

GLOBAL MACRO MATTERS

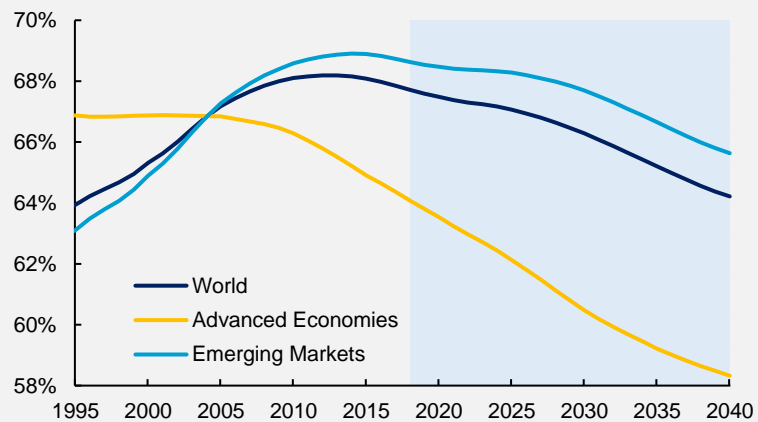
The Economics of Global Aging: Gray Skies, Rays of Policy Hope?

The global economy is in the midst of an accelerating demographic transition. Since roughly 2010, the share of the world's population that is of working age (15-64 years) has peaked, and it is now trending down, as shown in Figure 1. The United Nations projects that this ratio will continue to fall through 2040.

This paper examines some of the implications of this global demographic transition for macroeconomic performance and financial markets. The results are sobering. We find that aging demographics tend to result in softer real GDP growth, higher public debt levels, and lower inflation. The implications for asset market performance are complicated but, on balance, are skewed toward lower sovereign yields and increased headwinds for risk assets.

But such outcomes are not predetermined. Our reading of the evidence is that policymakers have scope to blunt, if not entirely offset, many of these effects. Central banks should remain focused on achieving inflation targets and anchoring inflation expectations; governments need to prioritize a strengthening of public finances; efforts should be made to vigorously deploy available labor resources, including making employment attractive for older workers; and economies should be as open to international trade as possible to allow labor-intensive goods and services to be produced where labor is relatively abundant. Finally, as wages and prices remain flexible, they should help reallocate resources across sectors and incentivize innovation, allowing the economy to adjust as smoothly as possible to the demographic headwinds. Our sense, however, is that government policies in many countries are falling short of these objectives.

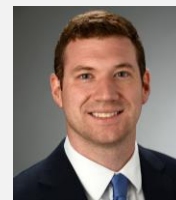
FIGURE 1: WORKING-AGE POPULATION SHARE (15-64 YEARS)*



Source: United Nations, Haver Analytics, and PGIM Fixed Income as of December 2018. *Share of total population.



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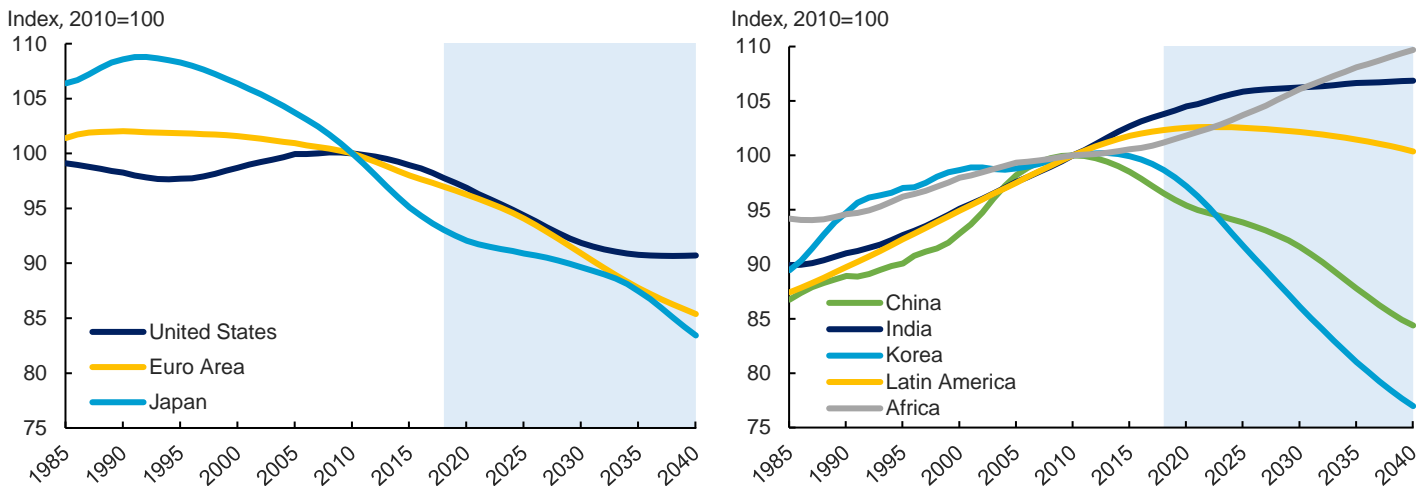
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DEMOGRAPHICS AND GROWTH

Aging demographics are likely to weigh on economic growth through several reinforcing channels. As a direct effect, an aging population generally brings slower labor force growth.¹ There are also indirect effects. As workers retire, they tend to reduce their expenditures and aggregate demand accordingly weakens.² Another set of issues involves the response of investment—with the slowing growth of the labor force, does investment also slow because there are fewer workers to outfit with capital? Or will investment accelerate as firms substitute to increasingly capital-intensive production technologies? The answer may vary from industry to industry and from country to country. A more speculative point is whether aging may also weigh on productivity growth. For example, if an older population is likely to be less engaged in risk-taking, innovation and entrepreneurial behavior, and the accumulation of new human capital, the result could be a lower rate of productivity growth. Japan’s experience on this point is mixed. Aggregate measures of its labor productivity have held up well as the population aged. But commentators have also hypothesized that these kinds of forces are indeed at work.³

Japanese demographics peaked in the early 1990s, contemporaneous with the bursting of the country’s asset-price bubble (left panel of Figure 2), and the working-age population (WAP) share maintained a downward trajectory in subsequent years.⁴ Demographics for the United States and the euro area have been more gentle, but the trajectory of descent in coming decades is only somewhat less severe. The right panel of Figure 2 gives comparable data for some major emerging markets. Many of these countries will also see a demographic transition in the years ahead. China and Korea have profiles reminiscent of the advanced economies, and the working-age population share eventually flattens out in India and declines slightly in Latin America. Only Africa continues to see unabated growth.

