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Population Division
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July 2021

United Nations expert group meeting on population and sustainable development, in particular, sustained and inclusive economic growth

New York, 21 and 22 July 2021

(Virtual meeting)

Report of the meeting

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The Population Division of the Department of Economic and Social Affairs provides the international community with timely and accessible population data and analysis of population trends and development outcomes for all countries and areas of the world. To this end, the Division undertakes regular studies of population size and characteristics and all three components of population change (fertility, mortality and migration). Founded in 1946, the Population Division provides substantive support on population and development issues to the United Nations General Assembly, the Economic and Social Council and the Commission on Population and Development. It also leads or participates in various interagency coordination mechanisms of the United Nations system. The work of the Division also contributes to strengthening the capacity of Member States to monitor population trends and to address current and emerging population issues.

Notes

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EXPLANATORY NOTES

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

The following abbreviations are used in the report:

CESEE	Central, South-Eastern, and Eastern European
CADR	Cognition-adjusted dependency ratios
COVID-19	Coronavirus disease
EDGE	The Evidence and Data for Gender Equality
EMDEs	Emerging markets and developing economies
GDP	Gross domestic product
HALE	Health-adjusted life expectancy
HCI	Human Capital Index
HICs	High-income countries
HHSA	Household Satellite Accounts
IMF	International Monetary Fund
LICs	Low-income countries
NCDs	Non-communicable diseases
NTA	National Transfer Accounts
NTTA	National Time Transfer Accounts
OECD	Organisation for Economic Co-operation and Development
OADR	Old-age dependency ratio
SDGs	Sustainable Development Goals
SNA	System of National Accounts
SPA	Standard pensionable age
UN DESA	United Nations Department of Economic and Social Affairs
UNCTAD	United Nations Conference on Trade and Development
UNFPA	United Nations Population Fund
UMICs	Upper-middle-income countries
UHC	Universal health coverage

I. BACKGROUND AND SCOPE OF THE MEETING

The special theme of the fifty-fifth session of the Commission on Population and Development will be ***Population and sustainable development, in particular sustained and inclusive economic growth***. The theme is related to chapter III of the Programme of Action adopted by the International Conference on Population and Development held in Cairo, Egypt in September 1994. That chapter focuses on the integration of population in development strategies, and on the interlinkages between population, sustained economic growth and poverty on the one hand, and between population and the environment on the other.

These issues remain relevant today and have assumed new importance and urgency. More research and evidence are now available on the connections between population dynamics and economic growth. Ending poverty in all its forms everywhere was enshrined by United Nations Member States as the first of 17 Sustainable Development Goals (SDGs) to be achieved by 2030. Poverty and other forms of inequality are receiving renewed attention in the light of the global health crisis and economic downturns caused by the coronavirus disease 2019 (COVID-19) pandemic.

Since the Cairo conference, there has been an accumulation of evidence on environmental problems attributable to unsustainable patterns of production and consumption. Such problems are compounded and amplified by continuing population growth. International commitments to take decisive action on climate change are part of the 2030 Agenda, including SDG 13, and at the core of the Paris Climate Agreement.

Population ageing, a gradual but relentless global demographic trend, brings the potential of economic benefits and personal opportunities associated with longer and healthier lives, as well as increased fiscal and macroeconomic pressures. Potential demographic dividends may not be realized in all developing countries, some of which could "get old before getting rich". As more countries are entering advanced stages of population ageing, those with persistently low levels of fertility face the reality or the prospect of population decline and need to formulate appropriate policy responses.

Extensive, systematic and comparable data are now available concerning the economic roles and contributions of men and women, both in the labour market and within households. Such data shed new light on the "gendered economy" and are relevant for SDG 5 on promoting gender equality.

The Population Division of the United Nations Department of Economic and Social Affairs (UN DESA), in collaboration with the Division for Economic Analysis and Policy (EAPD) and Division for Inclusive Social Development (DISD), the United Nations Population Fund (UNFPA), and the United Nations Conference on Trade and Development (UNCTAD), organized a virtual expert group meeting on population and sustainable development, in particular, sustained and inclusive economic growth on 21 and 22 July 2021.

The meeting convened about 100 experts from the Governments, the United Nations system, universities and research institutions, including 26 representatives of 15 Member States and 29 invited speakers and moderators. The meeting comprised seven sessions covering major topics, including population dynamics, the generational economy, macroeconomic growth and inequality; gendered economy; population and sustainable development and population dynamics and environmental sustainability. The meeting also included a discussion on policy challenges and recommendations. More information about the meeting can be found at: https:/un.org/development/desa/pd/events/EGM-CPD55.

The meeting reviewed the latest evidence and analysis of these topics, drawing from the experiences of countries in all regions of the world. The presentations and discussion during the expert meeting generated inputs for the preparation of the Secretary-General's report on the theme of the fifty-fifth session of the Commission.

The mandate of the Commission, as reaffirmed in 2016, is to monitor, review and assess the implementation of the Programme of Action of the International Conference on Population and Development (ICPD). Within that mandate, the Commission contributes also to the follow-up and review of the 2030 Agenda for Sustainable Development, taking into account the integrated nature of the Sustainable Development Goals (SDGs) and their interlinkages. Each year, the Commission aims to adopt a resolution on the special theme of its annual session. More information about the Commission can be found at: https://un.org/development/desa/pd/content/CPD.

The report is organized around main topics addressed in the presentations and discussions of this meeting, rather than by the order of presentations in the program. The Organization of Work of the meeting can be found in Annex I.

II. SUMMARY OF THE MEETING

A. POPULATION AND SUSTAINABLE DEVELOPMENT: GLOBAL MEGATRENDS

(Speakers: Elliot Harris, Nicole Mun Sim Lai, John Wilmoth)

In their presentations, Elliot Harris, Mun Sim Lai, and John Wilmoth explained that the expression "sustainable development" was coined by the "Brundtland Report" presented at the United Nations General Assembly in 1987.[1] The report established the concept of sustainability in terms of inter-generational and intra-generational equity: the ability to fulfil the needs of the present generation without compromising the ability of future generations to meet their own needs. It is based on a long-term, generational perspective, naturally linking it to population studies.

The relationship between population and sustainable development should be considered within the context of global demographic shifts, climate change, inequality, the spread of digital technologies and urbanization. All of these global challenges have a direct impact on sustainable development as well as on each other.

Demographic change, poverty and inequality are connected in several ways. High fertility and population growth continue to be associated with a high prevalence of poverty across and within countries. Population ageing makes labour relatively scarce, which induces efforts to replace it with capital. Increasing capital intensity, in turn, is likely to deepen inequalities: the so-called Piketty-effect. By contrast, social development and inclusion have contributed to demographic transition by extending access to health care, education and other services.

The presenters also discussed the linkages between demographic trends and climate change. Both "sudden onset" climate-related events that are abrupt and unpredictable (e.g., flash-floods and hurricanes) and "slow onset", longer-term processes (such as rising sea levels) have the capacity to spur migration. The size and structure of the population, as well as lifestyles, are key determinants of consumption patterns, energy use and carbon emission. The slower pace of global population growth is easing the pressure on the climate, but rising incomes and consumption are increasing it.

Population ageing induces technological innovations that enhance physical and cognitive capacities, allowing older people to work longer and enjoy a better quality of life. For countries experiencing a "youth bulge", digital technologies can support youth in acquiring the necessary education and training for participating in the labour market. Increasingly, digital communication technologies allow for the geographic separation of workers and employers ("virtual migration").

Due to the interlinkages between the above-mentioned global challenges, population change needs to be integrated into development planning. This requires governments to adopt a long-term planning horizon.

Future population trends can be predicted with a relatively high degree of certainty. Policy changes to adjust to demographic trends also take considerable time to be implemented as needed reforms are frequently obstructed by inertia, path dependency, or vested interests. As stated in the report of the World Population Conference of 1954: "Slow as demographic changes have been, changes in institutions have not kept pace with them".[2] Finding the right answers to demographic challenges requires institutional flexibility such as flexible working arrangements (supporting parents and older workers to maintain active participation in the

[1] Brundtland, G. (1987). Report of the World Commission on Environment and Development: Our Common Future. United Nations General Assembly Document A/42/427.
[2] Reference needed

labour market) and flexibility in the choice of the standard pensionable age (by revising the concept of "old age").

