Demographics and Their Implications for the Economy and Policy

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I thank the organizers for inviting me to speak at the Cato Institute's 35th Annual Monetary Conference. To some of us, 35 seems relatively young, but for a conference series it is a ripe old age. The series' longevity underscores the important contributions it has made over the years to the public discourse on monetary economics and policy. Whether you interpret 35 as young or old depends on the context, which brings me to my topic today: demographics and their implications for the economy and policy. This might seem like an unusual topic for a Cato conference, but demographics have been on my mind, and not just because I had a birthday last month.

The word "demographics" comes from the Ancient Greek: "demo" meaning people and "graphics" meaning measurement. There is a strong tradition of studying demography as part of economics. Malthus's writings on population growth are a part of many history-of-thought courses in economics. More recently, as the economy has moved from financial crisis and the Great Recession to sustainable expansion, attention has shifted from cyclical aspects of the economy to structural factors. In addition, as policy has

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begun to normalize, the question has been raised: What is normal? To answer such a question, we need to understand how the underlying fundamentals of the economy are evolving. A critical factor is demographics.

Demographic change can influence the underlying growth rate of the economy, structural productivity growth, living standards, savings rates, consumption, and investment; it can influence the long-run unemployment rate and equilibrium interest rate, housing market trends, and the demand for financial assets. Moreover, differences in demographic trends across countries can be expected to influence current account balances and exchange rates. So to understand the global economy, it helps to understand changing demographics and the challenges they pose for monetary and fiscal policymakers.

Today I will talk about some of these demographic trends and their policy implications. Of course, the views I'll present are my own and not necessarily those of the Federal Reserve System or of my colleagues on the Federal Open Market Committee (FOMC).

Demographic Trends

Until the early 18th century, world population grew little because high mortality rates offset high fertility rates.[1] But increased knowledge and technological change in the form of advances in medicine, public health, and nutrition began to lower mortality rates. Fertility rates also began to decline. In the United States there were shifting preferences for smaller families because of the rising opportunity costs of having children and the higher costs of raising and educating them. The shift in population from rural to urban areas reduced the need for large families to run farms. There were changes in social norms regarding the use and availability of birth control. The baby boom in the United States after World War II, and the subsequent echo when the baby boom generation began having their own children, were exceptions to a generally downward trend in the birth rate. Today, the U.S. fertility rate is 1.88 births per woman (United Nations 2017: 807). This is less than the United Nations' estimated 2.1 replacement rate needed to keep the population

[1]Two useful survey articles on the demographic change are Lee (2003) and Bloom and Canning (2004).

stable, and it is considerably less than the fertility rate in 1900, which was over 3.[2]

As these demographic changes have played out, the average life expectancy in the United States has risen and the population has aged. Average life expectancy at birth is now nearly 80 years old, 30 years higher than it was in 1900.[3] The median age of the U.S. population is approaching 38 years old, nearly 10 years older than in 1970.[4] The United Nations projects that by 2050, the median age in the United States will be 42 years old and that the number of people age 65 or older per 100 of working-age people, those age 15 to 64, will be more than double what it was in 1970.[5]

Reflecting projections of relatively stable fertility rates and continued aging of the population, world population growth is expected to slow.[6] It averaged around 2 percent per year in the latter half of the 1960s and slowed to 1.2 percent per year over 2010–15 (United Nations 2017: 3). U.S. population growth, including net international migration, is expected to slow from about 0.8 percent in recent years to under 0.5 percent in 2050, with nearly two-thirds of that growth coming from net migration.[7]

A number of advanced economies are further along in this demographic transition than the United States is, and the process of population aging is accelerating worldwide (Bloom and Canning 2004: 18). In Japan, the population has been shrinking over the

[2]For the replacement rate, see United Nations (2017: xxvii). However, Espenshade, Guzman, and Westoff (2003) point out that there is considerable variation in replacement rates across countries. Haines (1998: Table 7–2) reports that, in 1900, the fertility rate was 3.56 for whites and 5.61 for black and other populations.

[3]Life expectancy at birth in the United States over 2010–15 was 78.9 (United Nations 2017: 805). The life expectancy at birth in the United States in 1900 was 47.3 (National Research Council 2012: 32).

