Public Debt and the Long-Run

Neutral Real Interest Rate [1]

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Thanks for the introduction and the invitation to be here today. It is a pleasure to be back at Northwestern. I was an assistant professor in the Kellogg School back in the late '80's, and it was a tremendous learning experience for me that I remember quite fondly.

My remarks today are divided into three parts.

In the first part of the talk, I examine the behavior of the yields to Treasury Inflation-Protected Securities (that is, TIPS) and the yields to nominal Treasuries over the past decade. Using this evidence, I argue that, over that period of time, there has been a notable decline in the long-run *neutral* real interest rate. By the long-run neutral real interest rate, I mean the real interest rate that I expect to prevail when the economy is at maximum employment and inflation is at the central bank's target.

In the second part of my talk, I discuss two costs associated with the decline in the long-run neutral real interest rate. The first cost is that there is an increased risk that monetary policymakers will be constrained by the lower bound on the nominal interest rate. The second cost is that there is an increased risk of financial instability.

Finally, I discuss how fiscal policy can be used to increase the long-run neutral real interest rate. I consider a permanent increase in the market value of the public debt that is serviced by an increase in future taxes or a reduction in future transfers. This policy change increases the supply of assets available to investors. I argue that, in a wide class of plausible economic models, such an increase in supply would push downward on debt prices, and so upward on the long-run neutral real interest rate.

When I put these three points together, I reach my main conclusion. The decline in the long-run neutral real interest rate increases the likelihood of financial instability and the likelihood that the economy will run into the lower bound on nominal interest rates. Fiscal policymakers can mitigate these risks by choosing to maintain higher levels of public debt than markets currently anticipate.

I want to be clear at the outset that I am *not* saying that it is appropriate for fiscal policymakers to increase the long-run level of public debt. I am simply pointing to two key benefits associated with such an increase. I will also point to other costs (and benefits) associated with increasing the level of public debt. Sorting through them is outside the scope of my remarks today, and really outside my purview as a monetary policymaker.

My remarks today reflect my own views, and not necessarily those of others in the Federal Reserve System.

Context: What Is the *Neutral* Real Interest Rate?

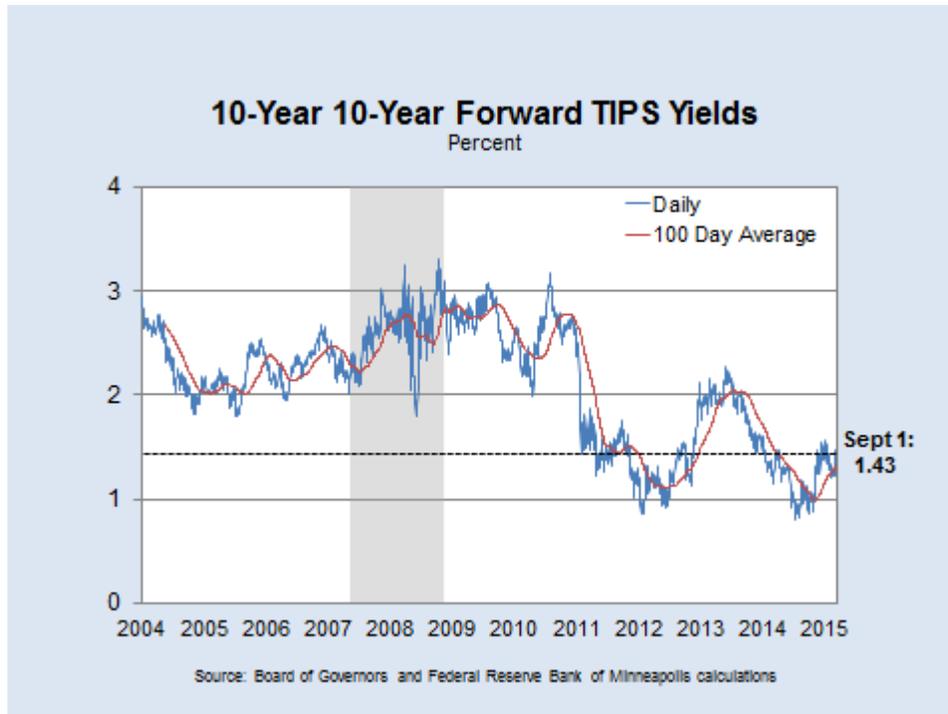I begin with some context: What do I mean by the *neutral* real interest rate?