Issues around inequality and inclusive growth have recently received greater attention in the context of sustainable development. Even the narrow notion of physical sustainability implies social equity between generations, which must logically be extended to equity within each generation. The objectives of sustainability and inclusiveness are intertwined—one cannot be achieved without the other. Beyond serving as overarching guides for policy formulation, these dual criteria are critical elements for evaluating specific policy interventions. An example is the proposal to gradually raise the standard pensionable age to maintain the fiscal solvency of social protection systems. While such a policy meets the aggregate fiscal sustainability criteria, the change should be done taking into account differences in longevity trends between social groups in order to prevent increased inequality.

Elliot Harris and John Wilmoth stressed the importance of better data and measurement in order to properly consider inclusiveness and to formulate policies to address exclusion... Inclusion demands visibility. Identifying groups at risk of being left behind requires data disaggregated by various characteristics, including income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in the national context. Such data allow to look beyond averages and obtain a more comprehensive understanding of the experiences of individuals and social groups. For this reason, the United Nations Department of Economic and Social Affairs (UN DESA), the United Nations Population Fund (UNFPA), and other United Nations entities have adopted or developed methods and provided training to Member States on the collection and use of data disaggregated by age and sex, an essential first step.

B. DEMOGRAPHIC SHIFTS

(Speakers: Alexia Fürnkrantz-Prskawetz, Michael Herrmann, Andrew Mason, Andre Medici, Naohiro Ogawa, Eliya Zulu)

As Andrew Mason described in his keynote presentation, all societies go through a demographic transition from a combination of high fertility and high mortality to low fertility and low mortality. The process starts with a decrease in infant and child mortality, which results in population growth until fertility falls when people's reproductive behaviour adjusts to the increased survival of children into adulthood. Once fertility drops in a sustained manner, societies grow older as the increases in life expectancy are realized in older age groups. Whereas some trends make populations become demographically more alike, as presented by Alexia Fürnkrantz-Prskawetz, Michael Herrmann and Andrew Mason, the time and pace of the transition create greater demographic heterogeneity across countries than ever before.

For example, life expectancy at birth, or $e(0)$, has been converging across countries of different income levels. For example, in 1900, $e(0)$ was 24 years in India, about half of the United States of America (47 years). By 2020, the gap had narrowed to nine years (69.9 years versus 78.9 years, respectively). The two countries represent general trends. In 1960, the group of high-income countries (HICs) had a $e(0)$ of 68.5 years against the 39.7 years of low-income countries (LICs). By 2019, the corresponding figures had grown closer, to 81.1 years in HICs and 65.0 years in LICs. The fastest growth was observed in upper-middle-income countries (UMICs) from 49.3 years to 76.5 years. The relative convergence of life expectancy at birth across countries has been driven by sharp declines in mortality in the early phase of the lifecycle.

The countries with the oldest age structures today, such as Japan, Italy, and Germany, where the median age of the population is between 45 and 49 years, have low fertility and mortality rates, including low mortality at the older ages. By contrast, in much of sub-Saharan Africa, which has relatively high fertility and mortality, the median age is still between 15 and 19 years, a very young population age structure by current international standards. This heterogeneity is expected to prevail in the coming decades. By 2050, the share of population aged 60 and over is expected to grow to 32 per cent of the total population in HICs,

whereas in LICs, it will still be only 8 per cent. Societies will face very different demographic challenges in the foreseeable future. The fastest ageing will take place in the UMICs where, in 2000, the share of the 60-year-old and older population was about half of the level of HICs, but by 2050, the two groups are expected to have almost the same proportion of older persons. This development raises the prospect of some societies growing old before becoming rich.

The gap between HICs and LICs is also observed in regard to health status, as Andre Medici demonstrated. Ageing is not only a chronological process but also a process of deteriorating health that affects people in different degrees across countries. Losses of years of life due to premature death or disease are much higher in LICs than in UMICs and HICs, especially for older persons. To undertake international comparisons, one can take as a benchmark the global level of age-related health conditions of an average person aged 65. Based on this health measure, for example, an average Japanese reached such health status at age 76. At the other end of the scale, the corresponding health status is reached at age 46 in Papua New Guinea. A full 30-year gap separates countries with the highest and lowest ages at which people experience the health problems of an "average" 65-year-old.

Similar age benchmarks presented by Naohiro Ogawa, can be used, for example, the indicator of "immediate recall" scores that measure cognitive functions. The average age of those who can recall four words out of ten within one minute of hearing them was 56.5 in Thailand, 58.2 in China, 65.8 in Malaysia, 69.4 in Southern Europe, 77.2 in India, and 78.7 in Continental Europe. In Japan, Northern Europe and the United States of America, the corresponding age is above 80. Such a wide range of the characteristic age of cognitive functions reflects a huge variation of national experiences of ageing.

Eliya Zulu noted that the 10 most populous countries in Africa today will remain in that category in 2050, except that Angola will replace Algeria in the top 10 group. But while the smallest country of the group had 43 million people in 2020, it will have 75 million people in 2050. The average number of children varies widely by region, between 2.5 in Southern Africa and 5.5 in Middle Africa. High fertility has persisted in the continent, due to various causes. Child mortality remains relatively high, while low use of modern contraception and high unmet need for family planning prevail. In addition, traditions and norms give women and girls little power to make important life decisions. Consequently, child marriage and early childbearing are still a challenge. This is related to the limited access to education, especially for girls and the inadequate information and access to adolescent sexual and reproductive health.

Population dynamics can differ both across regions and within regions, as shown by Alexia Fürnkranz-Prskawetz. Such within-region variations include migration, predominantly short-distance movements. Migrants and, especially displaced people, generally try to stay as close to their original home as possible. In turn, within-region variation of population dynamics and income, also affect the ageing process. Between 1990 and 2017, migration more than compensated the natural population loss in Western, Northern and Southern Europe, or, as in the majority of countries, it increased population growth. It also kept these societies slightly younger than they would have been without migration, since the age composition of migrants is typically younger than that of the native population. In contrast, many Central, South-Eastern, and Eastern European (CESEE) countries experienced net out migration (negative net migration) over the same period. Since most of these countries faced a natural population decline (total deaths exceeding total births) in the first place, the overall population loss was very high in some cases. For example, Bosnia and Herzegovina, Latvia and Lithuania lost more than one quarter of their population during the last three decades.

C. Changing age composition: Effects on economic growth and fiscal sustainability

The demographic transition affects the age composition of society, which in turn has a profound impact on economic output as well as the system of inter-age transfers and other reallocations.

1. Population and macroeconomic dynamics

(Speakers: Latif Dramani, Alexia Fürnkrantz-Prskawetz, Michael Herrmann, Sang-Hyop Lee, Andrew Mason)

Michael Herrmann introduced the impact of population change on macroeconomic dynamics and Andrew Mason elaborated on the economic effects in terms of demographic dividends. The entry of LICs into the phase of fast population growth around the mid-twentieth century led to the revival of Malthusian concerns among the biologist-ecologist research community about the linkages of demographics, poverty, food security and the environment (see, for instance, Paul Ehrlich's *Population Bomb*, or Garrett Hardin's *Tragedy of the Commons*). During subsequent decades, economic models focusing on the linkages between demography, economic development and income, have arrived at less pessimistic conclusions about how the economy can handle population growth. The notion that economies could absorb seemingly excess labour was put forth, for example, in W. Arthur Lewis' *Unlimited Supply of Labour*. Lewis argued that a dual economy in which a modern or capitalist sector can realize higher returns to capital as long as a non-capitalist or subsistence sector provides it with a steady supply of workers that keeps wages low at somewhat above subsistence level. If profits are reinvested, those resources can finance the continued transfer of labour force out of the subsistence sector and into the modern industrial sector, benefitting society and the economy at large.