[4]According to the United Nations (2017: 807), the median age in the United States was 28.4 in 1970, 37.6 in 2015, and is estimated to be 38.3 in 2020.

[5]According to the United Nations (2017: 807), this old-age dependency ratio was 16.3 in 1970, 22.1 in 2015, and is expected to rise to 36.4 by 2050.

[6]The United Nations (2017: 807) projects that the U.S. fertility rate will vary between 1.88 and 1.92 between 2015 and 2100. The Congressional Budget Office projects that the U.S. fertility rate will be 1.9 children per woman over 2017–47 (CBO 2017a: 30).

[7]For population growth projections, including projections for natural increases and net international migration, see U.S. Census Bureau (2014). Also see population growth projections in United Nations (2017: 807) and CBO (2017a: 30).

past five years, the ratio of older people to working-age people is the highest in the world, and the median age is almost 47 years old (United Nations 2017: 415).[8] Across Europe, fertility rates have been below the replacement level for some time (United Nations 2017: xxvii). In China, the growth rate of the working-age population has slowed since the late 1980s, and, partly because of its previous one-child policy, China's population is also rapidly aging (United Nations 2017: 191; Peng 2011). The median age in China has increased from around 19 years in 1970 to 37 years in 2015.

On the other hand, many low- and middle-income countries are at a considerably earlier phase in the demographic transition, with young and faster-growing populations, and rising labor force participation rates. In India, the median age is around 27 years and the annualized growth rate of the population from 2010 to 2015 has been 1.2 percent (United Nations 2017: 383). The United Nations projects that, in seven years, the population of India will surpass that of China, currently the most populous country, and that India's population will continue to grow through 2050. Much of the increase in world population between now and 2050 is projected to be in Africa, where fertility rates remain high.

The implications of these global demographic patterns for the future of the U.S. economy are worth considering because they pose some challenges for policymakers. Indeed, the magnitude of the effects will depend on policy responses. The remainder of my talk will discuss some of the ways these changing demographics could influence the U.S. economy, in particular, labor markets and economic growth. Then I will turn to considerations for monetary, fiscal, and other government policies.

Demographic Implications for Labor Markets

Demographics influence the supply of labor. Typically, as mortality rates decline and people live longer, the supply of labor increases. We saw this pattern begin in the United States in the late 1960s and the 1970s, especially as women and the baby boomers began entering the workforce. The result was an increase in the available supply of prime-age workers, both females

[8]The United Nations defines this potential support ratio as the number of persons age 20 to 64 divided by the number age 65 or over (United Nations 2017: xxxiii).

and males, and potential growth rates in the 3 to 4 percent range (CBO 2017b).

Even though increased life expectancy means individuals will need to work longer in order to save more for retirement, usually population aging eventually leads to a downward trend in labor force participation in the aggregate.[9] This is already happening in the United States. Labor force participation peaked at 67.3 percent in early 2000 and fell to 66.0 percent in December 2007, as the Great Recession was beginning. Since then, it has fallen further, to 62.7 percent as of October. While some of the decline represents cyclical factors, research suggests that most of the fall in the overall participation rate can be attributed to demographics: the combination of an aging population and reduced participation rates at older ages (see Aaronson et al. 2006, 2014).

As a result of lower population growth and labor force participation, the growth of the U.S. labor force has slowed considerably, from 2.5 percent per year, on average, in the 1970s, to around 0.5 percent per year over 2010–2016. It is expected to remain near that level over the next decade.[10]

The changing age distribution of workers can affect not only labor force growth and participation but also the longer-run natural rate of unemployment. Older workers typically have lower unemployment rates than other age groups, and they tend to change jobs less frequently (see Bean 2004, Cairó and Cajner 2014).[11] Young people now make up a smaller share of the labor force. All else equal, the combination of lower quit rates for older workers and lower numbers of

[9]Note that, so far, we have not seen much shift in the retirement age in the United States. In fact, since the 1970s, the average retirement age has been little changed even as life expectancies have continued to rise. This means people are spending more time in retirement and a smaller share of their lives working, which will put pressure on pension plans and savings. According to OECD estimates, the average retirement age for men in the United States was 65.9 between 1980 and 1985 and 66.8 between 2011 and 2016. Life expectancy at age 65 has increased from 14.8 years in 1970 to 19.4 years in 2015 (United Nations 2017: 807). Data from the Social Security Administration (2016) indicate that the average age of claims for retired workers has been little changed since 1970.

