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**Population Aging:  
Facts, Challenges, and Responses**

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## Population Aging: Facts, Challenges, and Responses

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### Introduction

The world's population is growing older, leading us into uncharted demographic waters. There will be higher absolute numbers of elderly people, a larger share of elderly, longer healthy life expectancies, and relatively fewer numbers of working-age people. There are alarmist views – both popular and serious – in circulation regarding what these changes might mean for business and economic performance. But the effects of population aging are not straightforward to predict. Population aging does raise some formidable and fundamentally new challenges, but they are not insurmountable. These changes also bring some new opportunities, because people have longer, healthier lives, resulting in extended working years, and different capacities and needs. The key is adaptation on all levels: individual, organizational, and societal. This article explores some potentially useful responses from government and business to the challenges posed by aging.

### Trends and patterns in population aging<sup>1</sup>

Population aging is taking place in every country in the world. There are three factors underlying this trend:

- **Increased longevity:** In most parts of the world, people are living significantly longer lives than in previous decades. For the world as a whole, life expectancy increased by two decades since 1950 (from 48 years in 1950–55 to 68 years in 2005–10). During the current half century, the UN Population Division projects global life expectancy to rise further to 76 years.
- **Declining fertility:** The world's total fertility rate fell from 5 children per women in 1950 to roughly 2.5 today, and is projected to drop further to about 2.2 by 2050. As families have fewer children, the elderly share of the population naturally increases.
- **The aging of “baby boom” generations:** the aging of large cohorts of children born after World War II in the United States – paralleled by similar booms elsewhere at various times – are leading to high shares of elderly people.

At the global level, the number of those over age 60 is projected by the UN Population Division to increase from just under 800 million today (representing 11% of world population) to just over 2 billion in 2050 (representing 22% of world population). World population is projected to increase 3.7 times from 1950 to 2050, but the number of those aged 60 and over will increase by a factor of nearly 10. Among the elderly, the “oldest old” – i.e., those aged 80 and over – is projected increase by a factor of 26.

Accompanying these projected increases in elder shares throughout the world is another salient trend: the “compression of morbidity”. Anti-aging technologies – from memory-enhancing drugs to high-tech joint replacements – and healthier lifestyles have not merely increased longevity but have also made old

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<sup>1</sup> The quantitative demographic data in this section are derived from United Nations Population Division (2011).

age healthier. As a result, the morbid years -- when people lose their functional independence and their minds and bodies break down -- are compressed into a smaller part of the life cycle, either relatively or absolutely. Thus, in addition to lifespans growing longer, potential working lifespans are longer still. Indeed, it may be reasonably anticipated that in the coming decades, employees in significantly growing numbers -- *particularly those who are not doing manual labor* -- will be able to work productively into much later ages than currently.

Although population aging is occurring in both developed and developing countries, Table 1 shows that the 10 countries with the highest shares of 60+ population in 2011 are all in the developed world (or are countries in transition, such as Bulgaria and Croatia). The picture will change by 2050, when perhaps most notably Cuba will enter the list -- and Finland and Sweden, for example, will no longer be on it. Most remarkably, the UN projects that in 2050 there will be 42 countries with higher shares of 60+ population than Japan has now.

**Table 1: Countries with the highest shares of 60+ population in 2011 and 2050 (percent)  
(among countries with 2011 population of 1 million or more)**

2011		2050	
<b>Japan</b>	31	<b>Japan</b>	42
<b>Italy</b>	27	<b>Portugal</b>	40
<b>Germany</b>	26	<b>Bosnia and Herzegovina</b>	40
<b>Finland</b>	25	<b>Cuba</b>	39
<b>Sweden</b>	25	<b>Republic of Korea</b>	39
<b>Bulgaria</b>	25	<b>Italy</b>	38
<b>Greece</b>	25	<b>Spain</b>	38
<b>Portugal</b>	24	<b>Singapore</b>	38
<b>Belgium</b>	24	<b>Germany</b>	38
<b>Croatia</b>	24	<b>Switzerland</b>	37

Source: United Nations Population Division (2011).

For another perspective, Table 2 shows that the most rapid aging is taking place primarily in relatively newly industrialized or developing countries.