FIGURE 2: WORKING-AGE POPULATION SHARE (15-64 YEARS)*



Source: United Nations, Haver Analytics, and PGIM Fixed Income as of December 2018. *Share of total population.

As an alternative measure, the growth rate of the working-age population is shown in Figure 3. WAP growth in the United States over the next 20 years is slated to decline by nearly a percentage point relative to the years before the financial crisis, with a similar-sized decline in the euro area. One difference is that the United States will continue to see slightly positive working-age population growth, while the euro area will record a contraction of 0.6% a year. Japan saw

¹ While the ultimate outcome also depends on the response of labor force participation, any rise in participation is unlikely to fully offset the slower growth of the working-age population.
² According to the Survey of Consumer Expenditure published by the U.S. Bureau of Labor Statistics, average expenditure of households headed by 25-64 year olds is about \$66,000, but just \$49,500 if headed by a person over 65.
³ See, for example, “The Impact of Demographics on Productivity and Inflation in Japan,” Yihan Liu and Niklas Westelius, *Journal of International Commerce, Economics, and Policy*, 5 July 2017.
⁴ Alternatively, the working-age population is just one minus the total dependency ratio (i.e., those younger than 15 and older than 64). Our past work has found this a useful indicator to gauge the overall economic effects of aging.

increasingly aggressive demographic change in the years after the financial crisis, with the WAP declining 1% on average between 2010 and 2017. The pace of decline will remain almost as severe in coming decades.

FIGURE 3: WORKING-AGE POPULATION (AVERAGE GROWTH, %)*

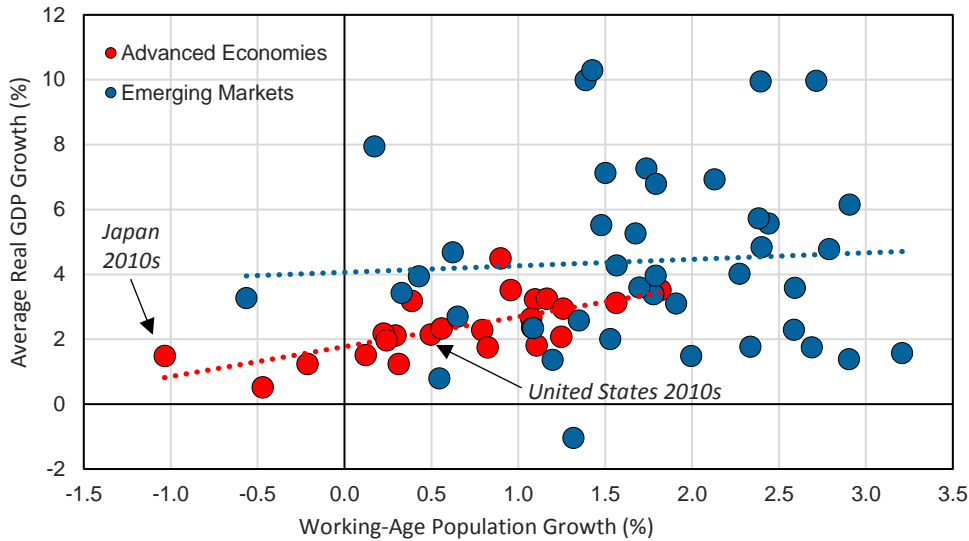
	2000-2009	2010-2017	2018-2040 (Proj.)
<u>Advanced Economies</u>			
<i>United States</i>	1.1	0.5	0.3
<i>Euro Area</i>	0.3	-0.2	-0.6
<i>Japan</i>	-0.5	-1.0	-0.9
<i>United Kingdom</i>	0.8	0.2	0.1
<u>Emerging Markets</u>			
<i>Mexico</i>	2.0	1.9	0.9
<i>India</i>	2.1	1.7	0.9
<i>China</i>	1.4	0.2	-0.6
<i>Korea</i>	0.6	0.3	-1.0
<u>Global</u>	1.7	1.2	0.8

*Source: United Nations, Haver Analytics, and PGIM Fixed Income as of December 2018. *15-64 year olds.*

Notably, some key emerging markets will also see demographics become less supportive. WAP growth in Mexico and India will slow by about a percentage point. In China and Korea, WAP growth is slated to decline even more sharply, with both countries seeing sustained contraction. For the global economy as a whole, the growth of the working-age population is projected to slow by nearly a percentage point, from 1.7% annually in the 2000s to 0.8% through 2040.

The next figure (Figure 4) looks at the relationship between economic growth and the working-age population. The upper panel plots the experience of six advanced economies and 10 emerging markets. Each observation represents a country's average performance over the course of a decade, and the data run from the 1980s to the 2010s.

FIGURE 4: WORKING-AGE POPULATION AND ECONOMIC GROWTH



Source: Haver Analytics and PGIM Fixed Income as of December 2018. Note: Decadal averages (1980s, 1990s, 2000s, and 2010s) for six advanced economies and ten emerging markets.

Regression Model			
	Advanced	Emerging	Global
WAP Growth	0.92	0.20	0.85
	(4.2)	(0.4)	(2.7)
Constant	1.77	4.06	2.52
	(8.8)	(4.1)	(5.0)
Obs.	24	40	64
Adj. R-squared	0.42	-0.02	0.09
Time Period	1980-2017	1980-2017	1980-2017

Source: PGIM Fixed Income as of December 2018.
 Note: Bold indicates significance at the 5% level; t-stats in parentheses.