[10]According to the latest available projections, the U.S. Bureau of Labor Statistics estimates that annual growth in the labor force over 2016–2026 will average 0.6 percent (U.S. Bureau of Labor Statistics 2017: 2.).

[11]Tasci (2012) documents that the job separation rate was rising through the early 1980s and then declining thereafter, likely due to demographic changes.

younger workers should imply a lower natural rate of unemployment compared to the 1990s.[12] Of course, the timing and magnitude of this demographic effect are not certain because there are some counterbalancing factors, including the fact that, so far, contrary to expectations, the retirement age for older workers hasn't changed much, the productivity of a worker varies with age, and policies such as unemployment and retirement benefits can affect labor market choices.

Demographic Implications for Economic Growth

The expected slowdown in population growth and labor force participation rates will have implications for long-run economic growth and the composition of growth. The key determinants of the economy's longer-run growth rate are labor force growth and structural productivity growth—how effectively the economy combines its labor and capital inputs to create output. Demographics suggest that labor force growth will be considerably slower than it has been in recent decades, and this will weigh on long-run economic growth.

In addition, in theory, the aging of the population may also have a negative effect on structural productivity growth. Over the past five years, labor productivity, measured by output per hour worked in the nonfarm business sector, has grown at an annual rate of only about a half of a percent; over the entire expansion, it has averaged 1 percent. While some part of the slowdown is likely cyclical, reflecting persistent effects of the Great Recession on investment spending, structural factors are also weighing on productivity growth. Older workers tend to stay longer in their jobs than younger workers, who are more likely to change jobs and employers. This allows older workers to gain deeper experience, which can be positive for productivity growth. At the same time, lower labor mobility means workers may remain in jobs that are not the best match to their skill sets. This would be a negative for productivity growth. Indeed, one study finds that both short tenures and long tenures adversely affect productivity growth

[12]Estimates of the natural rate of unemployment vary depending on what one assumes about the labor force participation rate. The FOMC participants' projections of the longer-run unemployment rate range from 4.4 to 5.0 percent (see FOMC 2017). Aaronson et al. (2015) estimate that changes in the age and gender composition of the labor force will mean that the natural rate of unemployment will be two-tenths of a percentage point lower by 2020, with a similar-size decline attributed to higher educational attainment.

(see Auer, Berg, and Coulibaly 2005). And historical evidence suggests a hump-shaped relationship between age and productivity, with productivity increasing when a person enters the workforce, stabilizing, and then declining toward the end of a person's work life (see Skirbekk 2008, National Research Council 2012: chap. 6). Research also indicates that an individual's innovative activity and scientific output peak between the ages of 30 and 40, although that age profile has been shifting older over time.[13]

Labor mobility and business dynamism, including the number of start-ups in key innovative sectors like high tech, have been declining for some time (see Haltiwanger 2015). Whether dynamism will remain low is an open question, but the aging of the population is here to stay. So far, the magnitude of the negative effect of the aging workforce on productivity growth appears to be quite small.[14] Even so, the demographics-induced slower growth of the labor force and the possible dampening effect on productivity growth suggest that longer-run output growth will likely remain below the 3 to 3.5 percent rate seen over the 1980s and 1990s, unless there is some effective countervailing policy response.[15]

In addition to affecting the economy's trend growth rate, demographics will likely affect the composition of growth by shaping aggregate consumption, saving, and investment decisions. Increased longevity means that people will need to save more over their

[13]One study showed that the median age of Nobel Prize winners in physics, chemistry, and medicine has increased about two years per century and the mean age has risen by eight years (National Research Council 2012: chap. 6).

