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Perspectives on $\bar{r}$ and r^*

Maurice Obstfeld

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2-1-1 NIHONBASHI-HONGOKUCHO
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Maurice Obstfeld*

I. Introduction

It is a great pleasure and honor to be back in this conference room to deliver the 2023 Mayekawa Lecture, the first one under Governor Kazuo Ueda's tenure. The governor's very kind words highlighted our previous work together for the Bank of Japan, when I was an honorary adviser for the Institute for Monetary and Economic Studies (IMES). I remember our interactions with gratitude and I also remember fondly our shared economics training at Massachusetts Institute of Technology during a previous period of challenging global inflation in the 1970s. There are many other old friends in the room. I will single out only this session's chair, Governor Chang Yong Rhee of the Bank of Korea, with whom I collaborated closely when he directed the Asia and Pacific Department at the International Monetary Fund (IMF), and Executive Director Masaaki Kaizuka, with whom I had many fruitful discussions during his service on the IMF's Executive Board.

II. Inflation: Now and on the Eve of the Global Financial Crisis

Governor Ueda quoted remarks of mine from the 2008 BOJ-IMES conference, which took place on May 28 and 29 of that year. The reference is fortuitous because that conference also featured the first Mayekawa Lecture. The establishment of this distinguished lecture series was the culmination of discussions here in which I was privileged to participate, and which led to the selection of John B. Taylor as the inaugural lecturer. His address, "The Way Back to Stability and Growth in the Global Economy" (Taylor, 2008), occurred at a fragile moment for the economies of the world. How fragile it was, we would not know until a few months later.

* C. Fred Bergsten Senior Fellow, Peterson Institute for International Economics and Class of 1958 Professor of Economics Emeritus, University of California, Berkeley (E-mail: obstfeld@berkeley.edu).

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Tensions had emerged in European and U.S. financial markets in August 2007, prompting unusual market liquidity support from the European Central Bank and the Federal Reserve. Stresses continued, however, bursting into the open in the March 2008 collapse of investment bank Bear Stearns. In retrospect, as I have said, the May 2008 conference took place at a delicate stage in the world economy, between the Bear Stearns and Lehman Brothers failures (the latter occurred in September 2008). You might call it the calm before the storm, but in fact, the moment was not very calm at all and displayed pressures analogous to what we have seen recently, and not only in terms of financial stress. We did not know at the time that the U.S. economy had entered a recession in December 2007, because the National Bureau of Economic Research (NBER) did not call that recession until December 2008.

A major concern at the conference, however, reflected in John B. Taylor's speech, was not so much potential *deflation* (a problem on which Japan finally seemed to be making some progress), but *inflation*.[1] The year 2008 was characterized by sharp global increases in energy and food prices, the latter leading to social unrest in many poorer countries, some of which enacted food export restrictions. The price of a barrel of Brent crude reached nearly $150 in July 2008. The IMF would soon echo inflation concerns in its *World Economic Outlook Update - July* (IMF, 2008), writing "The global economy is in a tough spot, caught between sharply slowing demand in many advanced economies and rising inflation everywhere, notably in emerging and developing economies."

The excellent staff summary of the Mayekawa Lecture in *Monetary and Economic Studies* (Fujiwara et al., 2008) listed the major problems that John B. Taylor identified and drew parallels with events during Governor Mayekawa's eventful tenure (1979-84):

> While noting the very important difference in economic vantage points between the late1970s/early1980s and 2008, [John B. Taylor] stressed the importance of a comprehensive "Mayekawan" approach to research and policy when considering the numerous economic difficulties of today. The difficulties were (1) high and rising global inflation; (2) financial instability and risks; (3) high and rising prices of energy, food, and many other commodities; (4) continuing high current account imbalances; (5) globally inconsistent exchange rate policies; and (6) rising protectionism and isolationist sentiment. He pointed out that as Mayekawa stressed many years ago, it was a challenge for policymakers to adopt a more comprehensive international policy focus

[1] Japan's year-on-year headline CPI inflation reached 1.3 percent in the second quarter of 2008 and 2.2 percent in the third quarter. By the second quarter of 2009, amid global recession, Japanese inflation had fallen to –2.3 percent.

that recognized the important interaction of these economic problems simultaneously, instead of approaching them separately.

Of course, all six of these concerns resonate strongly – once again – in today's economic, political, and geopolitical conjuncture, and I would suggest that the holistic Mayekawan approach remains badly needed to find the best policy paths going forward.

One more parallel with recent events. On the second day of the 2008 conference, May 29th, Bear Stearns's shareholders approved the company's sale at $10 per share to JPMorgan Chase. *Plus ça change, plus c'est la même chose.* Lehman Brothers failed a few months later and we know the rest – an observation that feeds into the main topic of this lecture, the behavior and policy implications of real interest rates.

A message of Taylor (2008) was that even though monetary policy cannot directly address all of the interconnected problems in the economy, central bankers should maintain a holistic Mayekawan view of the economy to understand the broader context for their decisions. Nowhere is this more true than when contemplating the real rate of interest, which provides an essential guide for assessing the stance of monetary policy. Real interest rates are driven by myriad factors, shifting over time and including not just macroeconomic policies but a broad set of global factors ranging from demographics to technological change to financial development to macro volatility to possible deglobalization. In the current turbulent circumstances of the global economy, with its echoes of the early 1980s and 2008-09, central bankers are grappling with the possibility of structural changes driving major shifts in the optimal stance of monetary policies.

Historical data illustrate the sudden turnabouts in monetary policy challenges since the late 2000s. Figure 1 shows consumer price inflation for the United States, euro area, Japan, and Korea. After the surge of higher commodity-driven inflation in 2008, inflation fell sharply as the financial crisis struck, rising again in the post-crisis recovery of the early 2010s. Starting around 2013, however, inflation fell below 2 percent target levels, and for several years, the challenge to central banks was to get policy rates low enough to reach inflation targets from below. The COVID-19 pandemic of 2020 brought more monetary along with fiscal accommodation, but with the arrival of vaccines and re-opening in 2021, inflation picked up suddenly and persistently, given an additional push by Russia's invasion of Ukraine in February 2022.

Figure 2 shows policy interest rates, which were higher at the start of the period shown owing to the inflationary pressures then. A prolonged period of very low rates ended with the sudden post-pandemic re-emergence of inflation, shown in Figure 1, and most central banks around the world (the Bank of Japan being the major exception so far) have raised

policy interest rates with great speed – in many cases, belatedly so. Now, every central bank is asking the question, is the policy rate high enough, or does it have to go higher? That is, what rate would be a "natural" or "neutral" rate sufficient to quell inflation pressures?

