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An International Approach to the Neutral Interest Rate

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Summary:

Following the COVID-19 recession, the US net international investment position, which is negative, declined to nearly 90 percent of national income. This decline coincided with an increase in long-term yields and a steady drop in net investment income. Increasing net savings is necessary to meet the US long-run budget constraint, suggesting that higher interest rates are needed to boost the net savings of US households and firms.

Key findings:

1. The neutral interest rate is the specific rate that balances the demand and supply of goods and services without causing inflation to rise or fall.
2. In an open economy, a debtor country must generate positive net savings in the future to meet debt obligations. An increase in the neutral interest rate is necessary to encourage households and firms to save more.
3. This *Policy Hub* paper highlights the importance of the US net international investment position in determining the neutral interest rate.

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An International Approach to the Neutral Interest Rate

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Andrés Blanco is an economist at the Federal Reserve Bank of Atlanta and a visiting professor at Emory University. He focuses on macroeconomic policy, investment, and labor economics. His work supports the Federal Reserve's mission of maintaining stable economic growth, fostering maximum employment, and ensuring price stability. He holds a PhD in economics from New York University. His academic background aims to answer policy-relevant questions by measuring new facts, developing theories, and testing their quantitative relevance.

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1 Introduction

Following decades of low interest rates, in which the Fed fund rate hit the zero lower bound for prolonged periods of time, the nominal federal funds rate—the primary tool of US monetary policy—increased to 5.33 percent and, up until very recently, remained there for over a year. The swift and significant increase in the federal funds rate was in response to the inflation surge of 2022–23. Since that time, inflation has been falling. As inflation has moved closer to the Federal Reserve's 2 percent target, the Federal Open Market Committee (FOMC) determined that a downward adjustment of the federal funds rate was warranted, leaving open a related question: In the long run, when inflation is stabilized at its 2 percent target, what might be the appropriate setting for the neutral federal funds rate? Macroeconomics provides a simple answer: The neutral federal funds rate should equal 2 percent plus the long-run *real* rate of interest. The harder question is, what is the value of the long-run real interest rate? To shed some light on this question, this *Policy Hub* paper focuses on a sometimes overlooked but important international mechanism that can influence the value of the long-run real interest rate and, hence, the appropriate neutral federal funds rate. In the context of our current economic environment, the effect of that international mechanism may increase the long-run real interest rate and, therefore, the appropriate long-run neutral nominal fed funds rate relative to prepandemic levels.

The concept of the *neutral* real interest rate is the real interest rate that supports output—that is, GDP, at its full employment or potential level—while at the same time maintaining stable prices. The neutral real interest can be affected by many factors, such as productivity, people's desire to save, and so on. This *Policy Hub* paper examines the financial relationships of the United States with the rest of the world and shows there is a relationship between the US net international investment position and the neutral real interest rate. Intuitively, to see this, suppose a country's negative net international investment position—where its liabilities to the rest of the world exceed its holdings of foreign assets—has worsened. This is the situation where the United States finds itself today. If this situation is not expected to continue with an even lower net international investment position, then domestic savings would need to increase so that the United States can continue to meet its international financial obligations. The mechanism that increases savings is an increase in the real neutral interest rate. In this paper, I examine recent US gross savings, investment, and net international investment position trends and find that if the United States continues to be a net borrower internationally at current levels, gross US savings must increase to finance its domestic investment and international debt obligations. This crucial international finance consideration may imply that the neutral nominal federal funds rate—which equals 2 percent plus the neutral real rate—might increase.

The importance of neutral interest rate for monetary policy

Robert King and Marvin Goodfriend's work on the neutral interest rate explored the concept of a specific rate in the economy that balances the demand and supply of goods and services without causing prices (or inflation) to rise or fall. This rate, often referred to as the neutral real interest rate, or r^*, is crucial for monetary policy because it represents the level of real interest rates that should ideally prevail when the economy is at full employment—meaning that everyone who wants a job can find one. The neutral nominal rate, which adds the central bank's inflation target of 2 percent to the neutral real rate, implies that inflation will be stabilized at this level. If the interest rate set by a central bank exceeds the neutral nominal rate, it can slow the economy and lead to unemployment; if the interest rate is below that neutral nominal rate, it can overheat the economy and cause inflation to rise above the target rate.

