
Live Long and Prosper? The Economics of Ageing Populations

CEPR Press

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Email: cepr@cepr.org

Web: www.cepr.org

ISBN: 978-1-912179-25-1

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Image title: 'Growing Old Together'

Live Long and Prosper? The Economics of Ageing Populations

Edited by David E. Bloom

A VoxEU.org eBook

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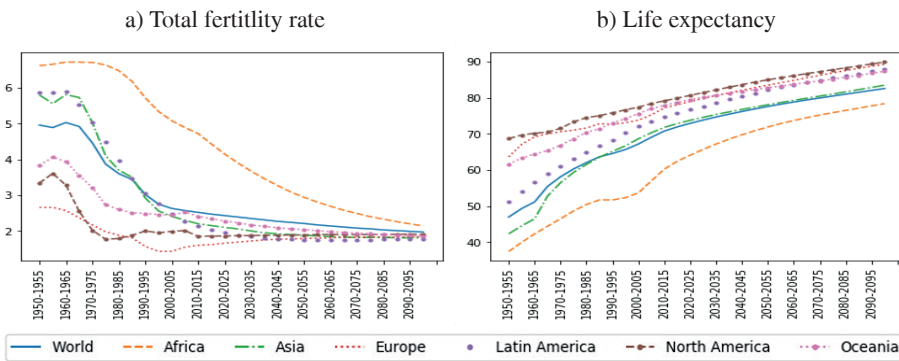
8 Global demographic changes and international capital flows

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The world has been experiencing dramatic changes in population growth and age structures since the second half of the 20th century (see, for example, Bloom and Luca 2016 for a review). These have been driven by decreasing fertility rates and increasing life expectancy (Figure 1). This unprecedented demographic transition has three distinct characteristics.

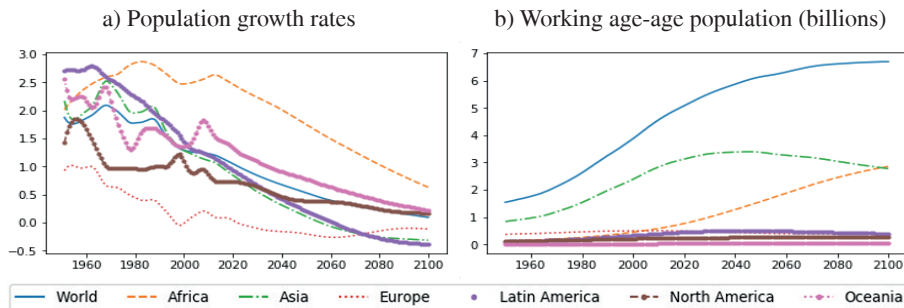
Figure 1



First, population growth has been slowing globally and is expected to decline further over this century (Figure 2a). The growth in the global total population was close to 2% in the 1950s and fell to around 1% in the 2010s. The rate is expected to further decline to around 0.5% by 2050. The growth of the global working-age population (aged 15-64) has also been decreasing since the 1980s, although it will continue to grow until 2050, mainly driven by the growth in Asia and Africa (Figure 2b).

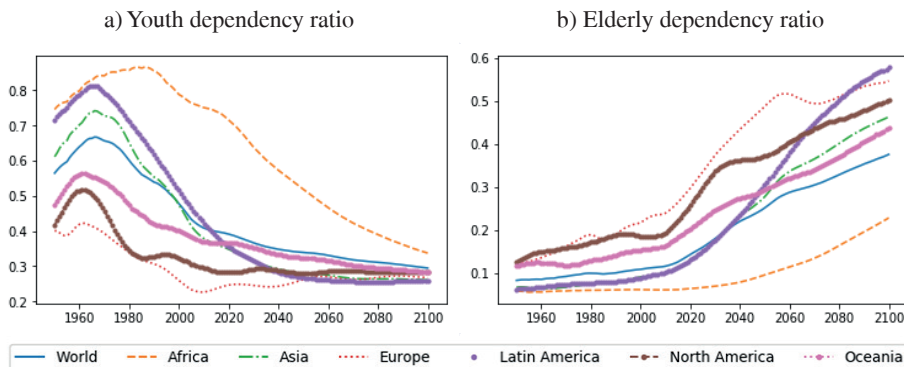
¹ Author's note: We gratefully acknowledge financial support from the Australia Research Council Centre of Excellence in Population Aging Research (CE170100005).

