LIVING ARRANGEMENTS OF OLDER PERSONS

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INTRODUCTION

During the past decade, there has been a surge of interest in the living arrangements of older persons. The theme has been part of the demography and sociology of the family, but only as an outcome subordinate to the broader issue of household and family organization. It has received new impetus owing to three interrelated factors: first, the rapidity and demographic inevitability of ageing in the developed world and its even more accelerated pace in countries that have experienced recent demographic transitions; secondly, the increasing availability of data and deployment of procedures to extract information from older sources and to analyse new ones; and thirdly, an upsurge of research in the economics of intergenerational transfers, an area that for a long time has been inextricably linked to the explanation of fertility changes but that now, paradoxically, experiences a revival in order to understand the consequences, rather than the causes, of fertility change.

The present paper takes stock of recent developments in the literature, summarizes key findings, provides a synthesis of theories and models, and reviews issues pertaining to statistical inference. It also suggests a road map for further research and identifies what appear to be the most salient problematic issues and likely solutions.

The term "living arrangements" or "co-residential arrangements" is used interchangeably to refer to the household structure of the elderly. When living with at least one child (or other kin), the term "co-residence" is used. Unless otherwise noted, when the elderly live with a spouse but no other kin or are unmarried and living with no other kin, the term "living alone" is used. The paper is divided into six sections. Section II reviews briefly some well-known and other lesser-known characteristics of the ageing process in both developed and developing countries. Using the case of Latin America as an example, the section highlights conditions of the ageing process that will constrain the social and demographic space where changes in future living arrangements of the elderly can take place. Section III examines the nature of recent trends in living arrangements and the current situation in both developed and developing countries, and reviews evidence regarding the relation between co-residence and well-being. Section IV locates elderly living arrangements in a theoretical niche carved out by the literature on households, families and intergenerational

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transfers, and identifies the most important findings for both developing and developed countries. Section V offers an examination of the theoretical issues to be addressed, promising model formulations, and a synthesis of the kinds of data required to shed light on important issues with policy relevance. The concluding section poses three strategic themes to be considered for future research.

PREAMBLE: THE INSTITUTIONAL AND DEMOGRAPHIC CONTEXT OF RAPID AGEING

With the notable exception of the African continent, the populations in most countries of the world are ageing rapidly. Commonly used indicators of ageing are the fraction of the population attaining age 60 or 65 and indices, such as the dependency ratio, comparing the size of the elderly to the younger population. Table 1 shows the values of the proportion of the population over age 60 and availability ratios[1] estimated in 1990 and projected in 2020-2025 for selected major regions of the world. An interesting feature of the table is the increased homogeneity projected to prevail in 2020-2025 as opposed to the heterogeneity in 1990. Countries with post-1970 demographic transitions and countries where the demographic transition was well established in the 1930s are much closer to one another in terms of both indices. Convergence of indicators of ageing is not just the result of the smoothing effects embedded in the persistence of a demographic regime, but also an outcome of more rapid ageing in countries with late demographic transitions. Figure I provides an illustration of the relative speed in the ageing process of selected countries in Latin America and compares values of the mean ages of various populations (see, also, Palloni, DeVos and Pelaez, 1999).

(TABLE 1 HERE)

(FIGURE 1 HERE)

The factors explaining population ageing are well known and will not be repeated here. Instead, the focus is on two characteristics of the ageing process in developing countries. These deserve attention because they can affect patterns of co-residence, and because they have a bearing on future levels of well-being of the elderly. The data compiled are for Latin America but, in principle, these conditions may be shared by other regions of the world.

A. *Incongruence between the speed of the ageing process and the institutional context*

There are a number of reasons why labelling ageing as a "problem" may well describe the conditions found in developing countries, rather than being an excessively charged characterization. The point is a simple one: the forces responsible for ageing in most developing countries, sharp fertility decline after 1970 and mortality decline after 1950, lead to relatively fast and concentrated changes in the age structure. The changes

take place before the social and economic conditions that facilitate and secure transfers of wealth towards the elderly have a chance to emerge, develop or consolidate. Instead, the institutional context is characterized by insufficiently developed capital markets, high risk and uncertainty that inhibits adequate private savings, insecure property rights, high inflationary pressures, as well as a lack of social security schemes, the absence of private pension plans and insufficient health insurance.

In these countries, there is a sharp incongruence between the advance of the ageing process and the social and institutional context within which it takes place. The consequences of this dislocation are two: first, the demands associated with rapid ageing are less likely to be met in these areas than elsewhere and, secondly, levels of well-being of the elderly will be endangered in the best of cases and will decline in the worst.

Social security

In the vast majority of countries in Asia and Latin America, social security systems are non-existent or poorly developed, and coverage extends to a privileged sector of the workforce only. Even though social security systems were established in some Latin American countries much earlier than in the United States of America, they are currently in disarray and are experiencing reforms that will drastically alter the programmes' coverage and contract their safety net components (Barrientos, 1997; Palloni, DeVos and Pelaez, 1999).

Human capital

Populations attaining age 60 or 65 now and in the near future belong to cohorts whose wage-earning history is fragile. These are cohorts whose levels of education are far lower than they are among the elderly in developed countries. With a few exceptions, in Latin American countries, not less than 30 per cent of those attaining age 60 are illiterate. Massive literacy campaigns did not begin in earnest until the late 1950s so their effects cannot be felt until after 2025. Even then, the composition of the elderly by levels of education will be lopsided towards incomplete primary and secondary levels, far from assuring access to sources of income derived from accumulated assets, savings and the private pension plans that are just now coming into existence.

Gender differentials

Male and female mortality disparities in developing countries are at roughly comparable levels with those in developed countries. In Latin America, just over two thirds of those surviving to age 60 are women and about half of them are widows. Women's levels of education lag far behind those of males, and their patterns

of labour-force participation have historically stayed at very low levels. Their wage-earning history is precarious and leaves them totally dependent on others in their families for income.

Health status of the elderly: where does the growth of the elderly population come from?

At least in Latin America, the rapid growth of the older population that will take place between now and 2025 or so has two main sources: the transient increase in fertility that took place between 1955 and 1965 and, most important, the massive mortality decline that began in 1950. Thus, the cohorts that attain their sixtieth birthday between 2000 and 2025 are the beneficiaries of unusually large improvements in survival, particularly during early childhood. For example, individuals born in 1960 experienced lower levels of early childhood mortality than those born in 1955. This will increase the size of the cohort attaining age 60 in 2020 relative to cohorts that reach age 60 five years earlier.

Empirical estimates of the contribution of mortality decline to the growth of the elderly

To assess the importance of mortality decline as a contributor to the growth of the elderly population, we select three countries that roughly represent the diversity of regimes of mortality decline in the region. For each of them, we estimate the profile of mortality decline over the period from 1900 to 1990, and calculate a projected life-table to assess future changes during the period from 1990 to 2020. We then proceed to estimate the absolute magnitude of the contribution of mortality changes to the rate of increase of the population in several quinquennial age groups at various points in time and for the years 2000 and 2020. Figure II shows the estimated magnitude of these changes for age groups 50-54, 55-59 and so on for the year 2020. The vertical axis represents the total cumulated change of mortality rates experienced by cohorts reaching ages in the horizontal axis during the year 2020. Thus, for example, compared to those who will be in the age group 60-64, Chileans who attain ages 65-69 in 2020 will experience reductions in mortality rates after birth of the order of 0.0125. For Chileans aged 70-74 in 2020, the figure is about 0.028. Since the bulk of mortality decline, particularly during early childhood, occurred in the post-Second World War years, the peak is attained among the cohorts born during those years (who will be aged between 70 and 80 in 2020). Older cohorts also experience mortality changes but, since they are not the beneficiaries of the typically larger gains accruing to early childhood, the magnitude of the changes is smaller.

(FIGURE II HERE)

Graphs for other countries in the region look similar to that in figure II. The only difference is that in cases where mortality decline occurs later than in Chile or Mexico, the curves are displaced towards the left, and their peaks are associated with younger cohorts. Furthermore, in countries where mortality changes are

less gradual and more concentrated in time (as in Bolivia, Peru, Ecuador or Paraguay), the curves are narrower and more spiked.

The estimates plotted in figure II enable us to informally gauge the magnitude of the contribution of past mortality changes to current and future ageing. In Chile, for example, about 43 per cent (0.015/0.035) of the total rate of increase of the population 60 or over by 2020 is due to mortality changes. In Mexico, the corresponding values are slightly lower. Thus, a substantial fraction of future ageing is attributable to mortality changes experienced during the period from 1930 to 1990. The remainder (about 57 per cent in the case of Chile) is associated with either changes in the size of the birth cohorts, or, to a lesser extent, with changes in mortality at ages above 60.

As shown elsewhere (Palloni and Lu, 1995), about 70 per cent of the mortality decline that occurred between 1940 and 1980 was due to changes in mortality associated with infectious diseases in the first 10 years of life. This statistic suggests that the relatively compressed schedule of ageing in the region can, in part at least, be traced to the medical and public health revolution that triggered the mortality decline nearly half a century ago. This legacy may have important implications for the health and disability status of the elderly population after 2000.

Even if there are significant improvements in mortality at older ages, it is worth asking how healthy the extra years of life will be, and what will be the magnitude of health-care costs associated with them. The following paragraphs contain a brief discussion of what the future trends in health status among the elderly are likely to be.

Prospective changes in mortality and health status

Even if it is true that additional gains in survivorship are possible, it is not at all clear that the added years of life will be healthy ones. The health status of the elderly will depend on two conditions. The first is access to satisfactory health or medical care. Health status will be worse for populations with limited access to health or medical care and better elsewhere. The second condition is the composition of the population at any age according to risk profiles. This is a complex result of three factors: early childhood exposure (perinatal and first five years' growth and development), lifetime behavioural risk profiles (smoking, drinking, diet and exercise), and past purchase of health inputs (possibly dependent on occupation, education and assets). Although we have some knowledge about the effects of each of these factors on health status and mortality, we know virtually nothing about their prevalence in populations of the region. The only evidence available to us pertains to the composition of the cohorts who will attain their sixtieth birthday after 2000. As mentioned above, about half of the rate of increase of the population in this age group is associated with mortality decline

in early childhood during the decades following the Second World War. These cohorts will be increasingly dominated by individuals who, during their early childhood, may have been exposed to conditions that would have been fatal several years earlier. To the extent that exposure to and contraction of conditions early in life has a physiological effect that endures and plays out many years later (Fogel, 1986; Fogel and Costa, 1997; Barker, 1997), we should expect that the health status of the corresponding cohort will deteriorate. These effects are likely to be stronger among populations that are more vulnerable or that have less opportunity to purchase adequate health inputs. As documented elsewhere (Palloni, DeVos and Pelaez, 1999), an important fraction of the elderly in the region will live in rural areas and will belong to the lowest social classes, that is, they will be exposed to conditions characterized by little, if any, access to satisfactory health-care facilities and to mediocre informal care. Reforms in the public sector, the wholesale revamping of pension systems, and past trends in labour-force participation will only worsen the situation by hampering the ability to purchase acceptable health services.

Elsewhere (Palloni, DeVos and Pelaez, 1999), the examples of respiratory tuberculosis, osteoporosis and dementia are cited as three conditions tightly linked to health status in the past that are likely to affect the health status of the elderly in the near future to a larger extent than they do now or than they ever did in developed countries.

The foregoing considerations suggest the conjecture that future increases in life expectancy above age 60 in countries of the region are unlikely to be accompanied by corresponding decreases in the prevalence of ill health. A more likely scenario is one where an increasing fraction of years of life gained are spent in disability or ill health.

Empirical assessment of recent conditions

Is there any empirical evidence directly or indirectly supporting the conjecture stated above?

The only two sources of information about health conditions among the elderly in the region are a multi-country study coordinated by the Pan American Health Organization in the early 1980s and two recent surveys carried out in Sao Paolo, Brazil and Mexico City. For a number of reasons, self-reports on health status are the only comparable item that provides useful variability across countries in the region. Table 2 shows the percentage of sample population aged 60 and above reporting their health in various categories in a continuum from “poor” to “very good”. Although age distinctions would have been desirable, sample sizes do not permit us to compute reliable age-specific estimates. The table also includes comparable percentages calculated from the Health and Retirement Survey (HRS) and Asset and Health Dynamics among the Oldest Old (AHEAD), two of the most important data sources on the elderly in the United States of America. Figures in the table are

shown by gender and, in the case of the United States, by ethnic group. Table 2 includes data for four additional countries (Colombia, El Salvador, Jamaica and Venezuela), where the categories for self-reporting employed originally did not allow us to make a distinction between "poor" and "average" or between "good" and "very good". In addition, results from two recent studies carried out in Sao Paolo, Brazil and Mexico City are included. In order to compare all countries, we merged "poor" and "fair" on the one hand, and "good" and "very good" on the other.

