0 |
| Ischaemic heart diseases | 14.4 | 25.1 | 36.1 | 12.8 | 20.6 | 28.2 | 1.1 | 1.2 | 1.3 |
| Disorders of bone density and structure | 2.2 | 4.0 | 6.9 | 9.1 | 12.9 | 14.5 | 0.2 | 0.3 | 0.5 |
| Spondylopathies | 10.2 | 13.2 | 16.7 | 11.9 | 13.7 | 14.3 | 0.9 | 1.0 | 1.2 |
| Diabetes mellitus | 11.6 | 15.9 | 15.8 | 10.5 | 14.6 | 13.8 | 1.1 | 1.1 | 1.1 |
| Cerebrovascular diseases | 4.7 | 9.7 | 16.1 | 3.7 | 6.6 | 10.6 | 1.3 | 1.5 | 1.5 |
| Lipidaemias | 9.5 | 10.3 | 8.7 | 8.9 | 9.4 | 6.7 | 1.1 | 1.1 | 1.3 |
| Chronic lower respiratory diseases | 6.2 | 10.2 | 14.9 | 4.0 | 5.2 | 6.6 | 1.5 | 2.0 | 2.2 |
| Malignant neoplasms | 3.2 | 5.5 | 8.0 | 3.7 | 4.5 | 5.1 | 0.9 | 1.2 | 1.6 |
| Transient cerebral ischaemic attacks | 2.6 | 4.7 | 7.0 | 2.5 | 3.6 | 4.3 | 1.0 | 1.3 | 1.6 |

*Source*: Yearbook of Health Statistics 2003. Budapest, Hungary: KSH, 2004.

[a] According to the International Classification of Diseases-ICD Revision X.

A comparison between NSDCP and a more recent source of health data—the Network of Sentinel Stations Based in Primary Care Facilities[6]—in terms of the prevalence rates of the two most widespread diseases among those who visited general practitioners (hypertensive disease and ischaemic heart diseases) showed important variations by age, sex and region. In general, prevalence figures from the NSDCP exceed those from the other data source. Although these results cannot be extrapolated to the other diseases, they suggest that caution should be exercised when analysing data from the NSDCP.

*Male/female ratio*

In tandem with excess male mortality, men are relatively more likely to suffer from several types of disease. This is particularly evident in the highest age group. Men aged 75 or over are more likely to be affected than women of the same age by nine out of the ten types of disease, even though the average age of men in this age group is lower than that of women. Male/female ratios among those aged 75 and over ranged between 0.5 and 2.3, respectively, for disorders of bone density and structure and chronic lower respiratory diseases (table 9). The former is the only disease to affect older men significantly less often than women. Chronic lower respiratory diseases and cerebrovascular disorders are much more common among men (with prevalence about 25 per cent higher than for women) in all three age groups shown.

For most diseases not mentioned so far, male/female morbidity ratios in the 55-64 and 65-74 age groups were close to 1.0, indicating no excess male morbidity. They range between 0.9 for hypertensive diseases and 1.1 for diabetes mellitus. Ischaemic heart disease and transient cerebral ischaemic attacks, however, are significantly more frequent among men than women at ages 65 or over. For most diseases the sex differential in prevalence is smaller among those aged 55-64 than at higher ages.

*Age gradient*

Age gradients, measured by the ratio between prevalence rates in two adjacent age groups, vary by gender and type of disease. Age gradients are steeper for men than women in almost all cases. Morbidity rates of cerebrovascular diseases are more than twice as high among men aged 65-74 than among their younger counterparts, aged 55-64 (table 10). Cerebrovascular diseases also show the steepest rise with age for women (a ratio of 1.8). While prevalence of most conditions increases substantially with age for both men and women, some conditions show small increases: lipidaemias (ratio of 1.1 for both sexes), and for women, spondylopathies, hypertensive diseases and diabetes (ratios of 1.1-1.2). Reported prevalence of malignant neoplasms rises substantially more rapidly with age for men than for women (ratios of 1.7 and 1.2, respectively).

Relative differences in morbidity levels between the two oldest age groups (75 and over and 65-74) are smaller than those between age groups 65-74 and 55-64. However, the prevalence of cerebrovascular diseases continues to increase rapidly in both sexes after age 75, with age gradients of 1.7 for men and 1.6 for women relative to age group 64-74. Although prevalence of most other conditions also continues to rise at higher ages, especially for men, diabetes and lipidaemias are less frequent among those aged 75 and over than in the next younger age group. Declines after age 65 are larger for women than men.

TABLE 10. AGE GRADIENTS FOR PREVALENCE RATES OF MAJOR DISEASES REGISTERED BY GENERAL PRACTITIONERS, BY SEX, HUNGARY, 2003

| Diseases[a] | Male | | Female | |
|---|---|---|---|---|
| | 65-74 / 55-64 | 75+ / 65-74 | 65-74 / 55-64 | 75+ / 65-74 |
| Hypertensive diseases | 1.3 | 1.2 | 1.2 | 1.1 |
| Ischaemic heart diseases | 1.7 | 1.4 | 1.6 | 1.4 |
| Disorders of bone density and structure | 1.8 | 1.7 | 1.4 | 1.1 |
| Spondylopathies | 1.3 | 1.3 | 1.1 | 1.0 |
| Diabetes mellitus | 1.4 | 1.0 | 1.4 | 0.9 |
| Cerebrovascular diseases | 2.1 | 1.7 | 1.8 | 1.6 |
| Lipidaemias | 1.1 | 0.8 | 1.1 | 0.7 |
| Chronic lower respiratory diseases | 1.7 | 1.5 | 1.3 | 1.3 |
| Malignant neoplasms | 1.7 | 1.4 | 1.2 | 1.1 |
| Transient cerebral ischaemic attacks | 1.9 | 1.5 | 1.4 | 1.2 |

*Source*: Yearbook of Health Statistics 2003. Budapest, Hungary: KSH, 2004.

[a] According to the International Classification of Diseases-ICD Revision X.

*National Health Interview Surveys (NHIS)*

During the post-transition period and in preparation for European Union membership, Hungary's Ministry of Health, Social and Family Affairs (now Ministry of Health) commissioned a new health survey program in the framework of the National Public Health Program. The survey followed international standards in health-monitoring methodology and aimed at introducing a series of regular,

periodically repeated health surveys and at fostering the practical use of the results (Boros, Németh and Vitrai, 2002). So far, two rounds of the survey have been held, the first in 2000 (NHIS2000) and the second in 2003 (NHIS2003).[7] Both surveys were based on cross-section random samples representative of non-institutionalized adults aged 18 and over by age, sex, region and settlement size of residence. The 2000 survey included 5,503 individuals from 440 settlements while the 2003 survey included 5,072 individuals from 447 settlements (Boros, Németh and Vitrai, 2002; Boros and others, 2004).

The analysis that follows refers to selected aspects included in the NHIS that are particularly relevant for the health of older persons. Since data processing of NHIS2003 was not yet complete at the time of the present study, it will only occasionally be possible to refer to changes between 2000 and 2003.

*Vision, hearing and functional capacity*

The 2000 NHIS survey included questions in which people were asked to describe their vision, hearing and functional conditions according to the following classification:

(i) Vision problems
None: Can recognize a person he/she knows across the road.
Mild: Can only recognize a person he/she knows across the road if wearing glasses or contact lenses.
Moderate: Can only recognize a person he/she knows at arm's length.
Severe: Unable to recognize a person he/she knows at arm's length

(ii) Hearing problems
None: Can listen to the TV or radio at normal volume
Mild: Can only listen to the TV or radio at high volume
Moderate: Can only listen to the TV or radio with hearing aid
Severe: Unable to listen to the TV or radio due to hearing difficulties

(iii) Functional impairment
None: No restriction
Mild: Permanent impediment but no help from another person is needed
Moderate: Another person's help is needed in self-care or participation in the community but can get up from bed on his/her own
Severe: Another person's help is needed to get up from bed

The results indicate that vision problems are more common than hearing problems. The gender gap was larger for vision problems than hearing problems, and women's vision problems tended to emerge earlier and increase more rapidly with age than men's. The age gradient of hearing impairment, however, was steeper than that of vision impairment, particularly among women.

The prevalence of moderate or severe visual problems was 10.6 per cent in men and 14.5 per cent in women aged 65 and over (table 11). These figures are significantly higher than those recorded by the 2001 census regarding visual impairment—2.2 per cent for men and 2.6 per cent for women. These latter percentages seem, in fact, to correspond to the prevalence of severe visual difficulties registered by NHIS2000.

The proportion of people aged 65 or over who reported either moderate or severe hearing impairment in the NHIS2000 survey was 3.1 per cent among men and 3.3 per cent among women (table 11). As in the case of vision problems, these proportions are also higher than those reported in the 2001 census (2.4 per cent for older men and 1.7 per cent for older women).[8]

TABLE 11. PREVALENCE RATES OF VISION AND HEARING IMPAIRMENTS AND
FUNCTIONAL IMPEDIMENT, BY SEX AND AGE, HUNGARY, 2000
(*Percentage*)

| Level of impairment | Male | | Female | |
|---|---|---|---|---|
| | *35-64* | *65+* | *35-64* | *65+* |
| *Vision impairment* | | | | |
| Mild | 14.4 | 26.4 | 27.7 | 45.5 |
| Moderate | 2.0 | 8.2 | 4.5 | 11.6 |
| Severe | 0.2 | 2.4 | 0.5 | 2.9 |
| *Hearing impairment* | | | | |
| Mild | 13.3 | 31.5 | 8.1 | 23.2 |
| Moderate | 0.5 | 2.2 | 0.3 | 2.7 |
| Severe | 0.1 | 0.9 | 0.1 | 0.6 |
| *Functional impediment* | | | | |
| Mild | 22.4 | 35.8 | 23.5 | 36.8 |
| Moderate | 3.1 | 6.8 | 1.9 | 7.3 |
| Severe | 0.3 | 3.2 | 0.5 | 2.1 |

*Source*: Vokó (2002), using data from NHS2000.

Regarding functional impairment, moderate or severe levels were reported for 10.0 per cent of men and 9.4 per cent of women aged 65 and over in the NHIS2000 survey (table 11). Severe cases were more frequent among older men (3.2 per cent) than among women (2.1 per cent). According to the NHIS2003 Executive Report, functional impairment increased among older men and women between 2000 and 2003. In 2003, the prevalence of severe functional impairment increased to almost 4 per cent among older men and almost 3 per cent among older women (Boros and others, 2004).

In another study using data from the NHIS2003, Görög (2005) applied an alternative scheme to identify levels of functional capacity, based on the ability to perform a number of activities of daily living. The activities included walking, going to and getting up from bed, sitting down and standing up, dressing and undressing, washing hands, eating, toileting, hearing, and seeing. The respondents were classified into three categories: (a) Retained functional capacity (able to perform all activities without difficulty); (b) Moderate functional restriction (difficulty in performing at least one activity); and (c) Severe functional restriction (need another person's help to perform at least one activity). In general, the study finds prevalence rates of functional impairment that are considerably higher than those shown in table 11 for 2000, for both the middle-aged and older persons (table 12). In particular, the results show that more than one out of every five men and one out of every four women aged 65 and over needed assistance in at least one basic function in 2003. It is worth noting that, while middle-aged (35-64 years old) men and women had practically the same distribution by functional capacity, older women (65 and over) scored worse than older men. This may be due, at least in part, to the lower selection effect and the greater concentration of older women at the highest ages.

*Chronic diseases*

In the NHIS2000 survey, respondents were asked to identify, among 8 chronic diseases, those which had ever been diagnosed by a medical doctor, regardless of whether they were being treated at the time of the interview. The chronic diseases were listed in the following order: (1) high blood pressure or hypertension; (2) heart attack or myocardial infarction (MCI); (3) any other heart disease; (4) cerebral

haemorrhage, stroke, cerebral spasm (excluding cerebral sclerosis); (5) high cholesterol level; (6) diabetes; (7) asthma (only lung asthma); and (8) allergic diseases.

TABLE 12. FUNCTIONAL RESTRICTION BY AGE AND SEX, HUNGARY, 2003
*(Percentage)*

| | *Men* | | *Women* | |
|---|---|---|---|---|
| *Degree* | *35–64* | *65 or over* | *35–64* | *65 or over* |
| None | 67 | 34 | 66 | 25 |
| Moderate | 28 | 44 | 28 | 50 |
| Severe | 5 | 22 | 6 | 25 |
| Total | 100 | 100 | 100 | 100 |

*Source*: Görög (2005), using data from NHIS2003.

Taken together, the diseases of the circulatory system were more common among women than men for both the middle-aged and the older population. The prevalence of diabetes was greater among women only in the older age group (table 13). Considering the two most important circulatory diseases, hypertension was more frequent among women than men while stroke was more common among men. Among persons aged 65 and over, men had higher occurrence of MCI (11 per cent for women and 14 per cent for men), while high cholesterol levels were more common among women (18 per cent for women and 12 per cent for men). The age gradient was particularly steep for stroke (4.1 for men and 3.2 for women). The age gradient of diabetes prevalence was substantially higher for women than for men (2.8 versus 1.8).

TABLE 13. PREVALENCE RATES OF SELECTED CHRONIC DISEASES BY SEX AND AGE, AND AGE GRADIENTS,
HUNGARY, 2000
(*Percentage*)

| | *Male* | | | *Female* | | |
|---|---|---|---|---|---|---|
| *Chronic diseases* | *Age* | | Gradient 65+ / | *Age* | | Gradient 65+ / |
| | *35-64* | *65+* | *35-64* | *35-64* | *65+* | *35-64* |
| Circulatory diseases | 36.2 | 65.3 | 1.8 | 42.7 | 73.8 | 1.7 |
| Hypertensive diseases | 28.8 | 45.8 | 1.6 | 35.4 | 64.9 | 1.8 |
| Stroke | 3.1 | 12.8 | 4.1 | 2.4 | 7.7 | 3.2 |
| Diabetes mellitus | 7.7 | 13.6 | 1.8 | 6.6 | 18.2 | 2.8 |

*Source*: 2000 National Health Interview Survey (NHS2000).

The 2003 National Health Interview Survey (NHIS2003) also gathered information about the prevalence of chronic illnesses or states. In 2003, however, 15 instead of 8 chronic diseases were listed,[9] and the formulation of the question was more elaborate than in the 2000 survey.[10] Table 14 displays the estimated frequency rank of these 15 chronic diseases among older persons, based on a study by Hermann (2005).

(*Percentage)*

|  | Women | Men |
|---|---|---|
| 1. High blood pressure | 60 | 45 |
| 2. Arthritis, rheumatoid arthritis | 51 | 37 |
| 3. Any other heart disease | 36 | 19 |
| 4. Disorders of bone density | 25 | 5 |
| 5. High cholesterol level | 21 | 10 |
| 6. Diabetes | 17 | 18 |
| 7. Anxiety or depression | 15 | 5 |
| 8. Migraine or frequent headache | 11 | 2 |
| 9. Allergic diseases (hay fever, eczema) | 11 | 4 |
| 10. Gastric or duodenal ulcer | 6 | 6 |
| 11. Asthma | 6 | 7 |
| 12. Chronic bronchitis, emphysema | 6 | 10 |
| 13. Heart attack, MCI | 5 | 5 |
| 14. Cerebral haemorrhage, stroke, cerebral spasm | 4 | 5 |
| 15. Malignant neoplasm | 2 | 3 |

*Source*: Hermann (2005), using data from NHIS2003.

Comparing the prevalence of diseases in the NHIS2000 and NHIS2003 surveys, one can find surprising improvements in the cases of stroke and hypertension. Within this short period of time, estimates of stroke prevalence decreased by almost one third among men, and by half among women aged 65 or over. Although part of this sudden drop might be due to differences in accuracy of reporting, the results point to a decline in the prevalence of stroke among the older population. As for prevalence of high blood pressure, there was a notable decrease of five percentage points among older women. Some improvements can also be noted for diabetes among older women although not among older men. These improvements in morbidity conditions of older persons probably began prior to 2000 in Hungary and are likely to have contributed to recent increases in life expectancy at older ages (Daróczi, 2000 and 2003; Daróczi and Kovács, 2004).

### *Socio-Demographic Panel Survey*

In cross-sectional surveys, the composition of samples changes over time and causal relationships cannot be confirmed by examining trends. While longitudinal or panel surveys can provide more valuable information, the costs associated with this kind of survey in money, time and effort are considerably higher. The Socio-Demographic Panel Survey, called *Turning Points in Life-Course,* is at present the most significant of its type in Hungary and deserves particular attention. It was organized and implemented by the Demographic Research Institute of the Hungarian Central Statistical Office with the aim of exploring ongoing demographic changes and the motivations behind them.

The first wave of the survey was held in 2001/2002.[11] The sample included 16,363 individuals aged 18-75, 20 per cent of whom were at least 60 years old at the time of the interview (Spéder, 2002; Kapitány, 2003; Dobossy, S.Molnár and Virágh, 2002 and 2003). Among many other topics such as family and household, life in retirement, informal support transfers, financial situation, and housing, the questionnaire included a section on health conditions. The analysis that follows examines responses to three of these questions:

1)  Are you restricted in your daily activities by any health problem, illness, or disability? If yes, to what extent (seriously, moderately, it depends/varies, does not know)?

2) Do you regularly take any medicine prescribed by a doctor due to illness?

3) Please indicate on a scale from 0 to 10 (0 = not at all; 10 = fully) how much you are satisfied with your health status.

Prevalence of functional restrictions was similar among women and men aged 40-49 and 50-59, although severe restrictions were more frequent among middle-aged males. From age 60 onwards, women's health seems to deteriorate faster than men's. First, at ages 60-69, moderate restrictions become more prevalent among women than men. Then, at ages 70-74, the prevalence of severe restrictions increases sharply among women (figure 10). This is in line with the process of vision impairment discussed earlier, in which female visual difficulties start at younger ages and progress more rapidly with age than for men (see table 11). This is also in line with the results shown above in table 12.

Subjective health evaluations corroborate the idea that women's health deteriorates more rapidly than men's at older ages. Results from the 2001/2002 Socio-Demographic Panel Survey, for instance, show that men and women in their fifties have similar perception of their own health but from age 60 onwards, the gender gap increases, with men scoring their health higher (figure 11).

Another important aspect of ageing and health concerns the consumption of medicines. High proportions of older persons under medication not only indicate poor health but also represent a heavy financial burden for the older population. Political and economic transitions in Hungary involved large-scale privatization and introduced market-determined prices in the health sector. At the same time, the relative contribution of health insurance to health expenditures has drastically decreased and pension adjustments have lagged far behind price increases. As a result, the number of older persons who cannot afford efficient drugs without reducing expenditures on other basic needs has drastically increased. Figure 12 shows that the proportion of middle-aged and especially older adults regularly taking medicines prescribed by a doctor was high in Hungary in 2001/2002. In all age groups, the proportion was significantly higher among women than among men.

**Figure 10. Prevalence of moderate and severe functional restrictions by age and sex, Hungary 2001/2002**



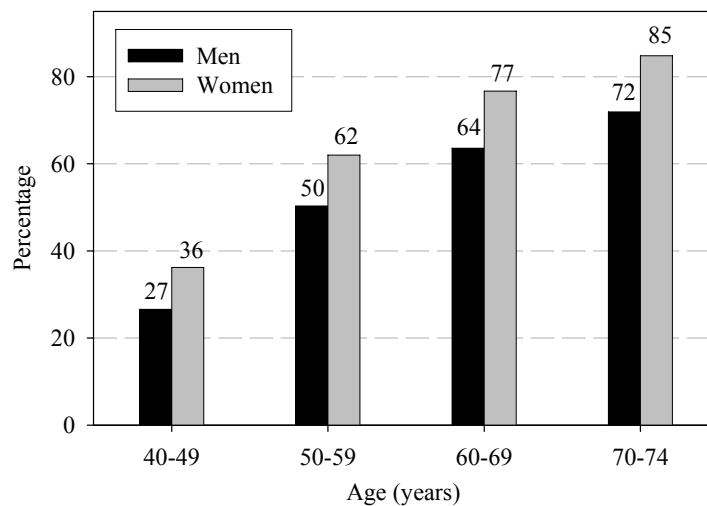*Source:* Dobossy, Molnár and Virágh (2003).

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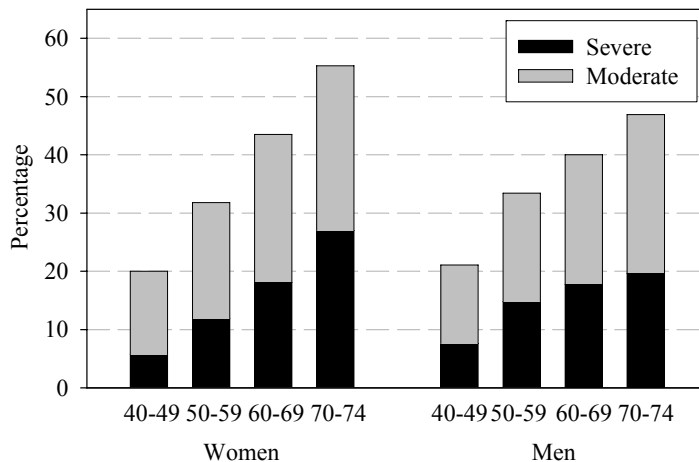
**Figure 11. Average score of perceived health by age group and sex, Hungary, 2001/2002**
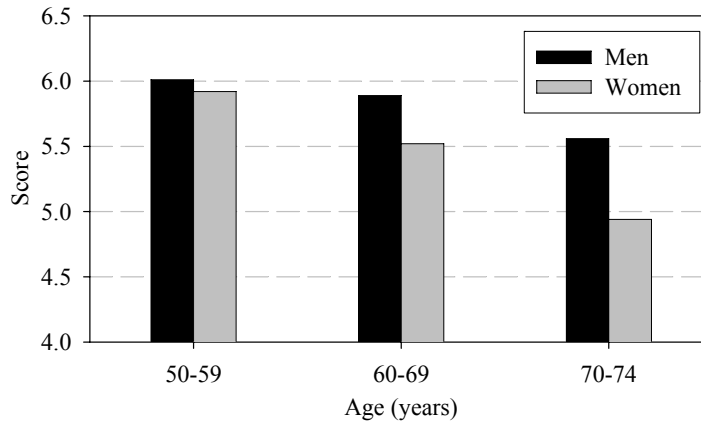


*Source:* Dobossy, Molnár and Virágh (2003).

An additional item of interest collected by the Socio-Demographic Panel Survey refers to the feelings and concerns among retired people about the future and getting old. Table 15 shows the prominence of concerns about health among retired Hungarians. Health-related topics were mentioned as a concern by the retired more often than were finances, loneliness, or family relationships. Interestingly, these results for retirees did not differ significantly from the concerns expressed by the middle-aged (aged 46 and over and economically active). Both the retired and the middle-aged were found to be deeply concerned about the future and the health of their children, and their own health and subsistence.

**Figure 12. Percentage of people regularly taking prescribed medications by age group and sex, Hungary, 2001/2002**



*Source:* Dobossy, Molnár and Virágh (2003).

TABLE 15. SOURCE OF CONCERN REGARDING THE FUTURE AND GETTING OLD AMONG RETIRED PEOPLE,
HUNGARY, 2001/2002
*(Percentage)*

| *Thinking of your future and getting old, how much do you worry ……………………………………………………….* | *A lot* | *A little* | *Not at all* | *Does not know* | *Total* |
|---|---|---|---|---|---|
| About your own health? | 47.7 | 38.3 | 13.7 | 0.3 | 100.0 |
| If you have a family: about the health of your family? | 45.2 | 34.5 | 10.3 | 10.0 | 100.0 |
| If you have child/ren: about the life, subsistence, security of your child/ren? | 47.8 | 30.0 | 9.5 | 12.7 | 100.0 |
| About subsistence? | 36.1 | 40.8 | 22.7 | 0.4 | 100.0 |
| About your mental degradation? | 23.6 | 44.0 | 31.5 | 0.9 | 100.0 |
| About widowhood, remaining alone? | 26.9 | 21.2 | 17.5 | 34.4 | 100.0 |
| About lack of activities, feeling idle? | 9.2 | 24.2 | 65.8 | 0.8 | 100.0 |
| If you have child/ren, grandchild/ren: about your weakening relationship with your child/ren and grandchild/ren? | 12.6 | 18.4 | 55.3 | 13.7 | 100.0 |
| If you have a spouse/partner: about future problems in the relationship with your spouse/partner? | 4.2 | 8.4 | 52.3 | 35.1 | 100.0 |

*Source*: Dobossy, Molnár and Virágh (2002: 92), using data from the 2001/2002 Socio-Demografic Panel Survey

## *Final comments*

Ageing in Hungary has reached an advanced level and will progress in the future. Several circumstances point in this direction, including the low and stagnating levels of fertility, the relatively large cohorts born in the mid-1950s who will soon enter old age, the low level of net in-migration, and the increases in life expectancy.

In spite of recent improvements, the mortality and morbidity conditions of the older (and also the middle-aged) population are far worse than they should be given Hungarian living standards, in particular its GDP per capita. In this sense, policies should be pursued with the aim of optimizing human and financial resource allocation, increasing efficiency in education and health management, expanding access to health services, improving environmental conditions and changing lifestyles.

There have been some positive developments. The expansion of preventive measures (measuring blood pressure, level of cholesterol, diabetes, weight control and mobility, and anti-smoking measures) has brought results. It is promising that those entering old age in the future will have more education, and that the number of the very poor can be expected to decline.

However, while the political and economic transition provided an impetus to civil, charitable and religious organizations to help the needy, the prospects for the older population, particularly regarding their health, have been of increasing concern. The health sector has experienced extremely difficult situations wherein medical and paramedical personnel are generally overburdened yet underpaid. Formal care is not readily accessible to everyone due to spatial, temporal or financial constraints. In particular, financing long-term care either from private or from Government resources seems problematic. At the same time, fewer relatives are expected to be available to older people in the future to provide informal care.

Documented scientific knowledge about health and morbidity of the population has been increasing in Hungary, and important steps have been made to raise awareness of these problems. Within the limits of the present paper, which was restricted to regular statistics and to a selected group of nationally representative studies containing information on the health of older people, it was possible to portray a reasonably comprehensive picture of the distressing health conditions of the aged in Hungary.

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NOTES

[1] The group of transition countries of Europe includes the following states (in alphabetical order):

| | | |
|---|---|---|
| 1. Albania | 10. Georgia | 19. Russian Federation |
| 2. Armenia | 11. Hungary | 20. Serbia and Montenegro |
| 3. Azerbaijan | 12. Kazakhstan | 21. Slovakia |
| 4. Belarus | 13. Kyrgyzstan | 22. Slovenia |
| 5. Bosnia and Herzegovina | 14. Latvia | 23. Tajikistan |
| 6. Bulgaria | 15. Lithuania | 24. The former Yugoslav Republic of Macedonia |
| 7. Croatia | 16. Poland | 25. Turkmenistan |
| 8. Czech Republic | 17. Republic of Moldova | 26. Ukraine |
| 9. Estonia | 18. Romania | 27. Uzbekistan |

[2] Transition countries did not experience post-war baby booms. This was one of the reasons why pro-natalist policies were widely applied. In 1953 Hungary introduced strict anti-abortion regulations which resulted in an increased number of births—children born in this period were known as "Ratkó children" in reference to the then Minister of health Anna Ratkó. These regulations were essentially abolished in 1956.

[3] A note of caution in the explanatory notes says: "HALE uncertainty is a function of the uncertainty in age-specific mortality measurement for each country, of the uncertainty in burden of disease based estimates of country-level disability prevalence, and of uncertainty in the health state prevalence derived from health surveys." (www3.who.int/whosis/hale/hale.cfm?path=whosis,burden_statistics,hale&language=english)

[4] Free translation from the 2001 Hungarian Census, Volume 12: *Disabled* (www.nepszamlalas.hu).

[5] According to Hoffer (2004), data providers do not have strong incentives to provide accurate data, which could have an adverse effect on the quality of the database.

[6] The Network of Sentinel Stations Based in Primary Care Facilities was first established in four Hungarian counties in 1998. In 2001, it was extended to two more counties. The great advantage of the network is the use of standardized protocols and methodology and the provision of valid and internationally comparable pictures of prevalence rates of particular diseases (Széles and others, 2003 and 2005).

[7] These surveys were designed and initially supervised by the Health Development Research Institute. Since 2001, it has been under the supervision of the Béla Johan National Center for Epidemiology. The analysis of NHIS2003 survey data was in process at the time of writing. The results relative to 2003 presented in this study were drawn from presentations made at the Health Information Forum held in November 17, 2005 in Budapest, available at www.oek.hu.

[8] These proportions also include people with speech impairments.

[9] It was also possible to report any disease or complaint other than the 15 listed by name.

[10] For each disease, it was asked: "Do you have or have you ever had such a disease? Was it a medical doctor who diagnosed this disease? Have you had this disease during the last 12 months? Have you taken medication or received treatment for this disease during the last 12 months?"

[11] Data analysis of the second wave (2004/2005) was still in process at the time of writing.

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# AGEING IN LATIN AMERICA AND THE CARIBBEAN:
# IMPLICATIONS OF PAST MORTALITY

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Ageing in Latin America and the Caribbean will proceed along different paths from those followed by the more developed countries. Several features distinguish the ageing process in the region. One of the most important is that it is difficult to predict the future health profile of the older population, due to factors associated with prevailing disease regimes and with the demographic history of those entering old age now and in the decades to come. Their demographic history may make these cohorts vulnerable, even if economic and institutional conditions develop more favourably than recent trends suggest. This paper focuses on health profiles of the older population and examines evidence for the conjecture that health status of older persons has been significantly impacted by the evolution of mortality in countries of the region. The paper employs data from SABE (Survey on Health and Well-Being of Elders), a cross-sectional representative sample of over 10,000 persons aged 60 or over in private homes in seven major cities in Latin America and the Caribbean. Data from the United States Health and Retirement Study (HRS) provide a benchmark for comparison with SABE. Attention is given to patterns of self-reported health, self-reported chronic conditions and disability, as well as relationships between early childhood conditions and adult health, with a focus on diabetes. Although this investigation finds only weak empirical support for the hypotheses regarding the lingering effects of past health conditions, this may be due to limitations of the available data. We may have examined just the tip of the iceberg, and the possibility remains that the new cohorts reaching old age in the next twenty years will indeed be frailer and more vulnerable because of their demographic history and the current ecology of disease.

## A  BECOMING OLD IN LATIN AMERICA AND THE CARIBBEAN

### *Conjecture and questions about older persons' health status*

This paper reviews empirical evidence to examine the conjecture that the past evolution of mortality in countries of the region will have important implications for the health status of those entering old age now and in the next 20-30 years. The nature of the mortality decrease in the Latin American and Caribbean region is hypothesized to have important effects on health in later life. In particular, a substantial fraction of those who attain their sixtieth birthday after 1990 may be of higher frailty than preceding cohorts, who were exposed to more severe mortality regimes. When mortality declined, it did so largely in the absence of improved standards of living. Many of the children who earlier would have died came from disadvantaged economic and social groups; such children survived to grow up in conditions of poverty and malnutrition and subject to a heavy burden of disease. If there are strong connections between levels of malnutrition in infancy and childhood, experience with poverty and

exposure to (and escape from) childhood illnesses, the new cohorts may be marked by higher than average risk of certain chronic conditions with late-adult onset. Provided that it is possible reliably to assess individuals' socio-economic conditions during early childhood, we expect to find large health disparities in later life according to earlier socio-economic status. Finally, there is reason to expect a strong relationship between adult prevalence of certain chronic conditions and indicators of early childhood conditions, particularly those associated with nutrition, growth and development, and exposure to disease.

The evidence supporting the aforementioned features of the ageing process in the Latin American and Caribbean region is heterogeneous. Considerably more data are available to support hypotheses about the demographic speed of ageing than the conjecture regarding the special conditions that may influence older persons' health status. Up to now very little was known about adult health in the region and, therefore, it has been virtually impossible to investigate such hypotheses. This paper employs a unique, newly released data set on older people living in seven major cities in countries of Latin America and the Caribbean to document salient properties of the health status profile of older persons in the region and to answer a set of four questions regarding its nature and determinants:

- What is the health profile of older persons in the region?

- How does this profile compare with other known profiles, such as that of older persons in the United States?

- Is there evidence of poorer health and functional status, as expected if some of the conjectures proposed above are on the mark? And, finally,

- Are there indications of relationships between early childhood conditions and adult health status?

In answering these questions, this study identifies what appear to be singularities in an otherwise standard landscape of ageing. Even if the hypotheses are verified only partially, they may point to a need for policies that are significantly different from those undertaken elsewhere.

*Speed of ageing*

The speed of demographic ageing in Latin America and the Caribbean will be unprecedented. The time it will take a typical country in Latin America and the Caribbean to attain a substantial proportion of people above age 60, say around 15 per cent, from current levels of around 8 per cent is less than two fifths the length of time it took the United States, and between one fifth and two fifths of the time it took an average Western European country to attain similar levels (Palloni, Pinto and Pelaez, 2002; Kinsella and Velkoff, 2001). By 2030, in many countries in Latin America and the Caribbean the number of persons aged 60 or over will be 2.5 to 3.5 times as large as it was in 2000. Barring unexpected demographic upheavals, for the next three to five decades the speed of ageing in the region will continue on a singularly rapid course, a result of the momentum of demographic forces set in motion long ago.

*Disjuncture between ageing and standards of living*

Rapid ageing is taking place in countries that have not been able to generate sustained high standards of living. Comparisons between countries in Latin America, on the one hand, and developed countries such as the United States or Japan, on the other, are revealing. First, even optimistic projections of growth in GNP per capita imply that when the fraction of people over age 60 begins to exceed 10 per cent,

countries of the region will have attained no more than a small fraction of the levels of GNP per capita enjoyed by developed countries when they reached similar levels of ageing.

Second, adopting even an optimistic forecast with fairly rapid economic growth, driven by annual rates of increase in GNP per capita of about 3 per cent (which is about 15 per cent higher than the average in the region during the last 50 years) would not alter this conclusion. Indeed, even in this rosy scenario, when the countries of the region reach 10 per cent over age 60, most will have a GNP per capita far below $10,000, which is itself modest by present standards in more developed countries. By comparison, the United States spent 95 per cent of the time after reaching that level of ageing, and Japan 100 per cent of the time, with a per capita income above that level[1] (World Bank, 2004). Barring unprecedented economic conjunctures, the fate of countries in Latin America and the Caribbean will be dominated by rapid ageing paired with precarious standards of living.

*Socio-political context and ageing: institutional volatility*

Even more striking is the conjuncture of the speed and magnitude of ageing in the Latin American and Caribbean region with the social and political contexts within which the process is taking place. First, a traditional order whereby older persons' well-being rested on the shoulders of the younger generation is being gradually subverted by shifts in norms regulating living arrangements and by rapid fertility declines (Devos, 1990; Devos and Palloni, 2002; Palloni, 2001). Admittedly, traditional living arrangements gave way in North America and Western Europe as well, but those changes were under way well before the onslaught of rapid ageing (Palloni, 2001; Ruggles, 1996). In countries in Latin America and Caribbean, the safety net articulated around families and kin relations is being dismantled *concurrently* with rapid ageing. This leaves little room for error and no time to seek adequate substitutes.

Secondly, ageing is occurring in a fragile institutional environment, one where sources guaranteeing a safety net or minimum levels of social and economic support for older persons are being reformulated, reformed and, often, eliminated. A good example is the widespread drive towards reform of social security systems (Mesa-Lago, 1994; Barrientos, 1997; Klinsberg, 2000). In all cases the reforms are designed to replace pay-as-you-go systems that operated uninterruptedly in many of these countries since the First World War, with privatised schemes. New plans will supplant a system that, though flawed, was successful in reducing inequalities and protecting the most vulnerable segments of the older population. Income receipts of those retiring from the labour force during the first ten years of the 21st century will depend on stop-gap arrangements during a prolonged transition to the establishment of the new system. An important fraction of these cohorts, but especially older women, received minimal earnings throughout their occupational careers and could not possibly accumulate sufficient wealth to secure adequate standards of living. In addition, the sheer growth of the older population will result in an increase in the demand for health services precisely during a time when access to health care will become more expensive under the onslaught of privatisation schemes.

In summary, no country in the Latin American and Caribbean region is blessed with institutional contexts designed to cope with changed demands from a growing older population. In almost all cases a highly compressed ageing process will take place in the midst of weak economic performance, tense intergenerational relations, fragile institutional contexts, and restricted access to health care services.

*Health status*

Latin American and Caribbean birth cohorts reaching age 60 after 1990 are unique, in that they are the product of medical interventions that increased childhood survival largely in the absence of significant improvements in standards of living. It is estimated that between 50 and 70 per cent of the mortality decline that took place after 1945 was associated with medical interventions (Preston, 1976; Palloni and

Wyrick, 1981). The remaining decline was probably associated with better standards of living, increased knowledge about exposure and resistance to illnesses, and assorted other factors. Furthermore, a large fraction of these gains were concentrated early in the life of individuals, between birth and age 5 or 10.

*Implications of past mortality decline*

The pattern of mortality decline just described has an important but little-noted implication: the revolution that produced unprecedented gains in life expectancy half a century ago is a powerful driver of the growth of the older population today and for many years to come. Understanding this requires a detour.

Just as the natural rate of increase expresses the proportionate change in the size of a population between two points in time, so age-specific rates of increase express the proportionate change of the size of the population in an age group between two points in time, $t$ and $t+dt$. A number of inferences can be derived from this elementary fact (Preston and Coale, 1982; Horiuchi and Preston, 1988; Preston and others, 1989). Horiuchi and Preston (1988) show how the value of an age-specific growth rate is determined by a population's demographic past.

Past changes in both fertility and mortality have contributed to today's growth of the population aged 60 or over in Latin America and the Caribbean. In considering the contribution of mortality, it is important to note that it is not just mortality gains at older ages that matter. Changes in mortality risks below the age of 60 have a large effect on the number of persons who reach age 60 from one year to the next.

More concretely, the rate of change in the number of persons aged 60 or over during the period 1990-2025, can be divided into 3 additive components[2] representing, respectively:

Component 1: the rate of change in the number of births during 1930-1965;
Component 2: changes in the probability of surviving to age 60 for the cohorts born during 1930-1965;
Component 3: changes in average survival (the sum of differences between mortality rates) above age 60 during 1990-2025.

Increase in the absolute size of the population aged 60 or over during a time interval will occur due to any combination of the three factors: cohorts reaching age 60 at a particular time, $t$, may experience improved mortality before reaching their sixtieth birthday (increases in the probability of surviving to age 60), may experience lower mortality thereafter (increases in life expectancy at age 60) or, alternatively, the size at birth of the cohort that reaches its 60th birthday between times $t$ and $t+dt$ may be larger than the preceding one. Component 3 above is entirely due to changes in mortality conditions at older ages whereas Component 2 is determined by improvements in mortality in early childhood and, to a lesser extent, by improvements in mortality at adult ages. Finally, Component 1 is solely dependent on *past* fertility.

We have employed trend data for countries in Latin America and the Caribbean to analyse the demographic sources of growth of the older population in terms of the three components. With a handful of exceptions, all countries in the region experienced high fertility levels (TFR above 5 children per woman) before 1950, and large mortality declines beginning within the period 1930-1940, but particularly after 1950. Between 1950 and 1965-1970, some of these countries experienced moderate increases in fertility. Countries such as Argentina and Uruguay are oddities since they started the period with relatively low levels of fertility (TFR around 4). In Chile, Cuba and Costa Rica, fertility began to decline slowly between 1930 and 1940, but rapid fertility decline in these countries occurred only after 1950, and after 1975 in the remaining countries of the region.

Two consequences of these trends for the ageing process are worth noting. First, cohorts attaining their sixtieth birthday between 2000 and 2025 are inflated by the small but ubiquitous increase in fertility during 1950-1970. Thus the rate of increase of the age group 60 or over will increase in part because of this transient rise in fertility levels (Component 1). Second, and most importantly, cohorts attaining their sixtieth birthday between 2000 and 2025 will benefit from unusually large improvements in survival, particularly during early childhood. Thus, for example, individuals born in 1960 experienced lower levels of early child mortality than those born in 1955. This will increase the relative size of the cohort attaining age 60 in 2020 relative to cohorts reaching that age in 2015 (Component 2).

Based on adjusted historical series of birth rates and life tables, we estimated the magnitude of the component of growth of the population aged 60 and above associated with past mortality decline. Figure 1 displays the total rate of growth of the population over 60 and the amount that is attributable to cumulated changes in mortality before age 60 for cohorts that attained, or will attain, age 60 during the interval 1950-2050. The figure shows these quantities for Puerto Rico and Guatemala, two countries that exemplify extremes in the demographic transition: the former experienced early mortality and fertility decline while the latter experienced late declines in mortality and fertility. Patterns in other countries are similar (Palloni, Pinto and Pelaez, 2002).

**Figure 1. Annual growth rate of the population aged 60 or over, and contribution of cumulated mortality changes, Guatemala and Puerto Rico, 1950–2050**
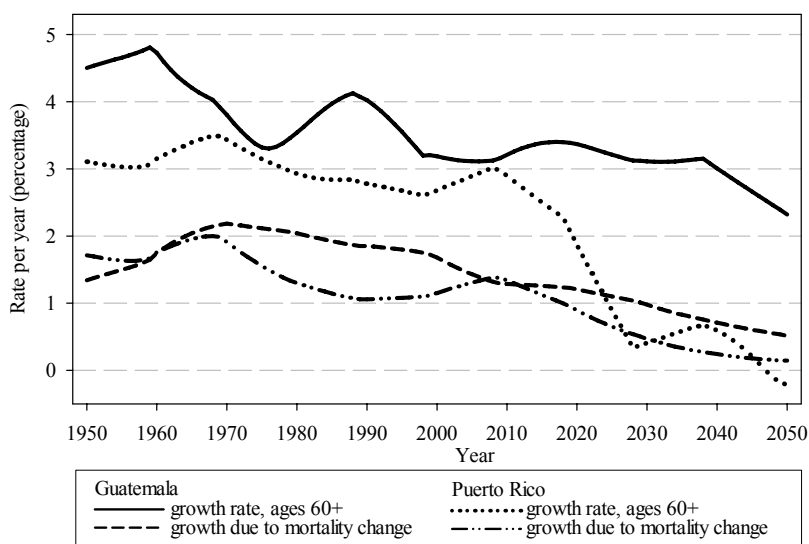


*Source:* Authors' calculations.