Goodfriend and King (1997) argued that modern central banks, such as the Federal Reserve, should aim to set policy interest rates close to the neutral interest rate. Doing so helps ensure smooth economic operation, avoiding extreme inflation or unemployment. In their view, understanding the neutral interest rate is crucial for effective monetary policy, as it serves as a benchmark for determining whether current interest rates are too high, too low, or appropriately set. Table 1 presents a summary of this discussion.

Table 1: Neutral Interest Rate and the Economy

	Inflation	Output
Fed funds rate above the neutral rate	Above 2% target	Above potential output
Fed Funds below the neutral rate	Below 2% target	Below potential output

Source: Authors' calculations • The table describes the relation between the Fed fund rate, the neutral interest rate, and the economy, i.e., inflation and output.

Although King and Goodfriend's work provides practical policy recommendations, it is important to emphasize that potential output and the neutral interest rate are not directly observable. As a result, economists rely on economic and statistical models to estimate the neutral real rate. For example, in *Measuring the Natural Rate of Interest*, Thomas Laubach and John C. Williams developed a method to calculate the neutral real interest rate. They introduced a statistical model that accounts for changes over time in both the economy's potential growth rate and the neutral interest rate, recognizing that economic conditions and trends influence these factors. They estimate the unobservable neutral interest rate using observable data on output, inflation, and the real interest rate.

An international approach to the neutral real interest

In this section, I examine a different approach to determining the neutral real interest rate based on the idea of the long-term sustainability of a country. Analyzing long-term

sustainability for households, firms, and governments is standard but a little less common for countries as a whole. A fundamental principle in international economics is that the sum of the financial account (which is a country's change in its net international investment position) and the current account (which is exports minus imports plus net investment income) equals zero. If we let $B(t)$ represent the international investment position of the United States in year t and $CA(t)$ represents the current account in year t, then from the fundamental principle of balance of payments, we have

$$B(t) = B(t-1) + CA(t). \qquad (1)$$

This relationship makes it clear that the evolution of the US international investment position can be described in terms of its current account. The international investment position can also be viewed from another important–and helpful–perspective. To see this, recall from national income accounting that GDP can be decomposed as

$$GDP(t) = C(t) + I(t) + G(t) + TB(t), \qquad (2)$$

where C is consumption, I is private investment, G is government expenditures, and TB is trade balance (meaning exports minus imports). Relationship (2) can be rearranged as

$$[GDP(t) - C(t) - G(t)] - I(t) + r(t)B(t-1) = TB(t) + r(t)B(t-1) = CA(t), \qquad (3)$$

where the current account is equal to the trade balance plus net investment income, described by the product of the net international investment position and r. The bracketed term on the left side of (3) represents national savings S, where national savings are relative to GDP and not national income. Relationships (1) and (3) imply that the financial account can also be written as the difference between national savings and investment and that

$$B(t) = B(t-1)\big(1 + r(t)\big) + S(t) - I(t). \qquad (4)$$

As is evident from (4), we can view the evolution of the US international investment position in terms of national savings and investment. This result should not be totally surprising. Intuitively, if a country saves more than it invests, then–almost by definition–it must lend to the rest of the world, and if it saves less than it invests, then it must borrow from the rest of the world.

This *Policy Hub* provides an understanding of the factors that influence the long-run real (or neutral) interest rate in an international context. By long run, I mean that we abstract from the various shocks that hit the economy and assume that all economic variables stabilize at their equilibrium constant values. This means that in the long run we have $S(t) = S$, $I(t) = I$, $B(t) = B$, and $r(t) = r$.

