1. Introduction: conceptualizing social policy for the twenty-first-century demography
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1. INTRODUCTION

In the second half of the twentieth century the overwhelming demographic question was how world population might be prevented from reaching over 20 billion during the coming century. Now the defining demographic characteristics of the twenty-first century are likely to be declining births, stabilization in size, and the ageing of the global population. The notion that most OECD countries are now experiencing growth in their older populations is well accepted by researchers, governments and policy makers alike. What is less well understood, however, is that this is not just a North American/European phenomenon, but is now occurring in both Asia and Latin America, and even in some parts of Africa. It is also not well understood that the ageing of populations arises not so much due to increased longevity, though that is an important influence, but more through falling fertility, and that as a result the twenty-first century is likely to see not a population explosion, but a cessation of population growth altogether.

2. DEMOGRAPHICS

These changes in the demography of human populations have arisen due to the 'demographic transition'. This started in Europe sometime after 1750, in Asia and Latin America during the twentieth century, and now there are indications that Africa will transition during the twenty-first century. Why the demographic transition occurred when it did, where it did and how it did is strongly debated. However, as humans develop economically, mortality falls, sometime later fertility falls, and in the gap between the two trends population grows. As the transition develops, low fertility and low mortality lead to a shift in the age composition of the population – resulting in population ageing.

The twenty-first century is predicted to see an overall increase in population size, accompanied by a change in distribution and age composition. World population is predicted to increase from its current 7 billion to around 11 billion by the middle of the century (UN 2013). The global distribution of people will change, with an overall increase in those living in Asia and Africa, and a fall in European and North American populations. The Less and Least Developed Region countries will account for 97 per cent of the growth to 2050. Asia will comprise 55 per cent of the world population by 2050 at 5 billion, Africa is projected to double in size by 2050 from 1 to 2 billion, while Europe will decline from 740 to 709 million. The age composition of the population will also alter as median ages rise, and there is a proportionate shift from younger to older people across the globe. Europe reached maturity at the turn of the millennium, by the measure

of more people over 60 than under 15. It is predicted that Asia will become mature by 2040, with over 1 billion people over 60, some 20 per cent of the population, compared to under 1 billion under 15, 19 per cent of the population. Similarly, in 2040, Latin America and the Caribbean will reach 20 per cent age 60 and over, while those under 15 will fall to 19 per cent. By 2050 there will, for the first time, be the same number of old as young in the world – with 2 billion of each – each accounting for 21 per cent of the world's population. Nearly 10 per cent of the developed world will be over 80.

Taking an 'age-structural transition' perspective, understanding the proportion of old and younger dependants within a population, and the relationship of this to non-dependants, allows consideration of the cohort composition and how this will alter over time. The reason why this is seen as important is that, generally, productive capacity varies across the life course, flowing from a period of youth dependency, through high productive potential in adulthood, returning to a decrease in productive capacity in old age. When we are young adults we produce, consume and save, and when we are older we reduce our production and consumption and begin to draw down on our investments. The macroeconomic effects will differ depending upon the age composition of the population.

This perspective also allows us to view population change in terms of a shift between providers and dependants – the dependency ratio – and how this will typically move from a large percentage of young to a large percentage of old dependants during the demographic transition. Three broad groupings are currently defined by the UN Population Division: youth dependants aged under 15; working-age population aged 15–64; and elderly dependants aged 65 and over. The ratios thus comprise Elderly Dependency Ratios (EDR), the number of persons of working age (aged 15 to 64) per person aged 65 or over; Youth Dependency Ratios (YDR), the number of persons of working age (aged 15 to 64) per person aged 15 or under; and Total Dependency Ratios, the number of those aged 15–64 with those outside this age range. The shift in TDR from YDR to EDR may be another useful measure in determining when a population reaches demographic maturity.

On these measures, the next decade will see a rapid shift towards increased EDRs in most industrialized countries. The EU25 EDR, for example, is set to double as the working-age population (15–64 years) decreases by 48 million between now and 2050. The EU25 will change from having four to only two persons of working age for each citizen aged 65 and above. Italy, for example, will see its EDR double between now and 2050 to reach 70:100 workers. In contrast, the UK will increase only slightly, reaching 67:100. By 2050, the EDR will also exceed 70:100 in Spain and Japan, while remaining below 40:100 in Denmark, Iceland, Luxembourg, Mexico, Turkey and the USA.