We find a strong and statistically significant relationship between the WAP and economic growth for the advanced economies (the red dots). A percentage point slowing in WAP growth results in slightly less than a percentage point slowing in real GDP growth. Given the projected growth rates in the previous Figure, these results indicate that demographics may trim growth in the United States and the euro area by close to a percentage point in coming decades. The coefficient obtained from the entire panel (both advanced and emerging markets) is also sizable in magnitude and statistically significant.

In contrast, the estimated coefficient for the emerging markets is smaller and statistically insignificant. EM growth is driven by an array of sometimes volatile economic factors, policies, and shocks (note the wide dispersion of the blue dots); the effects of demographic shifts are apparently swamped by these other factors. We conjecture that, perfectly identified, the impact of demographics on growth in the emerging markets would broadly mirror the advanced economies.⁵

⁵ Consistent with this hypothesis, when country-specific dummy variables are included in regression, the coefficient on WAP growth rises in magnitude and statistical significance (although not quite to the 10% level).

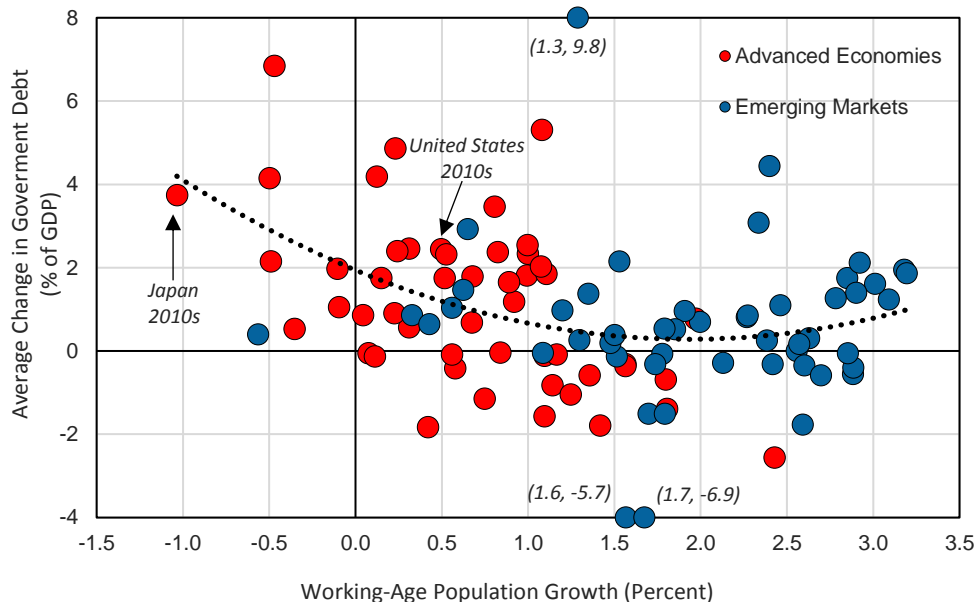
AGING AND FISCAL PERFORMANCE

One statement that we can make with confidence is that aging demographics are likely to intensify challenges for fiscal policy, especially for countries like the United States that have not made adequate preparations. These effects will be felt through several channels:

- First, aging will almost inevitably mean increased expenditures on public pensions and healthcare.
- Second, the slowdown in economic growth documented in the previous section will likely translate into a corresponding slowdown in tax revenues.
- Third, given the increased expenditures and decreased revenues, either tax rates on the working generation will need to rise, perhaps substantially, or debt levels will climb. Both of these may weigh on economic performance by impeding incentives for young workers to supply labor or, in the case of higher debt levels, creating uncertainties about economic sustainability in the future.
- Fourth, the political implications may also be important. What if younger workers object to government services being skewed to the old? If so, they might become a voice for fiscal austerity. But another possibility is that they may demand enhanced programs (or lower taxes) to meet their needs as well, which would exacerbate the fiscal imbalances.

Figure 5 presents some intriguing empirical results. Using a framework broadly similar to that in Figure 4, we find a *non-linear* relationship between growth of the working-age population and changes in government debt. As WAP growth declines from 2% to 1% and then to zero, countries tend to see a deterioration in their fiscal situations—presumably for many of the reasons outlined in the previous bullets. To be concrete, the United States is experiencing a drop in its WAP growth of about 1 percentage point from the early 2000s to the early 2020s. Our model indicates the accumulation of just over 1% of GDP in additional government debt each year as a result. These findings are consistent with Japan’s experience, where the deterioration in demographics has been accompanied by a sharp run-up in debt levels. Notably, this non-linear relationship suggests that very rapid growth rates of the WAP, i.e., in excess of roughly 2%, are also associated with higher accumulation of government debt. This presumably reflects the need to build schools, fund education, and provide other infrastructure and services that a young and growing population is likely to demand.

FIGURE 5: WORKING-AGE POPULATION AND CENTRAL GOVERNMENT DEBT



Source: Haver Analytics and PGIM Fixed Income as of December 2018. Note: Decadal averages (1960s, 1970s, 1980s, 1990s, 2000s, and 2010s) for nine advanced economies and nine emerging markets.

BOX: AGING AND U.S. FISCAL POLICY

The U.S. is experiencing demographic changes similar to those in many other countries. As shown in Figure A, in 2017 the share of the U.S. population younger than 40 was markedly lower than in 1980 (by nearly 12 percentage points in total), and the share over 40 was correspondingly higher. Broadly speaking, this same trend is projected to continue through 2040. By that time, the share of people 70 and over will be 6 percentage points higher than in 2017, with the share of those younger than 70 similarly lower. The one exception is that in 2040 there will be slightly more people in their 40s—the “echo boom” (children of baby boomers).

These demographic shifts are poised to create powerful headwinds for U.S. fiscal performance. The Congressional Budget Office projects that federal debt (Figure B), currently at 78% of GDP, will rise to nearly 100% of GDP by the late 2020s and inflect upward to 150% of GDP by the late 2040s.⁶ Deteriorating demographics, coupled with interest payments on the accumulating debt, are the key drivers of the projected deterioration.⁷ To date, the U.S. political process has done little to address this issue. Actions must eventually be taken, but such efforts are likely to uncover deep cleavages between the programs’ current and future beneficiaries.