I now introduce a bit of economics. Savings and investment decisions depend upon many factors, but here I focus on the real interest rate. First, assume that savings increases with the real interest rate. Intuitively, a higher interest rate today means that one can purchase

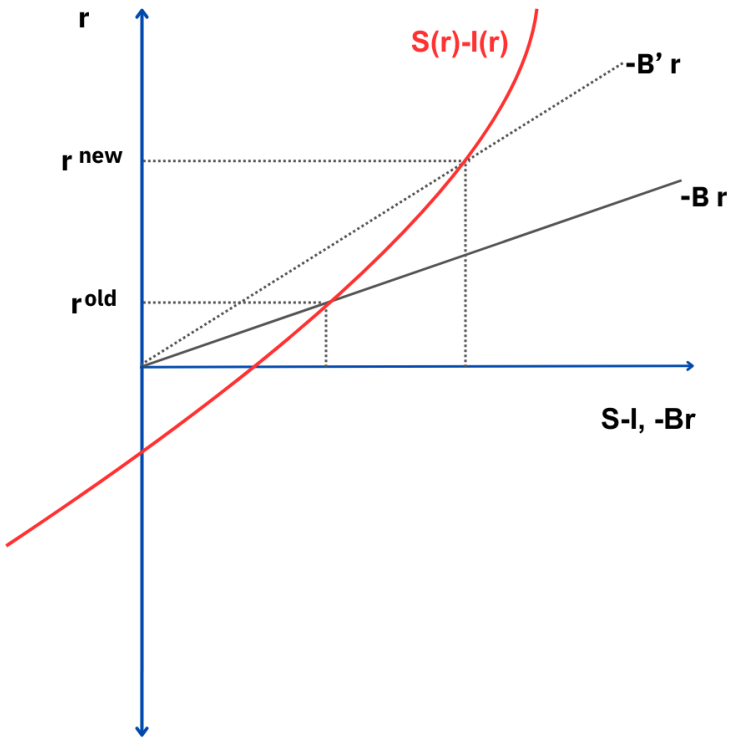
more consumption goods tomorrow—in fact, *r* more. That makes consumption today relatively more expensive than tomorrow, so there will be an incentive to consume less today and more tomorrow. The act of consuming less today is equivalent to increasing savings today. Second, assume that investment decreases with the interest rate. Intuitively, investment is negatively related to the interest rate because a higher interest rate raises the cost of capital, lowering the demand for it. Using these behavioral relationships along with relationship (4) in the long run, (4) can be rewritten as

$$-rB = S(r) - I(r). \qquad (5)$$

This relationship is the crucial insight for our discussion, and it represents the equilibrium condition for the neutral real interest rate of a country when considering international aspects of that economy. Notice that (5) lines up nicely with our intuition: A debtor country–one that has $B < 0$–must save more than it invests to pay its debt. Conversely, a creditor country can finance investments using the annuities from its international investment position and, hence, will save less than it invests.

Recently, the US international investment position has become more negative. If we think that the US international investment position will remain at that lower level going forward, how will US interest rates adjust? Since B has become more negative, then holding all else constant, this means that the left side of (5) is now a higher positive number, and (5) is no longer satisfied. An adjustment of the neutral real interest rate, *r*, is needed to restore (5) as equality. The appropriate adjustment to *r* can best be seen and understood diagrammatically. Since $B < 0$, the left side of (5), –rB, is a positive linear function of *r*, the neutral real interest rate. And since savings is a positive function of the real interest rate and investment is a negative function, the right side of (5), $S(r) - I(r)$, is a strictly positive function of the real interest rate. Figure 1 illustrates both of these functions.

Figure 1: Neutral Real Interest Rate Determination



Source: Author's calculation · Note: The figure describes the two components of the interest rate determination. The black solid line describes the annuities with a negative international investment position. The black dotted line describes the annuities with a lower level of international investment position, $B' < B < 0$. The red line describes net savings as a function of the interest rate.

Prior to the decrease in the country's international investment position, the country's position is $B < 0$ and the equilibrium neutral real interest rate, r^{old}, is given by the intersection of the $-Br$ line and the red curve (see figure 1). When the country's international investment position deteriorates to $B' < B < 0$, the neutral real interest rate increases to r^{new}, given by the intersections of the $-B'r$ line and the red curve. Two economic forces are at play behind this diagram, which can be interpreted with supply and demand curves. First, for the debtor country, the interest rate payment reflects the demand for resources. The larger the negative investment position, the greater the resource demand for debt servicing. Second, net savings reflect the supply of resources for debt repayment and, given the behavioral relationships at work, net savings increase with the real interest rate.

