



# Economic Letter

## Global Demographic Trends Shape Policy Environment

by Mark A. Wynne

**ABSTRACT:** Demographics are key determinants of what is economically feasible at both the global and national levels. Demographics also have important implications for monetary policy. Slower population and labor force growth in the coming decades will have a depressing effect on real interest rates.

**D**emographics will fundamentally affect the environment in which monetary policy is made over the next decade. The global population is expected to increase to 11.2 billion by the end of this century based on current trends, with essentially all of this growth occurring in the so-called developing regions of the world and none in the industrial regions (Europe, North America, Australia, New Zealand and Japan).

The global population stood at 7.3 billion in 2015, roughly three times the 1950 population of 2.5 billion, according to United Nations estimates published last year.<sup>1</sup> The 17 percent of the population living in advanced economies in 2015 will decline to a bit less than 12 percent, or one-eighth, of global residents by 2099. These same economies accounted for just under one-third of the world population in 1950.

In short, Asia and Africa are where the demographic action will be over the next 100 years.

The phenomenon of sustained population growth is a remarkably recent one. The world's population began growing in a persistent manner after the Industrial Revolution of the 18th century, surpassing 1 billion around the turn of the century.

Since then, global population growth has been more or less monotonic, despite the disasters of famine, epidemic and war. At the onset of sustained population growth at the beginning of the 19th century, English economist Thomas Malthus first wrote about overpopulation. Few, if any, of the worst fears of Malthus—known for his work *An Essay on the Principle of Population*—have come to pass. Still, demographics are fundamentally tied to long-run growth prospects and myriad other issues.

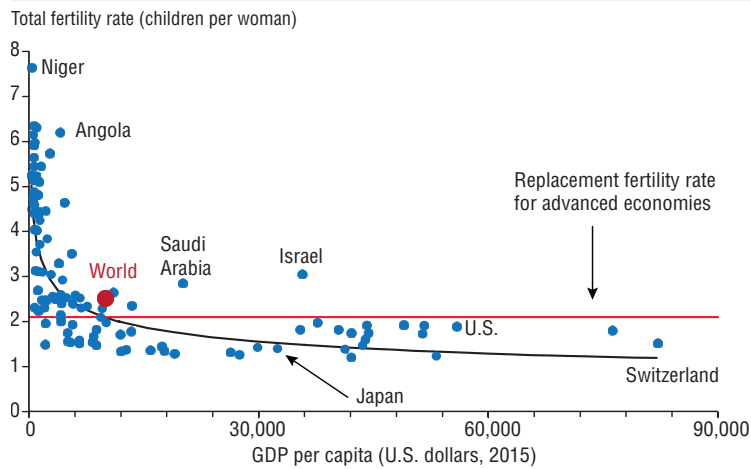
### Fertility and Income

A long-standing regularity of demographics is that as countries get richer, birth rates decline. Chart 1 depicts the relationship between fertility rates in various countries in 2015 and overall standards of living as measured by per capita gross domestic product (GDP) in U.S. dollars. The chart includes the “best fit” depiction to illustrate the negative relationship between income and fertility, as well as a reference line at a fertility rate of 2.1—about the level needed for a population to reproduce itself in advanced economies.<sup>2</sup>

A number of countries have fertility rates below the 2.1 replacement threshold, including the United States. Even with fertility rates below replacement, a

Chart  
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## Fertility Declines as Incomes Rise



population can continue to grow for some time due to immigration, declining death rates and population momentum. But if sustained for an extended period, sub-replacement fertility rates almost always translate into declining populations.

### Tipping Points

The total population in three regions of the world—Eastern Europe, Japan and Western Europe—has already or will shortly pass the tipping point from growth to decline. Eastern Europe, which for UN classification purposes includes Russia, began to experience slowing population growth around the time of the breakup of the Soviet Union. The region's population peaked at just under 311 million in 1992 before falling to just under 293 million as of 2015.

Among the world's major advanced and developing economies, Russia was the first to pass a tipping point. The UN estimates that Russia's population peaked at just over 148 million in 1994 before declining to 143.5 million last year and projects that the count will fall further through the end of the century.<sup>3</sup> The drop has been largely driven by a decline in fertility rates from 2.1 in 1909 to a low of 1.2 in 2000. Fertility has since turned up but is below replacement and is expected to remain so.

Some of the fertility decline was offset by a big uptick in immigration fol-

lowing the collapse of the Soviet Union. Russia also experienced a surge in the death rate that led to a big decline in life expectancy, especially among males. The former Warsaw Pact countries of Eastern Europe were similarly affected by these adverse demographics.

Japan's situation could have a greater impact than Russia's on the global economy. The Japanese government confirmed in early 2016 what demographers had predicted—its population had declined for the first time since records began in the 1920s, falling by just under 1 million between 2010 and 2015.

