

Special Commentary — July 29, 2024

## R-Stargazing: Part II

### Summary

- In our view,  $r^*$  probably has risen from the 0.50% or so that prevailed on the eve of the pandemic, but we are skeptical it has returned to the 2.50%–3.00% range that was prevalent before the 2008 financial crisis. Our working estimate for  $r^*$  is currently 1.00%–1.25%.
- Why do we believe that  $r^*$  has not risen even more? First, labor productivity has not accelerated relative to its pre-pandemic trend. Second, the pace of globalization appears to have stalled out, but it has not fully reversed, at least not yet. The United States continues to run a sizable current account deficit, and the corresponding current account surpluses elsewhere in the world leave foreigners positioned to keep buying dollar-denominated assets in size, including Treasury securities.
- Fiscal deterioration is one potential source of upward pressure on  $r^*$  since 2019. Using the rule of thumb that each percentage point increase in the debt-to-GDP ratio increases long-term rates by two to three bps suggests that  $r^*$  has increased by roughly 38–57 bps, all else equal, from the growth in U.S. public debt since 2019. However, we believe that at least some upward pressure on the natural rate from fiscal deterioration has been offset by structural demographic trends, namely the aging of populations in the U.S. and elsewhere.
- The behavior of the U.S. economic data since the FOMC started tightening monetary policy backs up the idea that the current stance of monetary policy is restrictive, i.e. the policy rate is currently above its neutral equilibrium. The yield curve has been inverted for two years now, including shorter-dated maturities that are less influenced by term premium effects. Inflation in the United States has slowed considerably since the FOMC began increasing the federal funds rate, while the labor market is no longer as hot as it previously was.
- Although  $r^*$  may still be low by historical standards, we think there is a more plausible case that it may rise further in the years ahead. The outlook over the next decade is naturally more speculative, but we think the risks are clearly tilted to the upside for  $r^*$ . This is in sharp contrast to the 2010s, when the risks to  $r^*$  were perpetually skewed to the downside.
- Labor productivity may accelerate in the years ahead as the impact from generative AI is slowly felt across the broader economy. Geopolitical tensions and protectionism are on the rise, and a steady slide and/or a sudden shock on this front could lead to a higher  $r^*$  if FX reserve managers, sovereign wealth funds and foreigners more broadly pull away from the U.S. Treasury market.
- The daunting federal fiscal outlook is another potential source of upward pressure on the natural rate, and a lack of action from Congress and the president could lead to a higher  $r^*$  and, by extension, higher rates more broadly in the years ahead.
- Is a return to  $r^*$  values in the 2.50%–3.00% range possible? We believe it is possible, just not probable. The outlook for variables such as new technologies and geopolitics is highly uncertain, and demographic headwinds likely will exert a structural downward pressure on  $r^*$  in the years ahead under all scenarios. As a result, we think a 2.50%–3.00%  $r^*$  value is more of a tail risk than a base case, with 1.50%–2.00% perhaps more realistic.

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## R\* Probably Up Since 2019, but Not Back to Pre-2008 Levels

“For over 125 years, economists have grappled with a dilemma: How can a concept at the very heart of monetary theory be so vexing to quantify? I’m talking, of course, about r-star, the natural rate of interest.” – John C. Williams.<sup>1</sup>

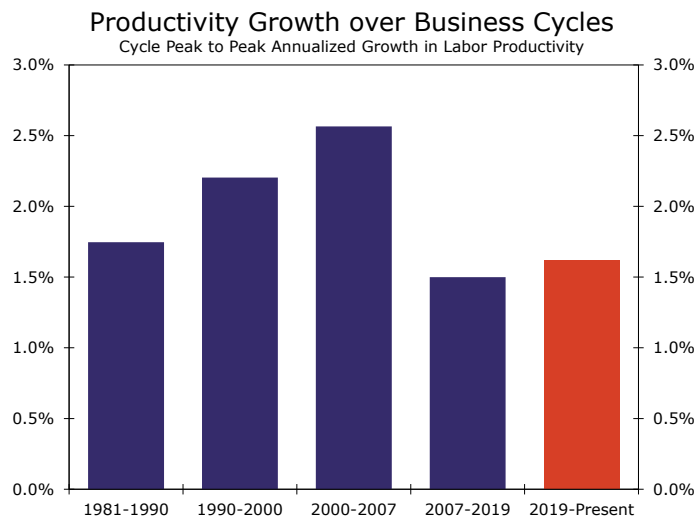
In [Part I](#) of this two-part series, we laid the groundwork for understanding what r\* is, how it is measured and what the key factors are that determine it. In Part II, we attempt to tackle a more difficult challenge. How has r\* evolved since the pandemic began in 2020, and where is it headed in the years to come?