Since the bulk of mortality decline, particularly during early childhood, occurred after the Second World War, the peak rates of growth, as well as the largest contribution of mortality changes before age 60, are attained by cohorts born between 1940 and 1960, whose earlier members began to reach age 60 in 2000. The effects of the rapid mortality decline will begin to be washed away only after 2010 in Puerto Rico and more than a decade later in Guatemala. Note that the contribution of mortality change to the growth of the population older than 60 is substantial, exceeding 50 per cent for several years after 2000. Other countries in the Latin American and Caribbean region will experience population dynamics that fall within the range set by Puerto Rico and Guatemala.

Figure 1 shows that a substantial fraction of future increases in the growth of the over-60 population and, therefore, of ageing as reflected in changes in the proportion of the population over age 60, is attributable to mortality changes experienced during the period 1930-1990. As shown elsewhere (Palloni and Lu, 1995), about 70 per cent of this change is due to changes in mortality associated with parasitic and infectious diseases in the first ten years of life. This is a revealing statistic: it suggests that the relatively compressed schedule of ageing in the region can, at least in part, be traced to the medical and public health revolution that triggered the mortality decline nearly half a century ago. This legacy of the past has implications for the health and disability status of the older population after year 2000.

*The "stickiness" of early health status*

The discussion above established, first, that a significant part of the ageing process that countries in Latin America and the Caribbean will undergo during the period 1990-2050 is attributable to the contribution of the mortality decline experienced during the period following 1930, and secondly, that the bulk of those mortality changes were due to an assortment of medical innovations and public health interventions rather than, as many analysts believe was the case for developed countries, to increases in standards of living or to improvements in levels of nutrition (McKeown, 1976; Fogel, 1994, 2003).

As a rule, when mortality falls the surviving members of cohorts experiencing changes are of higher average frailty (Vaupel and others, 1979; Alter and Riley, 1989). This is purely an artefact of the changing composition by frailty and will tend to happen regardless of the origin of the mortality decline. However, the lives saved by the mortality decline in the Latin American and Caribbean region were certainly not randomly distributed with regard to conditions affecting health status. Indeed, they were more likely to have been drawn from populations exposed to higher risks, those whose morbidity and mortality experiences were dominated by parasitic and infectious diseases and inadequate early nutrition. Whenever the root origin of mortality improvements triggers increases in survival among those whose nutritional status and experiences with illness is worse than average, the frailty composition of the corresponding cohorts will become less favourable than under a regime of survival gains that induces evenly spread mortality reductions.

Under conditions described above, most causes of childhood morbidity that were responsible for higher mortality *before* the interventions continued to affect children, albeit with reduced lethality. A growing proportion of survivors drawn from high mortality subpopulations shared the ongoing effects of these causes of morbidity. This has important implications if early childhood conditions exert an impact on adult health and mortality.

Evidence that early childhood conditions affect adult health has been mounting, even if much remains to be established regarding the size and universality of the effects. It is conjectured that detrimental conditions including poor nutritional status, illness and faltering growth, some of which occur *in utero* and others around the time of birth and during early childhood, increase the susceptibility to certain chronic diseases during adulthood and old age. Empirical data as well as theoretical arguments (Elo and Preston, 1992; Schaffer, 2000) implicate a very broad array of mechanisms, from those involving latent effects (Barker, 1998) to those requiring circuitous pathways (Hertzman, 1994), critical periods (Barker, 1998; Cynader, 1994; Hertzman, 1994; Schaffer, 2000) or accumulation effects (Barker, 1998; Elo and Preston 1992; Hertzman, 1994). The first mechanism is closely associated with the work of Barker, concentrating on the *sequelae* of processes that may start *in utero* or develop shortly before or around the time of birth ("foetal origin hypothesis"). In general, these effects result either from fixed traits that individuals are born with or as a result of stresses and uneven development of physiological systems following periods of moderate or severe deprivation and that remain latent until late in life. To test this conjecture empirically, it is necessary to have indicators of early deprivation; such indicators have been developed, for instance, from information about birth weight, placental weight, length of gestation, or

length of the newborn. None of the latter markers is available in the data employed in this paper. Instead, the present analysis relies upon indirect measures of early nutritional status, including height (adjusted for age), knee height (a proxy for leg length), and the ratio of hip-to-waist circumference. These measures have previously been used with some success by nutritionists as surrogate measures among adults.

A second mechanism identified in the literature focuses on episodes of illness in early childhood and their influence on the late onset of some chronic diseases (Elo and Preston, 1992; Wadsworth, 1986; Wadsworth and Kuh, 1997; Kuh and others, 2004; Davey Smith and Lynch, 2004; Blackwell and others, 2001). The best known example of this is the relationship between rheumatic fever—a common complication of streptococcal infections in developing countries, at least prior to the massive mortality decline that took place after the Second World War—and the onset of heart disease. Because the data used here contain information on retrospectively recalled childhood diseases, it is possible at least to attempt to assess the size of the effects. The strategy is by no means optimal since not only may the data be affected by faulty recall but there is a serious selection problem, since individuals with the most serious cases of disease may not have survived to be in the survey sample.

Finally, some research focuses on broader mechanisms, attempting to find associations between socio-economic conditions experienced in early childhood and adult health status (Wadsworth, 1986; Hertzman, 1994; Wadsworth and Kuh, 1997; Rahkonen and others, 1997; Kuh and Ben-Shlomo, 2004; Davey Smith and Lynch, 2004; Lundberg, 1991; Warner and Hayward, 2003; Hayward and Gorman, 2004). This type of work is an indirect way to find some of the connections concerning the two mechanisms mentioned before. This work generally looks beyond simple associations between socio-economic status (SES) early in life and health status among older persons, since such associations might merely reflect the relation between current or recent SES and health. For the most part this work aims at finding *net* effects of early SES on adult or health, that is, effects that remain after appropriately controlling for current or recent SES. The interpretation of the net effects conventionally invokes either the existence of Barker-type effects, as discussed above, or the influence of early illnesses. The data sources used here make it possible to test for this as they contain retrospective evaluation of markers of early childhood poverty, deprivation and SES.

If any of the above mechanisms has a substantial effect, increases in frailty among older persons whose earlier experiences fit the description provided above are likely to be pronounced.[3] Understanding of the relationships between early childhood exposures and adult health status is still too primitive to support precise predictions regarding the nature of expected health impairments. But the conjecture regarding such effects can at least be used as a guide to explore the evidence available.

*Health status in a new disease environment*

There is another important, but often neglected, set of conditions that may influence the health status of older persons in the region. As others have observed, the regimes of morbidity and mortality experienced by older people in developing countries are unusual. First, as one would expect (Omran, 1982) there is an increase in chronic conditions, such as heart and lung disease, cancers, diabetes, and arthritis, but at the same time older people continue to be assaulted by significant levels of parasitic and infectious diseases (Frenk and others*,* 1991). Such a "mixed mode" of exposure is especially prevalent in Latin American countries with a late demographic transition, such as Guatemala, Honduras, Bolivia, Peru and Ecuador. No one knows the health effects of exposure to highly interactive environments like these. What should one expect, for example, under conditions where older people are simultaneously weakened by malaria and exposed to higher risks of congestive heart disease? Or, where increases in diabetes due to the adoption of a westernized diet (Popkin, 1993; Albala and others, 2000) are combined with recurrent intestinal infections and high prevalence of respiratory tuberculosis? What are the implications of a mixed

mode of exposure for comorbidities, disability and impairments among the older population? What are the implications for treatment? What are the effects of this situation on demand for health care?

<p style="text-align:center">B. Description of data sets</p>

While the objective in this paper is to focus on countries of Latin America and the Caribbean, it is useful also to compare patterns observed in this region with a benchmark, to yield comparisons with other populations. For practical reasons of data availability, the benchmark data chosen for comparison are from the United States, from that country's Health and Retirement Survey (HRS).

<p style="text-align:center"><em>SABE</em></p>

SABE (SABE, 2003) is a data collection project anchored in seven major cities (six of them capital cities) of the region: Buenos Aires (Argentina), Bridgetown (Barbados), Sao Paulo (Brazil), Santiago (Chile), Havana (Cuba), Mexico City (Mexico) and Montevideo (Uruguay). All seven surveys were administered to representative samples of populations aged 60 or over in each city and were strictly comparable though translated to three different languages (Spanish, Portuguese and English). In some cases, interviewers selected a target older person and his/her surviving spouse. All sample frames were drawn either from recent population censuses or from nationally representative surveys carried out periodically in the capital cities of the region.[4] The fieldwork took place between June 1999 and June 2000, and a preliminary final report was completed in December of 2002. An important feature of the survey is that, with one exception (Buenos Aires), the rates of response were significantly higher than those in similar surveys in other countries. Table 1 displays basic information on sample sizes, rates of response and selected dimensions of the demographic profile (composition by age, sex, marital status, race) and of the socio-economic composition of the samples (by education). Table 2 displays information on a few health-related characteristics that will be the object of study in this paper, namely, self reported health status, Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), chronic conditions, and anthropometric measures.[5]

<p style="text-align:center"><em>HRS</em></p>

The University of Michigan Health and Retirement Study (HRS) (2000) surveys more than 22,000 Americans over the age of 50 every two years. The study paints an emerging portrait of an ageing America's physical and mental health, insurance coverage, financial status, family support systems, labour market status, and retirement planning. The sample employed in this paper included 12,527 target respondents (no spouses) aged 60 or over.

<p style="text-align:center">C. Self-reported health</p>

Self-reported health status is an indicator of general health with good construct validity (Smith, 1994; Manton, Stallard and Corder, 1997; Wallace, 1995; Soldo and Hill, 1995), and it is a strong predictor of mortality risks (Idle and Benyamini, 1997; Idler and Kasl; 1991), disability (Idler and Kasl, 1995) and morbidity (Schechter, Beatty and Willis, 1998; Beckett and others, 2000), though these properties vary somewhat with national or cultural contexts (Idler and Benyamini, 1997). Less is known, however, about whether and to what degree self-reported health status is affected by cultural idiosyncrasies, heterogeneous conceptualization of disease and ill health, and differential assessment of gradations of ill health. Even less is known about the impact of such factors on the validity of direct cross-cultural comparisons of self reports (Sen, 2002).

<p style="text-align:center">260</p>

TABLE 1. BASIC CHARACTERISTICS OF SURVEY RESPONDENTS

| Condition/ Variable | SABE Total (n=10,902) | Argentina (n=1043) | Barbados (n=1808) | Brazil (n=2143) | Chile (n=1306) | Cuba (n=1905) | Mexico (n=1247) | Uruguay (n=1450) | United States HRS (12,527) |
|---|---|---|---|---|---|---|---|---|---|
| *Response Rate (%)* | .. | 60 | 85 | 85 | 84 | 95 | 85 | 66 | 87 |
| *Age (mean years)* | 72 (8) | 71 (7) | 72 (8) | 73 (8) | 72 (8) | 72 (9) | 70 (8) | 71 (7) | 72 (8) |
| Percentage: | | | | | | | | | |
| 60-64 | 23 | 23 | 19 | 20 | 22 | 25 | 31 | 22 | 26 |
| 65-69 | 23 | 24 | 23 | 18 | 25 | 21 | 25 | 25 | 23 |
| 70-74 | 19 | 24 | 21 | 16 | 19 | 18 | 18 | 23 | 17 |
| 75-79 | 17 | 15 | 17 | 22 | 16 | 13 | 13 | 17 | 15 |
| 80-84 | 11 | 8 | 11 | 14 | 10 | 11 | 8 | 9 | 10 |
| 85+ | 8 | 5 | 9 | 10 | 8 | 11 | 6 | 5 | 8 |
| *Gender (%)* | | | | | | | | | |
| Females | 62 | 63 | 60 | 59 | 66 | 63 | 59 | 63 | 59 |
| *Education (%)* | | | | | | | | | |
| Primary or less | 71 | 71 | 77 | 85 | 68 | 57 | 74 | 65 | 7 |
| Secondary | 20 | 23 | 18 | 5 | 24 | 37 | 11 | 21 | 58 |
| Higher | 9 | 6 | 5 | 10 | 9 | 7 | 15 | 14 | 35 |
| *Race (%)* | | | | | | | | | |
| White | 55 | .. | 5 | 71 | 43 | 63 | .. | 90 | 84 |
| Black | 34 | .. | 93 | 16 | 1 | 36 | .. | 4 | 13 |
| Mestizo | 6 | .. | 1 | 8 | 30 | 0 | .. | 6 | — |
| Other | 4 | .. | 1 | 5 | 26 | 1 | .. | 0.1 | 3 |
| *Marital Status (%)* | | | | | | | | | |
| Never married | 7 | 6 | 18 | 5 | 7 | 3 | 4 | 4 | 3 |
| Married/union | 46 | 43 | 45 | 52 | 44 | 37 | 54 | 49 | 60 |
| Separated | 9 | 9 | 9 | 6 | 13 | 13 | 9 | 6 | 1 |
| Widowed | 34 | 42 | 24 | 35 | 36 | 35 | 32 | 37 | 27 |
| Divorced | 4 | 1 | 5 | 1 | 0.4 | 11 | 1 | 5 | 9 |

*Source*: Tabulated from SABE and HRS 2000, (for HRS, target respondents aged 60 years or over); unweighted data.
NOTES: Numbers in parentheses are standard deviations where appropriate. Numbers rounded to nearest whole number. For race: the category Black includes blacks and mulattos. The category Other for SABE includes indigenous, Asian and all other. Information on race is not available for Mexico or Argentina. Values may not sum to 100 per cent due to rounding.

TABLE 2: HEALTH AND OTHER ATTRIBUTES OF SURVEY RESPONDENTS

| Condition/Variable | Overall SABE (n=10,902) | Argentina (n=1043) | Barbados (n=1808) | Brazil (n=2143) | Chile (n=1306) | Cuba (n=1905) | Mexico (n=1247) | Uruguay (n=1450) | HRS (12,527) |
|---|---|---|---|---|---|---|---|---|---|
| Diabetes (%) | 17 | 13 | 22 | 18 | 14 | 15 | 22 | 13 | 16 |
| Cancer (%) | 4 | 5 | 4 | 4 | 5 | 3 | 2 | 6 | 14 |
| Respiratory (%) | 10 | 8 | 4 | 13 | 13 | 13 | 10 | 9 | 10 |
| Heart (%) | 21 | 20 | 12 | 21 | 34 | 24 | 10 | 23 | 25 |
| Stroke (%) | 7 | 5 | 6 | 8 | 7 | 10 | 5 | 4 | 7 |
| Arthritis (%) | 42 | 53 | 47 | 33 | 32 | 58 | 25 | 47 | 62 |
| Obesity (%) | 24 | .. | 24 | 20 | 30 | 14 | 30 | 34 | 22 |
| Poor health (%) | 11 | 5 | 5 | 9 | 21 | 13 | 20 | 7 | 8 |
| ADL (%) | 20 | 19 | 14 | 24 | 26 | 21 | 19 | 17 | 21 |
| IADL (%) | 18 | 15 | 15 | 29 | 21 | 18 | 18 | 8 | 11 |
| Height (cm) | 158 (10) | .. | 163 (10) | 157 (9) | 155 (10) | 158 (10) | 154 (9) | 160 (9) | 168 (10) |
| Knee height (cm) | 50 (5) | .. | 53 (5) | 50 (3) | 48 (3.3) | 50 (5) | 49 (4) | 48 (6) | .. |
| Weight (kg) | 67 (16) | .. | 72 (20) | 64 (13) | 67 (14) | 61 (14) | 66 (12) | 72 (15) | 80 (42) |
| BMI | 27 (6) | .. | 27 (8) | 26 (5) | 28 (5) | 25 (5) | 28 (5) | 28 (7) | 27 (5) |

*Source:* Tabulated from SABE and HRS 2000 (for HRS, target respondents aged 60 years or over); unweighted data.
NOTES: Numbers rounded to nearest whole number. Poor health: 1=Poor, 0=All other. ADL=difficulty performing at least one ADL. IADL=difficulty performing at least one IADL. No height and weight measurements were taken in Argentina; no knee height measurements were taken in the HRS study. Numbers in the parentheses are standard deviations. BMI is calculated as weight in kg. divided by the square of height in meters. Obesity is defined as BMI>=30; extreme BMI outliers were omitted.

Figure 2 displays the proportions reporting their health as "poor" ("mala") by age and gender for all seven cities. For comparison, a similar measure is shown for persons aged 60 and over who were participants in the United States Health and Retirement Survey (HRS). The first feature to note is the large inter-country heterogeneity. The cities with the highest proportions of older individuals in poor health are Santiago (21 per cent), Mexico City (20 per cent) and Havana (13 per cent). Those with the lowest are Buenos Aires, Bridgetown, and Montevideo (5 to 7 per cent). The latter three cities are in the countries that, until the beginning of the twenty-first century, enjoyed the highest standards of living, as measured by GNP per capita. They are also those with the most modern demographic regime, with near-replacement fertility and life expectancies at birth exceeding 75 years.

**Figure 2. Proportion reporting poor health by age and gender**
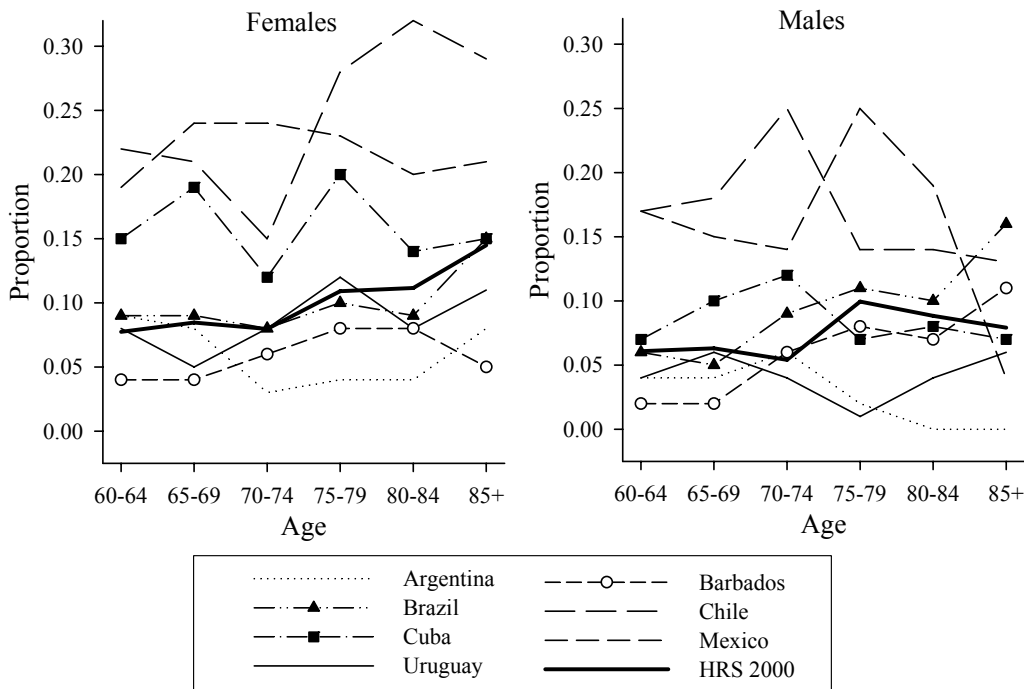


*Source*: SABE; HRS.

The second feature to note is the age and sex patterns of self-reported poor health. Women everywhere are more likely than men to report being in poor health, a recurrent finding with this type of data. Proportions in poor health appear to increase with age in some countries, although the age patterns are irregular.

A third feature is that older persons living in the cities with the best economic standing among SABE countries (Buenos Aires, Bridgetown and Montevideo) are, if anything, less prone than those in the United States to report their health as poor, while older persons living in Santiago, Havana and Mexico City are considerably more likely to do so.

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These visual regularities are confirmed in multivariate analyses of the proportion self-reporting poor health. The analysis is based on individuals within countries as units of observation and the logit of the probability of self reporting poor health as dependent variable. Predictors include dummy variables to represent cities, age groups and sex (see categories in table 1). The results from the most complete model, model I, are presented in panel A of table 3. A comparison of the fits of models I and II indicates that there is significant inter-country heterogeneity in prevalence of poor health. Gender differentials are substantial, while effects of age are more irregular. In model I only the effects of age groups 75-79 and 85+ are significantly different from the value for the reference category, ages 60-64. This indicates that there is no firm basis to infer the existence of an age gradient in the proportion of individuals reporting that they are in poor health. This is not unlike the pattern found in HRS.

Model III, in panel C of table 3, examines whether there are significant differences between the United States and the seven cities in Latin America and the Caribbean. The data from the seven cities were pooled and then compared to the data from HRS. On balance, older people in the United States report themselves to be in somewhat better health than the average of the seven cities in Latin America and the Caribbean. The odds of reporting poor health among older persons in the United States are 0.73 ($= e^{-0.31}$) as large as among the pooled sample, and this difference is statistically significant.

## D. FUNCTIONAL LIMITATIONS

Self-reported limitations in Activities of Daily Living (ADLs) or Instrumental Activities of Daily Living (IADLs) are a mainstay of population-based information on disability. They are arguably better gauges than self-reported health of the extent of physical impairment in population-based studies and are widely used in national surveys such as the HRS and other major surveys in the United States including the National Health and Nutrition Examination Survey, National Health Interview Survey and Longitudinal Studies of Aging, and they have also been employed in surveys in other countries. Limitations in ADLs reflect impairments associated with underlying conditions that induce physiological limitations and deterioration. ADL measurements provide a useful benchmark to calibrate demand for care, assistance and support. ADLs are good indicators of physical functioning, particularly lower body functionality (Smith, Branch and Scherr, 1990), and reflect impairment created by chronic conditions as well as cognitive and affective functioning (Stump and others, 1977; Wray, Herzog and Park, 1996; Wary and Lynch, 1998). IADLs are less closely tied to morbidity *per se* as they are sensitive to more generalized impairments and limitations in unassisted and independent living. The analysis discussed below focuses on the proportion of older persons with at least one ADL, or at least one IADL (see the annex for a list of the ADLs and IADLs[6]). ADL/IADL classifications were defined according to whether the person either had difficulty with a task or was unable to perform the task.

The age patterns of the proportions with at least one ADL or IADL difficulty are displayed in figures 3 and 4. There are strong age gradients and large gender differences but little intercity heterogeneity. The United States' HRS sample stands out (along with Uruguay) only for females at higher ages, who are relatively less likely than women in other countries to have difficulty in carrying out at least one IADL.

ADL and IADL patterns can be studied with the same tools used earlier for the study of self-reported health. Tables 4 and 5 presents results of multivariate analysis of probabilities of reporting at least one ADL (table 4) or at least one IADL (table 5), with dummy variables for sex, age categories and countries as predictors. For ADL, age and sex patterns are salient, but inter-country heterogeneity is trivial.[7] For IADL, on the contrary, inter-country differences are highly statistically significant (based on a comparison of the fit of Models I and II of table 5). Curiously, Montevideo, which has one of the lowest proportions of older persons reporting themselves in poor health, also has one of the lowest proportions with at least one ADL or IADL.[8]

| Predictors | *Dependent variable: Whether health status is poor (logit transformation)* | | | | | |
|---|---|---|---|---|---|---|
| | *A. Model I* | | *B. Model II* | | *C. Model III* | |
| | *Effect (log odds)* | *SE* | *Effect (log odds)* | *SE* | *Effect (log odds)* | *SE* |
| Constant | -3.00 *** | (0.13) | -2.36 *** | (0.08) | -2.41 *** | (0.06) |
| Female | 0.35 *** | (0.07) | 0.36 *** | (0.07) | 0.33 *** | (0.05) |
| *Age* (years) | | | | | | |
| 60-64 (reference) | .. | .. | .. | .. | .. | .. |
| 65-69 | 0.07 | (0.09) | 0.03 | (0.09) | 0.05 | (0.06) |
| 70-74 | 0.03 | (0.10) | -0.07 | (0.10) | -0.04 | (0.07) |
| 75-79 | 0.29 ** | (0.10) | 0.18 | (0.10) | 0.30 *** | (0.07) |
| 80-84 | 0.20 | (0.12) | 0.11 | (0.11) | 0.25 ** | (0.08) |
| 85+ | 0.34 ** | (0.13) | 0.26 * | (0.12) | 0.42 *** | (0.09) |
| *Country* | | | | | | |
| Argentina | -0.25 | (0.18) | .. | .. | .. | .. |
| Barbados | -0.22 | (0.15) | .. | .. | .. | .. |
| Brazil | 0.36 ** | (0.13) | .. | .. | .. | .. |
| Chile | 1.35 *** | (0.13) | .. | .. | .. | .. |
| Cuba | 0.77 *** | (0.13) | .. | .. | .. | .. |
| Mexico | 1.28 *** | (0.13) | .. | .. | .. | .. |
| Uruguay (reference) | .. | .. | .. | .. | .. | .. |
| United States/HRS | .. | .. | .. | .. | -0.31 *** | (0.04) |
| N | 10 679 | | 10 679 | | 23 200 | |
| Log likelihood | -3 533 | | -3 711 | | -7 290 | |
| LR chi square | 399 | | 42 | | 155 | |
| Degrees of freedom | 12 | | 6 | | 7 | |

*Source:* See table 1.
NOTES: Numbers in parentheses are standard errors. Significance: * $p<0.05$; ** $p<0.01$; ***$p<0.001$.

**Figure 3. Proportion reporting restriction in at least one activity of daily living (ADL), by age and gender**
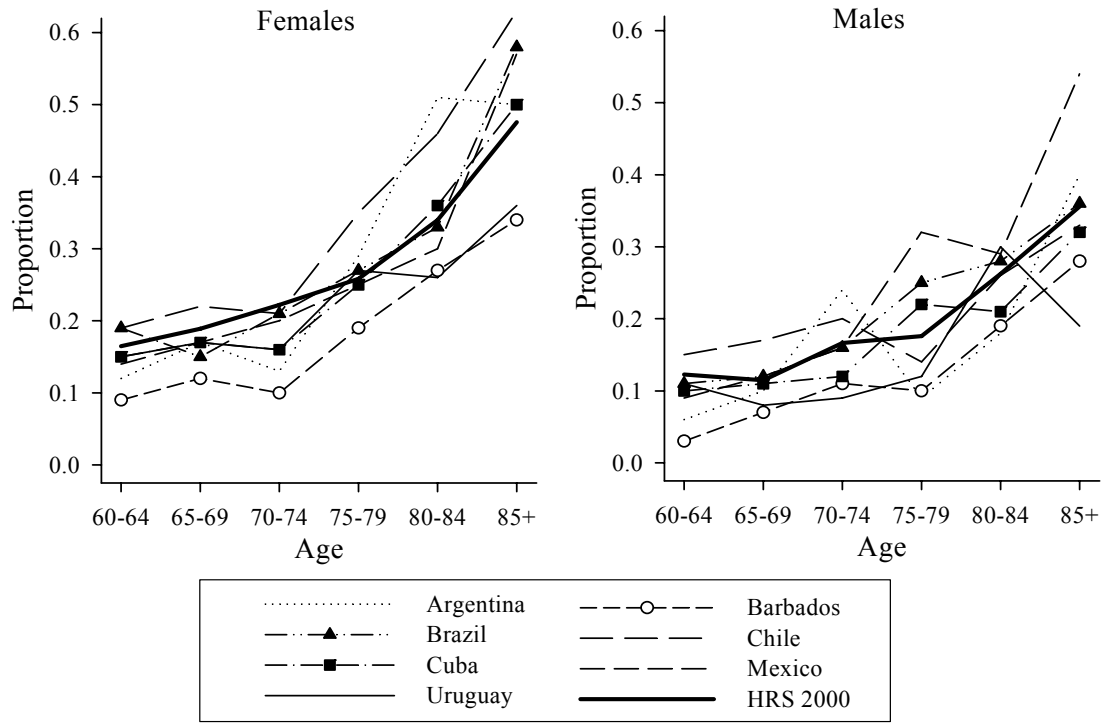


*Source*: SABE; HRS.

**Figure 4. Proportion reporting restriction in at least one instrumental activity of daily living (IADL), by age and gender**
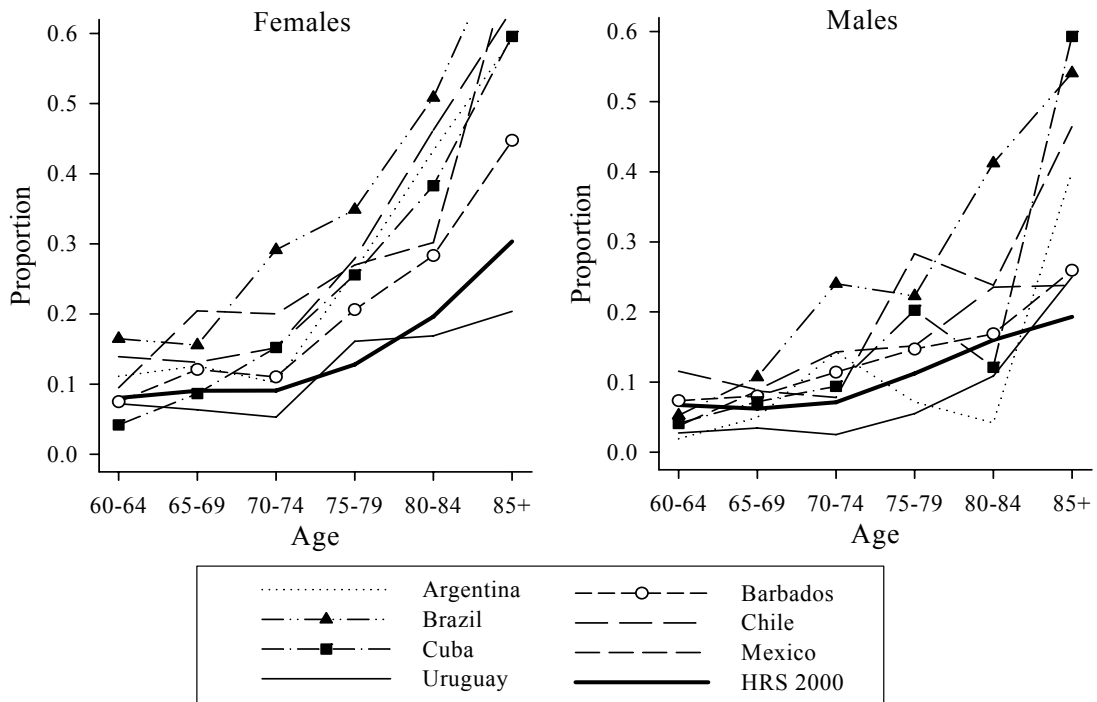


*Source*: SABE; HRS.

TABLE 4. RELATIONSHIP BETWEEN DIFFICULTY WITH ADLS AND AGE, GENDER AND COUNTRY

| | A. Model I | | B. Model II | | C. Model III | |
|---|---|---|---|---|---|---|
| | *Dependent variable: respondent has limitations in one or more ADL (logit transformation)* | | | | | |
| *Predictors* | *Effect (log odds)* | *SE* | *Effect (log odds)* | *SE* | *Effect (log odds)* | *SE* |
| Constant | -2.37 *** | (0.10) | -2.23 *** | (0.07) | -2.17 *** | (0.05) |
| Female | 0.45 *** | (0.05) | 0.45 | (0.05) | 0.44 *** | (0.04) |
| *Age* (years) | | | | | | |
| 60-64 (reference) | .. | .. | .. | .. | .. | .. |
| 65-69 | 0.16 | (0.08) | 0.15 | (0.08) | 0.11 | (0.06) |
| 70-74 | 0.28 *** | (0.09) | 0.25 ** | (0.09) | 0.30 *** | (0.06) |
| 75-79 | 0.76 *** | (0.08) | 0.75 *** | (0.08) | 0.63 *** | (0.06) |
| 80-84 | 1.15 *** | (0.09) | 1.14 *** | (0.09) | 1.04 *** | (0.06) |
| 85+ | 1.74 *** | (0.09) | 1.71 *** | (0.09) | 1.59 *** | (0.06) |
| *Country* | | | | | | |
| Argentina | 0.14 | (0.11) | .. | .. | .. | .. |
| Barbados | -0.36 *** | (0.10) | .. | .. | .. | .. |
| Brazil | 0.27 ** | (0.09) | .. | .. | .. | .. |
| Chile | 0.48 *** | (0.10) | .. | .. | .. | .. |
| Cuba | 0.13 | (0.09) | .. | .. | .. | .. |
| Mexico | 0.23* | (0.10) | .. | .. | .. | .. |
| Uruguay (reference) | .. | .. | .. | .. | .. | .. |
| United States/HRS | .. | .. | .. | .. | 0.10 ** | (0.03) |
| N | 10 824 | | 10,824 | | 21 322 | |
| Log likelihood | -5 041 | | -5 087 | | -10 272 | |
| LR chi square | 706 | | 614 | | 1082 | |
| Degrees of freedom | 12 | | 6 | | 7 | |

*Source:* See table 1.

NOTES: Numbers in parentheses are standard errors. Significance: * p<0.05; ** p<0.01; ***p<0.001. Panel C is a pooled HRS-SABE sample.

TABLE 5. RELATIONSHIP BETWEEN DIFFICULTY WITH IADLs AND AGE, GENDER AND COUNTRY

| | *Dependent variable: respondent has limitations in one or more IADL (logit transformation)* | | | | | |
| | *A. Model I* | | *B. Model II* | | *C. Model III* | |
| *Predictors* | *Effect (log odds)* | *SE* | *Effect (log odds)* | *SE* | *Effect (log odds)* | *SE* |
|---|---|---|---|---|---|---|
| Constant | -3.81 *** | (0.13) | -2.81 *** | (0.09) | -2.45 *** | (0.06) |
| Female | 0.59 *** | (0.06) | 0.55 *** | (0.06) | 0.43 *** | (0.04) |
| *Age* (years) | | | | | | |
| 60-64 (reference) | .. | .. | .. | .. | .. | .. |
| 65-69 | 0.35 *** | (0.10) | 0.30 ** | (0.10) | 0.17 ** | (0.07) |
| 70-74 | 0.67 *** | (0.10) | 0.62 *** | (0.10) | 0.36 *** | (0.07) |
| 75-79 | 1.21 *** | (0.10) | 1.23 *** | (0.09) | 0.89 *** | (0.07) |
| 80-84 | 1.72 *** | (0.10) | 1.74 *** | (0.10) | 1.38 *** | (0.07) |
| 85+ | 2.60 *** | (0.10) | 2.59 *** | (0.10) | 2.05 *** | (0.07) |
| *Country* | | | | | | |
| Argentina | 0.81 *** | (0.14) | .. | .. | .. | .. |
| Barbados | 0.66 *** | (0.12) | .. | .. | .. | .. |
| Brazil | 1.49 *** | (0.11) | .. | .. | .. | .. |
| Chile | 1.11 *** | (0.13) | .. | .. | .. | .. |
| Cuba | 0.85 *** | (0.12) | .. | .. | .. | .. |
| Mexico | 1.11 *** | (0.13) | .. | .. | .. | .. |
| Uruguay (reference) | .. | .. | .. | .. | .. | .. |
| United States/HRS | .. | .. | .. | .. | -0.61 *** | (0.04) |
| N | 10,798 | | 10 798 | | 23 303 | |
| Log likelihood | -4453 | | -4 576 | | -8 768 | |
| LR chi square | 1413 | | 1 168 | | 1 700 | |
| Degrees of freedom | 12 | | 6 | | 7 | |

*Source:* See table 1.
NOTES: Numbers in parentheses are standard errors. Significance: * $p<0.05$; ** $p<0.01$; ***$p<0.001$. Panel C is a pooled HRS-SABE sample.

The contrasts between ADL and IADL patterns in SABE cities and HRS are strong (see Model III in tables 4 and 5). An individual in the HRS population is about 1.11 times as likely to experience at least one ADL difficulty as an individual in the pooled SABE sample, a statistically significant difference. By contrast, the HRS population is much less likely (odds of 0.54 or $e^{-0.61}$) to report difficulty with at least one IADL than are respondents in the pooled SABE sample. This pattern could result from heavier mortality selection among those with compromising morbid conditions or, alternatively, from cultural idiosyncrasies in the interpretation of limitations in the SABE cities. Lower prevalence of IADLs in the HRS could also be influenced by greater access to assistive technologies or services in the United States, although this possibility cannot be explored with the data examined here.

## E. CHRONIC CONDITIONS

Figure 5 displays the mean number of chronic conditions[9] by age and gender. The number of chronic conditions increases with age, and women exhibit a more unfavourable profile than do men. A simple regression analysis reveals that inter-country heterogeneity in the number of chronic conditions is quite low and that the strongest effects are those of age and sex (not shown). A comparison with HRS shows that the older population of HRS exhibits a higher average number of chronic conditions than any of the countries in the SABE sample, with the possible exception of women in Cuba. This, again, is a pattern that could be expected under heavier mortality selection in SABE countries or, alternatively, could be due to underreporting of chronic conditions in those countries.

**Figure 5. Number of chronic conditions by age and gender**
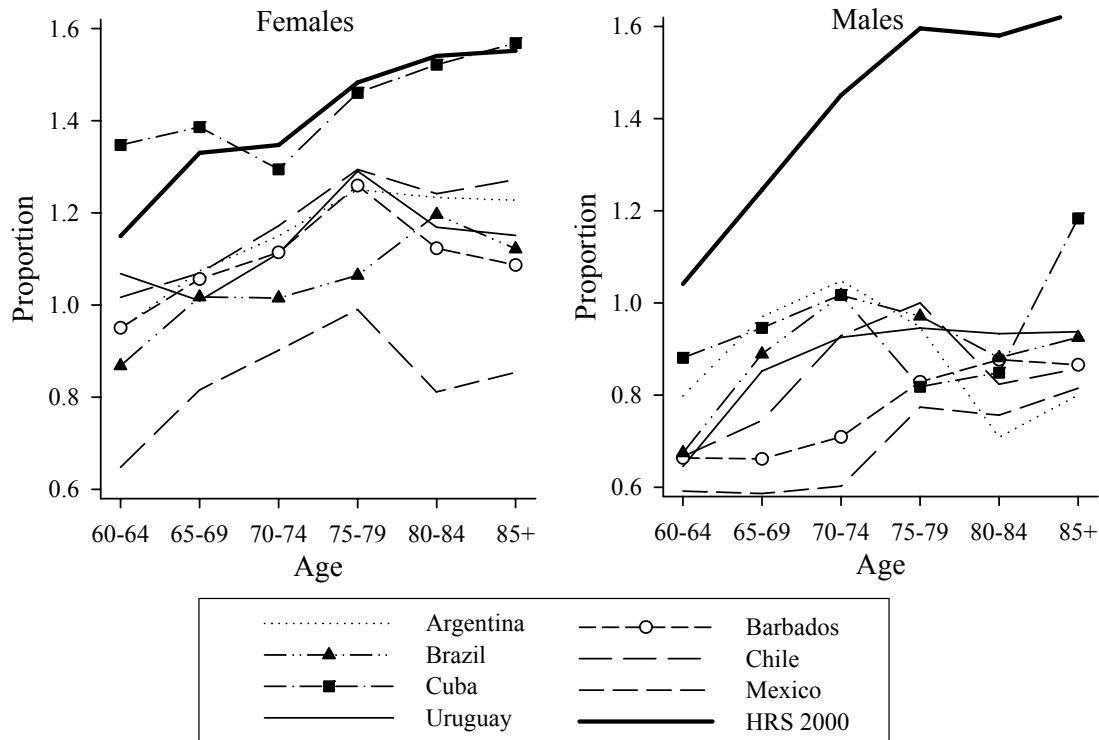


*Source*: SABE; HRS.

Of the chronic conditions highlighted in table 2 and included in figure 5, arthritis, heart disease, obesity and diabetes are the most common.[10] The latter two conditions are of particular interest here. First, other research has reported that developing countries, particularly in Latin America and the Caribbean, are in the midst of a diabetes and obesity epidemic, in part as the result of unfavourable shifts toward a "Western" diet rich in saturated fats, simple carbohydrates and sugar, coupled with a marked trend towards sedentarism (Popkin, 1993; and Albala and others, 2000). But never before has this been documented on a large scale for countries of the region and for older populations. Second, diabetes and coronary heart disease have been linked to unfavourable early childhood conditions that express themselves either in unfavourable nutritional status or as after-effects of infectious disease (Barker, 1998; Kuh and Ben-Shlomo, 2004). The case of diabetes is of special interest, for there is evidence that diabetes is related to early childhood malnutrition (Palloni and others, 2004; Barker, 1998; Hales and Barker, 1992; Hales and others, 1991; Lithell and others, 1996).