III. The Natural Rate and the Neutral Rate

The idea of a natural real rate of interest as a monetary policy lodestar is typically credited to Knut Wicksell's treatise of 1898, but the basic idea can be found already in Henry Thornton's writings during the Napoleonic wars. It was given a compelling analytical foundation in 2003 by Michael Woodford in his magisterial volume on monetary theory (Woodford, 2003). The natural rate is the Goldilocks rate. When the central bank implements it, the economy is neither too hot nor too cold: it is just right. The concept certainly caught on in the policy world after the Global Financial Crisis as many advanced-economy central banks struggled with the effective lower bound on nominal interest rates and implemented unconventional policies to counter deflationary pressures. Claudio Borio points out that in 2015, the number of mentions of the natural or neutral rate in central bankers' speeches reached double digits (Borio, 2021), and it has only risen since. So clearly, this is a topic that is on policy makers' minds. But how can we measure it? Back in the late 1990s, a classic paper by Clarida, Galí, and Gertler (1999) set out a roadmap for a "science of monetary policy," but more than two decades later, we're still struggling a bit with that science and as I will argue, monetary policy still retains important elements of art – albeit informed art. As policymakers, we would also naturally like to know about the future, and for that we need to understand the driving forces of natural or neutral real rates.

For some perspective on the intellectual challenges, I cannot resist sharing a wonderful quotation from John H. Williams (Williams, 1931). I first saw it in a well-known Brookings paper by Orphanides and Williams (2002):

> The natural rate is an abstraction; like faith, it is seen by its works. One can only say that if the bank policy succeeds in stabilizing prices, the bank rate must have been brought in line with the natural rate, but if it does not, it must not have been.

John H. Williams, with his keen interest in policy and institutions, knew whereof he spoke. His view certainly leaves us with a lot of analytical work to do if we wish to shift the balance in monetary policy from art to science.[2]

Several empirical approaches aim to assess what the correct rate "must have been," is at the moment, or will be in the future.[3] One is to estimate long-run forecasts or trends using non-structural time series models. A second is to look at bond prices, for example, indexed security yields, a useful approach for countries with developed and liquid bond markets. Given that prerequisite, a term structure model helps to extract measures of the long-run expected real interest rate. In yet a third approach, some studies examine the flexible-price equilibrium of a Dynamic Stochastic General Equilibrium model (or some other type of models, for example, an overlapping generations model) to extract an implied equilibrium real rate. One of the more popular methods is a fourth, semi-structural approach pioneered by Laubach and Williams (2003) and recently updated by Holston, Laubach, and Williams (2023). One feature all of these estimation approaches share is a generally high range of uncertainty in the predictions.[4]

As a conceptual matter, I would like to distinguish between what I will call $\bar{r}$ (r-bar) and r^* (r-star). The literature uses the terms "natural" and "neutral" rate fairly interchangeably, but I think it is useful to distinguish between some notion of the long-run equilibrium rate, $\bar{r}$, which you might infer from a non-structural time series model or from an asset pricing model, and r^*, the rate at which the central banker would want to set the policy instrument in order to reach a neutral monetary stance. Recalling the four general estimation methods I set out, only method four (e.g., Laubach-Williams) directly and empirically addresses inflation control. In some models, it may be that $\bar{r}$ and r^* happen theoretically to coincide. I wouldn't want to call that a divine coincidence, but it is a coincidence: it is not a general result. There are several reasons in reality why $\bar{r}$ might not equal r^*.[5]

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[2] Like John C. Williams, the current president of the Federal Reserve Bank of New York, John H. Williams worked closely with the New York Fed. He simultaneously retained his academic professorship at Harvard, where he and Alvin Hansen (of secular stagnation fame) taught "Money and Banking" to many talented graduate students, including the young James Tobin. Decades later, in 1983, Tobin and Milton Friedman were appointed to be the first Honorary Advisers to the IMES. On Williams's career, see Federal Reserve Bank of New York (1980-81).

[3] For more details and references to the literature, see Obstfeld (2023).

[4] A hybrid of the asset pricing and semi-structural macroeconomic approaches is in Davis et al. (2023). This methodology yields quite low estimates of r^*.

[5] This is also the theme of Platzer, Tietz, and Lindé (2022).

Looking first at some numbers: the long-run trends that different estimation methods imply are mutually consistent in their general decline over time, but there are also significant divergences over some periods. Figure 3 shows natural or neutral rate estimates for the United States based on three different methodologies:

1. The Lubik and Matthes (2015) natural rate, a forecast of the long-run rate based on a time-dependent vector autoregression.
2. The D'Amico, Kim, and Wei (2018) five-year forward average expected real short rate (DKW), estimated via a term-structure model that allows for both term and liquidity premia in the yields of U.S. Treasury inflation-protected securities.
3. Current model estimates of the Holston-Laubach-Williams r^* from the New York Fed (discontinued after 2020 Q2 owing to high GDP volatility, until back-filled in 2023 Q2 based on a revised model).

For example, the Holston-Laubach-Williams methodology yields estimates of r^* that are usually higher than the two $\bar{r}$ estimates – sometimes much higher – up until a sharp drop in the calculated r^* right after the Lehman collapse. The high levels of the HLW measure in the early 2000s, when the Federal Reserve was following a looser policy than HLW would have suggested, are notable. More recently (2023 Q1), the Lubik-Matthes and DKW numbers have jumped upward, but are separated by nearly 100 basis points, and both exceeded the new HLW measure of the neutral rate.

Several factors might drive a wedge between $\bar{r}$ and r^*. Looser financial conditions, including through a capital-inflow surge, could mandate a higher level of r^* for inflation control without necessarily changing the longer-run marginal product of capital (Borio, 2021). Imperfect credibility could also be important, but is not typically modeled. Perhaps the central bank is trying to signal to markets that it is serious about quashing inflation. That might call for a level of the policy rate higher than estimates of the long-run equilibrium rate. Most estimation methods don't adequately account for open-economy factors, but these are very important for most economies. I would maintain their relevance even for the United States, as I discussed in Obstfeld (2020). And of course, these global factors have been all-important in determining real rates.

For me, the smoking-gun evidence for the centrality of global factors is the common downward trend in real interest rates since the 1980s. Figure 4 shows what I would call "semi-ex-post" long-term real rates, that is, nominal long-term government bond interest less an inflation expectations proxy that places positive declining weights on the current

and past rates of inflation.[6] Real interest rates are not equal among the 12 industrial countries in the figure, nor does theory imply that they necessarily should be, but the common negative trend is obvious and the dispersion of rates generally falls over time, with one major exception during the euro crisis, when some euro member yields spiked due to elevated default risks.[7]

Figure 5 shows an unweighted average for more than 20 emerging markets, along with the average for the countries in Figure 4. Over the first decade of this millennium, the downward trend also holds true for emerging markets, but it is not very steep (perhaps 100 basis points in all). The seeming decoupling after around 2013 suggests the possibility of continuing impediments in capital movement from richer to poorer countries.

