SPEECH

R-Star: A Global Perspective

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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. The quotations listed in Table 1 reflect the age-old challenges surrounding it.[1] Recently, r-star has been in the spotlight once again.

Today, my remarks will focus on longer-run r-star, which is the real interest rate expected to prevail when shocks to the economy have receded and the economy is growing at its potential rate.

Before I go further, I'll provide the standard Fed disclaimer that the views I express today are mine alone and do not necessarily reflect those of the Federal Open Market Committee (FOMC) or others in the Federal Reserve System.

Three Approaches

Subsequent to Milton Friedman's claim to the contrary,[2] there are now three common approaches to inferring r-star from data: using a statistical method to extract a longer-run trend, basing it on financial market or survey data, or looking at r-star's effects on economic data. Each provides useful information, but each also poses significant challenges. As discussed in one of my papers with Thomas Laubach, univariate statistical methods do not adequately control for economic factors that influence interest rates. And these estimates can be overly influenced by large macroeconomic disturbances, such as the inflation of the 1970s or the pandemic.[3] Financial market and survey data are subject to measurement issues and, in any case, tell us what people are thinking about r-star, rather than act as an independent source of information on r-star. This is what I have referred to as a "hall of mirrors."[4]

For these reasons, I will focus my remarks on estimates of r-star gleaned from macroeconomic models that do not rely on financial market or survey data—in particular, the Holston-Laubach-Williams (HLW) model, which infers the natural rate of interest through the behavior of interest rates, inflation, and GDP.[5] Or, as the economist John H. Williams put it, "by its works."[6]

A Global Supply and Demand for Savings

Our estimates of r-star in the euro area and the United States fell dramatically over the quarter century leading up to the pandemic, and they are currently near the estimates from prior to the pandemic. Figure 1 shows the time series of r-star estimates for the euro area and the United States. I'll focus first on the euro area.

The estimate of r-star in the euro area is 0.5 percent in 2023, equal to its average over the five years prior to the outbreak of COVID. This assessment of a very low r-star is broadly consistent with analysis by ECB economists using a variety of models.[7]

The sizable decline in estimates of r-star during the decades prior to the pandemic is common to many advanced and emerging economies. It reflects developments related to the *global* supply and demand for savings.[8] These include falling birth rates and relatively low productivity growth that both reduce demand for savings, as well as increases in longevity and wealth inequality that increase the supply of savings. I emphasize the word *global,* because in a world of open capital markets, one should expect r-star to be highly correlated across countries. Indeed, there is evidence that r-star estimates are highly interconnected in advanced economies, although local factors play a role as well.[9]

The role of common and idiosyncratic factors is seen by comparing the estimates for the euro area to those for the United States, also shown in Figure 1. Although the two sets of estimates display some shorter-term wiggles, the dominant shared feature is the sustained two-percentage-point decline in r-star over the past 30 years. The same pattern is true of our estimates for Canada. Hence, according to these estimates, the low r-star regime endures.

Is R-Star Rising?

This finding runs counter to recent commentary suggesting that r-star has risen due to persistent changes in the balance between the supply and demand for savings, such as higher investment in AI and renewable energy, as well as larger government debt. In fact, some measures of longer-run r-star have risen to levels well above those directly prior to the pandemic. For example, market-based measures of five-year, five-year-forward real rates for the euro area and the United States have risen well above the HLW estimates, as shown in Figure 2.

Two things stand out from this figure. First, until recently, far-forward real rates displayed a broadly similar pattern of decline as the model estimates of r-star. Second, the market-based measures are volatile. Indeed, in the years before the recent rise, they had fallen to very low levels, well below the corresponding model estimates. This points to a significant time-varying risk premium, which interferes with taking market-based measures at face value in assessing what markets are telling us about their perceptions

of r-star. For example, based on the D'Amico, Kim, and Wei term structure model, the estimated rise in U.S. far-forward expected real yields since the onset of the pandemic is significantly smaller than that implied by a direct read of real yields.[10]

Where does this leave us regarding r-star? Although the value of r-star is always highly uncertain, the case for a sizable increase in r-star has yet to meet two important tests. First, owing to the interconnectedness of r-star across countries, plausible factors pushing up r-star on a sustained basis are likely to be global in nature. This highlights a tension between the evidence from Europe that r-star is still very low and arguments in the United States that r-star is now closer to levels seen 20 years ago.