Figure 6 displays the proportion of individuals who self-reported diabetes for all SABE samples and HRS, by age and gender.[11] The pattern by age is very distinct and is similar across countries: first rising with age and then falling, with a peak around ages 70-74. The declining pattern at high ages is probably a result of the heavier attrition of diabetics as age increases. Men are less likely than women to report diabetes. For the most part, the population in HRS is as likely as the average individual in the pooled SABE sample to report diabetes. Additional regression analyses, not shown here, reveal that within the SABE sample there is substantial heterogeneity; Cuba, closely followed by Argentina and Uruguay, exhibits the lowest level of self-reported diabetes (almost 17 per cent at the peak age group for women), whereas Barbados, Mexico and Brazil show the highest levels (about 29 per cent at the peak age for women). Prevalence of self-reported diabetes in the HRS sample is not significantly different from the weighted average in SABE.[12]

Figure 6. Proportion reporting diabetes by age and gender
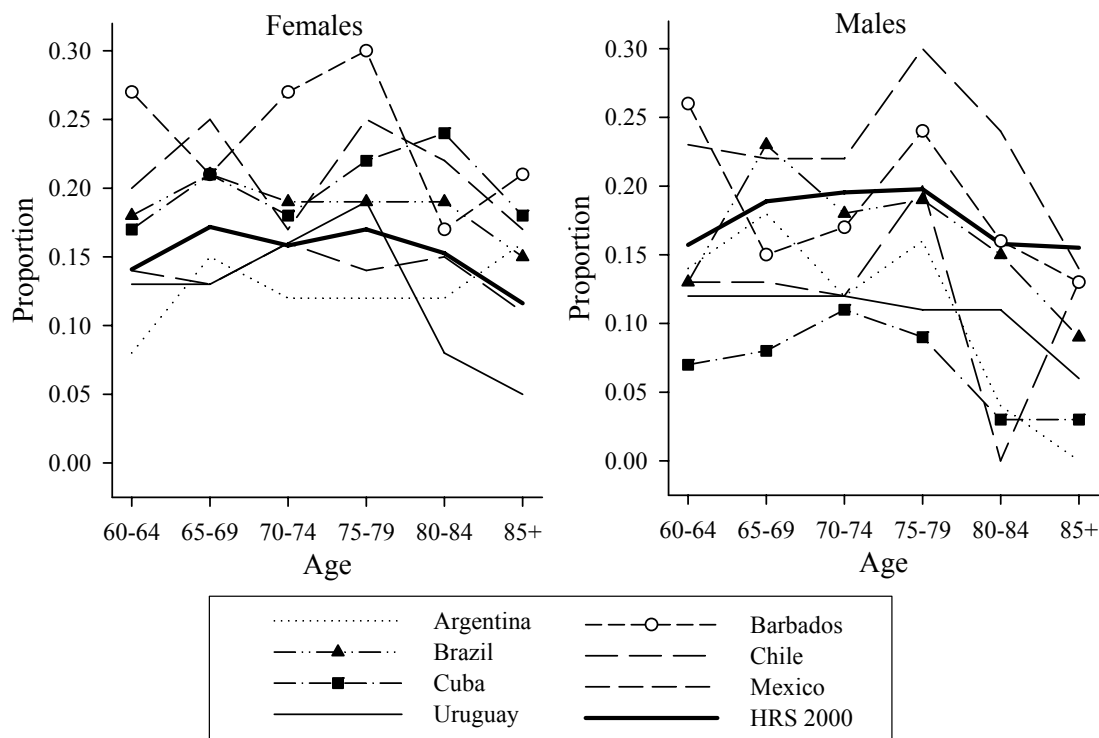


*Source*: SABE; HRS.

Cuba's low level of self-reported diabetes, especially among men, is undoubtedly due, at least in part, to the fact that the adoption of a Western life style has simply not been an option in this country and, therefore, the risk factors associated with a new diet and sedentary life styles are absent. But to explain the very high levels in Barbados, Brazil and Mexico one probably needs to explore the role of population composition by early nutritional status and/or the influence of ethnic composition as well as diet and physical activity patterns. In fact, ethnic compositions differ significantly among the SABE countries: Barbados and Brazil have a substantial component of population of African descent whereas Mexico has the highest percentage of indigenous and mestizo population. Whether the foetal origin explanation, the one resting on ethnic-related genetic endowments, the more conventional one invoking a Western diet and sedentary life style, or some combination of these, explain the distinctive patterns in these countries must remain a conjecture until it becomes possible to test directly the influence exerted by each factor.

### F. THE CONNECTION BETWEEN EARLY CHILDHOOD AND ADULT HEALTH STATUS

This section of the paper focuses on adult diabetes, examining the connection between early childhood and adult health status. The assessment presented earlier identified diabetes as one of the key chronic conditions with high prevalence among older adults in the SABE cities. Development of diabetes in adulthood also appears to be affected by early childhood conditions (Barker, 1998; Aboderin and others, 2002). Is there any evidence in countries of the region that current diabetes status is related to early childhood conditions and development?

A simple way to identify the direction and magnitude of effects is to estimate for each city the relationship between indicators of early health status and the probability of self-reporting diabetes. This is a blunt tool for a number of reasons. First, focusing on current diabetes status constrains the universe of study to those who were able to survive with the disease. It is likely that those in worst health were less likely to survive to be interviewed. Secondly, although self-reports of diabetes are generally accurate (Palloni and others, 2003; Goldman and others, 2002), even small measurement errors can lead to powerful attenuation of estimated effects. In addition, the indicators of early childhood conditions available here—anthropometric measurements and retrospective questions—were assessed in a population-based study, carried out using person-to-person interviews, rather than in a clinical setting. As a consequence, the anthropometric indicators may be subject to random errors, with the consequent distorting effects on estimates of association between variables.

Table 5 displays the estimated effects of three anthropometric indicators (see the annex for details) on the log-odds of reporting diabetes. Table 6 displays the effects associated with indicators of childhood economic and health status as reported in retrospective histories. In both tables 5 and 6, the models included controls for gender, age, race, education and obesity.[13]

The results for the anthropometric indicators are mixed. Unlike findings obtained by other authors for the United States (Fogel, 1994; Costa, 2002; Kim, 1993) this analysis provides little support for the idea that height is related to the probability of diabetes once the effects of *current* nutritional status, as reflected in the Body Mass Index (BMI), are controlled for.[14]

Knee height is not only a good predictor of current height in populations whose skeletal mass is compressed by age-related processes (Chumlea and others, 1998; Palloni and Guend 2005), but it, as well as leg length, is a marker of early malnutrition. Yet there is little evidence from the SABE data that early malnutrition as reflected in knee height is related to current diabetes status.

TABLE 5.  EFFECTS OF ANTHROPOMETRIC VARIABLES ON DIABETES

| Country and predictor | N | *Dependent variable: respondent has diabetes (logit transformation)* | |
|---|---|---|---|
| | | *Effect (log odds)* | *SE* |
| *Height* | | | |
| Barbados | 1665 | 0.05 | 0.16 |
| Brazil | 1765 | -0.03 | 0.17 |
| Chile | 733 | -0.04 | 0.29 |
| Cuba | 1669 | 0.07 | 0.17 |
| Mexico | 1022 | 0.27 | 0.21 |
| Uruguay | 1282 | -0.21 | 0.23 |
| Pooled SABE | 8668 | -0.05 | 0.08 |
| *Knee height* | | | |
| Barbados | 1660 | -0.15 | (0.15) |
| Brazil | 1763 | 0.05 | (0.16) |
| Chile | 729 | 0.12 | (0.27) |
| Cuba | 1668 | -0.09 | (0.17) |
| Mexico | 1022 | 0.32 | (0.19) |
| Uruguay | 1243 | -0.21 | (0.21) |
| Pooled SABE | 8617 | -0.07 | (0.08) |
| *Waist/hip ratio* | | | |
| Barbados | 1651 | 0.88 *** | (0.15) |
| Brazil | 1752 | 0.63 *** | (0.15) |
| Chile | 733 | 0.59 | (0.31) |
| Cuba | 1664 | 0.29 | (0.20) |
| Mexico | 1019 | 0.18 | (0.20) |
| Uruguay | 1229 | 0.71 ** | (0.23) |
| Pooled SABE | 8577 | 0.47*** | (0.08) |

*Source:*  See table 1.
NOTES: Height and knee height:  1=lowest 20% of distribution.  Waist/hip ratio: 1=top 20 per cent of distribution.   Significance:    * p<0.05;    ** p<0.01; ***p<0.001.  Anthropometric measures were not available for Argentina.
Each line of the table reports results from a separate analysis (country-specific except in the case of the "pooled SABE" data set). All models include controls for gender, age, education, race and obesity except for Mexico where there were no data on race.  The lower sample size for Chile is primarily due to missing values for race.  The analysis for the pooled SABE sample also includes country-specific dummy variables and does not include race so as to include Mexico. The sample size for pooled SABE is larger than the sum of the individual country sample sizes because excluding race increased the sample size for Chile.

TABLE 6. EFFECTS OF EARLY CHILDHOOD CONDITIONS ON DIABETES

| Country and predictor | N | Dependent variable: respondent has diabetes (logit transformation) | |
| | | Effect (log odds) | SE |
|---|---|---|---|
| *Barbados* | | | |
| Economic | 1636 | -0.005 | (0.16) |
| Health | | -0.37 | (0.55) |
| *Brazil* | | | |
| Economic | 1740 | 0.04 | (0.14) |
| Health | | 0.40 | (0.25) |
| *Chile* | | | |
| Economic | 726 | -0.17 | (0.23) |
| Health | | 0.49 | (0.41) |
| *Cuba* | | | |
| Economic | 1657 | -0.08 | (0.16) |
| Health | | 0.29 | (0.32) |
| *Mexico* | | | |
| Economic | 1018 | 0.27 | (0.20) |
| Health | | 0.42 | (0.33) |
| *Uruguay* | | | |
| Economic | 1270 | -0.11 | (0.18) |
| Health | | 0.30 | (0.41) |
| *Pooled SABE* | | | |
| Economic | 8566 | 0.02 | (0.07) |
| Health | | 0.26[†] | (0.14) |

*Source*: See table 1.

NOTES: Early childhood economic situation: 1=fair/poor, 0=good. Early childhood health: 1=poor, 0=excellent/good. Significance: [†]p<0.1; *p<0.05; ** p<0.01; ***p<0.001. Anthropometric measures were not available for Argentina. Separate analyses were conducted for each country and for the pooled SABE data. All models include controls for gender, age, education, obesity and race except for Mexico where there were no data on race. The lower sample size for Chile is primarily due to missing values for race. The analysis for the pooled SABE sample also includes country-specific dummy variables and does not include race so as to include Mexico. The sample size for pooled SABE is larger than the sum of the individual country sample sizes because excluding race increased the sample size for Chile.

In contrast, the waist-to-hip ratio (WHR) is a powerful predictor of current diabetes status in four of the seven countries. This finding is interesting but admits two very different interpretations. On the one hand, evidence for poor populations suggests that WHR is affected by early malnutrition (Schroeder and others, 1999; Martorell and others, 2001). If so, the estimated effects shown in the table could reflect the impact of early malnutrition on propensity to develop diabetes as an adult. On the other hand, WHR is a measure of central adiposity and could also reflect hormonal and metabolic disorders produced, for example, by sustained stress (Adler and others, 2000; Ostrove and others, 2001). If so, the estimated effects shown in the table would only reflect the relationship between stress in the recent past, metabolic imbalances, and diabetes. This mechanism could be independent of early malnutrition.

It may be noted that the SABE data provide evidence of a connection between early nutrition and WHR (Palloni and McEniry, 2004). Results not shown here indicate that, in SABE countries, being in the lowest quintile of knee height strongly affects the odds of being in the upper quintile of WHR. Indeed, the ratio of the odds of being in the upper quintile of WHR for a person in the lowest quintile of knee height is on the order of 1.4. This relationship is highly statistically significant. In contrast, neither the retrospective measure of health status nor that of childhood socioeconomic status is related to WHR.

Turning to the relationship between retrospective indicators of early economic and health conditions and current diabetes status, table 6 shows that the results are mostly negative. When the SABE data are pooled, the estimated effect for early health status has the expected sign but is only marginally statistically significant. In all other cases the effects are statistically insignificant.

To summarize: the evidence for connections between early childhood conditions and current diabetes status is largely negative, irrespective of whether one uses anthropometric or direct (retrospective) assessments of childhood conditions. In only one case, the measure of WHR, are the estimated effects substantively large and properly signed. In the remaining cases, the data reveal no relationships of importance.

## G. CAN WE MAKE INFERENCES ABOUT MORTALITY?

The discussion below ventures into uncharted territory, attempting to infer expected relative mortality risks for obese and non-obese individuals. The SABE study does not provide information on actual mortality and, therefore, does not permit direct estimation of mortality risks for any particular subgroup. There is, however, an indirect way of doing so using those samples for which information on anthropometric measures is available (that is, excluding Argentina, which did not gather this information). The idea is to estimate the relationships between height, weight and relative mortality risk using so-called Waaler surfaces. These surfaces are derived from the work of Waaler (1984) and others (Fogel, 2003; Kim, 1993; Costa 2002), which mapped risks of mortality according to height and weight, originally using data from Norway. We are now examining the applicability of Waaler surfaces to Latin American and Caribbean countries (Palloni and McEniry, 2005). Assuming that Norwegian relative mortality risks associated with height-weight combinations apply to countries in SABE, and considering that Norwegians in general were probably exposed to better living conditions than individuals in the SABE samples of older persons, Waaler surfaces identify lower bounds for the relative risks associated with height-weight combinations (i.e., less risk than might actually be the case). Conversely, it is likely that older persons in the United States are in better health than were the Norwegians whose mortality Waaler examined. In this case Waaler surfaces identify an upper bound of relative mortality risks for older persons in the United States (higher relative risk than might actually be the case).

For any health status indicator that leads to a partition of the sample into classes or groups (in the present case, obese and non-obese), relative mortality risks can be approximately identified for each class or group by calculating their mean weight and height and locating the corresponding point on a Waaler

surface. The first step is to estimate Waaler-type surfaces, using Waaler's original data (Waaler, 1984), for (the log of) relative mortality risks as quadratic functions of height (cm.) and weight (kg.) plus interaction terms.[15] Next, *optimal lines* are identified as the locus of points yielding a weight that minimizes the mortality risk for a given height, and *severe obesity lines* are defined as the locus of points where the height-weight combination yields a body-mass index of 35. Finally, average height and weight for obese and non-obese 60-74 year-old respondents are calculated from SABE and HRS data, and these points are plotted on the surfaces.[16] Under the assumptions stated earlier, the location of these points on the surfaces identifies a minimum mortality risk among obese (and non-obese) individuals in SABE countries and a maximum mortality risk for obese (and non-obese) HRS respondents.

Figures 7 and 8 display curves of the logarithm of the relative mortality risks for various combinations of height and weight among Norwegian males and females respectively. The figures also display the points corresponding to the average weight-height combinations among obese and non-obese males and females in the SABE and HRS data sets. The relative mortality risks in the reference population for different height-weight combinations are indicated in the graphs for selected iso-risk lines. For example, a male 140 cm tall and weighing 68.6 kg would be on the borderline of severe obesity (BMI=35) shown in figure 7. The iso-risk lines show that this weight-height combination corresponds to a relative mortality risk of 0.69666 or, after exponentiation, a mortality risk approximately twice as high as total mortality in the reference population. Relative mortality risk increases as height decreases and, as weight increases for a particular height, there is a set of optimal points where mortality risk is minimized ("optimal line"). A particular height-weight combination always yields higher mortality risks for males than for females; this is a feature inherent in the Norwegian data and is likely to apply to other societies as well.

Two patterns deserve attention. First, non-obese older men (represented with points bearing the symbol "(n)") can be located in an area of lower mortality risks than for the obese (represented with points bearing the symbol "(y)"). Indeed, the latter are always to the right and almost always below the level of the former (lower height). This is evidence of a clear mortality divide between obese and non-obese males as the former are always located in *loci* closer to the curve representing higher mortality risks whereas the latter cluster very close to the optimal line. This is a feature characterizing all data sets under examination and is also present among females (figure 7), albeit in a more attenuated fashion. The fact that the observed mortality divide between obese and non-obese is in the expected direction gives some basis for using the Waaler surfaces to draw stronger inferences.

The second pattern to note is that older persons in the SABE countries are in a disadvantageous position relative to those in the United States, and that the ranking of relative mortality risks in the SABE countries is related, in a general way, to the type of demographic regimes they experienced in the past. Thus, Barbados, Cuba and Uruguay, which experienced very early mortality decline (mostly associated with eradication of infectious diseases) appear to have a more advantageous relative risk profile, regardless of obesity status or gender. Indeed, the points (n) and (y) for these countries are always below (lower height) the points corresponding to the United States but are above all the others.

Waaler surfaces are a blunt tool to examine mortality risks. However, in the absence of direct data, they do show that, at least with respect to the obese vs. non-obese contrast, older persons in the SABE samples, as conjectured, have an anthropometric profile that places them at a disadvantage in terms of mortality risks relative to older persons in countries that are either wealthier (United States) or where the growth of the older population was produced by a different array of demographic forces.

**Figure 7. Waaler mortality surfaces showing obese and non-obese groups aged 60-74**

a. Men                                             b. Women



Country:
| | | | |
|---|---|---|---|
| Bar: Barbados | Ch: Chile | M: Mexico | HRS:United States/HRS |
| Br: Brazil | Cu: Cuba | U: Uruguay | |

Obesity: (n) = No   (y) = Yes
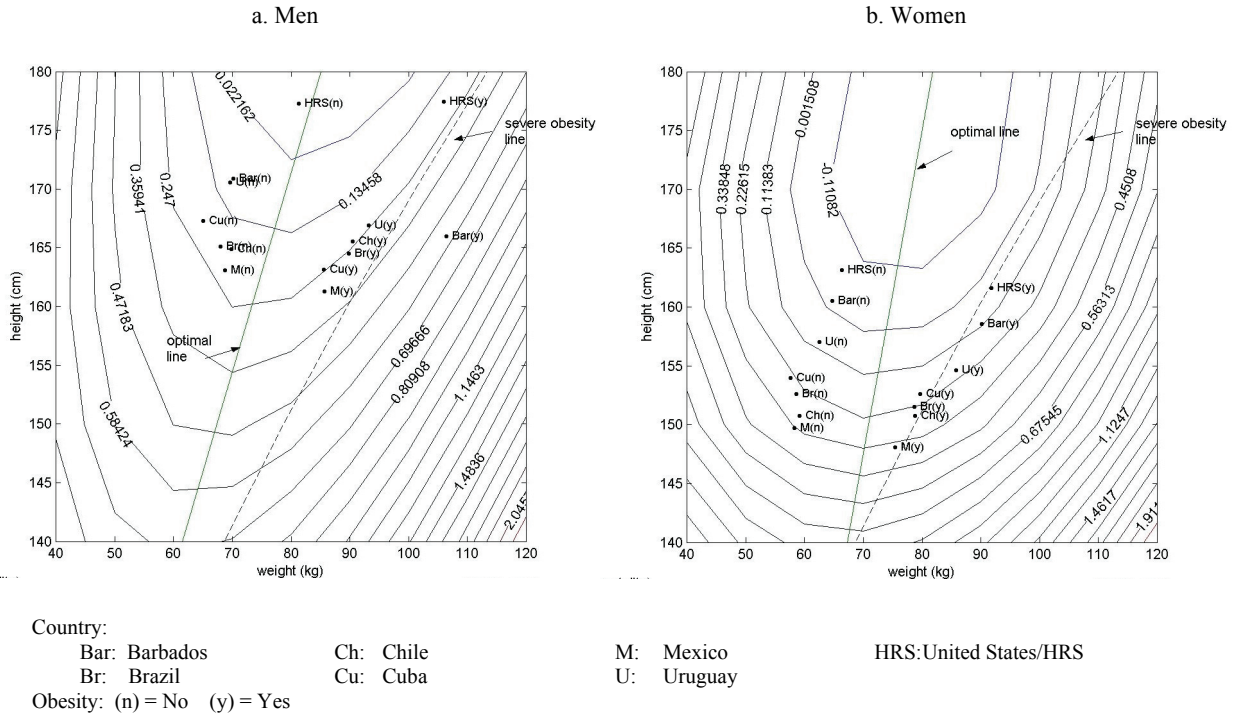
*Source*: Authors' calculations based on data from SABE and HRS.

## H. Discussion

This paper has employed cross sectional data on older Latin American and Caribbean populations to examine the conjecture that the past evolution of mortality in countries of the region may have important implications for the health status of those approaching old age now and in the next 20-30 years. If the conjecture holds merit, one would expect to observe (a) higher frailty among older persons born in the Latin American and Caribbean region than, for example, in developed countries such as the United States; (b) strong effects of early childhood conditions on adult health status; and (c) higher expected mortality risk than in the United States.

Examining the conjecture more fully would require observing a cohort of individuals over time. However, a cross-sectional analysis using comprehensive and recent data from the Latin American and Caribbean region provides an opportunity to conduct a preliminary examination of the conjecture. This paper set out to examine the conjecture by answering a set of four questions regarding (a) the nature of health profiles of the ageing in the Latin American and Caribbean region; (b) specifically, whether those profiles showed evidence of poor health and functional status; (c) comparisons with countries such as the United States; and (d) whether there was evidence of high impact of early childhood conditions.

The results reported above suggest that the conjecture has merit, even though the evidence available from the SABE data is weak. These new data show that the characteristic health profile of older persons in the region exhibits a high prevalence of chronic disease and disability, suggesting more frailty among the old in the region than in the United States.

Self-reported health status shows substantial inter-country variability. On average, countries in the region display patterns by age and sex that are similar to those found elsewhere. Women and the very old

are more likely to declare themselves in poor health. The proportion reporting difficulty carrying out at least one ADL or IADL is strongly related to age and gender. Prevalence of difficulty with ADLs displays remarkable inter-country invariance, though this is not the case for IADLs. Self-reported health, on the one hand, and ADL and IADL, on the other, are only moderately related to each other. The mean number of self-reported chronic conditions increases with age and is higher for women than men.

Of all chronic conditions there are three that stand out: arthritis, cardiovascular disease and diabetes. Diabetes was chosen as a focus of analysis because of its significant increase in the region and because of its potential connection with childhood experiences. Women are especially affected by this condition. Obesity, a risk factor for diabetes, is also high among older persons in the region, particularly among women. There is large inter-country variance in both diabetes and obesity, and the causes of this deserve further investigation. In some countries that are highly modernized and Westernized, such as Argentina, the prevalence of diabetes is fairly low and in other countries, such as Mexico and Barbados, where high percentages of the population are of African descent or mestizo, the prevalence is very high.

The new data show that in some cases the health profile of older persons in Latin America and the Caribbean is worse than in the United States, but this depends on the indicator; on some indicators health status appears worse in the United States. Age and gender patterns of self-reported health, ADLs and IADLs are comparable. Older persons in SABE countries are, on average, more likely than those in the United States to report difficulties with IADLs though not ADLs. The United States population reports a much higher mean number of chronic conditions at all ages, particularly among males. In contrast, SABE countries on average display levels of self-reported diabetes and obesity that are as high as if not higher than those found in the United States.

The investigation also found indications of an association between early childhood conditions and adult health status and diabetes, although the evidence available from these data is weak. The analysis was limited to examining the relationship between anthropometric indicators and retrospective measures of early childhood conditions. It was possible to document only the strong relationship between diabetes and waist-to-hip ratio, which persisted even after controlling for the effects of obesity. We interpret this relationship as a partial reflection of early malnutrition and propensity to develop adult diabetes. However, other interpretations are possible, and the data examined here do not permit us to discriminate among them.

Waaler-type surfaces were employed to estimate expected relative mortality risk in SABE countries. The approach met with some success in indicating, as expected, higher mortality risks associated with obesity. The results also clearly suggest, as conjectured, a pattern of lower mortality risk in those countries that experienced a more gradual mortality decline accompanied by improved standards of living.

The conjecture regarding the implications of the evolution of mortality trends for health status of the region's older persons received some support in the present study, and deserves future cross-national study across a larger sample of developing countries with different mortality histories. However, the results of this analysis are not intended merely to examine the past. The aim is to gain a better understanding of the likely implications of the past for the present and future health of older adults. What was learned in the present investigation adds to our understanding of older persons' health status in the region and underlines the importance of developing sound social and health policies—policies that will invest sufficient resources to prepare for a future in which conditions such as diabetes and obesity will be highly prevalent. These health conditions will pose a challenge to Latin American and Caribbean institutions and to policy-makers. As older persons in the region become an increasingly important part of society over time, this study's exploration of the implications of the past hopefully will help guide future directions in the care of Latin American and Caribbean older persons.

DEFINITIONS AND OPERATIONALIZATION OF VARIABLES IN SABE

1. Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL)

*ADLs*:
Walking across the room
Dressing
Bathing
Eating
Getting in and out of bed
Using bathroom

*IADLs*:
Preparing meals
Managing money
Difficulty with getting to places[1]
Buying food or clothing
Using the phone (in SABE only for those with a phone)
Doing light housework
Doing heavy housework
Taking medicine(s)

2. Chronic conditions

Arthritis
Cancer
Diabetes
Respiratory illness
Heart disease
Stroke

3. Targets, spouses and proxies

    In three countries (Argentina, Chile, and Uruguay) only one individual per household was interviewed. In two countries, Brazil and Mexico, interviewers proceeded to interview all individuals 60 or over found in selected household. In virtually all these cases, the additional interviews corresponded to spouses (one per household). In Cuba interviewers selected a target individual and a spouse.

    The present analyses include all individuals interviewed. This has the advantage of maximizing observations at the expense of introducing dependence of observations in the countries where more than one individual per household was interviewed. As a check for sensitivity of results to effects of within-household clustering, some of the analyses were repeated using clustering procedures to adjust for lack of independence; but, since the inferences remain unchanged we have chosen to present results based on the larger samples.

4. Sampling weights

        Only the sample from Santiago is self-weighted. All others require weights to expand the sample population to the city population. Since in two countries no sample weights were available we chose to ignore them in all the others. However, to ensure that none of the conclusions was sensitive to this choice, we re-estimated models using sampling weights for those countries that had them available. None of the inferences changed, and it is thus unlikely that this factor has appreciably affected the results reported here.

[1] The United States is estimated to have surpassed a per capita GDP of $10,000 per year (in 2000 dollars) by the early 1940s (cf. http://eh.net/hmit/gdp).

[2] This is a simplified decomposition that assumes a population that is closed to migration.

[3] The argument assumes that the effects of mortality selection are small and if the effects of changes in behavioural profiles and medical technology (exogenous or not) are weak.

[4] For more information on the nature of the samples see Palloni and Pelaez (2002).

[5] The definition of ADL, IADL, and self-reported conditions selected for study in this paper appears in the annex. They are strictly comparable to those used in other surveys of older populations, particularly the Health and Retirement Survey (HRS) (2000).

[6] For the purpose of the analysis shown here, attention is restricted to five IADLs for which measures were strictly comparable between SABE and HRS: preparing meals; managing money; buying food or clothing; using the phone and taking medicine.

[7] Analyses of variance (Palloni and McEniry, 2004) indicate that the fraction of total variance explained by country variability is statistically insignificant.

[8] Montevideo is also the only city in the SABE sample where more than a trivial proportion of the elderly live in institutions. (The samples are household-based and exclude those in institutions.) The peculiar relationship between self-reported health and ADL and IADL in Montevideo might be a result of heavy selection among elderly who remain independent instead of becoming institutionalized.

[9] See annex for definition of chronic conditions.

[10] In this paper the term diabetes refers to a mixture of diabetes 1 and diabetes mellitus or type 2. However, for the most part those individuals self reporting diabetes are afflicted by diabetes type 2.

[11] Self-reports of diabetes tend to underestimate true prevalence. But self reports are quite accurate (with very high specificity), though with lower sensitivity, in very different cultural contexts (Palloni, Soldo and Wong, 2003; Goldman, Weinstein and Y-Hsung, 2002).

[12] In HRS, the predicted probability at the peak age for women is 0.22, slightly higher than the weighted average for SABE. However, this difference is statistically insignificant.

[13] A control for obesity is required since the tenor of the conjecture is emphasis on the direct effects of early childhood conditions, not the gross effects. Since part of the latter operate via increased predisposition to develop obesity, it is important to control for current obesity.

[14] The Body Mass Index (BMI) is the ratio of weight in kilograms to the square of height in meters. Persons with a BMI of 30 or over are considered to be obese.

[15] The relative mortality risk is defined as the ratio of the mortality rate for a particular weight-height combination to the average mortality rate in the population.

[16] The sample was limited to those younger than 75 in order to include the older population to whom the conjecture is most likely to apply, namely, those born after the period 1925-1930.

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# DEMOGRAPHIC TRANSITION, DEMOGRAPHIC BONUS AND AGEING IN MEXICO

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Nearly all countries have undergone, or are currently undergoing, the demographic transition. In general terms, the transition is a shift from a regime characterized by high and uncontrolled levels of mortality and fertility to one of low and controlled levels. This transition began later but is progressing more rapidly in the developing countries, such as Mexico, than in the more developed countries. The transition leads to changes in the size and age structure of the population, and these give rise to social and policy challenges that have yet to be fully resolved.

In Mexico, the sharp decline in mortality due to the expansion of health services, the low cost of importing effective drugs and a pronatalist policy that sought to meet the labour needs of an expanding industrial sector and to populate the national territory, all favoured rapid demographic growth during the twentieth century. Growth was especially rapid between 1954 and 1974, when the population increased by over 3 per cent per year. This was among the highest rates of population growth in human history.

The country later adopted a new population policy that sought to reduce population growth, and this led to a rapid decline in fertility during the last quarter of the twentieth century. The demographic transition is expected to be essentially completed during the next fifty years, when the age structure of the population will become much older. On the way towards that final stage, the rapid demographic growth of the past will continue to impact the age structure, as large cohorts born during the periods of peak growth pass through the life cycle. The transition will give rise to two changes as pronounced as they are distinct: first, the population of working age will grow rapidly; later, the number of older adults will increase rapidly, reaching, within half a century, ageing ratios similar to those in the developed countries. Even in 2050, there will be traces in the age structure of the rapid growth that characterized the generations born during the second half of the twentieth century. The impact of that past growth will finally cease early in the second half of the twenty-first century. The consequences of this demographic past are evident today, but they will become even more pronounced in the coming years when the ageing process intensifies.

This paper reviews the demographic origin of those two changes in the age structure — in other words, how past and future changes in fertility, mortality and migration have contributed, and will contribute in the future, to the formation of the demographic bonus and eventual ageing. The paper first considers the phases of demographic transition and then goes on to analyse the contribution of each of these three demographic phenomena to changes in the number and age structure of the Mexican population.

## A. DEMOGRAPHIC TRANSITION IN MEXICO

Mexico's demographic transition has followed a typical profile, as can be seen from figure 1. Following the pre-transitional phase that lasted until about 1930, the first stage saw a rapid decline in mortality while birth rates remained fairly steady and even rose between 1945 and 1960. The second phase began around 1970 when the decline in fertility, which began during the 1960s, became more rapid. The third stage of the process, when the birth and mortality figures converge, will occur during the first half of the twenty-first century.

**Figure 1. Crude birth and death rates, Mexico, 1900-2050**
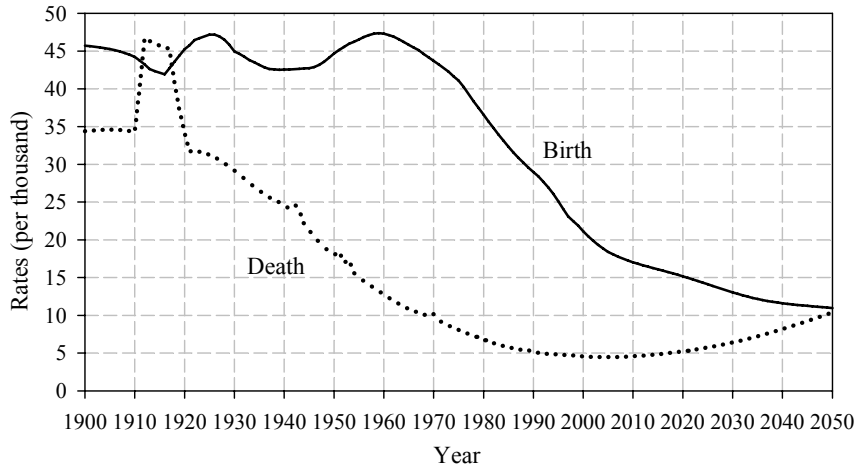


*Source*: CONAPO (2002), based on Collver (1965) and Zavala (1989).

The population growth rate is estimated to have increased from 1.4 per cent in 1921 to 1.7 per cent in 1930 and further to 2.7 per cent in 1950 and 3.5 per cent in 1965. As a consequence of the decline in fertility, the pace of population growth then began gradually to decrease, to 3.1 per cent in 1970, 2.3 per cent in 1985 and 1.3 per cent in 2000 (figure 2). The Mexican population entered the new millennium with a rate of growth similar to that of a hundred years earlier, but with a population size seven times greater.

**Figure 2. Total population and rates of population growth and natural increase, Mexico, 1900-2050**
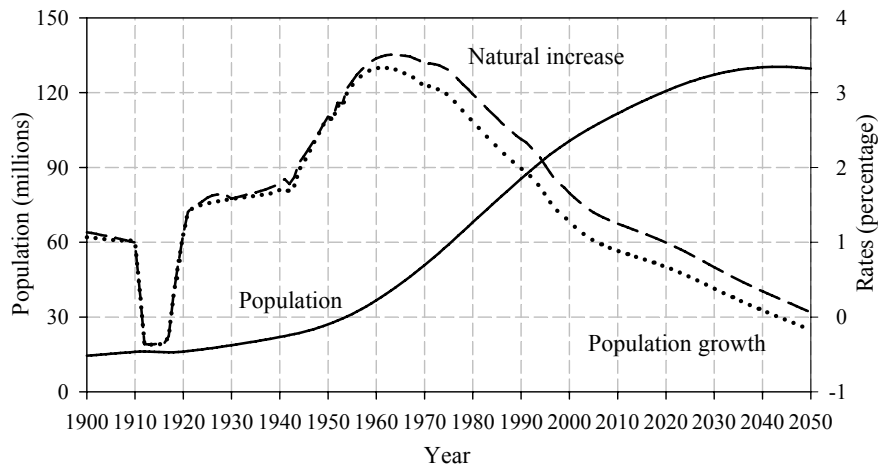


*Source*: CONAPO (2002).

*Changes in demographic variables*

A rapid and sustained decline in mortality took place beginning in the 1930s, in a context of far-reaching economic, political and social reforms. In 1930, life expectancy at birth was 35.9 years (34.9 years for men and 36.9 for women), whereas, in 2000, it was 74.0 years (71.6 years for men and 76.5 for women). Progress was greatest between 1942 and 1960 when there was an increase of almost one year in the average length of life for each calendar year (figure 3). The

general fall in mortality was so rapid that the cumulative reduction in the risk of death between 1930 and 2001 amounted to 82 per cent for men and 86 per cent for women. As in many other countries, Mexican mortality fell slowly during the 1960s. The pace of decline picked up later, but was not as rapid as in earlier years.

**Figure 3 Life expectancy at birth by sex, Mexico, 1900-2050**
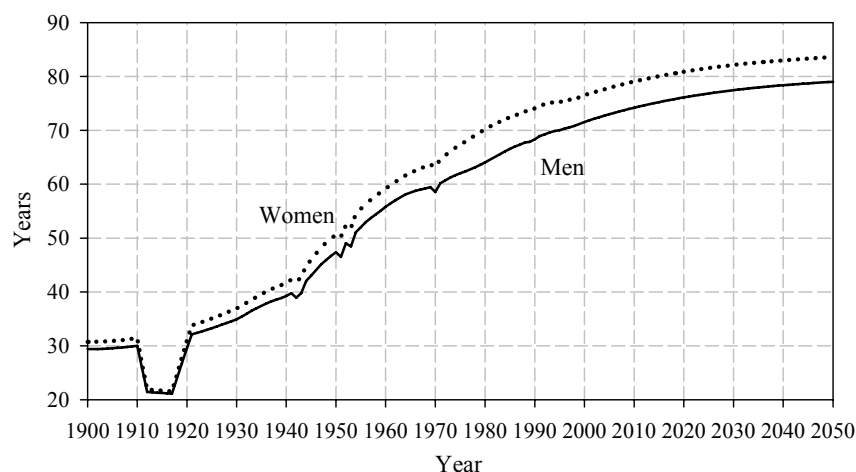


Source: CONAPO (2002), based on Collver (1965); figures for 1900-1929 based on gross mortality rates estimated by Collver (1965).

Among the main determinants of the sharp decline in mortality are the expansion of education services and sanitation infrastructure and the extension of health services. The latter has been a significant factor ever since the creation of the Mexican Social Security Institute (IMSS) in 1942 and the conversion of the Department of Health into the Ministry of Health in 1943.

According to recent projections from Mexico's National Council on Population (CONAPO, 2002; Partida 2003), life expectancy will increase from 74.0 years in 2000 (71.6 for men and 76.5 for women) to 76.6 (74.2 for men and 79.1 for women) in 2010, 79.8 (77.5 for men and 82.1 for women) in 2030 and to 81.3 years (79.0 for men and 83.6 for women) in 2050 (figure 3). Average life expectancy in Mexico at the end of the projection period will be similar to the recent figure for Japan, which currently has the lowest mortality in the world. The anticipated increases in life expectancy may be conservative since the projected overall reduction in the risk of death between 2000 and 2050 is 44 per cent, which is much smaller than the 73 per cent reduction observed during 1950-2000.

The decline in fertility did not begin until the mid-1960s. The high and even rising rates before then reflected the pronatalist policy prevailing in the country during those years. Families had about six children in the early twentieth century, reaching a maximum of 7.2 children at the beginning of the 1960s. The gradual spread of the practice of family planning—as part of a new policy that sought to regulate population growth in accordance with the agreements adopted at the 1974 United Nations World Population Conference in Bucharest—contributed to advancing the fertility transition in Mexico (figure IV).

The total fertility rate (TFR) fell to six children per woman in 1975, five in 1979, four in 1985 and three in 1994, and has now reached about 2.2 children (figure 4). The Mexican experience, like that of other countries, demonstrates that, once the fertility transition begins, the pace of decline accelerates but, as it progresses, the successive reductions become less year by year.

**Figure 4. Total fertility rate, Mexico, 1900-2050**
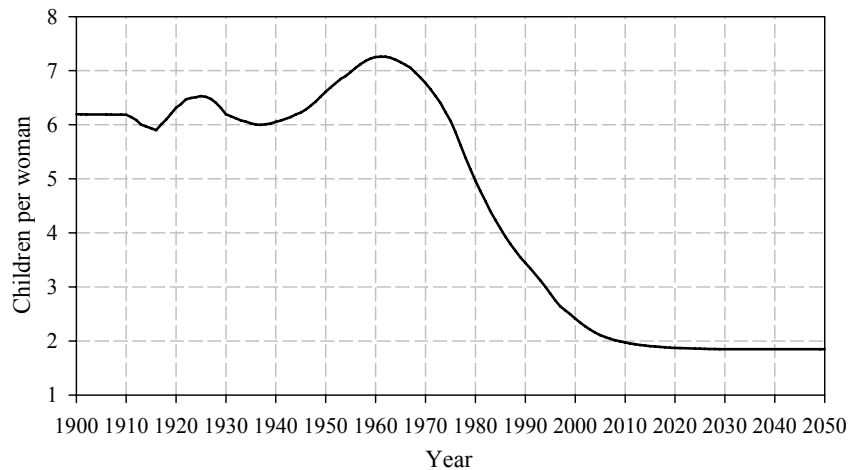


*Source*: CONAPO (2002); figures for 1900-1950 based on estimates made by Zavala (1989).

Mexico's population policy aims at achieving a fertility rate equivalent to the replacement rate in 2005 (a TFR of 2.1 children per woman).[1] It is estimated that, in 2000, about 71per cent of women of reproductive age living with a partner used methods of contraception. In order to reach the replacement rate, it will be necessary to increase contraceptive use to approximately 73.5 per cent in 2005 with an average annual increase of almost 0.5 per cent, which is less than the 0.7 per cent annual increase observed during 1997-2000.[2] The required increase in the use of contraceptives is feasible, since Mexico has a strong and comprehensive family planning programme that seeks to minimize the unmet demand for contraception. The goal is likely to be met since the rate of contraceptive use was 74.5 per cent in 2003, according to the National Reproductive Health Survey (Secretaría de Salud de México, 2004).

The author's projection of the TFR is shown in figure 4, based on the fertility targets and the rate of contraceptive use assumed by the Mexican Government, and assuming that TFR will reach a minimum of 1.85 children per woman and will remain at that level from year 2030 onwards. The latter assumption is in line with suggestions at a United Nations group of experts (United Nations, 2002, pp. 18-20). Fertility below the replacement level would result in an eventual reduction of the population.

The net loss of population as a result of international migration has been significant since 1960 (figure 3).[3] It is estimated that territorial mobility—principally, of Mexicans to the United States—is currently reducing the population of the country by 0.4 per cent per annum. Forecasts for the next fifty years indicate that the net emigration rate might fall from 0.39 per cent in 2000 to 0.23 per cent in 2050. If the fertility, mortality and migration rates forecast for 2050 were to remain unchanged, the intrinsic growth rate of the stable population would eventually be -0.78 per cent.

B. THE AGE STRUCTURE TRANSITION

The various phases of demographic transition have left their mark on the age structure of the Mexican population, as can be seen from the successive age pyramids in figure 5. The combination of falling mortality and high and rising fertility caused a rapid rejuvenation between 1930 and 1970. The sharp fall in fertility in the following thirty years produced a progressive reduction of the base of the pyramid.