FIGURE A: U.S. POPULATION DISTRIBUTION CHANGE (BY AGE)

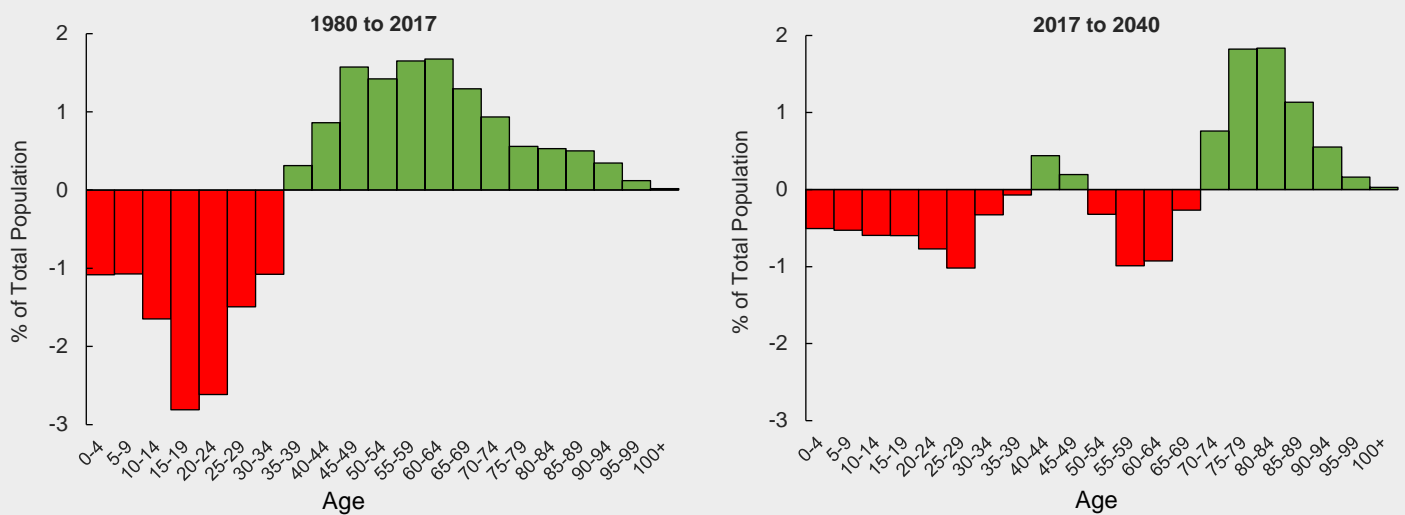
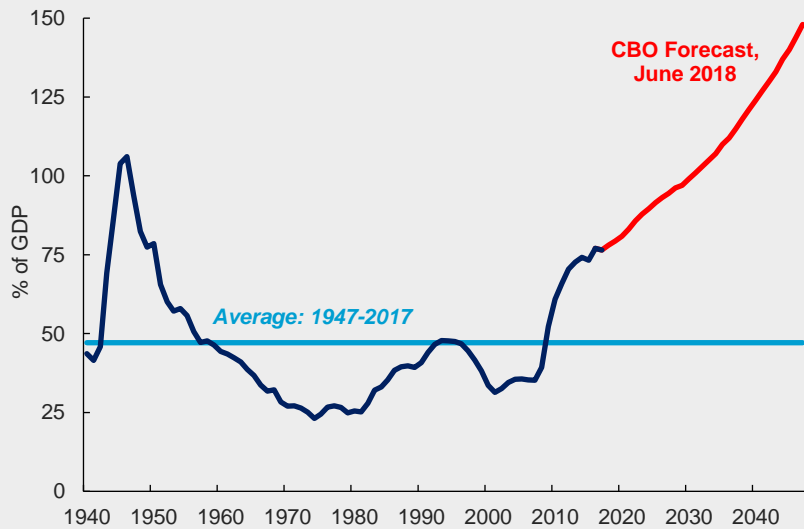


FIGURE B: U.S. FEDERAL GOVERNMENT DEBT*



Source for Figures A & B: Census and CBO as of December 2018. Note: The red (green) bars show age cohorts for which the 1980 (2017) population share is larger.

⁶ Projections are under “current law” and assume that many of the recent fiscal stimulus measures (tax cuts and spending) are temporary. If these measures become permanent, the CBO projects that debt will rise to around 210% of GDP in the late 2040s. See “CBO’s Alternative Long-Term Budget Scenarios,” 8 August 2018, www.crfb.org.
⁷ The CBO estimates that federal government expenditures will rise by 7.3% of GDP over the next 30 years. Expenditures are slated to increase by 3.5% of GDP for major healthcare programs (largely related to aging), 1.4% of GDP for Social Security, and 3.7% of GDP for interest payments. Spending on all other categories is projected to decline by 1.3% of GDP. (See “The 2018 Long-term Budget Outlook,” June 2018, www.cbo.gov/publications/53919.)