(TABLE 2 HERE)

While self-reported health status is not an ideal indicator of health conditions, it can be shown to be surprisingly accurate and a good predictor of subsequent ill health and mortality (Idler and Kasl, 1991; Idler and Benyamini, 1997; Mare and Palloni, 1988). Three features stand out in the table. First, in all countries of the region, except Argentina, the fraction reporting that they are not in good health status ("poor" or "fair") is two to three times higher than comparable figures for the white population in the AHEAD study. It should be remembered that the sample studied in AHEAD corresponds to an older age bracket (70+), whereas those of HRS correspond to a younger age bracket (51-61). Thus, in the AHEAD study, the population reporting to be in poor/fair health is 33.5 per cent among white males and 34.0 per cent among white females. In the best case in the region (Argentina), the corresponding numbers are 37.4 per cent among males and 52.7 per cent among females. In all other countries, the percentages are much higher, from about 55.3 per cent among males in Colombia to about 86.0 per cent among females in Jamaica. As would be expected, the comparison is more favourable if one takes as reference the United States black population. But even then, only Argentina seems to fare better. Secondly, the heterogeneity within the region is substantial and appears to be only weakly correlated with mortality levels. Thus, the lowest percentage reported to be in average or worse health occurs in Argentina (37.0 and 52.7 per cent), while the highest occurs in Jamaica (79.7 and 86.0 per cent) and Venezuela (82.7 and 77.3 per cent). Thirdly, there are large gender disparities and, with the exception of Venezuela, all of them favour males. The differences can be as large as 15.2 percentage points in Argentina and as small as 1 or 2 percentage points in El Salvador. It should be noted that in the United States and other developed countries the male-female differences are insignificant or exhibit the opposite pattern. If these gender differentials in self-reports do indeed reflect unobserved differentials in underlying health conditions, the patterns displayed are of importance since, as suggested earlier, elderly women not only represent close to two thirds of the elderly population but are also at higher risk of experiencing worse economic conditions.

TRENDS IN OLDER PERSONS' LIVING ARRANGEMENTS AND WELL-BEING

The living arrangements of the elderly are just one element among many others included in a package of transfers towards the elderly originating within the boundaries of the kin group or family. These are referred to

as familial or family transfers. In turn, these transfers are just one part of the totality of transfers towards the elderly that also include societal resources such as pensions, disability income, health payments and transfers in the form of subsidies for institutionalization, home care and housing. These are referred to as social transfers. Thus, co-residence of the elderly with their children (or other kin) is just one among many transfer flows involving the elderly. Social transfers and family (kin group) transfers are the most important sources of support for the majority of the elderly. Other sources include assets, wages and private pension plans.

The observed prevalence of co-residence with children may be related to the magnitude of other flows, but the exact direction of causality is not always clear. The demand for co-residence with children or other kin is probably heightened in societies with a precarious institutionalization of social transfers, with traditionally low levels of human capital investments, and where the health and disability of the elderly require large expenditures on care and health services.

Trends in co-residence of the elderly

The availability ratio is the ratio of the population aged 60 and over to the population between ages 15 and 59. The latter population is the pool of available individuals with whom the elderly could co-reside. Two dimensions of co-residence of the elderly are of interest: the overall levels of living alone, and the age patterns of living alone. Each of these is discussed below.

Overall levels of living alone among the elderly

Census information for the United States of America in 1990 shows that about 75 per cent of white males and females older than 65 lived alone or with a spouse. Roughly two thirds, or 65 per cent, of unmarried white women and men live alone (Kramarow, 1995; Ruggles, 1994; Schoeni, 1998). For African Americans, the figures are 51 and 48 per cent, respectively. In Western and Northern Europe, as in the United States, the prevalence of the elderly population, regardless of marital status, living in a single-person household is between 15 and 40 per cent (Keilman, 1988; Kinsella, 1990). Moreover, the prevalence of living alone in these countries is anticipated to be much higher in the short run since recent trends point to a rapid increase in this type of living arrangement (Pampel, 1992), with all the consequences that this transformation may entail (Reher, 1998).

This is in contrast to the situation in most countries of Asia and Latin America where the proportion of all elderly living alone rarely exceeds 10 per cent. Countries in the Caribbean occupy an intermediate position, with the prevalence of living alone ranging from 10 to 20 per cent (Kinsella, 1990). The aforementioned figures for these countries are calculated using as reference the entire elderly population and, therefore, conceal

higher levels of living alone among those who do not have a spouse. Since the fraction of all elderly over 60 or 65 who are unmarried ranges between one third and one half, the fraction of all unmarried elderly who live alone cannot be much higher than 0.20 in the countries of Asia and Latin America, and less than 0.40 in the Caribbean.[2]

Current levels of living alone among the elderly in the United States of America and in Western and Northern Europe are the result of changes that may have begun in earnest before 1900 but whose full effects are felt only after 1950. By contrast, and with only few exceptions, the observed changes in Asia, Latin America and the Caribbean are of only recent origin and of considerably lower magnitude. The two most noticeable exceptions are Japan and Taiwan Province of China. In Japan, a society with traditionally high levels of elderly co-residence, the proportion living alone has increased steadily since 1960, at an estimated rate of about 1 per cent per year, and has reached values close to 0.30 in 1990. It is projected to increase even more (Hirosima, 1997). Similarly, in Taiwan Province of China and the Republic of Korea, two Asian populations with traditionally high levels of co-residence, the trend towards higher levels of living alone is unequivocal (Hermalin, Ofstedal and Lee, 1992; Hermalin, Ofstedal and Chang, 1992; DeVos and Lee, 1988). Other countries in Asia and Latin America reveal less change in patterns of co-residence. Table 3a shows the fraction among all unmarried elderly living alone in the United States. Table 3b summarizes comparable information available for European countries, whereas table 3c gives comparable figures for a sample of countries from the developing and developed world, with available data for two or three points in time. While the largest changes have undoubtedly occurred in the United States of America and Europe, the situation in some Asian populations (Japan and Taiwan Province) has already destabilized. In Latin America and the Caribbean, observed changes are quite muted, and there are no indications of a massive break with the past (see, also, DeVos, 1990; Palloni and DeVos, 1992). Table 4 contains more detailed information at one or two points in time for selected countries in Latin America and the Caribbean. Altogether, the figures in tables 3c and 4 show that changes in the same direction, albeit of smaller magnitude, as those experienced by forerunners are occurring in the developing world as well.

(TABLE 3a, 3b, 3c)

(TABLE 4)

Not only are changes in developing countries of small magnitude but they also start from lower baseline values. Yet, researchers and policy makers alike suspect that much larger changes are in the making, and that patterns similar to those experienced by the United States of America and Europe will soon engulf Asia and Latin America alike, while Africa, in all likelihood, will continue to lag behind.[3]

Age patterns of living alone among the elderly

Age patterns of living alone among the elderly are a somewhat less studied aspect of the phenomenon. With a few exceptions (see Liefbroer and de Jong Gierveld, 1995), the prevalence of the elderly co-residing with children (or kin) decreases from about age 50 to about age 75 or 80 and then increases again (Kinsella, 1990). This age pattern is clearly exhibited among all the elderly in the United States microcensus data from 1880 on (Ruggles, 1994), and among elderly widows in the 1960-1990 Current Population Survey (CPS) time-series (Macunovich and others, 1995). Over time, the increase in living alone has been proportionately higher among the oldest old (over 85) than among the young old (Ruggles, 1994; Tuma and Sandefur, 1988). This age pattern of living alone is less pronounced but still detectable in Canada (Légaré, 1998) and in data for Japan (Hirosima, 1997) and a number of European countries (Kinsella, 1990).

Furthermore, in most cross-sectional studies, the estimated effects of parental age on the probability of co-residence are either increasing or display the non-linear form present in the United States data. Let us assume for a moment that these patterns remain constant. Since the difference between the minimum and maximum values of the fraction co-residing by age can be fairly large (of the order of 10 to 15 per cent in the United States), modest changes in the age distribution of the elderly could have non-trivial effects on the overall fraction living alone, even in the absence of changes in the age-specific probabilities of living alone. The direction and magnitude of these effects will depend on the relative size of consecutive cohorts of elderly. In turn, the overall magnitude of the difference between them will be a function of the past history of fertility and mortality. In the developing world, the size of the first few cohorts attaining age 60 by 2020 will create a bulge that will surely inflate the overall proportion living alone. This effect will increase for a number of years before it reverses or is attenuated as the same cohorts attain ages 75 or 80, the age interval where the age-specific rates of living alone begin to decrease again.

It is unlikely that observed age patterns will remain constant for too long. For one thing, they may reflect cohort effects: the oldest old of today belong to cohorts with less education and more modest wage-earning history. This makes them less likely to have a wide variety of choices available other than co-residence with children. Also, the oldest old have a higher prevalence of disability and chronic illnesses and are more likely to be offered care by kin or children (see below). If the age of onset of the most prevalent forms of disability increases (or decreases), age patterns of co-residence could experience a downward (or upward) shift at younger ages. Finally, there is a relation between length of generation and co-residence (see below). If the age difference between parents and the youngest of their children changes—as a result of delaying or anticipatory fertility tactics—the age patterns of co-residence will also be affected.[4]

Co-residence and levels of well-being

A concentrated research focus on the living arrangements of the elderly is a relatively new theme. It is driven by concerns raised around the world in general, and in developed countries in particular, about consequences of rapid ageing. To the extent that co-residence with adult children or other family members is seen as a fundamental strategy to bolster the overall levels of well-being of the elderly, trends pointing to a dissolution of traditional living arrangements, where most elderly live with children or relatives, are seen as worrisome and threatening.

This preoccupation is exacerbated in recently industrialized countries and in developing countries alike, where these trends are of more recent origin. They take place, however, within more fragile institutional contexts, where social transfers towards the elderly are non-existent or not well established, and whose prospects appear increasingly compromised by institutional reforms and tight fiscal discipline. It is well-known that levels of poverty everywhere have historically been higher among elderly people, and this is probably even more pronounced in developing countries now than it was in the past in more developed countries (Ramashala, 1997; Townsend and Wedderburn, 1965; Townsend, 1979). Given the current conditions of overall poverty in most developing countries, there is little evidence to suspect that this state of affairs could change any time soon (Gwatkin, 2000).

The combination of fiscal restraint and insufficiently developed mechanisms of social transfers could constrain even more the range of options during an epoch of swelling demand caused by the sheer increase in the size of the elderly population, even if their patterns of illnesses and disability were to remain unchanged. Thus, the argument goes, poverty among the elderly is likely to increase.

It is widely thought that the erosion of a traditional norm whereby the elderly commonly reside with children or relatives will reduce the well-being of the older population. This outcome is likely if the onset of a newer regime with lower co-residence is not accompanied by improvements in the elderly's command over private income, does not trigger changes in other elements of familial transfers, or does not induce an improvement of existent social transfers. Indeed, central Governments in many countries have undertaken explicit campaigns to reassert family obligations towards the elderly (Martin and Kinsella, 1994; Knodel, Amornsirisomboon and Khiewyoo, 1997; Reher, 1998).

In the developed world, industrialization and modernization may have eroded familial bonds but they have simultaneously fostered a system of social transfers that effectively operates as a compensatory mechanism to reinforce transfers towards the elderly. The onset and evolution of this system of institutionalized transfers

may itself have reduced even further the need for and discouraged the continuation of family transfers, including co-residence. In addition, through investments in human capital, older individuals are able to command higher levels of income while, as insurance or as a complement, they are open to and actively pursue the option of continuing to participate in the labour force. Competing with other needs and demands, the efficiency and sufficiency of compensatory social transfers, however, has been questioned in the United States (Preston, 1984), and are even less likely to be seen as a feasible solution in the less developed world.

In developing countries, older people's access to sources of income is usually far below what is necessary to secure self-sufficiency, while their continued participation in the labour force, for a long time a necessity rather than an option, may be endangered by rapid economic change and growing obsolescence of human capital. Furthermore, in both the developed and the developing world, the overall demand for care and attention for the elderly will be a function of the prevalence of illness and disability, and of the amount of time lived in good health at older ages. Recent research suggests that disability and ill health have not worsened over time in some developed countries (Crimmins, Hayward and Saito, 1994; Crimmins, Saito and Ingegneri, 1997; Manton, Corder and Stallard, 1993). But this may be a transient phase and, as suggested above, may not hold true at all in developing countries, where the available evidence suggests that the elderly could be far worse off than their counterparts in developed countries. Thus, even if there were compensatory changes in social transfers and improvements in private sources of support were feasible, the well-being of the elderly might remain compromised. In this pessimistic scenario, co-residence with children and relatives is seen as a mechanism of last resort.

Are observed changes in co-residential arrangements of the elderly associated with other changes affecting this subpopulation? The study of patterns of elderly co-residence is not just a theoretical exercise to understand the historical evolution of families and households. It is also an area of concrete concern for policy makers. Implicitly or explicitly some constituencies hold the strong belief that a reduction of elderly co-residence with kin can and will translate into deterioration of the elderly's levels of well-being.[5] What evidence is there to support this conjecture?

In order to construct a robust test, it is necessary to have time trends on indicators of levels of well-being for the elderly by residential arrangements. At least some foundation is also needed to assess the precise direction of causality or, to use in the technical jargon, to determine whether well-being is endogenous. The author is not aware of any comparative studies of changes over time of the older population's levels of well-being according to living arrangements and, despite many efforts, the problem of endogeneity appears to remain intractable.[6] It is possible, however, to use a number of disparate data sources that do shed some light on the issue. Although these data sources provide information on a rather large number of indicators, it suffices to focus on the relations between a handful of them.

Let us say that a satisfactory indicator of well-being is some demarcator enabling us to distinguish the older population living in poverty. Suppose the fraction of the elderly living below poverty level is Δ and the fraction below poverty level and living alone and co-residing are Δ_a and Δ_c, respectively. Let the probability of living alone among those above and below poverty be B_r and B_p respectively. The following equalities are straightforward:

$$\Delta_a = (1+\Delta/(1-\Delta)(B_r/B_p))^{-1}$$

and

$$\Delta_c = (1+\Delta/(1-\Delta)((1-B_r)/(1-B_p)))^{-1}$$

Thus, differences in the values of Δ_a and Δ_c over time (or across countries) depend on the overall levels of poverty among the elderly as well as on the relative magnitude of the probabilities of living alone among those above and below the poverty level. A decrease in poverty among those who live alone could be the result of either a decrease in the overall poverty rate (independently of living arrangements), an increase in the probability of living alone among those who are not poor, or a combination of the two. As a result, even under conditions guaranteeing strict comparability of the poverty measure, changes over time or over units of observations, cannot be interpreted unequivocally. Admittedly, these elementary equalities assume the analytic problem away since we implicitly assumed that decision making about co-residence—B—is correctly estimated as a function of poverty rather than the other way around.