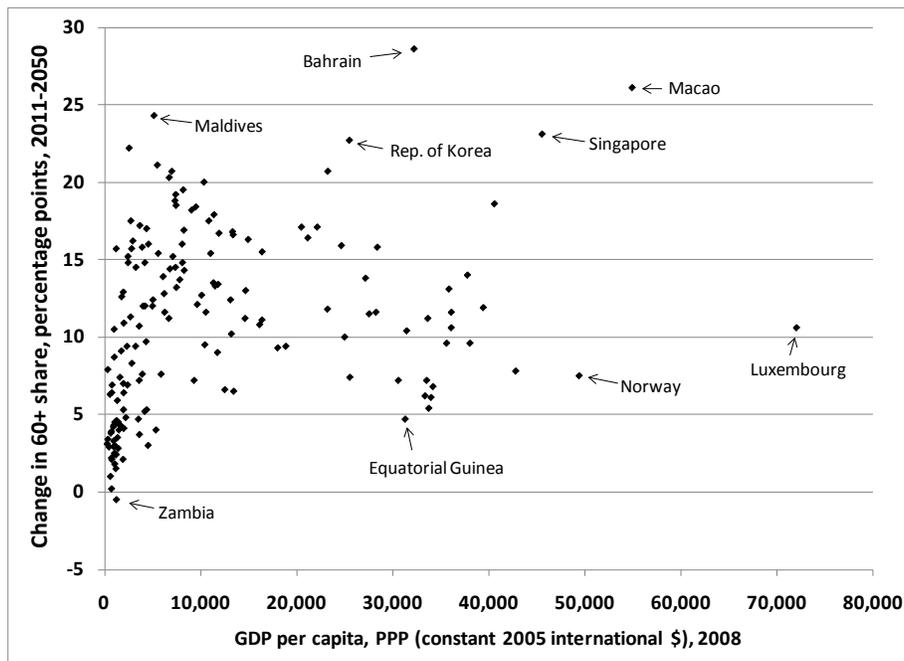
**Table 2: Countries with largest percentage point increase in 60+ share, 2011-2050  
(among countries with 2011 population of 1 million or more)**

	Increase, 2011- 2050	60+ share, 2050
<b>United Arab Emirates</b>	35	36
<b>Bahrain</b>	29	32
<b>Iran</b>	26	33
<b>Oman</b>	25	29
<b>Singapore</b>	23	38
<b>Republic of Korea</b>	23	39
<b>Viet Nam</b>	22	31
<b>Cuba</b>	22	39
<b>China</b>	21	34
<b>Trinidad and Tobago</b>	21	32

Source: United Nations Population Division (2011).

Figure 1 shows that population aging is taking place in virtually all countries, with considerable variation in the projected rate of increase of those aged 60 and above found across all levels of income.

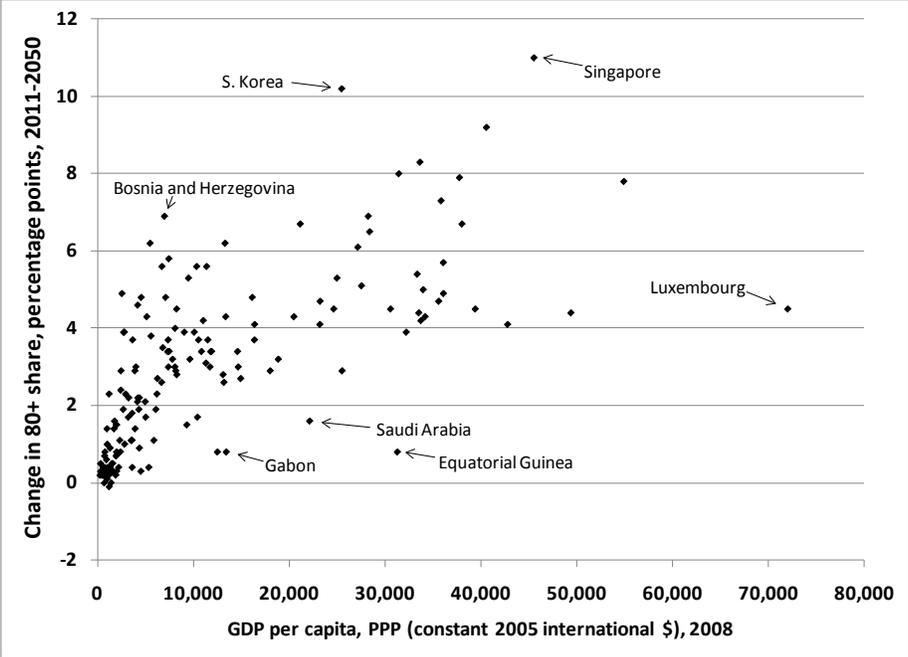
**Figure 1: Change in 60+ share, 2010-2050, versus income level**



