

## **William C Dudley: The case for TIPS – an examination of the costs and benefits**

Remarks by Mr William C Dudley, President and Chief Executive Officer of the Federal Reserve Bank of New York, at the Federal Reserve Bank of New York Inflation-Indexed Securities and Inflation Risk Management Conference, New York, 10 February 2009.

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Welcome to the New York Fed and to this timely conference on inflation-indexed securities and inflation risk management. Before discussing "The Case for TIPS", I would like to thank conference organizers, participants, panelists and supporting Bank staff for planning and putting together today's event.

In particular, I wanted to thank John Campbell for his contribution to making today's conference a reality and I expect that his involvement will heighten attention to this subject and stimulate additional research from the academic community on the topics we discuss here.

Over the past year, Treasury has been evaluating the costs and benefits of the TIPS program. Some research studies on this topic have concluded that the incremental financing costs associated with the TIPS program have been substantial; leading some to conclude that the costs may outweigh the benefits. Today's program, which includes a panel discussion on the welfare benefits of inflation-protected securities, should help to broaden our knowledge on this topic.

As the title of my speech suggests, today I am going to lay out the reasons why I, along with my colleagues Jennifer Roush and Michelle Steinberg Ezer, believe that the benefits of the TIPS program exceed the costs of the program.

Before saying anything more, let me emphasize that the views I express today are my own and those of my co-authors and, therefore, may not represent the views of my colleagues on the Federal Open Market Committee. Also, let me note that Jennifer and Michelle are the main authors of this paper. I have ridden along on their coattails. My main contribution was to slow down completion as I had to fit in my very modest contributions around the unfolding financial crisis! Finally, you may be wondering why this is my first speech since I have become president – an odd subject to choose, perhaps, given the ongoing financial crisis? The answer is a simple one, our paper and this conference have been in train for a long time. It is just a coincidence that the conference and my becoming president of the New York Fed have happened to arrive at about the same time.

The logic of issuing inflation-protected securities is straightforward. Wouldn't some investors pay a premium – that is, accept a lower expected return – in exchange for guaranteed, full compensation for inflation? Because the United States and a number of other countries decided that the answer was likely to be "yes," they developed an inflation-indexed government debt market.

Has the program been a good development from the perspective of the U.S. Treasury? What about from the public's perspective?

A good starting point for answering these questions is to account for the costs and benefits of the program relative to an appropriate counterfactual. For example, we might start by comparing the difference in funding costs to the Treasury of TIPS versus a program of comparable duration nominal Treasuries.

But we should also be careful not to ignore other potential benefits of the TIPS program. As we see it, these potential benefits include:

- the provision of a virtually risk-free investment that provides value to risk-averse investors,
- access to a market-determined measure of inflation expectations that can help inform the conduct of monetary policy,
- greater diversification of the Treasury's funding sources, which presumably has favorable implications for the Treasury's overall funding costs, and
- the potential for TIPS issuance to reduce the variability of the U.S. government's net financial position and provide an explicit incentive for the fiscal authorities to conduct policy with an eye toward the consequences of inflation.

Although it is difficult to quantify these benefits, we argue that they are meaningful and should not be ignored in evaluating the benefits of the TIPS program.

Turning first to the issue of measuring the impact of TIPS issuance on the government's funding costs, this could be done simply by comparing the *ex-post* costs of a program of TIPS issuance to the costs of a comparable program of nominal Treasury issuance. Studies<sup>1</sup> of this sort have typically shown that TIPS issuance has resulted in a higher net cost to the Treasury. Unfortunately, although this methodology is attractive in its simplicity, it has some flaws that undercut its usefulness in reaching conclusions about the attractiveness of the TIPS program.

The problem with an *ex-post* analysis is that it depends critically upon the performance of inflation over the period in question. If inflation turns out to have been meaningfully different than what was expected at the time of TIPS issuance, then this difference – the so-called “inflation surprise” – can be important in affecting the relative costs of TIPS versus nominal Treasury issuance. If inflation turns out to be higher than expected, then TIPS issuance will likely look to have been more expensive than nominal Treasury issuance. If inflation turns out lower, an *ex-post* analysis will likely show a savings from the TIPS program.

Over the long run – and I mean the *very* long run – there should be roughly as many downward surprises in inflation performance as upward surprises. But within any relatively short period, such as the last decade, this certainly does not need to be the case. In other words, over such a short period, the outcome of an *ex-post* analysis can be heavily influenced by which of the two sides – the Treasury or investors – was the lucky recipient of the net inflation surprise that occurred over the period in question. For example, in countries such as the United Kingdom, where inflation declined following the inception of an inflation-linked debt program, *ex-post* studies generally suggest that these programs have reduced financing costs for these countries.