**Figure V. Population pyramids, Mexico, 1930-2050**
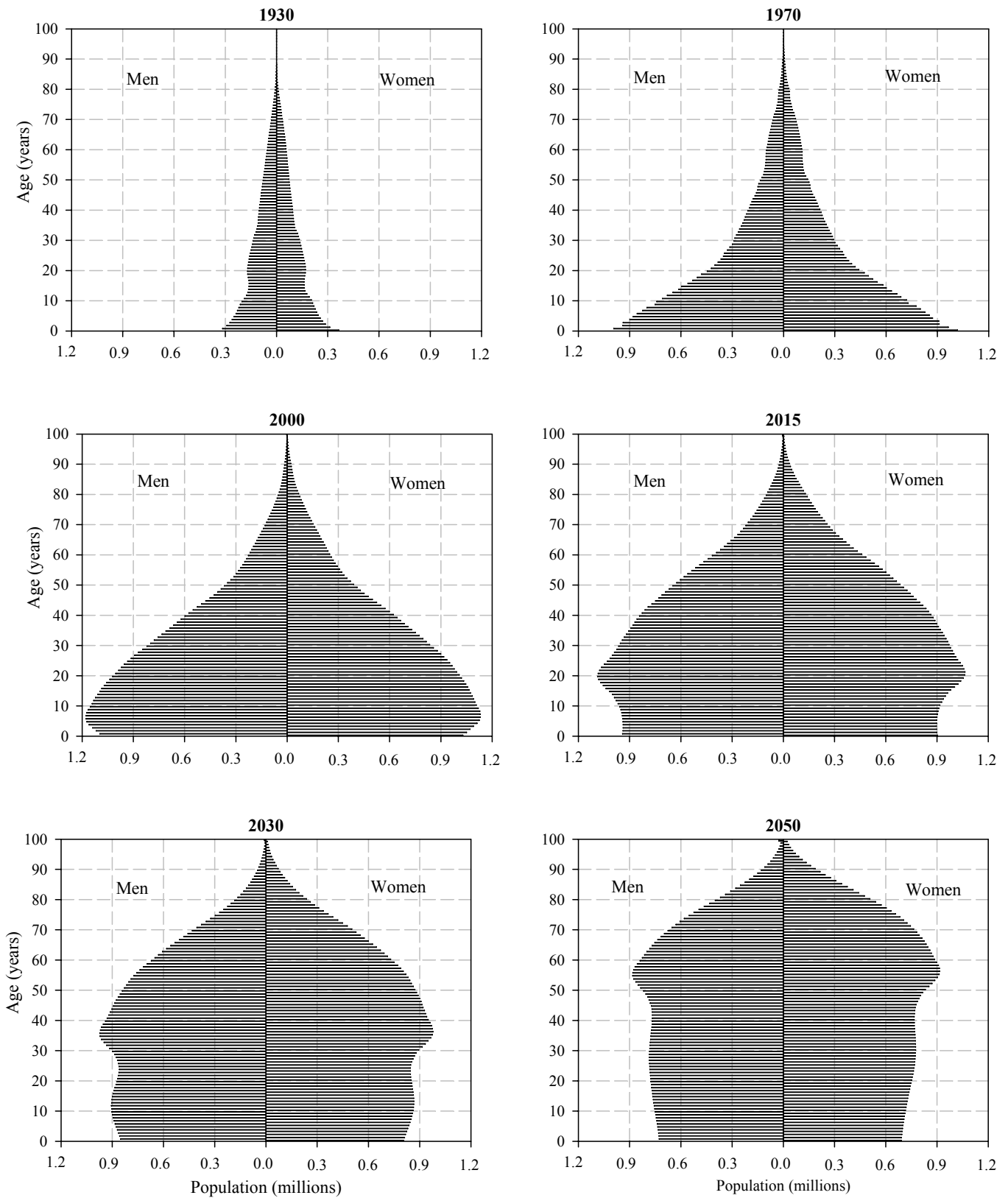


*Source*: CONAPO (2002).

Demographic projections indicate that this process will intensify in the first five decades of the present century. The contraction of the base of the pyramid will be increasingly evident, not only in relative terms, but also in absolute numbers. On the other hand, the momentum of the past rapid growth will be clear first in the working years (age 15-59) and later in old age (60 years and above). The working-age population will increase by almost 27 per cent between 2000 and 2015 but by only 3.8 per cent in the following 15 years, and it will decrease by 9.5 per cent in the next two decades. During the same periods, the number of older adults will continue to rise by 76.3, 83.3 and 63.2 per cent, respectively.

The changes in age structure can be seen more clearly in the time series for the six functional age groups shown in figure 6. Pool (2004) suggests equating these groups with distinct stages in the life cycle: childhood corresponds to age group 0-14 years; youth to 15-29 years; early middle age to 30-44 years; late middle age to 45-59 years; early retirement age to 60-74 years; and old age to 75 years and above. The timeline of the childhood group is similar in pattern to that of the crude birth rate (figure 1). This is due to the fact that these generations are still "close" to their year of birth. With the passage of time, the likelihood of survival for the most recent cohorts increases as a result of the fall in mortality. However, from 1960 onwards, these cohorts are reduced as a result of more intense international migration, particularly of young people and adults in early middle age.

**Figure 6. Population distribution by functional age group, Mexico, 1900-2050**
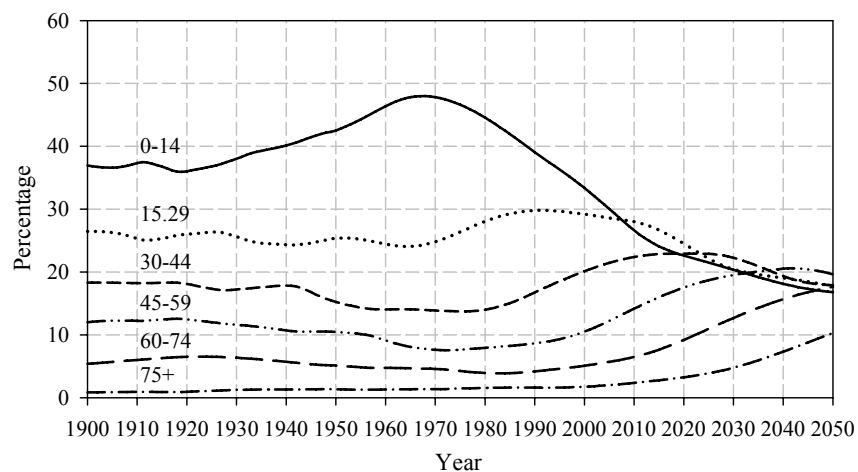


*Source*: CONAPO (2002).

Thus, as a result of changes in demographic variables, the expected "generational parallelism" between the six age groups does not occur strictly with a periodicity of 15 years (the high point of the 0-14 age group in 1965-1969 does not occur for the 15-29 age group in 1980-1984, etc.) either in the precise displacement of profiles (the shape of the high point of the 0-14 age group broadens when the same generations are in the 15-29 and 30-44-year age groups), or in the proportion they represent of the whole as time passes.

The panorama is clearer if we consider the potential population growth implicit in the age structure or the "momentum" of the population.[4] Pool (2004) suggests examining momentum in

terms of the increase in population by age group during a period of time, i.e. the growth potential of each age group, or the amount that each age interval contributes to the overall growth rate.

Figure 7 shows the year-by-year trend in momentum. In this case, the profile is similar between the six age groups, and one can even note some "waves", although they are not as marked as in other countries (Pool, 2004, figure 3).

**Figure 7. Impact of cohort flows on selected age groups, Mexico, 1900-2050**
*(Change in specific age group as a percentage of total population at the beginning of the year)*
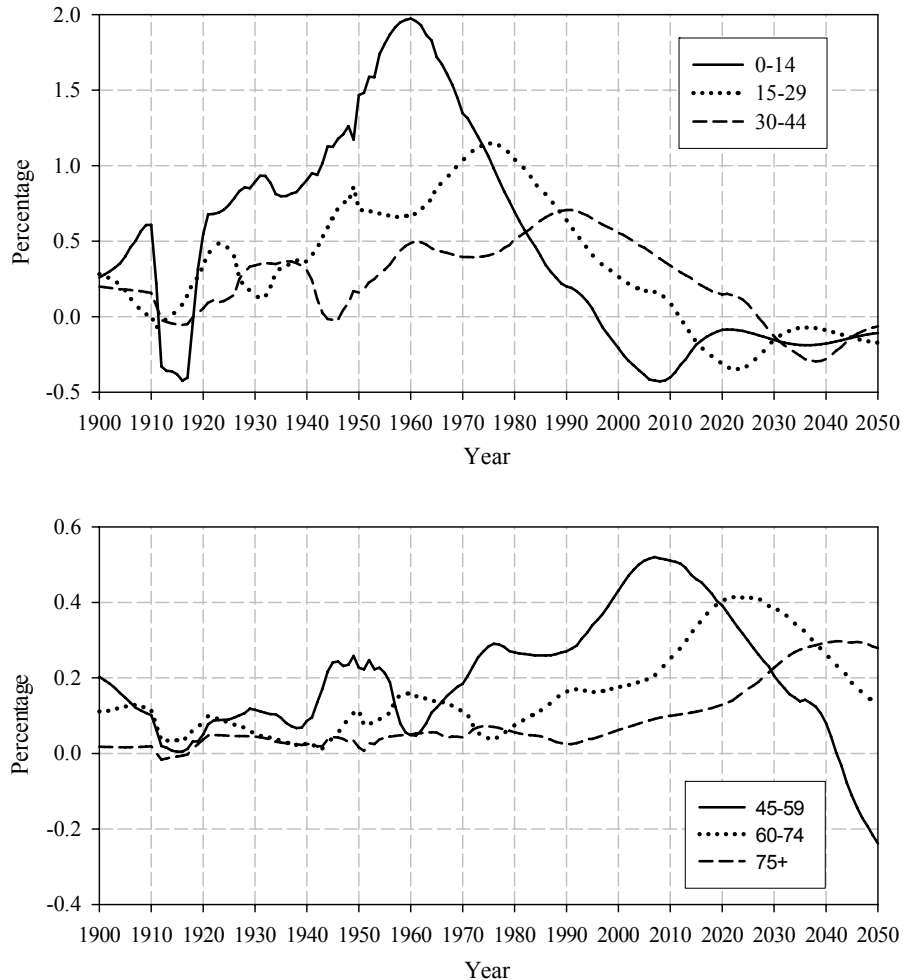


*Source*: CONAPO (2002).

The various stages of the overall population growth rate are most evident in the 0-14 year age group although they are also perceptible in other groups. Thus, for example, the fall in the number of births during the six-year period 1912-1917, during the time of the Mexican Revolution (1910-1921), is less apparent 15 years later (1927-1932) in the 15-29 age group, 30 years later (1942-1947) in the 30-44 age group and almost disappears (1987-1992) in the group aged 75 and over, due principally to the increasing contribution to trends at higher ages of longer survival resulting from the decline in mortality.

The clearest "wave" is the one that occurs around 1960 which is the result of the policy of promoting and, later, discouraging large families. Once the fall in fertility slows drastically beginning in 2005 (figure 4), the process of convergence towards eventual stability will continue to give rise to waves although they will be much smaller than the one that occurred around 1960. The "intergenerational" spacing of these waves will be approximately 15 years throughout the present century although up to 2050 they will be observed only among the children and youth (figure 7).

*Demographic bonus*

On the way to population ageing, there is a period when the most favourable demographic conditions converge and may help to trigger Mexico's economic growth potential if proper and sensible use is made of them. The gradual narrowing of the base of the age pyramid and the movement of the largest generations (corresponding to the high growth rates of the past) first to the economically active age groups and then to the older age groups, leads to a relationship between the productive and dependent population groups that is favourable scenario for employment, the economy and investment..

This "window of opportunity", also called *demographic bonus or dividend*, will briefly remain open in Mexico, for the first and only time, from 2006 to 2028. Among the various indicators that enable the timing of this "window of opportunity" to be identified, the demographic dependency ratio is the one that is generally used. Although it is a crude indicator, the dependency ratio makes it possible to pinpoint changes in the age structure as the demographic transition advances. The dependency ratio is the sum of the number of children and adolescents (aged 0-14 years) and of older adults (60 years and above), who are regarded as the dependent population, divided by the number of people of working age (15-59 years), regarded as being the income-earning population.

Figure 8 shows the development of the dependency ratio. It can be seen that, during the twentieth century, the total dependency ratio was almost entirely determined by the youth dependency ratio (children and adolescents from 0-14 years divided by the working-age population), reflecting high demographic growth. As a result of the rapid decline in the youth dependency ratio—due to declining fertility—the total dependency ratio will be near its minimum for a number of years between 2010 and 2020. Later, the total dependency ratio will increase rapidly as a result of the ageing process, reflected in the increase in the old-age dependency ratio.

This pattern can be clearly recognized in the first half of the present century, as shown in figure 8. There is no exact value of the dependency ratio that enables the timing of the demographic bonus to be identified. The period taken here is one when the dependency ratio is below 60 per cent. In the years of highest demographic growth (1960-1975) and the rejuvenation of the age structure, for every hundred persons of working age there were as many or more additional consumers in the dependent ages. Three decades later (2006-2028), it is expected that the proportion will have fallen to around half of the earlier period's maximum. From the perspective of the demographic dependency ratio, 100 workers in 1969-1970, in addition to supporting themselves, were working to support 117 additional persons. Between 2006 and 2028, they will be doing so for only 60 others, at most. Thus, if the available workforce is adequate and is properly used, over one quarter(1 - 160/217=0.263) of total consumption in the 1960s and 1970s could be transferred, in the next 22 years — through domestic savings — to spur economic growth and investment. This is what is meant by the demographic bonus or dividend.

The next two sections discuss how the changes in each of the three demographic phenomena since 1900 have contributed, and will contribute, to the demographic bonus, subsequent ageing and the growth of the potential workforce.

**Figure 8. Dependency ratios, Mexico, 1900-2050**
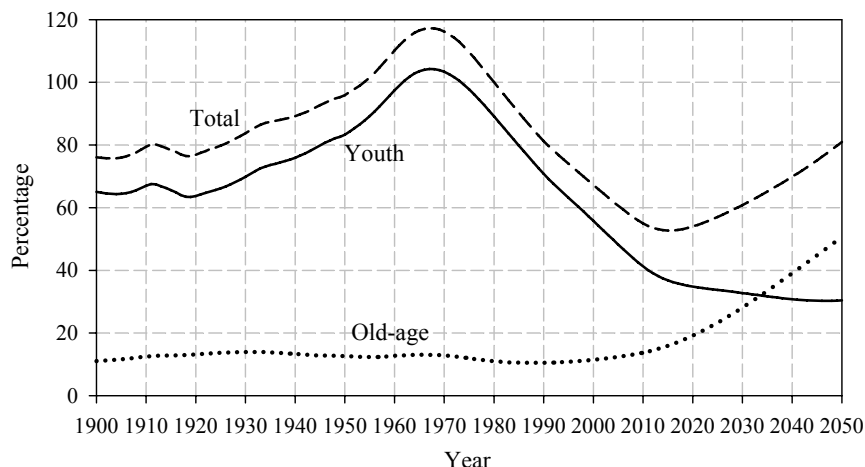


*Source*: CONAPO (2002).
NOTE: The youth dependency ratio is the ratio between age groups 0-14 and 15-59. The old-age dependency ratio is the ratio between age groups 60+ and 15-59. The total dependency ratio is the sum of youth and old-age dependency ratios.

C. CONTRIBUTION OF CHANGES IN DEMOGRAPHIC PHENOMENA TO CHANGES IN THE SIZE AND AGE STRUCTURE OF THE POPULATION AND THE SUPPLY OF LABOUR

*Demographic bonus and population ageing*

This section examines the contributions of fertility, mortality and migration to changes in the numbers of persons in the dependent and working ages during the period of the demographic bonus. The analysis is based on the observation that the population of age *x* at a particular time *t* is equal to the births that occurred *x* years ago (at time *t-x*) plus the cohort's history of mortality and migration. Thus, the change in the population of a given age at two different times is equal to the sum of the differences in the number of persons born into the groups and the differences in mortality and migration histories of those two birth cohorts. Those histories can be further divided into earlier and more recent periods. The annex explains the methodology used to derive the results presented below.

The contribution of changes in each demographic factor to the formation of the demographic bonus and to the ageing process is clearer if we separate trends in the birth rate, mortality and migration into three periods approximately corresponding to the stages of demographic transition: (i) the phase of rapid demographic growth (up to 1969); (ii) the decline in fertility (1970-1999); and (iii) the period of convergence between fertility and mortality rates (2000-2050).

In table 1, the contribution of each factor to the formation of the demographic bonus is broken down into the three periods mentioned above. The demographic bonus occurs between 2006 and 2028 (figure 9). The working-age population, ages 15-59, is projected to increase by 12.3 million

persons or 18.2 per cent during this period. Changes in fertility and mortality each contribute positively to growth in the number aged 15-59 (with growth in births contributing 6,522,654 persons and mortality decline contributing 6,955,228). By contrast, international migration is estimated to reduce the working-age population by 1.2 million persons, which amounts 8.6 per cent of natural increase (that is, the sum of the contributions of fertility and mortality, 13.5 million).

TABLE 1. CONTRIBUTION OF CHANGES IN DEMOGRAPHIC PHENOMENA
TO THE FORMATION OF THE DEMOGRAPHIC BONUS IN MEXICO, 2006-2029

| Period of change | Age | | |
| --- | --- | --- | --- |
| | Total | 15-59 | 0-14 and 60 or over |
| *Population* | | | |
| 2006[a] | 106 994 248 | 66 880 244 | 40 114 004 |
| 2029[a] | 126 443 156 | 79 204 364 | 47 238 792 |
| Absolute change[b] | 19 448 908 | 12 324 120 | 7 124 788 |
| Relative change | 18.2 | 18.4 | 17.8 |
| *Total contribution* | | | |
| Total | 19 450 146 | 12 324 959 | 7 125 187 |
| 1900-1969 | 21 470 716 | 10 134 780 | 11 335 936 |
| 1970-1999 | 1 189 055 | 2 863 730 | -1 674 675 |
| 2000-2028 | -3 209 625 | - 673 551 | -2 536 074 |
| *Natural increase* | | | |
| Total | 21 527 064 | 13 477 882 | 8 049 182 |
| 1900-1969 | 22 557 638 | 11 207 607 | 11 350 031 |
| 1970-1999 | 2 559 377 | 3 184 351 | - 624 974 |
| 2000-2028 | -3 589 951 | - 914 076 | -2 675 875 |
| *Fertility* | | | |
| Total | 9 031 673 | 6 522 654 | 2 509 019 |
| 1900-1969 | 18 306 508 | 9 900 145 | 8 406 363 |
| 1970-1999 | -3 123 683 | -1 330 375 | -1 793 308 |
| 2000-2028 | -6 151 152 | -2 047 116 | -4 104 036 |
| *Mortality* | | | |
| Total | 12 495 391 | 6 955 228 | 5 540 163 |
| 1900-1969 | 4 251 130 | 1 307 462 | 2 943 668 |
| 1970-1999 | 5 683 060 | 4 514 726 | 1 168 334 |
| 2000-2028 | 2 561 201 | 1 133 040 | 1 428 161 |
| *International migration* | | | |
| Total | -2 076 918 | -1 152 923 | - 923 995 |
| 1900-1969 | -1 086 922 | -1 072 827 | - 14 095 |
| 1970-1999 | -1 370 322 | - 320 621 | -1 049 701 |
| 2000-2028 | 380 326 | 240 525 | 139 801 |

*Source*: Estimates and projections of the National Council on Population (CONAPO).
[a]At start of year.
[b]The differences from the total contributions are due to approximations in the calculation of formula (4) in the methodological annex.

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**Figure 9. Population pyramids, Mexico, 2006 and 2029**
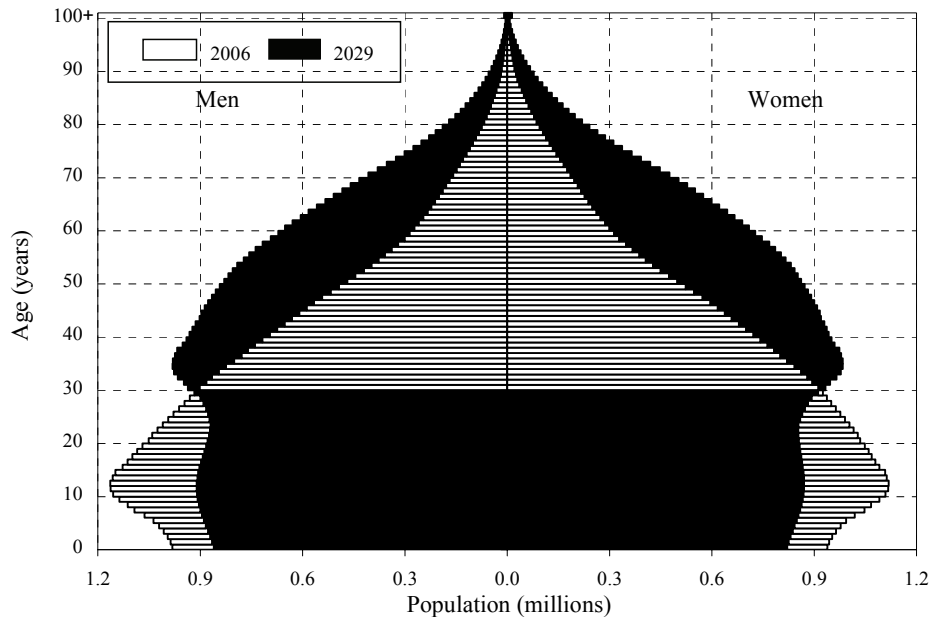


*Source*: CONAPO (2002).

However, if we make a distinction by period of occurrence, the picture becomes different. During the years of rapid mortality decline and high and rising fertility (1900-1969), changes in these two components of natural increase contribute positively. While the contribution of mortality continues to be positive in the following periods, the contribution of fertility turns negative as a consequence of the sharp decline in fertility rates. That decline is sufficiently large in the initial decades of the present century that it outstrips the positive effect of mortality and migration in both the working and the dependent age groups.

In short, most of the growth in the working-age population during the demographic bonus period derives from the rapid growth that took place before 1970, principally owing to high fertility (9.9 million). However, mortality decline is a significant positive force in all three periods, but especially during the last 30 years of the twentieth century — declining mortality during that period is estimated to add 4.5 million to the number of persons who will be of working age during the period 2006-2028. From 1970 onwards, the contribution of population dynamics has diminished significantly. The gain originating in 1970-1999 is a little over one quarter of what occurred in the previous seven decades (2.8 compared to 10.1 million). After 2000, demographic factors have tended to reduce rather than increase the size of the working-age population in 2006-2028. This can be seen more clearly in the contrasting pyramids in figure 9, which correspond to the beginning and end of the period in which we have located the demographic bonus. The increase in the working-age population is concentrated between 29 and 59 years of age, that is, persons born between 1946 and 1999.

In the dependent population, the scenario is even clearer. The reduction in the last three decades of the twentieth century is due to international migration (-1 million) — principally, of older adults when they were of working age — and lower fertility (-1.8 million), changes that are only partially offset by improvements in mortality (1.2 million) during the same period. On the

other hand, the expected reduction due to trends in the first thirty years of the twenty-first century is entirely attributable to fertility being below the replacement level after 2006.

The ageing process can be seen more clearly in terms of the overall change in the population by sex and age, as is shown in the superimposed age pyramids in figure 10 that correspond to the beginning and end of the projection. The ageing of the population can be seen from the fact that the net loss of 12 million children and young people under-15 years old at mid-century is almost matched by a gain of 12.3 million in the first 10 years of old age (60-69 years). Similarly, the reduction of 6.5 million in the first 18 working years (age 15-32 years) is offset by an increase of 6.8 million in the following 17 years (age 33-49 years).

**Figure 10. Population pyramids, Mexico, 2000 and 2051**
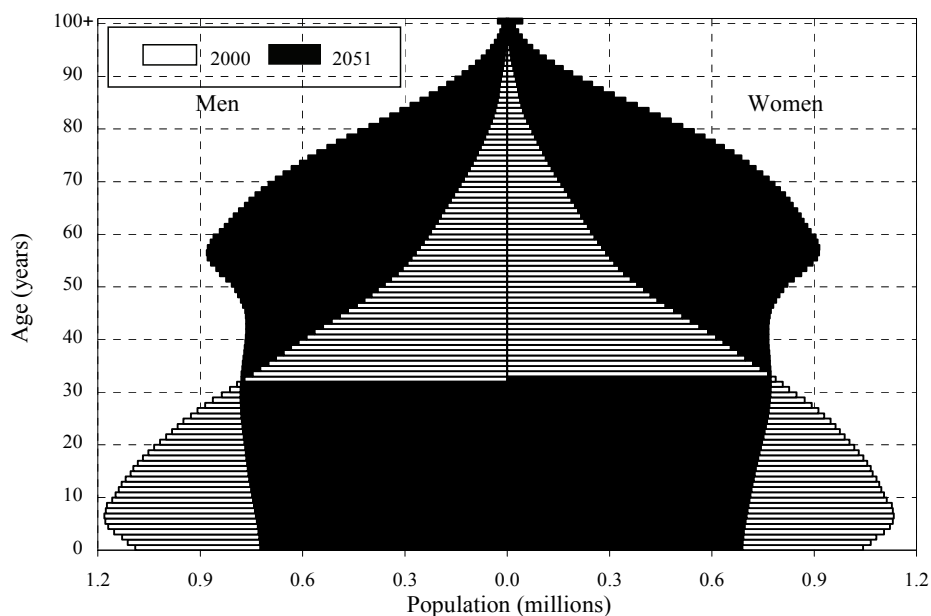


*Source*: CONAPO (2002).

The ageing of the Mexican population has already begun and will accelerate significantly during the present century. In 2000, people aged 60 years or over were 6.8 per cent of the total population. In 2050, they are expected to account for 28.0 per cent (table 2). According to the 2004 revision of the estimates and projections of the United Nations Population Division, the proportion of the population aged 60 or over in the more developed regions of the world is expected to increase from 11.7 per cent in 1950 to 32.4 per cent in 2050. Thus, a process that has taken a century in the more developed regions (increasing the proportion by 20.6 percentage points) will take less than half that time in Mexico (an increase of 21.1 percentage points).

Fertility and mortality both make large positive contributions to the expected growth in the number of older people between the start of 2000 and of 2051 (table 2). The high fertility of the past contributes over 80 per cent (18.4 million out of 22.7 million) of the total growth attributable to demographic changes that occurred before 1970. For the population younger than 60 years, below-replacement fertility in the next 50 years (2000-2050) will reduce the number aged under 60 by 18.4 million, which more than counterbalances the increase of 15.0 million during the 80 years (1890-1969) of high and rising fertility.

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TABLE 2. CONTRIBUTION OF CHANGES IN DEMOGRAPHIC FACTORS
TO POPULATION GROWTH DURING THE AGEING PROCESS IN MEXICO, 2000-2051

| Period of change | Age | | |
|---|---|---|---|
| | Total | 60 or over | 0-59 |
| *Population* | | | |
| 2000[a] | 99 929 495 | 6 752 115 | 93 177 380 |
| 2051[a] | 129 480 027 | 36 488 325 | 92 991 702 |
| Absolute change[b] | 29 550 532 | 29 736 210 | -185 678 |
| Relative change | 29.6 | 440.4 | -0.2 |
| *Total contribution* | | | |
| Total | 29 547 562 | 29 732 281 | -184 719 |
| 1890-1969 | 38 470 126 | 22 658 345 | 15 811 781 |
| 1970-1999 | 2 345 023 | 3 511 832 | -1 166 809 |
| 2000-2050 | -11 267 587 | 3 562 104 | -14 829 691 |
| *Natural increase* | | | |
| Total | 33 168 886 | 32 697 041 | 471 845 |
| 1890-1969 | 40 728 223 | 23 456 955 | 17 271 268 |
| 1970-1999 | 4 594 503 | 6 159 910 | -1 565 407 |
| 2000-2050 | -12 153 840 | 3 080 176 | -15 234 016 |
| *Fertility* | | | |
| Total | 8 138 009 | 20 974 104 | -12 836 095 |
| 1890-1969 | 33 378 322 | 18 381 567 | 14 996 755 |
| 1970-1999 | -6 794 642 | 2 592 537 | -9 387 179 |
| 2000-2050 | -18 445 671 | 0 | -18 445 671 |
| *Mortality* | | | |
| Total | 25 030 877 | 11 722 937 | 13 307 940 |
| 1890-1969 | 7 349 901 | 5 075 388 | 2 274 513 |
| 1970-1999 | 11 389 145 | 3 567 373 | 7 821 772 |
| 2000-2050 | 6 291 831 | 3 080 176 | 3 211 655 |
| *International migration* | | | |
| Total | -3 621 324 | -2 964 760 | -656 564 |
| 1890-1969 | -2 258 097 | -798 610 | -1 459 487 |
| 1970-1999 | -2 249 480 | -2 648 078 | 398 598 |
| 2000-2050 | 886 253 | 481 928 | 404 325 |

*Source*: Estimates and projections of the National Council on Population (CONAPO).
[a]At start of year.
[b]The differences from the total contributions are due to approximations in the calculation
of formula (4) in the methodological annex.


Although the overall reduction in the risk of death is the same (74 per cent) during the two 80-year periods 1890-1969 and 1970-2050 (calculations not shown), the contribution of improved survival to the growth in both age groups is greater in the second period (6.6 million for older adults and 11.0 million for persons aged under 60 years) than in the first (5.1 and 2.3 million, respectively).

The contribution of international migration might appear contradictory. Rather than positive, its contribution might be expected to be negative in the future, as it was in the twentieth century. The positive contribution is due to the fact that, the current official projections assume that the migration rates to the United States and back to Mexico that prevailed in 1995-2000 will remain unchanged throughout the projection period. As the latter rate (return migration) is higher than the former, the combined effect is a reduction in the net outward flow. Net out-migration amounts to an estimated loss of 390,000 in 2000, which is projected to be reduced to a loss of 303,000 in 2050. In total, the projected trends in migration will add 886,000 inhabitants over the period, compared to the number if the total net migration rate were to remain unchanged.

In conclusion, the current ageing process is based principally on the fertility decline from the high levels of the past. However, the reduction in mortality and the incidence of migration will be the most important factors in the distant future, particularly beyond 2050. This can be seen in figure 11 in which the age pyramid on 1 January 2051 is contrasted with the age pyramid that would eventually result in stability, if the demographic conditions anticipated for 2050 were to remain unchanged. It can be noted that the age structure of the population is expected to undergo few changes after the middle of the present century. At most, what stands out is the elimination of the last trace of the rapid growth of the generations born during the second half of the twentieth century — the peak between 45 and 65 years in 2051.

*Momentum*

The inertia of the high demographic growth observed up to 1970 is still present in the age structure and will continue to be so for decades. This is clearly apparent in the contribution of demographic variables to the potential for growth (momentum) from 2000 to 2015, as can be seen in table 3.

The combined effects of the sharp decline in mortality and high and rising fertility during the period 1890-1969 will give rise to an increase of 16.2 million, a figure that will be reduced slightly to 15.8 million as a result of the population dynamics after 2000. The momentum resulting from fertility in the case of the adult population (15.7 million at ages 30 years or over) is equal to the expected total growth from 2000 to 2015 (15.8 million). It can be seen how the population growth arising from the fall in mortality (8.6 million for all ages) will serve only to mitigate the loss resulting from the drop in fertility (-7.0 million in age group 0-29 years) and from the impact of international migration (-1.5 million).

In relative terms, the impulse from generations born up to 1969 will increase the population of Mexico by 16.2 per cent between 2000 and 2015, or by an average of 1.1 per cent per annum during this period. Half of the increase is attributable to mature adults aged between 45 and 59 years, whose number will increase by 8.0 per cent. At the same time, the contribution of 8.5 per cent from mortality will be nullified by the reduction from declining and below replacement fertility (-7.0 per cent) and from the massive emigration of Mexicans to the United States (-1.5 per cent).

Thus, the expected growth for the first 15 years of the twenty-first century in Mexico is almost exactly equivalent to the contribution of fertility in the first 70 years of the last century, as if the remaining population dynamics of the country had never occurred.

**Figure 11. Population pyramid and associated stable population, Mexico, 2051**
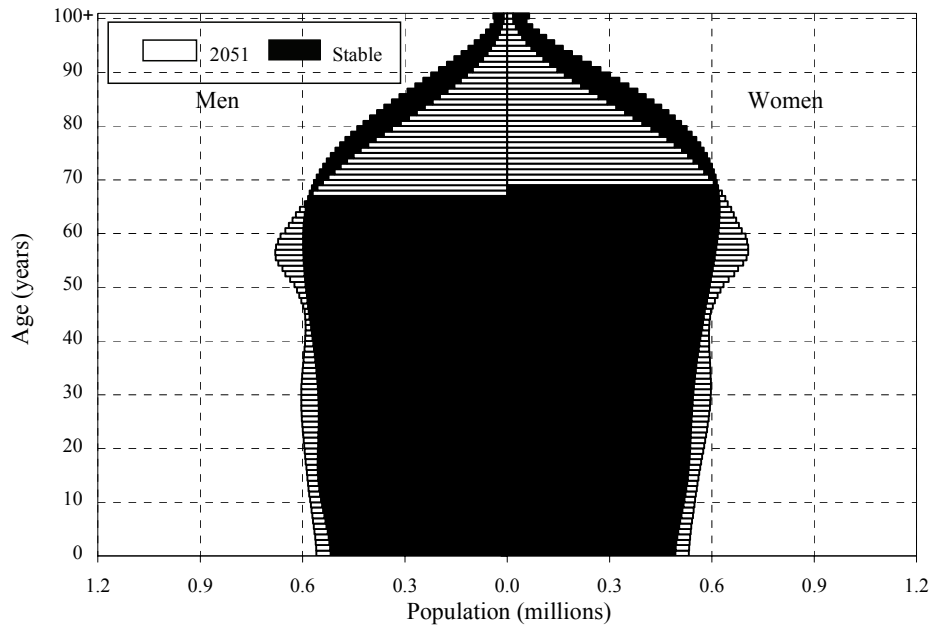


*Source*: CONAPO (2002).

## *Labour supply*

Current projections for Mexico indicate that the economically active population (EAP) will increase from 42.1 million in 2000, to 51.1 million in 2010 and to 64.0 million in 2030. It will reach a historic maximum of 66.1 million in 2042, and will then fall to 65.2 million in 2050. The increase in the labour supply, however, will not be of the same magnitude throughout the time horizon of the projection but is projected to fall more steeply from 2010 onwards. During the first 15 years of the present century, it will be necessary to create over 800,000 jobs per annum — preferably stable and well paid — while the requirements will fall at an annual average of almost half a million in the 2020s and become negative in the 2040s.

The enormous increase of almost 22 million in the labour supply from 2000 to 2030 — in other words, during the period of the demographic bonus — arises both from the various phases of demographic transition and from anticipated changes in levels of participation in the workforce (Partida, 2004), as can be seen in table 4. One conspicuous fact is that women, in terms of both demographic change and increased participation in economic activity, contribute significantly to the increase in the available workforce. As regards men, even though the demographic transition tends to increase the EAP, the small change in men's labour force participation rates before the age of retirement and the growing tendency to take retirement will give rise to a reduction in the EAP of 574,000.

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TABLE 3. CONTRIBUTION OF CHANGES IN DEMOGRAPHIC FACTORS TO POPULATION MOMENTUM IN MEXICO FROM 2000 TO 2015

| Functional age groups | Population at mid-year | | Increase | Period of demographic change | | | Contribution of demographic factors | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2015 | | 1890-1969 | 1970-1999 | 2000-2015 | Fertility | Mortality | Migration |
| *Momentum effects* | | | | | | | | | |
| Total | 100 569 263 | 116 344 933 | 15 775 670 | 16 261 428 | 1 038 266 | -1 524 024 | 8 689 642 | 8 584 801 | -1 498 773 |
| 0-14 | 33 557 864 | 28 028 698 | -5 529 166 | 0 | -3 230 769 | -2 298 397 | -6 201 822 | 563 819 | 108 837 |
| 15-29 | 29 351 643 | 31 012 507 | 1 660 864 | 0 | 1 588 502 | 72 362 | - 770 907 | 1 264 569 | 1 167 202 |
| 30-44 | 20 231 989 | 26 589 185 | 6 357 196 | 3 748 091 | 2 406 909 | 202 196 | 6 189 753 | 1 923 593 | -1 756 150 |
| 45-59 | 10 557 014 | 18 602 766 | 8 045 752 | 8 113 559 | - 268 972 | 201 165 | 7 002 609 | 2 208 458 | -1 165 315 |
| 60-74 | 5 117 698 | 8 886 204 | 3 768 506 | 3 322 921 | 278 639 | 166 946 | 2 071 976 | 1 661 813 | 34 717 |
| 75 or more | 1 753 055 | 3 225 573 | 1 472 518 | 1 076 857 | 263 957 | 131 704 | 398 033 | 962 549 | 111 936 |
| *Change as a percentage of population in 2000* | | | | | | | | | |
| Total | .. | .. | 15.7 | 16.2 | 1.0 | -1.5 | 8.6 | 8.5 | -1.5 |
| 0-14 | .. | .. | -5.5 | 0.0 | -3.2 | -2.3 | -6.2 | 0.6 | 0.1 |
| 15-29 | .. | .. | 1.7 | 0.0 | 1.6 | 0.1 | -0.8 | 1.3 | 1.2 |
| 30-44 | .. | .. | 6.3 | 3.7 | 2.4 | 0.2 | 6.2 | 1.9 | -1.7 |
| 45-59 | .. | .. | 8.0 | 8.1 | -0.3 | 0.2 | 7.0 | 2.2 | -1.2 |
| 60-74 | .. | .. | 3.7 | 3.3 | 0.3 | 0.2 | 2.1 | 1.7 | 0.0 |
| 75 or more | .. | .. | 1.5 | 1.1 | 0.3 | 0.1 | 0.4 | 1.0 | 0.1 |

*Source*: Estimates and projections of the National Council on Population (CONAPO).

| Period of change | Total | Men | Women |
|---|---|---|---|
| | *Population* | | |
| 2006[a] | 46 761 458 | 31 359 014 | 15 402 444 |
| 2029[a] | 63 411 901 | 40 457 308 | 22 954 593 |
| Absolute change[b] | 16 650 443 | 9 098 294 | 7 552 149 |
| Relative change | 35.6 | 29.0 | 49.0 |
| | *Total contribution* | | |
| Total | 16 651 677 | 9 099 202 | 7 552 475 |
| Demographic change | 13 833 483 | 9 673 338 | 4 160 145 |
| 1890-1969 | 11 122 640 | 7 615 007 | 3 507 633 |
| 1970-2005 | 1 468 167 | 1 115 656 | 352 511 |
| 2006-2028 | 1 242 676 | 942 675 | 300 001 |
| Joining workforce[c] | 2 818 194 | - 574 136 | 3 392 330 |
| | *Proportional contribution* | | |
| Total | 100.0 | 100.0 | 100.0 |
| Demographic change | 83.1 | 106.3 | 55.1 |
| 1890-1969 | 66.8 | 83.7 | 46.4 |
| 1970-2005 | 8.8 | 12.3 | 4.7 |
| 2006-2028 | 7.5 | 10.4 | 4.0 |
| Joining workforce[c] | 16.9 | -6.3 | 44.9 |

*Source*: Estimates and projections of the National Council on Population (CONAPO).

[a]At start of year.

[b]The differences from the total contributions are due to approximations in the calculation of formula (6) in the methodological annex.

[c]Only during the period 2006-2028.

In the coming years, there will be heavy pressure on the country's labour markets. The rapid population growth that occurred before 1970 will lead to a large increase in the EAP between 2006 and 2028, and this expanding workforce will need to be employed productively in order to take advantage of the opportunity represented by the demographic bonus. For both sexes, the demographic increasing arising in period of the pro-natalist policy makes the largest contribution to the projected growth of the labour force. However, while the figure for men is around 83.7 per cent, for women, the contribution of demographic changes taking place before 1970 (3.5 million or 46.4 per cent) is similar to the contribution of the growing incorporation of women in economic activity (3.4 million or 44.9 per cent), as anticipated for the 23 years during which the window of opportunity will remain open.

According to the National Employment Survey (*Encuesta Nacional de Empleo - ENE*), in 2000-2003, half of the labour force employed in the secondary and tertiary sectors were in the informal sector of the economy, representing 40 per cent of the total EAP. The precarious employment conditions characteristic of informal employment, and the low productivity of such work, hinder the growth of GDP and, ultimately, slow down job creation. The poor working environment reduces family earnings, leads more household members to enter the labour force and

minimizes any possibility of savings. A limited savings capacity not only puts family assets at risk from major unforeseen expenses, but also prevents the accumulation of resources needed to cope with old age.

Together with the low percentage of workers currently contributing to social security systems, those who do contribute to pension plans do so for too short a time, with the result that the fund so constituted is inadequate for the purchase of an adequate annuity to ensure a dignified old age. If recent patterns of contribution were to remain unchanged in the future, those aged 15 years — some of whom contribute, while some do not, and others have not yet joined the workforce — would spend the major part of their active life outside social security systems. The average number of years during which they would pay into retirement savings systems — about 12 years for men and 8 for women — is far short of the minimum required (24 years) to enable them to draw the minimum pension guaranteed by the current Mexican Social Security Institute (IMSS) law, which is likely to be extended before long to the other pension schemes in the country. At 25 years of age, the situation is similar, particularly for a professional beginning his or her active life after finishing university education. Thus, if present contribution conditions remain unchanged, people will be poor not only during their working life but also in retirement.

If the recent characteristics of labour markets were to continue until 2050, the proportion contributing to social security systems would begin to diminish in 2018, but the number of newly retired people would soar. The number would double between 2000 and 2016 and increase by a factor of 5 by mid-century.

According to economic forecasts, a constant rate of growth of GDP of 4.8 per cent from 2000 to 2030 would be necessary to ensure that the number of established, productive and well-paid jobs with benefits (including social security) would include 84 per cent of the EAP in 2030 (Hernández Laos, 2004). If that scenario were to occur, the number of people covered would rise rapidly, increasing more than three-fold in only a quarter of a century (2010-2035), but, above all, they would represent over 90 per cent of the EAP, implying that people would contribute to the system for long periods (almost 30 years for men and over 23 years for women). This highly optimistic scenario would involve a virtuous circle. The labour force would be highly productive, thereby supporting high economic growth. The high contribution rates would create substantial reserves in pension plans, which, in turn, would favour investment and would generate further productive employment. At the same time, the high level of remuneration would encourage adolescents and young people to remain in the education system, with a consequential increase in human capital and a rise in the productivity of labour. Thus, the optimum utilization of the demographic bonus is "merely" a matter of fuelling mechanisms to ensure an annual 4.8 per cent growth in GDP for three decades.