The important insight of this *Policy Hub* paper is that a country's international investment position significantly influences the neutral real interest rate. In particular, as a country becomes a larger debtor, the demand for resources to service its interest obligations grows. Consequently, net savings must increase to meet this demand, and the market mechanism to achieve this increment is a rise in interest rates. Figure 1 illustrates this

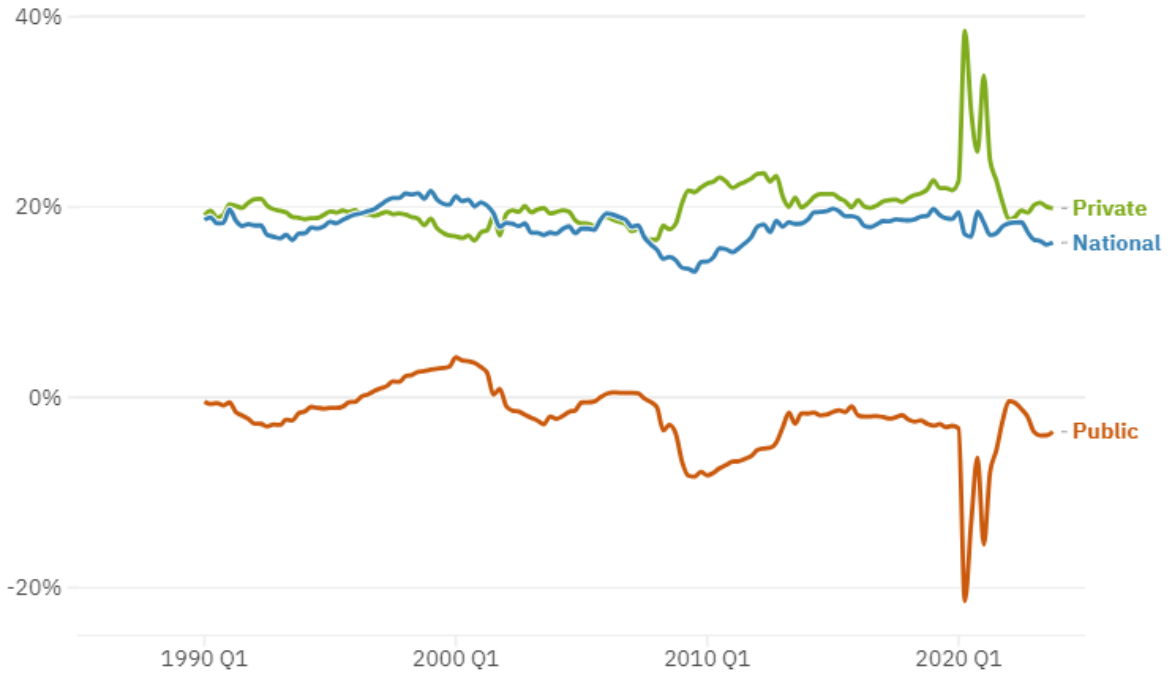
outcome: When a country becomes a larger international debtor, the neutral interest rate increases r^{old} to r^{new}. If that country's central bank is targeting inflation at 2 percent, then the neutral nominal policy interest rate consistent with a 2 percent inflation target will increase from 2% + r^{old} to 2% + ^{new}.

2 US savings and investment

I now examine the relevant US data that are identified in the previous section. Note that while the savings and investments of households and firms are likely to be influenced by the interest rate, government behavior is less responsive to the interest rate. For this reason, I separate gross savings and investment into public and private components.