IV. Factors Behind the Global Decline in Real Interest Rates

A basic and well-known framework for understanding recent experience is the Metzler model of global saving and investment, shown in Figure 6. This model is well known, and Obstfeld and Rogoff (1996) derive it from first principles for a world with perfectly foresighted households. In this model, the equilibrium global real interest rate, r^{world}, common to both regions Home and Foreign, lies between the two regions' autarky rates, $r_H^{aut} > r_F^{aut}$, and ensures that Home's desired current account deficit, $I_H - S_H$, equals Foreign's desired surplus, $S_F - I_F$. Algebraically, therefore, world saving, $S_H + S_F$, equals world investment, $I_H + I_F$, in equilibrium: a necessity, as the world as a whole is a closed economy. Whatever shifts saving curves anywhere to the right depresses global real interest rates. Whatever shifts investment curves anywhere to the left does the same. This is a basic framework for thinking about how global interest rates are determined by the aggregation of national shocks. The simple one-good model shown in the figure can be extended to account for deviations from purchasing power parity (Obstfeld, 2020), without big qualitative changes in its basic predictions.

But the mechanisms that the Metzler model highlights are not the entire story. I think it mistaken to analyze global interest rate developments in terms of global saving and investment flows alone, because the *compositions* of desired saving and investment – the mediums through which individuals wish to transfer wealth to the future or the forms of capital that firms want to accumulate – can matter greatly. This observation is especially relevant for saving. Portfolio preference shifts can have large effects on bond rates, which are (nominally) risk-free government borrowing rates, and returns on different assets

[6] For details, see Obstfeld (2023).

[7] Recently, the upward jump in inflation, not anticipated in bond markets, has led to some big negative observations. However, these are not indicative of equilibrium expected real rates.

could diverge. This is a very Tobin's q perspective, to return to one of the first Honorary Advisers to the IMES. A key piece of suggestive evidence is the failure of the return on U.S. equity to fall after the Global Financial Crisis in line with real government bond rates. A second could be the failure of emerging-market government bond rates to fall over the past decade in line with advanced-economy rates (recall Figure 5). Both phenomena could reflect a rise in global excess demand for safer advanced-economy central government debt (the effective supply of which was impaired by recent crises, including the euro crisis).

What does the historical record tell us? A very useful and clear-headed reckoning is in a short paper by Caballero, Farhi, and Gourinchas (2017).[8] I believe that the authors correctly identify many factors that have been at work in depressing global real interest rates, while also recognizing that different factors have been more or less important in different epochs. The latter observation explains why I find some of the regression evidence the literature offers to be unpersuasive. When you try to ask whether a certain candidate factor is important over a long period, in some cases more than a century, you run into major structural changes in goods markets, asset markets, policy regimes, and social arrangements that are likely to generate severe instability in the probability distributions of key economic variables.

If we look at the epoch from about 1990 to the Asian crisis, the peak of baby boomer work careers, high saving driven by demography was a big factor. So was growing inequality (which raised saving because the rich save more at the margin), a falling price of capital goods (which reduced investment, assuming relatively price-inelastic demand), and growing corporate market power (which reduced both investment and raised saving).

The next epoch, from roughly the end of the 1990s – with the Asian crisis – to the Global Financial Crisis, is the period for which Bernanke (2005) famously highlighted a "global saving glut." However, one could well argue, as Shin (2012) and others have, that the more important factor was the global *liquidity* glut that took place at the same time. Easy global liquidity in deregulated markets certainly helped set the stage for the Global Financial Crisis. Two-way capital flows among the advanced economies exploded. The creation of the euro and the easing of liquidity conditions there, the fall in yields of peripheral country bonds once the currencies were locked, was a major factor in generating global liquidity. High Chinese growth played a role too, helping to drive up Chinese saving beyond the country's investment, for record current account surpluses. Equity prices rose in this period, and official foreign exchange reserve accumulation, especially by lower-income countries, was also a factor – often, China ploughed even more than its

[8] There is a large supply of longer detailed studies on the topic, partially surveyed in Obstfeld (2023).

current account surplus into foreign reserves. This was an example of how asset preferences mattered, since Chinese and other countries' official preferences for safe assets drove down government yields. Easy financial conditions buoyed commodity prices and swelled the external surpluses of oil exporters, though mostly after the period on which Bernanke (2005) focused his analysis. Figure 7 shows the evolution of global imbalances, highlighting the sharp increase in their dispersion starting in this period. However, the magnitudes of these *net* capital flows pale in comparison with those of two-way *gross* capital flows.

Once the GFC arrived, things changed. Reserve accumulation by emerging market and developing economies abates after the 2002-12 surge (see Figure 8), but private safe asset demand likely rises in a very turbulent environment. The global banking crisis of 2008-09 feeds into the euro crisis, which brings fiscal cuts in Europe, including big cuts to public investment. Low productivity growth and aging workforces deter investment. Post-GFC banking regulations may have played a role as well in depressing government borrowing rates, although the regulations put in place by Basel III cut both ways in terms of their likely effects (Tarullo, 2023).

I have emphasized the global nature of the forces driving world real interest rates down over time, and while this point is well recognized, it is surprising that most attempts to estimate neutral or natural rates use closed-economy models. Alternatively, when they take a multi-country perspective, they often simply work with a collection of closed-economy models. That is beginning to change; for example, see Wynne and Zhang (2018), IMF (2023), and a handful of other studies. How one incorporates the open economy aspect depends on the structure of the economy and the shocks that it faces. As a simple example, take the classic "dependent economy" (or Australian) model of Salter, Swan, and Corden. It models an economy that produces traded and nontraded goods but has no market power in the markets for its imports and exports. It assumes a given world interest rate (in terms of traded goods) at which the economy can trade consumption of tradables over time with foreigners. If such a country has a big net export surplus, it will be consuming less compared with what its budget would allow it to consume under balanced trade. Its price of nontradables and therefore its overall price level (measured in tradable goods) will be comparatively low, but expected to rise as the trade balance ultimately returns to a steady-state level. Hence, its equilibrium flexible-price real interest rate r^* will also be comparatively low – and below the long-run equilibrium rate $\bar{r}$ that will

prevail when the steady-state net export deficit (equal to the interest earnings on net external assets) is reached. Indeed, $\bar{r}$ just equals the world interest rate in this model.[9]

The implication is that you can't really discuss neutral or natural rates the way much of the literature does. Appeals to the rate at which saving equals investment, or the rate at which demand equals supply, miss the mark, because neither of those things need be true in the open economy. You can export some of your supply, or import to consume and invest more than your supply. Saving doesn't have to equal investment if the current account is not in balance. That is why classical discussions in open economy focus on *external* as well as internal balance. You can't know what the equilibrium policy interest rate should be if you don't have some notion of where the equilibrium exchange rate should be. In some models, the right interest rate can be specified independently of external considerations, and the exchange rate will line up exactly as needed, in a divine coincidence. But such models are special, and in general the open-economy policy problem is much more complex. I believe that Haruo Mayekawa would agree with this holistic perspective.