Figure 2



Second, population structures have been ageing in most regions and are expected to continue to do so in all regions in the next several decades. The youth dependency (the ratio of the population under 15 to the population aged 15-64) started to decline in the 1980s (Figure 3a), and the elderly dependency (the ratio of the population over 65 to the population aged 15-64) has increased rapidly since the 2010s (Figure 3b). The global population over 65 is projected to reach 0.7 billion by 2020 and 1.5 billion by 2050, representing 16% of the world’s total population.

Figure 3



Third, regions and countries are significantly asymmetric in the timing and speed of this transition, particularly between developed and developing countries. European population growth has been much lower than the world average and the growth rate is already close to zero, with the working-age population declining since 2011. In contrast, Africa has grown strongly since 1950 and its growth rate is still as high as 2.5%. In the period from 2020 to 2050, more than half of global working-age population growth will come from Africa. Asia and Latin America have experienced similar declines in

population growth, and their working-age populations are both expected to increase until the 2040s before starting to decline.

All these characteristics are important for the overall macroeconomic impacts of demographic change, but the asymmetry is particularly important for the international aspects of demographic change.

Macroeconomic effects of demographic change

There is an enormous literature on the macroeconomic effects of population ageing in closed economies (e.g., Onofri 2004, Clark et al. 2007, Lee and Mason 2011, National Research Council 2012, Lee 2016). Here, we first consider the impact of demographic change on closed economies and then what it means for open economies.

On the consumption side, individuals tend to smooth their consumption over their lifetime by saving when they work and dissaving when they are retired (Modigliani and Brumberg 1954). Demographic change affects aggregate savings by altering the relative size of different age cohorts (young dependents, working adults, and elderly dependents) in the population. The current ageing process in developed countries is driven by the retirement of the baby boomers born in the first two decades after WWII, which were followed by sharp fertility declines. When this generation entered the labour force in the 1970s and 1980s and as fertility rates declined sharply, youth dependency ratios fell, so consumption on children also fell and savings rose. When this generation became prime workers in the 1990s and 2000s and as their life expectancy increased, they reduced their consumption and increased their savings in anticipation of a longer retirement period to smooth their consumption over their entire lives. When this generation gradually enters into retirement over the period 2010-2030, they should start to decumulate their assets, thus reducing savings. Developing countries have followed a similar ageing processes, but with considerable delays because they initially had much higher fertility rates, much shorter life expectancy, and much longer baby boom periods after WWII. However, their processes are expected to accelerate in the next several decades, so they should also experience such a process of first increasing savings and then decumulating savings.

On the production side, population ageing has significant impacts on economic growth through the labour supply channel. As fertility declines, labour force growth falls, so economic growth will also fall. Capital per worker rises, so output per worker and hence wages tend to rise, while the marginal product of capital falls and so does investment. This direct negative impact of labour scarcity on economic growth can be partly offset by the responses of households or governments to population ageing along several

dimensions (Bloom et al. 2001). For example, households are expected to work longer due to increasing longevity, and labour force participation may increase because more women can enter the labour force due to fertility declines and, more generally, women are encouraged to work in some countries where their participation has traditionally been culturally constrained. Capital per worker can increase as population ageing raises aggregate savings, and human capital can also increase as parents have more time and resources to invest in their children's education when family sizes shrink. Firms can also invest more in capital-intensive technologies to reduce the labour demand. All these responses have positive effects on economic growth, but they are unlikely to neutralise the negative effect of labour reduction.

The interaction of aggregate savings and investment drives the effect on the national real interest rate. The effect can be disentangled through two channels. First, when the baby boomers become prime workers and enjoy increasing longevity, they tend to increase their savings, which puts downward pressure on the real interest rate. Second, with decreasing fertility, the labour force falls because the following generations shrink, so capital per worker rises, which pushes down the real interest rate. Several recent studies find that demographic changes in advanced economies can explain significant fractions of real interest rate declines in the last few decades (Carvalho et al. 2016, Gagnon et al. 2016, Fujita and Fujiwara 2016, Lisack et al. 2017, Sudo et al. 2018).