Very few studies provide information on the values of Δ_a and Δ_c at one point in time and, even more rarely, over several periods of time. In some cases, one can obtain estimates of Δ but little or no information on anything else. Most studies report estimates of the B values but say nothing about Δ, Δ_a or Δ_c. In these cases, the values of B are usually not directly observed but can be retrieved indirectly by converting estimates of the effects of measures of wealth on the probabilities of living alone, while controlling for a host of other quantities. A complicating problem is that measures of socio-economic conditions—which we take as proxies for well-being—vary a great deal. Often, the indicator is income, and, in some cases, researchers use property ownership or "soft" proxies such as education levels, occupation and occupational status. Rarely, if ever, are estimates of B obtained using a dichotomous indicator of poverty as we have argued here. In sum, inferences and comparison across studies are hindered by a number of factors, even if one could agree on the rather dubious proposition that levels of well-being are indeed well captured by using only measures of socio-economic standing.

The longest string of evidence the author knows of is the United States microcensus samples starting in 1880. These data appear to corroborate the existence of a direct relation between indicators of wealth for the elderly in different co-residential statuses. Indeed, the data show that in the past it was among the better-off that one found the highest probability of co-residence with children or kin, whereas living alone was more likely among the poor, the propertyless and the destitute. The relationship reverses, however, after 1950 or 1960, just at the time of onset of the sharp upturn in the prevalence of living alone. Thereafter, the association between the probability of living alone and measures of wealth or socio-economic status among the elderly becomes strong and positive. Upon careful examination of these data, Ruggles infers that, in 1850, for example, there was a strong positive relationship between real property of the elderly and co-residence, and the richest 10 per cent lived with their adult children 50 per cent more often than did the propertyless. For the post-Second World War period, information on income, home value and years of education verifies the finding that multigenerational families are most frequent among the poorest and least educated (Ruggles, 1994, 1996).

In another study on conditions in the United States, Pampel finds evidence supporting the idea that B_r is higher than B_p (Pampel, 1983). He uses the 1960 and 1970 Public Use Samples (PUS) as well as the March 1976 Current Population Survey and confirms the effect of income on the probability of living alone but finds little evidence to support the idea that this has increased, at least in the 15 years or so covered by his data.

The information from these two studies refers to trends in values of B, not of Δ.[7] However, we can combine it with other sources to arrive at cleaner conclusions. The estimated (official) poverty rate among the elderly in the United States (Δ) declined from about 27 per cent in 1959 to about 12 per cent in 1990 (Holtz-Eakin and Smeeding, 1994). A drop in overall poverty rates among the elderly raises the fraction who are above poverty level both among those living alone and among those co-residing. However, since we know that B_r increased, it must be the case that levels of poverty among the elderly living alone dropped faster than levels of poverty among the elderly who co-reside. From this very elementary exercise one could conclude that, in the United States at least, living alone has not translated into deterioration of levels of well-being. Without a precise time-series of B, we cannot say, however, whether one group is now better off than the other, or whether the differential in well-being by co-residence status has increased or contracted.

Although there are no long-time trends of levels of well-being among the elderly by co-residential arrangements in other countries, some information can be obtained from an examination of recent conditions. The main findings are summarized below.

Europe, United States, Canada and Australia

In a study of microdata for nine countries from the Luxembourg Income Study, Smeeding and Saunders find that the fraction of elderly women below the poverty line (defined as 50 per cent of the median disposable income) is substantially higher among elderly women living alone than among all elderly women in all countries in the sample (Smeeding and Saunders, 1998). The ratio of elderly women who live alone and are below the poverty line to those co-residing who are below poverty ranges from 1.2 in Hungary to about 2.0 in Canada. In the United States, the ratio is about 1.6, a figure rather difficult to reconcile with our previous conclusion, though not necessarily inconsistent with it.[8] Overall, this information supports the idea that living alone among the elderly is accompanied by more widespread poverty, although it is not clear whether poverty is triggered by solitary living or vice versa.

In a cross-national study of European countries spanning the years from 1975 to 1989, Pampel (1992) shows that the fraction living alone among the unmarried has increased over time and approximately at the same rate in all countries in his sample. The two proxies for individual socio-economic conditions, education and occupation, have a trivial influence on the probabilities of living alone, suggesting that B_p and B_r are probably quite similar to each other.

The bulk of studies carried out with recent data for the United States (Soldo, Wolf and Agree, 1990; Bishop, 1986; Wolf, 1990; Wolf and Soldo, 1988; Kramarow, 1995; Kotlikoff and Morris, 1990; Michael, Fuchs and Scott, 1980; Ruggles, 1994, 1988) confirm the existence of a positive effect of income on the probability of living alone. Even though qualifications regarding the form of the relation, the appropriate set of control variables and the existence of contingencies are in order, the finding that the probability of living alone is higher among those who are better off is fairly generalized. Again, these estimates simply refer to the relative magnitude of B_r and B_p (or, better yet, to the ratio $B_r/(1-B_r)/B_p/(1-B_p)$) and are not directly or easily transformed into estimates of contrasts between levels of well-being among those living alone and those co-residing.

Asia and Latin America

It is well-known that in Asian countries filial piety and a strong sense of obligation towards parents and the elderly alike are still widespread and dominant. These cultural prescriptions translate into norms of support that reinforce intergenerational transfers towards the elderly and produce a robust tendency to live with parents. As documented earlier, the fraction of the elderly living alone is low, and those who do so constitute a population perceived to be much like they were in the United States at the beginning of the twentieth century,

that is, largely composed of the infirm, poor and destitute. But the evidence available for the most recent period is remarkably elusive on this score. The summary of various studies that follows shows that the empirical evidence from several countries is not always consistent with this imagery. The first two studies summarized below provide estimates of quantities analogous to Δ_a, whereas all the others only enable us to retrieve values of B_r.

The Luxembourg study cited above includes information for Taiwan Province of China, where the ratio of women living alone and below poverty level to those co-residing and below poverty is in the neighbourhood of 2.8. This is by far the largest ratio, and its magnitude is all the more remarkable since levels of poverty among all elderly Taiwanese are higher than in countries such as Canada or Germany, two of the countries where high ratios of poverty among those living alone were identified.

In a recent study of nationally representative data in Thailand, Knodel and colleagues uncover a more mixed picture that, although not entirely inconsistent with the belief that the elderly living alone may be worse off, suggests that the relations are more complicated. Thus, Knodel and colleagues conclude that the image of the elderly being increasingly deserted to live on their own or being neglected if they do live with their family is reinforced by media conveying the same idea. Unfortunately, it appears to be based more on preconceptions and anecdotal evidence than on hard facts (Knodel, Amornsirisomboon and Khiewyoo, 1997). In fact, their data reveal that while there are some differences in indicators of well-being (income, perceived sufficiency of income, recent financial problems, and household possessions), these are hardly large enough to substantiate the idea that those living alone are a particularly fragile group. It is only in rural areas where the differences are sufficiently strong to merit special attention.

Table 5 summarizes the information regarding the effects of indicators of well-being (socio-economic status) in a number of Asian and Latin American countries. The best way to characterize these results is that they are somewhat inconclusive, even though positive relations are more common than negative ones. The studies define different focal populations (unmarried versus unmarried and married elderly), and they differ in terms of indicators of socio-economic standing and types of controls used. Overall, and perhaps unsurprisingly, the estimated effects are somewhat inconsistent. In some cases (Brazil, Malaysia, Mexico and the Republic of Korea), the effects of income or home ownership are equivalent to those already verified in the United States and Europe. In other countries, the effects of indicators of well-being can be in the opposite direction, or statistically insignificant, as is the case of home ownership in Brazil.

(TABLE 5 HERE)

Finally, there are studies focusing on the effects of children's characteristics on the probabilities of co-residence with their parents. If one assumes that indicators of wealth across generations are strongly correlated and that the within-family (across offspring of the same parents) variance in wealth is trivial, then a high probability of not living with parents among children above the poverty line would suggest that parents above poverty are more likely to live alone. This is a fragile inference, particularly since often key parental characteristics are not controlled for. One of these studies (Martin and Tsuya, 1991) shows that in a sample of Japanese middle-aged individuals indicators of high socio-economic status correlate negatively with co-residence with parents. Similarly, in a study of middle-aged people in Turkey, Aykan and Wolf (1998) find that education of children is negatively related to co-residence with parents. By contrast, in a study of 10 counties scattered widely throughout eastern China, Parish and colleagues find that higher income among sons leads not to decreased co-residence in favour of financial aid but to more of both co-residence and aid (Parish, Shen and Chang, 1995).

What can one conclude from these disparate findings? The most robust inference is that the evidence supporting the claim that living alone among the elderly is associated with lower levels of well-being is not always consistent with the evidence. What we know for sure is that, with a few exceptions, there is some support for the contention that the probability of living alone is higher among those who are better off, and that in a few countries in Europe and in Taiwan Province, elderly women who live alone experience higher poverty levels than do those who co-reside, although this contrast is not confirmed by roughly comparable data in other countries (e.g., Thailand). Finally, while most of the studies attempt to estimate the effects of measures of economic standing on the probability of living alone, they do not shed light on the complementary, but quite distinct, issue of whether the elderly living alone are better off than those who co-reside or, more fundamentally, they cannot confirm the counterfactual that they would be better off if they did.

Given this rather negative conclusion, combined with the fact that throughout this exercise we intentionally overlooked endogeneity issues and systematically dodged considerations regarding the meaning and measurement of well-being, it seems fair to say that, to put it mildly, our state of knowledge in this key area for public policy is fairly primitive.

EXPLAINING TRENDS IN CO-RESIDENCE PATTERNS OF THE ELDERLY

Why did the prevalence of older people's living alone (or with spouse only) rise so much in the United States and Europe, and why should one expect that a similar phenomenon will occur in Asia, Latin America and the Caribbean? This question remains important even though the previous assessment does not reveal a close connection between co-residence arrangements and the elderly's well-being, nor does it justify gloomy scenarios associated with the increased prevalence of living alone. It is suspected that research in the area has

not been properly focused to make a connection that indeed exists. Thus, understanding the factors responsible for trends in living arrangements will help us to identify conditions that are, at least in theory, related to the elderly's well-being, and thus clarify not just the theoretically interesting issue of family and household transformations, but also some of its more concrete and practical implications.

To identify factors that explain past trends of intergenerational co-residence and the possible relation to the well-being of older persons, the paper first locates the theme within the broader and distinguished tradition of studies of families and households. There is then a discussion of a general framework to sort out conditions that could account for observed trends. Finally, the paper reviews some of the empirical evidence available to adjudicate between alternative explanations.

Living arrangements of the elderly, living arrangements of children and household types

The study of levels, patterns and changes of living arrangements among the elderly has been an important though not always central feature of sociology and demography of the family. The literature on transformations of the family and household living arrangements that accompany or follow industrialization and modernization is dense with references to a transition entailing drastic reductions of joint co-residence of members of different generations. The debate on whether such a transition has indeed taken place, rather than being an illusion created by demographic constraints, has generated a vast literature directly or indirectly documenting a number of changes of living arrangements of older persons (Wall, 1989a, 1989b; Smith, 1993; Laslett, 1972; Ruggles, 1987, 1988, 1994; Kobrin, 1976; Wachter, Hammel and Laslett, 1978; Levy, 1965; Berkner, 1972, 1975; Kertzer, 1989, 1991). There is a long tradition in sociology and social history that deals with this effect of industrialization and modernization on the nature of family bonds and on the related issue of household organization. The central problem is whether industrialization and modernization triggered a transition from a system largely dominated by extended households and families to one dominated by simple households and nuclear families. As an offshoot of this transition, the prevalence of the elderly's co-residence with children and other kin decreases, and living alone or with a spouse becomes the norm. Early formulations emphasize the existence of such a transition, while revisionists assert that the transition is merely apparent, an artifact created by an effectively low prevalence of extended families in pre-industrial societies to begin with. Such low prevalence could be the product of either a strong adherence to normative patterns inconsistent with more than minimal household extension, or to constraints imposed by the demographic regime characteristic of such societies, regardless of what the cultural norms or individual preferences were. A revision of this revisionist approach, however, makes it clear that, at least in some pre-industrial societies, a regime of extension did in fact exist, it can be identified if proper measures are used, and there is an observable transition to the elementary household and family forms (Ruggles, 1994).

By and large the empirical evidence brought to bear on this problem is in the form of distributions of households by type, that is, by categories of households defined according to classes of kin (or non-kin) relations that members in the household share. In particular, the level of co-residence of multiple generations is assessed using measures of the proportion of households that include parents and children (Wachter, Hammel and Laslett, 1978; Ruggles, 1987; King and Preston, 1990). In societies where the distribution of surviving offspring has a high mean, and where many adults do not survive to old age, the fraction of all households containing aged parents and their children cannot be too high, even if, for example, a stem family regime prevails (Ruggles, 1994; Kertzer, 1989, 1991). As shown in the previous section, redefining units of analysis and focusing instead on the living arrangements of the elderly (rather than directly on households) leads to clear evidence of a shift from prevalence of co-residence with children to living alone. This shift takes place even in the presence of a powerful demographic tug originating in sharp increases of survival among both parents and children.