Once the demographic transition reaches its next stage where fertility has fallen adjusting to improved survival rates among infants and children, the age composition can become a driving force of economic growth. During this period, the working-age population and the labour force temporarily grows more rapidly than the population dependent on it (including children, young people and older persons), freeing up resources in the economy for investment in economic development and family welfare. The economic growth thus generated is known as the first demographic dividend. Globally, the first dividend was highest during the last few decades of the twentieth century, mainly due to demographic trends in Eastern Asia and Latin America and the Caribbean. Increasing productivity was a major driver of global economic growth between 1950 and 1975, but during the last quarter of the century (between 1975 and 2000), global gross domestic product (GDP) growth was driven more by demographic changes, i.e., the first demographic dividend.

The global (average) first demographic dividend is composed of regional trends that vary in terms of timing, duration and magnitude. According to Mason and others (2017), in Europe, the positive phase of the first demographic dividend started in 1962, lasted for 38 years and added a cumulative 15 per cent to economic growth. By contrast, Africa's first-dividend period began in 1993 and it is expected to last for 92 years. Its cumulative dividend will be an additional 35 per cent growth, which is as much as Asia, where the first-dividend period is predicted to be shorter, lasting only 58 years.

Although the first demographic dividend appears to be a largely automatic consequence of demographic changes and the economic lifecycle, some conditions should be met for countries to fully benefit from it, echoed by Latif Dramani, Alexia Fürnkrantz-Prskawetz, Michael Herrmann, Sang-Hyop Lee, Andrew Mason. As John C.H. Fei and Gustav Rantis show in their refinement of Lewis' thesis in their *Model of Dual Economy*, labour productivity has to increase *before* it can be absorbed into the capitalist sector (also, they emphasize the importance of the modernization of the agricultural sector in industrial growth). Without investments in human capital and without basic conditions for a functioning economy (including the protection of property rights and contracts), the dividend could become a missed opportunity and may even become a source of potential political instability and outmigration.

As Latif Dramani explained, such challenges can be examined, for instance, through the correlation of economic output and the Human Capital Index (HCI). The HCI is a compound measure of survival (share

of children surviving past age 5), education (expected years of schooling by age 18 and average harmonized test scores) and health (share of 15-year-olds who survive until age 60 and stunting rates of children under age 5). As the research by the *Consortium régional pour la recherche en économie générationnelle* (CREG) on African regions demonstrates, a significant difference can be observed between the countries of Northern Africa and those of Southern Africa (except South Africa) by analysing the link between the HCI and growth of GDP per capita. The countries of Northern Africa stand out clearly from other countries in Africa because of their greater human capital and economic productivity. Since the demographic window of opportunity will close around 2040 in Northern and Southern Africa, between 2055-2060 in Central Africa and around 2080 in Eastern Africa, these countries need to take action now to transform the potential for the first dividend into effective and inclusive growth in the decades to come.

Alexia Fürnkranz-Prskawetz demonstrated that migration can divert dividends. The population loss of CESEE countries to Western, Northern and Southern European countries (see the previous section) has direct and indirect economic effects. Migrants bring human capital, which means that sending countries who invested in them are unable to hold claims on its return, producing a type of human and economic "drain" on the origin countries. The demographic dividend is reaped by the receiving countries primarily in the form of additions to productivity and net tax revenues. It is a windfall gain for the receiving countries and a loss for the sending countries. However, beyond the direct effect of dividend export and lower GDP, sender countries suffer secondary losses. A specific type of loss or drain is the "brain drain", which results from the emigration of highly skilled workers that lowers the productivity of sending countries. According to the IMF (2019), the emigration of younger and well-educated people poses a major challenge for healthcare, social security and pension systems in sending countries in CESEE.

Andrew Mason in his keynote presentation, explained that the first dividend period has a limited duration. The period of faster growth in the number of effective workers as compared with the growth of effective consumers—the first demographic dividend—ultimately gives way to a reversal once the relatively large cohorts start to retire, grow older and need support. So, what contributes to economic growth at the beginning, diminishes it later. The first dividend eventually becomes negative, as has already happened in Europe. Effective labour is growing in countries with relatively low labour productivity but declining in countries with high labour productivity. Globally, the contribution of changing population age structures to GDP growth (the first dividend) will be minimal in the coming decades, an assessment based on National Transfer Accounts estimates (see below) of labour income and United Nations estimates and projections of population for 185 countries (Mason, 2021).

However, there is considerable room for countries to benefit from a second demographic dividend. Lower fertility transforms family dynamics and investments in human capital. Women face increased opportunities as they redirect their time to education, production of market goods/services and time-intensive childrearing. Also, smaller families typically invest more per child in health and education, through both private and public channels.

In addition, the first dividend period creates opportunities for working-age cohorts that have relatively fewer children. They can save what would otherwise have been spent on children, to prepare for old age and accumulate it as lifecycle wealth. Demand for wealth accumulation also intensifies: a population concentrated at older working ages and facing an extended period of retirement has an incentive to accumulate assets. If that happens, the negative period of the first dividend can be mitigated or avoided altogether. Greater assets lead to capital deepening —an increase in capital per worker—which generates the second demographic dividend.

The peak of the estimated second dividend follows the peak of the first dividend by about a bit under generation's time - 26 years in Africa, 24 years in the Americas and Oceania and 22 years in Asia (Mason and others, 2017). In Europe, the gap is shorter, 15 years. Notably, the estimated size of the second dividend is larger everywhere than the first one. In the peak years, it adds an annual 1.88 per cent to the economic growth in Asia (against the 1.38 per cent growth premium of the first dividend). The difference of the peak-

year dividends varies between 0.5 per cent and 0.6 per cent across continents, except for the Americas (0.3 per cent).

The institutional requirements for realizing the second dividend, such as the presence of well-functioning markets and high-quality education, are more demanding than the conditions to achieve the first dividend. Potential demographic dividends may not be fully realized in all developing countries, as some of them could "get old before getting rich". Population ageing is a complex demographic process of increasing life expectancy and lower fertility. Living longer and healthier brings potential economic benefits and personal opportunities, but low fertility creates higher fiscal pressures as more older persons will have to be supported by fewer workers (see next section). However, as the population age composition changes, so can various age-sensitive social and economic processes. In particular, lower fertility allows for increased saving and gives strong incentives for people facing the prospect of retirement with inadequate support from the next generation to accumulate wealth. If properly invested, the increased wealth can also boost overall productivity.

2. Fiscal sustainability

(Speakers: Alexia Fürnkrantz-Prskawetz, Sang-Hyop Lee, Andre Medici, Naohiro Ogawa)

The primary source of the demographic pressure on economic growth and public budgets is the changing age structure of the population: the rate of the working-age population to those who rely on them. So, much of the tensions can be neutralized if the productive period of the lifecycle is extended.

Naohiro Ogawa demonstrated this point by using Japan as an example. In 2005, Japan took over from Italy to become the most aged society in the world. Those aged 65 and over accounted for 28 per cent of the total population, and since 2008, the country's population has been declining. Japan was the first non-Western country to experience fertility decline during post-war period and its decline was the most significant across all industrialized nations. Meanwhile, Japan's life expectancy at birth has improved dramatically and is currently the highest in the world: 81.5 years for men (the second highest in the world), and 86.9 years for women (the highest).

Improvements in life expectancy at the older ages were driven by human capital investments. Today's 65-year-olds are better educated and healthier than those of the same age 30 or 50 years ago. However, Professor Ogawa noted that the standard pensionable age (SPA) has not kept up with the rapid decline in mortality. If the SPA increased at the same pace as population grew older, so that the proportion of those older than the SPA remained at its 1920 level (when the SPA was 55 years, and 11.5 per cent of the population was above that age), today it should be close to 80 years. However, it is 65 years at the moment, and recent amendments to the pension regulations aim to raise it to 70 years.

A related estimate puts the size of the "untapped work capacity" of older Japanese workers at 4.12 million people. If market wages are applied to this potential labour force, the income to be generated by the additional older workers corresponds to 6 percentage points of Japan's real GDP in 2015. This could be called the potential "silver demographic dividend", which would relieve public budgets in two ways: by increasing the labour supply that contributes to fund the pension and health care systems and by postponing pension payments. Using alternative valuation methods (such as applying the NTA labour income profile (see above) or assuming that the "untapped" workers earn the minimum wage) the author estimates that the "silver demographic dividend" could reach 3.2 to 4.5 per cent of Japan's GDP, still very significant figures.