Figure 2: Gross Savings Rate

Gross savings over national income %, quarterly data



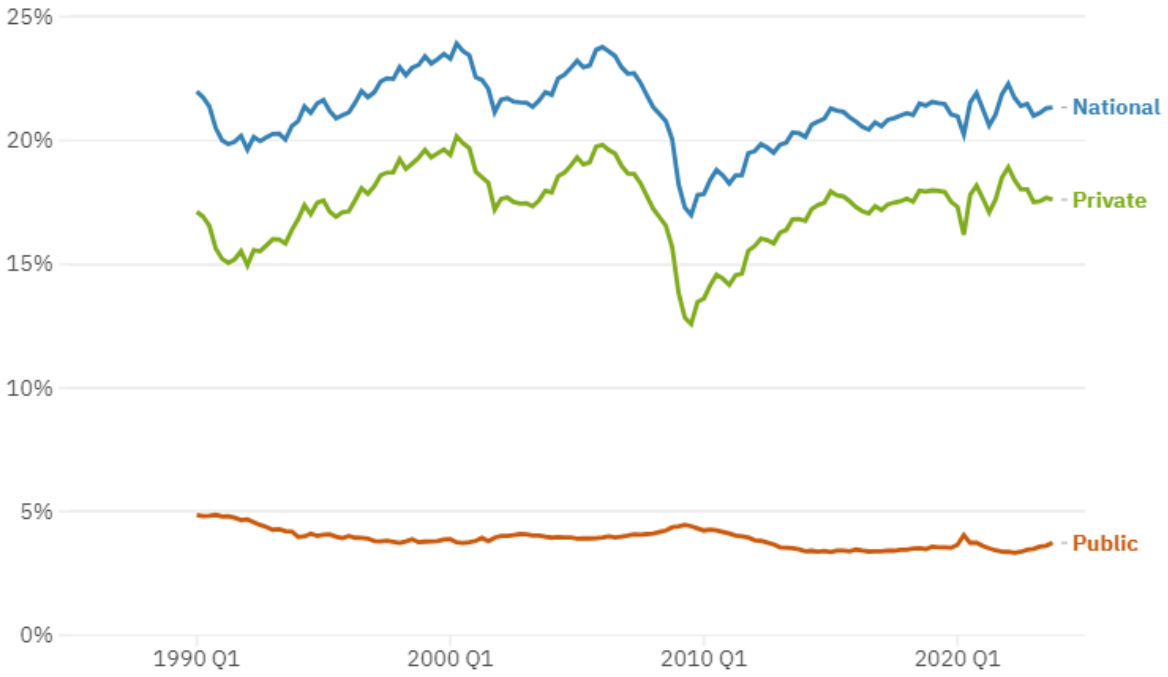
Source: U.S. Bureau of Economic Analysis, National Income and Product Accounts (NIPA), Author's calculations • Note: The figure describes Private, Public, and National gross savings rates from 1990Q1 to 2023Q4. National income is computed as "Gross Domestic Output" (Table 1.1.5., Gross Domestic Product, NIPA) plus "Income Receipts on Assets" minus "Income Payments on Assets" (Table 4.1., Foreign Transactions in the National Income and Product Accounts, NIPA). Total savings are "Net Savings" plus "Consumption of Fixed Capital" (Table 5.1. Saving and Investment by Sector, NIPA).

Figure 2 illustrates US gross national savings rates and their decomposition into private and public components. Three key patterns emerge after the 2008–10 Great Recession. First, following 2008, both private and public savings simultaneously increased. This relationship was reversed during the COVID-19 recession when several fiscal programs (for example, the Coronavirus Aid, Relief, and Economic Security Act and the American Rescue Plan Act) resulted in public savings to drop to –20 percent of national income. An increase in private savings partially offset the decline in public savings. However, after the COVID-19 recession, national savings continued to fall, even with historically high interest rates.

Figure 3 depicts the other component of net savings, represented by the investment rate. As the figure shows, the investment rate significantly decreased during the 2008–10 Great Recession, followed by a gradual increase in total investment from 2009 to 2015. Despite some changes after the COVID-19 recession, such as rising public investment from 2022 to 2024, national investment rates remained relatively constant.