This tension between different types of units of observations also exists if one insists that measurement should be centred on children rather than on parents. In this case, the focus is on the distribution of children (rather than of households) by co-residential arrangement with parents. From first principles one can derive a number of relations between the two (Preston, 1976; Freedman and others, 1991), but the key idea is that for some research objectives only one of them will do.

The argument for focusing on the elderly rather than on children is the same as the one given in favour of a focus on the elderly rather than on all households. That is, the assessment based on children—as was the one based on household types—is subject to confounding effects produced by demographic forces that affect strongly the distribution of surviving offspring. If one is interested in the elderly's well-being, it is advantageous to define direct measures that reflect the characteristics of the elderly, not those reflected in the characteristics of offspring.[9] As discussed below, this does not mean that the characteristics of children are unimportant and should be neglected, but rather that they should be regarded as affecting outcomes of interest among the elderly. Thus, co-residence among the elderly should have theoretical priority over the alternatives of studying household distributions or children's co-residence patterns.

Frameworks to explain trends in the elderly's living arrangements

Co-residential arrangements of the elderly are a strategic element of broader patterns of household organization and part of a much larger set of intergenerational transfers. It is sensible then to look for interpretative insights using ideas borrowed from the stock of theories and models designed for the study of these two phenomena.

A number of recently developed frameworks link intergenerational transfers to formulations based on evolutionary theories. These suggest that strong kin networks, familial bonds and the prevalence of household extension were dominant in pre-industrial societies where they operated as mechanisms to spread the high costs of childbearing and sustain a high fertility regime that offset high infant and childhood mortality. These arguments stress the role of the grandparental generation as an important source of support to younger relatives (Turke, 1989, 1991; Fricke, 1990; Lee, 1997; Kaplan, 1994, 1997; Stecklov, 1997; Kobrin, 1976). To the extent that children and grandparents (and other kin) were able to support the care and nurturing of siblings and grandchildren, they maximized reproductive potential under precarious conditions. Strong family bonds and household organization are designed to decrease the costs of these activities for everybody involved. Co-residence, and other forms of exchanges largely realized within the household, represent the context in which most support took place. Without invoking evolutionary principles, Caldwell's theory of intergenerational flows (Caldwell, 1976) also links strong multigenerational family ties and support to the maintenance of high fertility.

However, while Caldwell chooses to emphasize the importance of transfers from the younger to the older generation, recent evidence suggests that even in pre-industrial societies the direction of net transfers is probably from the old to the young and not vice versa (Turke, 1989; Fricke, 1990; Lee, 1997; Kaplan, 1994, 1997; Stecklov, 1997).

Industrialization and modernization subvert the system of transfer flows by concentrating production outside the household and privileging returns to human capital. The fall in mortality makes unnecessary the maintenance of very high levels of fertility and instead gives way to the need for investing heavily in children. Thus, the props for a system of intergenerational exchange—and the household organization that sustained it—are weakened and, with them, the entire system of family bonds and exchanges. The direction of intergenerational flows reverses and alternative forms of social support acquire importance as compensating mechanisms, simultaneously freeing the younger generation from obligations towards the elderly and securing for them minimal levels of well-being. The whole ideological superstructure is revamped as the nuclear family becomes a legitimate arrangement and ceases to be a deviant behavioural alternative subject to social sanctions. The new arrangements rest on an individualist ideology that replaces strong familistic sentiments and asserts individual welfare and self-development over the kin group or the clan.

This evolutionary interpretation has much to recommend it. But it fails on a number of counts. First, it is not altogether clear that the flow of intergenerational transfers in pre-industrial and high-fertility societies is upward at all. Utilizing a simple accounting procedure, Lee documents that in some high-fertility settings the direction of flows is, unexpectedly, towards the younger generations, with the consumption needs of children

dominating over the consumption needs of the elderly (Lee, 1994a, 1994b, 1995; Lee and Paloni, 1992; Stecklov, 1997). Instead, in industrialized societies, the direction of transfers is upward, from the younger to the older generation (Lee and Palloni, 1992).[10] Secondly, as discussed above, the statement that everywhere in the pre-industrial world extended co-residential arrangements were pervasive has proved to be incorrect, at least in some key pre-industrial societies where the nuclear family was the norm, not the exception. Thirdly, and more importantly, the explanation based on an evolutionary argument is excessively loose as it does not identify precise mechanisms ensuring the persistence of networks, bonds and exchanges that result in a high density of transfers towards the elderly and, as part of these, co-residence with children and kin. As a consequence, it is difficult if not impossible to formulate defensible hypotheses, much less testable ones, accounting for diversity over time and space.

In a much less ambitious attempt but one that contains the specificity that the evolutionary approach lacks, Burch and Matthews (1987) identify a number of factors that could account for the persistence (or change) of household arrangements. Their suggestion is to define key principles, stipulate a few axioms and formulate explicitly a number of testable explanations for observed changes. The main disadvantage of the approach is that it lacks generality as it is intended to account only for household arrangements and overlooks the totality of intergenerational flows, of which co-residence is a part. However, this shortcoming may become less relevant to the extent that one can blend their framework with theories of intergenerational transfers.

The object to be explained is household status. Co-residence of the elderly with their children is just one among several possible household statuses. The main axiom in this perspective is that household type is a composite good that can be chosen by individuals. In doing so, they choose some combination of a set of goods, including privacy, companionship, domestic services, and consumption economies of scale. The household arrangement is thus not a goal in itself but an instrumental good, a means to an end. This departs somewhat from the traditional microeconomic formulations that emphasize household arrangements as an expression of demand for only one of these goods, namely, privacy and independence. A number of other formulations insist on the centrality of the idea of household as a composite good (Ermisch, 1981; Lam, 1983, 1984, 1988). The difference between the Burch-Matthews formulation and these revisionist microeconomic approaches is that the former contains a more thorough identification of the classes and types of goods produced by household sharing.

This axiom is fundamental as it implies a key principle for investigation. This is that, to the extent that household arrangements may produce a variety of goods, it must also be the case that factors explaining the persistence or change of household arrangements will be found among (a) those that change individual preferences for these goods, (b) those that alter their prices, and (c) those that determine individuals' ability to purchase them.

Three qualifications are in order. First, the effect of these factors is tightly related to the nature of each good appropriated or consumed in a household. Shelter, for example, is a public good "produced" by the household that is very sensitive to changes in private income. Not so domestic service or recreation. Thus, fine-tuning the definition of goods to establish their relations and classifying them as public versus private, as complementary or substitutes, and as inferior, superior or mixed, is of some importance to formulate hypotheses explaining change and persistence in household arrangements. As we will see below, this is done in most research on co-residence of the elderly, but mostly in an ad hoc, unsystematic fashion.

Secondly, the ability of individuals to pay for these goods involves income from labour and from income-producing transfers, household labour, and a number of less tangible modes of payment such as affection, deference, or credits from past services. The intrinsic value attached to each of these payments may wax and wane and will alter conditions of individual decision-making about living arrangements.

Thirdly, the tug of traditional sentiments and the social sanctions reinforcing them may be strong. Thus, although changes in conditions that affect prices, preferences and income could lead to decision-making where nuclearization is the optimal strategy for individuals, the observed household arrangements may not reflect this at all. Instead, they may lag behind, sustained by social sanctions that continue to reinforce more traditional household arrangements. Consequently, time lags are relevant and they will routinely play a role in groups where social sanctions to prevent deviations from a traditional norm operate with some efficiency.

This very simple schema is sufficient to pose a number of alternative hypotheses to explain the observed trend towards the increased prevalence among the elderly in the United States and Europe of living alone, and to anticipate what may happen in the rest of the world. What follows is a review of the main factors that have been invoked to explain increasing trends of living alone. Two shortcomings need to be highlighted. First, not all of these factors occupy the same level of abstraction. Thus, for example, income is a characteristic that can be associated with the elderly or their children. The same applies to preferences or to other social transfers. Health status, on the other hand, is more likely to be relevant when it refers to the elderly rather than to their children. Secondly, only in a few cases is the evidence derived from time trends; the bulk comes from cross-sectional studies. These two classes of evidence are not strictly comparable, do not have the same empirical weight and may and finally do lead to different inferences.

The role of income

A number of analyses lead to the conclusion that the rising real income among older persons is no doubt one of the main reasons that the proportions living alone have reached such high levels, especially among

single or previously married women (Burch and Matthews, 1987; see, also, Michael, Fuchs and Scott, 1980; Kobrin, 1976; Soldo and Lauriat, 1976; Wolf, 1984). As individual real income increases, some goods traditionally produced by households become more affordable. Goods produced outside households, such as recreation, become private goods and replace others that are produced by households. Increases in real income are thought to decrease the propensity of individuals to rely on the public good component contained in the basket of household-produced goods.

This explanation implicitly assumes that goods associated with separate living (privacy and independence) are indeed superior and that, when budgetary constraints are relaxed, individuals tend to consume them instead of those produced by shared living. The assumption is tantamount to stating that the preference for these goods preceded the changes that made their consumption feasible, in much the same way as explanations of fertility decline that invoke the importance of knowledge and availability of contraception implicitly assume that a desire for smaller families preceded their advent.

The empirical evidence for an income effect on co-residence among the elderly does exist but it is not altogether convincing. In a cross-national study based on individual data, Pampel (1992) shows that effects of variables proxying for income are in the expected direction, but they are of trivial magnitude, and that the increasing trend in proportions living alone remains largely unexplained by well-identified conditions. In a decomposition analysis of trends in living alone among elderly widows in the United States, Kramarow (1995) also finds that proxies for income account for a fraction of all changes during the twentieth century, although, as mentioned earlier, the key variable does not behave as expected. In an important paper advocating a microeconomic framework, with income as the key variable, Michael, Fuchs and Scott (1980) attribute increases in prevalence of living alone largely to the increased ability to purchase privacy and to support independent living afforded by higher incomes. Finally, in a study of CPS data for the United States from 1965 to 1990, Macunovich and colleagues find that the effect of retirement income on the probability of living alone among elderly widows is positive and very strong (Macunovich and others, 1995). However, their analysis does not provide estimates of the amount of change (increase) in the proportion living alone attributable to changes in income and to other factors. Estimation using limited time trends leads Kobrin (1976) and Soldo (1981) to argue that, although changes in income may have an important influence, it is to the decrease in the availability of children that one should attribute primary responsibility for observed increases in living alone (see, also, Soldo, Wolf and Agree, 1990).

Some of the limited success in explaining time trends using income as an explanatory factor may be attributable to poor measures of real income among the elderly, or to inappropriate controls for relevant variables. Furthermore, the effects of income appear to be highly non-linear (Wolf and Soldo, 1988), and only in a few studies do the models allow for non-linearities.

In developing countries, most studies are of the cross-sectional variety and have not shed any light whatsoever on the nature of changes. We do know, however, that cross-sectional data are not always consistent with the hypothesis that higher income promotes living alone (see above), at least in the simplified models used so far.

More serious than the lack of consistency between theoretical expectations and observable regularities is an interpretative problem. Increases in income among the elderly have taken place as a result of large institutional changes that eroded attachment to traditional norms, transformed individual preferences and reinforced social transfers. These broader social changes have also led to increases in income of children, and this may also have an influence on decisions about shared living.

Finally, the choice of wealth indicators matters, as is the case with property ownership, for example. All three situations (settings where ideologies change simultaneously with material conditions, with children's income and with the meaning of property ownership) lead to a danger of overinterpreting the effects of parental wealth on co-residential arrangements: it will be hard to establish whether the association between income and living alone is a spurious one, making parental income changes endogenous, not an exogenous causal factor.

There is some evidence that effects of income (or other indicators of wealth) do indeed reflect artifacts. For example, in the study by Kramarow cited above, changes in the effects of variables have more salience than do changes in the variables themselves. A similar finding is reported by Chan and DaVanzo (1996) who find that among unmarried individuals in Malaysia, ethnic differentials in living alone are largely attributable to differences in the effects of variables, not to differences in the values of the variables. Patterns of this sort are typically found in the presence of endogenous effects, although, of course, this is not the only possible interpretation.[11]

Thus, although there are strong reasons to suspect that income affects the elderly's co-residence, and that increasing income over time may partially explain the large changes in levels of co-residence in the post-Second World War era, the empirical evidence is mixed and the interpretation of findings is not straightforward.

The role of social and other alternative transfers

One of the factors responsible for the increase in real income among the elderly is the institutionalization of social transfers through pension funds and safety-net programmes. More generally, it is widely stated in the

literature that a central motive for the maintenance of a net flow of family transfers and co-residence with the elderly is associated with needs emerging in social contexts with poorly developed capital markets, precarious private savings rates, high levels of risk and uncertainty, and devoid of institutionalized mechanisms for social transfers. In view of this, one would expect that accounting for social changes that alter such contexts and for the presence and strength of social transfers would provide some leverage to explain observed changes in levels of living alone. But this is not the case. In the study by Pampel (1992) in Europe, his study of United States data (Pampel, 1983), and in one by Keilman (1988) on European countries, the role of social transfers is of trivial importance and cannot account for the observed diversity in levels of co-residence across countries in Europe and over time in the United States.

Similarly, co-residence and other family transfers from children to parents continue to dominate even in societies such as Malaysia and Taiwan Province of China, where, albeit in the absence of significant social transfers towards the elderly, the social and economic contexts are conducive to very high levels of private savings rates (Lillard and Willis, 1995, 1997; Lee, Mason and Miller, 2000).