Another effect of human capital investment is the postponement of the decline of cognitive functions. As mentioned above, the research found a wide variation in the average age of individuals reaching pre-set levels of cognitive functions (such as the ability to recall words) across countries. Authors such as Skirbekk, Loichinger, and Weber (2012) have defined and estimated cognition-adjusted dependency ratios (CADR) as a complement or alternative to the standard old-age dependency ratio (OADR). They have found that

whereas the standard OADR for the United States of America was 19 per cent in 2006-2007, its CADR was only 10 per cent. Similarly, the cognition-adjusted measure indicates a significantly lower "burden" of ageing in Northern Europe (OADR: 24 per cent, CADR: 12 per cent). Such differences also suggest a potentially untapped labour force or seen from a policy angle, a potential for increasing the effective retirement age. By contrast, demographically much younger countries such as India or Mexico, with OADR of 7 and 9 per cent, respectively, face a more severe old-age dependency problem when cognitive functions are factored in. These countries have a CADR of 14 per cent, higher than the cognitive-adjusted dependency ratios of the demographically older United States of America and countries in Europe.

Despite the more optimistic perspective of and trends in cognitive functioning at the older ages, realizing their potential economic benefits remains a politically difficult task. However, without shifting the demarcation line between working age and old age, the pressure on public budgets can become prohibitively high. Sang-Hyop Lee illustrated the point with the case of China with estimates based on Lee, Mason and Park (forthcoming). He pointed out that the ageing-related public debt in China was estimated to be 2.2 per cent of GDP in 2020 and that if there was no change in relevant policies and programmes, it could be expected to grow to over 100 per cent by 2040 and almost 500 per cent by 2060. Other East-Asian countries appeared to have even less sustainable systems. In the Republic of Korea, the current 2 per cent of ageing-related debt would increase (in the "no policy change" scenario) to 150 per cent and above 800 per cent over the same timeframe. In Japan, it would expand from the current 5 per cent to almost 150 per cent and over 700 per cent. In Southeast Asia, ageing was expected to have little or no effect until after 2040. In the Philippines, the results signalled the need to strengthen programmes for seniors and to address, in a balanced manner, issues with the adequacy and sustainability of its pension funds.

Alexia Fürnkranz-Prkawetz's further noted that the 202 Ageing Report of the European Commission showed that challenges seemed less severe in Europe, although the situation varied across countries. The projected share of the combined public inter-age budget, including education, health care, pensions, and long-term care, is (not unlike the Asian countries mentioned above) an additional 2 per cent of GDP for the European Union (EU). However, in some EU member states, the expected increase is well above this level: in Luxemburg and Slovakia, it exceeds 10 per cent of GDP, which, if translated into accumulated debt, can reach the elevated East Asian magnitudes.

Notably, the various pension reforms already in effect will cut the future pension budgets in several countries, whereas spending on healthcare and long-term care will increase in all EU member states. However, the relationship between population ageing and healthcare expenditures is unclear. On the one hand, healthcare expenses are expected to grow as populations age, but, on the other hand, spending on healthcare can improve the health status of older persons and at least, partially buffer the fiscal pressure of population ageing. The overall impact of population ageing may therefore not be excessively high or prohibitive. Moreover, institutional reforms, such as integrating primary and higher level of care or replacing a treatment-centred approach with a stronger emphasis on prevention, can further reduce costs.

As Andre Medici pointed out, one of the Sustainable Development Goals target is to attain Universal Health Coverage (UHC).[3] Access to health-care services differ significantly across countries due to income per capita levels and age composition. Coverage of essential health-care services is highest in the Americas (Northern America and Latin America and the Caribbean) and lowest in South Asia and sub-Saharan Africa. The services coverage index in high-income countries is more than twice that observed in low-income countries. A statistical analysis of the services coverage index and health-adjusted life expectancy (HALE) in 179 countries shows that there is significant variation between countries and regions and an overall positive correlation between health care coverage and HALE. In countries like Japan and Singapore, where the index of access to health service capacity is almost 100 per cent of the population, a person aged 65 or over is expected to live another 17 years of a healthy life. By contrast, in countries like Somalia, the Central

[3] Target 3.8 aims to "achieve universal health coverage, including financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all."

African Republic and Chad, where the coverage index is below 30 per cent, HALE at age 65 is about eight years of healthy life, less than half of that for Japan and Singapore.

Catastrophic health expenditures are an important related problem area. Middle-income countries (UMICs and LMICs) had the highest proportion of the population between 14 per cent and 15 per cent, incurring catastrophic health spending in 2015 (using the 10 per cent threshold value). In HICs, health expenses affected seniors' life more intensively than other age groups. For example, a recent study in Italy showed that spending on health proportionally leads to more reduction in the quality of life of older people than other variables, such as life expectancy and GDP per capita. A 2016 study analysing 15 European countries had found that being diagnosed with diabetes mellitus and cardiovascular diseases was associated with catastrophic health expenditure among older people even in countries with developed risk-pooling and health insurance mechanisms such as Belgium, Czech Republic, Denmark, Hungary, Italy, Poland, Portugal and Switzerland. South-East Asia was the region with the highest share of people who fell below the poverty line in 2015 due to high health expenditures when using the $1.90 and $3.20 poverty lines.

In addition to the direct impact on health and mortality, the COVID-19 pandemic had secondary effects on morbidity and mortality because hospitals and outpatient units cancelled elective medical procedures and surgeries, as required to protect health services safety. Most of these cancelations have reduced medical care of noncommunicable diseases (NCDs), worsening the health conditions of older people and generating an increase of premature mortality associated with NCD. In addition, older persons are more vulnerable than other age groups to lose their income and livelihoods if they are not covered by the pension system. They are also more likely to experience mental illness due to physical distancing measures. Lockdowns and strict social distancing measures have increased older persons' risk of abuse and negligence. Among older persons living alone, the limitations or inability to use electronic devices (including computers and smartphones during prolonged lockdowns) have led to an increased prevalence of depression and loneliness.

D. ALTERNATIVE INSTITUTIONS ORGANIZING INTER-AGE TRANSFERS

(Speaker: Naohiro Ogawa)

The public sector is not the sole provider of inter-age transfers or other reallocations. Market institutions and familial networks also take part in this chain. The relative importance of one or the other depends on historical paths, social norms and technology. In particular, technological developments create ever-larger risk pools replacing familial support networks in some parts of the inter-age transfer chain while intensifying their importance in other segments. Whereas support for older people has gradually shifted to public or market institutions as public pay-as-you-go schemes or pension funds matured, the families' role in child-raising strengthened further. In many countries, more stable families care for fewer children and therefore increase the resources and attention devoted to a child.

What is common in the alternative inter-age channels is their exposure to the effects of demographic change. As much as the public sector faces financial strains, inter-age reallocations transmitted by markets or families will also face pressure. The demand for wealth and returns to capital are affected by the relative numbers of savers and borrowers—two numbers exposed to changes in age composition. The pressure on the working-age population is no less intensive if transfers are exchanged between family members or through government mediation.

A unique Japanese data source sheds light on the interconnectedness of the various channels of inter-age transfers and the effect of their transformations on the underlying intangible institutions: the social norms dictating inter-age behaviour and expectations.

In 1950, about two thirds of Japanese married women of reproductive age expected to rely on their children when growing old. However, as coverage of medical and pension programmes increased, and especially after 1961, when such programmes became universal, that rate started to decrease. Today, just around 5 per cent of the respondents are expected to depend on their children. In periodic surveys of married Japanese women of reproductive age, the respondents were asked about expectations of being supported when they grow old, and to express their opinion about them giving support to their aged parents. Through the 1960s up to the mid-1980s, 75-80 per cent of the respondents repeatedly considered the latter form of support as a "good custom" and a "natural duty". However, that proportion suddenly dropped by about 25 percentage points after 1986 when public in-home care services were introduced. As a clear sign of another generational change, that proportion, which oscillated between 45 and 50 per cent between 1990 and 2010, fell further over the last decade to its current level of about 20 per cent.