In our view, r\* probably has risen from the 0.50% or so that prevailed on the eve of the pandemic, but we are skeptical it has returned to the 2.50%–3.00% range that was prevalent before the 2008 financial crisis. Our working estimate for r\* is currently 1.00%–1.25%. Layer on PCE inflation of 2% and this yields a nominal neutral rate of roughly 3.00%–3.25%.

Why do we believe that r\* has not risen even more? First, labor productivity has not accelerated relative to its pre-pandemic trend. From Q4-2007 through Q4-2019 (business cycle peak to business cycle peak), nonfarm labor productivity growth was 1.5% per annum. Since Q4-2019, labor productivity growth has been 1.5% per annum, matching the pre-pandemic pace ([Figure 1](#)). Productivity growth also has been fairly anemic in most of the other major economies of the world since 2019, a key theme we highlighted in our mid-year [International Economic Outlook](#). A productivity boom could be coming (more on that later), but for now we do not have much evidence that one has occurred over the past few years.

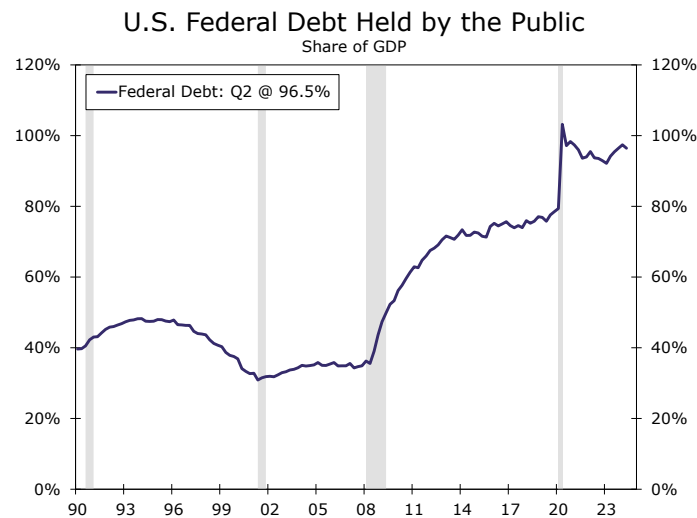
***In our view, r\* probably has risen from the 0.50% or so that prevailed on the eve of the pandemic, but we are skeptical it has returned to the 2.50%–3.00% or so that was prevalent before the 2008 financial crisis.***

Figure 1



Source: U.S. Department of Labor and Wells Fargo Economics

Figure 2



Source: U.S. Department of the Treasury, U.S. Department of Commerce and Wells Fargo Economics

Fiscal deterioration is one potential source of upward pressure on r\* since 2019. Debt held by the public as a share of GDP has increased from 78% of GDP in Q4-2019 to 97% of GDP in Q2-2024 ([Figure 2](#)). Using the rule of thumb that each percentage point increase in the debt-to-GDP ratio increases long-term rates by two to three bps suggests that r\* has increased by roughly 38–57 bps, all else equal, from the growth in U.S. public debt since 2019.<sup>2</sup> Furthermore, fiscal deterioration has not been a phenomenon exclusive to the United States, as we discussed in a [recent report](#).

***We believe that at least some upward pressure on the natural rate from fiscal deterioration has been offset by structural demographic trends.***

That being said, we discussed in Part I how the aging of the population in the United States and many other countries around the world has put downward pressure on r\*. This trend remains firmly entrenched, and the research literature suggests that longer lifespans and aging populations have been one of the biggest drivers of the decline in r\* in recent decades. For example, Carvahlo et al. (2016) find that these demographic factors accounted for at least 1.5 percentage points of the decline in the equilibrium interest rate between 1990 and 2014.<sup>3</sup> Thus, we believe that at least some upward

pressure on the natural rate from fiscal deterioration has been offset by structural demographic trends.

Other potential drivers of a higher  $r^*$  do not suggest to us that a major change has occurred since 2019. It is true that the pace of globalization seems to have slowed in recent years. Global goods exports as a share of GDP peaked in 2008 and have hovered around that level in recent years (Figure 3). Similarly, official FX reserve accumulation has stalled out in recent years relative to the booming growth in the previous decades. That said, a full-blown reversal has not occurred, at least not yet. In 2019, U.S. exports to the rest of the world were about 12% of GDP, while imports were about 14% of GDP. In 2023, U.S. exports were 11% of GDP, while imports were 14% of GDP. The United States continues to run a sizable current account deficit, and the corresponding current account surpluses elsewhere in the world leave foreigners positioned to keep buying dollar-denominated assets in size, including Treasury securities (Figure 4). In short, globalization may not be exerting any *new* downward pressure on  $r^*$  as was the case from the 1990s through the mid 2010s, but neither is it exerting much *new* upward pressure on  $r^*$ —at least not yet.