Source: United Nations Population Division (2011); World Bank (2010).

While aging is taking place in almost all countries of the world, rich or poor, very high longevity is still a matter of very high income levels. This holds not only for the level but also the change in the proportion of the “oldest old”, those aged 80 and over, creating an increasing wedge between poor and rich countries. Figure 2 shows the clear-cut relationship between population aging and income level: more developed countries can expect to see a more rapid rise in the 80+ share of their populations.

**Figure 2: Change in 80+ share, 2010-2050, versus income level**



Source: United Nations Population Division (2011); World Bank (2010).

**Challenges**

Population aging generates many challenges and sparks concerns about the pace of future economic growth, the operation and financial integrity of health care and pension systems, and the well-being of the elderly.

*The size and quality of the workforce*

Economic prosperity depends crucially on the size and quality of the workforce. As people pass through their 50s and beyond, their likelihood of participating in the labor force tends to decrease. The stock of assets could also decrease as the elderly increasingly rely on their savings to finance their spending. The combination of possible labor market tightening and dissaving raises concerns that the steeply aging countries (cf. Tables 1 and 2) will experience slower economic growth (Boersch-Supan and Ludwig, 2009). Some countries may even face the shrinkage of their economies.

Analysis by Bloom, Canning, and Fink (2010) counters the specific argument about a shrinking labor force. It is true that the global labor force participation rate (LFPR) has been declining and is expected to

decline further by 2050 (see Table 3), and part of this change can be attributed to population aging. But because of falling fertility rates, the labor force as a share of total population has been increasing and is expected to continue increasing through 2050. Thus, one of the most widely cited fears about population aging – that there will be a crushing rise in elderly dependency unless the labor force participation of the elderly drastically increases – appears to be unfounded for the world as a whole – notwithstanding very steep increases in particular countries such as Italy and Japan.

To document this point, consider Table 3, which is reproduced from Bloom, Canning, and Fink (2010).

**Table 3: Global labor force: 1960, 2005, and 2050**

	1960 Actual	2005 Actual	2050 Projected
<b>LFPR (labor force/pop 15+)</b>	67.4	65.8	61.4
<b>LFTP (labor force/total pop)</b>	42.3	47.1	49.0

Source: Bloom, Canning, and Fink (2010).

Table 3 reports actual global labor force rates in 1960 and 2005 and projected rates in 2050. The projections are formed by assuming each country’s age- and sex-specific labor force rates in 2005 remain constant and applying them to projected demographics in 2050.

The first row reports the global labor force participation rate as a summary statistic. This is the ratio of the labor force to the population aged 15 and over. The second row reports the global labor force-to-population ratio as a summary statistic. This is the ratio of the labor force to the total population. Note that the global labor force participation rate is projected to fall 4.4 percentage points from 2005 to 2050 (from 65.8 to 61.4). This is the labor force indicator that many analysts find so alarming.

But note that the alternative labor force indicator in the second row shows a very different pattern. This indicator – the size of the labor force expressed as a ratio to total population – will actually increase by about two percentage points (from 47.1 to 49.0). This is mainly because of falling fertility in developing countries. In fact, this projection of the labor force to population ratio likely underestimates the actual increase that will take place since it does not account for the likely positive effect on female labor force participation of lower fertility (see Bloom, Canning, Fink, and Finlay, 2009).

The key point here is that the increase in elderly dependents will be more than offset by a decline in youth dependents. And this offset suggests that population aging does not pose an imminent economic crisis for the world.