The demographic transition in the developing countries, such as Mexico, is occurring much more rapidly than in more developed regions. In Mexico, the sharp fall in mortality combined with a pro-natalist policy, which sought to meet the demand for labour from an expanding industrial sector and to populate the national territory, favoured high population growth during the twentieth century.

## D. Final remarks

The consequences of that demographic past are apparent today but will be even more important in the next few years, when the demographic bonus will offer the opportunity to promote savings and investment to cope with rapid population ageing.

A number of public policies have been implemented in recent years that may help in utilizing the demographic bonus, even though they were not specifically designed to address the age-structure transition. The programme known as *Oportunidades* (Opportunities) is part of the struggle to combat extreme poverty. It focuses on the creation of human capital by means of food allowances that are granted on the condition that children and adolescents remain in school. Although the programme has been rated a success, only in the first years of the demographic bonus will it be possible to ascertain whether the available workforce is sufficiently qualified and whether it can be fully utilized to generate savings and investment.

Another programme that should have a positive influence on the utlitization of the demographic bonus is *Arranque Parejo en la Vida* (Equal Start in Life). It aims to offer the same chance of healthy survival to all newborns and to reduce maternal mortality significantly. The anticipated increases in life expectancy and, hence, the eventual ageing of the population, largely depend on the success of health programmes such as *Arranque Parejo en la Vida*.

Although programmes such as *Oportunidades* and *Arranque Parejo en la Vida* are short- and medium-term in scope and are useful tools for the utilization of the demographic bonus, the major challenge is the generation of sufficiently productive and well-paid employment to fully utilize a growing workforce stemming from the rapid increase in the working-age population.

Informal employment currently accounts for almost half the economically active population. In addition to this problem, it will be necessary to create sufficient employment to meet the annual increase of over 800,000 new entrants to the workforce between 2000 and 2015 and an average of 500,000 during the period 2016-2030. While the window of opportunity remains open (2006-2028), the EAP will increase by 16.7 million, of which 12.5 million will be due to the increased numbers in the 15-59 year age group. Making use of the demographic bonus thus rests on the practical possibilities of minimizing the informal sector of the economy and creating productive employment for new job-seekers. Only in this way can the country take advantage of the saving and investment opportunities offered by a favourable dependency ratio. Recent economic projections for Mexico indicate that a sustained growth of 4.8 per cent per annum will be needed to ensure that, in 2030, enough formal jobs will have been created to absorb the available workforce. An intermediate scenario would perhaps be more likely, under which the jobs created would absorb between 71 and 76 per cent of the available workforce.

If the current stagnation of the Mexican economy continues for 10 or 15 years, the demographic bonus will become a demographic nightmare. The "window of opportunity" will close without ever having been opened and, worst of all, Mexico will be doomed to become an old and poor country.

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## CALCULATION OF THE CONTRIBUTION OF DEMOGRAPHIC COMPONENTS TO
## POPULATION CHANGE IN EACH AGE GROUP

The method is based on an old demographic principle: the population of age x at time t is equal to the births that occurred at t-x plus the cohort's history of mortality and migration. Thus, the increase in the population of a given age at two different times is equal to the sum of the differences of births and the mortality and migration histories of the two cohorts. Horiuchi (1988) originally presented the result and his formulation is reconstructed here, using some of the results of Horiuchi and Preston (1988).

Let $\mu(x)$ be the instantaneous mortality rate (force of mortality) at age $x$. It is well known that the survival rate at age $a$ from birth in the cohort of the life table is given by:

$$p(a) = \frac{\ell_a}{\ell_0} = \exp\left\{\int_0^a \mu(x)\,dx\right\}$$

where $\ell_a$ are the survivors at age $a$ from $\ell_o$ births. Similarly, in the absence of migration, for a particular cohort born at $t$-$a$ the surviving proportion is:

$$s(a,t) = \exp\left\{-\int_0^a \mu(x, t-a+x)\,dx\right\}$$

where $\mu(x,t)$ is the instantaneous mortality rate (force of mortality) at age $x$ and time $t$. The sign in the exponent on the right-hand side is negative because the rate is positive and mortality reduces the size of the cohort. In order to incorporate the effect of international migration, we use the net instantaneous migration rate, which is positive if there is a net gain or negative if there is a net loss; thus the rate is added to the exponent on the right-hand side:

$$s(a,t) = \exp\left\{-\int_0^a \mu(x, t-a+x)\,dx + \int_0^a \eta(x, t-a+x)\,dx\right\} \tag{1}$$

Now let $P(a,t)$ be the annual density of the population aged $a$ at time $t$ and $B(t - a)$ be the annual density of births at time $t$-$a$; it is clear that:

$$P(a,t) = B(t - a)\,s(a,t)$$

Like the mortality rate, the instantaneous growth rate is derived from the natural logarithm of the population, namely,

$$r(a,t) = \frac{\partial}{\partial t}\ell n\{P(a,t)\}$$

then:

$$r(a,t) \;=\; \frac{\partial}{\partial t}\ell n\{B(t-a)\,s(a,t)\} \tag{2}$$

$$=\; r_B(t-a)-\int_0^a \frac{\partial}{\partial t}\mu(x,t-a+x)\,dx+\int_0^a \frac{\partial}{\partial t}\eta(x,t-a+x)\,dx$$

where $r(a,t)$ is the rate of population growth at age $a$ at time $t$, $r_B(t-a)$ is the rate of increase in births at time $t$:

$$r_B(t)=\frac{\partial}{\partial t}\ell n\{B(t)\}$$

and by (1) the derivative of the natural logarithm $s(a,t)$ with respect to time is:

$$\frac{\partial}{\partial t}\ell n\{s(a,t)\}=-\int_0^a \frac{\partial}{\partial t}\mu(x,t-a+x)dx+\int_0^a \frac{\partial}{\partial t}\eta(x,t-a+x)dx$$

If we multiply both sides of (2) for the population at time $t$, we get the absolute increase in the population at age $a$:

$$\frac{\partial}{\partial t}P(a,t) \;=\; P(a,t)\,r(a,t) \tag{3}$$

$$=\; P(a,t)r_B(t-a)-P(a,t)\int_0^a \frac{\partial}{\partial t}\mu(x,t-a+x)\,dx+P(a,t)\int_0^a \frac{\partial}{\partial t}\eta(x,t-a+x)\,dx$$

One can see the contribution of the change in the birth rate in the first term on the right-hand side of the second equation, the improvement in mortality between cohorts in the second term and the effect of net migration change in the third.

The discrete version of equation (3) is:

$$\Delta_t P_a(t) \;=\; P_a(t+1/2)r_B(t-a)$$

$$-P_a(t+1/2)\sum_{x=0}^a \Delta_t M_x(t-a+x) \tag{4}$$

$$+P_a(t+1/2)\sum_{x=0}^a \Delta_t N_x(t-a+x)$$

where $P_a(t)$ is the population aged $a$ at last birthday at time $t$, $M_x(t)$ and $N_x(t)$ are the rates of mortality and net migration, respectively, at age $x$ at last birthday in the year that begins at $t$, and $r_B(t)$ is the growth rate of births:

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$$r_B(t) = \ell n \{B_t / B_{t-1}\}$$

with $B_t$ being the number of births during the year that begins at $t$.

To analyse the contribution of changes in demographic variables and of the beginning of employment, we consider the definition of the rate of participation in working life:

where $EAP(a,t)$ is the annual density of the economically active population (EAP) at time $t$. Thus,

$$A(a,t) = \frac{EAP(a,t)}{P(a,t)}$$

the change in the $EAP$ is:

$$\frac{\partial}{\partial t} EAP(a,t) = \frac{\partial}{\partial t} P(a,t) \, A(a,t) = A(a,t) \frac{\partial}{\partial t} P(a,t) = P(a,t) \frac{\partial}{\partial t} A(a,t) \tag{5}$$

In the first element on the far right one can identify the contribution of demographic change and in the second term the part played by transformations on incorporation into labour markets. The discrete version of equation (5) for the year beginning at $t$ is:

$$\Delta_t EAP_a(t) = A_a(t + 1/2) \Delta_t P_a(t) = P_a(t + 1/2) \left[ A_a(t+1) - A_a(t) \right] \tag{6}$$

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NOTES

[1] The target was proposed in 1995 in the context of the National Population Programme 1995-2000 and remains in the National Population Programme 2001-2006.

[2] It is estimated that the TFR fell by approximately 0.47 children between 1995 and 2000, corresponding to an annual decrease of 0.09 children. Reaching the population replacement rate in 2005 will entail a smaller annual reduction in the TFR from 2000 onwards.

[3] The difference between total growth and natural increase is the net migration balance. Since the natural increase rates exceed those of total growth, it follows that the net migration rate is negative.

[4] This concept was originally proposed by Keyfitz (1971) and refers to the number of times by which the present population would be multiplied when stability was eventually reached if the prevailing fertility were to fall immediately to the replacement rate and the age schedule of mortality were to remain at its current level (net reproduction rate equal to 1). The author finds that the closer the current age structure to the eventual stable age composition, the lower the factor by which the present population will multiply. Thus, the more distant the current age structure from stability (i.e., the more youthful it is), the greater the age structure's "momentum".

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# SOCIAL SECURITY AND POPULATION AGEING IN MEXICO:
## ANALYSIS OF THE INDIVIDUAL ACCOUNT RETIREMENT PENSION SYSTEM

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Mexico's Social Security Act was amended in late 1995 with a view to the establishing an individual retirement savings scheme. These amendments were promulgated in December 1995 and entered into force on 1 July 1997. Under the new version of the Act, individuals who were already employed when the reforms entered into force may choose to retire under the rules of the old system. Under those rules, rights acquired through a recognition bond or similar entitlement were not counted, since payment of pensions under the old system remains the responsibility of the Federal Government, as are other costs arising from the transition to the new system. Workers in the formal labour market (primarily in the private sector) participate in the social security scheme, and the conditions for civil servants and members of the armed forces have remained unchanged.

Based on eight years of experience with the current system and as a result of the situation created by the system's own rules, as well as by the conditions of the economy and the labour market, the forecast for a high percentage of workers is rather bleak. This situation is compounded by the limited and, in recent years, shrinking proportion of the economically active population that is covered.

This paper provides a medium-term forecast. It begins by describing the situation of the economically active population (EAP) in terms of the protection it enjoys in retirement and compares recent trends within this population group with the trend among members of the Mexican Social Security Institute (IMSS) and of pension fund management companies (AFOREs). It describes the features of the system in terms of its contributor and sub-account structure, management commissions currently in effect or proposed for the immediate future, and probable yields on savings. It surveys the insured population and, with a view to analysing the results, selects a subgroup equivalent to 80 per cent of the total number of insured, namely, those who contribute at the five lowest wage levels. It then identifies the various contribution densities — that is, the amount of time spent contributing to social security as a proportion of the total amount of time worked[1] — that workers can be expected to achieve during their working lives, distinguishing between the probable situation of men and women, based on the experience of Chile's pension system.

The study proposes and utilizes a model to generate analyses of the possible combinations by sex, wage level, contribution density and rate of return. It then presents a set of results showing the number of workers classified by sex and pension level, distinguishing between those who reach retirement age without having contributed for the minimum number of years needed to qualify for a pension, those whose savings are insufficient to guarantee a minimum pension and must therefore be supplemented by the State, and lastly, those who have exceeded this minimum.

All of this information is then used to determine, by sex and wage level, the subsidies needed both to supplement the pensions of contributors who do not have the minimum length of service

needed to qualify for a pension and to guarantee a minimum pension for those whose individual savings accounts cannot provide them with this minimum.

## A. COVERAGE OF PENSION SYSTEMS

The percentage of the national population that is able to enjoy a retirement pension is an indicator of the level of protection provided by the institutions that offer this type of benefit. Figure 1 shows the approximate distribution of the economically active population among the main retirement systems during 2004. The majority, 63 per cent, lack institutional coverage, while the members of the Mexican Social Security Institute (IMSS) account for 30 per cent of the economically active population, and the remainder, approximately 7 per cent, are covered by the Government Workers' Social Security and Services Institute (ISSSTE), other governmental institutions, and various State social security agencies.

**Figure 1. Coverage of the economically active population in employment and with pension plans in 2004**



IMSS, 29.5%

ISSSTE, 4.7%

State agencies, 2.4%

Other public institutions, 0.7%

No coverage, 62.7%
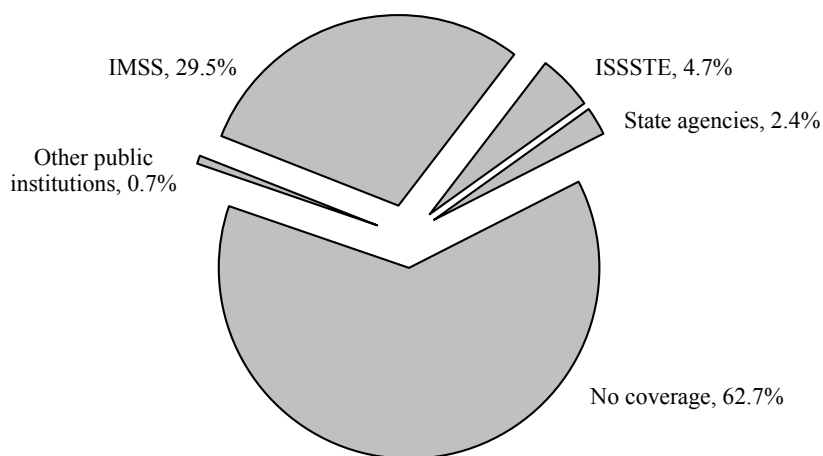
Institutional coverage of approximately 15.8 million, for an economically active population in employment of 42.4 million

*Sources:* Standardized valuations of the Federal Public Administration (1998); CONAPO (2005); CONSAR (2005); INEGI (2005b).

For IMSS, the number of workers insured during the period from June 1998 to June 2005 rose by 1.61 million, or the equivalent of an average annual growth rate of 1.93 per cent. This is in contrast with the trend for the economically active population, which, during the same period, increased by 5.5 million at an average annual growth rate of 1.82 per cent. The difference between these figures, in absolute terms, reveals a shortfall in the creation of jobs in the formal sector, which gives rise to greater competition for jobs and less labour stability. In this connection, ILO (2005) has warned of the risks and consequences of the growth of the informal economy in Latin America and the Caribbean, which ultimately affects the formal labour market.

All of these factors may help explain the peculiar trend in the membership of AFOREs, which increased during the same period by 21.6 million, at an average annual growth rate of 15.3 per cent. The fact that the number of AFOREs members in 2005 was 2.7 times greater than the number

of workers insured under IMSS may be due to some extent to duplicate accounts but also to a high rate of job turnover, with the consequent lack of continuity in contribution periods and wage earning histories. Figure 2 provides data on the aforementioned trend among insured and economically active persons.

**Figure 2. Economically active population (EAP), workers insured by IMSS, and members of AFOREs**
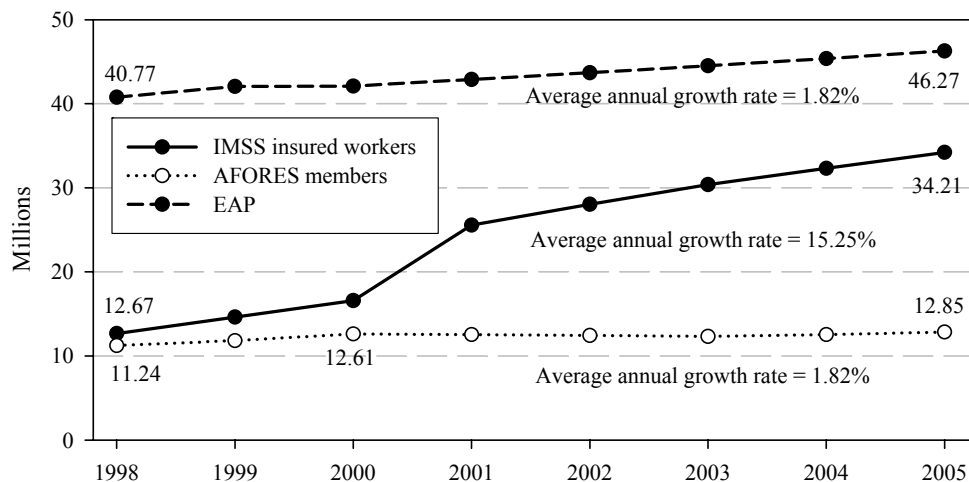


*Sources*: CONSAR (2005); CONAPO (2005); INEGI (2005b).

## B. CHARACTERISTICS OF THE SYSTEM

### *Contributors and sub-accounts*

Mandatory contributions to the individual accounts system, which began in July 1997 with the entry into force of the reforms to the IMSS Act, are paid by three categories of participants, namely, employers, the State and workers, and into three sub-accounts, namely, retirement, unemployment and old-age benefits for older workers, and housing benefits. Figure 3 shows the percentage contributions for each type of participant and sub-account in accordance with the Act.

The housing sub-account, which is funded by the 5 per cent employers' contribution (calculated from the base salary of each worker) is managed by the National Workers Housing Fund Institute (INFONAVIT), and its assets are pooled to finance pensions only for those workers who did not use their entitlements to purchase a home.

Sub-accounts for retirement, unemployment benefits for older workers and old age benefits are managed in practice like a single account and the percentages shown below refer to the base salary of each worker, unless otherwise indicated. For these sub-accounts, the employers contribute 5.150 per cent, making their total contribution (including for housing) 10.150 per cent. Workers contribute only 1.125 per cent of their salary, and the State contributes an additional 0.225 per cent for unemployment and old age benefits, plus 5.5 per cent of the minimum wage as a social contribution, the amount of which declines as the wage level increases.

The total contribution (of the three participants) is therefore 17 per cent for a worker earning the minimum wage, 14.250 per cent for a worker earning twice the minimum wage, 13.33 per cent

for workers earning three times the minimum wage, declining to 11.72 per cent for workers earning 25 times the minimum wage.

If the 5 per cent for the housing sub-account is deducted from the above percentages, the amounts remaining specifically for retirement are 12 per cent for workers earning the minimum wage, 9.250 per cent for workers earning twice the minimum wage, and 8.33 per cent for workers earning three times the minimum wage, declining to 6.72 per cent for workers earning 25 times the minimum wage.

In Chile, the percentage is a flat 10 per cent and is contributed only by the workers themselves.

**Figure 3.  Percentages of contribution to the individual account system by participant, sub-account and wage level**

*Management commissions*

Retirement, unemployment and old age benefit funds are managed by AFOREs at a cost of 6.5 per cent of the wages of each worker. These management companies are responsible for channelling the resources collected to pension fund investment companies (SIEFOREs)[2] so that they can be invested and produce financial returns. Moreover, the social contribution (5.5 per cent of the minimum wage), which is deposited into the individual account of each worker, is not subject to commission and its value is adjusted every quarter for inflation.

AFOREs have established various mechanisms for collecting their commissions for managing the workers' resources. Some charge a variable commission, calculated as a percentage of the contribution of 6.5 per cent of the worker's wage. Others use a combination of the variable commission and the account balance to determine their rates.

Using the variable commission method, the proportion of the 6.5 per cent represented by the commission is deducted from the amount contributed by each worker. Thus, at a rate of 1.67 per

cent that is common among the group of AFOREs that handle some 60 per cent of the current portfolio, the sum of 25.7 centavos (ratio of 1.67 to 6.5) is deducted from each peso deposited, so that 74.3 centavos go into the individual account. At a 5 per cent real rate of return per annum, it would take 74 months (six years and two months) for the peso to regain the purchasing power it had at the time it was first deposited, which gives an idea of the true cost of such commissions, even though they represent a relatively small percentage. Commissions based on account balances, as the name suggests, are charged annually based on the balance in the individual account.

TABLE 1. VARIABLE COMMISSIONS AND COMMISSIONS BASED ON ACCOUNT BALANCES TO BE COLLECTED BY PENSION FUND MANAGERS (AFOREs) IN 2005 AND 2014

| AFORE | Commission (percentage) | |
|---|---|---|
| | *2005* | *2014* |
| *A. Variable* | | |
| Inbursa | 0.50 | 0.50 |
| Actinver | 1.03 | 1.03 |
| Invercap | 1.03 | 1.03 |
| Azteca | 1.10 | 1.10 |
| IXE | 1.10 | 1.10 |
| Metlife | 1.23 | 1.23 |
| XXI | 1.30 | 1.30 |
| Banorte Generali | 1.40 | 1.40 |
| HSBC | 1.60 | 1.60 |
| Principal | 1.60 | 1.60 |
| Santander Mexicano | 1.60 | 1.60 |
| Profuturo GNP | 1.67 | 1.67 |
| Bancomer | 1.68 | 1.68 |
| ING | 1.68 | 1.68 |
| Banamex | 1.70 | 1.70 |
| *B. Based on account balance* | | |
| Azteca | 0.15 | 0.15 |
| Actinver | 0.20 | 0.20 |
| Invercap | 0.20 | 0.20 |
| XXI | 0.20 | 0.20 |
| Metlife | 0.25 | 0.20 |
| IXE | 0.35 | 0.26 |
| Principal | 0.35 | 0.30 |
| HSBC | 0.40 | 0.25 |
| Banorte Generali | 0.50 | 0.30 |
| Inbursa | 0.50 | 0.50 |
| Profuturo GNP | 0.60 | 0.50 |
| Santander Mexicano | 0.70 | 0.15 |

*Source*: CONSAR (2005)

Table 1 shows the commissions charged by the various pension fund management companies in June 2005 and the forecasts for 2014. As the table shows, there is practically no change in the percentage rate of variable commissions from 2005 to 2014, while the level of commissions based on account balances will decline.

*Returns*

The amount of savings depends on several factors, the most important of which include: (i) the amount of regular contributions; (ii) the contribution period; and (iii) the rate of return. Depending on how the commission is calculated, the final rate of return obtained by workers is affected by the length of their contribution period.

For example, for a variable commission of 1.67 per cent, a real rate of return of 5 per cent per year and 10 years of uniform, uninterrupted contributions for each month of that period, the equivalent rate of return would be negative (-0.91 per cent) over a period of 120 months (figure 4).

As figure 4 shows, it takes up to 144 months, or 12 years, for the equivalent rate of return to cease being negative, and the value reaches a maximum of 3.77 per cent after 40 years of uninterrupted contributions.

**Figure 4. Real net return for the saver, net of administrative fees: equivalent rate for the period shown**
*(With 5 per cent real return on funds annually and variable commission of 1.67 per cent)*
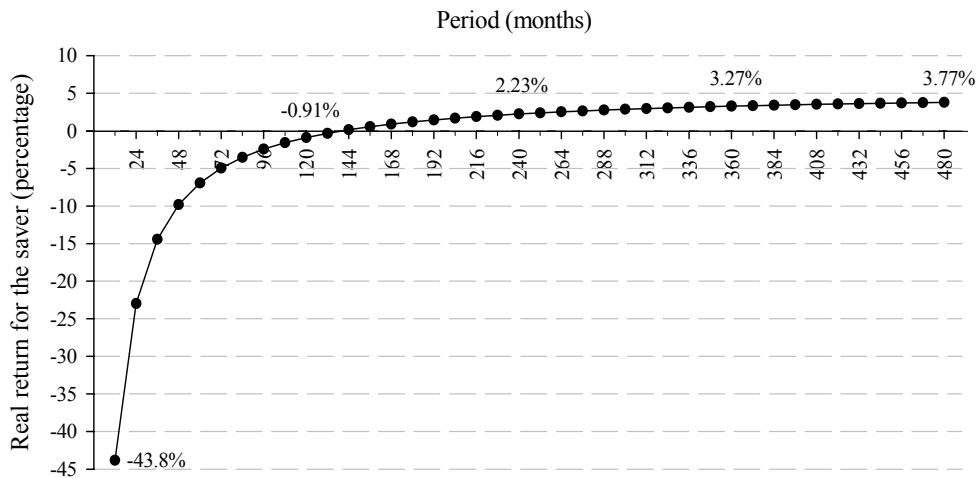


*Source*: CONSAR (2005).

To continue with this example, in a working life of 40 years, 10 years of contributions could be situated at the beginning, in the middle or at the end. If they were at the beginning, and assuming a real rate of return of 5 per cent on the funds accumulated during the remaining 30 years, the equivalent rate would be 4.05 per cent; if the 5 per cent were capitalized for 20 years, the equivalent rate would be 3.63 per cent; if the capitalization were only for 10 years, the equivalent rate would drop to 2.80 per cent, and if there were no additional capitalization after 10 years of contributions, then the equivalent rate would be -0.91 per cent.

If we calculate the average of the foregoing figures, we arrive at a value of 2.39 per cent for the 10-year period. Because of the uncertainty about how contributions are made, the average values obtained by a method similar to that described will be used for different periods. We thus

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obtain the average rate of return shown in figure 5. The values set out are an estimate of the likely returns that might accrue to savers who make contributions to their accounts during the contribution periods shown.

**Figure 5. Estimated equivalent rate of return on deposits in an individual account, for different contribution periods**

*(With 5 per cent real return on funds annually and variable commission of 1.67 per cent)*
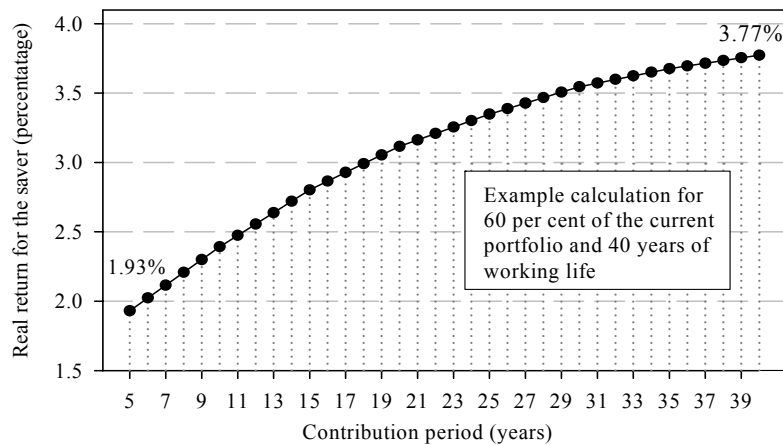


*Source*: Author's calculations.

**Figure 6. Rate of return of pension fund investment companies (SIEFOREs) and net return for the saver (real rates), and margin of AFOREs, 2001-2005**
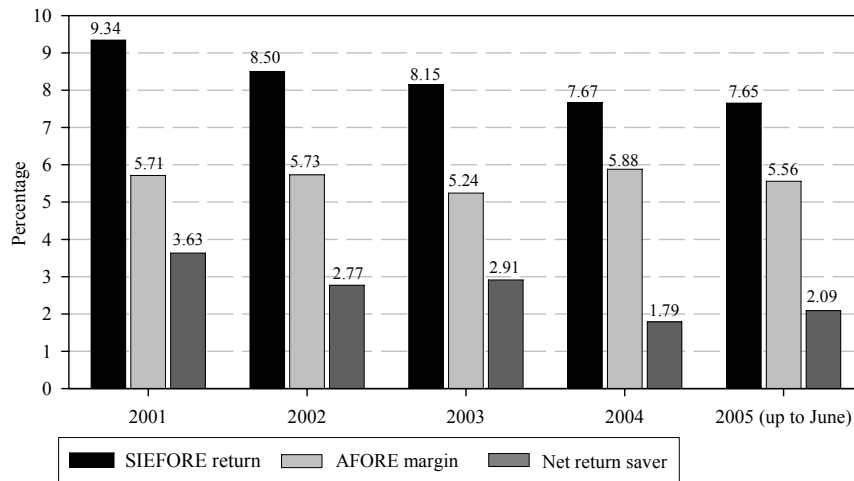


*Source*: CONSAR (2005).
NOTE: Historical mean values up to the date indicated.

The way returns behave, with values ranging from 1.93 per cent for 5 years of contribution to 3.77 per cent for 40 years of contribution, clearly shows that contributing for a limited number of years has the unfavourable effect of not only saving a smaller amount, but also reducing the rate of

return on savings. This disadvantage is in addition to others that stem from the informality of the labour market and the instability of employment.

The National Commission for the Retirement Savings System (CONSAR) has been producing statistics on historical returns virtually from the time the system was established on 30 September 1997[3] up to June 2005. These statistics highlight the difference of 5.56 per cent between the rate of return (7.65 per cent) obtained by the pension fund investment companies (SIEFOREs) and the net return for workers (2.09 per cent), a margin that favours the pension fund management companies. Through June 2005, this margin is 2.7 times the average return received by workers (see figure 6). By way of a benchmark, the system's technical rate was set from the inception at 3.5 per cent; thus the net return to date is approximately 60 per cent of that rate.

## C. CHARACTERISTICS OF THE POPULATION CONTRIBUTING TO SOCIAL SECURITY

Having commented on the main rules governing the operation of the system of individual accounts, we shall now provide information about the population to which these rules apply. The characteristics of that population and its behaviour in the formal labour market, as expressed through its social security contributions, define both current results and medium-term projections.

### *Contribution densities*

It was noted earlier that the amount of savings in individual accounts depends basically on the following factors: (i) the amount of regular contributions; (ii) the contribution period; and (iii) the rate of return. The amount of contribution is determined by the worker's wages. The contribution period will depend on the length of active employment and whether employment is in the formal or informal sector. Unfortunately, for one important concept associated with the contribution period, which is the contribution density, statistics for Mexico are not available. The contribution density refers to the period of time during which contributions are made to social security as a proportion of the total time worked.

With regard to the contribution density and its importance for the future of individual accounts, one key benchmark is the survey of the working population conducted by the Sub-secretariat for Social Welfare of the Government of Chile in 2002. According to the survey, the contribution density, which had been presumed to be 80 per cent on average, was actually 52.4 per cent overall, 59.8 per cent for men and 43.7 per cent for women. The survey also highlighted the need to obtain more detailed basic information from individuals rather than make calculations based on individuals assumed to be representative of the community.

Drawing on the Chilean data as a framework for analysing the situation in Mexico, and in the absence of specific data for that country, the following indicators have been selected to compare the situation of the two countries. These indicators, which have been selected for their likely impact on the level of activity and employment status of the working population, refer to the period 2000-2003 and the average for 2001-2003, and are taken from documents issued by the Economic Commission for Latin America and the Caribbean (ECLAC, 2005).

From the figures in the far right column of table 2, it is clear that Chile's performance is better than Mexico's in terms of GDP growth, per capita GDP growth, inflation level (measured by variations in Consumer's Price Index - CPI), and visible under-employment. Therefore, applying the results from the Chilean survey to the case of Mexico could be regarded as a rather optimistic scenario.

The results obtained cannot be seen as indicative of the real situation in Mexico but rather as highlighting the significant effect that different contribution densities may have on the system of individual accounts, the aim being to encourage special studies on the subject. The situation would of course need to be analysed by sex. The present paper accordingly endeavours to quantify the most significant differences in the results between men and women.

TABLE 2. COMPARISON BETWEEN CHILE AND MEXICO: SELECTED VARIABLES
(*Percentage*)

| Variable | Country | *2000* | *2001* | *2002* | *2003* | *Average for 2001 - 2003* | *Ratio of Chile/Mexico averages* |
|---|---|---|---|---|---|---|---|
| GDP growth | Chile | 4.50 | 3.50 | 2.00 | 3.30 | 2.93 | 5.50 |
| | Mexico | 6.70 | -0.30 | 0.70 | 1.20 | 0.53 | |
| Per capita GDP growth | Chile | 3.20 | 2.30 | 0.90 | 2.20 | 1.80 | 4.00 |
| | Mexico | 5.10 | -1.80 | -0.70 | -0.20 | -0.90 | |
| CPI variations (average annual rates) | Chile | 3.80 | 3.60 | 2.50 | 2.80 | 2.97 | 0.56 |
| | Mexico | 9.50 | 6.40 | 5.10 | 4.50 | 5.33 | |
| Visible under-employment rate (average annual rate)[a] | Chile | 5.40 | 6.40 | 5.60 | 5.90 | 5.97 | 0.57 |
| | Mexico | 11.70 | 11.10 | 10.00 | 10.50 | 10.53 | |

*Source*: ECLAC (2005a and 2005b).
[a] Refers to percentages of the economically active population in urban areas.

We shall now look at the contribution densities obtained directly by processing information from the First Social Welfare Survey of Chile database, entitled Employment History and Social Security 2002 (Secretariat for Social Welfare of the Government of Chile, 2002).

Figure 7 shows the distribution of female workers in Chile according to the contribution density. The left vertical axis indicates the percentage of working women at each level of contribution density. The right vertical axis indicates the cumulative percentages. Generally speaking, the values on the left side of the figure occur more frequently (indicative of lower rates). As for the cumulative values, 36.3 per cent of women have a contribution density up to 25 per cent, 57.5 per cent have a contribution density up to 50 per cent, and 75.4 per cent a contribution density up to 75 per cent.

The same comparison yields different results for men, for whom the values on the right side of the figure are the most frequent, indicating higher contribution densities. That conclusion is confirmed by the aggregate values: 24.9 per cent of men have a contribution density up to 25 per cent, 40.3 per cent a contribution density up to 50 per cent, and 61 per cent a contribution density up to 75 per cent (figure 8).

The figures also show a relatively high percentage of men and women with a zero contribution density. In applying this scheme to Mexico, that group has been eliminated and the results adjusted proportionally for both sexes so that the sum of the remaining values is 100 per cent. The

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rationale for this is that, in this specific case, we are dealing with the pool of IMSS affiliates who work in the formal sector and whose contribution density will always be greater than zero as they need to contribute at least one day to be registered with the institute. The adjusted values are shown in figure 9. What is most noteworthy in this direct comparison between men and women is that relatively more women are towards the left of the horizontal axis (low contribution densities) and more men are towards the right.

**Figure 7. Percentage distribution of workers by contribution density, women (Chile)**
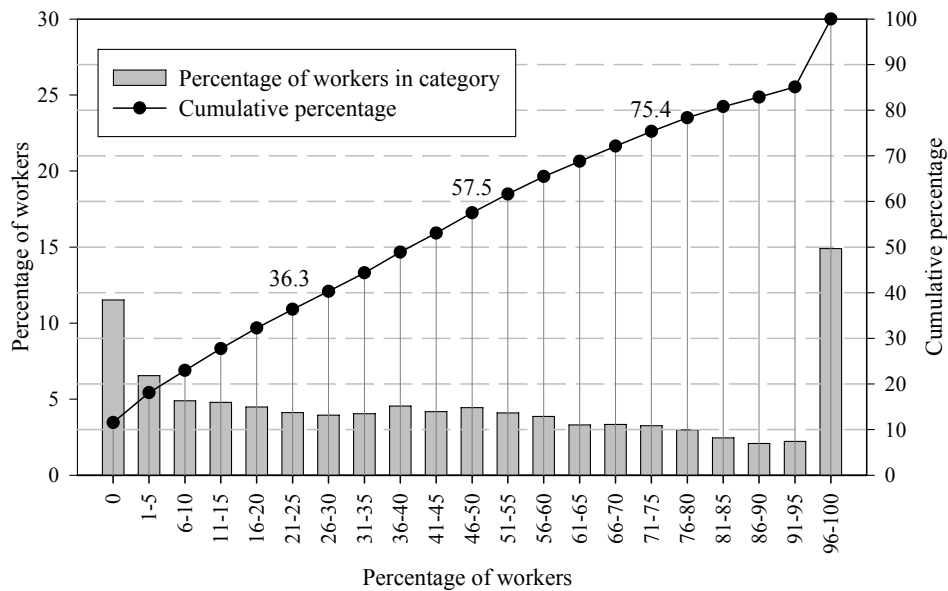
**Figure 8. Percentage distribution of workers by contribution density, men (Chile)**
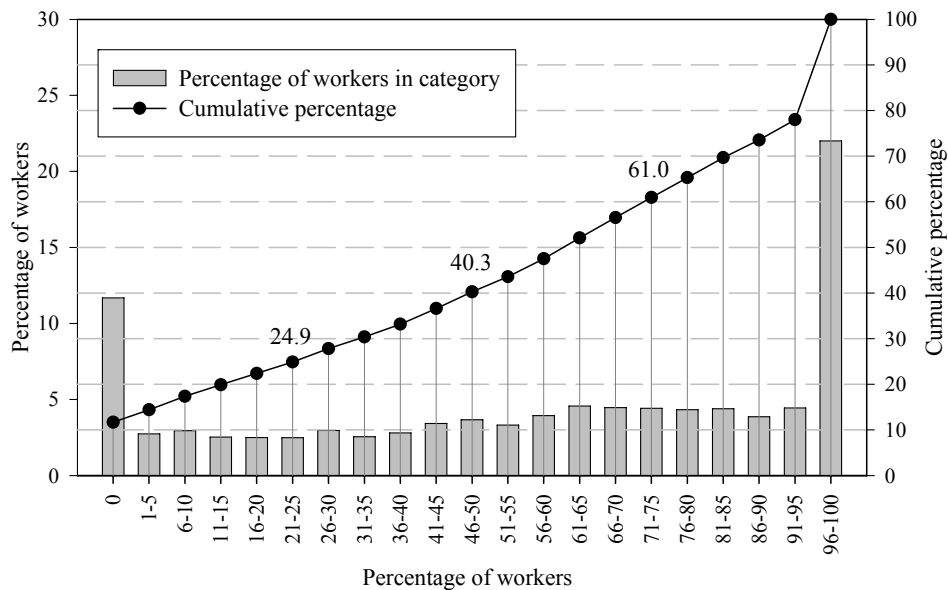
**Figure 9. Percentage distribution of workers by contribution density,
men and women (Chile)**
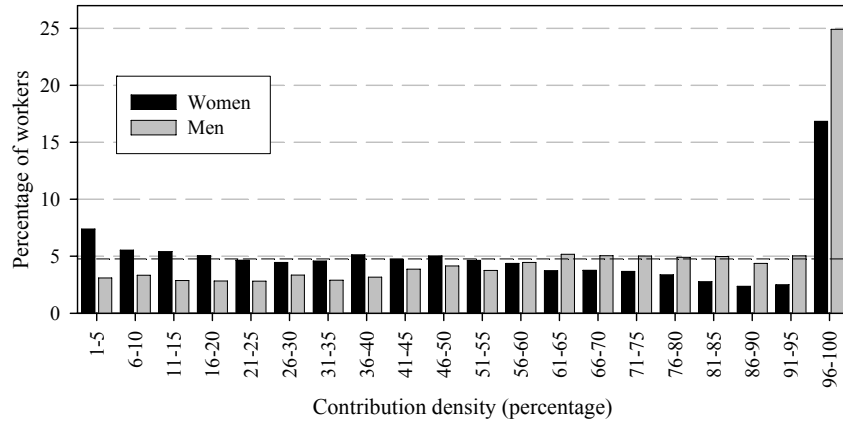
## Wage level of workers

Figure 10 shows IMSS affiliates classified according to their level of remuneration for contribution purposes, from 1 to 15 times the minimum wage, in aggregate percentages, as of March 2005. It should be noted that most are concentrated at the lowest wage levels, with 59 per cent falling in the 1 to 3 times the minimum wage category and 79 per cent in the 1 to 5 times category.

**Figure 10. Cumulative distribution of contributions to IMSS by wage level**
*(March 2005)*
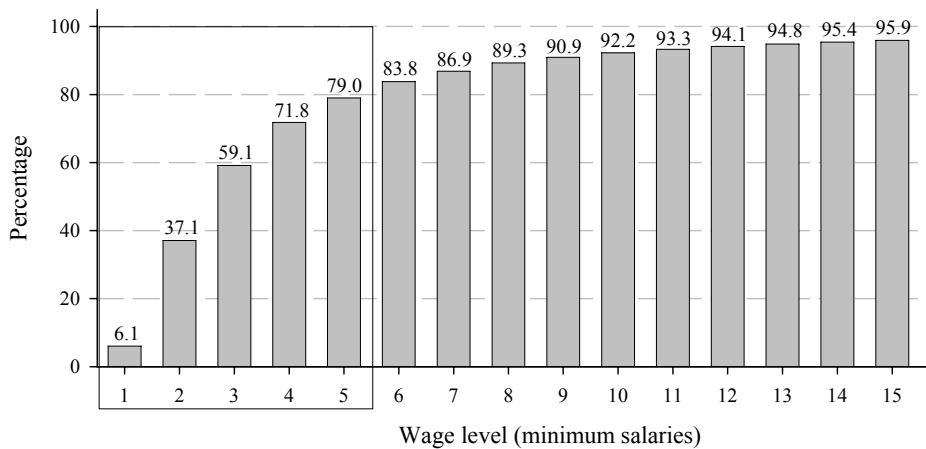
The predominance of workers with low earning power is one of the major limitations of the system. Although the social contribution made by the Federal Government, which is proportionally greater for those who earn less, partially compensates for this limitation, it is still difficult for most workers to accumulate sufficient capital for an adequate pension. This is due to factors determined by the labour market such as low wages and intermittent formal employment, over which workers have little real control.

Since they have no real influence over their employment situation, one might think that workers would be more responsible and save for their retirement by increasing the 1.125 per cent of their salary they currently contribute, but that option clashes with the practical difficulty of doing so for the great majority earning a minimal subsistence-level income.

Those factors underscore the risks and limitations of a funded benefit system under conditions of scarce capital.