E. INEQUALITY AND INCLUSIVE GROWTH

(Speakers: Hervé Boulhol, Gretchen Donehower, Isis Gaddis, Pamela Jiménez-Fontana, Valeria Nesterenko, Rita Sciarra, Lubov Zeifman)

Inequality and inclusivity are multidimensional concepts with a long research tradition. However, until relatively recent, their measurement relied almost entirely on comparisons of households. The issue of gender inequality coming to the fore revealed the limitations of the household-level approach and required methodological innovations.

1. Gender inequality

As presented by Gretchen Donehower, a major source of gender inequality is unpaid household-care work, a major part of economic activity in terms of working hours and added values. Unpaid-care work represented well over one half of the total working hours in countries (Colombia, Germany, Spain and Viet Nam) according to an 18-country study. The ratio was around 30 per cent even in the countries with the lowest share of unpaid work (Ghana, India and Thailand). Valuing time at an imputed market wage puts the aggregate weight of unpaid-care work at 12 to 55 per cent of GDP. The share of unpaid-care work relative to the total-carework (summing up both paid- and unpaid-care work) in two of the countries analysed (the United States of America and the Republic of Korea) exceeded 90 per cent. Most of the rest is paid-care work provided by credentialed professionals (teachers, nurses, doctors, social workers, etc.) with licenses and educational backgrounds. Only a tiny fragment of total-care work is paid-care work provided by less credentialed people (home health aides, child-care workers, etc.) with fewer licenses and educational requirements.

The age composition of the unpaid-care economy varies from country to country, which is captured by the age profile of time spent in unpaid work. Many countries (e.g., Bangladesh, India and Mexico) have a single peak, mainly on the shoulders of women, reflecting the age of childbearing and child-rearing. In other countries, for example, Germany and Spain, the profile has a double-humped shape. Here, the unpaid-care economy consists of two distinct phases. The first one is related primarily to childbearing and child-rearing, while the second peak is created by the care for older spouses and grandchildren.

The average hours consumed by net unpaid-care work per week reveals that young children receive the most net-time transfers. By contrast, the net-time transfers (time received minus time given) remains negative for older persons, meaning that most of them make net-time transfers to others, up until the very oldest ages. Most of those transfers, if not all of them, are made by women.

The share of men in unpaid-care work was less than 20 per cent in most countries in the sample and the ratio did not exceed 30 even in the top-performing Scandinavian countries. Unpaid work accounted for 90

per cent of the value invested in an infant's consumption up to the age of one. The remaining 10 per cent comes from the consumption of market products and services.

Lubov Zeifman contributed additional interesting details. Women spend more than twice as much time on unpaid work per day as men, on average. This disproportion is observed for both domestic chores (women: 3:22 hours; men: 1:23 hours) and care work (women: 50 minutes; men: 22 minutes). Among parents living with their children, these numbers are even higher, both for women and men. Northern Africa and Western Asia have the largest gender gap and HICs have the smallest. The gender gap in the time spent on unpaid-domestic chores varies more across regions than the gender gap in time spent on unpaid-care work (although methodological differences make full comparisons difficult).

The results presented (see above) by Ms. Donehower apply a novel methodology that overcomes some of the limitations of the System of National Accounts (SNA), covering services produced and used in the household (other than housing-related), and volunteer services that are part of the Household Satellite Accounts (HHSA).

Extending the aggregates of SNA with unpaid household labour is not new. The first HHSA estimates have been published in the early 2000s. Eurostat, the statistical service of the European Union, released its manual of methodology in 2003. However, drawing age profiles of production and consumption of unpaid-household labour as well as age profiles of "time transfers" (the gap between the value of unpaid-household labour produced by a household member and consumed by another one) and in this way introducing age into HHSAs, is novel. This extension of NTA is called the National Time Transfer Accounts (NTTA) by the research community. The Population Division of UN DESA plans to publish an NTTA first manual later this year.

Lubov Zeifman added that during the COVID-19 pandemic, both men and women saw a 30 per cent increase in the amount of time spent on unpaid-care work, as shown by a 16-country study indicating that the gender gap has not changed in the pandemic, at least not in unpaid-care work.

In the context of an ageing society for which investments in future workers and taxpayers are crucial, ignoring unpaid-care work is a huge blind spot. The unpaid household sector of the economy is still invisible in current standard statistics. This might change after the recent lockdowns when people were forced to stay at home and work at home—an experience that made decision-makers realize the need for a better understanding of the household economy, that should be taken as an opportunity to change statistical standards and acknowledge unpaid-care work as a relevant part of the economy.

Like the Beijing Declaration, international agreements can also revitalize the statistical methodology of the measurement of unpaid work. The 2030 Agenda for Sustainable Development, for example, motivates the further development of the statistical toolkit since Goal 5 requires achieving gender equality and empowering all women and girls. A sub-target (Goal 5.4) explicitly demands the recognition of unpaid care and domestic work through the provision of public services, infrastructure, and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate. Specifically, SDG indicator 5.4.1. is defined as the proportion of time spent on unpaid domestic and care work by gender, age, and location.

One of the main methodological challenges is that only 90 countries (less than half of UN members) currently collect data on unpaid work. A mere 15 per cent of them have three or more data points from the last two decades, making it difficult to assess trends over time. National statistical offices have to juggle competing demands: on the one hand, there are growing expectations about data quality and user-friendliness, while on the other hand, many countries face increasing constraints in data collection as response rates decline and respondent burden increases.

The United Nations Expert Group on Innovative and Effective Ways to Collect Time-Use Statistics (EG-TUS) was formed in 2018 to collect information about how people spend their time, including work, leisure, travel, and other activities. Several countries and organizations have joined the Expert Group and supported data collection in the member states in various ways.

Pamela Jiménez Fontana contributed information and analysis of the Latin-American experience in this area. Between 1980 and the turn of the century, female labour-force participation was on an upward trend in Latin America. One of its main drivers was decreasing fertility and higher education of younger female cohorts, which positions them more favourably in the labour market. However, these trends have slowed or stalled in recent years. Ms. Jimenez's analysis of age- and gender-specific participation rates revealed some of the factors of the slow-down. Even in the most productive ages, between 30 and 45 years, female labour-force participation did not exceed 60 per cent, which is 30 percentage points lower than the male participation rate in those same ages. Also, women tend to retire earlier than men. Surveys show that personal labour-market motivations are gender-specific: most men who are asked about the reasons for their unemployment name market-related issues. Women, by contrast, refer more to personal reasons. Such grounds, named by about one quarter of the female respondents, include childcare and unpaid housework.

Unpaid work was estimated to be 25 per cent of GDP in Costa Rica, with women performing 75 per cent of it. Women spend 5 hours and 25 minutes per day on average, doing unpaid work. Young children in particular, depend largely on their mother's time. A newborn demands 4-5 hours of exclusive care per day on average. Young women with an education level of incomplete high school or less dedicate significantly more time to childcare than women with high school degrees or more. Consequently, less-educated women do more unpaid work. The variation of education-specific fertility levels explains this and it also reveals the obstacles to further increase the female labour-force participation rate.

The COVID-19 pandemic (reversed previous developments. It reduced both male and female participation, but it affected women and, especially poorly educated women, more severely. Unemployment in Costa Rica was high before the pandemicand worsened as a result of the COVID -19 pandemic. The female unemployment rate reached a historical high level of 25 per cent in 2020? Among less-educated women, the rate exceeded 40 per cent during the peak of the pandemic in 2020. Evidence shows that the market does not eliminate gender inequalities—public policies have to be enacted with a particular focus to train less-educated women and support them with quality childcare.

Isis Gaddis discussed intra-household inequalities Available data show that the gender inequality in unpaid work contributes to the gender gap in global poverty. Although poverty data are usually collected at the household (not individual) level, they do show that slightly more women than men live in poor households (and significantly more children than adults). Gender differences are most prominent in the prime productive and reproductive age (e.g., from the early 20s up to age 34) when women are 2 percentage points more likely than men to live in poor households. The gap is partly explained by the significant number of women with children living alone without a partner. The adult-child poverty gap prevails mainly because low-income families tend to have more children.