V. The Future of Real Interest Rates

Let me turn to a question that Governor Ueda raised in his remarks opening this conference: will real interest rates return close to the higher levels of the past? There is an active debate about the right answer. Prior to COVID-19 and the Russia-Ukraine war, Goodhart and Pradhan (2020) set out a comprehensive and detailed case that the future will be more inflationary and that real interest rates will be higher. The scope of the book is remarkable: it looks at many aspects of the question and also at the longer historical context of the huge transformations of the world around 1990 in the positions of the Soviet bloc, China, and other emerging markets. The recent book by Blanchard (2023), in contrast, argues for the persistence of low real rates into the future.[10]

Of course, this is not the first time that higher real interest rates have been predicted. Back in 2010, the McKinsey Global Institute issued a study called *Farewell to Cheap*

[9] Of course, the level of net exports is endogenous itself and will depend on fundamental factors such as the expected growth rates of productivity in the traded and nontraded sectors (Obstfeld and Rogoff [1996] chapter 4). Notice that if the interest rate a country must pay to borrow in world markets rises with its net borrowing, this will reinforce a negative covariance between the current account surplus and the domestic equilibrium real interest rate.

[10] Lawrence Summers, the leading proponent of applying Hansen's secular stagnation concept to the two pre-pandemic decades, has more recently expressed a view on real interest rates similar to Goodhart's, but based largely on events of the past three years. See the debate between Summers and Blanchard on the Peterson Institute for International Economics website, at https://www.piie.com/events/summers-and-blanchard-debate-future-interest-rates.

Capital? The Implications of Long-Term Shifts in Global Investment and Saving. They projected that "by 2020, global investment demand could reach levels not seen since the postwar rebuilding of Europe and Japan and the era of high growth in mature economies." The basic premise was that high investment needs in emerging markets would draw in world capital and lead to a much higher global level of real interest rates, in line with the effect of a big increase in investment demand in the Metzler diagram of Figure 6. Today, of course, we're still struggling to transfer investment resources from rich countries to emerging markets – for decarbonization, climate adaptation, poverty reduction, public health infrastructure, and other needs. This challenge is a prime motive behind recent initiatives to have the multilateral development in banks leverage their capital more aggressively. International capital markets remain fragmented between richer and less prosperous countries.

However, that was 2010: what would we predict today? A number of indicators, including long-term inflation-indexed bond yields in several advanced economies, are pointing in the direction of somewhat higher long term real interest rates. To assess the credibility of these signals, it is important to consider the many fundamental macro factors in play.

One key element of the Goodhart-Pradhan account is increasing longevity, which they argue will decrease saving as people dip into their savings over longer retirements. They also predict a decline in inequality as workers' bargaining power rises, somewhat reversing the decline in bargaining power that came after big additions of low-wage workers to the global labor force around 1990. In light of the events following their book, other analysts have cited additional factors that could push interest rates up: higher global defense spending, higher investment needs associated with the green transition, and as a result, higher public debts.

Demographic trends are especially influential, and certainly are among the easier factors to project (if not necessarily their effects). Two important aspects are total population growth and life expectancy. The United Nations (U.N.) predicts that world population growth will decline steadily over coming decades and turn negative sometime in the 2080s. The U.N. also predicts that average life expectancy will rise globally – at a lower pace than it has in the past, and at a declining pace, but still reaching around 82 years by 2100 (it is currently 73.4 years after a dip during the pandemic).

The Goodhart-Pradhan thesis that the second factor, increasing longevity, will lead to a decline in saving does not persuade me. The basic problem is that people may also save more for their longer retirements, raising saving, and more importantly, the global *stock*

of saving, which helps determine the capital stock and thus, the marginal product of capital. Blanchard (2023) gives a counter-example. His analysis overstates the case because it does not allow for the first factor cited above, declining population growth, which raises the weight of the old compared with the young. However, I believe he is empirically correct. One reason is that the old simply don't dissave in the way the simplest life-cycle models assume. A range of studies going back at least to Kotlikoff and Summers (1981) (for the United States) highlights this fact. At least in the higher income ranges (where most of the wealth is), the old often continue to save for bequests, unexpected health-related expenses, and against the misfortune of living too long. Detailed calibrated multi-country overlapping generations models by Auclert et al. (2021), as well as by teams of researchers at the Bank of England (for example, Cesa-Bianchi, Harrison, and Sajedi [2022]), show real interest rates continuing to decline through much of this century owing to projected demographic developments. Investment could be lower as well as work forces age and the scope for profitable innovation fails to grow or contracts. A productivity surge due to AI, if one materializes, might cut the other way.

At least in the advanced economies, I don’t think we will return anytime soon to sustained and substantially higher real interest rates. Figure 9 shows a scorecard of possible considerations. Regarding demographics, the weight of the evidence points to continued downward pressure. Future productivity developments are always a question mark. I don't want to be a Cassandra, *à la* Bob Gordon, but we still await the next big productivity innovation feeding into measured growth. It could well be AI, and it could come sooner rather than later, but it is not here yet. As for inequality, I'm skeptical that this is going to reverse in a big way. Around the world we see countries turning to industrial policies, which in some systems have the capacity to enrich elites and worsen the income distribution. Even if growth enhancing innovations arrive, they could worsen inequality. Global fragmentation is likely a big negative in terms of just the profitability and the efficiency of investment, and that effect interacts with my next item, which is ambient uncertainty. How does one invest without knowing what geopolitical stresses might emerge where, or what security-drive actions governments might take that radically change the investment environment? We see these happening all around us via U.S.-China tensions and the spillovers to U.S. allies in Asia. Furthermore, investment shocks need not always be geopolitically motivated in the new world of industrial policy: look at the provisions of the Inflation Reduction Act in the United States, which certainly have upended a lot of global investment plans.