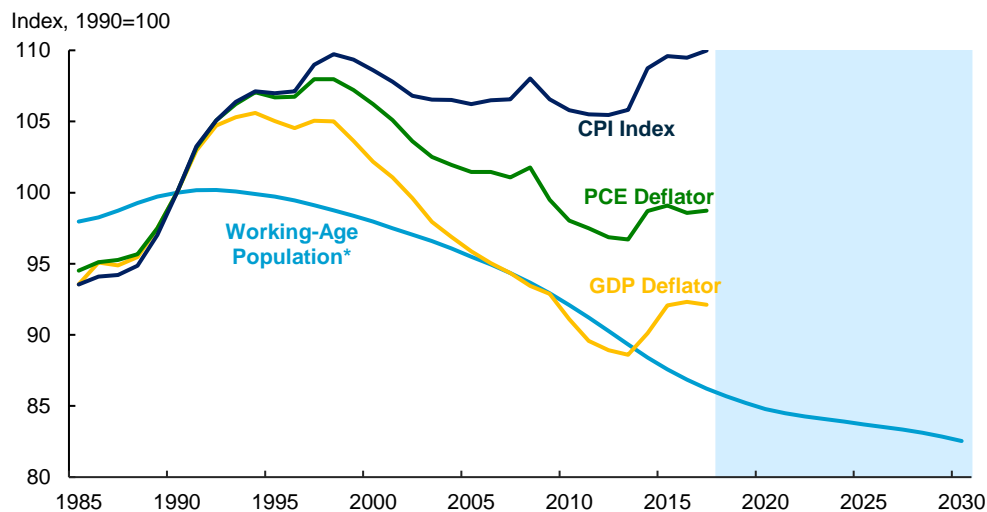
AGING AND INFLATION

We now turn to the relationship between aging and inflation. We highlight several possible linkages. First, we have argued that aging demographics likely mean softer demand, as workers transition into retirement, and slower growth of real GDP. The upshot of these developments, holding all else constant, should be downward pressures on prices.⁸ Second, retirees who have amassed saving during their lifetime are likely to prefer low and stable inflation to preserve their capital, and, accordingly, will vote for government policies consistent with low levels of inflation (of course, as previously noted, we also expect that they will seek to preserve their own benefits). Third, as an important offset, aging demographics also imply that the supply of labor grows more slowly. A reduction in the supply of labor will tend to tighten the labor market and increase the bargaining power of workers, potentially putting upward pressures on wages.

As a further consideration, economic theory emphasizes that central banks have significant influence in determining the rate of inflation that prevails over the medium to long term. The recent experience of Japan and other advanced economies, where central banks have struggled to reach inflation objectives, softens our confidence on this score. Still, a case can be made that, for example, the Fed's vigorous actions over the past decade helped prevent deflationary pressures from taking hold in the United States.

Japan's transition toward aging may offer some signals as to what other countries are likely to face. With this in mind, Figure 8 shows various measures of the Japanese price level since the bursting of the asset bubble in the early 1990s. These measures generally flattened out during the mid-1990s. Thereafter, the GDP and PCE deflators fell steadily for the next 15 years or so, along with the demographic deterioration, until rebounding some with the intensification of the BoJ's stimulus under Abenomics and the 2014 consumption tax hike. The general profile of the CPI was similar, but it moved down much less from the late 1990s through the early 2010s.⁹

FIGURE 8: JAPAN WORKING-AGE POPULATION & INFLATION MEASURES



Source: United Nations, Japan Ministry of Internal Affairs and Communications, and Haver Analytics as of December 2018.

*Share of 16-64 year olds relative to the total population.

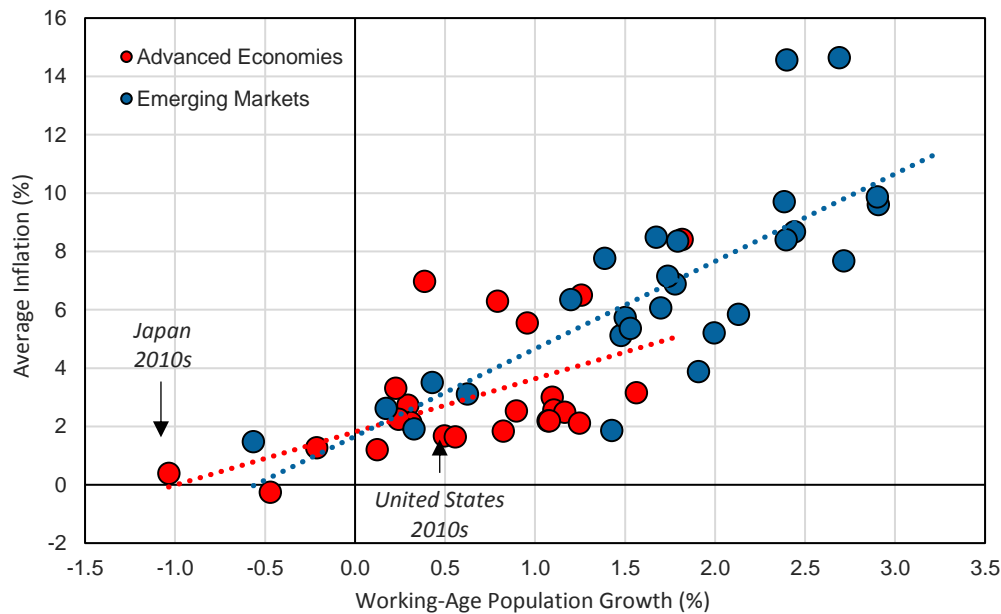
⁸ More specifically, the expected inward shift of the aggregate demand curve implies a lower overall level of prices. Given well-documented rigidities, the resulting downward pressure on prices suggests an adjustment period of decreased inflation. To the extent that these effects are large, or occur over an extended period, there is a risk that inflation expectations could be dragged down more permanently.

⁹ The observed gap between the Japanese CPI and PCE deflator reflects deep differences in sampling methodologies and index construction, which persist even at more granular levels of disaggregation.

These data hardly establish a causal relationship. Nevertheless, they hint at some connection between Japan’s demographic transition and the deflationary (and low inflationary) challenges over the last decades. Japan’s experience also underscores that inflation dynamics are not invariant to central bank policy—the BoJ’s efforts seem to have helped reverse the downward drift in the price level.

The observations above are echoed by the results reported in the next figure. We find strong and statistically significant relationships between demographics and inflation for the advanced economies and the emerging markets. For both sets of countries, a decline in the growth rate of the working-age population is associated with a meaningful slowing in inflation.

FIGURE 9: WORKING-AGE POPULATION AND INFLATION



Source: Haver Analytics and PGIM Fixed Income as of December 2018. Note: Decadal observations with inflation higher than 15% are omitted.

AGING AND ASSET PRICES

We now turn to the complex question of how aging demographics may influence asset prices. As with the macro issues above, multiple channels are likely to be at work. First, benchmark macro models suggest that the expected slowing in growth and inflation will put downward pressure on nominal and real interest rates and restrain equity price gains.¹⁰

Second, the higher public debt levels that are likely to accompany aging will be significant for financial markets, although the precise effects on long-term interest rates are hotly debated. On the one hand, higher public debt levels are typically thought to raise the risk premium on public debt because investors will demand compensation for increasing the share of government securities in their portfolios. But on the other hand, Japan’s experience points to a very different outcome—the accumulation of a massive public debt has been accompanied by a sharp decline in bond yields. This may reflect that the downward thrust on rates from softer economic conditions has overwhelmed any increase in the risk premium. But the cocktail of rising public debt and aging demographics may make investors more risk averse in their investment choices as they seek to preserve savings amassed over a lifetime. This could be true for both retail investors themselves and

¹⁰ Textbook growth models indicate that the economy’s interest rate and growth rate should move roughly in tandem. Broadly speaking, this relationship can be stated in either nominal or real terms.

institutions managing assets for older investors. If so, this could be an important factor supporting demand for government securities and holding their yields down.¹¹ Similarly, a reduction in risk aversion would depress the price of risky assets, including equities.