The figures, based on the 2015 census, confirmed UN projections released last year that had Japan's population peaking at 127.3 million in 2009, declining to 126.6 million by 2015 and falling further to 83.4 million by the end of the century.

But Japan is not alone among advanced economies. The population of Europe as a whole (including Russia) is projected to peak at just under 740 million in 2020. However, the demographic destinies of the four largest Western European economies are quite different. UN estimates put Germany's peak population at just over 82 million in 1998. Since then, the trajectory has been downward, with the German population projected to shrink to about 62 million by the end of this century. The UN estimates

that Italy's population will peak at about 60 million in 2016 before it, too, begins a steady decline.

By comparison, the populations of the United Kingdom and France are expected to grow through the end of the 21st century, with the UK overtaking Germany as Europe's most populous nation by the middle of the century and France surpassing Germany by about 2060.

### Another Tipping Point

As important as aggregate population developments are at the global and national levels, the composition of the population also matters for economic policy. These effects are particularly dramatic in the aftermath of a transition to a higher or lower fertility rate or birth rate.

Chart 2 shows the global working-age population—proxied by the population age 15-64—as a share of the total world population over the past 65 years and through the middle part of this century.<sup>4</sup> The proportion of working-age people dramatically declined in the immediate post-World War II period through the late 1960s. This was primarily due to the postwar surge in births—the baby boom in the United States and other countries.

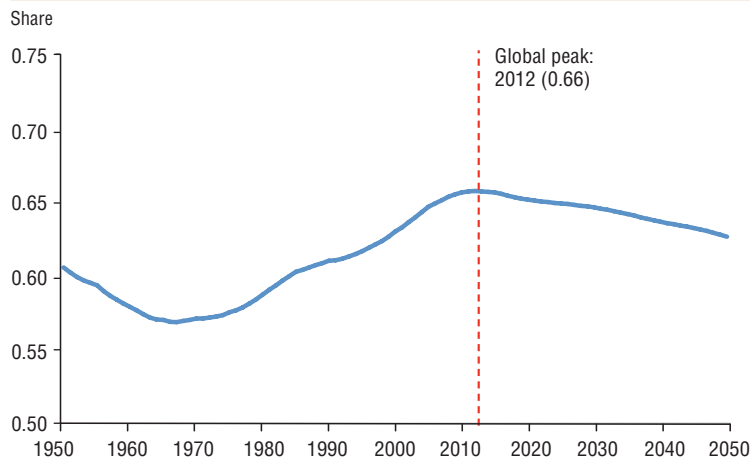
Baby boomers began entering the global workforce in the mid-1960s, and labor became relatively abundant on a global scale. That trend ended in 2012. Since then, the number of potential workers has shrunk as a share of the global population and is projected to continue doing so until the middle of this century and beyond.

The flip side of this decline is that the dependency ratio (those age 15 and under plus those 64 and older) is projected to rise globally. That is, each worker will need to support a larger number of dependents going forward, putting potentially significant strains on the public finances of many countries.

Just as some parts of the world seem to have reached peak population, so too have many countries or regions experienced peak worker availability. The euro area hit this peak in 1990, Japan in 1992, the U.S. in 2008 and China in 2011.

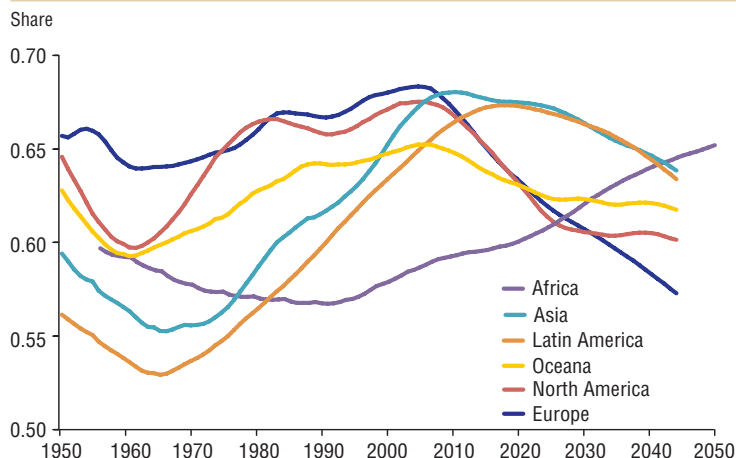
What is striking about the global phenomenon of growing worker scarcity is just how broad based it is. Every major

**Chart 2** | Tipping Point for Worker Population Share Possibly Reached  
(Working-age population, 15–64, as a share of world total)



SOURCES: United Nations; Haver Analytics.