Looking ahead, when the baby boomers in developed countries are retiring, their aggregate savings should fall and the declining trend of the real interest rate should be gradually reversed. However, as developing countries are accelerating towards ageing in the next several decades, their aggregate savings will tend to rise and thus put downward pressure on the world interest rate. The negative effect on the real interest rate could continue for a long time because the world as a whole will still be accelerating towards ageing.

Implications for international capital flows

The macroeconomic effects of population ageing in closed economies serve as a benchmark when we consider asymmetries across regions. In the context of an increasingly integrated world, the macroeconomic effects in open economies are more complicated when demographic changes are not synchronised and capital is mobile across countries.

International capital flows are fundamentally governed by arbitrage forces in the world capital markets. The real interest rate adjusted by country risk premiums and the expected change in the real exchange rate tends to be equal across countries unless

there are capital controls in some countries. If the real interest rate, adjusted by country risk premiums and the expected depreciation in the real exchange, is higher than the global interest rate, capital would flow in. Otherwise, capital will flow out.

While the decrease in the labour force in more rapidly ageing countries reduces the marginal product of capital and hence the real interest rate, the increase in the labour force in less rapidly ageing or still growing countries raises the marginal product of capital and also the real interest rate. This demographic asymmetry can stimulate capital flows from more rapidly ageing countries to less rapidly ageing countries to finance productive investment in the latter. The resulting current account surpluses and capital outflows can partially offset the reduction in rates of return on capital that would otherwise occur in rapidly ageing countries.

The cross-border effects of asymmetric demographic changes across countries can be both qualitatively and quantitatively important (e.g. Borsch-Supan et al. 2001, Brooks 2003, Fehr et al. 2003, Bryant 2004, Bryant and McKibbin 2004, Batini et al. 2006, Domeij and Floden 2006, Backus et al. 2014, Attanasio et al. 2016). The effects are becoming increasingly significant because global financial markets are becoming more integrated, not only within OECD countries but also between advanced and emerging economies. An increasing amount of research shows that capital flows from more rapidly ageing countries to less rapidly ageing countries are substantial, and suggests that studies on demographic changes in closed economies are likely to miss important effects of international capital mobility. Some studies show that considerable capital flows emerge between OECD countries as a result of asymmetric ageing processes, particularly between the US and Europe (and Japan), while others show that the demographic divergence between OECD countries as a whole and developing countries could stimulate capital flows from OECD countries to developing regions.

Capital flows across countries, particularly between developed and developing countries, are beneficial overall for both groups of economies. As capital per worker in developing countries is on average much lower than in developed countries, capital flows can accelerate capital deepening and boost economic growth in developing countries, while developed countries can enjoy higher rates of return on capital. Economic openness fosters a sharing mechanism to diversify demographic shocks with the rest of the world and mitigates the negative consequences of population ageing for domestic income and consumption, so financial globalisation plays a positive role in handling the international aspects of population ageing.

While developing countries can provide investment opportunities, they may not be able to absorb enough OECD savings to dramatically change the saving-investment balance for the OECD for two reasons. First, investment in developing countries requires

those countries to make major progress in macroeconomic management and financial stability. Second, developing countries are also experiencing ageing and their marginal product of capital will eventually decline, making their investment less attractive over time. Most early studies focused on the pattern of capital flows from developed to developing regions, but this pattern will start to reverse between 2010 and 2030, when the baby boomers in developed countries are retiring.

The magnitude of capital flows depends heavily on the openness and the relative size of countries. In a closed economy, national savings and domestic investment must move together. A small open economy has little impact on the global interest rate and its domestic investment moves more independently from domestic saving over the transition. The integration of global financial markets since the 1980s has facilitated capital flows across countries driven by asymmetric demographic changes. The magnitude also depends on the timing and relative speed of demographic change and how sensitive economies respond, on both the consumption and production sides, to demographic change.

