Population Aging: Unwinding the Demographic Dividend

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Population Aging, the Demographic Dividend and Demographic Transition Theory

The population of the world is aging and has been for at least 40 years. This reflects a combination of increasing longevity resulting in more older people and of decreasing fertility resulting in fewer younger people. However, the impact of population aging has varied geographically. It was first experienced in the wealthy countries of the developed world and is now being experienced in the increasingly wealthy countries of the developing world. The record in the least developed countries is mixed, but many of them are also experiencing the beginnings of population aging.

This historical record follows demographic transition theory, which postulates that population growth and economic development follows four (or five) consecutive stages. Stage I is characterised by high birth and high death rates resulting in slow population and low economic growth. After some time economic growth results in better public health and a decrease in death rates, thereby stimulating population growth and, with a lag, faster economic growth. This is Stage II. These developments in turn promote better education, which, especially when experienced by women, lowers birth rates and population growth thereby increasing per capita incomes and wealth. This is Stage III. Stage IV is characterised by low birth and death rates and hence slower population and economic growth, but higher levels of accumulated wealth. More recently, the phenomenon of increasing death rates in aging populations has resulted in negative population growth and shrinking population size, with associated challenges for economic growth. This can be labelled Stage V. Because demographic transition theory is based on a combination of lower death rates (or increasing longevity) and decreasing birth (or fertility) rates over time, it is effectively a theory of population aging.

By almost all measures Japan is the oldest country in the World having recently entered Stage V of demographic transition. This is the result of the highest longevity (or life expectancy) in the world combined with the earliest post-war reduction in fertility reflecting the devastating impacts on the country at the conclusion of the Second World War. This reduction in fertility was sustained into the modern era partly as a result of increasing and broadening levels of education, especially for women.

Canada, like most of the remainder of the developed world, is firmly ensconced in Stage IV of demographic transition, with comparatively high life expectancy, below replacement fertility and slow population growth, increasingly maintained by comparatively high per capita levels of immigration. All countries have benefited to some degree from increasing longevity over the Twentieth Century, first as a result of reduced infant mortality and then, primarily in the second half, an increase in the longevity of older people. Also, all developed countries experienced reductions in fertility usually associated with the commercial availability of the birth control pill, which occurred in the late 1950s in the U.S.A. and gradually spread across the developed world over the following decade. The Pill gave women more control over desired family size. In most cases, fertility dropped to below replacement, which really propelled the aging process as societies were not generating sufficient

children to replace themselves over time. In this sense, these developed countries are all following in the footsteps of Japan. Some like Russia and Germany have already reached Stage V, while others such as the U.S.A. are earlier in Stage IV because of comparatively lower life expectancy and higher fertility.

As an aside, it is useful to recognise that the speed and impacts of population aging are not uniform within countries. Because of past internal migration patterns, eastern Canada is noticeably older than western Canada and the northeast of the U.S.A. is older than the southwest. Because young people gravitate to urban centres, cities like Toronto and Tokyo are younger than smaller rural towns. In addition, selected groups within a population may have experienced different historical patterns. For this reason, aboriginal peoples in Canada as a group are younger than the rest of the national population, as are the Afro-American and Latino populations in the U.S.A..

The impact of demographic transition on population growth is direct since population growth in the absence of immigration, is simply the difference between birth and death rates. The translation of population growth into economic growth is somewhat more complicated. In Stage II, rapid population growth as a consequence of rising longevity results in increasing domestic demand thereby setting the stage for increased economic growth. However, because of increased population size, per capita incomes remain low. The subsequent decline in fertility in Stage III slows population growth but not economic growth because the young are entering their working ages resulting in rapid labour force growth. Decreasing population growth raises per capita incomes and wealth, but rapid labour force growth can temporarily increase unemployment until all new entrants are absorbed into the economy. This combination of slowing population growth and rapid labour force and economic growth in Stage III is called a demographic dividend. All developed countries currently in Stages IV and V of demographic transition have benefited from this phenomenon to a greater or lesser degree.

The timing of a demographic dividend is directly linked to fertility levels. High fertility rates in Japan over the 1930s and much of the 1940s resulted in rapid labour force growth over the 1950s and 1960s at a time when population growth was slowing, thereby increasing wealth. The associated economic growth persisted through the 1970s and into the 1980s, a golden era in Japanese economic performance. But the persistently low fertility rates were slowing labour force growth and hence economic growth by the end of the 1980s and a prolonged period of stagnation set in. Demographics may not have been the only cause, but it played a large role.