The neutral real interest rate refers to the real interest rate that would prevail if the economy were at maximum employment and inflation were at target. The neutral real interest rate is a latent—that is, unobservable—variable. But it is a critical variable for monetary policymakers. The goal of the Federal Open Market Committee (FOMC) is to achieve maximum employment and keep inflation at 2 percent over the longer run. Definitionally, the FOMC can achieve this goal only by ensuring that the market real interest rate is, in fact, equal to the neutral real interest rate over the longer run. In contrast, if the market real interest rate is expected to be too high relative to the neutral real interest rate, then the FOMC is providing insufficient accommodation. In such a case, I would generally expect the inflation rate to run below target and employment to be below its maximal level.

As I say, the neutral real interest rate is unobserved. However, there is valuable information about the expected neutral real interest rate in the behavior of observed real interest rates and inflation forecasts. I next turn to how best to use that information.
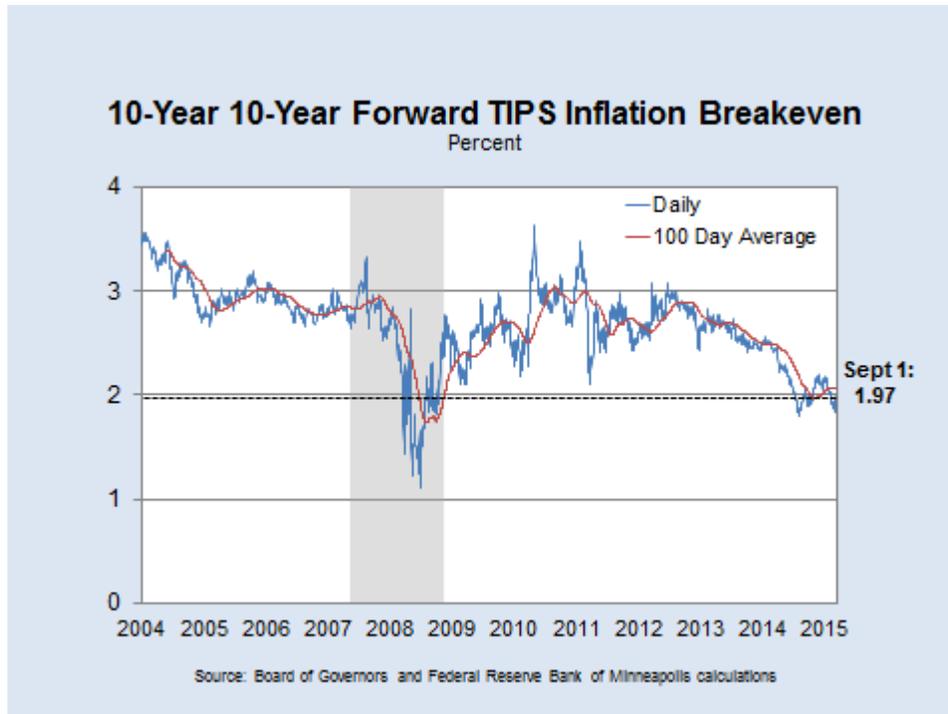
The Decline in the Long-Run Neutral Real Interest Rate

My first point is that the long-run neutral real interest rate has declined over the past few years in the United States. We can see evidence of this decline in the recent behavior of the long-run *market* real interest rate. Consider the behavior of the 10 year-10 year forward yield on TIPS. This is a measure of what financial markets expect the annual real interest rate to average over the 10-year period that starts 10 years from the current date.

If we go back to the period between the second half of 2004 and the first half of 2007—before the onset of the global financial crisis—the 10 year-10 year forward TIPS yield varied between 2 percent and 2.5 percent. Over the past year, it has been below 1.5 percent.

10-Year 10-Year Forward TIPS Yields
Percent

Source: Board of Governors and Federal Reserve Bank of Minneapolis calculations

I see at least two possible reasons that market real interest rates could have declined. The first is that the long-run neutral real interest rate has declined. The second is that investors expect looser monetary policy, conditional on an unchanged long-run neutral real interest rate. To disentangle these two possible explanations, it is helpful to look at the behavior of inflation forecasts implied by financial market data. This graph depicts the behavior of 10 year-10 year forward inflation breakevens imputed from TIPS. This is a measure of anticipated inflation over a 10-year period that begins 10 years from the current date. The graph shows that anticipated average inflation has risen little over the past few years, and may well have fallen. This suggests that the decline in the long-run market real interest rate is associated with investors expecting tighter monetary policy in the future, not looser policy. I conclude that the long-run neutral real interest rate has also declined—and possibly by even more than the long-run real interest rate itself.