This is different for particular economies, such as those OECD countries in which fertility is already low. However, these economies (e.g., Germany) typically have low labor force participation rates at old age. Ironically, such low participation rates provide a chance to counter the negative economic effects of population aging, because they leave considerable scope to increase a population’s total labor force participation by taking steps to encourage people to retire later (Boersch-Supan and Ludwig, 2010). Indeed, labor force participation among the elderly has increased recently in many OECD countries, including Japan.

### *Noncommunicable diseases*

Population aging also signals the advent of a tremendous challenge: the tidal wave of noncommunicable diseases (NCDs). NCDs are currently responsible for roughly 60% of all deaths and nearly half of the loss of actual and effective life years due to disability and death. They range from a significant to a dominant cause of disability and death in high- and low-income countries in every world region, and among people who are classified as old and not old (working-age adults). The most important NCDs are cardiovascular disease, cancer, diabetes, and chronic respiratory disease. These diseases share four modifiable risk factors – tobacco use, physical inactivity, unhealthy diets, and the harmful use of alcohol – and one non-modifiable risk factor: age. Especially concerning is the fact that many people living with NCDs are undiagnosed, which often results in later and more costly treatment. Indeed, treatment and care costs tend to be relatively high for NCDs, with the prospect of even greater costs as expensive new medical technologies are introduced and access to public health care becomes increasingly universal. In order to counterbalance these cost increases, we may expect to see greater emphasis on disease prevention, including the spread of workplace wellness programs. Business ingenuity and effort may also be expected to usher in a wave of more healthful products and services.

### **Financial issues**

In recent decades, much attention has been given to the potential effect of population aging on asset prices. Specifically, there have been concerns that asset prices will fall as the elderly sell off their assets (an “asset meltdown”). Some analysts predicted asset meltdowns in housing markets due to decreased demand from aging members of the post-World War Two baby boom generation (Mankiw and Weil 1989). Fortunately, this and other dire predictions have proven overly pessimistic; mitigating factors such as the potential for policy change suggest a rather moderate effect on asset prices (Boersch-Supan and Ludwig 2009; Poterba 2004).

Population aging has implications for various types of pension systems. Publicly funded pay-as-you-go (PAYG) pension systems face serious challenges, as the number of beneficiaries will increase while the number of contributors will decline. Fully funded systems are not necessarily a panacea, since they need a long time until they can deliver substantial pensions; for the baby boomers who have not saved so far, it is simply too late to accumulate sufficient funds. Moreover, voluntary funded pension systems suffer from procrastination, while mandatory funded systems create governance problems. A mix of both systems is thus the risk-minimizing solution.

Some countries, such as Germany and Sweden, have successfully solved their pension problems by effectively converting their defined benefit systems into a special form of defined contribution systems, where actual pensions depend on the ratio of workers to retirees, augmented by a compensating funded system. The Swedish system relies explicitly on “national defined contribution” accounts; in Germany, the defined benefit formula was amended by a “sustainability factor” that reduces the annual pension increase in proportion to population aging. Both reforms have been mimicked by other countries. Switzerland has taken the unusual step of allowing the establishment of a pension fund for a child when he or she is born. In addition, changes in the statutory retirement age are under way in most developed countries, although they are often highly contested and accompanied by popular protests.

## Responses

Public policymakers and the business community are just beginning to acknowledge the coming acceleration of population aging. Thus far, there has been little need for rapid policy changes, because population aging has been slow and because large baby-boom generations have been fueling business activity and economic growth. But the need for policy adaptations to an aging population will become more important in the face of retirement of the baby boomers, slowing labor force growth, and the rising costs of pension and health care systems, especially in Europe, North America, and Japan. Businesses will soon have little choice but to be more attentive to the needs and capacities of older employees; their ability to adapt could become a source of competitive advantage.

It is also worth noting that, to a considerable extent, natural market adjustments will offset the impact of changing demographics, e.g., capital substitution for labor, or development and use of labor-saving technologies.

On an economy-wide scale, responses to longer lifespans will require a series of reforms to both public policy and business practices.