Third, an important behavioral question is the extent to which older people will be net sellers of assets to fund their retirements. A large cohort of retirees gradually selling their lifetime wealth could shift the balance between supply and demand in global financial markets. Residential real estate might be particularly affected. While these dynamics will no doubt be in play, several factors are likely to dampen such effects. First, with the aging of the population, there will be increasing incentives to keep older workers in the labor force. This will mean labor relationships that are better suited to the preferences of older workers, and if they fund their retirements by “keeping a foot” in the labor market, the need to draw down assets will be reduced. Second, retirees may desire to preserve wealth to pass to the next generation. This may be particularly true for those in the top financial brackets. Ironically, the polarization of wealth in the United States, which is otherwise quite concerning, might help insulate financial markets from the forthcoming demographic shock. Third, with rising life expectancies and uncertainty about mortality, retirees may be hesitant to aggressively sell off assets for fear of outliving their financial resources.¹²

Pulling these considerations together, we conclude that aging demographics are likely to be a headwind for financial markets in the years ahead. But given the various countervailing considerations, the magnitude of such effects is not clear. With these observations in mind, we now look, first, at some financial data for Japan and then go on to consider the cross-country evidence for real and nominal bond yields.

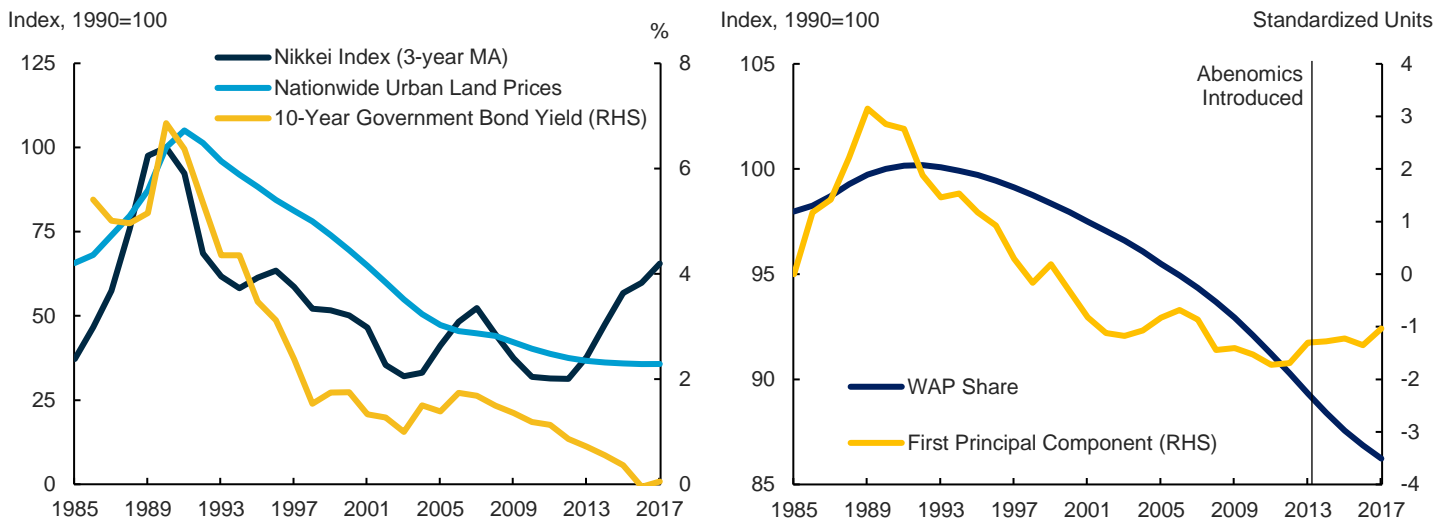
The left panel of the next figure shows Japanese equity prices, real estate prices, and government bond yields since the late 1980s. All three of these series peaked more or less simultaneously in the early 1990s and then fell sharply. Notably, these series remained on a sustained downward trajectory through the next two decades. Only with the advent of Abenomics in recent years have equity prices finally rebounded some, highlighting that outcomes for asset markets are sensitive to central bank actions—and policy actions more broadly.

The right panel shows the first principal component of these three asset price series (i.e., their central tendency) and graphs it against Japan’s working-age population share. The similarity in the trajectory of these two series is remarkable. The central tendency of asset prices peaks at roughly the same time as the working-age population. And the two series track each other closely until the last few years when the effects of more aggressive economic policies have supported performance. These results are certainly not definitive, but the correlation is striking.

¹¹ Rising public debt could also stimulate private saving, as households respond to a more uncertain economic environment and prepare for tax hikes that will likely be necessary. The increased saving, in turn, could allow the additional debt to be absorbed at lower rates.

¹² Research has found that households in the top 20% of the wealth distribution see rising net worth until around age 85. And the next 60% of retired households also report relatively stable net worth many years into retirement. Only for the bottom 20% is there evidence of meaningful drawdowns in financial assets. Other research has documented that wealth is stable until a shock arises, especially the onset of an intense medical condition or the death of a spouse. Notably, the dynamics for personal retirement accounts are somewhat different. For these, the drawdown is typically small until age 70-1/2, when distributions are statutorily required. For a broad discussion of these issues see, “The Composition and Drawdown of Wealth in Retirement,” James Poterba, Steven Venti, and David Wise, *Journal of Economic Perspectives*, Fall 2011.