***A full-blown reversal in globalization has not occurred, at least not yet.***

In a similar vein, we discussed in Part I how new financial regulations adopted in the wake of the 2008 financial crisis increased demand from financial institutions for safe, liquid assets such as Treasury securities, putting some downward pressure on  $r^*$ . These regulations are largely unchanged since 2019, and there is a case to be made that marginal demand for safe, liquid assets may even be higher today than it was back 2019 in light of the 2023 regional bank failures.

Figure 3

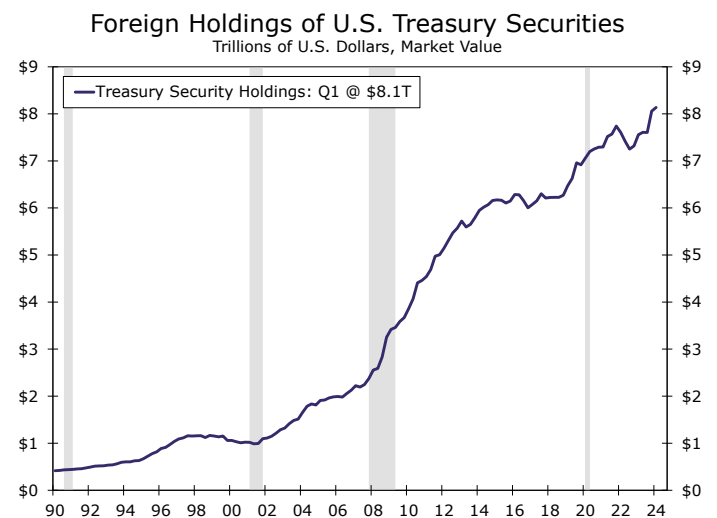


Source: International Monetary Fund and Wells Fargo Economics

The behavior of the U.S. economic data since the FOMC started tightening monetary policy backs up the idea that the current stance of monetary policy is restrictive, i.e. the policy rate is currently above its neutral equilibrium. The yield curve has been inverted for two years now, including shorter-dated maturities that are less influenced by term premium effects (Figure 5). An inverted yield curve can be indicative of tight monetary policy, as financial markets anticipate that rates are higher today than they will be in the future. Inflation in the United States has slowed considerably since the FOMC began increasing the federal funds rate (Figure 6), while the labor market is no longer as hot as it previously was.<sup>4</sup> In the words of San Francisco Fed President Mary Daly, “we have growth slowing, spending slowing, the labor market slowing, inflation coming down — that’s how policy works.”<sup>5</sup> This real-time evidence suggests that the spot real policy rate of ~2.75% is restrictive relative to a neutral policy stance and offers another reason to be skeptical that  $r^*$  has risen back to its pre-2008 level.

On balance,  $r^*$  may have drifted up from its pre-pandemic value of roughly 0.50%, but the net impact from the aforementioned forces argue for a marginal change rather than a full return to the 2.5%–3.0% real rates that were common before the 2008 financial crisis.