### *Public policy*

Allowing people more freedom of choice regarding the timing of retirement is a good starting point for public policy reform. Between 1965 and 2005, life expectancy in 43 selected countries shows an average rise of 9 years; for the same period, the average legal retirement age rose by roughly 6 months (Bloom, Canning, and Fink 2010). Various countries (e.g., France, Ireland, Greece, and the United Kingdom) have recently raised the normal legal retirement age. While these changes have been generally accepted in some countries (e.g., Germany, USA), they have led to significant social conflict in others, indicating that further moves in this direction are possible but may not be easy. It is also important to note the distinction between actual and legal retirement ages; the former is influenced by the incentives offered by employers and existing policies (Gruber and Wise, 1999).

There are several policy adjustment options to encourage extended working years. Public pension systems in many countries could be reformed to remove incentives to retire between the ages of 60 and 65. Tax and benefit policies can also be adjusted so as to encourage, and capture the benefits of, prolonged careers. In Japan, the labor force participation rate for men aged 60-64 (about 77%) is considerably higher than in Australia, Canada, and the United States. But Japan's public pension system still uses an earnings test, which encourages early retirement and part-time work and thus deprives the country of a capable and willing older workforce. Compounding this problem is the predominance of mandatory retirement practices, typically at age 60, in Japanese firms. According to a survey by Japan's Ministry of Health, Labor and Welfare, workers in general still have a strong motivation to continue working after age 60. In addition, Japanese workers over age 45 seeking new employment are often deterred by maximum hiring ages. In order to avoid these negative effects of the public pension's earnings test and mandatory retirement on the labor supply behavior of the elderly (Seike 2008), the Japanese government has started to raise the pension-eligible age from 60 to 65 and to require employers to extend employment to age 65. This has had a significant impact, with the labor force participation rate for men aged 60-64 increasing from 71% in 2006 to 77% in 2009.

In most developed countries, retirement itself is a complex process, which is often more of a transition, involving early retirement, phased or partial retirement, or unretirement. Changes in the legal retirement age will interact with this process in complicated ways. In most developing countries, by contrast, the legal retirement age applies in practice to only a small portion of the labor force, and pensions are relatively uncommon. People very often work until they can no longer do so and are then dependent on their children or remittances from abroad.

Pension reform – under way in many countries – usually takes place “in installments”, i.e., in a slow process of many small steps, and typically with many dimensions: a reduction in benefits; an increase in contributions of the PAYG part of the pension system; an expansion of individual accounts; and a gradual change in the statutory retirement age. Well-designed reforms affect the entire system and do not create loopholes, e.g., through disability or unemployment insurance, which can have work disincentive effects. Index schemes (e.g., linking benefits to the dependency ratio, and retirement age to life expectancy) can reduce political opposition.

Financing health care systems is extremely problematic in many countries, such as in the United States, where healthcare coverage is still not universal, there is considerable proclivity to use expensive new medical technology, and a significant portion of healthcare spending is accounted for by third-party payers. New financing systems will have to account for the greater healthcare needs of the elderly, especially in light of their increased numbers, older ages, and the continued development of expensive, new medical technologies.

Of possible benefit for both sending and receiving countries is the immigration of working-age people to aging societies. To be fair to migrant workers, this solution would require institutionalization of a system of portable benefits. However, huge numbers of immigrants would be necessary to compensate for population aging (United Nations, 2000). Such numbers would likely face enormous political and social opposition by the electorates in Europe (and to a lesser extent, in the United States). Immigration is therefore unlikely to be a significant contributor to the problems posed by population aging.

Similar anti-immigrant feelings have long prevailed in Japan. Nevertheless, a consensus has now developed in favor of greater immigration of skilled foreign workers. Indeed, the number of professional workers from abroad has been rising, though the pace has been a bit slower than expected. Recently, Japanese companies have started increasing the recruitment of international students from both foreign and Japanese universities. The case for unskilled foreign workers is more difficult, because of the effect on domestic workers' wages, but also because of the danger of creating a dual labor market and therefore eventually a dual social structure, with the tensions that implies. It may be possible to overcome these problems by paying careful attention to the extent and timing of labor market opening, by enforcing labor standards (including minimum wages), by ensuring that social security applies to all workers, and by providing subsidies or other incentives to employers to provide adequate training to foreign workers so that they will not be locked at the bottom of the labor market.