The impacts of a demographic dividend are magnified by a baby boom, which is not specifically considered in demographic transition theory. Many countries in the developed world experienced a post-war baby boom. Some booms were small like most of Western Europe; some were much larger like the U.S.A., Australia and, especially, Canada. And some were non-existent like Japan. A baby boom occurs when births increase noticeably, are maintained at a historically high level for some time and then subsequently decrease. This occurred in Canada between 1947 and 1966 and in the U.S.A. between 1946 and 1964. As a result, North America enjoyed a demographic dividend from the early 1960s to the mid-1980s as the Boomers entered the labour force. The impacts of that dividend remained as the Boomers continued to work over the subsequent three decades. This period of sustained economic growth in Canada and many other developed economies is now largely over as the Boomers start to exit the labour force. The unwinding or reversal of the demographic dividend is now upon much of the developed world.

Because fertility in Japan dropped almost twenty years before North America and Europe, Japan has been facing 'unwinding' for the past two decades. Because the baby boom in Europe was not as pronounced as in North America a demographic dividend was not as powerful and economic growth was slower than in North America. Nonetheless, European countries too are facing some 'unwinding' and even slower growth in the future. It is important to emphasise that while slower economic growth may be a challenge, it is not necessarily a problem. It can be good for the environment and so long as economic growth remains faster than even slower population growth, per capita incomes and wealth can continue to increase.

Because demographic dividends lead to rapidly growing economies, population aging can contribute to changing influences in the global economy. Countries that have already benefited from a demographic dividend are more wealthy and tend to exert a larger and more powerful role in global affairs than the size of their populations alone might dictate. Both Japan and, particularly, Canada are prime examples of this phenomenon. Consequently, countries currently enjoying the benefits of a demographic dividend can be expected to play a greater role in future international affairs. Countries like Brazil, Mexico and Turkey have been enjoying rapid growth of the young (and better educated) working age population over the past decade, while at the same time stabilising the growth of the younger population through lower fertility. Conversely, 'unwinding' of demographic dividends might lead to reduced influence in international affairs. As suggested above, many European countries, especially those around the Mediterranean, such as Italy, Spain, Portugal and Greece are in this situation.

The contrast between China and India is interesting. They are in very different stages of demographic transition. China's

'one child' policy, introduced in 1979, effectively vaulted the country into Stage III before the completion of Stage II. Moreover, population momentum generated a noticeable echo of the numerically large generation born in the 1960s. These children are aged 20 to 29. Consequently, China experienced a demographic dividend over the first decade of the new millennium as the Echo children entered the workforce. That is now over because the past 'one child' policy in China will slow future workforce growth, thereby placing upward pressures on wages which, when combined with slower population growth, is likely to raise per capita incomes. The big question for China is will they get rich before they get old or will they get old before they get rich? Modifications of the 'one child' policy today will not change this conclusion. Meanwhile, there is no 'one child' policy in India and fertility is still not sufficiently under control for a clear transition through Stage III to increase per capita incomes in the country. Other countries in the region are aging rapidly. South Korea and Taiwan are prime examples, but the small populations of Singapore and Hong Kong are already old by international standards.
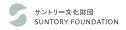
It appears that to access the economic benefits of a demographic dividend there is a necessary 'window' for the fertility rate centered around the replacement level of approximately 2.1 children per woman. First, as an upper bound, fertility needs to fall below approximately 2.4 children per woman, otherwise there are still too many youth to absorb into the labour force. The resulting high youth unemployment not only keeps per capita incomes low, but can also lead to volatile and unstable social situations, which are not conducive to rapid economic growth. Second, the lower bound to the window for sustained economic benefits is about 1.8 children per women unless a country has a formal immigration policy to maintain labour force growth from external sources (like Canada). A fertility rate that is lower results in too few young people to look after a growing elderly population both in terms of bodies and in terms of the tax base. This is the situation currently facing Japan and, to a greater or lesser degree, many other aging developed nations, including Western Europe and Canada. This is also why a number of countries are exploring immigration as a possible 'solution' to population aging, but immigration levels are always too small relative to population size to make any noticeable difference and by the time the problem is recognised it is usually too late to be proactive on this front!

The 'problem' of too low fertility has elicited many responses from academics, politicians and the media. Probably the most common solution proposed by all three groups is to enact policies to increase the fertility rate. Economists tend to favour economic solutions such as a child bonus or offering financial incentives to have more children. This was tried in Quebec (and other jurisdictions) without much success. Children are expensive and the bonus offered is usually insufficient to change decisions. One policy that can have a limited impact is subsidised, universal childcare. This policy provides ongoing support to families for a number of years, which appears to make a difference to some potential parents. This policy is currently in effect in Quebec where the fertility rate has increased modestly, along with the labour force participation rate of women. In general, advising women to have more children without establishing adequate support systems is not effective. Moreover, by the time the 'problem' is recognised, it is usually too well entrenched for any fertility policy to be an effective solution to population aging..