Fiscal activism is the one area that clearly points to higher interest rates. Part of this is the green transition, with its probable need for massive new investments ranging from

renewable power grids to carbon capture facilities. While I link the transition with "fiscal activism" because it is likely to require significant government support, new green investment demand driven by private incentives will obviously tend to push up real interest rates, too. However, fiscal activism has to be sustainable, and with high interest rates, government debt sustainability comes into question. So there may be a paradox in predicting higher real interest rates driven mostly by higher government-supported deficits and debt. We do not know what the path to fiscal sustainability would look like under that scenario.

Let me conclude with some of the policy implications of low for longer interest rates, should that be our fate. While these conclusions may seem obvious, they are worth stating because they permeate the three main spheres of macro policy that concern us. Low for longer rates would ensure that the effective lower bound will continue to bedevil monetary policy. We will not stop discussing remedies such as eliminating cash or moving to higher inflation targets. Low real rates could be good news for fiscal sustainability (thereby easing the green transition), but not if they are primarily driven by low economic growth. Finally, we have learned, and with the recent U.S. banking troubles have been reminded, that the low interest rate environment can accentuate financial instability threats. If rates remain low, we will need to increase our level of vigilance, raise our games as macro-prudential regulators, and scrutinize critically the business models of some financial-sector business models that rely on a positive interest rate environment.

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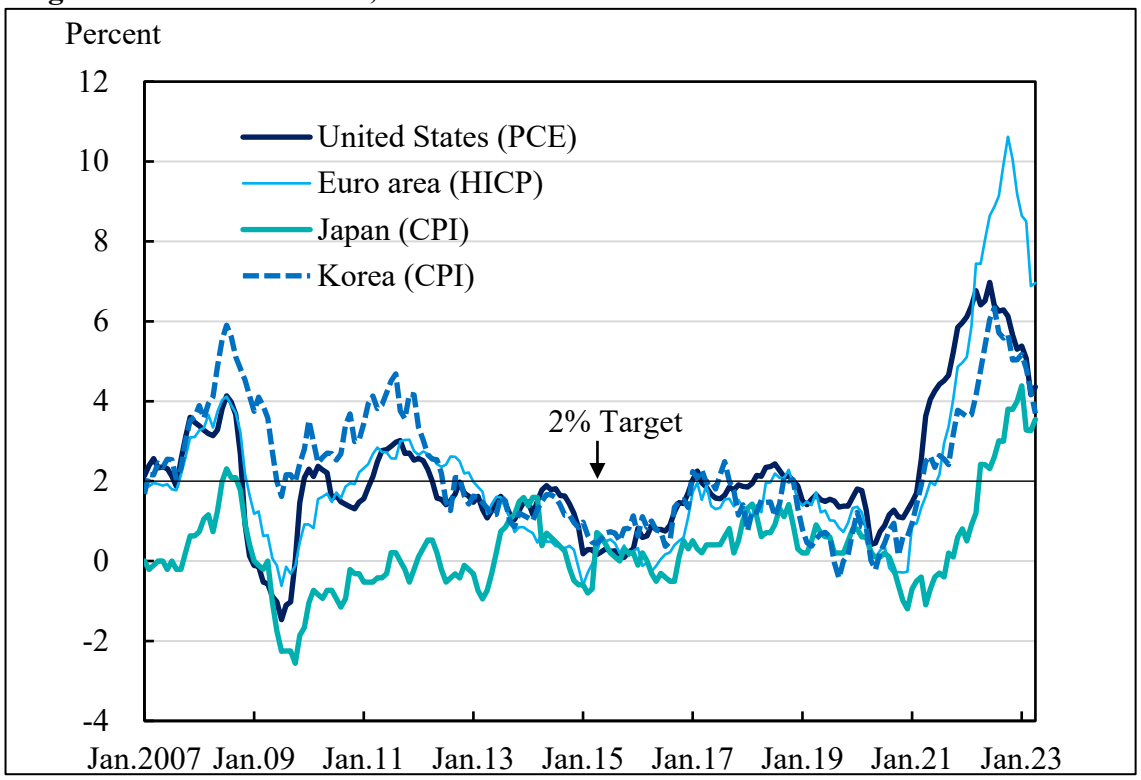
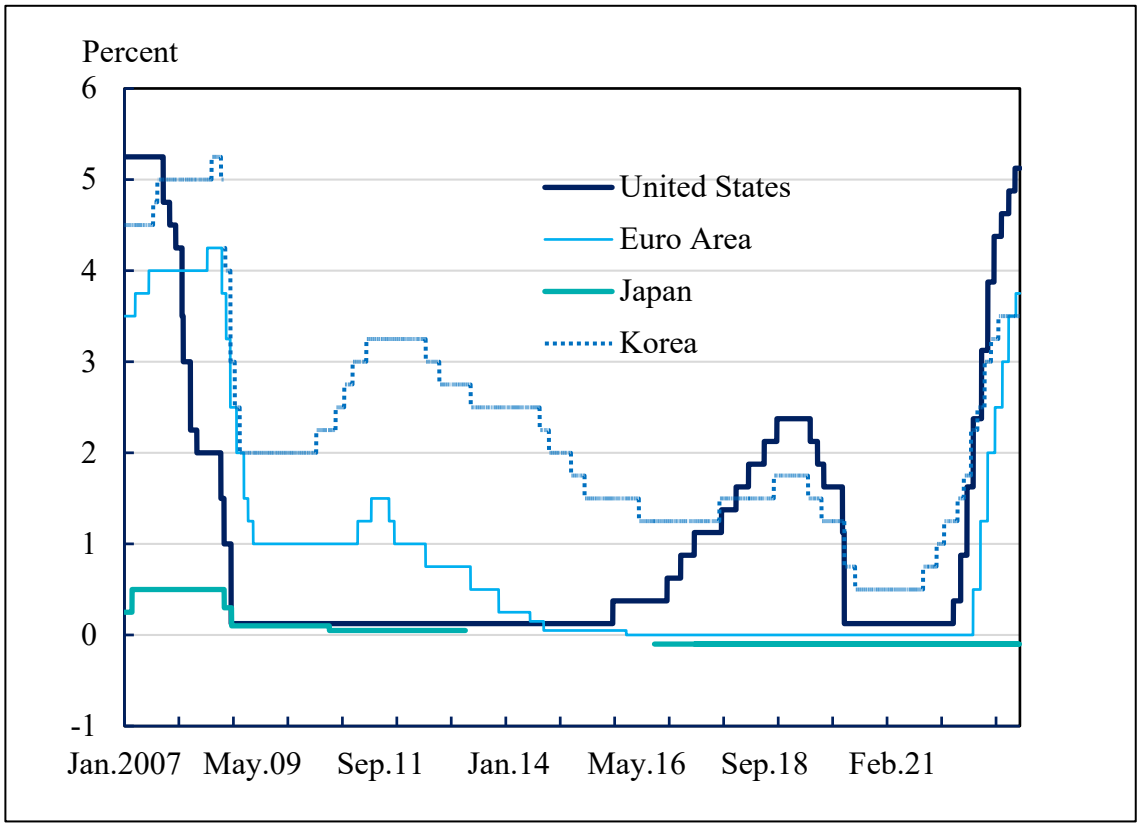
Figure 1 Inflation Rates, 2007-2023