### *Business practices*

To adapt and possibly benefit from an increasingly aged world, businesses must shift organizational structures, and practices. As a start, attitudes need to change. Older workers are sometimes seen as a burden, with younger candidates preferred in recruitment decisions. But in an economy where knowledge rules, the experience of older workers grows in value, and they can serve as role models for younger workers. Employer surveys commonly reveal that workers over 60 are seen as more

experienced, knowledgeable, reliable, and loyal than younger employees; practice should match that perception, as has occurred to some extent in smaller-sized firms.

Older employees who wish to keep working may demand flexible roles and schedules. Allowing more part-time work and telecommuting will entice older workers to stay on, extending their careers by placing lighter burdens on their stamina. Likewise, allocating demanding physical tasks to younger employees will produce a similar benefit and may potentially reduce health care costs arising from workplace accidents.

Ongoing training will help older workers master new skills as the economy changes. Moreover, longer working lives for employees allow firms the benefit of greater productivity gains from past training investments. A higher legal retirement age can increase these benefits.

Investing in the health of *all* employees enhances productivity and avoids unnecessary costs as the workforce ages. Worker wellness programs produce healthier employees at all ages; on-site clinics save workers time and focus care on prevention and early disease detection, further lowering costs.

Moving from pay systems that are seniority-based to ones that are performance-based (which has already occurred in many countries, including in the public sector) will invariably lead to a relaxation of corporate norms surrounding age at retirement. Careful thought and skillful negotiation will need to go into such a transition to ensure economic soundness, fairness, and political support. Moves in this direction have already taken place in Japan, with the age-based wage profile becoming less steep in the past two decades.

In designing business organizations of the future, the private sector – with appropriate public-policy support – should anticipate, rather than passively await, this trend toward longer lifespans and older employees. In one example of business opportunities spurred by aging, media companies are hoping to profit from aging viewers and readers by shifting their target away from the traditional range of 18-49 year olds (The Economist 2011). Although some adaptations lie on the more distant horizon, others can be undertaken right now, to the benefit of both younger and older employees, firms, and society – both now and in future.

## References

- Bloom, David E, David Canning, and Günther Fink (2010). "Implications of Population Aging for Economic Growth", *Oxford Review of Economic Policy*, Vol. 26, No. 4, 583-612.
- Bloom, David E, David Canning, Günther Fink, and Jocelyn Finlay (2009). " 'Fertility, Female Labor Force Participation, and the Demographic Dividend' ", *Journal of Economic Growth*, Vol. 14, No. 2, June 2009, 79-101.
- Boersch-Supan, A., and A. Ludwig (2009). "Aging, Asset Markets, and Asset Returns: A View from Europe to Asia." *Asian Economic Policy Review* 4: 69–92.
- Boersch-Supan, A., and A. Ludwig (2010). "Old Europe is Aging: Reforms and Reform Backlashes," In: Shoven, J. (Ed.), *Demography and the Economy*, Chicago: University of Chicago Press, 169-204.
- Gruber, J., and D. A. Wise, (Eds.) (1999), *Social Security and Retirement Around the World*. Chicago, London: University of Chicago Press.
- Mankiw, N.G., and D. Weil (1989). "The Baby Boom, the Baby Bust, and the Housing Market." *Regional Science and Urban Economics* 19: 235-258.
- "Pensions: 70 or Bust." (2011, April 7). *The Economist*. Available from <[http://www.economist.com/node/18529505?Story\\_ID=18529505](http://www.economist.com/node/18529505?Story_ID=18529505)>.
- Poterba, J (2004). "Impact of Population Aging on Financial Markets in Developed Countries." Federal Reserve Bank of Kansas City Annual Symposium, Jackson Hole, WY.
- Seike, Atsushi (2008). "Pensions and Labour Market Reforms for the Ageing Society," in Conrad, Harald, Victoria Heindorf, and Franz Waldenberger, (eds.), *Human Resource Management in Ageing Societies*, Palgrave Macmillan: 29-42.
- Stock, J. and D. A. Wise (1990). "Pensions, The Option Value of Work, and Retirement." *Econometrica* 58: 1151-1180.
- World Bank (2010). *World Development Indicators 2010*. Washington: The World Bank.
- United Nations Population Division (2011). *World Population Prospects: The 2010 Revision*. New York: UN Population Division.
- United Nations Population Division (2000). "Replacement Migration: Is it a Solution to Declining and Ageing Populations?". New York: UN Population Division.