Gender gaps are also well documented for some non-monetary dimensions of well-being. Adult women are less likely to be literate than adult men in many developing countries, although this is changing rapidly as female enrolment rates are much higher in younger cohorts than in the past and, in general, girls do better at school than boys. Women, on average, are also more "time-poor" or disadvantage on time use??? than men due to the double burden of paid and unpaid work and less likely to own property and other assets that would make them financially independent.

Targeted research focusing on specific consumption components at the individual level suggests that intra-household differences in consumption can be significant. Women and children are allocated a smaller share of the households' resources than men. For example, China's Health and Nutrition Survey shows that men consume significantly more so-called "extended food" items, including alcohol and tobacco, than women. Indeed, the gender gap is accounted for primarily by four items—tea, coffee, alcohol and tobacco. However, these results are still preliminary as the current standards of collecting consumption data still focus on households, not individuals and, the estimates provided by various methods of splitting household-level consumption among the members do not always converge.

The COVID-19 pandemic may have exacerbated the gender poverty gap. An analysis covering 40 countries (mainly low-income ones) suggested that women were more likely to stop working in the initial phase of

the pandemic than men. This trend was partly driven by the increasing demand for care work and partly by the sector-specific nature of the pandemic-induced economic depression (such as service sector). The service sector, which employs proportionally more women, was more exposed.

Consumption surveys focus on the household sector. Households are usually classified as poor or non-poor without differentiating between individual members, although poverty statistics can, within limits, disaggregate household-level statistics based on the demographic characteristics of households. Indeed, a standard practice in the measurement of poverty is to use equivalence scales that focus on the number and age of household members, but not on their gender. The fundamental problem is the lack of cost-effective survey methods to collect individualdisaggregated data as part of household consumption and expenditure surveys.

Concerns about the position of women and children are raised explicitly in the Sustainable Development Goals. For instance, target 1.2 prescribes "[b]y 2030, [to] reduce at least by half the proportion of men, women and children of all ages living in poverty […]". However, currently, no satisfactory method is available to evaluate the target with that level of specificity. Unfortunately, in the absence of reliable data, "zombie statistics" (g)estimates are sometimes used (such as, "70 per cent of the world's poor are women"). Also, sometimes flawed comparisons are made, for instance, between female- versus. male-headed households as a proxy for describing the differences between women and men.

Experts of the World Bank have made some progress in estimating intra-household resource shares and corresponding poverty rates. A key feature of that research has been to assess the consumption of individuals drawing on data that can be collected individually through existing household surveys that include information that allows the assignment of at least some consumption to individuals (such as separating aggregate clothing expenditures among men, womenand children).

Preliminary results of research based on the new methodology in four middle-income countries (namely, Albania, Bangladesh, Bulgaria and Malawi) reveal substantial intra-household inequality. Although the gender gaps are not always statistically significant, the results suggest that women are poorer than men in the countries studied.

2. Other aspects of poverty and inequality

Valeria Nesterenko focused on labour-market inequalities and how social protection systems can help to reduce them. Almost half (49 per cent) of the global labour income goes to the top decile of workers, while the total share of the bottom 50 per cent of earners is less than 6.5 per cent.

Many countries still have significant numbers of working poor despite remarkable improvements during the pre-COVID-19 years. Seventy-nine per cent of all employed persons in the world lived above the poverty line in 2018; 13 per cent were moderately poor and 8 per cent lived in extreme poverty. However, young workers face higher risks of falling into extreme poverty than adult workers (14 per cent).

There was a significant decrease in global poverty in the past two decades. Still, progress was uneven across regions. It was most dynamic in Asia and the Pacific, where the working poverty rate was close to 5 per cent in 2018, down from 33 per cent in 2000. In Africa, the working-poverty rate has also continuously decreased to 33 per cent by 2018, compared with 47 per cent in 2000. The decline in the proportion of the working poor in Africa was far slower. Regions and countries with very high rates of working poor often have a large informal sector .

Rita Sciarra described the effects of the COVID-19 pandemic on inequalities. After the relatively prosperous period and fairly steady poverty reduction before the pandemic, the multifaceted crisis caused by the COVID-19 pandemic could reverse much of the gains achieved over the last decades. The reversal is already visible: slower economic growth (or in some cases, economic decline), more multidimensional inequality, less inclusivity of growth. The pandemic itself affected the world unequally. The ratio of

COVID-19 cases in the total population was more than twice as high in emerging markets and developing economies (EMDEs) than in advanced economies. By contrast, the prevalence of vaccination in advanced economies was more than double that in EMDEs.

The crisis had a devastating impact on the most vulnerable social groups, amplifying pre-existing inequalities within and between countries. Less than half of the world's population is covered by social protection. More than 100 million people were pushed into extreme poverty since the outbreak, resulting in human development reversal for the first time in 30 years.

The negative impact of the crisis affected several aspects of everyday life. During the lockdowns, the effective out-of-school rate for primary education jumped from 27 per cent to 86 per cent in low human development countries. Globally, this indicator increased from 10 to 60 per cent, which is the most significant reversal of the out-of-school rate in history, widening new gaps in social development.

In countries with low levels of human development, internet access was only 15 per cent, 69 percentage points lower than in countries at the top of the ranking. The importance of access to the internet goes beyond education. In the context of the COVID-19 crisis, critical aspects of human development have come to depend on online resources and applications: the ability to work, buy, stay healthy, report domestic violence, interact socially and create new businesses.

Lower labour-force participation and losses in working hours have translated into a sharp drop in labour income and an increase in poverty in LICs. The working-poverty rates (share of the employed who live on less than $1.9 per day) in LICs reached 42.5 per cent in 2020, reverting to the level that the rate had in 2015. Latin America and the Middle East stand out as the world's most unequal regions, with the top 10 per cent of their populationcollecting 65 per cent and 56 per cent, respectively, of the national income.

Hervé Boulhol added the experience of the Organisation for Economic Co-operation and Development (OECD) countries. He emphasized that evaluating inequality in old age requires a life-course approach (OECD, 2017). Disadvantages accumulate and become entrenched. Interactions of various spheres of life produce compound inequalities that can be captured by the interrelation between health, education and the labour market. The perception of one's own health status is closely related to the education level, sex and employment status, even in the same age group. The share of older persons reporting bad health is around 50 per cent. . The share of people reporting bad health is higher for those in lower education attainment compared to those with higher education attainment. Bad health limits employment prospects. In addition, people with bad health not only work less at all ages, but they also earn less for their work. Persistent bad health is estimated to reduce lifetime labour income by 33 per cent.

3. Inequalities in the OECD

Hervé Boulhol went on to show that income inequalities at any given age are higher today than in the past in most OECD countries. This can be measured by the income Gini Index, which ranges from 0 (or 0 per cent) to 1 (or 100 per cent), with 0 representing perfect equality and 1 representing perfect inequality. In the OECD as a whole, income inequality within age groups has climbed steadily for all cohorts born between the 1920s and 1980s, particularly in the younger age groups. For the birth cohorts of the 1950s, the Gini index was 0.25 at age 20-24, while for the cohorts born in the 1980s, it was 0.3, a significant increase. If the age patterns of the past prevail among the younger cohorts, they will face deep inequalities in old age.

The rising inequality from one generation to the next is a common feature in about two thirds of the OECD countries. The increase is considerable in Australia, Austria, Belgium, the Czech Republic, Finland, Israel, Poland, Slovakia, the United Kingdom of Great Britain and Northern Ireland and the United States of America. However, there are some exceptions, where income inequality at the same age declined across generations, such as France, Greece, Ireland, and Switzerland.

There is a large and important pass-through of income inequality from wage to pension (OECD, 2017). The transmission can be measured as the change in the Gini index of pensions produced by a unit change of the Gini index of wages. Its value is close to 1 percentage point in more than half of OECD countries, where inequalities in labour earnings are not mitigated by the pension systems but absorbed directly into it. The OECD average is 0.7, reflecting some mitigation/redistributive effects of pensions on inequality. Pension systems by design redistribute wealth from people who die early to those who live long. To prevent or mitigate regressive redistribution from the poor to the rich through pension systems, requires effective, universal disease prevention policies, health promotion and equal access to good health services for all.