### D. MODEL FOR SIMULATING EXPECTED RESULTS OF THE SYSTEM

With a view to estimating the foreseeable results for the system, a model was developed which takes into account gender, income level (1 to 5 times the minimum wage), the different contribution densities (1 to 5, 6 to 10, ... 96 to 100) and the resulting contribution periods, as well as the rate of return relative to the contribution periods.

For each sex and wage level, the model calculates the following:

1.  number of workers who have not had the minimum number of contribution years during their reported working life to qualify for a pension, even after reaching the required age (65 years);

2.  estimated cost of supplementary assistance for workers who do not qualify for a pension, at 50 per cent of the minimum wage;

3.  number of workers who do not qualify for a pension but who fulfil the requirements for obtaining health-care benefits;

4.  number of workers who do not achieve the minimum pension, and the estimated cost to the State to provide a supplement in such cases; and

5.  number of workers having a pension equal to or greater than the minimum.

The model was applied to the 9.9 million workers (60 per cent men, 40 per cent women) currently contributing at levels 1 to 5 times the minimum wage, who represent 79 per cent of the participants in the system. Given the uncertainty over whether income from the housing subsidy would actually be available (it could be used for the purchase of real estate), this kind of subsidy was excluded from the model. Additional costs arising out of any widow's or orphan's benefit were not taken into account.

The model incorporates the following assumptions:

The age structure of the workers is normally distributed with a mean age of 42 years for both men and women. Although statistics on the age distribution of current workers are not available, this average age can be considered a reasonable working estimate, given that IMSS is an

institution that has existed for more than 55 years and whose affiliates could easily be around that average age.

The mortality tables used for the system assume that 91 per cent of women and 85 per cent of men will survive to age 65 (retirement age), for a total of 8.7 million workers (87.3 per cent of the current population at that wage level).

Wages remain the same over 40 years of working life (no salary increase).

There is entitlement to pension after contributing for 1,250 weeks (24 years).

There is entitlement to health-care benefits after contributing for 750 weeks (14.4 years).

The rate of return on assets in an individual's account varies according to the contribution period (see data in figure 4).

A supplement of 50 per cent of the minimum pension is assumed for individuals who have not contributed for at least 1,250 weeks (as part of supplementary benefits not currently paid under any head).

The contribution densities calculated from the First Social Welfare Survey of Chile (2002) are assumed to apply to Mexico.

## E. EXPECTED RESULTS

The results shown below relate to a number of workers equal to the number currently insured by IMSS (in the range of one to five times the minimum wage) and whose retirement pension depends exclusively on their individual savings. They show detailed figures for a closed group, which is analysed by way of example. Should we wish to calculate the results for a specific period, a more complex exercise would need to be undertaken with an open group, in which the workers retiring or leaving the group permanently for some other reason are replaced, in order to keep the number of insured persons at a pre-established level.
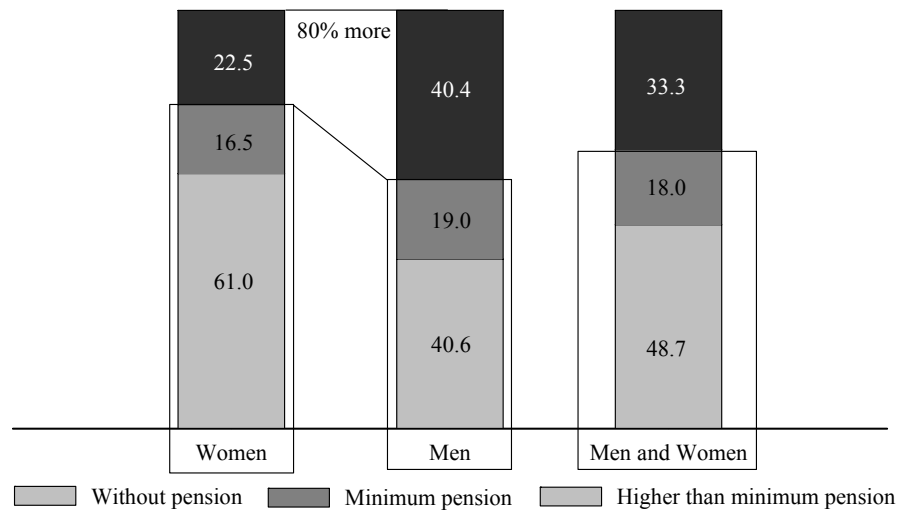
### *Demographic results by sex and pension level*

Figure 11 shows the results obtained for the pool of 8.7 million workers — those who survive to age 65 out of the 9.9 million who currently contribute in the range of one to five times the minimum wage — based on the likely situation of their individual savings.

The results show that, among women, 61 per cent would not be entitled to a pension, 16.5 per cent would find themselves obliged to receive the guaranteed minimum pension, and only 22.5 per cent would receive a pension higher than the minimum. In sum, 77.5 per cent— approximately 2.7 million women—would not have achieved a sufficiently high level of savings for retirement.

As for the male workers, 40.6 per cent would not qualify for a pension, 19 per cent would have to apply for the minimum pension and the remaining 40.4 per cent (practically the same percentage as those who would not qualify for a pension) would exceed the minimum pension. In sum, 59.6 per cent—approximately 3.1 million men—would not have achieved a sufficiently high level of savings for retirement.

**Figure 11. Expected results of the individual account system by sex**
*(Percentage)*



| | Women | Men | Men and Women |
|---|---|---|---|
| | 22.5 | 40.4 | 33.3 |
| | 16.5 | 19.0 | 18.0 |
| | 61.0 | 40.6 | 48.7 |

80% more

Without pension  Minimum pension  Higher than minimum pension

In the comparison between the sexes, women are at a notable disadvantage. There are proportionally more women who would not have a pension and fewer who would have a pension equal to or higher than the minimum.

In the aggregate, 67 per cent of men and women would not have achieved a sufficiently high level of savings for retirement (approximately 5.8 million workers).

Moreover, the maximum replacement rate[4] for those who contribute at five times the minimum wage is 53.9 per cent, which is equivalent to 2.7 times the minimum wage and 2.3 times the urban poverty line[5] (ECLAC, 2005a). The replacement rate is within the range observed for most international references (between 40 and 60 per cent), but the value of the pension, at 2.3 times the urban poverty line, cannot be considered adequate in terms of its purchasing power (figure 12).

*Demographic results by pension level and sex*

In the previous section, the primary focus was on the situation according to sex, while this section focuses first on the pension level, thereby complementing the picture that has emerged thus far (see figure 13).

Despite the fact that only 40 per cent of the working population are women, the number of women who would not qualify for a pension (25.4 per cent of the total workers) is slightly higher than that of men (23.6 per cent). Overall, nearly half of all workers (49 per cent) would be in this unfavourable position. Of the 18.1 per cent of workers who would have to rely on the minimum pension guarantee, 11.1 per cent are men and the remaining 6.9 per cent women.
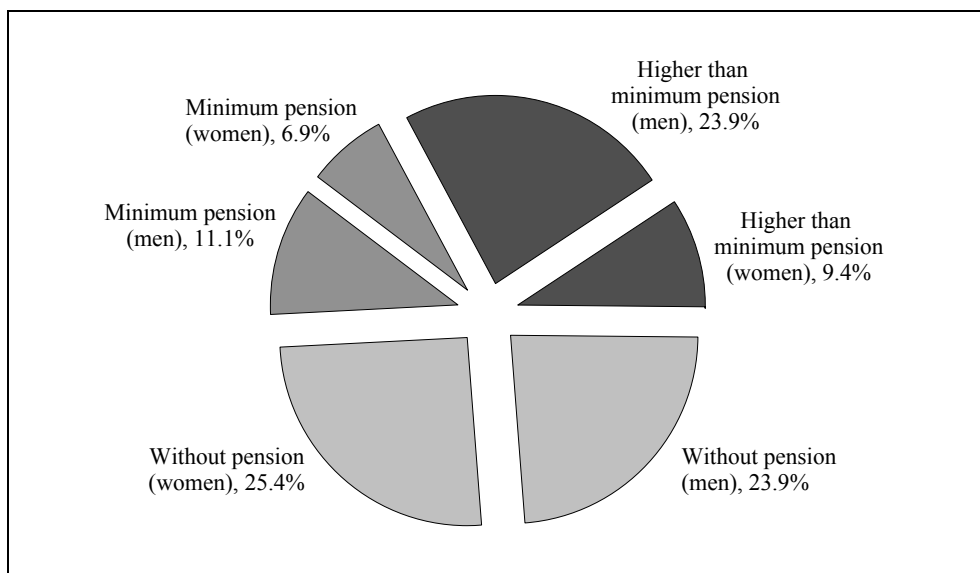
Among those who would receive a pension higher than the minimum (33 per cent), the proportion of men (23.6 per cent) is much greater than the proportion of women (9.4 per cent). Within the group of those who would not qualify for a pension there are some who do fulfil the

**Figure 12.  Evolution of the real minimum wage, 1987-2005**
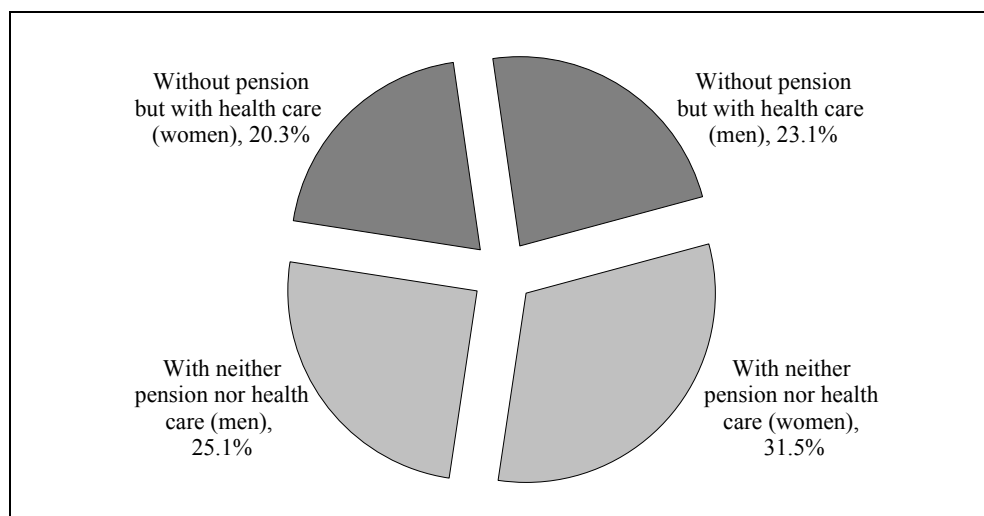(*January 1987 = 100*)
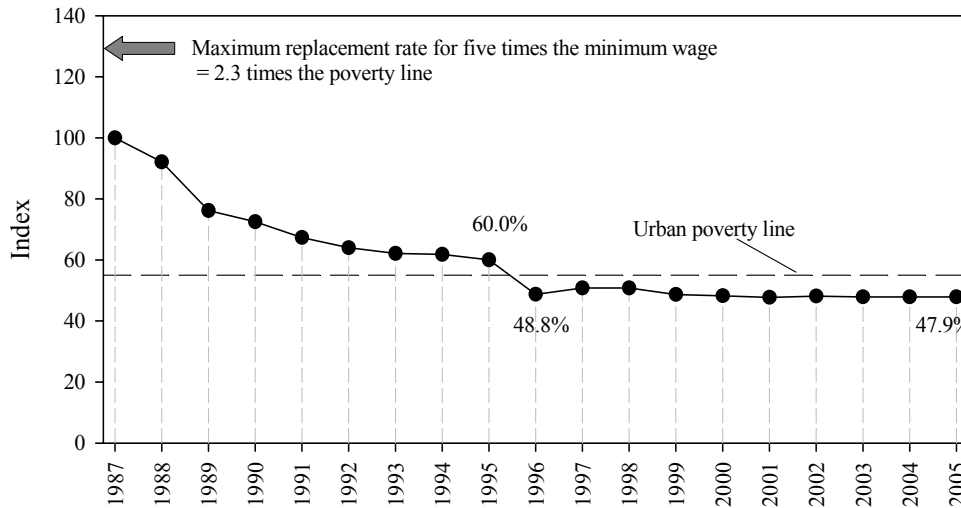
*Sources*: ECLAC (2005a); Banco de México (2005).
NOTE: Figures are for January of each year.

**Figure 13.  Estimated distribution of workers according to pension eligibility and sex**

*Source*: Author's calculations based on the First Social Welfare Survey of Chile, Subsecretariat for Social Welfare of the Government of Chile (2002).

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750 weeks requirement to qualify for health-care benefits. They represent 43.4 per cent of the total. The remaining 56.6 per cent are those who would have neither pension nor health care. In absolute terms, this pool consists of some 2.4 million workers. Figure 14 shows the respective percentages.

*Financial results by sex and minimum wage level*

The financial results refer to the resources that would be needed as supplementary assistance equivalent to 50 per cent of a minimum wage for those who do not qualify for any pension, and to supplement a minimum pension for those relying on the guaranteed minimum.

It should be made clear that the situation presented here refers to the point at which all current workers reach the retirement age. However, this is not something that would happen overnight. Rather, as workers started reaching retirement age the subsidies would gradually increase up to the values described in figures 16 and 17, after which they would decrease.

Figure 15 illustrates the situation for women. It shows the estimated subsidy needed as a proportion of the annual pre-retirement wages for different wage levels, taking into account the corresponding contribution densities.

The percentages of annual subsidy for the group not entitled to a pension and with a low wage level are particularly high, beginning at 157.1 per cent for the minimum wage and declining to 22.7 per cent for five times the minimum wage. The average value for those who contribute at one to five times the minimum wage is 50.1 per cent.

For those entitled to receive the minimum pension, the subsidy percentage starts at 48.9 per cent for the minimum wage and decreases to 0.6 per cent for four times the minimum wage. The average for the group of one to five times the minimum wage is 5.3 per cent.

Taking into account the two types of subsidy, the overall percentage needed would be 20.6 per cent. In absolute terms, the overall amount is equivalent to 17.7 billion pesos, which represents about 0.22 per cent of GDP for 2005.

**Figure 15. Proportion of annual earnings required as a subsidy to supplement retirement assistance and pensions, in relation to the amount of annual earnings (women)**
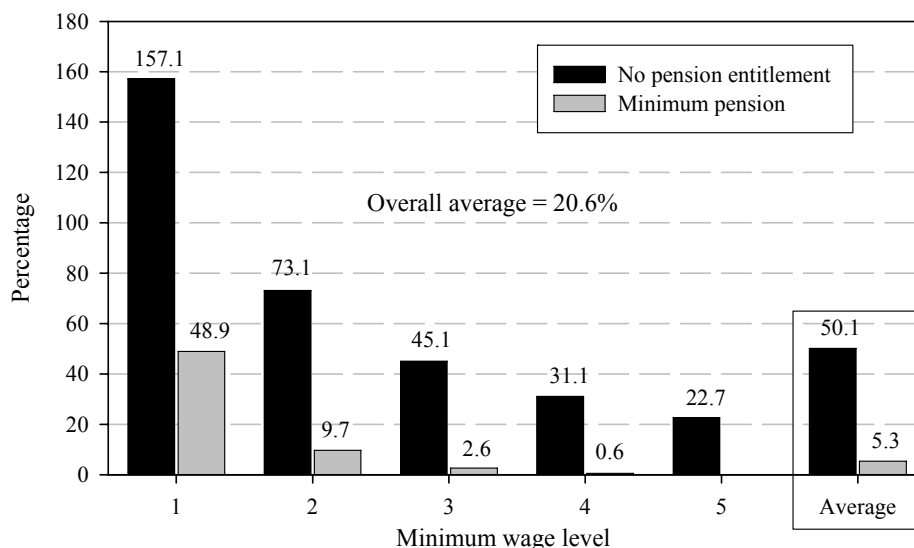
For men, the subsidy percentages for the group not entitled to a pension begin at 131.8 per cent for the minimum wage and decrease to 16 per cent for five times the minimum wage. The average value for the group contributing at one to five times the minimum wage is 39.6 per cent (figure 16).

Those who are entitled to the minimum pension would require a subsidy percentage beginning at 37.8 per cent for the minimum wage and declining to 0.1 per cent for four times the minimum wage. The average for the group contributing at one to five times the minimum wage is 3.4 per cent.

For both types of subsidies, the overall percentage necessary would be 10.8 per cent, which is about half the percentage for women (see figure 15). In absolute terms, the total is equivalent to 16.4 billion pesos, which represents approximately 0.20 per cent of the 2005 GDP.

Taking men and women together, the average subsidy for those who contribute at one to five times the minimum wage is 44.7 per cent for those not entitled to a pension and is 4 per cent for those who are entitled to the minimum pension (figure 17).The overall percentage necessary for both types of subsidy would be 14.3 per cent. In absolute terms, the overall amount is equivalent to 34.1 billion pesos, which represents approximately 0.42 per cent of the 2005 GDP (0.33 per cent of the GDP for those who fail to qualify for a pension and 0.09 per cent to supplement the minimum pension guarantee).

While the necessary support is modest as a percentage of GDP, it should be recalled that this support refers to only one generation of workers, those currently employed. Furthermore, the subsidies do appear high in relation to the annual earnings of workers at the lower wage levels.

These financial results highlight the disadvantages of women in relation to men and imply that the support required by women will be greater than that required by men. In addition, support for women is expected to last longer than for men, as women's life expectancy is higher.

## F. Conclusions and recommendations

At present, only about 37 per cent of current workers have retirement pension coverage through social security mechanisms and institutions in the formal labour market.  Of this percentage, IMSS members account for the majority, with 30 per cent, and the remaining 7 per cent are covered by various agencies. Therefore, 63 per cent lack any form of protection.

The percentage of contributions specifically for retirement, particularly contributions by the workers themselves (1.125 per cent of their salary), is very low, although there is little real possibility that the percentage will be increased so long as the purchasing power of the minimum wage remains low. Moreover, the housing sub-account (amounting to 5 per cent of the worker's base salary) is applied to retirement only if those resources are not used to acquire housing.

The commissions collected by pension fund managers significantly reduce the capital available to savers for their retirement. This reduction is accentuated when the periods of contribution to social security are shorter.

The precarious nature of the labour market results in lower contribution densities, which ultimately reduces the opportunities to save for retirement. This is the situation of 79 per cent of the members of IMSS, who contribute at one to five times the minimum wage and whose future savings will also be affected by their low earnings.

According to the results of the analyses, most workers in the formal labour market are likely to have insufficient savings for retirement. Specifically, this would apply to 78 per cent of women, 60 per cent of men and 67 per cent of men and women combined. In absolute terms this amounts to approximately 5.8 million workers.

Significant subsidies will be needed to offset the deficit in workers' savings — approximately 14 per cent of overall annual earnings, 21 per cent for women and 11 per cent for men — either to supplement the minimum pension or to round out assistance for those who do not meet the required number of contributory years when they reach retirement age.

The results show that the situation is significantly less favourable for women than men, revealing a considerable gender inequality, which is contrary to the principles of social security.

The differences by sex, wage level and contribution density suggest that any calculation based on a supposedly average individual cannot be considered as being representative of a larger group.

**Figure 16.  Proportion of annual earnings required as a subsidy to supplement retirement assistance and pensions, in relation to the amount of annual earnings (men)**
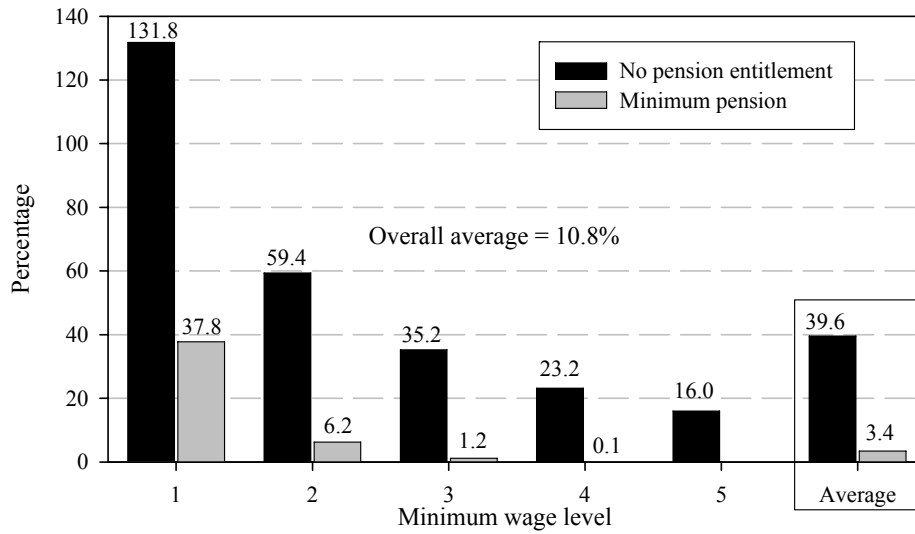


*Source*: Author's calculations based on the First Social Welfare Survey of Chile, Subsecretariat for Social Welfare of  the Government of Chile (2002).

**Figure 17.  Proportion of annual earnings required as a subsidy to supplement retirement assistance and pensions, in relation to the amount of annual earnings (men and women)**
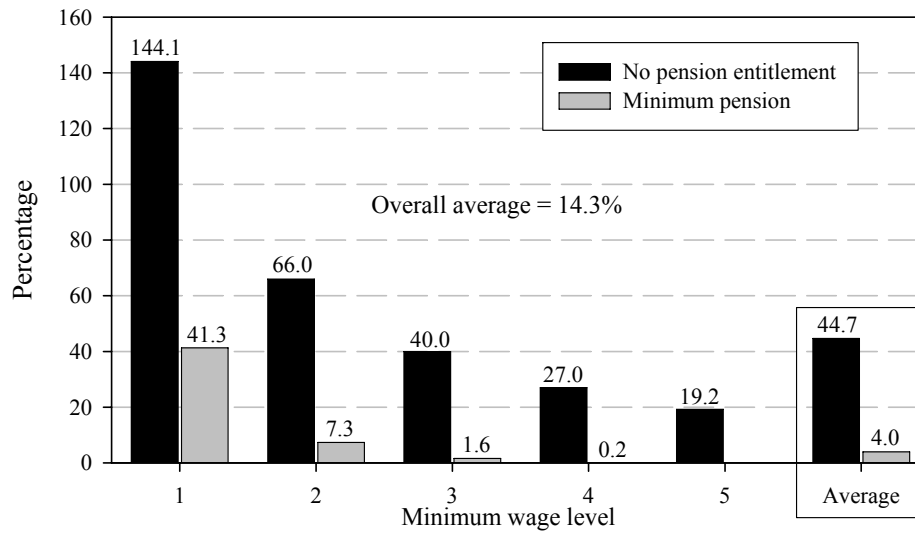


*Source*: Author's calculations based on the First Social Welfare Survey of Chile, Subsecretariat for Social Welfare of  the Government of Chile (2002).

Measures will be necessary to ensure financing for health care for future pensioners and for those who, while not qualifying for a pension, receive health care benefits.

A critical and in-depth review is also needed with a view to amending the rules of the current retirement savings system with respect to eligibility, commissions and contribution rates, among others elements, since the predictable results in the current economic and social environment are not very encouraging in terms of offering an adequate pension to savers, particularly because of the manifest inequality suffered by women. A fundamental part of such a review involves collecting information similar to that found in the Social Welfare Survey of the Government of Chile.

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NOTES

[1] If, during a working life of 40 years contributions are paid during a period equivalent to 24 years, then the contribution density is expressed as the ratio of 24 to 40, or 60 per cent.

[2] Investment companies specializing in pension funds whose exclusive aim is to invest the funds in the individual accounts of workers who are members of an AFORE.

[3] The reforms to the IMSS Act were adopted in 1995 but did not come into force until July 1997.

[4] The replacement rate indicates the extent to which the pension replaces the wage that the worker received when actively employed. If the pension is equal to the wage, then the replacement rate is 100 per cent.

[5] Although the data for the poverty line determined by ECLAC correspond to 2002, the same ratio is used for 2005, since the real minimum wage remained practically unchanged during that period.

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# FORMAL AND INFORMAL INTERGENERATIONAL SUPPORT TRANSFERS IN SOUTH-EASTERN ASIA

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At the turn of the millennium, population ageing has replaced fertility control as a primary concern of developed and developing nations. Population ageing will put pressure on the intergenerational support of older persons in both social and economic terms. This paper reviews some of the demographic indicators for South-eastern Asia with the aim of presenting the rapid ageing of its population. This is followed by a review of the levels and types of informal intergenerational support available for older adults in South-eastern Asia using specific countries as examples, and a discussion of the changes in demographic and social realities that may make continued familial support of older adults difficult. Then, the notion of a South-eastern Asian family response model that is unique to the region and is an outcome of specific cultural, demographic, and economic contexts is introduced. The levels and types of formal support available to older adults in South-eastern Asia are then examined, with the aim of highlighting the inadequacies of available formal systems. The paper also addresses the policy implications based on conclusions derived from available data for South-eastern Asia.

In thirty years' time, more than half of the world's older population will be residing in Asia. The speed of ageing, however, is not uniform across Asian countries. In general, more developed Asian countries with higher per capita income are ageing faster (table 1). On one end of the scale is Singapore with the highest life expectancy of 79 years and lowest total fertility rates of 1.35 for the period 2000-2005. On the other end of the scale, Cambodia has the lowest life expectancy of 56 years and the highest total fertility rate of 4.14. In 2005, Singapore had the highest old age dependency ratio of 12 older adults aged 65 or over per 100 in the working ages 15-64. This is double the old-age dependency ratio of countries such as Brunei Darussalam, the Philippines and Cambodia. South-eastern Asia is projected to age rapidly in the next 30 years and this will result in a closing of the demographic window of opportunity that benefited most of these countries economically in the 1970s and 1980s.

In many developing countries, the beginning of the ageing process is accompanied by a substantial decrease in the dependency ratio. This ratio of dependent young and elderly to the adult population first declines with the fall in fertility and later increases as the population ages. The rapid and significant fall in

TABLE 1. DEMOGRAPHIC INDICATORS FOR SELECTED COUNTRIES IN SOUTH-EASTERN ASIA

| Country | Life expectancy | Healthy life expectancy | | Total fertility rate | Old-age dependency ratio |
|---|---|---|---|---|---|
| | 2000-2005 | Males | Females | 2000-2005 | 2005 |
| Singapore………………….. | 78.6 | 68.8 | 71.3 | 1.35 | 12 |
| Brunei Darussalam………… | 76.3 | 65.1 | 65.5 | 2.50 | 5 |
| Thailand…………………… | 69.7 | 57.7 | 62.4 | 1.93 | 10 |
| Malaysia…………………… | 73.0 | 61.6 | 64.8 | 2.93 | 7 |
| Indonesia………………….. | 66.5 | 57.4 | 58.9 | 2.37 | 8 |
| Philippines………………... | 70.2 | 57.1 | 61.5 | 3.22 | 6 |
| Myanmar………………….. | 60.1 | 49.9 | 53.5 | 2.46 | 8 |
| Cambodia………………….. | 56.0 | 5.6 | 49.5 | 4.14 | 6 |

*Sources*: United Nations (2004, 2005); Lamb (1999).

fertility, together with the still modest increase in the number of old people, modifies the age structure of the population in favour of young adults, producing the "demographic window" (Bloom and Sevilla, 2003). As a result, working-age adults will support a relatively low social burden for the next two or three decades. This situation gives developing countries a rare opportunity to implement fundamental social policies that can be the foundation of sustainable development before they face inescapable and unprecedentedly fast ageing (Chan, Lutz, and Robine, 2005).

The closing of this demographic window of opportunity will put pressure on Governments to provide care for older members of their societies. Asian Governments currently consider care for older citizens as a family responsibility. However, policymakers realize that families may find it increasingly difficult to care for older members as South-eastern Asian societies develop.

## A. LIVING ARRANGEMENTS

Current policies directed at the care of older adults place the onus of care on the family. Most Asian Governments view co-residence as an important form of informal support (e.g., tax incentives provided to children who reside with older parents in Malaysia and Singapore). In the late 1980s and 1990s, Western theorists and organizations such as the World Bank pointed to the fact that multi-generational living may decline in Asian societies with the development of modern economies. This decline in multi-generational living was thought to have a negative effect on older adults' well-being (Martin, 1990; World Bank, 1994). Several factors operate to decrease the probability of co-residence. These include lower fertility, gender preference, migration, and changing tastes. Lower fertility generates fewer opportunities for co-residence as there are fewer children available to live with. Lower fertility also lessens the probability that an individual's gender preference for choice of child to live with will be fulfilled. This is particularly relevant in countries where gender preference persists. Migration of young adults from their country of origin also reduces the availability of children with whom to co-reside. Finally, changing attitudes towards co-residence such as, for example, an increased preference for privacy by either older parents or adult children, may contribute to a decline in co-residence levels (DaVanzo and Chan, 1994).

The following tables examine changes in living arrangements over time in select South-eastern Asian countries. In the Philippines, there has been little change in the percentage of older adults living with a child between 1988 and 1996. In 1996, approximately two-thirds of older adults lived with a child, 6 per cent lived alone, and 8 per cent lived with spouse only (table 2). Unfortunately, there were no trend data for Viet Nam at the time of this study, but available data for Ho Chi Minh City shows that 83 per cent of older adults were living with a child, 5 per cent were living alone, and 5 per cent were living with spouse only in 1997.

In Singapore, there has been little change in the percentage of older adults living with a child. In 1988, 88 per cent of older adults lived with a child compared to 85 per cent in 1995. This slight decrease in the percentage of older adults living with a child appears to be offset by a doubling in the percentage living with spouse only between 1988 and 1995. In Thailand, there was a decrease in the percentage living with children from 74 per cent in 1995 to 68 per cent in 2002. Conversely, the percentage living alone has almost doubled. Overall, the proportion of older adults living with a child remains high even though there appears to be an increasing trend in the proportion of older persons living alone or with spouse only.

Recent data on preferences by type of living arrangement show some interesting patterns. Figure 1 shows the percentage of older Indonesians who prefer to live with or near a child, or to live alone. In general, the preference is to live with or near a child. However, urban males (81 per cent) and urban females (78 per cent) are those most likely to prefer this living arrangement. Rural older males and

| Country | Year and nature of sample | Living with any child | Living alone | Living only with spouse | Other living arrangements |
|---------|---------------------------|----------------------|--------------|-------------------------|---------------------------|
| Philippines............ | 1988 National Survey | 68 | 4 | 10 | 18 |
| | 1996 National Survey | 69 | 6 | 8 | 17 |
| Viet Nam............... | 1996 Red River Delta Survey | 74 | 7 | 13 | 6 |
| | 1997 Ho Chi Minh City and Nearby Provinces | 82 | 5 | 5 | 8 |
| Singapore.............. | 1988 National Survey of Senior Citizens | 88 | 2 | 3 | 7 |
| | 1995 National Survey of Senior Citizens | 85 | 3 | 6 | 6 |
| Thailand................. | 1995 National Survey | 74 | 4 | 12 | 10 |
| | 2002 National Survey | 68 | 7 | 14 | 11 |

*Sources*: Knodel and Debavalya (1997); Knodel and others (2005).

**Figure 1. Preferred type of living arrangement by urban-rural residence and sex,
Indonesia**
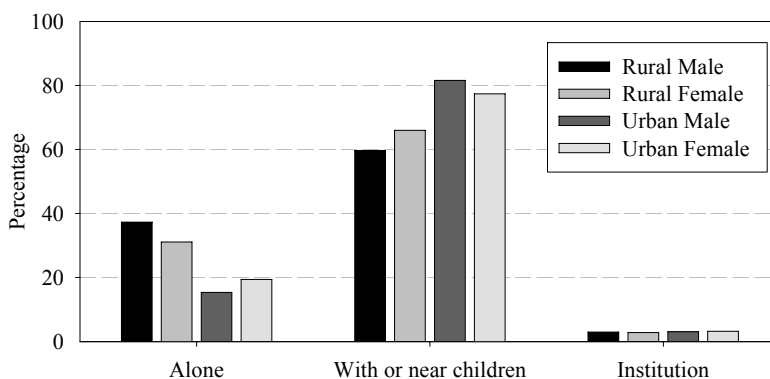


*Source*: United Nations (1999).

females, on the other hand, are more likely to prefer living alone as compared to their urban counterparts: one-third of rural older adults prefer to live alone. One possible explanation is the perception of urban older adults regarding the difficulties in moving around in an urban environment. The uneducated are the ones who face greater difficulties, particularly with respect to transportation and language. Moreover, it is difficult for older persons to find employment in urban areas, and the living costs are higher than in rural areas. Thus, urban males and females report a greater preference for living with children compared to their counterparts in rural areas. A small proportion of older adults, less than 10 per cent, report that their preferred type of living arrangements is to be living in an institution.

In Thailand, the proportion of older adults who prefer to live alone (15 per cent or less, depending on the sex and place of residence) is much smaller compared to Indonesia (figure 2). The proportion preferring to live with children is very high, 80 per cent or more. In particular, an extremely high proportion of urban older females (about 90 per cent) prefer to live with or near a child. This

**Figure 2. Preferred type of living arrangement, by urban-rural residence and sex, Thailand**
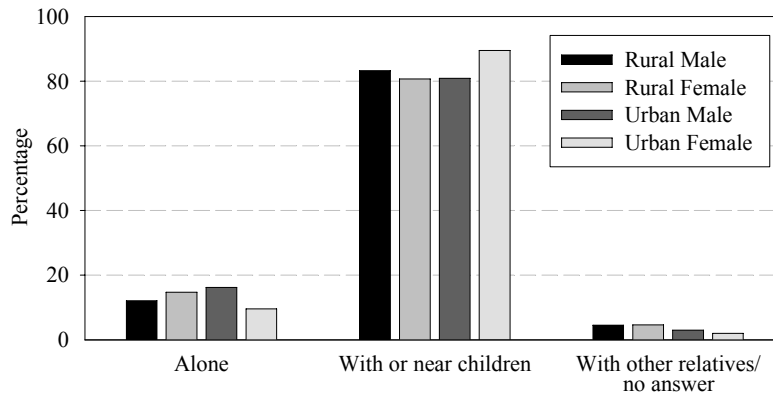


*Source*: United Nations (1999).

may reflect the particularly disadvantageous situation of older women in urban settings, who are more likely to be uneducated and to be disabled, and less likely to have ever worked compared to their male counterparts. The difficulties of maneuvering in an urban setting and the high cost of living may explain their preference for living with or near children.

## B. INTERGENERATIONAL TRANSFERS

In recent years there has been an increasing emphasis on the study of intergenerational transfers as opposed to simply the study of living arrangements. Hermalin (2002) notes the need to take into account both the form, i.e., living arrangement type, and the function, i.e., intra-family relationships, in terms of living arrangements. This kind of information can provide a more comprehensive picture of the support flow involving older adults within Asian families.

In most South-eastern Asian countries, intergenerational transfers from adult children to older parents are intense. A total of 91 per cent of older adults in Singapore, 88 per cent in Thailand and the Philippines and 78 per cent in Viet Nam received monetary transfers from their children (table 3). However, older parents are not passive recipients of support. Sixty-seven per cent of older parents in the Philippines and 55 per cent in Thailand provided monetary support to their adult children. In Singapore and Viet Nam the corresponding percentages are significantly lower. Thus, older persons should not always be viewed as dependent on other family members. Furthermore, the important downward support flow from parents to children suggests that enhancing older adult well-being would enhance overall family economic well-being.

As in the case of monetary transfers, intergenerational transfers of material goods are also more likely to be upwards (from children to parents). In the Philippines, Thailand, and Viet Nam, approximately 90 per cent of older adults received material goods from their children. However, as with financial transfers, the downward flow of material support also tends to be important, particularly in the Philippines and Thailand. Two-thirds of older Filipino parents and almost half of older Thai parents provided material support to their children. All those figures suggest that intergenerational support transfers of older adults remains significantly high.

TABLE 3. PERCENTAGE OF POPULATION AGED 60 OR OVER RECEIVING AND PROVIDING MONETARY TRANSFERS IN SELECTED SOUTH-EASTERN ASIAN COUNTRIES

| Country | Percentage receiving | Percentage providing |
|---|---|---|
| Thailand………............. | 88.1 | 54.7 |
| Philippines……............. | 87.9 | 67.2 |
| Singapore…………….. | 90.5 | 28.4 |
| Viet Nam (RRD)…….... | 34.8 | 5.4 |
| Viet Nam (HCMC)…... | 78.4 | 33.8 |

*Sources*: Biddlecom, Chayovan and Ofstedal (2002); Anh and others (1997).
NOTE: RRD=Red River Delta; HCMC=Ho Chi Minh City.


TABLE 4. PERCENTAGE OF POPULATION AGED 60 OR OVER RECEIVING AND PROVIDING MATERIAL GOODS IN SELECTED SOUTH-EASTERN ASIAN COUNTRIES

| Country | Percentage receiving | Percentage providing |
|---|---|---|
| Thailand………............. | 87.5 | 47.1 |
| Philippines……............. | 90.6 | 76.1 |
| Viet Nam (RRD)…….... | 86.4 | 11.9 |
| Viet Nam (HCMC)…... | 90.0 | 38.3 |

*Sources*: Biddlecom, Chayovan and Ofstedal (2002); Anh and others (1997).
NOTE: RRD=Red River Delta; HCMC=Ho Chi Minh City.


## C.  ATTITUDES TOWARDS FAMILY SUPPORT

In many Asian countries filial piety appears to remain a strong norm.  For example, Sobieszczyk, Knodel, and Chayovan (2003) report that in Thailand respect for the elderly continue to be strong.  In countries that are rapidly modernizing, the forms of respect may be changing rather than decreasing.  For example, Mehta (1997) suggests that changing forms of respect are taking place in Singapore. The attitudinal data shown in table 5 reveals that a large majority of older adults in urban Indonesia disagree with the statements that "children today take less care of their elderly parents than they used to in the past" and  that "youngsters today have less respect for elders than they used to in the past."

The maintenance of family support in rapidly industrializing contexts suggests that Asian families may respond differently to the pressures of social and economic development compared to Western countries.  Maintenance of familial care of older adults may be possible by putting appropriate policies in place to enable families.  Enabling families requires, in the first place, recognizing the pressures they face when caring for older adults.  Even if the situation is as positive as the data suggest - i.e., older adults still have moderate to high social status in South-eastern Asia, and filial petty remains strong - there is still the need to address the issue of caregiver burden in any policy regarding living arrangements and intergenerational transfers.  The best intentioned adult child will face the effects, both physical and mental, of caring for an older parent as the number of years, and the cost, of required care increases over time.  What have South-eastern Asian nations done in response to enabling families to take care of older members?

| Statement | Agree | Disagree |
|---|---|---|
| Children today take less care of their elderly parents than in the past | 14.1 | 85.8 |
| Youngsters today have less respect for elders than in the past | 14.9 | 85.1 |

*Source*: Wirakartakusumah (1999).

## D.  RELIANCE ON FORMAL SUPPORT

Several countries in South-eastern Asia now have established national policies on ageing, including Indonesia, Malaysia, the Philippines, Singapore, and Thailand (Phillips, 2000).  As Governments in Asia and the Pacific re-assess their formal programmes for older persons or seek to develop new ones, some key issues need to be taken into account. The major difficulty lies in fine-tuning the amount of formal support Governments should provide.  The provision of formal care for older persons, whether it is economic (social security or pension schemes), physical (built environments/nursing homes), or social (community programmes) will, to some extent, replace functions performed by the family.  The World Bank (1994) has provided a number of reasons why Governments might want to be cautious regarding the implementation of formal programmes.  As already mentioned, formal programmes may "crowd out" or lessen family support for older persons.  Formal programmes also need to be established in an economic and social environment that can be supportive of such programmes.  In an uncertain economic arena, e.g., one that lacks infrastructure or legislation, the implementation of social security or alternative programmes is more likely to fail.  In many Asian countries, as social security plans now stand, workers are often able to evade contributions but manage to qualify for benefits. Savings, on the other hand, are often not indexed to inflation thereby recipients receive lower payments than anticipated.

Formal programmes that "crowd in" family support for older persons are ideal. Rather than replace, these types of programmes encourage familial support of older persons.  Various Government incentives are offered as rewards for caring for older parents. For example, in Singapore, priority housing and tax incentives are provided to adult children who live with older parents.

Apart from the issue of formal programmes, there is the issue of legislating family care of older adults.  How far should Governments go in legislating filial piety? Do such sanctions operate to enhance familial support of older parents?  In Singapore, parents can sue adult children for economic neglect. However, the number of cases actually brought forward to the tribunal is only 100 or less per year.  In most cases, there are other prevailing reasons why adult children refuse to support their parents - for example, that the adult children were abused by their parents.

The main source of formal support in South-eastern Asia is the pension programme.  However, most Asian countries do not have adequate social security systems in place. For example, Asher (1996) notes that social security systems in the Philippines and Indonesia are inadequate and under-funded, leading to an uncertain economic future for current and future older persons.  In addition, only a minority of older persons are covered by formal systems in most countries.  Singapore stands out as an Asian country with a well developed social security programme known as the Central Provident Fund (CPF).  However, estimates show that in 2003 the net balance of members' accounts (after withdrawal for housing investments and other schemes) did not meet the minimum balance required (set at 80,000 Singapore

dollars in 2003).  Only two-thirds of Singapore's current older persons are covered by the CPF.  The majority continues to depend on their families for economic support.  In addition, the recent Asian economic crisis has had detrimental effects on many savings plans in Asia, decimating the investments of many older persons.  With the exception of the Red River Delta area in Viet Nam, the figures below show that very few older adults, less than 10 per cent, in Singapore, Thailand, Indonesia, Ho Chi Minh City in Viet Nam and the Philippines rely on pension income as their major source of income:

Percentage of older adults reporting pension income as a major source of income:

| | |
|---|---|
| Singapore | 2.2 |
| Thailand | 2.3 |
| Indonesia | 9.0 |
| Viet Nam (Red River Delta) | 22.8 |
| Viet Nam (Ho Chi Minh City) | 2.4 |
| Philippines | 7.0 |

*Sources*: Ofstedal and others (2002); Anh and others (1997).