Since most of the concern focuses on the financial burdens on workers from the provision of health care and pensions to the senior population and there is the, often implicit, assumption that current taxes cannot be increased (they can), new revenue sources need to be identified. Perhaps, a small tax on all foreign exchange transactions should be considered to fund the provision of health care to seniors. This would collect revenues from both those buying and selling the national currency and could be embedded in the foreign exchange rates much like bank profits currently are. An alternate or additional source of revenues could be a small (say 0.1%) tax on the value of all stock market transactions. Again this could be easily collected at source much like stock exchange fees are currently collected. The demographic dividend that contributed to wealth generation could keep on contributing to the population through these wealth-related revenues that could be used to fund pensions, health care and other so-called senior 'entitlement' programs.

The potential shortage of workers in aging populations can also encourage creative solutions. Technology can be used to replace people in some instances, such as lifting incapacitated seniors in and out of bed. In general, the health care sector offers excellent opportunities for technological solutions to possible labour shortages, especially when it comes to self-monitoring devices and remote reporting, etc. Also, lower fertility means that many seniors may not have children or be able to count on children to care for them in old age so they may turn to each other. For example, members of a family or a book club may decide to purchase or rent adjacent units in a housing complex so that they can watch out for each other and provide assistance in emergencies. This solution may also help if children are in another town, city or country.

In short, rather than calculating more dependency ratios, complaining about financial burdens on governments or younger generations or worrying about the lack of support workers, we need to discuss and provide creative policies and solutions to an inevitable situation that has been known about for decades.

Population Aging, the Changing Structure of Demand and Life Cycle Theory

Population aging leads not only to slower population and workforce growth, but also to slower growth in consumption and, hence, gross domestic expenditures. In addition, with differential impacts on different sectors of the economy, population aging leads to a changing structure of demand in the economy. For example, with population aging the health care sector 'wins' and the education sector 'loses' in terms of expenditure growth. In fact, all sectors of the economy are impacted to a greater or lesser extent by population aging.

The sectoral impacts of population aging can be determined by combining changing population sizes in different age groups with the economic (and socio-economic) behaviour in the different age groups. Household expenditure surveys conducted by national statistical bureaus contain information on individual and/or household expenditures on many different items at different ages. To examine changing aggregate expenditure patterns in the economy over time, age-related household expenditure information can be combined with the changes in population size and age over time. This approach is based on life cycle theory, which argues that individuals' incomes, expenditures and savings behaviour varies over their life spans. An extension of this theory can be used to argue that within the consumption expenditure category, expenditures on individual items also vary over the life span. The economic impacts of population aging can be ascertained by combining the aging population with unchanging age-related expenditure patterns. Since these age-related expenditure patterns change very little over time, this approach can also provide projections of the economic future when combined with population projections.

This approach can be illustrated by noting, for example, that Canadians gradually move from spending money on child care in the 30s, to pet care in the 40s, to eye care in the 50s and then on pharmaceuticals (pharma care) in 60s and beyond. As the Boomer generation has moved through the life span, it has had major impacts on the products and services associated with each of these sectors in the economy. Similar transitions occur within sectors. For example, the average Canadian occupies rental housing in the 20s before purchasing their owner occupied housing in the 30s. A subset then inherits or purchases a vacation home in the 50s and moves into a nursing home in the 80s. This housing behaviour is further reflected in the myriad of housing related expenditures (on, for example, electrical goods, furniture, repairs and maintenance), so population aging has had major impacts on the housing sector over the post-war period and will continue to make its presence felt on the sector in the years to come.

Life cycle theory was originally developed with the financial sector in mind. The average person borrows money (education loans, mortgages, etc) when they are young and incomes are lower. Then as incomes increase over the working years, savings take place first to pay back the loans and then to accumulate the 'nest egg' for retirement, either in formal pension plans or in individual accounts. This is followed in the post-retirement ages by drawing on those assets and may result in dis-saving if expenditure exceeds income (even though both may be decreasing). This is a theory of loanable funds and the need for financial markets to enable income to be 'smoothed' over the life span. However, it also has implications for interest rates and equity markets. Young populations are likely to have more borrowers thereby increasing the demand for loanable funds and placing upward pressure on interest rates as the North American Boomers did in the 1970s and 1980s. However, as the population ages and more people move into the saving years, the demand for loanable funds decreases and the supply increases thereby putting downward pressure on interest rates, as has been the experience of the past twenty years. Moreover, as people save for retirement either in institutionally or individually managed funds (pension and some mutual funds, etc.), the demand for equities and other longer-term assets grows thereby increasing prices. This could explain the upward trend in prices on North American equity markets, which has little to do with supply side indicators such as price-earnings ratios and other financial measures. Of course, liquidation of equities in the retirement years will place downward pressure on equity prices, unless there are enough domestic or foreign investors to maintain demand. Japan had neither and the equity markets plunged. In a more open world without capital restrictions, Canada lacks the domestic market but has foreign demand (which can be problematic), whereas the U.S.A. has both. This leads to the conclusion that U.S. equity markets are not likely to follow the stagnation experienced by Japan. Because of demographic realities, Canadian and European equity markets are likely to perform between these two extremes.