Valeria Nesterenko added that there is a strong correlation between social protection expenditures and poverty reduction. However, only 47 per cent of the global population were effectively covered by at least one social protection benefit, while the remaining 53 per cent—as many as 4.1 billion people—are unprotected. Further reductions in poverty would require additional social expenditures and improvements of social protection systems, including broader coverage. This can be a particularly demanding task under the current circumstances of tight fiscal spaces of pandemic-ridden governments.

F. ENVIRONMENTAL SUSTAINABILITY

(Speakers: Leiwen Jiang, Raya Muttarak, Eliya Zulu)

Raya Muttarak introduced the session by showing the substantial impact populations make on the global climate system through technology and consumption. The population interacts with the environment and affects the climate through productive and consumptive activities. In turn, human well-being is affected by the changes in the climate system directly and indirectly and the human population adapts to the climate changes through technological developments.

Humans affect the environment through three major channels including population, affluence and technology. Affluence is usually measured by consumption or GDP per capita, while technology is measured by the impact per unit consumption. The population size is relevant, as well as its distribution by age and geographical location. For example, in the case of electricity or natural gas, consumption increases with age. However, the consumption of other items, such as cars or air flights, is age-neutral. In sum, carbon emission increases with age up to 60 years, and declines thereafter. As a result, carbon emissions may on the whole decline with population ageing.

Leiwen Jiang used the case of wildfires as an example of the effect of human activity on the environment. Climate change and the change of carbon dioxide (CO_2) emission alone do not explain the trends of wildfires in the last 200 years, but by introducing urbanization in the model, the estimation fits the trends of wildfires.

The effect of population dynamics on the environment can be captured by the impact of the variation of population projections on climate change. The basic difference between the high and medium scenario of the United Nations populationprojection can be expressed in terms of 1.7 billion tons less carbon emission per year in the middle of the century. By the end of the century, the difference increases to 7 billion tons of carbon emission per year. While China and India are responsible for the biggest share of the difference, the United States of Ameriica and other developed countries also have significant contributions due to their high consumption levels.

Thanks to major efforts by the environment and climate change research community, the understanding of the importance and complexity of population dynamics in affecting the climate system has improved considerably in recent years. It is better understood today that slower population growth would not eliminate all harmful consequences of climate change, but it does help decelerate the process and mitigate its effects.

Research has also demonstrated that population ageing reduces emissions while urbanization increases them, although the effects vary across regions. Consequently, investments in education and reproductive health, changes in consumptive and productive behaviour are crucial for achieving inclusive and sustainable development.

Raya Muttarak added that women with higher education tend to have lower fertility. Since households with two adults and one child have about 25 per cent higher carbon footprint than a childless couple, education contributes to reducing fertility and, in turn, reducing the number of people who consume and add to carbon emissions. People's awareness of climate issues and their mindfulness of their behaviour's environmental impacts affect carbon emissions as well.

Human well-being is affected by the change in the climate system in many ways, for example, floods or heat waves. However, the negative consequences are not evenly distributed across societies and within households. The age and sex composition of households also influence the ultimate effects. Climate risk is the product of exposure to weather extremes and the vulnerability of people to them. Human activities lead to anthropogenic climate change and the spatial distribution of the population determines the level of exposure. Other population characteristics (such as age, gender and rural-urban residences) determine people's vulnerability and exposure to hazards. Vulnerability is, in turn, a function of the level of preparedness for disasters and the speed of recovery from catastrophic events, when they materialize. These capabilities correlate with the level of education and vary across countries, within countries, and across individuals. Environmental and climate disasters affect health and may accelerate some demographic responses, especially migration. Such a chain of events demonstrates the complexity of the interlinkages of social and environmental factors.

Eliya Zulu introduced demographic trends in Africa and discussed the effects of climate change on the continent. While Africa's contribution to global climate change is currently small compared to other world regions, it bears a disproportionately high share of the impact of climate change. Most African countries are likely to experience a significant reduction in food production as a result of climate change. Malaria suitability is projected to increase by 1.6 additional months per year in tropical highlands from the present to 2050. Dengue suitability will increase, too. The projected size of the population living in water-stressed or water-scarce countries will increase from 0.8 billion to 1.4 billion in the next 30 years. Most nations of the continent will face high population growth and low resilience to climate change. Therefore, mitigation measures for this region should receive priority attention.

G. Final comments on policy challenges and recommendations

In the final session, the Meeting reflected on some policy challenges, ongoing work and potential recommendations for international organizations and national governments.

1. International organizations and agencies

The Programme of Action (PoA) of the International Conference on Population and Development (ICPD, Cairo, 1994), marked a shift in focus on meeting the needs of individuals rather than achieving demographic targets. The PoA also featured the prominence of women's interests and introduced the concepts of sexual and reproductive health and reproductive rights. The PoA was also quite explicit about specific demographic-development linkages. For example, chapter III of PoA highlighted the need to combat poverty as it was seen as a major priority of development efforts, along with its correlates of unemployment, malnutrition, illiteracy, low status of women, exposure to environmental risks and limited access to social and reproductive health services, including family planning. The PoA recognized that many of those same factors that contribute to high levels of fertility, morbidity and mortality, contribute also to low economic productivity. Slower population growth, the reduction of poverty, sustained economic growth with

environmental protection and the elimination of unsustainable consumption and production patterns have been seen, since Cairo, as mutually reinforcing.

The 2030 Agenda for Sustainable Development has provided a new overarching framework for international cooperation to achieve defined global development goals and targets. Specialized units and agencies of the United Nations, including the Population Division of the Department of Economic and Social Affairs and the United Nations Population Fund (UNFPA) support international deliberations and help to set international standards for population data analyses by convening expert group meetings such as the present one, publishing manuals and supporting knowledge transfer through capacity building, training and research.

One example related to the theme of this Meeting is the establishment of international standards in measuring the economic activity of population groups at the national scale. A first in a series of manuals provided the methodology of describing the economy by age through the National Transfer Accounts (NTA) approach introduced above. The NTA manual, published in 2013 in English, has been used by over 90 national teams around the globe. With support from the Population Division and the UNFPA, the manual will be soon published in Spanish and Russian editions. The next manual will add gender as another key dimension of economic accounting, also discussed in this Meeting, will be published in 2022. Another manual in planning, aims at examining the *inclusion* issue, extending the accounts by age and gender to socio-economic status as well.

Additional efforts in this direction include UN DESA's work aiming at "going beyond GDP", by establishing a statistical standard and indicator set to measure economic activity beyond the value of market exchanges. These efforts include the System of Environmental-Economic Accounting, the System of Population and Social Conditions Statistics and the Evidence and Data for Gender Equality (EDGE).

The United Nations Population Fund's programmes are tailored to the specific needs of member states. Countries with a young population are eager to realize a first demographic dividend. Demographically more diverse countries in later phases of the demographic transition, face concerns about population ageing, for example, in European and in some Asian countries, the focus is more on older–population age structures, population decline, very low fertility and migration. The United Nations Population Fund finances projects, among others, on data collection, improving access to data, preparing population situation analyses and research on National Transfer Accounts. Knowledge transfer projects include organizing expert meetings, regional and global events, the Annual Seoul Symposium (in collaboration with KOSTAT) and the high-level conference on demographic research. The United Nations Population Fund also provides policy and programme support.

2. Governments

Experts in the meeting provided some policy recommendations that are inexpensive and require modest new investments, which include integrating existing information on unpaid labour into official statistics on labour, consumption and income or more generally, integrating the data on the household economy into national accounting.

Further suggestions were made to expand the information base available for decision-makers at a low cost. While many countries collect data on income or living conditions annually, consumption and time-use surveys, which are the main information source for the measurement of poverty and the household economy, respectively, are conducted at much wider intervals, only once or twice within a decade. In particular, the reaction of the market economy was widely reported through both the 2008-2009 financial and economic crises and the COVID-19 pandemic depression, but little is known about the strategies of households and their capacity to absorb the consequences of macroeconomic shocks. Therefore, there is a need for data to show how crises (including economic and financial crises as well as epidemics) affect household behaviour, including in regard to consumption and investment. A related proposal is to

incorporate NTA as part of the (routine) production of official statistics of national accounting. Since the countries with the most developed and reliable statistical systems are also the countries most exposed to population ageing, their governments would gain a vital information source with a relatively small investment.