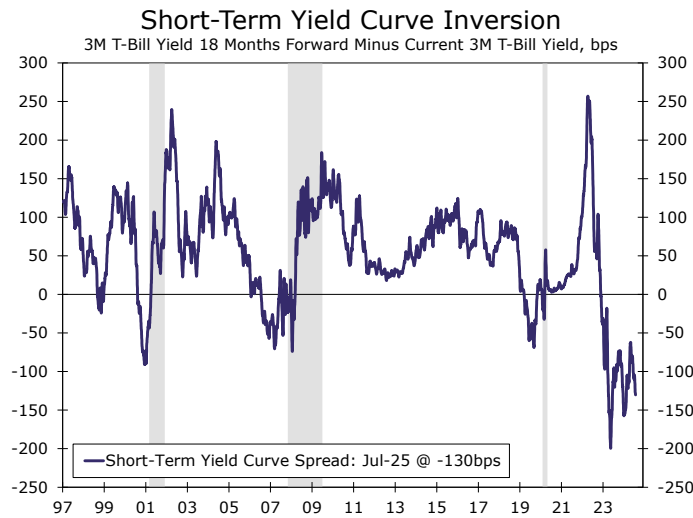
Figure 4



Source: Federal Reserve System and Wells Fargo Economics

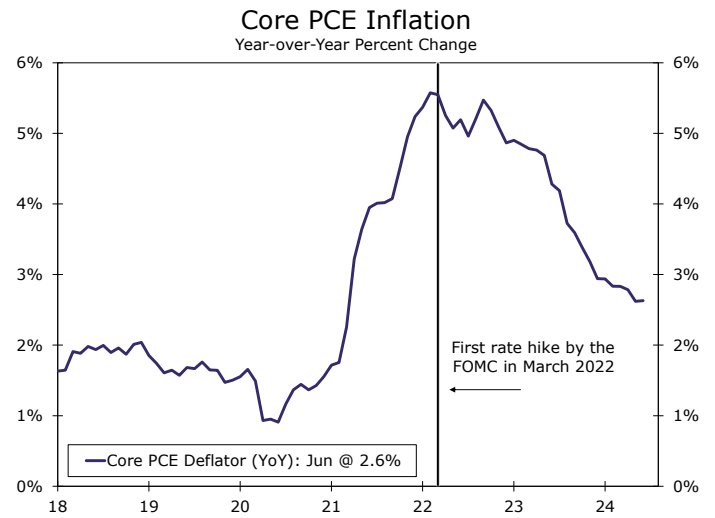
***The behavior of the U.S. economic data since the FOMC started tightening monetary policy backs up the idea that the current stance of monetary policy is restrictive, i.e. the policy rate is currently above its neutral equilibrium.***

Figure 5



Source: Bloomberg Finance L.P. and Wells Fargo Economics

Figure 6



Source: U.S. Department of Commerce and Wells Fargo Economics

### R\* May Rise More Materially in the Years Ahead

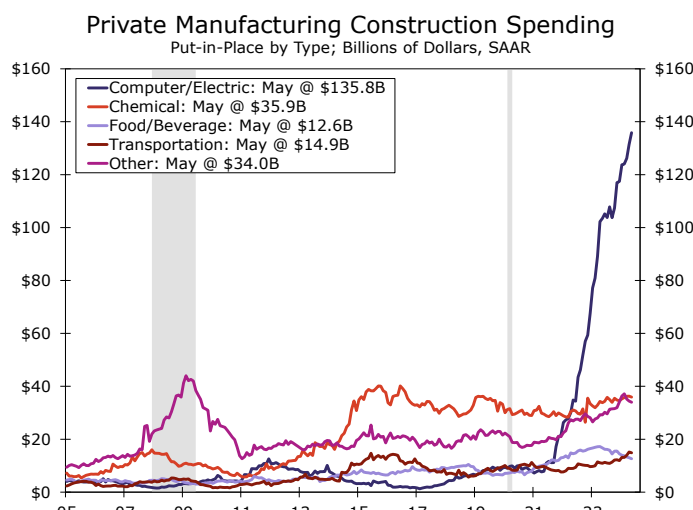
Although  $r^*$  may not have risen much since 2019, we think there is a more plausible case that it may rise further in the years ahead. The outlook over the next decade is naturally more speculative, but we think the risks are clearly tilted to the upside for  $r^*$ . This is in sharp contrast to the 2010s, when the risks to  $r^*$  were perpetually skewed to the downside.

### Generative AI Could Spark a Productivity Boom

As we wrote in Part I, labor productivity growth is a key determinant of  $r^*$ . Productivity is in turn determined by growth in the capital stock (i.e., structures, equipment and intellectual property products), changes in labor quality and total factor productivity (i.e., changes in technology and other processes). As we detailed in a series of recent reports on [generative artificial intelligence](#) (gen AI) and on [U.S. potential growth](#), we see the widespread adoption of gen AI as a major upside for labor productivity growth, investment demand and, therefore,  $r^*$ .

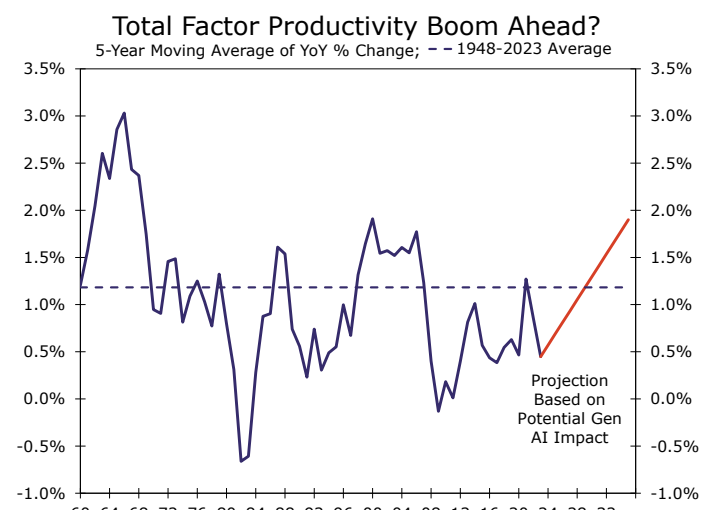
***We see the widespread adoption of gen AI as a major upside for labor productivity growth, investment demand and, therefore,  $r^*$ .***