[14]For example, the National Research Council's (2012: chap. 6) review of the literature showed that a changing age distribution had little effect on the distribution of earnings, a proxy for productivity. Its estimation of the effect for OECD countries indicates that productivity increases and then decreases with age, with a maximum reached at about 40 years. Using projections of the age distribution and its preferred quadratic specification, it estimates that changes in the age distribution will subtract only about 0.1 percentage point per year from aggregate productivity growth over the next 20 years (National Research Council 2012: 119, Table 6–2). Note that Feyrer (2007) finds that differences in demographics could explain as much as a quarter of the gap in productivity between OECD countries and low-income countries. However, the National Research Council suggests that sampling error may explain the large magnitude of that finding.

[15]The Congressional Budget Office currently estimates that potential GDP growth averaged 3.4 percent per year over 1982–90 and 3.3 percent per year over 1991–2001; it projects that potential growth will average 1.8 percent per year over 2017–27 (see CBO 2017b).

working life to fund a longer retirement period. This is especially true given the degree of underfunding of public pension plans at the state and federal levels. Demand for health care will continue to rise, and an aging population will place different demands on the housing sector than a younger population, affecting the demand for single versus multifamily properties, for owning versus renting, and for residential improvements that allow older adults to age in place.[16] By affecting the composition of output, changes in the age distribution have the potential to affect the business cycle. Because of its cyclical and structural implications, demographic change also has implications for monetary policy. Let me talk about three.

Demographic Implications for Monetary Policy

First, although monetary policy cannot affect the growth rate of potential output or the long-run natural rate of unemployment, it needs to take these into account as part of the economic environment, and to consider the downward pressure demographics put on both relative to their historical levels.

Second, changes in demographics could also affect the transmission mechanism of monetary policy to the economy, in particular, the strength of wealth effects versus income effects. Older people tend to hold more assets than the young and tend to be creditors while drawing down their assets to fund their consumption during retirement. Younger people tend to be borrowers but face tighter credit constraints than the old because they hold fewer assets. As the share of the population shifts from young to old, the propagation of an interest rate change through the economy is likely to change. There will be a smaller share of young borrowers able to take advantage of a decrease in interest rates but a larger share of older people who benefit from higher asset prices; similar reasoning applies for an increase in interest rates. Demographic change may mean that wealth effects become a more important channel through which monetary policy affects the economy (Bean 2004, Imam 2013).

A third important implication of demographic change for monetary policy is through its effect on the equilibrium long-term interest rate. FOMC participants have been lowering their estimates of the fed funds rate that will be consistent with maximum employment

[16]See Joint Center for Housing Studies of Harvard University (2014).

and price stability over the longer run. The median estimate has decreased from 4 percent in March 2014 to 2.8 percent today. And empirical estimates of the equilibrium real fed funds rate, so-called *r*-star, while highly uncertain, are lower than in the past.[17]

Demographic change may be a factor in this decline to the extent that it results in a lower long-run growth rate of consumption and, therefore, of output, which is a key determinant of the longer-run equilibrium interest rate. The magnitude of any effect is difficult to determine because complicated dynamics are at work. Static analysis might suggest that as longevity increases, people will want to accumulate more assets to fund their retirements and this would put upward pressure on asset prices and, therefore, downward pressure on returns. Moreover, because people prefer to reduce their exposure to risk as they age, we might expect to see a shift toward assets with fixed returns, putting upward pressure on risk premia and downward pressure on risk-free rates.[18] However, older people also tend to save less because, once people reach retirement age, they need to draw down their savings and perhaps sell assets to fund their retirement. This countervailing effect from dissaving, as well as public spending on retiree benefits, would tend to put upward pressure on interest rates.[19] Thus, the magnitude and even the sign of the effect of demographic change on interest rates are empirical questions.

So far, there is little evidence that demographic trends are driving large-scale shifts into fixed-income investments that would depress returns; indeed, the evidence suggests that people are undersaving for retirement (see National Research Council 2012: chap. 7). Historically, there appears to be only a weak correlation between age structure in the United States and asset returns.[20]

[17]For FOMC projections, see FOMC (2014) and FOMC (2017). For a review of the literature on the equilibrium interest rate, see Hamilton et al. (2015).