FIGURES 10: PERFORMANCE OF JAPANESE ASSET MARKETS

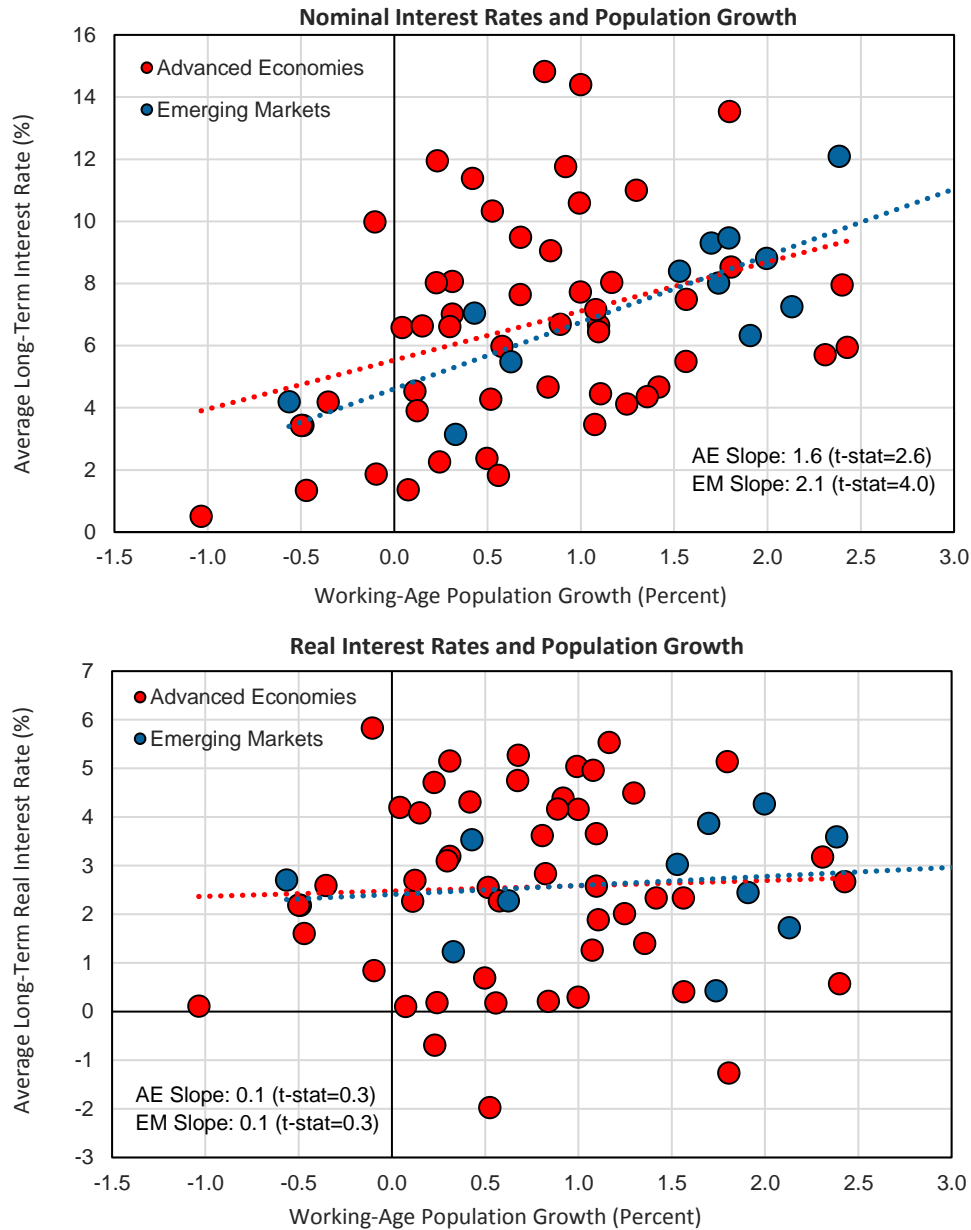


Source: Haver Analytics, Japan Ministry of Finance, Nikkei, and PGIM Fixed Income as of December 2018.

As another perspective on these issues, Figure 11 examines the relationship between working-age population growth and 10-year government bond yields across a broad set of countries.¹³ One striking result is that this relationship is much clearer and more statistically significant for nominal yields than for real yields. We interpret this as reflecting the strong link between working-age population and inflation, which was previously documented, and the well-established relationship between inflation and nominal rates. In contrast, while we have documented a significant relationship between working-age population and real GDP growth (at least for the advanced economies), the linkages between real growth and real rates are much noisier. Even so, the balance of our work seems consistent with the view that weakening demographics (i.e., slower working-age population growth) will tend to lower government bond yields.

¹³ We found the necessary data for six emerging-market economies generally starting in the 2000s.

FIGURE 11: INTEREST RATES AND POPULATION GROWTH



Source: Haver Analytics and PGIM Fixed Income as of December 2018. Note: Decadal averages (1960s-2010s) for nine advanced and six emerging markets. Real interest rates are derived using the CPI.

WHAT CAN POLICY DO?