Figure 7



Source: U.S. Department of Commerce and Wells Fargo Economics

Figure 8



Source: Federal Reserve Bank of San Francisco and Wells Fargo Economics

Early signs of the gen AI build-out are starting to appear. A surge in the capital stock is underway via a construction boom in the manufacturing sector, specifically for facilities that will produce “high-tech” equipment and components such as computers and semiconductors (Figure 7).<sup>6</sup> Beyond growth in the capital stock, the gen AI build-out will also likely come with a rise in efficiency and improvements to other processes that manifest in total factor productivity (TFP) gains. As we discussed in our series on AI last year, major technological advances generally impact productivity with a long lag because it takes time for the new technology to become widely adopted. If the hype over gen AI pans out and TFP growth slowly ramps up over the next decade to 1.9% per annum—its high-water mark during the 2000s—the *level* of TFP could be about 20% higher in the mid-2030s than it is today. This rise is roughly equivalent to the increase in TFP that occurred between 1992 and 2007 when the business sector widely adopted the internet and the networking of computers (Figure 8). If this outcome is realized,  $r^*$  could rise by up to one percentage point in the decade ahead, a move similar to what occurred during the internet buildout.

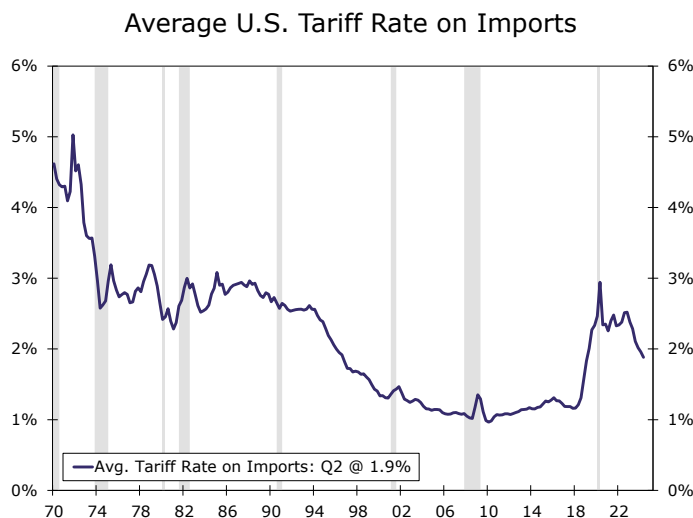
**The Odds of a Deglobalization "Shock" Have Risen**

Over the longer term, a trend toward deglobalization represents another potential source of upward pressure to  $r^*$ . Cracks have developed in global trade and capital markets over the past decade amid a deteriorating geopolitical landscape. U.S. tariff rates on imports remain elevated relative to the mid-1990s through mid-2010s period, driven largely by higher tariffs on imports from China (Figure 9). President Biden recently [announced](#) that he was raising tariffs on roughly \$18 billion worth of imports from China. Former President Donald Trump has threatened to raise tariffs materially higher on a much broader range of imports. In a [recent report](#), our colleagues analyzed trade flows between U.S. and China-aligned countries and found that trade patterns are indeed evolving along geopolitical lines. Reduced trade between the U.S. and China has been associated with China-aligned nations engaging less with U.S.-aligned countries.

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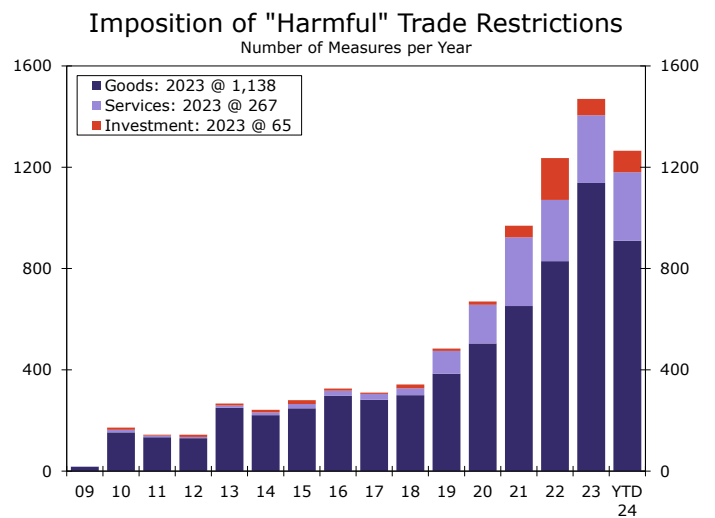
The scrambling of global trade that occurred in the wake of Russia's invasion of Ukraine is another example, as many large economies were forced to reorient themselves amid a rapid change in geopolitics. More broadly, sanctions, tariffs, quotas and a host of other trade impositions seem to be becoming more prevalent. According to Global Trade Alert, a research initiative of the Centre for Economic Policy Research (CEPR), “harmful” trade restrictions that reduce the inter-connectedness of the world's economies have abounded in recent years, with 2023 being the most protectionist that global trade policy has been in some time (Figure 10).