In contrast to these negative findings, Chan and Cheung (1997) report that among Singaporean retirees the availability of social transfers significantly decreases the propensity to cite children as the main source of financial support. They conclude that as coverage of CPF (a form of social transfer) widens, reliance on children as the main source of financial support will probably decrease. Although the main outcome of their investigation is not co-residence, it is likely that the same conclusion applies to it as it does to other forms of transfers.

In Latin American countries, the aggregate relation between, for example, levels of coverage and proportion of elderly living alone is close, but it is so partly because countries with a well-developed social security system are also those where fertility is lower, where industrialization and modernization have advanced the most, and where changes in the traditional norms may be further ahead. In such conditions, aggregate data will tell us very little about the mechanisms actually involved (Palloni, DeVos and Pelaez, 1999). Deterioration in the real value of social transfers and drastic changes in the mechanisms to enforce them have already led to erosion of wages and pension among the elderly. Future trends are anticipated to only get much worse (Margulis, 1993; Barrientos, 1997). If these changes are indeed accompanied by a decrease in the fraction of elderly living alone, one would have a better case to argue for income effects. This is so because it is unlikely that changes in preferences could operate fast enough to be responsible for the potential decrease in co-residence.[12]

Social transfers are not the only source of alternative support for the elderly. Another source is within-family transfers, consisting of actual flows of cash or services provided by the younger generations. The

institutional changes that facilitate increases in the elderly's income are also responsible for increasing real income among their children, and for changes in their consumption priorities. If income of adult children rises, it is more likely that co-residence with parents could be substituted for other private transfers. Admittedly, this requires the relaxation of a regime where stigma or disapproval is attached to children living away from their parents.

In order to test this hypothesis, we must examine jointly patterns of co-residence and the entire array of family transfers towards parents. As a rule, however, this is not done in the studies surveyed.[13] Instead, researchers focus either on the probabilities of co-residence among the elderly, without considering other transfers from their children, or on the flow of transfers from children to the elderly, without considering co-residence. And if they do, co-residence is a control variable, not an outcome variable. For example, in an interesting paper on intergenerational transfers in the United States, Hogan, Eggebeen and Clogg (1993) identify three latent patterns of transfers towards the elderly among younger adults. But since co-residence is not considered as an explicit transfer, the patterns identified in their latent class model are subject to measurement error. It would have been desirable to identify latent classes using co-residence as well as other family transfers. The point is that both should be modelled simultaneously as they are complementary to and may substitute for each other. Whether this occurs or not, and to what extent, may vary across social and economic settings.

Although not explicitly designed to deal with co-residence, the accounting framework elaborated by Lee (1994a, 1994b) could, in principle, take account of both co-residence and other transfers. For example, in the estimation exercise performed by Stecklov (1997) for Côte d'Ivoire, family transfers could be decomposed into those associated with shared living and those originating in other sources. Weights could be assigned to co-residence as a function of the nature of consumption of household goods. This could lead to identification of the relative magnitude of all family transfers. If this exercise is carried out with different social groups, it is possible to describe the variability in co-residential arrangements simultaneously with the variability in other transfer flows (social and family-related).

The role of preferences

The role of preferences is a thorn in the side of research on co-residence arrangements, for their effects can rarely be identified when they are not measured directly (Myers, 1996). The idea that changes in tastes for privacy and independence are causing rapid changes in the living arrangements of the elderly is a plausible one. But there are few studies that measure preferences directly. For the most part, preferences are assumed away, as happens in most research that focuses on changes in the role of income.

Lesthaeghe has argued in favour of the hypothesis that a number of demographic changes, including low fertility, are attributable to the rise of individualism. This emerges as an ideological consequence of the advent of a post-modern society, the spread of affluence and the availability of enhanced social transfers and government-sponsored safety nets (Lesthaeghe and Meekers, 1986; Inglehart, 1981; Lesthaeghe, 1983).

An individualistic superstructure, however, may not suffice without subverting the household as a unit of production of goods, a consideration that is especially important in rural areas of the developing world. Growth of individualism is facilitated by reorganization of production and by technological developments that make possible an ample supply of goods, such as recreation and companionship, traditionally produced by households. Other goods, such as personal care for children and the elderly, housekeeping and meal preparation, also become available outside the household, and the opportunity costs for the production of these goods by individuals within a household become steeper. If, as some empirical research shows (Lesthaeghe and Meekers, 1986), this connection between individualistic ideology and technological and material development is a plausible one, we face, here again, an endogeneity problem, as both income and preferences for living alone are similarly responsive to other factors, without necessarily influencing one another.

Despite these massive changes, traditional ideas appear to change very slowly. Investigations on attitudes of young adults towards the elderly and of elderly people towards their children reveal an important regularity, namely, a strong sense of reciprocity and altruism on the part of both young adults and the elderly alike. In a study not directly focused on co-residence but on motives for intergenerational exchanges, Logan and Spitze (1995) find that, in the United States at least, there is a high degree of consensus across ages on responses that favour older persons' interests. They conclude that, in contrast to a public image of selfishness and self-interest, age differences in the attitude studied highlight intergenerational solidarity: older people's attitudes seem to give greater weight to the needs of younger generations, and vice versa. Relations across age groups apparently have an altruistic character—not only in the family, where economists have come to expect it, but also in the interpersonal realm of governmental programmes. These findings are not necessarily inconsistent with higher probabilities of living alone among the elderly, provided that the "losses" incurred by establishing separate living arrangements are indeed compensated by other transfers, either social or familial. But they give less credence to arguments pointing to a shift in ideology as the main causal factor responsible for trends in living arrangements.

In an analysis of attitudes expressed in focus group interviews in four Asian societies (Philippines, Singapore, Taiwan Province and Thailand), Ingersoll-Dayton and Saengtienchai (1997) report that, while expressions and manifestations of bonds of solidarity with the elderly are changing, respect remains a central value. While strict obedience is on the decline, focus group participants acknowledge that deference and

respect are embedded in many other behaviours. Their findings suggest that, far from being neglected, traditional feelings for the elderly are very much in place.

Similar work with focus groups by Knodel and colleagues in Thailand points to a widespread norm of support for the elderly and the elderly's preferences of co-residence with children. They conclude that fertility decline, and the entire ethos that accompanies the change, may have limited effects on co-residence, largely owing to the relative flexibility among Thais with respect to the gender of co-resident adult children and particularly with respect to the gender of the child who eventually remains with the elderly parents once all others have left the parental household (Knodel, Chayovan and Siriboon, 1992, p. 96). Opinions by participants in their focus groups reflect that young adults and the elderly alike seem to hold co-residence and other forms of support in high esteem, and they are not about to abandon them even if smaller families are accepted as the norm.

In apparent stark contrast, a study of the elderly in the city of Sao Paolo, Brazil carried out by Ramos finds that multigenerational arrangements are not necessarily appreciated by the elderly. In fact, he confirms the existence of a positive gradient between the probability of living alone and levels of poverty but also discovers that the perceptions of those living in three-generational households, in particular, were often negative. They expressed less satisfaction with life and with family relations, and referred to fewer confidants and people to visit than the average for the sample. This was despite the fact that they were receiving more personal and nursing care (Ramos, 1994). On the other hand, those in living arrangements with children (but not jointly with grandchildren) appear to be more satisfied. It is unclear from this whether lack of satisfaction is a result of overall living conditions in three-generational families or the outcome of an inconsistency between actual living arrangements and the elderly's (or children's) preferences. In a comparison of conditions among Dutch and Tuscan elderly, de Jong Gierveld and colleagues find that those living alone were more likely to feel isolated and lonely (de Jong Gierveld, Van Tilburg and Lecchini, 1997). Isolation and loneliness are two important indicators of emotional dissatisfaction and depression among the elderly. However, living with children was less protective against loneliness than was the presence of a spouse, and having a wide social network and other sources of emotional support helped protect against loneliness, independent of living arrangements. This suggests that shared living with children may not always lead to a higher likelihood of emotional satisfaction.

This is all very sketchy and fails to address the main point, namely, whether preferences for living alone—rather than respect for the elderly—have indeed changed. However, these findings cannot be ignored since, if anything, they suggest that there is no compelling and convincing proof of the admittedly more general hypothesis that individualism and self-centredness could be eroding norms of co-residence. If it has changed, preferences for co-residence with the elderly is unlikely to be the product of an overhaul of the ideological

foundation of family solidarity. Even if verified on a massive scale, ideological changes are not sufficient proof, as it would be difficult to reject the alternative hypothesis that new values regarding co-residence are more a rationalization of new behavioural patterns than their cause.

The multiplying effect of diffusion

An idea that has attracted remarkably little attention is that norms of living arrangements among the elderly may be diffused and adopted even when the whole set of material conditions that led to their emergence elsewhere are not yet realized in a particular place and time.

The sudden and large fertility decline that took place in the developing countries after 1970 cannot be explained without recourse to a diffusion explanation. The key is not the diffusion of the availability of contraception but of the social acceptance of a low-fertility norm. Similarly, it could well happen that under a minimum set of conditions regarding social transfers, for example, the norm of living alone becomes accepted and practised among groups that have not yet completely developed all conditions that lead to a higher prevalence of living alone in other places. The lure of what is "Western" is generalized and powerful, and is not just manifested in completed fertility but in family size as well. It may turn out to be even stronger under the onslaught of rapid ageing itself (Wolf, 1994a). It is not implausible, then, to think that one of the components of Westernization, the nuclearization of families, becomes embedded even in local traditional cultures, much as the low-fertility norm is absorbed wholeheartedly by those whose material living conditions lag behind the behavioural innovation.

Admittedly, testing this hypothesis is difficult as it requires long time-series or, alternatively, microdata for different social groups at two or more points in time, a simultaneous assessment of material conditions, and knowledge of co-residential preferences.

Demographic availability of kin

A constraint on the observed prevalence of co-residence with children is the availability of surviving children. In theory, only one surviving child suffices for co-residence to occur. Thus, the fertility decline experienced in Western societies, Asian countries and the majority of the developing world should not, in principle at least, precipitate higher levels of living alone since it takes place simultaneously with an equally sharp increase in child survival. Admittedly, the distribution of children surviving per mother has shifted towards lower values and contains much less dispersion than in the past. But declines in fertility could exert immediate pressure on co-residence only if they are accompanied by widespread childlessness. This is a scenario that could become a fact in industrialized societies but it is not yet so, and it is far from the reality in

developing countries. With a few exceptions, the observed desired family size in many countries and across all cohorts of women does not suggest a future of sharp increases in voluntary childlessness.

The literature on co-residence, however, systematically shows that the number of surviving children does matter for the probability of the elderly to co-reside. In particular, it suggests that elderly persons with a larger number of surviving children are more likely to co-reside. In a thorough review, Wolf (1994a) shows that in most studies carried out before 1993 in the United States and European countries, the probability of living alone is negatively related to the availability of children. Similarly, in an interesting study of United States historical patterns, the authors venture a prediction of future increases in living alone based solely on oscillations in the number of surviving children (Macunovich and others, 1995). But these large effects are also seen in Asia (Casterline and others, 1991; Knodel, Amornsirisomboon and Khiewyoo, 1997) and in Latin America (Solis, 1999; Agree, 1993). How can this regularity be interpreted?

One explanation is that families with higher numbers of children surviving are selected for characteristics that motivate stronger adherence to the traditional norm of co-residing with parents. In this scenario, the explanatory variables (availability) are endogenous and their effects cannot be interpreted as liberally as is frequently done in the literature (Myers, 1992). A second explanation requires us to invoke auxiliary elements that are, strictly speaking, not part of demographic availability per se. A higher number of children surviving implies a larger and more diverse pool of resources so that either the costs (for children) associated with co-residence can be spread over a larger number of individuals or, alternatively, parents are more likely to find a desirable set of choices (Wolf, 1994a). If only one child is available, the brunt of the costs has to be absorbed by one person, and the range of options narrows down to only two. When the number of surviving offspring is higher, there is far more room for adjustment, including the possibility of rotating co-residence. And if there is variance in the characteristics of children, it is more likely that a desirable choice can be at least approximated. This argument assumes a number of conditions regarding bargaining among children, which, for the moment, is intentionally overlooked.

A third explanation suggested by Knodel is that a larger number of children surviving is likely to be associated with higher variance in the ages of children. In particular, families with higher numbers of surviving children are more likely to contain relatively young ones when their parents are older than, say, 60 or 65. To the extent that younger children are less likely to be encumbered by parental responsibilities, they are more likely to co-reside. It follows from this that it is not the availability of children per se that matters, but the characteristics of those available. Although Knodel suggests that the key feature is the age of the youngest, this is but a proxy for the relevant target conditions, namely, those associated with the stage of the life course experienced by all relevant children. Knodel's conjecture finds support in other Asian countries as well (DaVanzo and Chan, 1994; Casterline and others, 1991).

This finding has a few implications. The most important one is that as the length of generations rises—childbearing becomes increasingly concentrated at older ages—the proportion living alone will systematically vary by age of parents: it should be lower at younger ages (young old) and will increase thereafter (oldest old). Thus, the overall proportion living alone will depend strongly on the age distribution of the elderly. In developing countries at least, the cohorts who reach age 60 or 65 by 2020 are relatively large cohorts, a result of transient increases in fertility in the 1950s and 1960s and of steadily declining mortality. But these are the same cohorts adopting norms of concentrated childbearing. Therefore, one would expect that, if everything else is constant, the proportion living alone will decrease for a period of time after 2020 but then increase steadily as these larger cohorts age and their children reach stages in their life cycle that make co-residence with parents increasingly difficult.

If extensively verified, the effects of the age of the youngest child need to be interpreted by examining the life course characteristics of available children, an idea that has been posed and pursued by Wolf in several papers (Wolf, 1994a).