All countries benefit from comparable long-run forecasts/scenarios and disaggregated data. Population dynamics cannot be reliably integrated into development planning without a long-term prospect and proper details about various social groups. Less developed countries would gain from improving their knowledge base by data harmonization or following the international developments and recommendations more closely, according to updating statistical standards.

Other recommendations would require more substantial, wide-ranging institutional reforms. They include preparations for population ageing by improving the school-to-work transition (better education) and the work-to-retirement transition (raising or eliminating mandatory retirement age). In between, policies should support increasing the productivity of older workers through continuing educational programmes and employment practices. The focus of the entire reform package is to maintain high productivity and good health longer, throughout the life course.

As described above, as the first demographic dividend is fading away in many countries, the demand for wealth increases. Realizing the potential of the second demographic dividend requires well-functioning financial markets and a high degree of financial literacy of the population. Governments would be well advised to take an active role in both issues, including improving regulations, supervision and the general conditions of competition, as well as preparing the public to navigate in an environment it feels familiar.

Better health across all ages contributes to a successful demographic transition. Achieving universal health coverage while keeping services affordable to all population groups will remain a key priority. An effective and low-cost strategy is to integrate primary and higher-order health care, which helps to treat patients at the more cost-effective primary level and makes patient referrals shorter and more efficient. Another type of reform that can produce significant cost savings while improving health conditions is to shift the incentives from the input side of health (through treatment) toward outcomes (through prevention), which makes the operation of the health care system more cost-effective without compromising its efficiency.

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ANNEX 1. ORGANIZATION OF WORK

21 and 22 July 2021

UNITED NATIONS EXPERT GROUP MEETING ON POPULATION AND SUSTAINABLE DEVELOPMENT, IN PARTICULAR, SUSTAINED AND INCLUSIVE ECONOMIC GROWTH

Population Division
Department of Economic and Social Affairs
United Nations Secretariat
New York

ORGANIZATION OF WORK

Day 1: Wednesday, 21 July 2021

EDT	
12 noon - 12.10 pm	**Opening remarks** o Mr. Elliott Harris, Assistant Secretary-General for Economic Development and Chief Economist, UN DESA
12.10 - 12.30 pm	**Keynote presentation** o **Moderator:** John Wilmoth, Director, Population Division, UN DESA o Mr. Andrew Mason, Senior Research Fellow, East West Center, Hawaii. Population and Sustainable Development
12.30 - 12.50 pm	**Session I. Setting the stage: Population dynamics, programmes and sustainable development, sustained and inclusive economic growth** o **Moderato**r: Mr. Jorge Bravo, Branch Chief, Population Division, UN DESA o Ms. Mun Sim Lai, Population Affairs Officer, Population Division, UN DESA. An overview of population, sustained and inclusive economic growth and sustainable development o Mr. Michael Hermann, Senior Adviser, UNFPA. Population and sustainable development, in particular, sustained and inclusive economic growth: A review of pertinent programmes **Break**

1.05 - 2.05 pm

Session II. Population dynamics, the generational economy, macroeconomic growth and inequality

- Intergenerational economy and demographic dividends
- How to ensure that economic growth benefits all?
- How do demographic dynamics interact with macroeconomic performance, especially in the post-COVID-19 era?

- **Moderator**: Ms. Chantal Line Carpentier, Chief, New York Office of the Secretary General, UNCTAD

- Mr. Sang-Hyop Lee, Professor, Department of Economics, University of Hawaii. Generational economy and demographic dividends
- Ms. Rita Sciarra, Team Lead, Inclusive Growth and Poverty Reduction, UNDP Regional Hub Panama. Inequalities and inclusive economic growth
- Mr. Hervé Boulhol, Senior Economist, OECD. Ageing and rising inequality in OECD countries

Q&A

Break

2.20 - 3.20 pm

Session III. Gendered economy

- Market and non-market economic contributions of women and men
- Pathways to gender equality and the empowerment of women
- The economy of care and its potential role in the new economy

- **Moderator:** Francesca Grum, Chief, Social and Gender Statistics, Statistics Division, UN DESA

- Ms. Lubov Zeifman, Statistician. Social and Gender Statistics Section, Statistics Division, UN DESA. Modernization of time use statistics and the latest trends
- Ms. Gretchen Donehower, Project Scientist, Center for the Economics and Demography of Aging, University of California, Berkeley. Counting women's work and the care economy
- Ms. Pamela Jiménez-Fontana, Professor of University of Costa Rica and State of the Nation Program. Challenges to achieve the gender dividend during Covid-19

Q&A

Day 2: Thursday, 22 July

EDT	
9.00 - 10.00 am	**Session IV. Population and sustainable development** **Part I: Upper-middle income and high-income countries**

- Population ageing and decline and macroeconomic sustainability
- Financing social policies against the background of demographic shifts
- Extension of lifespans and healthy ageing

- **Moderator:** Mr. Hamid Rashid, Chief, Global Economic Monitoring, Economic Analysis and Development Division, UN DESA

- Ms. Alexia Fürnkranz-Prskawetz, Professor of Mathematical Economics, Vienna University of Technology. Ageing, macroeconomic implications, and financing social policies in Europe
- Mr. Naohiro Ogawa, Visiting Fellow, Asian Development Bank Institute, Distinguished Research Fellow, University Malaya. Three vital phenomena in ageing Japan: The "silver dividend", the changing cognitive performance of older workers and the abrupt value shift of care for the elderly
- Mr. Andre Medici, former Senior Health Economist, World Bank. Ageing and health sector policies and reforms

Q&A

10.00 - 10.15 am **Break**

10.15 - 11.15 am **Session IV. Population and sustainable development**
Part II: Low and lower-middle income countries

- The role of human development, including universal access to sexual and reproductive health care services
- Labour markets and social protection
- SDG1 Ending poverty in all its form and COVID-19

- **Moderator**: Ms. Zhenqian Huang, Associate Population Affairs Officer, Population Division, UN DESA

- Ms. Isis Gaddis, Senior Economist, Gender Group, World Bank. Gender and age differences in poverty: Measuring inequality within households
- Ms. Valeria Nesterenko, Research Statistician, Social Protection/Labour Standards Department, ILO. Labour market inequalities and social protection
- Mr. Latif Dramani, Professor of Economics, University of Thiès, Senegal. Human capital and sustainable development in Africa

Q&A

11.15 - 11.30 am **Break**

11.30 am - 12.30 pm **Session V. Population dynamics and environmental sustainability**

- Population dynamics and global climate challenges.
- How has population change affected the patterns of consumption and production? Key environmental implications

  - **Moderator**: Mr. Steven Stone, Chief, Resources and Markets Branch, Economy Division, UNEP

  - Ms. Raya Muttarak, Program Director, International Institute for Applied Systems Analysis (IIASA). Addressing climate change and environmental challenges from a demographic perspective
  - Mr. Leiwen Jiang, Senior Associate, Population Council. Population Dynamics, environmental & climate change
  - Mr. Eliya Zulu, Executive Director, African Institute for Development Policy. Population dynamics, climate change and sustainable development in Africa

Q&A

12.30 - 12.45 pm **Break**

12.45 - 1.45 pm **Session VI. Interactive discussion: Policy challenges and recommendations**

- National and regional experiences in the integration of population issues in development planning and strategies
- Country case studies by country types, e.g., slow population and economic growth in developed countries, persistent population and economic growth in least developed countries
- Population, the environment and climate change: what has changed since Cairo and future prospects
- Other key topics for the Secretary-General's report to effectively support the Commission's mandate to review and assess the implementation of the ICPD Programme of Action and its contribution to achieving the SDGs

  - **Moderator**: Mr. Tim Miller, Interregional Adviser on Population and Development, Population Division, UN DESA

Open to all panellists to contribute.

Q&A

1.45 - 1.55 pm **Closing remarks**

  - Mr. John Wilmoth, Director, Population Division, UN DESA

ANNEX 2. LIST OF PARTICIPANTS

21 and 22 July 2021

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