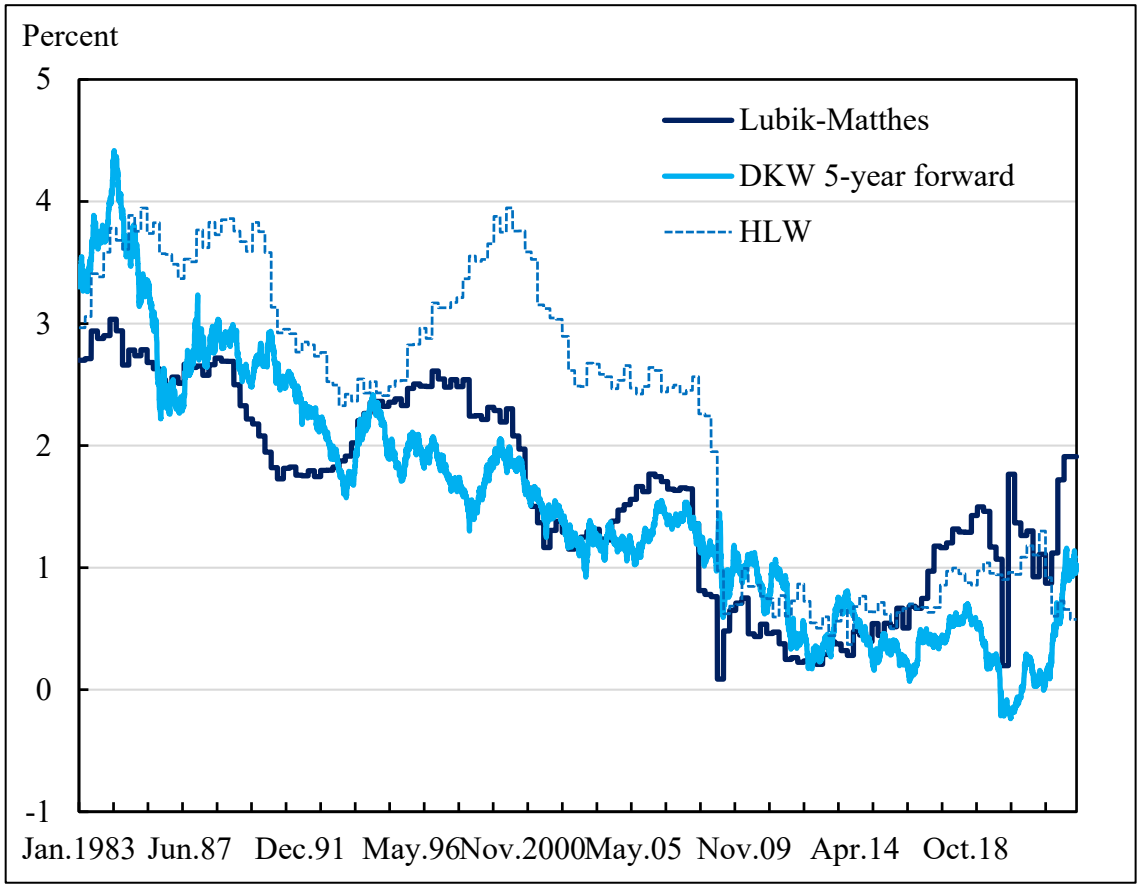
Sources: FRED; Federal Reserve Bank of St. Louis.

Figure 2 Central Bank Policy Rates, 2007-2023



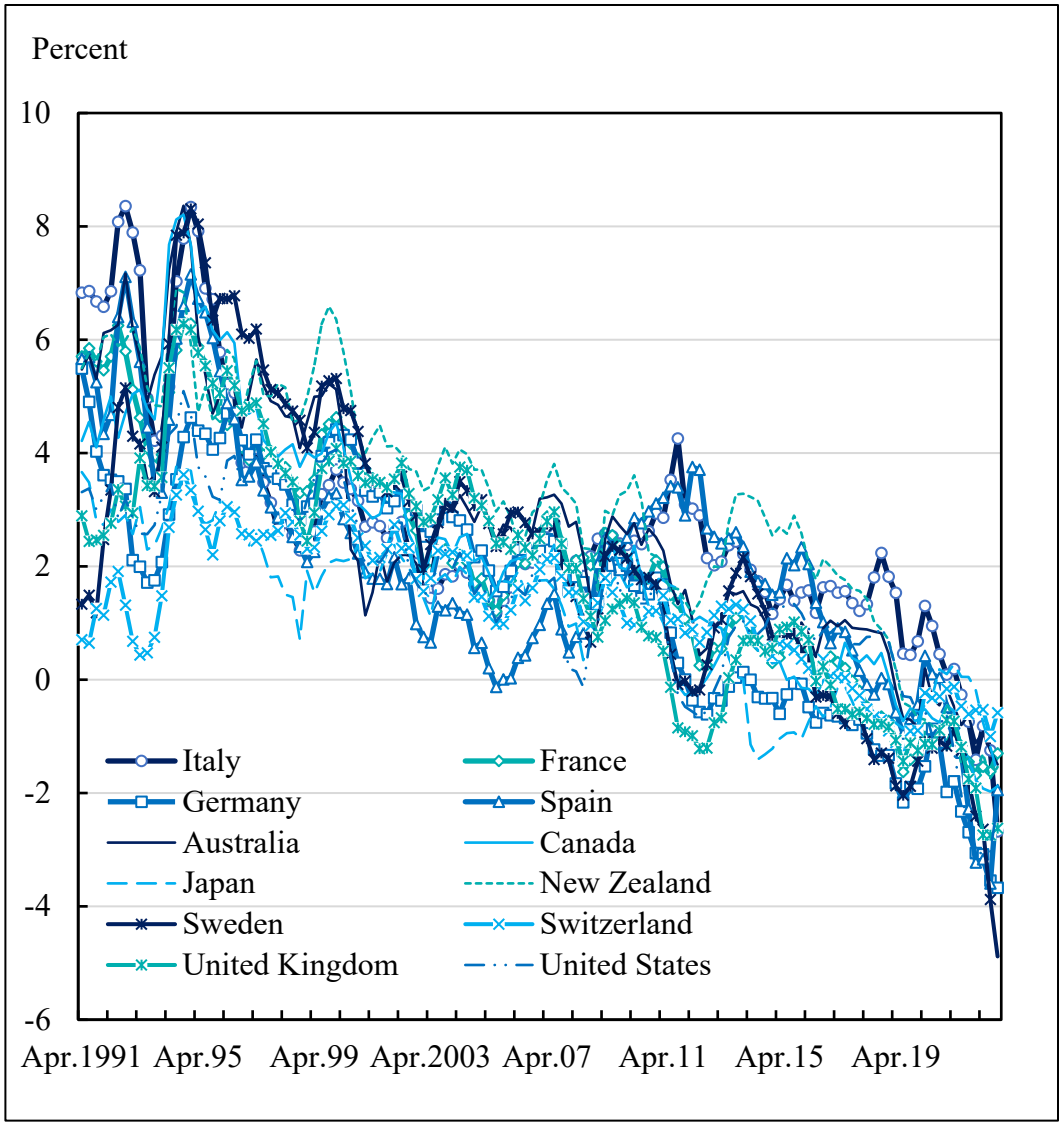
Sources: Bank for International Settlements; CEIC.