Figure 9



Source: U.S. Department of the Treasury and Wells Fargo Economics

Figure 10



Source: Global Trade Alert and Wells Fargo Economics

A full review of the trends driving deglobalization is beyond the purview of this report, and we would encourage interested readers to check out our [globalization in retreat series](#) published last year. For our purposes, we believe there is a tail risk that the slow pace of deglobalization accelerates in the years ahead. Protectionism could ramp up more meaningfully as a tit-for-tat series of events leads to higher trade barriers and a more restricted flow of goods and capital across countries. A full-blown war between the major powers of the world would be even more Draconian in terms of its economic impact. FX reserve managers and other foreign holders of Treasury securities could dump their holdings in a worst case scenario, pressuring U.S. interest rates.

***A steady slide and/or a sudden shock on the geopolitical front could lead to a higher  $r^*$  in the years ahead if FX reserve managers, sovereign wealth funds and foreigners more broadly pull away from the U.S. Treasury market.***

To be clear, this is not our base case forecast. We [remain skeptical](#) that the U.S. dollar will lose its reserve currency status anytime soon, and as we discussed earlier, global trade and capital flows generally remain robust despite the tensions in recent years. That said, the risks clearly have risen that the world may be less integrated and liberalized in the years ahead. A steady slide and/or a sudden shock on the geopolitical front could lead to a higher  $r^*$  if FX reserve managers, sovereign wealth funds and foreigners more broadly pull away from the U.S. Treasury market and dollar-denominated assets more generally.

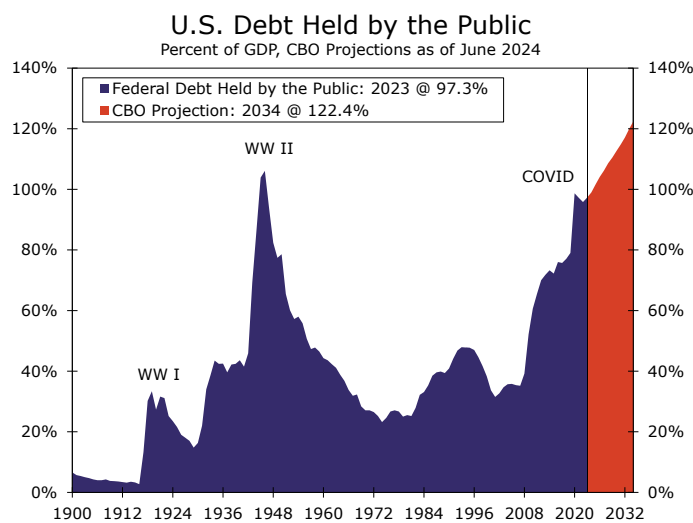
### The U.S. Fiscal Outlook Is Unsustainable

The daunting federal fiscal outlook is another potential source of upward pressure on  $r^*$  in the years ahead. The Congressional Budget Office projects that the federal debt-to-GDP ratio will increase by 25 percentage points over the next decade under current law ([Figure 11](#)). Using the rule of thumb from earlier, this suggests 50–75 bps of additional upward pressure on  $r^*$ , all else equal. Furthermore, there are reasons to believe these projections could understate the budget imbalance going forward. CBO's projections assume the expiring provisions of the Tax Cuts and Jobs Act lapse as scheduled at the end of 2025. If Congress extends these tax cuts in full, CBO estimates the debt-to-GDP ratio will be roughly 11 percentage points higher than in its baseline scenario.

***The daunting federal fiscal outlook is another potential source of upward pressure on  $r^*$  in the years ahead.***

CBO's projections also assume that most forms of discretionary spending grow at the inflation rate for the foreseeable future, including defense spending. As a result, defense spending as a share of GDP gradually declines in the years ahead to some of the lowest levels since World War II ([Figure 12](#)). Defense spending as a share of the economy was much higher during the Cold War of the mid to late 20th century, and it remains to be seen whether today's geopolitical tensions will eventually demand a more robust investment in national security. This already has occurred in some other countries. In 2023, inflation-adjusted defense spending grew 11% among North Atlantic Treaty Organization (NATO) countries excluding the United States. In 2024, it appears that 18 NATO allied countries will spend 2% of GDP on defense, up from just three in 2014.<sup>7</sup>

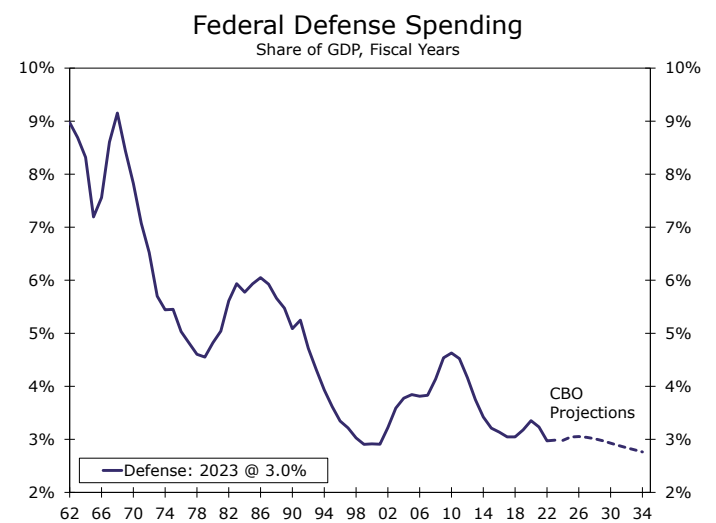
Figure 11



Source: Congressional Budget Office and Wells Fargo Economics

Bringing the federal budget into better balance will require tough policy choices when it comes to tax collections and spending. Numerous Federal Reserve officials have characterized the U.S. federal fiscal