However, behind these statistics defining dependency and productivity lie the complexity of social and economic behaviour, and the ability of societies and individuals to adapt to changing circumstances. In particular, new cohorts enter adulthood with different characteristics, and this is reflected in their ability to remain healthy and productive over their life courses. Much of the concern over population ageing is based on assumptions developed from the characteristics of current older populations. It is highly likely, however, that future generations of older adults will have higher levels of human capital – in terms of education, skills and abilities – and better health profiles, and this will enable them to remain active, productive and contributory for far longer. In addition, the significant contribution made by older adults in the informal sector, providing family

and community support and care in particular, is now widely recognized. Many now question the relevance of EDRs as currently defined.

Fertility Rates

The greater challenge going forward, however, may be around the question as to how low fertility and mortality rates will fall. Two-thirds of the world's countries now have child-bearing rates that are at or below replacement level – crudely defined as 2.1. These are diverse, including Hong Kong, the lowest at 0.99, Poland, Germany, Barbados, Thailand, Vietnam, Mauritius, Iran, Chile, Tunisia, the USA and Myanmar. Indeed, some demographers (Leeson, Chapter 3 in this volume) now argue that low-fertility countries are in the midst of a 'second demographic transition', which is keeping fertility well below replacement. Some countries may well be in a so-called 'low-fertility trap', which arises both through demographic factors, the fact that fewer potential mothers in the future will result in fewer births, and sociological ones, in that ideal family size for the younger generations is declining as a consequence of the lower childbearing they see in previous generations. Such low childbearing will affect future population structures. For example, by the end of the century the percentage of children in most countries will have fallen to 15 per cent or below, and those of working age (currently defined by the UN as 15–64) will have fallen to just over half. The caveat here is that of course 15–64 is an unrealistic proxy for working age even today, and it is highly improbable that it will define working life by the middle of the century. But this is one of the key messages: unless policies support a change in behaviour, this will be the scenario by the middle of the century.

Mortality Rates

However, while population ageing is primarily driven by falling childbearing, mortality rates have also been falling, and this also has significant impacts. As the bio-demographer Carnes points out (Chapter 4 in this volume), humans have been designed to live long enough to reproduce and ensure the survival of their offspring. This is the 'essential lifespan'. But in an ageing population most of us live well beyond this 'essential lifespan' – the twenty-first century will see life extension being the common experience for most people alive today. There appear three particularly pertinent questions.

1. Will increases in both life expectancy and in life extension or longevity continue? In other words, will there be an increase in average years lived by humans and also maximum years attained by a human being?
2. Will life expectancy increase in line with life extension? That is, will we all enjoy the benefits of longevity or will it be for a few?
3. Will increases in life expectancy be accompanied by increases in life extension, or are we seeing a compression of longevity after 100? In other words, will the predicted increases in centenarians over the coming century be accompanied by increases in super-centenarians? (Over 110?)

The drivers of life extension appear to be fourfold: healthy living, disease prevention and cure, age retardation or senescence prevention and regenerative medicine. It has been

argued that healthy living and disease prevention and cure can push most lives in advanced economies to the century. Indeed, centenarians in the UK are likely to increase from around 12 000 currently to near half a million by the middle of century and approaching 1 million by the end (Leeson, 2011). Eight million alive in the UK are likely to reach a century, 127 million in Europe. According to calculations made by Vaupel (2010), life expectancy of babies born here today is probably around 103. However, we shall probably need age retardation and regenerative medicine to achieve real life extension. The third question above is important here. Will increases in life expectancy be accompanied by increases in life extension, or are we seeing a compression of longevity after 100? The interesting evidence can be drawn from deaths among the oldest old – those over 80. Late life mortality rates in many developed countries are declining and currently show no signs of slowing. If we take not life expectancy but 'model age at death' – in other words the age each year at which most people in the population die – in countries such as Japan (where we have sufficient numbers of old people to study this), we find first that the mode is some six years older than the average; and importantly as the mode increases, so the tail – or the distribution of deaths above this mode – is also sliding to higher ages. We call this a 'shifting mortality scenario' and this provides evidence – at least for Japan – that, as we see an increase in centenarians, so we should expect to see an increase in super-centenarians.