Figure 3 Alternative Estimates of Natural or Neutral Real Interest Rates



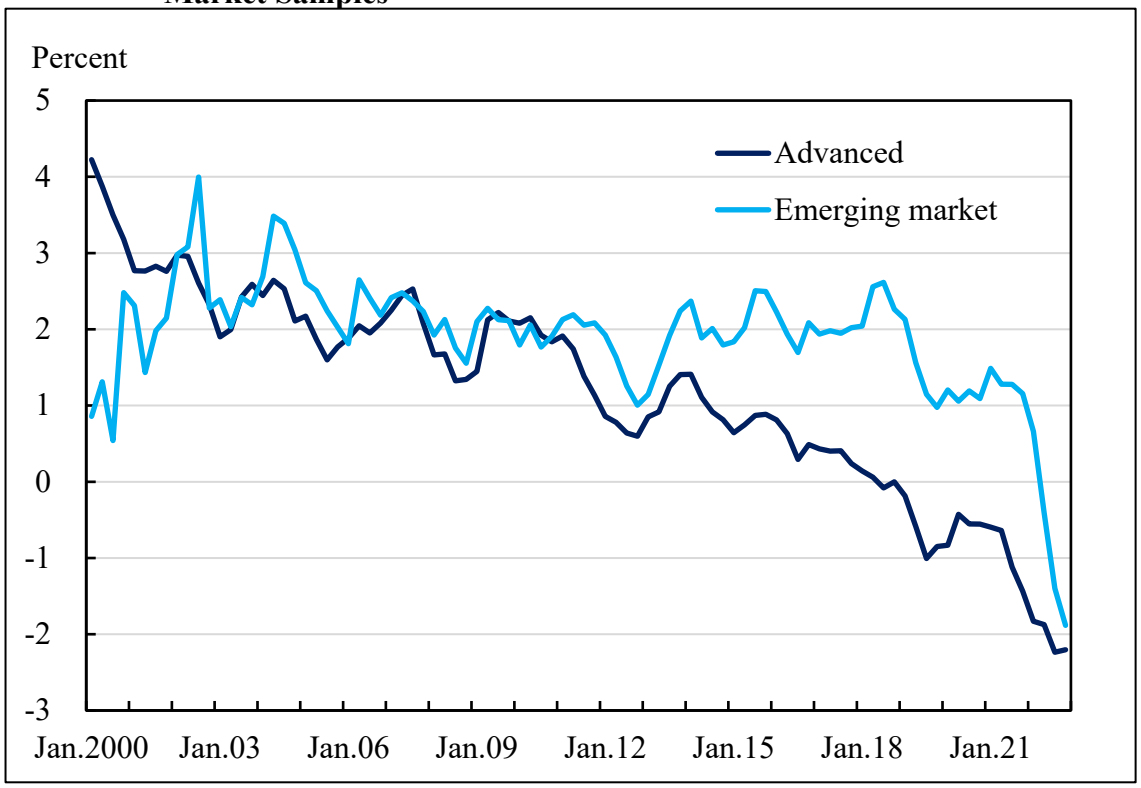
Sources: Federal Reserve Bank of Richmond; Board of Governors of the Federal Reserve System; Federal Reserve Bank of New York.

Figure 4 Real Long-Term Interest Rates for 12 Industrial Countries



Sources: FRED; Federal Reserve Bank of St. Louis; author's calculations.

Figure 5 Average Long-Term Real Interest Rates for Advanced and Emerging Market Samples



Sources: FRED; Federal Reserve Bank of St. Louis; Obstfeld and Zhou (2022) data; author's calculations.