## E.  POLICY IMPLICATIONS

Existing research suggests the need for policies that enable families to support older members.  In countries such as Malaysia and Singapore, there exist some financial incentives.  On a practical level, however, home nursing and respite care are seriously lacking.  Policies that allow older persons to maintain their independence are important.  Healthy and economically active older adults will significantly reduce the stress on the family.  Several countries in Asia are concerned about low fertility rate.  However, couples will decide not to have children or to have fewer children, unless policies are put in place that recognize the burden on middle-aged children to support two generations  their older parents and their own children.  In Singapore, the high cost of living and time pressures are the most frequently cited reasons for not wanting to have children.  Policies that recognize the enormous costs of caregiver burden need also to be put in place.  This includes the development of more respite care centers and educating caregivers about their own needs.  Formal support for the current generation of older adults is insufficient and ineffective, and quality and coverage are poor.

Some countries, such as China and Singapore, have even legislated family care. Existing research shows, however, that family support may be declining in the face of structural changes such as rapid industrialization, globalization, and increased migration (World Bank, 1994).  There are also documented sociological changes such as less convergence across generations.  The speed of population ageing in South-eastern Asia and indeed, in Asia as a whole, requires that policymakers remain flexible.  In one generation, the entire picture will change.  The next generation of older adults will be significantly better educated and will have higher incomes and better health.  As such, the policies that they will require will be very different from the current generation of older adults.

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# MICRO AND MACRO PERSPECTIVES ON INTERGENERATIONAL RELATIONS AND TRANSFERS IN EUROPE

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Parts of Europe have been experiencing the demographic transition for more than a century, and much of the continent has had some time to reflect on the changes and their implications. The contours of the changes are well-known: a lifespan of 80 years that has become the "expected" rather than the exceptional, especially for women; and a population age structure that includes about equal proportions of children and old people, moving towards a situation in near future when individuals aged 60 or over will outnumber children by a ratio of two to one.  These changes have reshaped population pyramids, altered the composition of family networks, and changed the rhythm of individual lives. Table 1 and figure 1 show the relative size of older and younger age groups, at present and in 2050, based on United Nations data.  Table 1 shows that there are distinct contrasts in age and sex composition in various regions of Europe.  By 2050, Eastern and Western Europe will have the strongest "top-heaviness". Figures for North America are included for comparison. This paper outlines some possible consequences of the demographic changes for intergenerational ties and transfer patterns in different parts of Europe.

## A.  SOME CONCEPTUAL ISSUES

### Generations

Addressing the topic of macro and micro perspectives on intergenerational ties means considering three phenomena, which may all be assigned the term *generation*.  First, there are *age groups or age grades*, such as children, youth, adults and old people.  Second, there are *historical generations*, i.e., groups of birth cohorts that share certain characteristics.  Third, there are *family generations*, i.e., location in a system of ranked descent. In each case, this involves examining people who are anchored differently in dimensions of time, primarily biographical time/chronological age and historical time.  A host of challenging research and policy issues lie in the intersection of these three phenomena.

When anthropologists first called attention to the social organization of age about a century ago, (e.g., van Gennep, 1909), they gave vivid accounts of clearly age-graded societies in which rites of passage often served the function of moving a whole set of individuals into a new age grade with its socially assigned roles. Across societies, rights and duties are commonly based on age, and age groups are linked to the division of labour and systems of inequality. Mayer and co-authors (e.g., Mayer and Müller, 1986) discuss how the modern nation-state identifies the individual rather than collectives in assigning age-linked rights and duties and structures biographical time through laws and policies. Social policy also shapes patterns of both dependence and interdependence among age groups and family generations (Walker, 1993a).

Historical events, such as depressions, wars and revolutions, create dividing lines among people whose chronological age anchors them in different points of historical time.  Demarcations can also be created by more gradual social and cultural change.  When there are dramatic contrasts, even between people who are relatively close in age and may be put in the same age group, we speak of *watersheds*.

Little is known about how watersheds affect contact, learning, and help across generational lines in society at large or in families.  In many Central and Eastern European nations now in transition, are

| Region | 2000 | | 2050 | |
| --- | --- | --- | --- | --- |
| | Old/young ratio | Sex ratio 60+ | Old/young ratio | Sex ratio 60+ |
| Northern Europe | 1.07 | 75.1 | 1.87 | 83.7 |
| Western Europe | 1.27 | 71.9 | 2.23 | 79.5 |
| Eastern Europe | 1.02 | 58.2 | 2.31 | 65.9 |
| Southern Europe | 1.40 | 75.9 | 2.76 | 81.2 |
| North America | 0.76 | 76.7 | 1.58 | 82.8 |

*Source*: United Nations (2005).

**Figure 1. Number of persons aged 60 or over per hundred children under age 15 in major areas, 2000 and 2050**
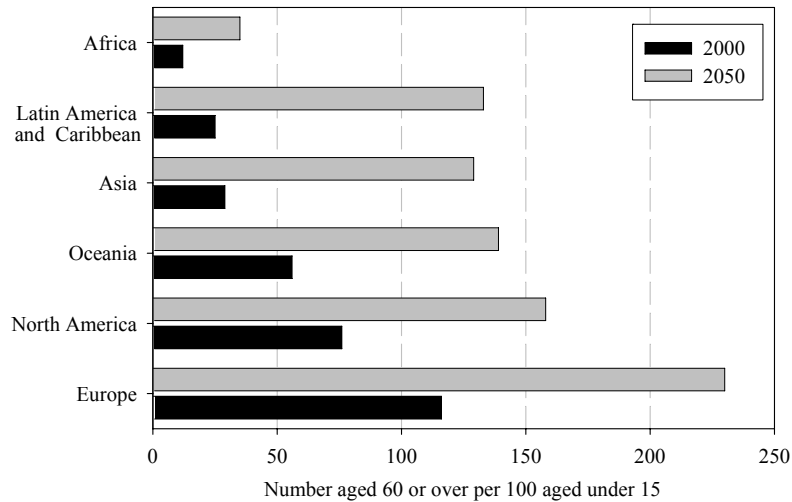


*Source*: United Nations (2005).

currently around 80 years of age grew up in a society that was dramatically changed after World War II. National boundaries were moved, and a new political regime created sharp discontinuities in the conditions of their lives.  The cold war era accentuated the contrasts. Today, many of them have grandchildren who never lived in a communist society.  How can these two generations find a common ground of shared understanding? Today's Europe offers rich opportunities for studying families as unique meeting places and for examining how different age- and cohort-linked constellations of resources affect transfers across generational lines.

For sociologists, it is a central fact that families create their own constellations of life phases - age and cohort - in other words, their own population pyramids (Hagestad, 2001).  In family lineages, history takes on interpersonal meanings, shaped by resources available and basic outlooks on life (Elder, 1974). Members often serve as "cohort bridges" for each other through communication and mutual learning. As

discussed below, recent demographic changes have made the intergenerational constellations of families more complex.

## *Transfers*

In this paper, the term *transfers* is treated broadly so as to include the provision of different kinds of resources: material, emotional and practical support, and the sharing of knowledge and skills. Transfers can go "up" and "down" generational lines in the public sphere as well as in the private realm of the family (Attias-Donfut and Wolff, 2000; Kohli, 1999). It is important to keep in mind that "immaterial" transfers in the form of time and attention can have strong material implications. Grandparents who provide childcare enable young parents to hold paid jobs. Taking care of frail parents keeps women out of the workplace and leaves them with reduced or no pension.

## B. THE CHANGING INTERGENERATIONAL COMPLEXION OF FAMILIES

Altered patterns of mortality and fertility have made intergenerational structures in the family more "top-heavy" and vertically extended. While horizontal intragenerational ties are shrinking, vertical ties across generations are more complex and durable than ever before in history. The most dramatic changes in the availability of vertical ties have occurred among the young. This illustrates the inherent asymmetry of intergenerational structures, with families looking different from "the top" than they do from "the bottom". In the past, individuals who reached old age typically had children and grandchildren but, under conditions of high mortality, many children had no surviving grandparents and a relatively high proportion of them also lost parents before reaching adulthood (Uhlenberg, 1996). Harper (2005) stresses that demographic shifts have increased the number of generations, but decreased the absolute number of relatives. She suggests that as a consequence, intergenerational connections, such as the grandparent-grandchild tie, may become more socially prominent and personally significant.

### *Joint survival, durable ties*

#### *Ageing children*

Co-longevity has greatly increased the duration of family ties. The parent-child relationship may last 6-7 decades and the grandparent-grandchild bond, 3-4 decades. Table 2 presents data from a survey of ten countries in Europe called SHARE (Survey of Health, Ageing and Retirement in Europe).[1] Seven countries have a majority of respondents aged 50-59 with at least one parent living. In three countries, namely The Netherlands, Austria and Italy, the figure is slightly under 50 per cent. France tops the list, with 62 per cent of the respondents in their fifties still with at least one parent. A recent study from the Norwegian Life Course, Ageing and Generation Study (NorLAG) shows that 56 per cent of women in their fifties have living parents. Likewise, a substantial number of those in their sixties still have parents. According to the SHARE study, that proportion is highest in France, where 23 per cent of those aged 60 or over have a living parent, but the proportion is nearly as high in Greece, Norway, Sweden, and Switzerland. After the age of 70, the figures typically drop to under 5 per cent, but in Italy 8 per cent and in France 7 per cent still have a living parent.

#### *Inheritance and inter-vivos transfers*

It should come as no surprise that inheritance is typically received relatively late in adulthood. Table 3, based on SHARE data (Jürges, 2005), shows that in six countries, inheritance is more often received after the age of 55 than before the age of 45. Most people receive bequests when they are between 45 and 64, close to the time of retirement. Only in Austria and the Mediterranean countries do most people receive inheritance before age 45. Several authors have argued that the long co-survival of parents and

children is a major reason why inter-vivos financial transfers have become increasingly common and significant. It is further argued that such transfers also help maintain reciprocity in exchanges when old, parents become frail and need help and care. Kohli (2005) reviews recent data from France, Germany, Norway and Sweden, in addition to Israel and the United States. He concludes that inter-vivos transfers are given at considerable rates, especially "down" generational lines. In Germany, 32 per cent of

TABLE 2. PERCENTAGE WITH AT LEAST ONE LIVING PARENT BY AGE GROUP, SELECTED EUROPEAN COUNTRIES

| Country | Age group (years) | | |
| --- | --- | --- | --- |
| | 50-59 | 60-69 | 70+ |
| Austria | 48 | 15 | 4 |
| Denmark | 57 | 16 | 1 |
| France | 62 | 23 | 7 |
| Germany | 55 | 14 | 4 |
| Greece | 56 | 19 | 4 |
| Italy | 49 | 16 | 9 |
| Netherlands | 47 | 14 | 2 |
| Spain | 55 | 16 | 5 |
| Sweden | 59 | 16 | 1 |
| Switzerland | 54 | 19 | 4 |
| Total | 54 | 16 | 4 |

*Source*: Börsch-Supan and others (2005), based on SHARE data.

TABLE 3. PERCENTAGE RECEIVING INHERITANCE BY AGE GROUP, SELECTED EUROPEAN COUNTRIES

| Country | Age group (years) | | | | |
| --- | --- | --- | --- | --- | --- |
| | <34 | 35-44 | 45-54 | 55-64 | 65+ |
| Austria | 25 | 20 | 28 | 18 | 9 |
| Denmark | 8 | 14 | 40 | 28 | 10 |
| France | 11 | 13 | 33 | 25 | 19 |
| Italy | 10 | 25 | 33 | 24 | 8 |
| Germany | 15 | 18 | 35 | 25 | 7 |
| Greece | 23 | 28 | 28 | 15 | 6 |
| Netherlands | 9 | 23 | 36 | 23 | 8 |
| Spain | 11 | 28 | 37 | 18 | 7 |
| Sweden | 10 | 18 | 34 | 27 | 11 |
| Switzerland | 11 | 16 | 36 | 27 | 10 |

*Source*: Jürges (2005), based on SHARE data.

individuals aged 40-85 reported giving such transfers over the last year. In SHARE, 28 per cent of the respondents said they had provided transfers of 250 euros or more during the last 12 months (Attias–

Donfut, Ogg and Wolff, 2005b). Kohli (2005) suggests that transfers from parents to adult children are often allocated according to need, while bequests are typically divided equally among children. Furthermore, he concludes that no significant gender differences emerge. This conclusion would most likely be challenged by Cox (2003) who, in a provocative paper, calls for research to systematically contrast parent-child dyads, such as mother-daughter and father-son. Inter-vivos transfers and inheritance often follow a "skip pattern", in which middle-aged children initially receive funds but pass them onto the next generation-grandchildren. For example, a study in Norway (Gulbrandsen and Langsether, 1997) found that adults commonly receive inheritance when they are in their 50s, a phase of life when they are the least likely to be in financial need. On the other hand, their children are at that time often still paying for education and have high housing costs and young children to provide for. The study found that, among individuals over the age of 55 who received inheritance, more than 40 per cent passed on part or all of it to children or grandchildren.

*Grandparents and grandchildren*

The grandparent-grandchild relationship also has an unprecedented duration. A recent British study found that 80 per cent of twenty-year-olds had at least one grandparent living (Grundy, Murphy and Shelton, 1999). Data from the OASIS (Old Age and Autonomy: The Role of Service Systems and Intergenerational Family Solidarity) study, which includes urban samples from England, Germany, Norway and Spain[3] found that about one third of individuals in their thirties had grandparents living (figure 2) while for those in their forties, under 10 per cent still had a surviving grandparent. The NorLAG study shows that 10 per cent of Norwegians aged 40-44 are still grandchildren. The oldest grandchild found in the OASIS study was a woman of 55.

*Multi-generational structures*

A growing number of individuals will spend part of the life course in structures with four or more generations. Decades of life vary in their intergenerational complexity. There are also within and across-societal variability in multigenerational structures. SHARE found that 25 per cent of respondents aged 50-60 in Austria, Denmark, France and Sweden were in four-generation structures (Kohli, Künemund and Lüdicke, 2005). For the Netherlands, SHARE reports a figure of 13 per cent. A similar finding emerges from an ongoing large-scale study of Dutch kinship patterns, the Netherlands Kinship Panel Study

**Figure 2. Proportion of adults with living grandparents by age group, selected countries**
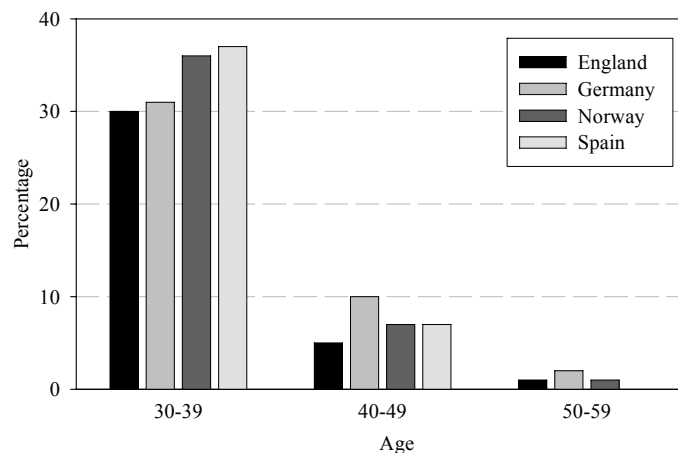


*Source*: OASIS.
NOTE: Urban areas only.

(NKPS) (Dykstra and Komter, 2004), in which 12 per cent of respondents in their fifties reported being part of four-generation structures.

The OASIS study shows that nearly one in five Norwegian grandparents aged 50-59 has an own parent still living (figure 3). This situation is least common in Spain, with 7 per cent. Because they become parents relatively earlier, women are more likely than men to find themselves in this type of generational constellation. In the NorLAG sample, 28 per cent of grandmothers in their fifties have living parents.

Clearly, the timing of births and deaths in family lineages determines the emergence of multi-generational structures. In a comparison of the Netherlands and Hungary, Knipscheer and others (2000) found that among individuals aged 70 and over, more Hungarians were great-grandparents. This contrast reflects clear differences in the timing of first births. Earlier start of parenthood produces "accelerated generational turn-over" in Hungary. SHARE finds that 40-50 per cent of respondents over 80 in most of the study's continental and Northern European countries are members of four-generation families. In Austria, Switzerland and the Mediterranean countries, the figures are 20-30 per cent (Kohli, Künemund and Lüdicke, 2005).
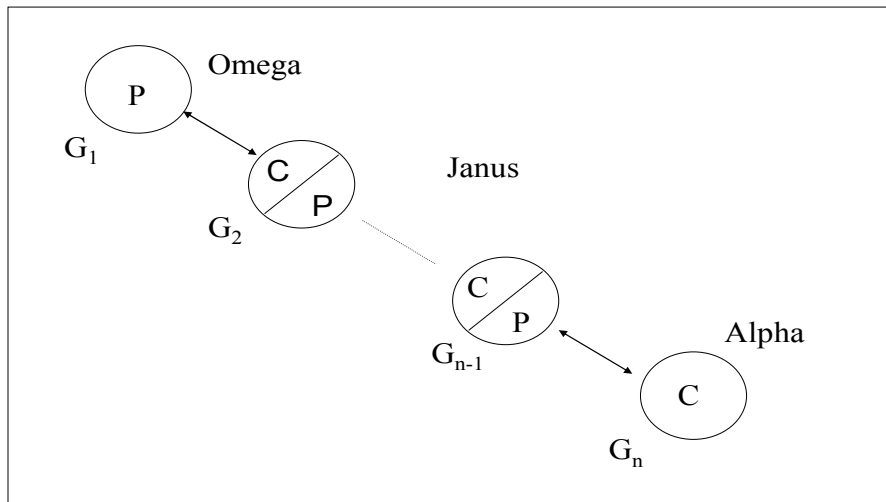
*Janus generations*

The critical nexus in intergenerational webs is the parent-child tie, both in individuals' sense of responsibility and obligation and in the actual flow of help (Rossi and Rossi, 1990). As we have seen, for several decades of adulthood, individuals occupy *Janus generations*, defined as being simultaneously parents and children (figure 4). Individuals in an *Omega* generation have no generations above them; those in the *Alpha* position have no generations below them (Hagestad, 1984).

**Figure 3. Proportion of adults with grandchildren and living parents, by age group, selected countries**
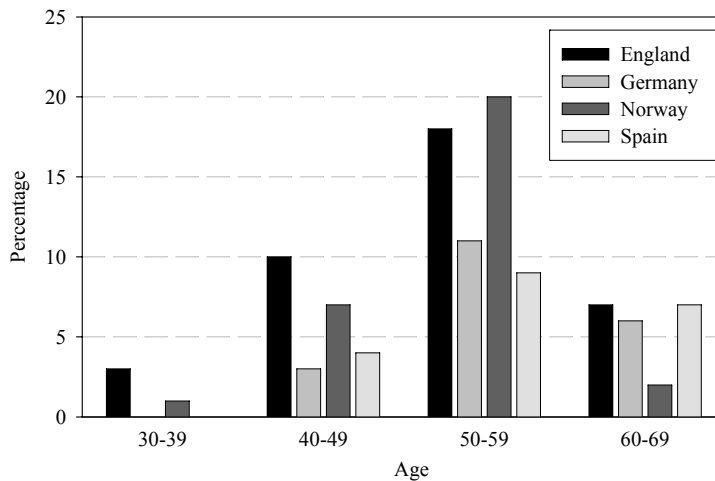


*Source*: OASIS.
NOTE: Urban areas only.

**Figure 4. Multigenerational model of parent-child relations**



When multiple parent-child links are considered, there is typically a pessimistic tone. Much has been written about the stresses and strains of being in Janus generations. Headlines about "sandwich generations", "women in the middle" and "generational squeezes" are common (Soldo, 1996) and there are even websites devoted to the topic (e.g., www.empub.com/sandwichgen.shtml). There is often an assumption of a zero-sum phenomenon: what is given to one generation is taken from another. Such accounts are being questioned on two counts. First, data suggest that cases of coinciding responsibilities for parents and children are relatively rare. Secondly, there is little evidence that intergenerational support is a zero-sum phenomenon. In an overview of 12 European Union countries, Dykstra (1997) found that overall, only 4 per cent of men and 10 per cent of women had overlapping responsibilities for young children and old parents who required care. In general, by the time parents are frail and need help, children have grownup. Agree, Bissett and Rendall (2003) report that among British women aged 50-54– the peak ages for providing care to frail parents – only 2 per cent of those who took care of a parent were still living with a child under 18. If competing needs arise, it is more likely to be between grandchildren and parents. Results presented at a symposium at the annual meeting of the Gerontological Society of America in 2004 showed remarkable convergence in findings from four countries. Specifically, when individuals are faced with both younger and older generations needing care, they give to both. In other words, there is no indication of a zero-sum phenomenon. Grundy and Henretta (2004) found that Janus-generation individuals both in the United Kingdom and the United States give up and down, to parents and to adult children. There was no indication of inverse relationships between giving to the young and giving to the old. They conclude that some families are "high exchangers" across several intergenerational links, so that those who provide help "up" also give "down". However, in further analyses of the data, these authors report that among Janus-generation members with three or more children, there was a reduced likelihood of providing help to parents. Hagestad and Oppelaar (2004) reported that grandparents with own parents still living appear to provide the same amount of help, if not more, to children and grandchildren compared to grandparents in three-generation structures. The same

**Figure 5. Percentage of persons aged 50-69 looking after grandchildren,
by family structure, selected countries**
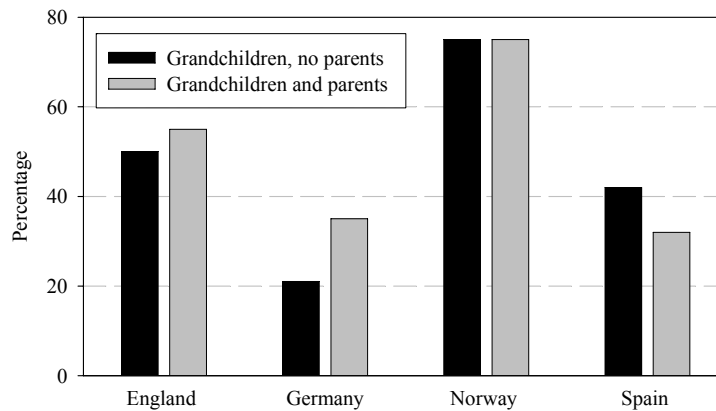


*Source*: OASIS.
NOTE: Urban areas only

trend was found in the OASIS study (figure 5). However, an interesting finding emerged in the OASIS data: Spanish grandparents with living parents were less involved in caring for grandchildren than their counterparts in three-generation structures. SHARE data provide some indication on why this is the case. In all ten countries, 40-60 per cent of grandparents reported taking care of grandchildren during the last year (Attias-Donfut, Ogg and Wolff, 2005a). However, a very different story emerged when such childcare was regular every week. Grandmothers in Italy and Greece were more than twice as likely (80 per cent) to be involved compared to their counterparts in Scandinavia (30 per cent). The authors note that while only 10 per cent of Italian and Greek grandmothers are gainfully employed, the corresponding figure in Scandinavia is over 50 per cent.

## C. CONTRASTING CONTEXTS: CULTURE AND SOCIAL POLICY

### *Views on lines of demarcation*

Discussions of intergenerational transfers often draw contrasts between European societies with nuclear family patterns and a cultural emphasis on individual choice and those that place a greater emphasis on family cohesion and extended ties (Billari, 2005; Höllinger and Haller, 1990). Such distinctions are reflected in an edited volume titled *Europe: One continent, different worlds* (De Beer and Van Wissen, 1999). Reher (1998) sees north-south contrasts as paramount, suggesting that Southern Europe has "strong" families, emphasizing extended, vertical kin ties, while Northern Europe has "weak" families with an emphasis on independent individuals and small units. He traces the contrasts back to the late Roman Empire, suggesting that Southern Europe reflects early Muslim influence. Many of the demarcation lines briefly outlined above can also be found in ongoing discussions of individualism and collectivism, as reflected in the literature on the second demographic transition (Lesthaeghe, 1983; van de Kaa, 1994). Modern living arrangements indeed show a north-south divide.

Four decades ago, Rosenmayr and Köckeis (1963) called for an awareness of "intimacy at a distance*"*, i.e. generations that live in close proximity, but not in the same household. SHARE allows us to examine proportions of older parents who have at least one child within a distance of one kilometer, and to see how many have a child in the same building (but not necessarily in a shared household). Table 4 shows these distributions across the 10 societies. As seen in the table, intimacy has quite a distance in Scandinavia and the Netherlands, while the Mediterranean countries and Austria are characterized by

close proximity and shared living quarters. Similar contrasts are found in the United Nations report on living arrangements of older persons (United Nations, 2005). While 40 per cent or more of people over the age of 65 live alone in Denmark, the Netherlands and Sweden, only 17 per cent of people of the same age do so in Spain. Greece and Italy have 22 and 26 per cent, respectively, who reside in one-person households.

A number of authors have argued that when we seek to account for observed national differences in family patterns and living arrangements of older people, we need to look beyond cultural differences. The factor that has been given the most attention in such discussions is social policy. Central in the ongoing debate about policy contrasts is the work by Gösta Esping-Andersen (1990 and 1997), who identified three welfare-state regimes: (i) the social democratic (e.g., the Nordic countries), (ii) the conservative (e.g., Germany), and (iii) the liberal (e.g., the United States). The social democratic model is built on universalistic principles and ensures a range of care and services for the old and the young. Thus, citizens are less dependent on the family than is the case in the more familistic conservative regime. In the latter model, social rights are based on employment and not on citizenship, in contrast to the social democratic welfare states. Societies within the conservative model provide generous public transfers, especially through pensions, but few services. The liberal model is individualistic and market-oriented. In such states, public transfers and services are given only to the very needy. In a later publication, Esping-Andersen (1999) discusses the different regimes in terms of what he calls "familialism" and "de-familialization". Some countries have familistic social policies (Daatland, 2001), defining care as a private, mostly female concern. In social democracies, much of the care for young and old has been defined as a responsibility of the State, including long-term care. One goal of social policies in this regime has been to maximize women's economic independence by freeing them from heavy care obligations. In societies with conservative regimes, on the other hand, social policies directed at the family are often poor or undeveloped, and the family has to carry the major responsibility for the welfare of its members. In some of these societies, such as Italy, financial transfers in the form of pensions constitute the main public support of older family members. Some critics of Esping-Andersen's model have called for a fourth regime, a southern or Mediterranean one (Leibfried, 1992; Ferrera, 1996). This

TABLE 4. PERCENTAGE WITH AT LEAST ONE CHILD LIVING WITHIN 1 KM. DISTANCE
OR WITHIN THE SAME HOUSE , BY AGE, FOR SELECTED EUROPEAN COUNTRIES

| | Within 1 km. | | | In the same house | | |
|---|---|---|---|---|---|---|
| | Age (years) | | | Age (years) | | |
| Country | 60-69 | 70-79 | 80+ | 60-69 | 70-79 | 80+ |
| Austria | 48 | 45 | 58 | 33 | 29 | 38 |
| Denmark | 27 | 24 | 22 | 7 | 3 | 6 |
| France | 34 | 26 | 33 | 15 | 8 | 15 |
| Germany | 39 | 43 | 42 | 26 | 25 | 33 |
| Greece | 67 | 63 | 55 | 42 | 41 | 35 |
| Italy | 95 | 65 | 60 | 82 | 49 | 42 |
| Netherlands | 40 | 32 | 23 | 32 | 6 | 3 |
| Spain | 77 | 74 | 76 | 55 | 37 | 40 |
| Sweden | 21 | 24 | 25 | 6 | 3 | 3 |
| Switzerland | 38 | 38 | 31 | 22 | 21 | 21 |

Source: Börsch-Supan and others (2005), based on SHARE data.
NOTE: Same house includes same household and same building.

part of Europe is, indeed, identified as a separate type in a classification suggested by Mellens (1999). This author groups European nations into five clusters. The first, which he calls *maternalistic*, includes the five Nordic countries. Key characteristics are high labour force participation among women, high coverage of childcare facilities, and an emphasis on what he calls "female values", such as cooperation. The second cluster, labeled *pragmatic*, comprises Austria, Belgium, France, Germany, Ireland, Luxembourg, the Netherlands and the United Kingdom. In these societies, he argues, there is a strong emphasis on economic performance, but moderate efforts towards gender equity. The third cluster, which he calls *paternalistic*, is basically found around the Mediterranean and is characterized by traditional family values, fairly low labour force participation among women and few public childcare facilities. The fourth cluster, labeled *intermediate culture*, is found in central Europe: Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia. The final cluster, *the post-totalitarian*, exhibits "incomplete transition to a capitalist structure" and is exemplified by Belarus, Bulgaria, Moldova, Romania, Russia and the Ukraine.

As we have seen, contrasts between societies are particularly clear when we focus on their youngest and oldest members. All nations assign financial and care responsibilities to the parents of young children, although there are differences in the degree to which care, material provision and education are shared by the family and the State. However, it is in scholarly work and political discussions on transfers across generations of adults and the relative balance of State and family responsibility for making the life of older people secure that we find the strongest contrasts and the most heated debates.

*The substitution debate*

In familistic societies, adult children have a legal obligation to support their parents and the primary care responsibility for older persons has remained within the family. Formal family obligations are most extensive in Mediterranean countries such as Spain and Italy. In both those societies, the legal responsibility to provide support includes extended kin, while in others, the obligation is limited to parents and children, as is the case in Germany (Millar and Warman, 1996). Other societies, such as England and the Scandinavian countries, have eliminated the legal responsibility between adult family members. In these societies, higher levels of social services have been developed, including more extensive home care provision. In familistic societies, the State is much more reluctant to introduce such services (Daatland, 2001).

In what is often referred to as the *substitution thesis*, it is argued that family care involvement is low when the level of public services is high (Lingsom, 1997). This has also been referred to as the *crowding-out hypothesis* (Künemund and Rein, 1999). When services are available, families will withdraw, be substituted or crowded out. A less radical version holds that families will reduce their care responsibilities if they have the opportunity to do so, but without withdrawing completely. They may simply want to transfer some of the care work in order for their responsibilities to be in better balance with other obligations and preferences (Daatland and Herlofson, 2001). The emphasis here is on *complementarity*. Services are seen as a supplement to family care. Older recipients of care may have less feeling of burdening the family, and family caregivers may be able to combine care with other commitments (Chappell and Blandford, 1991). Another form of complementarity is *family specialization* (Lyons, Zarit and Townsend, 2000) or *the task-specific model* (Litwak, 1985). In this form of complementarity, the private and public realms are seen as providing different kinds of support because each has different qualities that cannot easily be replaced by the other. Public services can be responsible for instrumental tasks, allowing families to concentrate on domains in which they have special competence, in particular, those related to socio-emotional needs.

So far, research does not provide clear support for the substitution thesis. A Eurobarometer study from the early 1990s (Walker, 1993b) allows for some comparison between State and family as care

providers in different European Union countries. At first glance, it appears that societies with the highest level of services have the lowest level of family care. For example, among the elderly receiving regular help in Denmark and the Netherlands, 60-80 per cent reported help from social services compared to 40-60 per cent from the family. In comparison, family care was almost totally dominant in countries such as Germany and Greece, outnumbering social services by nearly ten to one (Walker, 1993b; Daatland and Herlofson, 2001). However, more recent research has shown the importance of considering combinations of public and private care.

In the OASIS study, both service rates and family help vary greatly across countries but the former varies considerably more than the latter. Forty-two per cent of urban older persons aged 75 and over in Norway received help from public services compared to 25 per cent in England, 16 per cent in Germany and only 7 per cent in Spain. Family help, on the other hand, varied from 29 per cent in Norway, 39 per cent in England, 34 per cent in Germany to 38 per cent in Spain (Daatland and Herlofson, 2003). Contrasts are even more striking when only older persons at risk of dependency (i.e., with poor physical health) are studied. Daatland and Herlofson (2003) conclude that generous welfare state services complement family care, resulting in a higher total coverage of need among the old. This is illustrated in figure 6.

Findings from the SHARE project seem to support the above-cited conclusion. Attias-Donfut, Ogg and Wolff (2005a) note that it appears to be more risky to live alone in countries with low service levels compared to countries with more generous services. Again, there is convergence with the OASIS study (Daatland and Herlofson, 2003). So far, there seems to be consensus that services do not substitute for or crowd out family care. Kohli (1999) and Künemund and Rein (1999) even argue the opposite: that mature welfare systems contribute to a process of "crowding in". Based on a comparative study of five countries −United States, Canada, Japan, United Kingdom and Germany − these authors conclude that welfare-state expansion increases rather than undermines family support and solidarity.

Cross-sectional data make it possible to compare countries that currently have different degrees of welfare state involvement, but they do not say anything about development over time. In a given country, does family care tend to decline when service levels increase, or does family care increase when service levels decline? The SHARE study has a longitudinal design but only the first wave has been completed.

**Figure 6. Percentage of persons aged 75 or over with poor physical health who received support, by source of support, selected countries**
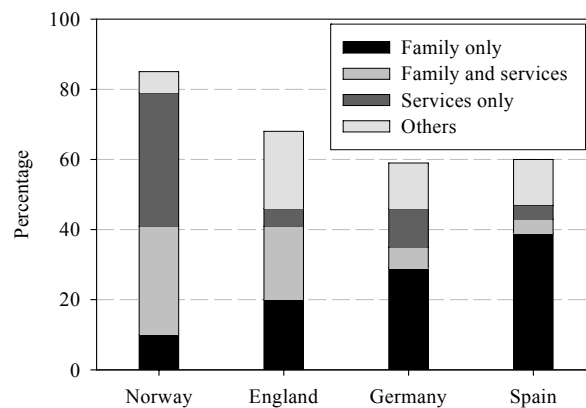


*Source*: OASIS.
NOTE: Urban areas only.

Lingsom (1997) studied Norway over time. Like the other Scandinavian countries, Norway is an interesting case because services were introduced early and have moved farther into traditional family territory than in most other welfare states. In Norway, homemaker and home care services were introduced in the 1950s. Services expanded greatly during the 1960s and 1970s, levelled off during the 1980s, and declined moderately in the 1990s. Family care, on the other hand, remained remarkably stable over the whole period when service expanded and when service levels declined. In line with the "crowding in" argument, Lingsom (1997) concludes that older parents with help from home services received more help from their adult children than parents without such services, even after controlling for need and the availability of filial care.

*Issues of segregation/integration*

The previous section examined recent work on the role of the State and family in providing care for old people. A different literature addresses care for children. Indeed, scholarly work on State and family has emerged within quite separate research communities, with one emphasizing families with young children and the other focusing on older persons and adult offspring. Policy discussions reflect a similar demarcation. It is interesting to note that "family policy" usually refers to young families. A recent overview, which examines developments since the United Nations/ECE 1993 European Population Conference and the 1994 Cairo International Conference on Population and Development Programme of Action (Gauthier, 2005) hardly mentions old people. In this literature, much of the discussion is carried out under the heading of "work-family interface". Writing on adult generations of parents and children carries headings such as "ageing policies", "long-term care policies" or "caregiver burden". In much of the deliberation surrounding the Madrid International Plan of Action on Ageing, children and young people were left out. This state of affairs is unfortunate because it neglects the fact that in today's ageing societies, adults typically spend decades when they are both parents and children, as was discussed above. Members of the middle generation relate "up" as children to old parents, and "down" as parents and often also, as grandparents. Both in research and policy, we are "chopping up" long, interconnected chains.

The separation of young and old families in research and policy partly reflects institutional age segregation which, in turn, is related to modern life-course organization. In the life course, rights, duties and typical activities are tied to an individual's age, and life is divided into three main parts (Kohli, 1986). The first part is devoted to preparation, i.e. education; the second, to family building and work; the third, to retirement and leisure. Recently, Hagestad and Uhlenberg (2005) have argued that this segmentation of individual life trajectories leads to institutional, spatial and cultural separation of persons who are in different phases of the life course. Thus, the organization of the modern life course often leads to age segregation. This might be the most pronounced in welfare states in which the care of the very young and the very old have become a public responsibility.

Institutional age segregation occurs when the principles and norms that define a social institution include chronological age as an eligibility criterion for participation. Age is embedded in the way that social welfare policies and programmes are formulated and implemented. Concerns related to the old typically fall under a greater diversity of government programmes and offices than do matters related to children and youth. As mentioned above, this also seems to apply to United Nations deliberations and publications. The central place of age in social institutions and organizations also fosters spatial and cultural separation.

Spatial segregation by age occurs when individuals of different ages do not occupy the same space and hence cannot engage in face-to-face interaction. An extreme version of spatial age segregation occurs in intentionally age-homogenous housing, such as nursing homes, assisted living facilities, retirement homes and retirement communities. Several publications use strong spatial metaphors to describe

divisions based on age. In at least three books, old age is discussed as a separate country (Hendriks, 1980; Pipher, 1999; Smith, 1995).

Institutional and spatial separation by age is reflected and reproduced in cultural contrasts. A central factor in such differences is language, which draws distinctions between age categories and marks differences in lifestyles. Of course, many cultural contrasts reflect the fact that when we separate by age, we also separate by cohort, i.e. individuals anchored in distinct historical periods.

Recently, segregation has been linked to what some developmental psychologists call *generativity*, defined as "the adult's concern for and commitment to the next generation, as expressed through parenting, teaching, mentoring, leadership, and a host of other activities that leave a positive legacy of the self for the future" (de St. Aubin, Mc Adams and Kim, 2004, p. 4). The work just cited is part of a volume based on a United States-Japan collaboration, emphasizing *societal generativity*. Peterson (2004) urges a public discussion of generative responsibilities across generational lines and reminds the reader that children depend on adults to ensure advantages in the political arena, such as quality education and safe neighborhoods: "a generative person recognizes that humans are embedded in intergenerational communities" (p. 207). One could ask whether older adults who have family ties to younger generations invest more in communities and in institutions serving the young than is the case for individuals without descendants.

The family realm appears to be qualitatively different from other social arenas in providing cross-age relationships. The family is central in counteracting the effects of societal age segregation (Uhlenberg, 2000). However, significant proportions of both young and old lack intergenerational ties. Given recent trends in fertility, concerns are warranted. A number of societies report increased rates of childlessness in cohorts born during the 1960s. In the United Kingdom, the rate is 21 per cent; in the Netherlands, 18 per cent; and in Italy, 15 per cent (Billari, 2005). Rates of childlessness among the middle-aged are higher among men in a number of countries, often more than 25 per cent. In Norway, the rate is 26 per cent among men currently in their early forties. If we also consider the proportion of fathers who have infrequent or no contact with their children because of divorce and fertility outside stable partnerships, the figure is significantly higher.

Discussing a recent historical decrease in men's involvement with children, Eggebeen and Uhlenberg (1985) express concern that this will reduce men's investment in local communities. Findings from NorLAG suggest that their concern is warranted. Respondents completed questionnaires that included two items that could be seen as indicators of societal generativity, namely: (i) participating in volunteer work, and (ii) wanting more funding for daycare. Individuals with no ties "down" are the least likely to participate in volunteer work, while grandparents participate the most. The trend holds across age/sex categories, but is significant only for men in their 60s. Similar contrasts were found in the support of funding for daycare.

Older individuals with no direct vertical ties to younger generations are neglected in research on family structure and transfers. Indeed, for many societies, rates of childlessness among men are not available. An illustration is the current United Nations report on living arrangements (United Nations, 2005). However, men with no descendants seem to be a group at risk across policy contexts. In familistic societies, they may not receive adequate care. In social democratic contexts, they may represent high expenditure for public services and limited integration in communities and civil society.

The available support and care for older persons with no direct intergenerational ties would be one central item on a rather long list of unexplored issues. Some of these issues are highlighted in the next section.

Trying to paint a picture of intergenerational relations in today's Europe is a monumental task.  In this paper, an attempt has been made to sketch current demographic, cultural and policy contexts and how they might shape the flow of resources across generations.  The discussions in this paper left a number of unanswered questions such as the following:

*What is the interplay of public and private financial transfers?*

To what extent, and under what conditions, does the family serve a redistributive function in the total flow of intergenerational transfers?  Kohli (2005), who speaks of *transfer regimes*, argues that "material transfers are not only an important part of the intergenerational linkages in the family; they are also the most appropriate field for studying how the family and the welfare state interact" (Kohli, 1999, p. 84).  Based on data from the German Ageing Survey, he concludes that part of the public transfers from the employed to older persons is channeled back to younger individuals through family transfers. Kohli argues that such transfers strengthen intergenerational ties, thus enhancing social embeddedness. Consequently, they have a stronger welfare effect than if they were paid directly from the State. The distributional effects of intergenerational transfers, i.e., their relationship to patterns of inequality, would benefit from interdisciplinary examination (Arrondel and Masson, 2001).  So far, sociological research seems to indicate that inter-vivos transfers increase inequalities within family generations, but may reduce cohort inequalities. On the other hand, bequests typically are divided equally among members of family generations, but increase cohort differences (Attias-Donfut and Wolff, 2000; Attias-Donfut, Ogg and Wolff, 2005b; Kohli, 2005).  This aspect urgently warrants dialogue and collaboration among economists, sociologists and family researchers.

*How are family intergenerational transfers shaped by different income- and wealth distributions across age groups, generations and cohorts?*

As discussed above, demographic change has produced increased "top-heaviness" in families as well as society at large.