[18]Bernanke (2005) discusses how a global savings glut could push down longer-term interest rates.

[19]The simulation results in Fehr, Jokisch, and Kotlikoff (2008) show an increase in interest rates along the baseline path of demographic change projected for the United States, the European Union, and Japan. Goodhart and Pradhan (2017) argue that demographic change will lead to increases in the equilibrium interest rate.

[20]Poterba (2004) finds only a weak correlation between the age structure in the United States over the past 70 years and asset returns on stocks, bonds, and Treasury bills.

Ultimately, how demographics affect economic outcomes will also depend on how governments respond, so, in the remainder of my time, let me discuss the implications of demographic change for fiscal and other government policies.

Demographic Implications for Fiscal and Other Government Policies

The rising share of older people will put significant pressure on Social Security and Medicare in the United States, which are structured as pay-as-you-go programs, with current workers providing support for current retirees. Other developed countries' government pension and health care funds will also be stressed. Projected longer-run fiscal imbalances are unlikely to be sustainable, and it seems likely that governments will need to respond with some combination of increased borrowing, reduced benefits, increased taxes, program restructuring, and policies intended to stem the growth rate of health care costs.[21] Longer-run fiscal sustainability will depend on what combination is used, and how effective the actions are.

According to Congressional Budget Office projections, under current policy, the federal deficit as a share of GDP will more than triple over the next 30 years, from 2.9 percent in 2017 to 9.8 percent in 2047 (CBO 2017a). During this time period, outlays for Social Security and Medicare are projected to rise from 8 percent to 12.4 percent of GDP. As a result, the federal debt-to-GDP ratio rises dramatically, from 77 percent in 2017 to 150 percent in 2047. This increase dwarfs the run-up in debt to fund World War II. The extent to which such an increase, per se, will crowd out productive investments and lower economic growth is debatable.[22] But the sovereign debt crisis in Europe over 2009–12 shows that high debt levels can pose severe problems if investors lose faith in the ability of governments to service their debts, generating spikes in what had previously been viewed as risk-free rates.

[21]Auerbach (2016) points out that rising health care costs, and not aging alone, explain some of the difference in projected fiscal gaps across countries.

[22]For discussions, see Cecchetti, Mohanty, and Zampolli (2011); Auerbach and Gorodnichenko (2017); and Reinhart and Rogoff (2010).

If financing the funding shortfall through increased government borrowing is undesirable, raising taxes and reducing benefits or other expenditures are not very appealing either. Depending on how such policies are implemented, they could ultimately hurt the economy's longer-run growth prospects, leaving the fiscal outlook even worse. Moreover, in a world where countercyclical fiscal policy is constrained, business cycle volatility could rise, and monetary policy could find itself near the zero lower bound more often, potentially requiring the use of nontraditional policy tools such as asset purchases and forward guidance in order to meet monetary policymakers' economic objectives (see Kiley and Roberts 2017).

More effective policies to overcome the effects of the aging population on fiscal imbalances would focus on reducing the rising costs of health care, not just on health insurance. In addition, policies that increase the growth and productivity of the workforce would address not only fiscal imbalances but also the downward pressure on longer-run growth from demographics or other sources. Policies that increase immigration, not reduce it, that support continuing education, that encourage research and development and innovation, and that provide incentives so people work longer should receive attention.

Conclusion

In conclusion, demographic change will result in a slower-growing and older population. This transition will likely put downward pressure on the growth rate of potential output, the natural rate of unemployment, and the long-term equilibrium interest rate. The magnitude of these effects and the timing are uncertain because they depend on complicated dynamics and the behavior of consumers and businesses. Demographic change may also affect the business cycle and the monetary policy transmission mechanism. Monetary policymakers will need to continually evaluate these structural and cyclical effects in determining appropriate policy. Demographic trends present challenges for fiscal policymakers as well. Rising fiscal imbalances are projected to lead to higher government debt-to-GDP levels, potentially putting upward pressure on interest rates, and crowding out productive investment. But steps can be taken to offset some of the negative consequences of

demographic change for the economy. These include policies that focus on increasing productivity and labor force growth and that address growing fiscal imbalances.

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