Figure 12



Source: Congressional Budget Office and Wells Fargo Economics

outlook as "unsustainable," an assessment with which we agree. A lack of action from Congress and the president could lead to a higher  $r^*$  and, by extension, higher rates more broadly in the years ahead.

### Demographics Remain a Major Source of Downward Pressure on $R^*$

The previous sections make clear that the outlook for some drivers of  $r^*$  are skewed in the direction of a higher neutral rate in the years to come. However, one area where that is clearly not the case is demographics. Not only is this driver still firmly entrenched, the trend toward aging populations and longer lifespans may even be picking up steam. This is true not just in the United States but in most countries around the world.

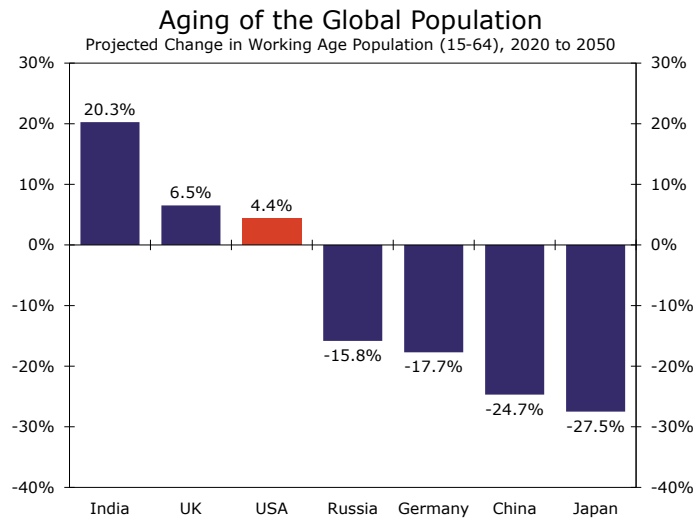
After a temporary fall in life expectancy during the pandemic, global life expectancy at birth has continued its decades' long upward march. The United Nations (U.N.) estimates global life expectancy is 73.3 years at present, nearly a ten-year increase from 64.0 years as recently as 1990. By the late 2050s, the U.N. projects life expectancy at birth to rise to nearly 80 years. Strikingly, they expect that by the late 2050s more than 50% of global deaths will occur at ages over 80, a three-fold increase from 17% just 30 years ago.<sup>8</sup> As we discussed in Part I, longer lifespans drive up demand for savings and put downward pressure on  $r^*$ , all else equal.

Longer lifespans also have coincided with falling birth rates, a trend that appears likely to continue for the foreseeable future. In fifty or so years, the U.N. expects the population ages 65 and older to exceed the population of children (18 and under) globally. Between 2020 and 2050, the U.N. projects the working-age population will shrink by roughly a quarter in Japan and China, by one sixth in Russia and Germany while barely growing in the U.S. and the U.K. (Figure 13). Almost one-fifth of countries have "ultra-low" fertility rates lower than 1.4, and the United States is not much higher at just 1.6 births per woman over a lifetime (Figure 14). Even the U.N.'s grim demographic outlook may prove too optimistic if fertility rates fall even faster in the years ahead.

***The trend toward aging populations and longer lifespans may even be picking up steam, putting more downward pressure on  $r^*$  in the years ahead.***

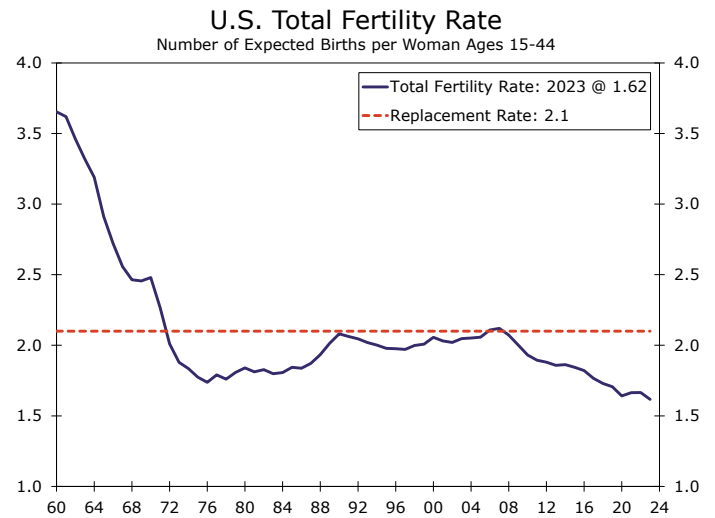
***Between 2020 and 2050, the U.N. projects the working-age population will shrink by roughly a quarter in Japan and China, by one sixth in Russia and Germany while barely growing in the U.S. and the U.K.***