However, in order to continue these increases, which may at present be linked to our first two factors – healthy lives and disease prevention and cure – we shall have to address senescence – or ageing – itself. For while some demographers such as Vaupel assert that the mortality data suggest that the increases in life extension will continue (Vaupel, 2010), others, such as bio-demographers Olshansky and Carnes, maintain that we need biological intervention to continue the trends (2009).

Here is possibly the greatest challenge. Epidemiological evidence suggests that the onset of disability is pushed back into later ages; conditions prevalent within the 60- and 70-year age groups are now being delayed in some populations until the 70s and 80s. A 70-year-old European has the same probability of dying today as a 57-year-old 50 years ago. This is primarily the effect of healthy living and tackling disease. Will, however, these gains in healthy years as well as long lives continue as we increasingly turn to science and technology to extend our years? Or will the modern increasingly scientific and medical drivers of longevity not only increase our life expectancy but also enable us to live for longer and longer with disease, disabilities and frailties? This leads to three significant public policy challenges:

- the need to maintain both healthy life expectancy and disability-free life expectancy as life expectancy considerably increases;
- the need to refigure support and care, formal and informal, to support these new considerably extended lives; and
- the need to finance the cost of maintaining health and quality of life, particularly at the end of these new extended lives.

This, then, is the demography of the twenty-first century – low fertility and low mortality rates for most countries, leading to an ageing of the world's population. How can modern societies successfully adjust to population ageing?

3. THE CHALLENGE

As we have discussed, the ageing of populations is caused by two distinct trends: older people are living longer and at the same time younger people are having fewer children. This shift from predominantly young to predominantly older populations raises concerns over the ability of nations to finance the social security and long-term health and social care required to support a growing number and percentage of older dependants at a time when the number and percentage of those who are economically active is declining. There are also concerns about the ability to reconfigure health and long-term care provision; this is particularly the case in emerging economies, which will still be tackling acute and infectious disease and relatively high levels of infant and child mortality at the same time as addressing the growing number of frail older adults. A third challenge concerns the reconfiguration of social institutions to address issues of intergenerational and intragenerational fairness; that is, fairness and equity within and between different generations as populations age and the support of individual well-being across the life course. Indeed, inequalities in access to resources – health, economic and social – are likely to remain a pressing concern over the coming decades.

Economic Challenge

This challenge has been brought into sharper focus since the financial crisis of 2008. In particular, growing national debt has drawn government attention to two apparently conflicting priorities: the need to sustain public spending on pensions and healthcare versus the need to reduce budget deficits. A number of countries are consequently reconsidering their pension and healthcare provision, which accounts for up to 40 per cent of all government spending in advanced economies. Japan is often seen as the classic ageing society. The steady rise in average income combined with the introduction of social security had led to an increase in average life expectancies from a postwar level of 60 to currently the highest in the world at 83. However, the social security system now faces serious financing problems as the number of beneficiaries is increasing at a time when the working population is declining – a simultaneous increase in payments and decrease in revenues.

The USA is also facing considerable budget deficits in part due to its public social security and health programmes. Future scenarios predict that the deficit will rise from 8 per cent to 20 per cent of GDP by 2050. The UK is in a different situation as there has been a continuous shift towards the older individual bearing financial responsibility for health and pension costs. Yet in the UK the government has raised state pension age to 66 as from 2016, in a direct move to cut the budget deficit by some £13 billion per year. Even Australia – currently experiencing annual surpluses – faces a budget deficit of $100 billion in ten years' time, around 4 per cent of GDP, of which $30 billion will arise from increased healthcare spending.

The economic challenge is to maintain productivity among the older population for as long as possible, thus both reducing the need for social security and enabling the financing of this for those who are no longer economically active. Furthermore, many governments, in particular in advanced economies, are exploring policies to address the demographic composition. These measures may be approached by altering the age composition of the population, through encouraging changes in fertility and migration rates

to increase the proportion of young people. Couple this with the potential to increase productivity through technological innovation and increased female participation, and the increased 'dependency ratio' argument begins to weaken.