Transportation choices also follow a life cycle. Younger workers are more likely to use public transportation, because they live in cities and cannot afford automobiles (and, maybe, care more about the environment). Older workers have families, live further away in the suburbs and can afford autos so are more likely to drive. The Japanese auto industry was brilliant in following the life cycle of the Boomers in North America (perhaps because they had already experienced it themselves). When the Boomers were young (1960s and 1970s) they wanted small, inexpensive vehicles. Then as they aged into the family years, family-friendly vehicles (mini-vans, etc.) became the vehicle of choice, first as basic packages (1980s) and then with more features and luxury (like SUVs) that they could then afford (1990s). As they aged further and their children departed

the household, the demand for luxury vehicles increased (2000s), hence the success of luxury brands like Acura and Lexus (and Audi and BMW).

Food and drink choices also change as a person ages. Fast food in the younger years gets replaced by family food at home in the early working years and then increasingly by sit-down restaurant food in the later working and early retirement years. And the average Canadian is more likely to order fresh fruit and vegetables and more fish as they get older. Many other food items show similar age-related variations. A fun, but relevant application for the financial sponsor of this conference, is that average North Americans move from beer to wine to hard liquor (such as whisky) over the life span, which means that aging populations are 'kinder' to wine and liquor manufacturers than to beer producers.

Leisure and recreation trends are also influenced by population aging as people move from active pursuits (e.g. sports) when they are young to less active pursuits (e.g. walking, birding, gardening) as they get older. This has important implications for the provision of appropriate recreation facilities in communities. It also means that countries with higher proportions of their populations in the high performance ages (20s and early 30s) are likely to out-perform relative to their population size at international sporting events such as the Olympic Games. Russia is a good example today, as is Canada because the kids of the Boomers (the Echo generation) are now all in their 20s and early 30s. Therefore, allocating the Olympics to countries like Greece that have fewer young people leaves the country with high debts and underutilized sports facilities. This should provide a lesson for Japan, recently awarded the 2020 Olympics.

Finally, applications of life cycle theory to health care needs are familiar to politicians, media commentators, physicians, researchers and many other groups. People make greater use of health care as they get older. Besides eye care in their 40s (referenced above), people are more likely to experience diabetes and arthritis in the 50s, then cancer in their 60s and 70s, followed by strokes and heart attacks in their 70s and 80s. The demand for home care services increases in their 70s and 80s and the need for nursing homes in their 80s and 90s. The trends emanating from these life cycle needs have implications not only for all parts of the health care sector, but also for food providers (diabetes) and workplace facilities (arthritis).

These behavioural patterns over the life cycle are remarkably stable over time. Canadian household expenditure data have been regularly available since the early 1960s and the expenditure patterns in broad categories have not changed noticeably, although technological change has changed the methods by which consumer demand has been satisfied (e.g. recorded music). They are also remarkably similar across cultures and countries. We are all human and the human condition is the dominant determinant of these behavioural patterns. Of course, adjustments have to be made for geography and unique cultural attributes, including sub-populations within national population (e.g. rice versus potatoes, tea versus coffee, etc). For example, the sport of curling is unlikely to exist in countries that do not have ice such as Australia, but there lawn bowling has a similar behavioural profile.

Societal and economic trends are determined by the behaviour of the 'average' person. We all like to think that we are not average, but in most behaviour we mirror the patterns of our age group. It is always possible to find non-characteristic individual behaviour (such as a 12 year old attending the symphony or an 80 year old downhill skiing), which makes that person 'interesting' in one aspect of their life. But it is the majority behaviour and not the exceptions that drive the trends. As was once noted 'Always remember that you are unique, just like everyone else'!

The implications of population aging are ubiquitous and largely predictable. Every year we get a year older and so much follows from this simple 'fact'.

David K. Foot is Professor Emeritus of Economics at the University of Toronto and the author of the best-selling books *Boom Bust & Echo: How to Profit from the Coming Demographic Shift* and the updated paperback, *Boom Bust & Echo: Profiting from the Demographic Shift in the 21st Century*. These books are based on his research on the economic impacts of demographic change and on the resulting implications for both private and public policies. His books have sold over 300,000 copies in Canada and were on the Canadian best-seller lists for over 3 years.

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