10-Year 10-Year Forward TIPS Inflation Breakeven
Percent

Source: Board of Governors and Federal Reserve Bank of Minneapolis calculations

The Costs of a Lower Neutral Real Interest Rate

I now turn to a discussion of two key costs associated with this decline in the neutral real interest rate.

The first cost is that there is a risk that monetary policy will be less effective. With a lower long-run neutral real interest rate, the long-run federal funds rate will be correspondingly lower. As a consequence, the FOMC has less monetary policy "space," as it is more likely to be constrained by the lower bound on nominal interest rates. It is true that, during the recent stay at the zero lower bound, the FOMC has used unconventional policies like purchases of long-term assets as a way to generate additional monetary accommodation. The available evidence is consistent with the hypothesis that these unconventional policies were supportive of prices and employment. However, it also seems clear that central bankers see costs associated with these tools. Given these costs, I anticipate that monetary policy will be insufficiently accommodative during periods at the nominal interest rate lower bound, which will lead the economy to undershoot the FOMC's inflation and employment objectives.

The second cost of the low long-run neutral real interest rate has to do with incipient financial instability. In past remarks, going back to April 2013, I've highlighted three signs of financial

instability that I would expect to be associated with low real interest rates.[2] The first is elevated asset prices. The high price of TIPS bonds will increase investor demand for other assets. Hence, many, if not most, asset prices will be above historical norms. The second is elevated asset price volatility. With low real interest rates, investor asset demand will be highly sensitive to information about the distant future. This sensitivity will make asset prices more volatile. Finally, with low real interest rates, we are likely to see a lot of merger activity. Many mergers involve an exchange of upfront costs for backloaded benefits. With low real interest rates, those backloaded benefits are more valuable, and so more mergers become viable.

As I say, I've highlighted these three consequences of low real interest rates—elevated asset prices, elevated asset price volatility, and elevated merger activity—in past remarks. Other observers have emphasized additional risks to financial stability associated with low real interest rates. The overall implication of all of these analyses is that the decline in the low *neutral* real interest rate has the potential to create a difficult trade-off for the FOMC. On the one hand, the low neutral real interest rate means that the FOMC has to keep the real interest rate unusually low if it wants to achieve its price and employment objectives. On the other hand, keeping the real interest rate that low is likely to increase the risk of financial instability. As we have seen all too clearly over the past decade, if these risks do transpire, the FOMC may not be able to achieve its price and employment objectives. In this way, the low neutral real interest rate creates a challenging risk-reward trade-off for the FOMC.

This analysis treats the inflation target as fixed. The president of the Federal Reserve Bank of Boston, Eric Rosengren, has suggested that the FOMC should consider increasing the inflation target.[3] Any such increase would translate into a higher long-run fed funds rate. This would offset the impact of a decline in the long-run neutral real rate of interest by giving the FOMC more "policy space" to respond to adverse shocks. Raising the target inflation could also be helpful in terms of mitigating some sources of financial stability risk. For example, some institutional investors have target returns that are pegged in nominal terms. Low *nominal* interest rates have the potential to provide incentives to such investors to take on undue amounts of risk. Raising the inflation target could lower these incentives and thereby reduce the risk of financial instability.

Of course, an increase in the inflation target would also be costly in at least a couple of different ways. First, higher average inflation is typically thought to have a number of economic costs, including increasing the dispersion of relative prices. Second, changing the target inflation rate could potentially weaken the credibility of any target. In any conversation about raising the

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[2] See Kocherlakota (2013, 2014).
[3] See Rosengren (2015).

target inflation rate, the FOMC would have to weigh these costs against the benefits that I mentioned earlier.

Public Debt Levels and the Long-Run Neutral Real Interest Rate

I now turn to my final topic: how an increase in the level of public debt, serviced by higher future taxes or lower future transfers, affects the long-run neutral real interest rate. My analysis here is agnostic about how the government uses the funds generated by the initial new debt issue.