Conclusion

Demographic change will continue to have important macroeconomic impacts on savings, investment, and real interest rates nationally and globally. Asymmetric demographic change will have important effects on the allocation of global capital and international trade balances, migration flows, and real exchange rates.

Demographic change is not taking place in isolation from other major global transformations. For example, technological change is an important engine of economic growth, and how technologies respond to population ageing in different countries will have important consequences that could reverse or accentuate the impact of ageing on the allocation of global capital and on the drivers of economic growth.

References

Attanasio, O, A Bonfatti, S Kitao and G Weber (2016), “Global Demographic Trends: Consumption, Saving, and International Capital Flows”, in J Piggott and A Woodland (eds), *Handbook of the Economics of Population Aging*, pp 179–235.

Backus, D, T Cooley and E Henriksen (2014), “Demography and Low-Frequency Capital Flows”, *Journal of International Economics* 92: S94–S102.

- Batini, N, T Callen and W J McKibbin (2006), “The Global Impact of Demographic Change”, International Monetary Fund Working Paper 06/9.
- Bloom, D E, D Canning and J Sevilla (2001), “Economic Growth and the Demographic Transition”, NBER Working Paper 8685.
- Bloom, D E and D L Luca (2016), “The Global Demography of Aging: Facts, Explanations, Future”, in J Piggott and A Woodland (eds), *Handbook of the Economics of Population Aging*, pp 3–56.
- Borsch-Supan, A, A Ludwig and J Winter (2001), “Aging and International Capital Flows”, NBER Working Paper 8553.
- Brooks, R (2003), “Population Aging and Global Capital Flows in a Parallel Universe”, *IMF Staff Papers* 50(2): 200–221.
- Bryant, R C (2004), “Cross-Border Macroeconomic Implications of Demographic Change”, Brookings Discussion Papers in International Economics No. 166.
- Bryant, R C and W J McKibbin (2004), “Incorporating Demographic Change in Multi-Country Macroeconomic Models: Some Preliminary Results”, in P Onofri (ed.), *The Economics of an Ageing Population*, pp 349–408.
- Carvalho, C, A Ferrero and F Nechio (2016), “Demographics and Real Interest Rates: Inspecting the Mechanism”, *European Economic Review* 88: 208–226.
- Clark, R L, N Ogawa and A Mason (2007), *Population Aging, Intergenerational Transfers and the Macroeconomy*, Edward Elgar Publishing.
- Domeij, D and M Floden (2006), “Population Aging and International Capital Flows”, *International Economic Review* 47(3): 1013–1032.
- Fehr, H, S Jokisch and L Kotlikoff (2003), “The Developed World’s Demographic Transition - The Roles of Capital Flows, Immigration, and Policy”, NBER Working Paper 10096.
- Fujita, S and I Fujiwara (2016), “Declining Trends in the Real Interest Rate and Inflation: The Role of Aging”, Working Papers 16-29, Federal Reserve Bank of Philadelphia.
- Gagnon, E, B K Johannsen and D Lopez-Salido (2016), “Understanding the New Normal: The Role of Demographics”, Finance and Economics Discussion Series 2016-080, Board of Governors of the Federal Reserve System.

Lee, R (2016), “Macroeconomics, Aging, and Growth”, in J Piggott and A Woodland (eds), *Handbook of the Economics of Population Aging*, pp 59–118.

Lee, R D and A Mason (2011), *Population Aging and the Generational Economy: A Global Perspective*, Edward Elgar Publishing.

Lisack, N, R Sajedi and G Thwaites (2017), “Demographic Trends and the Real Interest Rate”, Staff Working Paper No. 701, Bank of England.

Modigliani, F and R Brumberg (1954), “Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data”, in K K Kurihara (ed.), *Post-Keynesian Economics*, Rutgers University Press, pp 388–436.

National Research Council (2012), *Aging and the Macroeconomy: Long-term Implications of an Older Population*, National Academies Press.

Onofri, P (2004), *The Economics of an Ageing Population: Macroeconomic Issues*, Edward Elgar.

Sudo, N and Y Takizuka (2018), “Population Aging and the Real Interest Rate in the Last and Next 50 Years – A Tale Told by an Overlapping Generations Model” Bank of Japan Working Paper Series No.18-E-1

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