In addition to their age distribution, a characteristic of surviving children systematically omitted from analyses is their composition by migrant status. A demographic measure of availability only reflects a potential for co-residence but conceals the unavailability of those who are migrants. The migration of children from rural to urban areas or from one country to another may reflect household strategies whereby co-residence is replaced by income transfers in the form of remittances. If this is so, controlling for children's migration status will attenuate the effects of pure availability. This is because migrant children are more likely to come from households with a higher number of children among which migration and other income-generating strategies are pursued simultaneously.[14]

The idea that it is not sheer availability that matters has a flip side that has not gone unnoticed. This is that spatial proximity and the ability to establish frequent and easy contact with children and kin may ultimately matter more than shared living in the same dwelling (Wolf, 1994a; Choe, 1987; Florentina, 1991; Cai, 1991; Kendig, 1987; Knipsheer and others, 1995). It may also solve some of the potential problems of co-residence that may lead to the elderly's dissatisfaction (Ramos, 1994). Spatial proximity to children and the elderly's density of social networks involving children (and other kin) and friends or acquaintances could be considered as substitute transfers, just as are help with income or with provision of services.

Finally, it is worth considering another characteristic of children, namely, their composition by marital status. Although in some research a measure of availability of children is the number of unmarried surviving children, the bulk of investigations uses number of children, frequently controlling for their marital status. At

least in the United States, the effects are unequivocal: availability of unmarried children matters more than sheer availability (Wolf and Soldo, 1988). Recent work has begun to explore this theme in depth but from the point of view of parents, namely, assessing the effects of parental marital history on the patterns of exchanges flowing from children to parents (Pezzin and Schone, 1999). In most countries in Asia and Latin America, marital status matters less as co-residence seems to take place equally among parents and unmarried and married children.[15]

The issue has importance if trends towards a new form of family organization involving high levels of divorce and consensual unions materialize throughout the developing world. This is because the budgetary, spatial and social constraints imposed by these new types of family arrangements of children are bound to affect their (and their parents') preferences for co-residence, and constrain (or enhance?) shared living even more than the reduction in sheer availability of surviving children.

Health status of the elderly

In virtually all cross-sectional studies of the probability of living alone (or co-residing with children or kin) there is mention of the role of the health status of the elderly. The conjecture is simple: since the needs of elderly persons who are disabled or ill are greater, co-residence should be more likely (keeping everything else constant). The empirical record is not at all clear on this score; although the effects are usually in the expected direction (for example, Haaga, Peterson and DaVanzo, 1993), their magnitude pales relative to the magnitude of other determinants. In a few studies, the findings are inconsistent with those expected and no relation at all is found (Martin, 1989). In yet others, the effects are as expected for some elderly (married) but not for others (unmarried) (DaVanzo and Chan, 1994).

If health status and disability status do have an independent impact, their role in the overall reduction of the probability to co-reside should be investigated. In view of the conjecture posed earlier about the possible increase in disability and chronic illnesses among the elderly in Latin America, one would expect that the trend towards solitary living promoted by other factors would be counterbalanced by the expected deterioration of health status.

Finally, most studies that use health measures rely heavily on self-reports. These are subject to some measurement error but, more importantly, may reflect a state achieved as a result of co-residence. That is, some elderly among those who co-reside may have been ill and temporarily disabled in the recent past, but recovered after the onset of a co-residence spell.

Residential arrangements as a coping mechanism

As is plain from the theoretical framework reviewed earlier, patterns of co-residence of the elderly have traditionally been studied with excessively static lenses, as if they were part of inflexible social arrangements or exchanges and lacking in plasticity. As a consequence, we know little about the social use of co-residence as a transient adjusting mechanism to cope with crises, however short-lived, triggered by income or property loss, death of a spouse, or health deterioration, or as a defensive resource to offset deleterious consequences of shifts in social conditions that suddenly alter demographic profiles, institutional settings or property regimes. In all these cases, living arrangements may be temporarily adjusted and tinkered with until conditions in existence before the adjustment are restored, a point in which they may return to their initial state.

An important example of this type of phenomenon is taking place in countries in Africa, as a consequence of the HIV/AIDS epidemic. About 10 years ago, simple simulation models suggested that a major adjustment in patterns of co-residence would need to occur to accommodate not just for the steep increases in adult mortality, but also for the completely changed adult health profile that would ensue (Lee and Palloni, 1992). This has proved to be true, but the author knows of only one effort to assess what the adjustments are for the elderly in the case of Thailand (Wachter, Knodel and VanLandingham, 1999) and none in Africa.

A second example of short-term changes in co-residence patterns of the elderly in response to social shifts may be occurring in a number of countries in Latin America. The most demographically advanced among them (Argentina, Chile and Uruguay) are also the ones where the ageing process is proceeding most rapidly and where currency and inflationary crises and draconian restructuring programmes have undermined the earnings of the elderly population. They are also those in which reforms of traditional pension systems and publicly funded health insurance programmes have been thoroughly dismantled. Although there is abundant anecdotal evidence indicating that there are significant increases in co-residence of the elderly, I know of no study assessing the impact that these changes have had on the elderly's living arrangements. This may undermine our ability to predict what will inevitably occur in other countries, such as Brazil and Mexico, that could rapidly join the ranks of countries such as Argentina, Chile and Uruguay.

MODELLING LIVING ARRANGEMENTS OF THE ELDERLY

The present section reviews several classes of models for the study of the living arrangements of the elderly. Some of them have been conventionally used in the literature and will continue to be used for a time to come. Others are less developed and their use is much less widespread, but they offer a great deal of

promise and their properties and implications should be studied further. The section also contains a discussion of the role of simulation and data needs to shed light on issues that remain poorly understood.

The review is necessarily selected and driven by two rather narrow concerns. First, as mentioned above, one of the central motivations for studying the living arrangements of the elderly is a practical one, namely, the belief that they have a bearing on the elderly's levels of well-being. We are normally content with assessments about what the prevalent living arrangements are, an examination of the nature of time trends, and the identification of key factors that determine them. Most of the time, however, we neglect to consider related issues regarding residential preferences of parents and children alike, or whether they suffice for satisfying basic necessities. It seems fair to ask whether our models enable us to pass judgements about the extent to which the welfare of the elderly is affected by living arrangements.

Secondly, as reiterated several times in this paper, the living arrangements of the elderly are just one among many other alternative resources, and may not even be the most important one. Furthermore, the availability of other resources may condition the role played by living arrangements, when they play a role at all. Yet, as noted earlier, living arrangements are studied as an outcome in itself, neglecting the entire bundle of resources that the elderly "consume", including savings, bequests, assets and rents, wages and family and social transfers. Thus, an important question to ask is whether the models we use enable us to understand complementarities, substitutability and contingencies of living arrangements and other resources, particularly those associated with other family and social transfers.

Types of models

Five classes of models are distinguished: reduced forms for co-residence (simple and complex), structural forms for co-residence (conditional and unconditional) and structural forms for intergenerational transfers.

Reduced forms for co-residence: simple representations

The conventional way of studying the living arrangements of the elderly is to use observable information at one point in time or from pooled time-series data, and then to model the observed probabilities of living alone versus a number of alternative options. If the alternatives are just two, a logit (or probit) model is used. If there are more than two, a multinomial logit is the preferred choice.

The specification of the models usually proceeds by including co-variates in the model that are considered to be good indicators of properties identified in a number of alternative theories about co-residence (old-age security hypothesis, parental repayments, risk and insurance, altruism, exchange motive and so on). In

addition, appropriate controls are included. Often, empirical specifications include characteristics of the elderly but only on rare occasions do they also include selected characteristics of a sample of their surviving children.

The estimation of these models results in a set of regression coefficients, usually in the form of estimates of effects on the log odds of living alone (versus one or a number of alternative co-residential arrangements). The validity of a theory is then judged by examining the statistical significance of the regression coefficients of the set of indicators associated with it.

The shortcomings of this kind of modelling are many. The paper focuses on three of them that are closely related to the two main concerns stated at the outset of the present section.

(a) Lack of a decision-making model

Perhaps the most important drawback of these models is that they never explicitly pose a representation of what the decision-making process for co-residence is. Even if one neglects the existence of other transfers and ignores their influence on co-residence, the estimated coefficients are largely uninterpretable since we do not know what they refer to, other than to an empirically found association. It is certainly not enough to say, for example, that the effects of the variable income or property ownership are statistically significant and properly assigned as we have no theoretical model within which they are assigned some meaning. One consequence of this lack of theoretical specificity is that endogeneity problems plague these studies and, frequently, the researcher pays only passing attention to them. The second drawback is that to the extent that the decision-making process leading to observable co-residential patterns is opaque, comparability of estimated effects over time or over units of analyses is impossible, for one does not know how differences in estimates should be interpreted. They may simply reflect changes in the importance of the degree to which a variable is endogenous to the process, or be the result of shifts in the social contexts where decisions about co-residence are made. Finally, individual preferences are never explicitly introduced, and frequently the whole issue of preferences is hardly mentioned at all. The result is that these models cannot even begin to address whether the elderly's residential arrangements increase, decrease or are neutral with respect to their well-being.

(b) *Absence of representation of entire sets of options*

An equally troublesome feature of these models is that, more often than not, there is no consideration of alternative co-residence options offered by the array of children and kin available to the elderly. This is not just a difficulty that can be solved by controlling for the demographic availability of children (using the number of children surviving) or kin (using frequencies of available close kin). The problem is that what

matters for co-residential arrangements has more to do with the joint characteristics of children vis-à-vis their parents than with the sheer number of surviving children. Their marital status, their labour-force status, their education and their income are all of considerable importance and should to be taken into account in suitable ways.

(c) *Lack of consideration of other family and social transfers*

A final shortcoming is that the role of other family and social transfers is overlooked. In the rare examples when this is not the case, they are represented as co-variates that enter the specification of the model in the same way as any other co-variate. Instead, the actual utilization of other transfers could be a function of co-residence (rather than the other way around) as children and the elderly may substitute one for the other. More generally, the availability and feasibility of alternative transfers may be an integral part of the decision-making process that leads to living alone or to co-residence. They should then be considered as joint outcomes about which individuals make decisions. The lack of a solution to this problem leads to difficulties analogous to those described earlier regarding the availability of children. This is not surprising since they are tightly related to each other. For example, accounting for children's educational effects on the probability of the elderly's co-residence has relevance for assessing the validity of the hypothesis according to which increased co-residence with the more highly educated among the children reflects the existence of repayment of parental investments in children's education.

Reduced forms for co-residence: complex representations

To resolve the problem summarized in (b) above, Wolf and Soldo (1988) formulate a more nuanced model that incorporates all co-residential arrangements that are possible with surviving children. This formulation consists of a multinomial model simultaneously considering all options available to the elderly and making them functions of both the elderly's and, potentially, all of their children's characteristics. It can be applied in cases where there is substantial simultaneous co-residence with children, or when the prevailing rule is one of co-residence with a single child. Estimates of such models can be interpreted more freely than can the conventional reduced logit (or probit) approach as they are potentially informative about the influence of all possible parent-children pairings and about their relevant characteristics. So far, however, the actual estimation of these models has been carried out in the absence of a theoretical formulation that makes explicit the underlying decision-making process, and that considers the non-additive influence of alternative forms of transfers.[16]

An important advantage of the model proposed by Wolf is that, with appropriate information, one could include explicit consideration of other family transfers (as associated characteristics of children), as well as

other social transfers. In this sense, the model also opens the door to solve problem (c). However, since it still does not solve (a), it is unlikely that one could interpret meaningfully the effects of variables measuring the existence of other family (via child) transfers.

Structural forms for co-residence: conditional model

Kotlikoff and Morris (1990) were the first to derive an estimable model of co-residence from a stylized yet informative and potentially rich decision-making framework for co-residence between parents and one available child (or kin). The detailed description of the framework is beyond the scope of this paper but its core aspects can be briefly summarized. One starts from first principles, namely, two utility functions, one for a child, U(c), and one for the parent, U(p). Each of them depends on levels of consumption, C, housing services, H, and a pair of coefficients capturing preferences for shared living arrangements, A and B, for the child and parent, respectively. In addition, there is a utility function that applies when they choose to live together. This is a weighted average of U(c) and U(p), where the weight is a parameter 2 chosen jointly by the pair. This parameter reflects the bargaining process between parent and child. However, knowledge of the particular value of 2 chosen by the pair if they decide to live together is not necessary to infer their preferences for shared living arrangements. All that is needed is that there be a set of possible values of 2 such that, in each case, parent and child are better off living together than living apart. This property is key since it means that the analyst can separate the preferences of the elderly parent and adult children from the unknown dynamics of the bargaining process that makes shared living possible.

A final step in the construction of the model is the formulation of a pair of equations for A and B, the unmeasured preferences for the child and the parent. These are made functions of measured characteristics and associated effects, and of individual heterogeneity:

$$A=\forall_c X_c+\gamma_c$$
$$B=\forall_p X_p+\gamma_p$$

where A and B are the child and parent preferences for shared living, X_c and X_p are vectors of child and parental characteristics, $\forall_c$ and $\forall_p$ are effects, and γ_c and γ_p are child and parent unmeasured factors.

Co-residence is an event that will occur if, and only if, a simple condition, K, is met. Condition K can be expressed as a function of A and B and, therefore, determined by the vectors of measured characteristics, associated vectors of estimable effects and, lastly, by unmeasured individual heterogeneity. The precise form of the function on which shared living depends is contingent on the precise parameterization of the γs. The

important point is that, under a normal approximation, the final formulation is a model quite different from a conventional reduced-form probit or logit.