Figure 3: Investment Rate

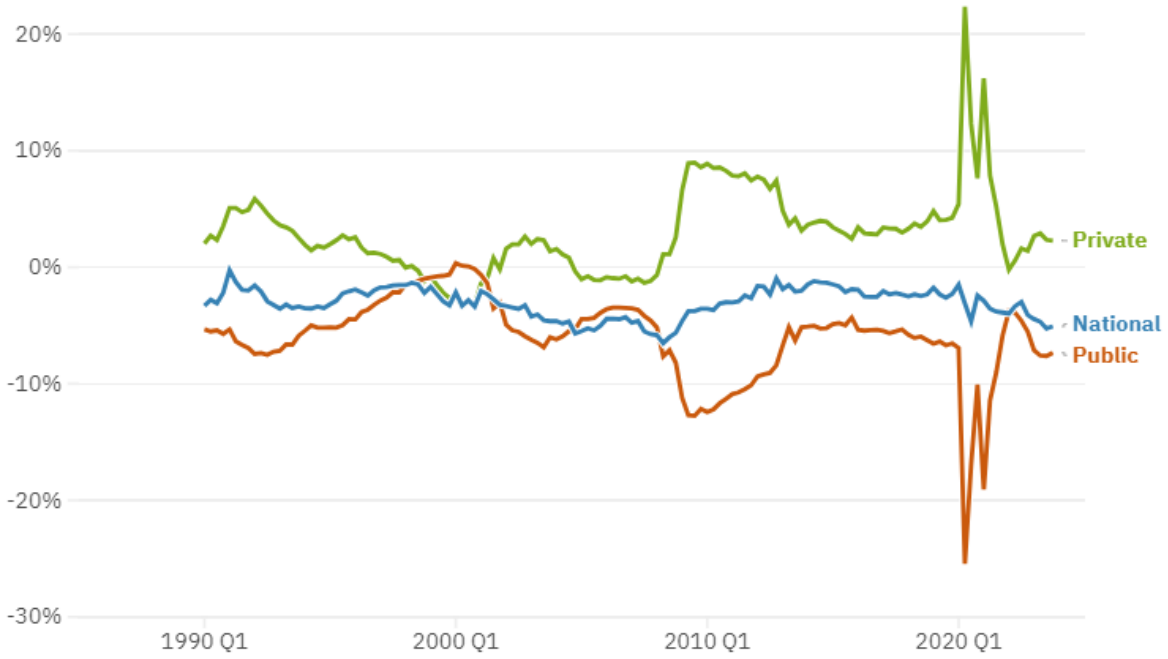
Investment over national income %, quarterly data



Source: U.S. Bureau of Economic Analysis, National Income and Product Accounts (NIPA), Author's calculations • Note: The figure describes Private, Public, and National investment rates from 1990Q1 to 2023Q4. National income is computed as "Gross Domestic Output" (Table 1.1.5., Gross Domestic Product, NIPA) plus "Income Receipts on Assets" minus "Income Payments on Assets" (Table 4.1., Foreign Transactions in the National Income and Product Accounts, NIPA). Total savings are "Net Savings" plus "Consumption of Fixed Capital" (Table 5.1. Saving and Investment by Sector, NIPA).

Figure 4 displays US net savings over the same period as figures 2 and 3. After 2008, two significant fiscal expansions occurred during the two recessions: the 2008–10 Great Recession and the COVID-19 recession. In both cases, increases in private savings compensated for these expansions in public spending. The main takeaway from this figure is the persistent decline in national net savings, as the private sector has been unable to fully offset the reduction in public sector savings, even at the current high interest rate.

Figure 4: Net Saving Rate
Net savings over national income %, quarterly data



Source: U.S. Bureau of Economic Analysis, National Income and Product Accounts (NIPA), Author's calculations • Note: The figure describes Private, Public, and National net saving rates from 1990Q1 to 2023Q4. The net saving rate is computed as the difference between gross saving and investment rates.

Equation (5) tells us that if the United States were a *creditor* to the rest of the world—that is, if $B > 0$—we would expect to see a net saving pattern similar to that in figure 4, where $S < I$. But the United States is a debtor to the rest of the world. Although it is possible for a country to be a debtor to the rest of the world and have negative net savings, $S < I$, *at some point in time*—to this point, see relationship (4)—this combination is not sustainable and is inconsistent with the long run. Our analysis indicates that if the United States continues to be a debtor nation, then real interest rates should increase in the long run to "reverse" the current net savings position.