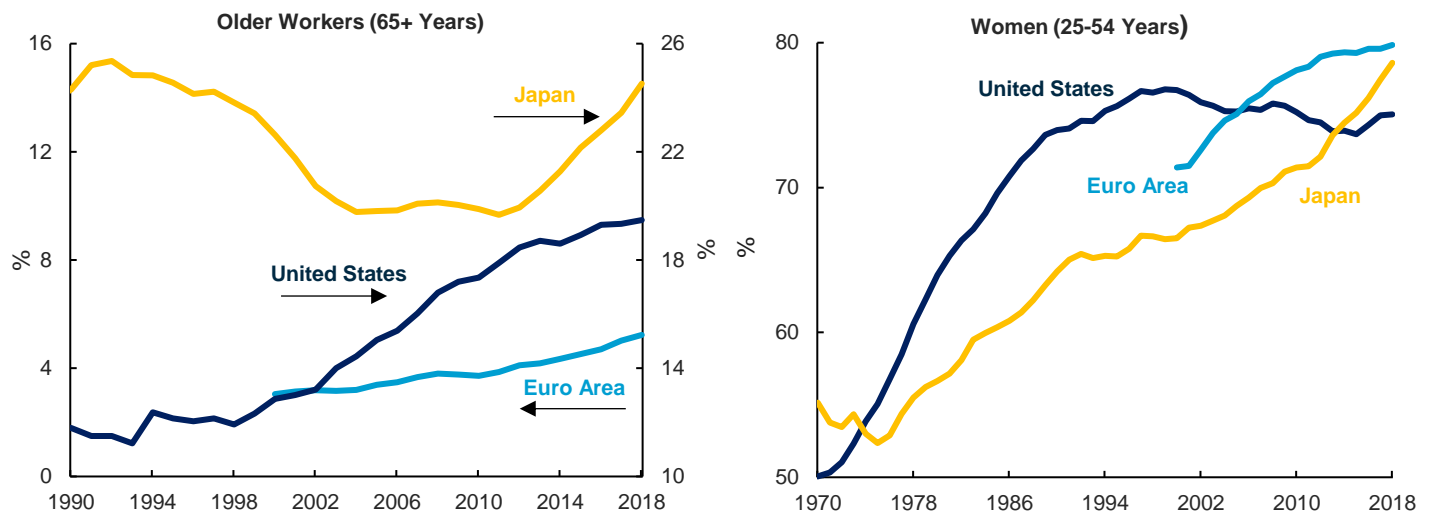
The results that we have presented indicate that aging demographics are likely to generate strong headwinds for the economy and financial markets. But, even so, Japan’s more recent experience under Prime Minister Abe suggests that a creative policy response may be able to reduce the magnitude of, but probably not entirely eliminate, the adverse effects.¹⁴

¹⁴ Managing the BoJ’s large balance sheet is an important challenge arising from the central bank’s exceptional efforts in recent years. This highlights that aggressive actions, in themselves, may have side effects.

One crucial policy step is to make work attractive for older people. Evidence suggests that older workers have much to contribute to the labor force, but they may be looking for more flexible working relationships; for example, they may desire to work less than full-time.¹⁵ The workplace will need to adapt to this reality. This also means that the future of the “gig economy” could have an increasingly gray tinge. This structure gives older workers exactly the kind of flexibility and sense of control that they desire—letting them choose where and when they work. In addition, increased scope to start small businesses would be helpful. Small firms often have the ability to provide greater flexibility in employment relationships. Or, alternatively, older workers may see running a small business (or sole-proprietorship) themselves as an attractive way to stay engaged in the workforce.

The left panel of Figure 12 highlights that the major industrial countries have seen some progress in boosting their labor force participation rates for older workers (65+) in recent years. This is true for Japan since 2010 and, over a longer period, for the United States as well. This measure has gently trended up for the euro area, but it remains at just 5%. All these economies still have plenty of scope for bringing older workers back into the labor force, particularly the euro area.

FIGURE 12: LABOR FORCE PARTICIPATION RATES



Source: Haver Analytics as of December 2018

There are a range of other policies that might also be helpful. As shown in the right panel, labor force participation rates of women have risen markedly in recent decades, but the question is whether the resulting opportunities are *qualitatively* similar to those for men. Another step, which currently faces strong political opposition in many countries, is immigration reform to boost the size and quality of the labor force. Even so, at some point in the years ahead, it might be more politically palatable to allow labor resources to flow from countries with sustained population growth to those with weaker population growth. Notably, Japan is now embracing a policy to allow “guest workers” to remain for sustained periods.

Finally, much of the adjustment to aging demographics will no doubt occur endogenously in the private sector as firms innovate their production processes and product mix to match shifting labor availability and demand. Similarly, these same incentives are likely to spur the development of labor-augmenting and labor-substituting technologies. Two examples of this on the horizon are robotics and autonomous vehicles. The latter could be a particularly powerful force.

¹⁵ See “Age and Individual Productivity: A Literature Survey,” Vegard Skirbekk, *Vienna Yearbook of Population Research*, 2004; also “Gradual Retirement, Sense of Control, and Retirees’ Happiness,” Esteban Calvo, Kelly Haverstick, and Steven Sass, *Research on Aging*, January 2009.

Four million U.S. workers are estimated to provide services primarily associated with “driving.”¹⁶ Freeing these folks for other functions would allow a powerful reallocation of labor resources. International trade might also play a constructive role, allowing the production of labor-intensive goods and traded services to flow to younger countries, while concentrating more capital-intensive industries in older countries. Innovation may create new types of services that may allow workers in younger countries to meet the needs of populations in aging countries—for example, through robotic interfaces and real-time communication.

As a parallel development, economic resources will need to flow to sectors well aligned with the demands of an older population, including healthcare and entertainment. Innovation might also play a role here—creating new goods and services that meet the needs of older people. All these arguments underscore the importance of ensuring that wages and prices remain flexible and that economies are open to trade and other transactions.

In this context, monetary and fiscal policies must also be appropriately calibrated. For central banks, this means stubbornly defending inflation targets to prevent disinflationary expectations from becoming entrenched. For fiscal policy, it means taking steps to ensure sustainability. With many countries struggling with increased indebtedness in the aftermath of the financial crisis, there is still much work to be done. Early action would allow the required fiscal adjustment to be achieved with less pain and disruption. However, the reality is that governments may be unable to take sufficient action until the challenges are more imminent.

In sum, aging global demographics are likely to pose powerful challenges for the global economy—with the prospect of lower economic growth, weaker fiscal performance, and softer inflation. Given these challenges, we see downward pressures on nominal interest rates and a likelihood of reduced demand for risk assets. That said, there are also dimensions for policy to respond. Steps to better deploy labor resources, maintain economic flexibility, and spur innovation should all be constructive. In addition, monetary and fiscal policies must be appropriately tailored. Such actions should be able to blunt at least some of the expected pressures. With this in mind, we would summarize the long-term prognosis for these issues as “gray skies, but with some rays of policy hope.”

¹⁶ “Self-Driving Cars Could Cost America’s Professional Drivers up to 25,000 Jobs a Month, Goldman Sachs Says,” 22 May 2017, CNBC.com.

NOTICE: IMPORTANT INFORMATION

Source(s) of data (unless otherwise noted): PGIM Fixed Income as of December 2018.

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