Much of the conventional wisdom rests on the view that the oldest generations are the most affluent. What happens when this is not the case?  In a discussion of the former German Democratic Republic (GDR) and Federal Republic of Germany (FRG), Kohli (2005) shows that in the mid-1990s, the group aged 75-85 years had the lowest income in the FRG and the highest in the GDR. On the other hand, mid-life individuals in the former GDR were the losers in the reunification period.   This generational constellation shows up in data on intergenerational transfers. In the former GDR, adult children in their forties and fifties accounted for a significantly higher proportion of those who received transfers than was the case in the former FRG.   Unfortunately, longitudinal comparisons of transfers before and after reunification are not possible.   Kohli cites research in Hungary (Harcsa, 1996) showing that the proportion of households receiving economic support from parents decreased markedly between 1984 and 1995.   One of the many factors that need to be considered in examining intergenerational income distributions and transfer rates is altered morbidity and mortality patterns.  For example, Hungary was one of the countries where gender differences in mortality increased significantly following the transition (Nolte, McGee and Gilmore, 2005).   To our knowledge, sex ratios have not been considered in discussions of intergenerational transfers.

*How are flows of non-material, in-kind and symbolic transfers affected by the watersheds in countries in transition? Are generations able to build shared understanding and solidarity across watershed lines?*

For this paper, an attempt was made to find recent data on countries in transition, but relatively little was found. There are a few thought-provoking papers by demographers (e.g., Nolte, Mc Kee and Gilmore, 2005; Philipov and Dorbritz, 2003), but very few discussions have presented a more micro view of family units, particularly on patterns of cohesion and exchange across generational lines. Clearly, Eastern and Central Europe constitute compelling "laboratories" for studying the complex interplay of culture, demographic structures, and social policy in shaping intergenerational transfer regimes on macro- and micro-levels of social reality.

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NOTES

[1] The Survey of Health, Ageing and Retirement in Europe (SHARE) is a multidisciplinary, cross-national database on health, socio-economic status and social networks of some 22,000 continental European individuals over the age of 50. The study is coordinated at the Mannheim Research Institute for the Economics of Ageing. It has incorporated many of the issues and questions utilized in the United States Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA). In addition, the SHARE database includes variables and indicators created by the AMANDA RTD-project under the European Union's 5th framework programme. Data collection was carried out through CAPI (Computer-assisted personal interview). http://www.share-project.org

[2] NorLAG, the Norwegian study of life course, ageing and generation is designed as a longitudinal study. Baseline data collection was carried out in 2002-2003. A stratified sample of the population aged 40 or over was drawn from 30 local communities in four different regions of the country. Data collection was carried out by Statistics Norway through telephone interviews, postal questionnaires, and national registries. Total sample size was 5,600. Both authors are members of the research team.
http://www.nova.no/subnet/lag/index.htm

[3] OASIS (Old Age and Autonomy: The Role of Service Systems and Intergenerational Family Solidarity) data are from a cross-sectional survey that was carried out in Norway, England, Germany, Spain and Israel in 2000-2001. The representative age-stratified sample includes 6,106 community-dwelling individuals aged 25 or over who were living in urban areas with a population of 100,000 or more. In each of the five countries, structured interviews were conducted with approximately 1,200 people (400 aged 75 or over; 800 aged 25-74 ). Since the present article addresses European countries, data from Israel are not included here. The second author was a member of the research team. http://oasis.haifa.ac.il

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# INTERGENERATIONAL TRANSFERS AND SOCIAL PROTECTION
# IN LATIN AMERICA

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This paper examines the available evidence on intergenerational transfers in Latin America, their social and economic importance in different national contexts, their effects on distributional outcomes and on the medium and long-term financial sustainability of social protection systems. In this review, it used as a guide the concept employed by Lee (2003) and Mason and others (2005), according to which intergenerational transfers refer to the reallocation of economic resources among members of different ages, without an explicit *quid pro quo*. These transfers differ from other inter-temporal or intergenerational reallocations, such as investment in assets and credit operations in that the latter involve changes in the capital stock of the economy, transactions of land and property, or borrowing and lending, which are in any case governed by explicit or contractual obligations.[1]

Intergenerational transfers are important because in all types of societies they help to smooth out consumption over the life cycle and, in particular, to cover income deficits during the "dependent" ages of childhood and old age. In Latin America, they are of special relevance because transfers, both intra and intergenerational, are also key to providing basic social protection to the significant proportion of the population living in poverty or, otherwise, subject to the effects of economic fluctuations, in settings of structurally high levels of socio-economic inequality (Uthoff and others, 2005).

Despite their importance, the knowledge on intergenerational transfers in the region is relatively limited. One practical problem has been the lack of readily accessible information on income/productivity, consumption, and public and private transfers, classified by age, as well as the scarcity of primary data sources that would allow for a truly generational/inter-temporal examination of these age schedules over extended periods of time. This is a real limitation in most countries, although there are several sources already available that could be usefully exploited to advance the knowledge in this area.

Another factor may be that national governments have had to deal with many acute and pressing short-term macroeconomic problems such as recession, unemployment, external adjustment, and difficulties in the management of national debt, which, in certain countries and periods of time, have indeed been quite serious. In this context, concerns over the intergenerational redistribution of income have, in general, received low priority in discussions of what are perceived to be the most urgent public policy issues. However, this is not a sound justification for neglecting the issue of intergenerational transfers. The intergenerational, inter-temporal analysis of transfers can be very useful, for example, for advance detection of disequilibria implicit in the combination of population trends and the continuation of current programmes or policies. They can thus help to identify policy options that can contribute to avoiding future crises. Also, the capacity of familial or inter-household transfers to compensate for the changes in public spending for social protection is key in determining the final effects that the economic cycles and governmental policies have on the well-being of the population.

Finally, and at least as important, the relative scarcity of information and analysis of intergenerational transfers is probably related to the fact that, until relatively recent times, there was no comprehensive, systematic theoretical basis nor standardized accounting principles to analyse the ensemble of intergenerational transfers. In fact, the study of these questions in the region has been for the most part fragmentary and, with a few exceptions, not comparable across countries. In this regard, the theoretical and accounting frameworks of Auerbach, Gokhale and Kotlikoff (1991) and Auerbach, Kotlikoff and

Leibfritz (1999) for the analysis of equity and sustainability of fiscal policies and the framework of Mason and others (2005) for the analysis of all types of transfers are very helpful.

Before proceeding to the discussion of the different types of transfers, figure 1 illustrates the size, broad shape and net direction of inter-age reallocations in Chile, Mexico and El Salvador. Note that the consumption curves depicted here refers to private consumption only and are therefore not strictly comparable to those of Mason and others (2005), Turra (2005) or others that include also the consumption of publicly provided goods and services.

Preliminary estimates of the total amount of intergenerational transfers in these countries[2] suggest that they are indeed substantial as they represent between 36 per cent and 42 per cent of the total labour income and between 30 per cent and 39 per cent of aggregate consumption. In all cases, there are sizeable income-consumption deficits for young dependents and lesser overall deficits for older dependents, both of which are financed with reallocations coming mainly from the surplus of income over consumption of the working-age population. The relatively greater volume of transfers toward younger dependents is to be expected in countries with relatively young age distributions and not highly developed welfare systems for the elderly.
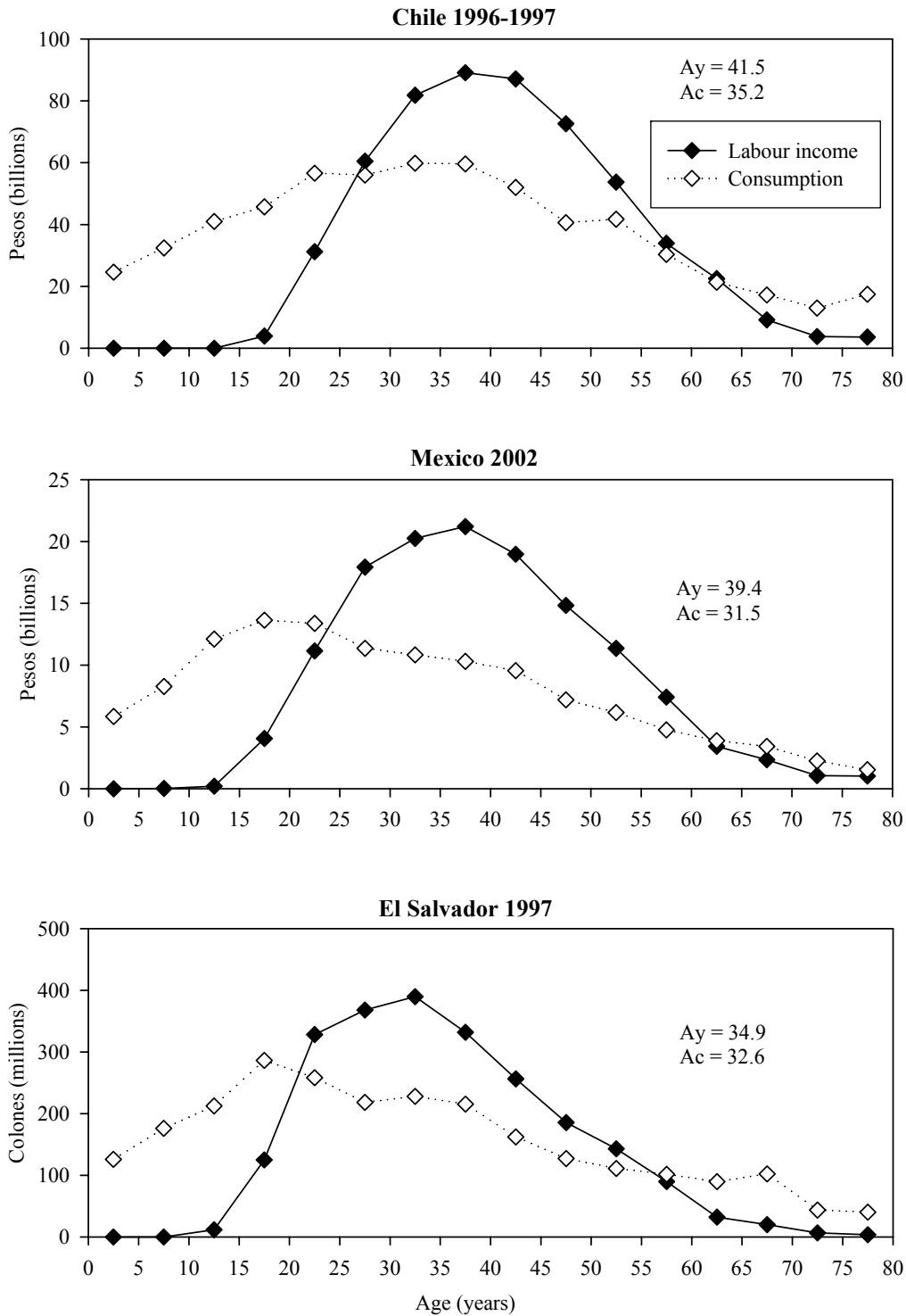
There are some significant differences across countries. Chile has a higher average consumption age than Mexico and El Salvador, which is due mainly to Chile's older population. The lower average age of labour income in El Salvador, in comparison with Mexico and even more so in relation to Chile, is due to El Salvador's younger population and the significantly higher income of older adults in Chile than in Mexico and El Salvador. The graph shows that the age at which net consumers become net producers is highest in Chile, somewhat lower in Mexico, and lowest in El Salvador -  a pattern directly proportional to the degree of ageing of their respective populations. In the same vein, the younger the population age distribution, the earlier the age at which older adults become net consumers. Irrespective of these differences, however, there is a clear aggregate net "descending" average pattern of reallocations,[3] from older to younger ages, a common situation in less industrialized settings (Lee, 2003; figure 2).

How much of the transfers are channelled through the State, what proportion of them are familial/private, and what distributional effects do they have? These are the questions addressed in the following sections on the basis of the available evidence for Latin American countries.

A. DISTRIBUTIVE EFFECTS AND SUSTAINABILITY OF PUBLIC SPENDING
AND TRANSFER PROGRAMMES

There is an increasing recognition by fiscal analysts and policymakers of the usefulness of taking into account the age-specificity of public spending and transfers, as a complement to the traditional analyses of incidence of fiscal policy by income levels, and to the traditional budget assessments and projections based on aggregate deficit and public debt indicators. An important reason for this is that the traditional budget measures become less appropriate for assessing the sustainability of current policies, in the context of rapid population ageing and a sharper focus of government policy on social programmes that are age-related (Gokhale and Smetters, 2004). In fact, a number of industrialized countries, concerned by the effects of their ageing populations on government spending for pensions, health, long-term care and education, have been explicitly incorporating the generational dimension of public budgets for some time now. These analyses have made it possible to evaluate alternative inter-temporal finance strategies for these sectors and for public spending as a whole.  Recent studies along these lines include those of Heller and Hauner (2005), Comley and McKissack (2005), and Gokhale (2005).

**Figure I. Private consumption and labour income by age, Chile, Mexico and El Salvador**



Chile 1996-1997

Ay = 41.5
Ac = 35.2

Labour income
Consumption

Mexico 2002

Ay = 39.4
Ac = 31.5

El Salvador 1997

Ay = 34.9
Ac = 32.6

Age (years)

*Sources*: Encuesta de Presupuestos Familiares 1996/97, INE (Chile); Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2002 (México); Encuesta de Hogares de Propósitos Múltiples 1997 (El Salvador).
NOTE: Ay = Average age of labour income; Ac = Average age of consumption.

**Figure 2. Incidence of poverty by age group excluding and including transfers, Chile, Mexico and El Salvador**



**Chile 2000**



**Mexico 2002**
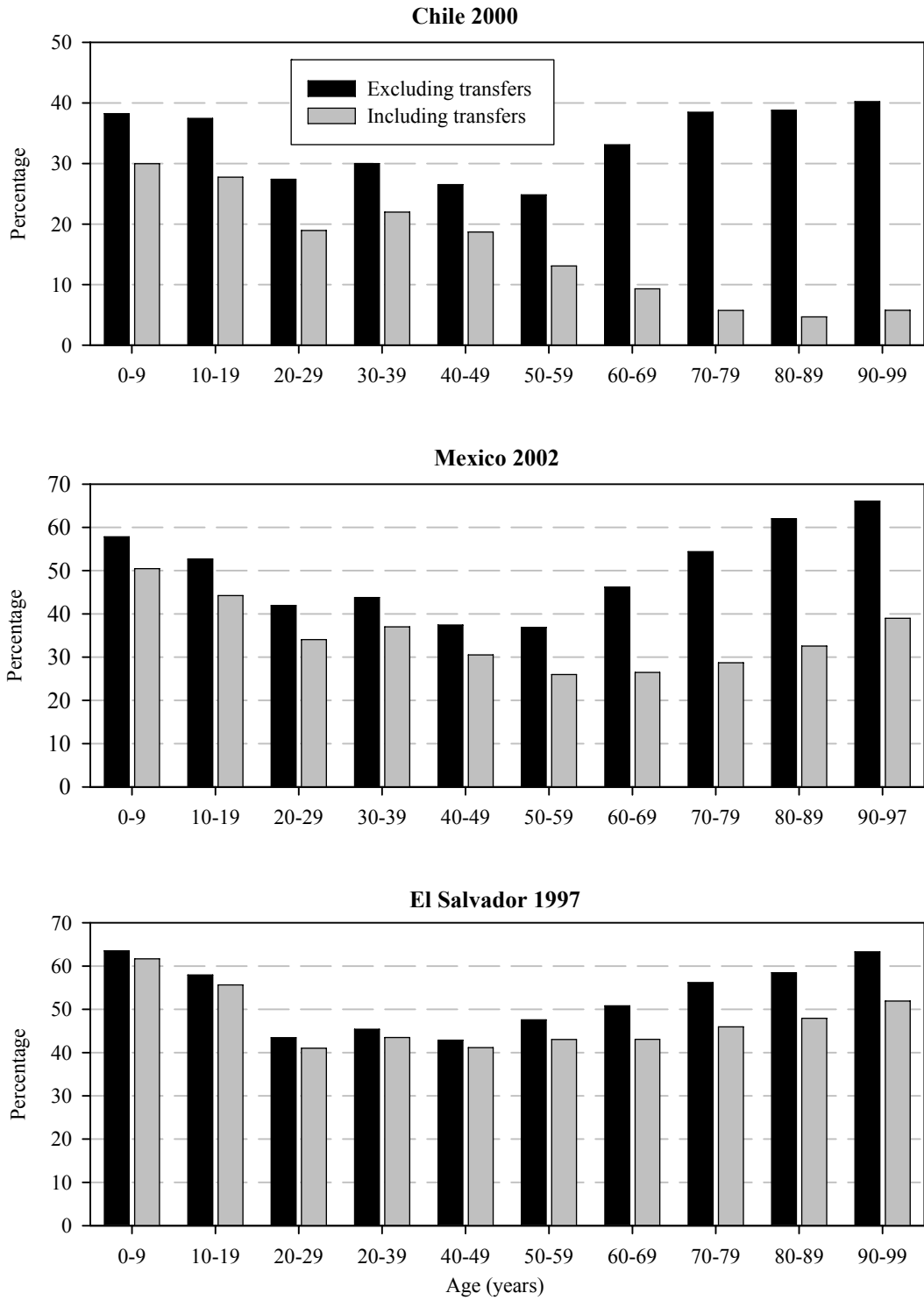


**El Salvador 1997**

*Sources*: CASEN 2000 (Chile); Encuesta Nacional de Gastos e Ingresos de los Hogares (ENIGH) 2002 (México); Encuesta de Hogares de Propósitos Múltiples 1997 (El Salvador).

A few countries in Latin America have undertaken analyses of the distributive effects of taxes and public spending that correlate with age, such as education, social security and some health programmes, with varying degrees of specificity. Arenas and Guzmán (2003) and Arenas (2005), analysed some broad distributional effects of public social spending and the countercyclical nature of the country's "fiscal surplus" policy[4] in the case of Chile. Government transfers have been concentrated in children's education and nutritional programmes, and health and social security for retirees as well as assistance for the elderly poor. As for their distributional impact, the evidence suggests that over the last decade, fiscal policy and especially social spending, has had a substantial positive effect on the reduction of poverty from 38.6 per cent in 1990 to 20.6 per cent in 2000. Public policy has also, in good part, compensated for the effects of the short-term economic cycles, thanks to the fiscal surplus rule in place, which has also made a key contribution to the medium- and long-term financial sustainability of the overall budget and, in particular, of social programmes.

In a different setting, Paes de Barro and Carvalho (2003) showed that social spending in Brazil has not been very effective in improving income distribution or poverty levels between 1981 and 2001.[5] According to the authors, there are several factors that explain this situation, the most important of which is the lack of distributive focus of social programmes. They report that in two cases  one, a childcare programme aimed at poor children aged 0-6 years and another, for children and teenagers aged between 6 and 15 from poor families (Bolsa Escola) - the distribution of resources among states does not correlate well with the target population in those age groups. More recently, the Government of Brazil has launched a new programme, *Bolsa Família*, that unifies a number of previous transfer programmes aimed at poor families and intends to improve efficacy in producing a more progressive (that is, inequality-reducing) incidence of social spending (Brazil, 2005).

The authors also warned about the generational distribution of resources for social public spending, again, from a poverty-reduction perspective. "Compensatory" transfer programmes have been found to be much more beneficial for the elderly than for children (Paes de Barros and Carvalho, 2003), with the result that, after transfers, child poverty rates are more than triple those of the elderly. Turra and Queiroz (2005) arrived at a similar general conclusion on the differential age incidence of transfers through an in-depth examination of 1996 data.

Mexico provides another interesting example, since it was one of the few Latin American countries that reduced inequality and poverty levels between 1999 and 2002. A detailed study of the distributive effects of different types of taxes and expenditures in 2002 (Mexico, 2004)[6] found that transfers, both from the Government and from other households, helped to reduce inequality (as measured by the Gini coefficient[7]) by 3 percentage points when assessed with total household income, or by 1 percentage point with income per capita. Much of public spending in Mexico on education, pensions, electricity subsidies and transfers from programmes such as *Progresa/Oportunidades* and *Procampo*, are targeted at specific age groups. The most progressive programmes are pre-school and primary school education programmes, health programmes for the entire population, and *Oportunidades*, a (conditional) cash-transfer programme for poor families. On the other hand, spending on state pensions (ISSTE and IMSS) and institutional/formal health plans are assessed to be quite regressive. In spite of the latter, when the ensemble of taxes paid is compared to the total benefits and cash transfers received from the Government, the net redistributive impact of fiscal policy is found to be progressive.

Perhaps, the study that has most clearly considered social spending by age groups is that carried out for Costa Rica (Trejos, 2005; see also Estado de la Nación, 2004), which examines changes in the distribution of fiscal spending during the 1990s according to income quintiles and regional, generational and gender variables[8]. The study shows that, between 1990 and 2002, "social public investment" increased in real terms and improved the (after-transfer) income distribution, especially in programmes aimed at teenagers (12-17 years of age) and the over-50 population. However, in per capita terms, it is

children under-12 years of age and the elderly that benefited the most from increased spending. These effects came hand in hand with the greater increase in spending on basic education and especially on social security, the sector found to be the most regressive of all the programmes studied. Thus, despite the overall increase in social spending (referred to in the paper as "social investment"), there is concern over the restrictions imposed on spending in other sectors, particularly in higher education. In fact, spending on higher education has decreased in real absolute and relative terms over the period analysed, a trend that, if continued, could well damage the present and future competitiveness of the Costa Rican economy.

The studies reviewed in the foregoing constitute good advances towards a more systematic and integral examination of intra- and intergenerational distributional incidence of taxes and public spending, although the data, definitions and methods used vary from one country to the other and, therefore, the results are not easily comparable. A more consistent examination of these issues is possible using "generational accounting", an analytical approach specifically designed for this purpose, to which the discussion turns next.

### B. Generational accounting in Latin American countries

Generational accounts measure, in present value, the taxes paid over a cohort's lifetime net of benefits received from the public sector. They show whether the continuation of current policies is financed in an intergenerationally fair manner or it imply passing a net cost to future generations. Generational accounting is thus the flip side of the inter-temporal fiscal balance and serves to evaluate the sustainability of current policies and their projection into the future.

This approach seems to be particularly appropriate for analysing social protection systems and policies because it explicitly considers the associated intergenerational transfers, the present and future solvency of the fiscal systems as they are affected by demographic ageing, and the final consequences on the population groups that the programmes seek to protect.

Of course, small differences in the generational accounts in one direction or another should not be a cause for alarm, especially when a political consensus can be achieved by current generations to take responsibility for the inter-temporal financing of current policies. It is well-known that the estimates of generational accounts, as defined above, are sensitive to several assumptions in the accounting framework (Auerbach, Kotlikoff and Leibfritz, 1999; Haveman, 1994; Bonnet, 2002). Some examples are assumptions regarding the discount rate to convert future flows into present values and the classification of some items of public spending as transfers rather than governmental consumption or investment (especially in the areas of health and education). It would, therefore, be inappropriate to attach great significance to small differences in the value of generational accounts in any given country or to differences between countries at a given moment in time. However, there would be a legitimate cause for concern and intervention, if the net sum of lifetime taxes, transfers and government expenditure (the generational balance) imposed disproportionate net tax burdens for some groups in comparison to others or if they implied a large absolute burden for one or more generations.

In Latin America, a literature search for this paper found studies on generational accounts for Argentina, Brazil and Mexico[9]. In the study of Argentina, Altamiranda (1999) evaluated the sustainability of fiscal policy and the "convertibility plan", implemented during the first half of the 1990s, which included a privatization programme and the beginning of pension system reform. The author estimated that the privatization programme, which generated fiscal income of US$18.7 billion between 1990 and 1994, had nonetheless a negative impact on net national wealth of US$9.9 billion (equivalent to 3.5 per cent of GDP in 1994). Moreover, the privatizations increased intergenerational imbalances (defined as higher net taxes to be paid by future generations in comparison with those alive today) by 2 per cent to 10 per cent, according to the assumptions made, added on to base imbalances of 70 per cent to 124 per cent.

The introduction of social security reform produced a generational imbalance equivalent to a permanent reduction of pensions of between 33 per cent and 48 per cent. Also, given that almost 60 per cent of private pension funds had been invested in state bonds (circa 1995), that particular form of investment of pension fund assets had little effect on government inter-temporal balance. This is because although the net present value of taxes decreased, the national debt stock rose[10], meaning that there was a change in composition rather than in the level of the inter-temporal budget.

Taken as a whole, the policies of the first half of the 1990s are considered by Altamiranda (1999) to be unsustainable. They imply the transfer of a net tax burden to future generations of 75 per cent to 150 per cent, which is greater than that borne by taxpayers in 1995. Thus, according to the author, what appeared to be an initially balanced and macro-economically stabilizing adjustment, evaluated on the basis of the period flows, had implicitly substantial inter-temporal and intergenerational imbalances. The ageing population is one of the factors behind this imbalance, with a weight that varies according to other assumptions in the model. A more recent study by Cetrángolo and Jiménez (2003) provides a detailed and more nuanced assessment of the fiscal policies over the last decade and a half, but it concurs with the previous analysis in identifying the insolvency of the reformed social security programme, together with a series of internal and external problems, as a key factor of the fiscal imbalance that contributed to the severe 2001-2002 economic crisis.

The analysis carried out in Brazil (Malvar, 1999) follows a methodology very much in line with that used in the Argentina study and those of other countries examined in Auerbach, Kotlikoff and Leibfritz (1999). Brazil displays an even greater imbalance in generational accounts than Argentina, as the net tax burden for future generations is estimated (in the base scenario) to be 116 per cent greater than that of taxpayers in the mid-1990s. The ageing population plays an important role (the imbalance would decrease by almost half had the demographic structure remained stable) as does the growth of the national debt, although to a much lesser degree. As in the Argentinean case, the imbalance is found to be related, for the most part, to the insolvency of the social security system, which was worsened by legislation incorporated into the 1988 Constitution. The 1988 Constitution instituted improvements in benefits and even lowered the retirement age for rural workers, without securing adequate funding for those measures.

To reinstate the inter-temporal balance in Brazil in the mid-1990s, it would have been necessary to make such drastic adjustments, such as a permanent cut in government spending of 26.2 per cent and a tax increase of 11.7 per cent (including social security contributions), or a reduction in public transfers to workers of 17.9 per cent. If no adjustments are made, the net payments of future generations will continue to grow substantially. The author highlighted the necessity and importance of correcting these imbalances, not only for intergenerational equity considerations. Since the elderly, who have disproportionately benefited from net government transfers, have a relatively high propensity to consume, the correction of the imbalance would also have a positive effect on savings and growth.

The generational accounting analysis for Mexico, carried out by Sales and Videgaray (2000) concludes that Mexican fiscal policy, as assessed in 1999-2000, did not present an inter-temporal imbalance.[11] In fact, a (positive) balance of 11 per cent was found in favour of future generations; in other words, those born after the year 2000 are projected to face a tax burden 11 per cent lower than the preceding generations. The study follows the same basic methodology as in the previously mentioned studies, with several differences. First, it is clear, as the authors state, that in Mexico the oil sector plays an important role in the results as this sector provides a very large proportion of tax revenue - more than 30 per cent - and oil production significantly affects aggregate economic growth. For this reason, the study pays special attention to this sector.

Secondly, some assumptions in the Mexico study seem less realistic than those of the studies already mentioned. In particular, the change in the Mexican demographic structure from 2030 onwards was

assimilated to that of the United States and, for pension payments, the age profile as the United States social security system was adopted.[12] Finally, spending on education was not included in the accounting, as no data were available at the time the study was made. This could also be remedied by using information that became available subsequently. In any case, as the authors note, the non-inclusion of education in the accounts biases the result downward, i.e the balance would be even more positive than reported.

In summary, different situations exist in Latin America regarding the effect of public expenditure and transfers on income distribution and generational equity. There are cases of globally progressive redistributive effects in Chile, Costa Rica and Mexico, and also cases of low distributive effectiveness, as in Brazil. There are cases of significant intergenerational imbalances in fiscal policy, which are affected by the degree and speed of population ageing and by the insolvency built in some policies and reforms concerning the pensions system (Argentina and Brazil in the 1990s). In other settings, there is evidence that the overall fiscal position and transfer programmes are intergenerationally balanced and sustainable over time (Mexico and Chile, circa 2000).

## C. PRIVATE TRANSFERS

Private transfers are important in all regions of the world. In Latin America, they are presumably important because of the significant role that family ties play in support networks and because the coverage of social protection systems in the majority of countries is far from universal. However, the studies on private transfers are much scarcer than those regarding public transfers, as there are data limitations in the majority of countries that impede a detailed and systematic analysis. Nonetheless,, the information that does exist sheds some light on the circumstances under which private transfers occur in the region and the sort of effects they have.

Some studies are of reduced geographical scale and are based on small samples of households, such as that carried out by Kaufman and Lindauer (1984) in El Salvador[13], with the objective of examining monetary transfers between households and their role in maintaining "minimum" family consumption. The study found that a third of households were receiving private transfers and that they accounted for 11 per cent of the total income of these poor households. Households headed by women were more likely to receive transfers than those headed by men (60 per cent and 25 per cent, respectively), and the amount of the transfer was inversely related to the recipient household's earned income.

The transfers appear to serve to satisfy basic needs and to alleviate poverty in recipient households, but they take place for the most part within the "extended family" context. Consequently, the observed progressive redistribution has limited scope and does not come close to substituting for the public sector redistribution needed for poverty reduction. The authors suggest that transfers may be provided for altruistic or even paternalistic motives, although they could also well be the result of a social contract aimed at reducing the risk that basic consumption needs would go unmet.

Several other studies on private transfers are based on surveys representative of large cities (Saad, 2005b), the urban population of some countries (Cox, Eser and Jiménez, 1996) or, more exceptionally, are representative at the national level (Torche and Spilerman, 2005; Wong and Espinoza, 2005), with a main focus on older adults.

Two recent studies by Saad (2005a, 2005b) stress the key role of co-residence in facilitating different types of intra-familial support and material transfers, as well as in improving the well-being of older adults in the Latin American and Caribbean countries. Also, evidence obtained for four major cities (Sao Paulo, Buenos Aires, Montevideo and Mexico City) shows that the population over age 50 is involved in reciprocal support and exchanges, with the same and different generational groups. The intense exchanges

documented point to a possibly partial compensation for insufficient public transfers to support the needs of the elderly and also hint at an important role of the older population as a source of support for other family members in contexts of adverse economic conditions.

Taking the case of Mexico, Wong and Espinoza (2005) examined the changes in transfer between persons aged 50 or over and their children (or other non-family members under the age of 50) during the period 2001-2003. They paid particular attention to individuals that switched from being donors to recipients of transfers and vice-versa in a multivariate framework. The results showed that persons over age 50 decreased their propensity to make transfers over time. Age is an important factor, which has a positive correlation with ceasing to be donors and with becoming transfer recipients. Widows and adults with many children are more likely to be recipients of transfers than other persons of the same age. As may be expected, individuals with higher incomes are less likely to be recipients and more likely to be donors, a finding consistent with those of Saad (2005b) for the four metropolitan areas mentioned above. Contrary to expectations, the individual's health status does not appear to affect the likelihood of receiving or making transfers.

Torche and Spilerman (2005) used a retrospective survey of "intergenerational financial linkages" carried out on 4,408 households in Chile in 2003 to study the extent to which the wealth of parents affects the standard of living and possession of assets of their children when they reach adulthood. The study confirmed that children's economic status has a high correlation with their parents' income when the children were young, and showed that the dominant intervening variable is the children's educational level. The authors concluded that investment in human capital (education), which positively and directly affects their level of labour income, is the main direct determinant of the children's current standard of living. They also note that the high standard of living enjoyed by some children raised in low-income families could be due, at least in part, to public education and other social programmes. This hypothesis, if confirmed through more rigorous testing at the micro level, would bear out the conclusions reached by Arenas and Guzmán (2005) at the macro level regarding the efficacy of the redistribution of government expenditure and fiscal policy.

For the second dependent variable, the ownership of assets, the results are somewhat different. The variables representing parental economic status did not appear to be significant, except for parental household wealth. When the children's characteristics are controlled for, parental wealth continues to be significant, but to a lesser degree. The authors concluded from this evidence that parents transfer wealth to their children directly in the form of physical or financial assets (as opposed to human capital formation, the main vehicle for the intergenerational transmission of the standard of living). In any case, some care would be warranted in interpreting the distinct results, as income and wealth are so closely associated that it is difficult to tell their determinants apart.

Cox, Eser and Jiménez (1996) studied transfers between parents and children in urban areas of Peru and the variables that determine them, including income, education, and some household characteristics. They also discuss whether the motives behind such transfers could be altruistic or the result of implicit contracts of inter-temporal mutual assistance. They find in all cases that the probability of receiving transfers over the life cycle is U-shaped and has an inverse relationship with life-cycle earnings (which has an inverse U-shape). This provides some direct confirmation, once again, that transfers between parents and children provide important "smoothing" of life-cycle consumption. The amount of transfers given from parents to children has a sign that changes from positive for income up to 2,900 soles, to negative marginal effects above that level. Similarly, the amount transferred by children to parents increases for income levels up to 3,700 soles and stabilizes or slightly decreases thereafter. As the authors explained, these findings do not seem consistent with altruistic motivations, which would imply an overall *negative* effect of the recipients' income on the amount of the transfer received.[14]

Interestingly, it was also found that the level of social security benefits had a negative effect on the amount of transfers from children to parents, which suggests some substitution of private transfers for those provided by the government. It was also found that ill health and unemployment increase the likelihood of receiving transfers.

In sum, the studies reviewed indicate that transfers are indeed an important means to smooth consumption over the life cycle and, in some settings (e. g., poor neighbourhoods in El Salvador), over the economic cycle as well. In general, families or individuals with lower income or that are otherwise disadvantaged are more likely to receive transfers, but the motive is not always clearly altruistic. In fact, in some cases (e. g., urban Peru), the evidence seems more consistent with an exchange motive. All the studies suggest that intergenerational support transfer is a two-way process in which every generational group includes both recipients and providers.

## D. REDISTRIBUTIVE AND POVERTY-REDUCTION EFFECT OF TRANSFERS

It was seen in the previous sections that, in general, public transfers have had an overall redistributive effect, especially in the case of education, health and cash transfer programmes that benefit primarily young children. In some cases, however, pension and other programmes for older persons were found to be regressive in the traditional sense of incidence according to income class. Private transfers, studied for the most part through small or medium-scale surveys, seem to serve different purposes and have more complex effects according to the specific setting. In all cases, they seem to benefit individuals in the dependent ages and, in many cases, they confer greater benefits on individuals with relatively lower income or that are otherwise disadvantaged. However, in at least some settings, private transfers between parents and children correlate positively with wealth and income, thus providing a mechanism for an intergenerational reproduction of economic well-being.

This section examines further the data presented in the opening section relative to nationally representative household surveys in Chile, Mexico and El Salvador. The analysis follows up on a previous, detailed study by Uthoff and Ruedi (2002) that examined the efficacy of cash transfers in alleviating poverty in seven Latin American countries in 1996-1997, using information on monetary transfers from household surveys. That study showed that transfers, both public and private, accounted for 4 per cent to 22 per cent of total household income in the countries studied, and that they had a "poverty-reduction" effect between 2.5 and 13.4 percentage points, depending on the country.

More specifically, the study found that transfers had a substantial effect mainly on economically inactive household heads aged 65 and over, and had little effect in reducing poverty among the unemployed. This can be explained by the fact that, compared to unemployment insurance and despite their limitations, social security and pensions benefit more people and account for a larger proportion of Government social expenditure. The study showed that in households headed by unemployed or low-income individuals aged 25-64, transfers reduce poverty from 37 per cent to 30 per cent, while the effect on the total population is to reduce poverty from 43 per cent to 29 per cent.

Estimates using data from the most recent surveys in Chile, Mexico and El Salvador showed that transfer income, as measured in the respective surveys, accounted for 14 per cent of total income in Chile, 15 per cent in Mexico and 9 per cent in El Salvador. These transfers helped to reduce poverty by 18 percentage points in Chile, 9 percentage points in Mexico and 3 percentage points in El Salvador. The different degrees of efficacy are due mainly to the fact that the aggregate value of transfers in Chile and Mexico, amounting to 15 per cent and 14 per cent of total income respectively, was higher than that in El Salvador, where it accounted for only 9 per cent of total income.[15]

Figure 2 illustrates the different effectiveness of transfers in reducing poverty in the three countries by showing the poverty rates for different age groups, excluding and including cash transfers. It can be noted that in the three countries the compensatory effect on poverty is proportionately higher among the elderly than in the rest of the population, especially in comparison with children and teenagers.[16] In general, younger individuals display near or below-average incidence of poverty when transfers are excluded. However, when transfers are included they have above-average poverty rates. Except in the case of El Salvador, poverty rates among younger individuals are significantly higher than among older adults.

These estimates suggest that there is room for considerable improvement in the redistributive effect of transfers. Also, the effect across generations is not necessarily balanced, as transfers tend to be biased towards the elderly, which can certainly be justified in terms of the aims of the social security systems. However, viewed from a broader perspective of intergenerational solidarity and productive efficiency, those aims should not lead to the neglect of other population groups, especially children and teenagers, who are subject to high poverty rates in almost all of the countries studied. As mentioned before, in some settings, this problem is compounded by the deficiency of transfers for secondary and higher education, which could jeopardize present and future productivity growth.

## E.  FINAL REMARKS

Intergenerational transfers in Latin America are of a substantial aggregate magnitude. In practically all documented cases, they are essential in smoothing life-cycle consumption and contribute significantly, although in varying degrees, to alleviating poverty.

Public transfers are not always strongly redistributive. In certain countries and sectors, they have been assessed to be rather regressive and tend to favour some generational groups much more than others. In several countries, public transfers have a greater poverty-reduction effect among older adults than among children, which continue to weigh heavily within the poor population in most countries of the region.

Even in countries where government transfers are sizeable, private transfers play a key role in the support of different generational groups. However, the redistributive effect of private transfers is even less clear-cut than in the case of public transfers. In many cases they appear to be directed foremost towards individuals with lower incomes but, in other situations, they tend to favour to a greater extent those who are relatively better off, thus providing a basis for an intergenerational reproduction of poverty and wealth. Some evidence was found of substitution of private for public transfers. However, private transfers appear far from sufficient to replace the state responsibility over the provision of social services and protection to the population as a whole.

The combined analysis of changing demographic structure and age-specificity of public programmes and transfers shows that, in some countries, the ensemble of social programmes and fiscal policy appears to be inter-temporally unbalanced, with ensuing serious budgetary and macroeconomic consequences in the medium- and long-term. Population ageing and the insolvency of social security systems are among the important factors of the imbalances. These situations have a flip side in intergenerational inequity, as future generations are burdened with significantly higher net taxes than the present ones to finance the continuation of policies into the future.

There are important advances in the knowledge and analysis of these types of questions in several countries, but there is clearly much room for improvement in the region for the development of a more systematic information basis that would allow for periodic, more precise and comparable diagnosis. As can be appreciated from many of the cases reviewed, such information can make a valuable contribution in identifying policy options to improve the intra and intergenerational distributive equity of policies and social protection programmes.

[1] Other useful criteria for classifying reallocations and transfers distinguish a) the channel of transmission: the family, financial institutions/markets, or the state, and b) their direction, i.e. those "ascending" from younger to older generations, or "descending", from older to younger generations.

[2] Based on consumption and income data from household consumption/budget surveys in each country depicted in figure 1, assuming that the consumption deficit of young dependents is entirely financed by transfers.

[3] Evidenced by an average age of income higher that that of consumption.

[4] The fiscal policy, whereby the Government sets its spending level for the purpose of stabilizing the economy, aims at a structural surplus of 1 per cent of GDP, with provisions for permitting spending to rise during periods of economic contraction and for avoiding fiscal expansion during periods of rapid economic growth (Eyzaguirre, 2005).

[5] Although the percentage of extreme poverty in Brazil has decreased by some 10.5 percentage points, a very good overall performance, 90 per cent of the result was due to improved economic growth, and only 10 per cent was due to improved income distribution.

[6] The national survey on household income and spending (ENIGH) of 2002 was the main source of information. This was complemented with data from the accounts of the Federal Treasury, which includes national accounts, records from the Mexican social security institute (IMSS) and other state entities. Data from nutrition, health, and other surveys, as well as an evaluation of the *Progresa* programme were also used.

[7] The Gini coefficient, which is a measure of inequality in a population, ranges from a minimum value of zero, when all individuals are equal, to a theoretical maximum of one.

[8] The beneficiaries of State programmes were identified on the basis of the multi-purpose household surveys (EHPM) and the national survey on social investment (ENISO). Subsequently, public social investment was allocated to individuals in proportion to the distribution of beneficiaries per programme. In this way, it was possible to classify the level of investment according to income, age group, gender and geographical area, and to calculate the corresponding distributional changes between 1990 and 2002.

[9] Generational accounting or models based on it have also been applied to specific sectors or reforms, for example the assessment reforms of national pension systems in Chile and Uruguay.

[10] This kind of effect occurs, in different degrees, in all of the reforms that introduce or increase prefunding, where a substantial proportion of the pension funds are invested in public debt.

[11] Chile is another country with evidence of inter-temporal sustainability of its public budget, based however on sustainability indicators different from those of generational accounting (see Crispi and Vega, 2003).

[12] It would surely be better to use the projections available for Mexico, and to estimate the age schedule of pensions from the Mexican 2002 national survey of household income and expenditure instead. However, the results for the aggregate generational balance would probably not change drastically.

[13] Based on a survey of 500 households in poor districts of the city of Santa Ana, compiled in 1976.

[14] The evidence appears in fact, more consistent with the theory of implicit inter-temporal contracts, according to which parents agree to transfer more resources to their children in the expectation that they will in turn provide larger transfers to the parents in their old age. This can also explain transfers from children to parents, to the extent that they increase the likelihood of future bequests.

[15] The proportion of transfers directed towards poor households in El Salvador is similar to that of Chile and higher than in Mexico; therefore, the lower efficacy of transfers in reducing poverty in El Salvador in comparison to Chile and Mexico is due primarily to the smaller relative size of transfers in El Salvador.

[16] This same effect was observed in Brazil by Paes de Barro and Carvalho (2003).

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