The baseline thinking about the level of public debt and the neutral real interest rate is shaped by Robert Barro's (1974) formulation of Ricardian equivalence. The heart of Ricardian equivalence is that additional issuance of public debt leads households to demand more assets in order to save for anticipated future taxes needed to service the extra debt. The ultimate impact of an addition to public debt on the neutral real interest rate depends on how that increase is offset by the increase in households' asset demand. Under Ricardian equivalence, the offsetting is perfect, and there is no impact on the long-run neutral real interest rate. This hypothesis underlies the basic New Keynesian model.

However, there are many models of the economy in which Ricardian equivalence does not hold. In these models, those who buy the government bonds are not the same as those who pay the future taxes. I'll cite two examples of such models. The first is the overlapping generations framework pioneered by Paul Samuelson (1958) and Peter Diamond (1965). In this model, the buyers of additional debt pay only some of the taxes needed to service that debt. Hence, the increase in the supply of public debt is not completely offset by a corresponding increase in the demand for assets, and the long-run neutral real interest rate rises.

The second is the incomplete markets class of models of Truman Bewley (1986) and S. Rao Aiyagari (1994). In this kind of model, at least some agents face binding borrowing constraints at any point in time. On the margin, any additional debt issuance will be purchased only by the unconstrained agents, but all agents have to pay the taxes required to service the extra debt. This asymmetry between who wants to buy the debt, and who pays for its service, again means that additional debt issuance pushes up on the long-run neutral real interest rate.

The overlapping generations and incomplete markets models of the effects of public debt issuance both seem to me to be more plausible than the fully Ricardian mechanism that I discussed earlier. These models imply that fiscal authorities can push up on the long-run neutral real interest rate by issuing more public debt. By doing so, they will reduce the risk of financial

instability and the risk of less effective monetary policy associated with the lower bound on nominal interest rates.

I should emphasize that the increase in the level of public debt that I've considered in my remarks is quite different from the asset purchase programs implemented by the Federal Reserve over the past few years. In those purchase programs, the Federal Reserve bought long-term assets (issued or backed by the Treasury). This sounds like the Fed reduced the level of public debt. But the Fed financed those purchases by increasing the level of bank reserves, and those bank reserves are simply another liability of the federal government. The Fed's intervention left the market value of outstanding federal government liabilities unchanged. Hence, the Fed's long-term asset purchase program was really a shift in the maturity structure of outstanding government liabilities. It is conceptually and practically distinct from the increase in the value of the public debt that I've discussed.

In my talk today, I have pointed to benefits of having a higher level of public debt. That does not mean that I am arguing in favor of extra debt issuance. Models without Ricardian equivalence typically imply that there are winners and losers associated with additional government debt issuance. Consider, for example, the baseline overlapping generations model that I sketched earlier. Many would argue that the most plausible parameterizations for this model imply that the neutral real interest rate is *higher* than the long-run growth rate for the economy ("dynamic efficiency"). It is still true under these parameterizations that an increase in the level of public debt pushes upward on the neutral real interest rate. But, in and of itself, the associated increase in debt service makes *all* generations worse off (except, possibly, the initial old). The question is whether this particular welfare loss is outweighed or not by the welfare gains associated with reducing the risk of financial instability or reducing the risk of ineffective monetary policy.

This tension that emerges in models seems very real to me. In many of my public appearances, retired older individuals have expressed concern to me about the low yields they are receiving on their investment portfolios. If the federal government were to issue more public debt, the neutral real interest rate would rise, and the FOMC would be in a position to raise the fed funds rate target more rapidly. Thus, a public debt increase would help retired older savers (the initial old in the overlapping generations context). But—of course—this step is not without costs. Younger workers (and those who are yet to be born) have to pay the taxes to fund this extra debt issuance. Balancing these gains versus losses is clearly a job for the fiscal authority, not for monetary policymakers like me.

Conclusion

Let me wrap up by summarizing my argument one last time.

There has been a significant decline in the long-run neutral real interest rate in the United States over the past few years. This decline in the long-run neutral real interest rate increases the future likelihood that the FOMC will be unable to achieve its objectives because of financial instability or because of a binding lower bound on the nominal interest rate. Plausible economic models imply that the fiscal authority can mitigate this problem by issuing more public debt, although such issuance is not without cost. It is, of course, the province of the fiscal authority to determine whether those costs are worth the benefits that I've emphasized today.

Thanks for your attention.

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