Given this conclusion, what are the implications for the neutral real interest rate? Between June 2019 and June 2024, the net international investment position relative to national income deteriorated from –64 percent to nearly –90 percent, with a trend that is expected to move farther into negative territory in the future. Despite this, current net savings are at a level that remains inconsistent with the long-run budget constraint at the prevailing real interest rate. At some point, the real interest rate will need to rise to align future US savings with the country's net international investment position. The required real interest rate will likely exceed past levels, where the extent of this increase will depend on the elasticity of net investment with the real interest rate.

3 Discussion

The crucial idea so far is that there is a systemic relation between net international investment position, net investment income, and net savings *in the long run*. Nevertheless, it is well known that while the US net international investment position is negative, its net investment income is positive, which can be explained by the fact that the US dollar is the world's primary reserve currency, implying a lower borrowing cost for the US government than other countries. This advantage generates substantial financial income for the US economy. The key question is whether this situation is temporary or permanent. Can the US government oversupply government bonds with the implied increase in US government yield?

To answer this question, let's look at some data along with some additional economics. If the rates for which the United States can borrow and lend are different, then relationship (5) should be written as we can decompose the left-hand side of (5) as

$$-(r^F\ A - r^D\ L) = \ S(r^D) - I(r^D)\ , \qquad (6)$$

where r^D is the rate at which the United States can borrow internationally and r^F is the rate at which the United States lends internationally, A is US international lending, and L is US international borrowing. Figure 5 illustrates US net investment income, $(r^F\ A - r^D\ L)$, over the past 30 years. The data show an increase in the net investment income relative to national income following the 2008 Great Recession. An explanation for this increase is that the average nominal interest rate for a US 10-year government bond from 2010 to 2020 was 2.27 percent, which is equivalent to an almost zero real interest rate. The real interest rates on the assets held by the United States are greater than zero, implying that net investment income will be positive. Does this mean that the important insights from Section 2 may not be relevant to understanding neutral real interest rates? I don't think so.

Figure 5: Net Investment Income over National Income
Net investment income over national income %, quarterly data

Source: U.S. Bureau of Economic Analysis, National Income and Product Accounts (NIPA), Author's calculations • Note: The figure describes net investment income over national income from 1990Q1 to 2023Q4. National income is computed as "Gross Domestic Output" (Table 1.1.5., Gross Domestic Product, NIPA) plus net investment income given by "Income Receipts on Assets" minus "Income Payments on Assets" (Table 4.1., Foreign Transactions in the National Income and Product Accounts, NIPA).

Several factors suggest that the near-zero interest rate on U.S. liabilities, along with its borrowing advantage, may not persist indefinitely. In particular, a reduction in global net savings is likely to increase the world interest rate. For example, China, the world's largest saver, has significantly reduced its savings, with net savings declining from $200 billion in 2016 to $80 billion in 2024. Moreover, the United States, as the world's largest debtor, is projected to maintain large deficits. According to the Congressional Budget Office, the average federal deficit is expected to be about 6.1 percent of GDP from 2024 to 2034, which indicates that the U.S. will continue to be a significant borrower. Both of these factors suggest future upward pressure on real interest rates. Notably, yields on 10-year U.S. government debt have risen from around 2 percent pre-pandemic to roughly 4 percent now. This increase may signal a diminishing U.S. borrowing advantage, which has previously contributed to positive net investment income. Consequently, relationship (5), rather than (6), becomes the more relevant consideration.

4 Taking Stock

This *Policy Hub* paper draws on insights from the Fiscal Theory of the Price Level (see Leeper 1991, Sims 1994, Woodford 1995). Whereas that literature uses the government's long-run budget constraint to say something about the general price level–and inflation–I use a *country's* long-run budget constraint to discuss the neutral real interest rate. I find that a negative net international investment position, as in the United States, implies that net savings will be positive in the future. An increase in the neutral real interest rate can bring about this

adjustment. This insight is critical for monetary policy, as it introduces an overlooked–and maybe underappreciated–international economic mechanism that could influence the neutral interest rate. This particular mechanism is absent in the work of Edge, Laubach and Williams (2003) and the extensive literature that follows (see also Lubik and Matthes, 2015), which only uses domestic variables to recover the neutral interest rate.

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