Much of the concern about the economic challenge arises from the presumption that future older labour forces will be less productive and less innovative, and that an older population will consume less, with negative consequences for economies. However, in advanced economies at least, new cohorts of highly educated, skilled and increasingly healthy populations are approaching traditional retirement ages, and are increasingly remaining in economic activity – producing, consuming, and paying taxes (Bloom et al., 2011). Furthermore, longer lives allow a great accumulation of assets that, when invested, can enhance productivity, generate asset income and raise living standards. Similarly, while population ageing may affect the aggregate savings rate by raising the fraction of the population in age groups traditionally associated with drawdown, it may also affect an economy's average level of savings per capita, as individuals approaching and shortly after retirement tend to have higher levels of savings than those at the start of their working career. It has been estimated, for example, that the USA will see a 25 per cent increase in national net worth per person of working age by the middle of the century due to population ageing alone. These two factors – the need to save more for a longer retirement and the changes in the age distribution of a population – have the potential to raise the asset income of a nation. Increased productivity, increased savings and, given the high level of wealth currently accumulated by older populations, continued consumption, and the ageing of populations may not herald the scenarios currently being forecast.

While research indicates that increasing fertility can have a strong influence on altering old-age dependency ratios, very few countries are currently pursuing an active fertility promotion policy. However, there is recognition that 'family-friendly' policies aimed at supporting both children and parents will allow women to have the number of children they desire (OECD 2007), which in most OECD countries tends to be higher that actual achieved births (D'Addio and Mira d'Ercole 2005a, 2000b). These include affordable child care, parental leave, financial transfers and tax provisions.

Similarly, as Harper explores in Chapter 5 of this volume, migration has a potentially strong and long-lasting impact on population growth and structure through the interaction of the number of migrants, their relatively young age structure and their higher fertility. Immigration thus has the ability to prevent population decline, maintain the size of the labour force and thus the support ratio, and slow down structural population ageing. Alternative policy options include increasing the productivity of the population by encouraging higher labour force participation rates and extending working lives by altering entry and exit ages.

Health Challenge

A second challenge is the need to maintain health among older populations for as long as possible, thus reducing the requirement to provide and finance long-term health and social care. Population ageing will hold particular challenges for the provision of health and social care. In particular, the amount of ill health and disability is likely to increase, the type of ill health to change from acute to chronic conditions, and, importantly, the effect of decreasing numbers of younger people will reduce those able to provide care.

The total amount of ill health and disability in the population will rise because, as societies improve their population life expectancy, so the proportion of the population with serious health problems will increase, unless there is a significant improvement in the health of successive birth cohorts that shows up as a decrease over time in age-specific prevalence rates. This has also been termed 'epidemic of frailty' (Robine and Jagger 2005), as an increasing number of individuals survive to experience the increased frailty and dependency associated with advanced old age. Even if the improvements in healthy life expectancy keep pace with increasing life expectancy, as Howse (2010) highlights, the change in the age structure of the population that will result from the ageing of the large birth cohorts in the middle of the twentieth century in many advanced economies will increase the scale of healthcare needs in the population. In particular, there will be an increase in the proportion of the population in close proximity to their death, a time when ill health is more likely to predominate. Analyses of age-related data on health spending have shown that proximity to death is more important than age *per se* as a predictor of the consumption of health resources (e.g. Zweifel et al. 2004; Seshamani and Gray 2004).

There is also evidence of a change in attitudes to and demand for healthcare provision from successive cohorts. As Leeson (2004) has pointed out, although a number of cross-national studies have considered the determinants of healthcare costs, only one has found that the age structure of the population, that is the proportion of population aged 65 and over being taken as the age structure indicator, is the explanatory factor. Rather, it is the wider effects of income, lifestyle characteristics and new technology, alongside the effects of environmental factors, that are driving up the demand for new advanced medical applications. Indeed, analysis of OECD data by Seshamani and Gray (2002) reveals that, in advanced economies at least, per capita healthcare costs for those aged 65 years and over have increased at the same rate as for those aged less than 65 years.

Change in type of ill health that will exert pressure for a major shift in the allocation of healthcare resources and the configuration of services arises from the shift from acute infectious disease to complex chronic long-term ill health and disability: the chronic disease burden (Nolte and McKee 2008). There is thus a need in both advanced and emerging economies to reallocate of health and social care resources away from infectious and acute medicine towards preventing and managing late-life chronic disease.