There are a number of advantages to this approach. The first is that the final functional form for the probability of co-residence that the analyst needs to estimate empirically is entirely determined by the decision-making model. This is in contrast to the reduced form models researchers usually use, where the functional form is defined a priori as probit or logit or tobit. The second advantage is that the way in which co-variates affect the decision about co-residence is not arbitrarily specified but depends on the nature of the decision-making model. To the extent that the assumptions and properties of this model are altered, so will the form in which individual characteristics or social settings affect the probabilities of finding co-residence for a particular parent-child pair.

The Kotlikoff-Morris model is elementary since it only allows for effects of a limited set of characteristics, and their utility functions are, perhaps intentionally, excessively simplistic. However, neither of these shortcomings is fatal as the model can be expanded to accommodate, for example, more complex utility functions and to include the effects of numerous parental and child characteristics omitted in their first application. It is because of this that their model solves problem (a). It does not, however, solve problem (b) and, consequently, cannot solve problem (c).

Structural forms for co-residence: unconditional model

The most important disadvantage of the Kotlikoff-Morris model is that it is limited to one pair, the parent and one available child. In this sense, the model is conditional on the choice of one pairing. For most interesting cases, this will not do since within each family there might be a number of possible pairs that could lead to shared living between parents and children.

The solution to this shortcoming consists of extending the Kotlikoff-Morris model to multiple pairs and then adopting the two-sided logit (TSL) model proposed by Logan (1996) and Logan, Hoff and Newton (1999) to determine the empirically observable co-residence pairs. The resulting model is unconditional (on the pair chosen for co-residence). An outline of the solution follows. First, we extend the Kotlikoff-Morris model to consider every possible pair that can be formed between parents and each surviving (available) child. This means that there will be as many U(c) functions as there are children and as many total (family) utility functions as there are possible pairs.[17] As a consequence, there will be as many parameters 2 as there are possible pairs for shared co-residence. Each of these captures the bilateral bargaining between a child and the parent, as well as the dynamic of any between-sibling bargaining process.

The second step consists of the implementation of the two-sided logit approach proposed by Logan and others (1999) to determine the equilibrium (stable) solution to the matching problem and to estimate the effects of vectors of parental and children's characteristics. The TSL approach was designed to increase the tractability of problems involving a match between two sides. Each side is assumed to have preferences that are functions of the characteristics of each member of the pair. The empty set option (no pair formed) is equivalent in our case to choosing the option of living apart.

Estimation of the TSL model is numerically very difficult when the set of pairs that can be formed is large. However, in the case of co-residence, we have a rather small number of possible pairs per family, unless the number of surviving children is extremely large. Therefore, the numerical estimation problems should be considerably reduced.

Structural forms for intergenerational transfers

The main disadvantage of the extension of Kotlikoff-Morris type models is that they are not designed to deal with the totality of intergenerational transfers, of which co-residence is a part. An admittedly ad hoc solution that preserves the main properties of the model is to include family or social transfers as part of the vector of parent-child characteristics. However, this is unappealing and unlikely to get us too far in assessing theories regarding joint motives for co-residence and other transfers between parents and children.

The only feasible solution is to build models for overlapping generations such as those proposed by Lillard and Willis (1995), and the richer ones suggested and estimated by Rosenzweig and Wolpin (1993). They are, in principle at least, well designed for addressing the problem of decision-making about co-residence as part of the bundle of intergenerational exchanges, but are difficult to specify, are data demanding, and complicated to estimate, all of which limits their more generalized application.

Further developments

While the modelling issues discussed above and their implications for data collection could mean significant advances in the field, more modest undertakings can also improve our understanding of the living arrangements of the elderly. The present section concludes at a lower level of abstraction, with a brief discussion of desirable analyses of easily obtainable aggregate data. Also identified are some improvements in our existing analytic schemes and their application to extant longitudinal data.

Aggregate data analysis

A number of interesting issues discussed earlier could be studied with data already available to us, particularly those in the form of microsamples from national censuses. For example, it is not difficult to create comparable (across time and social settings) measures of poverty from census data, and to cross-tabulate the elderly population by poverty status and a number of relevant characteristics. This will enable us to establish levels of poverty by living arrangements and, when two or more censuses are available, to assess time trends. Modelling of these data for causal inferences is difficult but a subordinate goal, that of understanding the status quo as well as anticipating where future trends are heading, could be attained.

Similarly, cross-classification of the elderly by living arrangements and number of surviving children is a useful exercise to understand patterns of living arrangements by demographic availability and according to life-cycle stages of children. The goal is not to produce precise causal inference but rather a detailed demographic accounting to establish whether theoretically interesting relations conjectured by researchers are at least weakly supported.

Finally, cross-national studies of microsamples linked to contextual data pertaining to institutional contexts can be useful for identifying the variability of older persons' living arrangements according to conditions that normally constrain observed patterns of social and family transfers.

Analytic improvements

A plea for collecting and using individual longitudinal data is customary at the end of many papers on living arrangements. There are many reasons for this plea, including the enhanced ability to identify the existence and quantify past transfers and living arrangements. There is a different reason to focus on longitudinal data (even if only in the form of limited panels), namely, the enhanced ability to assess the influence, however transient, of changes in individual or social conditions on co-residential arrangements.

A simple example is the one regarding the relation between elderly health status and living arrangements. With access to longitudinal data, we can estimate reduced form multistate hazard models that, with all their limitations, will shed light on the issue of plasticity of living arrangements. It could well be, for example, that although the norm of shared living loses its appeal, another norm remains in effect, namely, one that calls for co-residence if and when the health status of a parent deteriorates. Under what conditions associated with individual characteristics (parents' and children's) and their social context (existence of health insurance schemes and so on) this occurs, and under which ones it is less likely to materialize is of relevance for

understanding how levels of well-being of the elderly may fluctuate. These studies can also support the projection of future living arrangements as a function of the health status of the elderly.

The plea for using microsimulation models is also well-known but less frequent. For the most part, microsimulation is a tool sparsely used to quantify the effects of demographic conditions on availability (DeVos and Palloni, 1989; Wachter, Knodel and VanLandingham, 1999; Wachter, Blackwell and Hammel, 1999; Wolf, 1999). The outcomes of microsimulation, however, are silent on issues regarding preferences and propensities and without them their application is of limited reach.

However, as suggested and implemented by Wolf in several papers (1994b, 1999), microsimulation models can be combined with empirical estimates of the probabilities of co-residence, given the characteristics of the parent-child pair. If models regarding co-residence were designed to deal with other transfers, there is no reason why microsimulation could not incorporate modules designed to represent jointly the effects of demographic availability, the effects of individual characteristics and the interplay of co-residence and other transfers. This is a powerful tool that can make tractable thorny issues regarding feedbacks and may, if properly used, provide the needed link between micromodels of intergenerational transfers (including co-residence) and aggregate demographic accounting of the sort promoted by Lee and colleagues.

CONCLUSIONS

Throughout this paper the author stresses the important point that our concern with the living arrangements of the elderly should be subordinate to the larger concern for welfare among them. This requires that we pose the problem differently from the way in which it has been treated historically. To do so we need to address three interrelated problems. The solution to each of these problems presents its own demands in terms of theories, model formulations and data-collection protocols.

The first problem is to link living arrangements more tightly to levels of well-being of the elderly. This requires that we emphasize as much the precise measurement of the elderly's (and children's) preferences and desires as we do observed living arrangements. Simultaneously, our data-collection efforts should also include objective assessments of levels of well-being by compiling lists of goods consumed and needs that may depend on health status, residential location and other individual or contextual characteristics. Making inferences about the elderly's living arrangements that have indeterminate implications for their levels of well-being is a somewhat empty exercise.

The second problem is to understand how living arrangements change as a function of the increase in the aged population itself, the improving (or deteriorating) health status of the elderly and the processes that alter

the opportunities and constraints of their children (or other kin). In concluding a review of the literature on living arrangements, Wolf (1994a) conjectured that perhaps the largest concern of all has to do with feedback effects: as ageing of societies proceeds, the growth of the elderly population itself could create conditions for changes in the norms of co-residence and of relations between generations. If they occur, these feedback effects will require time before they can percolate and influence observable living arrangements and other social and familial transfers. Although some of them may be interpretable by way of diffusion-like models, where trends in one social context directly affect trends in others, their full understanding will require fine-tuning of our frameworks, as well as collecting much more detailed information on actual preferences and characteristics of the social, political and economic settings than we do now.

By the same token, larger demographic changes that include but are not restricted to rapid ageing will influence the characteristics of the life cycle of adult children. Higher prevalence of divorce and consensual unions, shifts in the timing of marriage and of first birth cannot occur without having an impact on patterns of relations between generations. What influences, for example, will the massive prevalence of divorce and disrupted families of adult children have on opportunities and desire to co-reside with parents?

Finally, a major part of the prospective changes in modern demographic regimes could be substantial increases in longevity. The conditions under which this will occur will necessarily differ among countries. In some, increased longevity may go hand in hand with better health and longer duration lived as healthy at older ages. In others, this may not be the case at all. The consequence could be an increasing demand for care among a much larger stock of elderly people living much longer. What changes will this bring in patterns of living arrangements and what effects will they have on the levels of well-being of the elderly?

The third and final problem has to do with locating living arrangements of the elderly within a larger context constituted by other family and social transfers. Changes in education and technology will affect productivity and human capital and thus alter the basis of within-family transfers. The diffusion of Western-like institutions will provide opportunities for materializing social transfers in societies that did not have them, and globalization of the economy will offer numerous opportunities for changing the nature of capital markets, altering the levels of risks and uncertainties in local economies, and modifying private and governmental savings patterns. Decisions about the living arrangements of the elderly will be affected by these changes, which will surely alter the likelihood, magnitude and direction of family and social transfers made possible by the new or reshaped institutional contexts. Without considering co-residence and other transfers simultaneously, as complements or substitutes for each other, our knowledge about levels and patterns of the elderly's living arrangements will continue to lag behind their historical transformations.

NOTES

[1]The availability ratio is the ratio of the population 60 and over to the population between ages 15 and 59. The latter population is the pool of available individuals with whom the elderly could co-reside.

[2]It is suspected that the prevalence of living alone among the elderly in Africa, though varying widely across countries, is at lower levels than in Asia and Latin America. This could be changing rapidly, particularly in countries with high levels of HIV prevalence.

[3]Co-residence regimes in sub-Saharan Africa are undergoing sustained stress and may quickly become destabilized as a consequence of the massive effects of the HIV/AIDS epidemic.

[4]For a view imputing changes in age patterns of living alone to past oscillations in fertility, see Macunovich and others, 1995.

[5]The eighth five-year plan in Thailand makes this explicitly a governmental concern (NESDB, 1995, cited in Knodel, Amornsirisomboon and Khiewyoo, 1997). See, also, Reher (1998) for a statement regarding the consequences, and state of affairs they reflect, of co-residence in Europe.

[6]This is one area where improvements through purely descriptive endeavours are feasible and useful. In fact, we now have available a large number of microcensus data for several areas in the world from which one could compute indicators of levels of well-being for the elderly by household type. These estimates could be compared across countries and over time to assess changes in the joint distribution of the elderly by co-residence and levels of well-being. Admittedly, the most difficult task here is to construct comparable indicators of well-being from census data.

[7]In a more recent analysis of the United States microcensus samples, Kramarow finds that the effects of home ownership, the most important among a handful of indicators of individual wealth, on the probability of living alone among elderly widows are trivial before 1940 but turn very strong and negative between 1960 and 1990 (Kramarow, 1995, p.343). This is a somewhat surprising result because, as the author notes, we expect that home ownership reflects wealth which is associated with living alone in the second half of the twentieth century (Kramarow, p. 344). Home ownership is a variable that behaves erratically in most analyses of living alone in developing countries, at times depressing the probability of living alone (Agree, 1993, for Brazil) and at times enhancing it (Solis, 1999, for Mexico). To the extent that older persons' home ownership encourages children to move in with parents, there will be a positive association between it and probabilities of living alone. Without being able to explicitly address the endogeneity problem associated with the use of this variable, one needs to also examine relations between co-residence and other indicators of wealth. Similarly, it is possible that the relationship between wealth and co-residence, at least as embedded in B values, is gender-specific and that Kramarow's results apply only to women, not to men.

[8]The finding is consistent with Kramarow's findings. As mentioned in note 7, one possibility is that there are sharp gender differentials in the relations between poverty and co-residence, a conjecture that Smeeding's data do not confirm. A second possibility is that the relationship between poverty levels and co-residence involves complicated non-linearities not captured by the coarse categorization of poverty level used here.

[9]There is another possibility, which is to measure expectancies rather than distributions. Thus, for example, Schoeni (1998) shows that the fraction of the elderly living alone and the expected duration of living alone behave in somewhat different ways. But, since the differences between the two are hardly consequential and the latter is harder to compute, I will choose to focus on the distributional measure.

[10]This statement refers to overall transfers. Family transfers in industrialized societies are still downward but are more than offset by large social transfers mostly realized through the public sector.

[11]An interpretative problem of a different nature from that posed by endogeneity has to do with model specification. Thus, Kotlikoff and Morris (1990) show that the interpretation of income effects at one point in time is highly sensitive to the nature of the underlying decision process about shared living. They show, for example, that effects of increase of parental income on the probability of co-residence are a function of both parents' and children's preferences for shared living.

[12]However, in the study by Lesthaeghe and Meekers (1986), the authors find that short-run oscillations in the inflation rate have a visible impact on value judgements associated with preferences.