Figure 6 Global Equilibrium Interest Rate and Current Account Balances

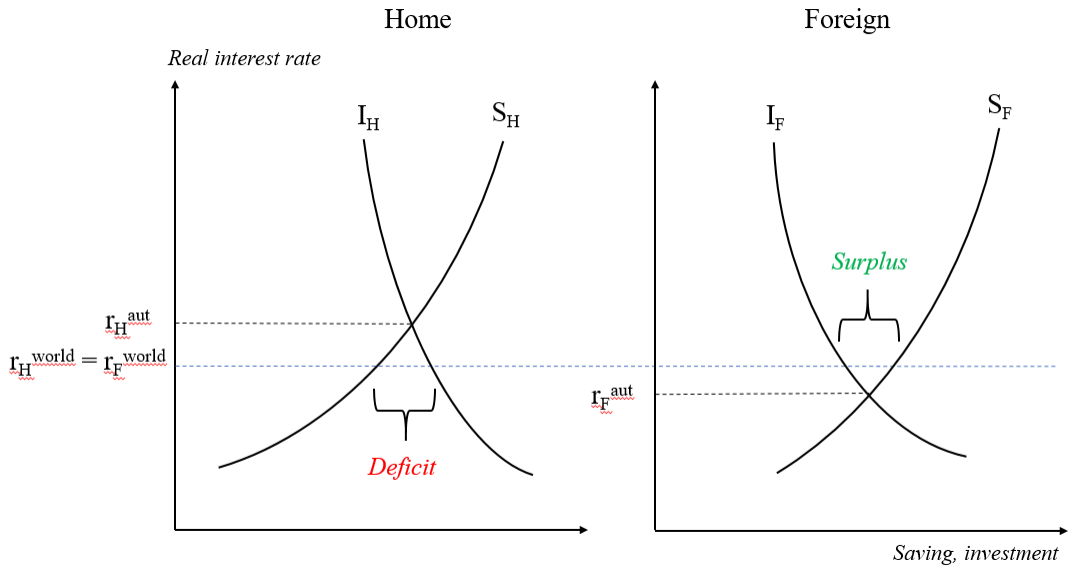
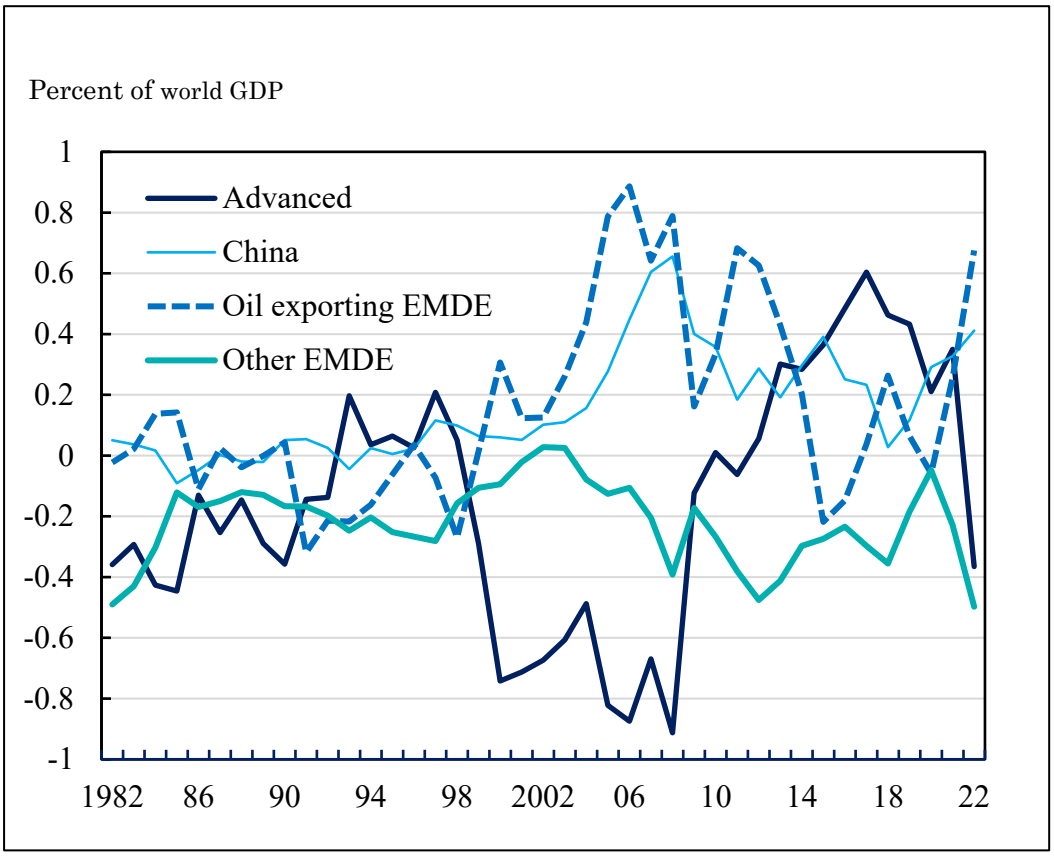
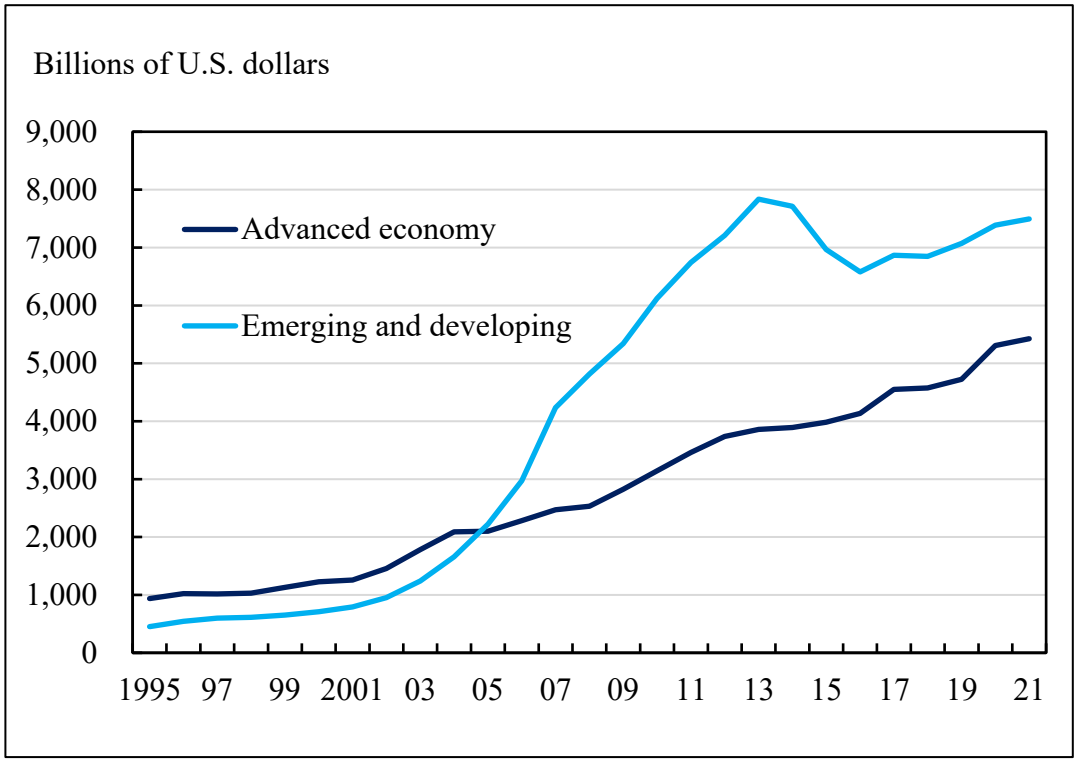


Figure 7 Global Current Account Imbalances, 1982-2022



Sources: International Monetary Fund; World Bank.

Figure 8 Foreign Exchange Reserves, by Country Group



Sources: International Monetary Fund; COFER database; IMF Annual Report 2022.

Figure 9 Possible Scorecard for Determinants of Real Interest Rates

	Higher real rates	**Same old**
Demographics	✗	✓
Productivity	*?*	*?*
Inequality	✗	✓
Global fragmentation	✗	✓
Ambient uncertainty	✗	✓
Government fiscal activism/green transition	✓	✗