**Chart 3** | Regions' Working-Age Tipping Points Arrive  
(Working-age population, 15–64, as a share of total population)



SOURCES: United Nations; Haver Analytics.

geographic region of the world but one will experience a declining working-age population relative to the total (*Chart 3*). Europe, North America and Oceania have already hit the peak, Asia probably reached its peak sometime in the past year or two, and Latin America will peak before the end of this decade. Africa is the only major region in which the working-age population is expected to increase relative to the total.

### Monetary Policy Impact

Basic economic theory tells us that ultimately the real (inflation-adjusted) interest rate is determined by the time

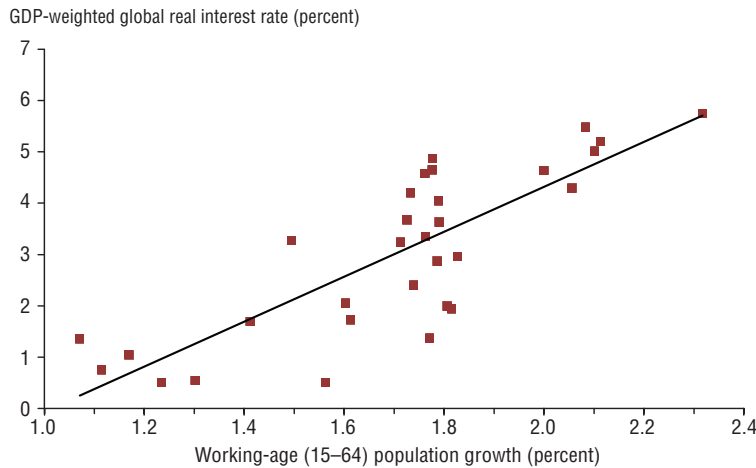
preference rate (how impatient people are) and the population growth rate. Indeed, there seems to be a positive relationship between the global real interest rate and the growth rate of the global working-age population (*Chart 4*).

Faster growth in the working-age population is associated with higher real interest rates, while slower growth is associated with lower real rates. However, the relationship is not as strong as economic theory might predict. To the extent that the positive relationship between the growth of the working-age population and real rates has held over the past 35 years, demographics will likely be a

▶ To the extent that the positive relationship between the growth of the working-age population and real rates has held over the past 35 years, demographics will likely be a significant source of downward pressure on global interest rates for some time to come.

## Chart 4

### Global Real Interest Rates Rise with Labor Force Growth



NOTE: Each dot represents world population for a given year, 1985–2015.

SOURCES: National central banks and statistical organizations; International Monetary Fund; Haver Analytics; author's calculations.

significant source of downward pressure on global interest rates for some time to come.<sup>5</sup>

### National Economic Policies

Demographics matter. They are key determinants of what measures may be feasible at the global and national levels. But demographics by themselves do not define what can be done at a policy level. Other factors such as productivity, tax rates and the regulatory environment matter as well—and in some ways, more so.

Furthermore, key contributors to demographic trends such as fertility rates, labor force participation rates and even mortality rates are susceptible to influence by public policy. Global demo-

graphics are important, though demographics also matter at the national level. In some respects, the national level is where we should focus attention because national economic policies and social norms often impact the ultimate drivers of demographic developments.

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### Notes

<sup>1</sup> United Nations data are estimates are through 2010 and projections from 2011 through 2099.

<sup>2</sup> The number is higher in less-developed countries because of higher mortality rates. If a significant number of women do not survive through the end of their childbearing years, those who do survive need to have more children just to keep the population constant. The fertility rate is somewhat different from the birth rate. While the birth rate (number of births per thousand people) is a parameter of the entire population, the fertility rate is a parameter of the female population of reproductive age (generally 15 to 49). Fertility-rate estimates are subject to revision because they are based on projections of the number of children that a woman of childbearing age would be likely to have during her childbearing years based on current birth rates.

<sup>3</sup> Note that Russian population estimates from the Russian Federation's Federal State Statistics Service, reported in the Haver Analytics database, show an increase of 2.6 million in 2014 that is not reflected in the UN estimates.

<sup>4</sup> Arguably for many advanced countries, the age of entry into the workforce is later than 15 and the age at retirement is later than 64. A roughly similar pattern, albeit less dramatic, emerges if we define the working-age population as 25 to 64.

<sup>5</sup> A number of studies have attempted to quantify the impact of demographics on interest rates. In "Demographics and Real Interest Rates: Inspecting the Mechanism" (Federal Reserve Bank of San Francisco Working Paper no. 2016-05, April 23, 2016), Carlos Carvalho, Andrea Ferrero and Fernanda Nechio find that demographics can account for a 150 basis-point reduction in the equilibrium interest rate in developed countries between 1990 and 2014. In "Secular Drivers of the Global Real Interest Rate" (Bank of England Staff Working Paper no. 571, December 2015), Lukasz Rachel and Thomas D. Smith argue that close to 1 percentage point of the 4.5 percentage-point decline in the global neutral interest rate between 1980 and 2015 can be attributed to demographics.

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