[13]A noteworthy exception is the analysis of Malaysian data carried out by Haaga and colleagues where they verify that, at least among those in poor health, family transfers are larger in the absence of co-residence. Similarly, Rosenzweig and Wolpin (1993) explictly develop a model where co-residence and other transfers are considered simultaneously. The estimates they derive from United States data, however, do not provide a basis for assessing the relations between one and the other since they do not investigate the latter stages of the life cycle.

[14]In reference to the previous discussion on the relation between co-residence and well-being, it should be noted that areas of high migration may be among those where parents' and children's co-residential status is a misleading indicator of quality of living and well-being of the elderly.

[15]In their study in Malaysia, however, DaVanzo and Chan (1995) find that there are important differentials according to marital status and gender.

[16]In a generalization of this approach to continuous but truncated variables, Wolf and colleagues suggest using a simultaneous tobit equation model (Wolf, Freedman and Soldo, 1997).

[17]A more complicated alternative is to consider a unique but composite family utility function including all children and the parents.

TABLE 1. PROPORTION OF THE POPULATION OVER AGE 60 (P) AND AVAILABILITY RATIOS (AR), 1990-2025[a]

Region	1990		2020-2025	
	P	*AR*	*P*	*AR*
Sub-Saharan Africa	0.047	12.8	0.048	11.8
Eastern Africa	0.044	12.3	0.048	13.6
Central Africa	0.049	10.9	0.046	12.7
Northern Africa	0.059	10.4	0.093	7.9
Southern Africa	0.055	11.5	0.066	10.6
Western Africa	0.047	11.6	0.051	12.1
Eastern Asia	0.103	7.2	0.178	4.6
South Central Asia	0.067	9.4	0.101	7.3
South-eastern Asia	0.067	9.9	0.112	6.8
Western Asia	0.068	9.3	0.097	7.2
Eastern Europe	0.171	4.6	0.236	3.6
Northern Europe	0.202	4.0	0.204	3.2
Southern Europe	0.206	4.1	0.278	3.1
Western Europe	0.202	4.1	0.278	3.1
Caribbean	0.093	7.4	0.141	5.4
Central America	0.062	10.1	0.106	6.9
South America	0.077	8.7	0.126	6.0
Northern America	0.163	4.8	0.235	3.5
Oceania	0.132	5.6	0.184	4.2

[a]AR is the ratio of population aged 15-59 to the population aged 60+. A more precise indicator of availability requires establishing average length of generations, t(x), between the elderly aged x and their children aged x-t(x). One can then form the age-specific availability ratio for age x, AR(x), as the ratio of population aged x to the population aged x-t(x). The adjusted availability ratio is the weighted average of AR(x).

Source: United Nations, World Population Prospects, 1998 Revision.

TABLE 2. PROPORTIONAL DISTRIBUTION OF POPULATION 60+ ACCORDING TO SELF-REPORTED HEALTH STATUS: SELECTED COUNTRIES IN LATIN AMERICA AND THE CARIBBEAN, AND THE UNITED STATES, 1980-1995

	A. Unabbreviated categories			
Country	*Poor*	*Fair*	*Good*	*Very Good*
		Males		
Argentina	3.4	33.6	53.4	9.7
Brazil	22.2	-	62.2	15.6
Chile	20.2	37.9	36.3	5.6
Costa Rica	17.7	38.5	33.1	10.6
Mexico	19.6	47.0	27.8	5.6
Trinidad and Tobago	26.6	32.6	32.6	7.9
USA black population (HRS)	12.6	22.5	30.6	39.3
USA black population (AHEAD)	20.4	30.0	28.0	21.6
USA white population (HRS)	7.7	12.3	28.8	51.2
USA white population ((AHEAD)	12.5	21.0	32.0	34.6
		Females		
Argentina	10.0	42.7	40.8	6.6
Brazil	34.9	-	50.6	14.5
Chile	27.6	42.9	34.7	4.9
Costa Rica	20.7	42.8	27.8	8.7
Mexico	22.6	48.5	24.8	4.1
Trinidad and Tobago	37.6	37.1	19.8	5.3
USA black population (HRS)	12.0	22.7	33.1	32.2
USA black population (AHEAD)	19.7	29.7	27.6	22.9
USA white population (HRS)	6.7	14.3	25.8	54.6
USA white population ((AHEAD)	11.5	22.5	30.4	35.8

TABLE 2. (*continued)*

Country	*B. Abbreviated categories*	
	Poor/fair	*Good/very good*
	Males	
Argentina	37.4	63.0
Brazil	61.4	38.6
Chile	58.1	41.9
Colombia	55.3	44.7
Costa Rica	56.2	43.7
El Salvador	78.8	22.2
Jamaica	66.6	33.4
Mexico	79.7	20.3
Trinidad and Tobago	59.2	40.8
Venezuela	82.7	17.3
USA black population (HRS)	35.1	64.9
USA black population (AHEAD)	50.4	49.6
USA white population (HRS)	20.0	80.0
USA white population ((AHEAD)	33.5	66.6
	Females	
Argentina	52.7	47.4
Brazil	72.8	27.2
Chile	70.5	29.6
Colombia	66.7	33.3
Costa Rica	63.5	36.5
El Salvador	77.6	18.4
Jamaica	86.0	14.0
Mexico	71.1	28.9
Trinidad and Tobago	74.7	25.3
Venezuela	77.3	22.7
USA black population (HRS)	34.7	65.3
USA black population (AHEAD)	49.4	50.5
USA white population (HRS)	21.6	80.4
USA white population ((AHEAD)	34.0	66.0

Sources: Pan American Health Organization, 1989a, 1989b, 1989c, 1990, 1993, except Brazil and Mexico (see Palloni, DeVos and Pelaez, 1999). For Brazil, see Ramos and others (1998); for Mexico, see Gutierrez (1998); for USA, see Smith and Kingston (1995).

HRS = Health and Retirement Survey.
AHEAD = Asset and Health Dynamics among the Oldest Old.

TABLE 3a. PROPORTION OF UNMARRIED ELDERLY (65+) LIVING ALONE IN THE UNITED STATES, 1910-1990

	Unmarried elderly living alone	
Year	*White*	*Non-white*
1910	0.12	0.16
1940	0.21	0.15
1960	0.39	0.30
1980	0.66	0.47
1990	0.70	0.49

Sources: Ruggles (1994). Estimates for 1990 calculated from Kramarow (1995).

TABLE 3b. PROPORTION OF UNMARRIED ELDERLY (60+) LIVING ALONE IN EUROPE, 1975-1990[a]

	Year	
Country or area	*1975*	*1990*
France	0.74	0.86
Belgium	0.72	0.85
Netherlands	0.72	0.87
West Germany	0.60	0.77
Italy	0.46	0.66
Luxembourg	0.55	0.73
Denmark	0.84	0.92
Ireland	0.37	0.56
Great Britain	0.75	0.87
Northern Ireland	0.49	0.68
Finland		0.70
Czech Republic (1991)		0.66
Estonia (1989)		0.51
Romania (1992)		0.51
Bulgaria (1992)		0.50

[a]No comparable time trends are available for Eastern Europe. Estimates for Eastern Europe refer to elderly population 60+.

Sources: Figures for Western Europe calculated from Pampel (1992). Figures for Eastern Europe from Devos and Sandefur (1999).

TABLE 3c. PROPORTION OF ELDERLY POPULATION LIVING ALONE IN OTHER COUNTRIES OR AREAS

Brazil: unmarried elderly 55+		Mexico: all elderly 65+	
1960	0.11	1976	0.07
1980	0.20	1994	0.07
Chile: unmarried elderly 60+		Argentina: unmarried elderly 60+	
1970	0.06	1970	0.10
1982	0.08	1982	0.11
Japan: unmarried elderly 65+		Thailand: all elderly 65+	
1970	0.15	1986	0.06
1980	0.27	1994	0.08
1990	0.35		
Taiwan Province of China: all elderly 65+ (living alone or with spouse)			
1976	0.09		
1989	0.23		

Sources: For Argentina, Pan American Health Organization (1989a); for Brazil, Agree (1993); for Chile, DeVos, (1990); for Japan, Hirosima (1997); for Mexico, Solis (1999); for Taiwan Province, Hermalin , Ofstedal and Chang (1992); and for Thailand, Knodel, Amornsirisomboon and Khiewyoo (1997).

TABLE 4. PROPORTION OF ALL ELDERLY AND OF UNMARRIED[a] ELDERLY (60+) LIVING ALONE, BY SEX, SELECTED LATIN AMERICAN COUNTRIES

		All			*Unmarried*		
	Year	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*
Argentina	1970	10	10	11	21	31	17
	1980	11	9	12	22	29	20
Bolivia	1976	12	10	13	23	28	21
Brazil	1970	7	5	9	17	24	14
	1980	8	7	10	21	31	17
Chile	1970	6	7	6	12	18	9
	1982	8	7	8	15	22	13
Colombia	1973	6	6	6	10	15	8
	1985	6	6	6	12	19	9
Costa Rica	1973	6	5	6	12	18	9
	1984	8	8	8	17	25	13
Dominican Republic	1970	7	8	6	12	21	8
	1981	7	9	6	15	26	9
Ecuador	1974	8	8	7	15	23	12
	1982	9	9	8	19	27	14
Guatemala	1981	5	5	6	12	20	9
Mexico	1970	8	6	10	17	23	15
Nicaragua	1971	8	9	7	14	27	10
Panama	1970	12	15	9	21	35	13
	1980	12	15	9	24	38	15
Paraguay	1972	7	7	8	14	23	11
	1982	7	5	8	14	20	12
Venezuela	1981	8	9	7	14	23	9

[a]Unmarried refers to individuals not in a union.

Source: Microsamples of decennial censuses.

TABLE 5. EFFECTS OF INDICATORS OF WELL-BEING ON THE PROBABILITY OF LIVING ALONE, ASIA AND LATIN AMERICA

Study	*Country or area (year)*	*Indicator of well-being*[a]	*Direction of effect*[b]
Martin (1989)	Republic of Korea (1984)	Ownership	Positive
	Malaysia (1984)	Ownership	Positive
	Philippines (1984)	Ownership	Not significant
	Fiji (1984)	Ownership	Not significant
Casterline and others (1991)	Philippines (1984)	Education	Not significant
	Singapore (1986)	Education	Not significant
	Taiwan Province of China (1989)	Education	Positive
	Thailand (1986)	Education	Not significant
Chan and Da Vanzo (1996)	Malaysia (Malay) (1988/89)	Income	Positive
	Malaysia (Chinese) (1988/89)	Income	Positive
	Malaysia (Indian) (1988/89)	Income	Positive
	Malaysia (Malay) (1988/89)	Education	Not significant
	Malaysia (Chinese) (1988/89)	Education	Not significant
	Malaysia (Indian) (1988/89)	Education	Not significant
Da Vanzo and Chan (1994)	Malaysia (1988/89)	Income	Positive
Solis (1999)	Mexico (1994)	Income/education	Not significant
Agree (1993)	Brazil (1960)	Income	Positive
	Brazil (1960)	Education	Negative
	Brazil (1980)	Income	Positive
	Brazil (1980)	Ownership	Negative

[a]Ownership refers to home ownership.
[b]Unless explicitly noted, all effects are statistically significant.

Figure I. Mean age of population

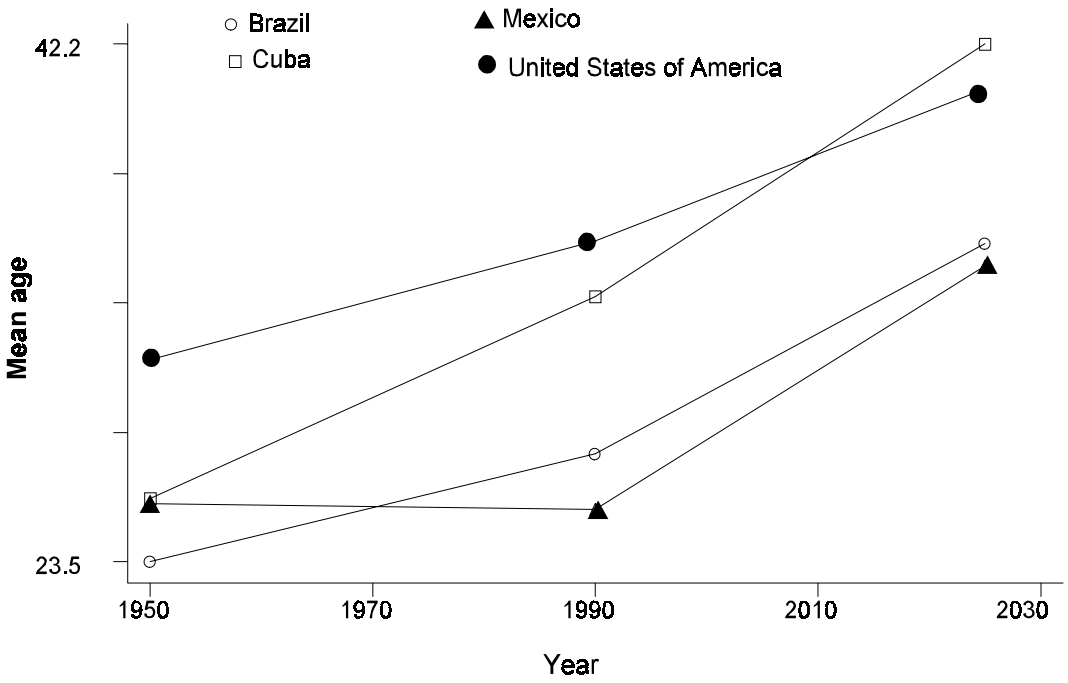

Figure II. Cumulated mortality change by age, 2020