Figure 13



Source: United Nations Department of Economic and Social Affairs and Wells Fargo Economics

Figure 14



Source: World Bank, CDC and Wells Fargo Economics

In our view, the trend toward longer lifespans and older populations is a major reason to be skeptical that  $r^*$  is headed back toward 2.50%–3.00% or so. As we discussed earlier, the research literature suggests that longer lifespans and aging populations have been one of the biggest drivers of the decline in  $r^*$  in recent decades. More immigration into the United States could help stem the gray tide, but the breakneck pace of immigration over the past year already has shown signs of slowing down, and a policy change calling for greater immigration does not appear to be in the cards anytime soon. Furthermore, immigration into the U.S. does nothing to change the global trend towards lower fertility rates, and the inter-connectedness of  $r^*$  across countries means that an aging global population would still act as a headwind against a higher  $r^*$ .



## R\* Likely Still Low by Historical Standards, but Risks Skew to the Upside

We suspect  $r^*$  has drifted up since 2019, but we think the neutral rate is still low by historical standards. It is true that public debt in the United States and elsewhere has exploded over the past five years, but very few other determinants of  $r^*$  have exhibited a similar trend. Labor productivity has not accelerated, the population is still aging, global trade and capital markets remain deeply integrated and post-2008 financial regulations largely remain in place. Furthermore, the behavior of the U.S. economy in the face of the highest real interest rates in 20 years offers additional evidence that the current federal funds rate is above its equilibrium value. In sum,  $r^*$  probably has risen from the 0.50% or so that prevailed before the pandemic, but we are skeptical it has returned to the 2.50%–3.00% or so level that was prevalent before the 2008 financial crisis. Our working estimate for  $r^*$  is currently 1.00%–1.25%.

Is a return to  $r^*$  values in the 2.50%–3.00% range possible in the years ahead? We believe it is possible, just not probable. There are compelling reasons to believe labor productivity will accelerate as the generative AI boom gathers momentum. Geopolitical tensions are on the rise, and the long-run U.S. fiscal outlook is daunting. That said, the outlook for variables such as new technologies and geopolitics is highly uncertain, and demographic headwinds likely will exert a structural downward pressure on  $r^*$  in the years ahead. As a result, we think a 2.50%–3.00%  $r^*$  value is more of a tail risk than a base case, with 1.50%–2.00% perhaps more realistic.

***Our working estimate for  $r^*$  is currently 1.00%–1.25%. The natural rate may rise further in the years ahead, but it would take a lot of change to push it back to the 2.50%–3.00% range that prevailed before the 2008 financial crisis.***

## Endnotes

1 – John C. Williams. "[R-Star: A Global Perspective](#)." Remarks at the ECB Forum on Central Banking. July 3, 2024. ([Return](#))

2 – Edward Gamber and John Selinski. "[The Effect of Government Debt on Interest Rates](#)." Congressional Budget Office. Working Paper 2019-01. March 2019. ([Return](#))

3 – See Etienne Gagnon, Benjamin Johansson and David Lopez-Salido. "[Understanding the New Normal: The Role of Demographics](#)." IMF Economic Review. March 15, 2021 and Carlos Carvalho, Andrea Ferrero and Fernanda Nechio, "[Demographics and Real Interest Rates: Inspecting the Mechanism](#)." Federal Reserve Bank of San Francisco. April 23, 2016. ([Return](#))

4 – For some of our recent analysis on the softening in the labor market, see our [note on June Employment](#), our special report covering the [increased concentration in hiring by industry](#) and the Topic of the Week section in a recent weekly publication where we provide an update on key [cracks in the labor market](#). ([Return](#))

5 – See Daly's [recent interview on CNBC's "Squawk Box"](#) on June 28, 2024. ([Return](#))

6 – For more detail on the high-tech construction boom, see our colleagues' report from March 20, 2024: "[Building the Future: Implications of the High-Tech Construction Boom](#)." ([Return](#))

7 – North Atlantic Treaty Organization. "[Secretary General welcomes unprecedented rise in NATO defence spending](#)." February 14, 2024. ([Return](#))

8 – The United Nations (U.N.) demographic projections presented in this section are from the [2024 Revision of World Population Prospects](#), published on July 11, 2024 by the U.N. Department of Economic and Social Affairs, Population Division. ([Return](#))



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