The third factor concerns the impact of population ageing on a society's capacity both to provide workers to care for the older population and tax income to finance this. In addition, demographic change will reduce both informal family care through a reduction in the availability of younger members to provide such care, and formal care as the provision of overseas migrants providing healthcare is reduced as their own societies start to age. Furthermore, this will occur at a time when the epidemiological transition is towards labour-intensive chronic disease care.

Intergenerational and Intragenerational Relationships

The traditional contract between the generations is based on a system of intergenerational reciprocity. Adults provide for young dependants (children) and, in return, when those young dependants become adults, they provide for older dependants. This is maintained in most societies both at the familial level (parents providing for young children, children

providing for elderly parents). It is also maintained at a societal level, with adults within the labour market providing via public transfers, for both older and younger dependants, for healthcare and education, and healthcare and income support respectively. The question for an ageing population is whether successful cohorts (in terms of both fertility and mortality reduction) pass the cost of such success on to future cohorts via the 'traditional intergenerational contract', or bear the cost of their success via an 'adapted intergenerational contract'. This latter contract would require older cohorts to bear the costs of their longer lives through, for example, higher post-retirement contributions to their own welfare and/or a longer working life.

The consideration of intergenerational fairness also raises the question of ensuring that both those generations who are working and those who are now retired are able to benefit from the proceeds of any economic growth. This, for example, may occur through maintaining a link between pensions and wages so that pensioners receive some share of a nation's economic growth. It may be implemented through linking pensions to increases in prices so that pensioners do not see absolute living standards fall as a result of inflation. It could be ensured by tying pensions to the capacity of the system defined by the growth in the total wage bill – or it may be maintained by a system that integrates several indices.

At the same time, most governments will wish to ensure that they work to reduce intra-generational inequalities that exist between those with differing educational and employment opportunities and access to social capital resources.

4.   CONCLUSION: THE NEED FOR ADAPTATION

Twenty-first-century population ageing is taking place within existing institutional structures mainly inherited from the twentieth century. As societies attempt to adjust to population ageing, a key public policy question is thus how national collective goals will influence these necessary societal adjustments, and how such required adjustments will be facilitated or restricted by existing social goals. More specific is the question of the appropriateness of financial and health institutions and programmes, designed for the population of the twentieth century, for the individual life courses, familial and societal structures of the twenty-first century. In particular, will individuals and households be able to make the relevant adjustments to savings behaviour, labour productivity, family intergenerational transfers, and investment in their own human capital; and will institutions be able to make the relevant adjustments to enable arrangements for savings, labour supply, public intergenerational transfers and investment in human capital?

It may be argued that population ageing necessitates a division between government responsibility (public money) to keep a population out of poverty and individual responsibility (private money) to raise personal standards of living. The new challenges also require consideration of new frameworks that support and encourage individual responsibility. Two particular challenges will be how to manage the expectations of relatively affluent upcoming cohorts of older adults who wish to maintain quality of life and health in later life, while also tackling the likely increasing inequalities between different income/asset groups in later life.

New policy approaches in the light of population ageing must thus include the devel-

opment of broad, coherent and integrated multi-pillar approaches to labour markets, health and social security. These should enable and promote longer working lives through lifelong training, education and skills updating, and the provision of appropriate working environments for older workers. They should further ensure that private family/household transfers are integrated into old-age security systems where possible; promote well-being and enable healthy active living to reduce chronic illness and healthcare costs, and support active contributory life for as long as possible; provide access to education across the life course to ensure that all individuals are prepared physically, mentally, socially and financially to cope with increasing individual responsibility for old age.

Understanding this reality is vital for individuals who need to reassess their life courses in the light of the new longevity probabilities. Moreover, it is also of the highest importance for governments charged with planning and developing appropriate policy frameworks to address the forthcoming demographic changes, challenges and opportunities. However, it should be recognized that the major concerns – public spending on pensions; high dependency ratios between workers and non-workers; increases in healthcare costs; declining availability of family-based care; and a slowdown in consumption due to an increase in older people and a decrease in younger people – are dynamics of current cohorts and current behaviours; they are not fixed. In additional, they are all phenomena that can be addressed by policy, given the political and economic will.

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