Second, any increase in r-star must overcome the forces that have been pushing r-star down for decades.[11] In this regard, recent data reinforce the continuation of pre-pandemic trends in global demographics and productivity growth. One lens through which to see this is our model estimates of potential GDP, or y-star, which is a key factor that affects r-star. Many of the explanations arguing for a higher r-star would likely show up in higher potential output growth. However, the HLW estimates of euro area and U.S. trend potential GDP growth in 2023 are nearly unchanged from their respective 2019 values. This is consistent with other estimates of potential GDP growth for the euro area and the United States.[12]

R-Star and Monetary Policy

I will end with a brief comment on the usefulness of estimates of r-star for policymaking. First, as the Swedish economist Knut Wicksell and others have stressed, r-star is either explicitly or implicitly at the core of any macroeconomic model or framework one can imagine. Pretending it doesn't exist or wishing it away does not change that. In that context, it is important that we do our best to understand the factors that affect r-star and the uncertainties related to it, so that we have the best understanding possible of the forces affecting the longer-term evolution of the economy.

Second, and equally important, as shown in my work with Athanasios Orphanides, the high degree of uncertainty about r-star means that one should not overly rely on estimates of r-star in determining the appropriate setting of monetary policy at a given point in time.[13] Instead, such determinations must be, and are, based on a wide range of information and assessments, including those related to risks.

Presentation PDF

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[1] The original sources of the quotations are the following:
Knut Wicksell, 1898. *Interest and Prices: A Study of the Causes Regulating the Value of Money*. Translated by R. F. Kahn, London: Macmillan, published 1936.
Gustav Cassel, 1928. "The Rate of Interest, the Bank Rate, and the Stabilization of Prices," *The Quarterly Journal of Economics 42(4)*: 511–29.
John H. Williams, 1931. "The Monetary Doctrines of J. M. Keynes," *The Quarterly Journal of Economics 45(4)*: 547-87.
Milton Friedman, 1968. "The Role of Monetary Policy," The American Economic Review58(1): 1–17.
Thomas Laubach and John C. Williams, 2003. "Measuring the Natural Rate of Interest," *The Review of Economics and Statistics 85(4)*: 1063-70.
The first four quotations were originally compiled in Athanasios Orphanides and John C. Williams, 2002. "Robust Monetary Policy Rules with Unknown Natural Rates," *Brookings Papers on Economic Activity*, 2: pp. 63-145.

[2] Milton Friedman, 1968. "The Role of Monetary Policy," *The American Economic Review 58(1)*: 1–17.

[3] Thomas Laubach and John C. Williams, 2016. "Measuring the Natural Rate of Interest Redux," *Business Economics*, 51: 51-67.

[4] John C. Williams, 2017. Comment on "Safety, Liquidity, and the Natural Rate of Interest," by Marco Del Negro, Marc P. Giannoni, Domenico Giannone, and Andrea Tambalotti, *Brookings Papers on Economic Activity*, 1: pp. 235-316.

[5] Kathryn Holston, Thomas Laubach, and John C. Williams, 2017. "Measuring the Natural Rate of Interest: International Trends and Determinants," *Journal of International Economics* 559-75; Kathryn Holston, Thomas Laubach, and John C. Williams, 2023. "Measuring the Natural Rate of Interest after COVID-19," Federal Reserve Bank of New York, Staff Reports, no. 1063.

[6] John H. Williams, 1931. "The Monetary Doctrines of J. M. Keynes," *The Quarterly Journal of Economics 45(4)*: 547-87.

[7] Claus Brand, Noëmie Lisack, and Falk Mazelis, 2024. "Estimates of the Natural Interest Rate for the Euro Area: An Update," European Central Bank, Economic Bulletin, Issue 1, Box 7.

[8] See John C. Williams, 2018. "The Future Fortunes of R-star: Are They Really Rising?," Federal Reserve Bank of San Francisco, *FRBSF Economic Letter* (May 21).

[9] Kathryn Holston, Thomas Laubach, and John C. Williams, 2017. "Measuring the Natural Rate of Interest: International Trends and Determinants," *Journal of International Economics* 559-75. Philip Barrett, Christoffer Koch, Jean-Marc Natal, Diaa Noureldin, and Josef Platzer, "The Natural Rate of Interest: Drivers and Implications for Policy," World Economic Outlook, Chapter 2. International Monetary Fund: April 2023.

[10] Stefania D'Amico, Don H. Kim, and Min Wei, 2018. "Tips from TIPS: The Informational Content of Treasury Inflation-Protected Security Prices," *Journal of Financial and Quantitative Analysis*, 53(1): 395-436.

[11] Or as Ken Rogoff and co-authors have claimed, for centuries. See Kenneth S. Rogoff, Barbara Rossi, and Paul Schmelzing, 2024. "Long-Run Trends in Long-Maturity Real Rates 1311-2022," American Economic Review (forthcoming).

[12] In fact, the HLW estimate of the level of y-star is now close to its pre-pandemic trend in the United States, and only slightly below it in the Euro Area.

[13] Athanasios Orphanides and John C. Williams, 2002. "Robust Monetary Policy Rules with Unknown Natural Rates," *Brookings Papers on Economic Activity*, 2: pp. 63-145; Athanasios Orphanides and Jhon C. Williams, 2007, Robust monetary policy with imperfect knowledge," Journal of Monetary Economics, 54 (2007) 1406–1435.