The fact that the Treasury saved or lost money *ex-post* is thus not a very reliable guide as to whether the strategic decision to implement a TIPS program has been a good idea. The relevant question is whether the Treasury obtained the financing it needed at a lower *ex-ante* cost. If the experiment were to be run thousands of times drawing from the underlying distribution of possible inflation outcomes, would Treasury's costs have been lower, on average, with TIPS or with nominal Treasuries? To conclude on the basis of one coin flip or roll of the dice as *ex-post* analysis essentially does surely is not the best way to evaluate the respective costs of TIPS issuance versus nominal Treasuries.

Thus, we need to focus on the underlying factors that determine the *ex-ante* difference in costs.

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<sup>1</sup> See Sack and Elsassser (2004), Roush (2008).

There are two primary factors<sup>2</sup> underlying the relative cost differences:

- 1) the compensation investors require to hold a security that is less liquid than its nominal counterpart, termed the illiquidity premium, and
- 2) the insurance value they attach to obtaining protection against inflation risk, known as the inflation risk premium.

With regard to the first factor, when investors are worried about their ability to resell TIPS in a liquid secondary market, they require compensation for holding the securities compared with more liquid alternatives. This illiquidity premium tends to drive up TIPS yields and increase the Treasury's borrowing costs.

The second factor works in the opposite direction. To the extent that investors are willing to pay for inflation protection, they would purchase TIPS at a price above that implied by their expected payment stream. As such, inflation risk premiums result in lower expected borrowing costs for the government and savings for the TIPS program compared with nominal issuance.

To determine which factor has been historically dominant, we conduct an *ex-ante* cost analysis: We compare the amount that the Treasury received for inflation compensation at auction with an observable measure of the inflation expectations of TIPS investors that is not contaminated by premiums for inflation risk or liquidity differentials. Unfortunately, we don't have a perfect measure of expected inflation. Nevertheless, we may be able to get close. We do have estimates of expected inflation from other sources – such as the Survey of Professional Forecasters (SPF) conducted by the Federal Reserve Bank of Philadelphia. If such measures do indeed reflect the inflation expectations of investors, then we can conduct a reasonably accurate *ex-ante* analysis.

TIPS analysts often talk about a concept they call the breakeven inflation rate. Essentially, this is the realized inflation rate that would cause investors to come out the same in terms of total compensation regardless of whether they had bought TIPS or nominal Treasuries.

The difference between the auction breakeven inflation rate and the SPF forecast yields a measure of the net savings or loss incurred by the Treasury that is independent of forecast errors. It is also equal to the net value of the illiquidity and inflation risk premiums associated with each TIPS. Our analysis, which covers TIPS auctions through April 2008, found that prior to 2004, the breakeven inflation rate was below the SPF. This indicates that the illiquidity premiums exceeded the inflation risk premium over this period. However, since 2004, we find that breakeven inflation rates were approximately equal to expected inflation, indicating that investors were roughly indifferent between the benefit of being protected against inflation risk versus the cost in terms of the greater illiquidity of TIPS relative to on-the-run nominal Treasuries. Thus, on an *ex-ante* basis, it appeared that the cost of issuing TIPS was about equal to the cost of issuing nominal Treasuries.

To determine the impact of the illiquidity premium and inflation risk premium on these results, we decomposed our *ex-ante* analysis, comparing the breakeven rate of inflation excluding the illiquidity premium in TIPS yields<sup>3</sup> to the SPF forecast. This comparison yields an

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<sup>2</sup> In addition to these primary factors, TIPS yields also reflect the taxation difference between TIPS and nominal issues, the convexity difference between real and nominal yields and the price of the embedded deflation floor.

<sup>3</sup> We used the illiquidity premium in TIPS yields estimated in D'Amico, Kim and Wei (2008). D'Amico, Kim and Wei calculated the liquidity component for five- and ten-year TIPS yields, which we used to adjust the auction prices for 5- and 10-year TIPS issues. For twenty- and thirty-year TIPS issues, we assumed that the liquidity component is equal to the component for a ten-year security, which in the event that these securities are less liquid than the ten-year note, understates this effect and thus underestimates the risk premium at this horizon. For further information, see Dudley, Roush and Steinberg Ezer (2008).

estimate of the premium investors were willing to pay for inflation protection at previous TIPS auctions. We found an average risk premium estimate of 47 basis points over our sample period. This suggests that the TIPS program does satisfy a real demand that is not met by nominal Treasuries.

It also suggests that if the Treasury were to take steps to shrink the illiquidity premium by, for example, improving secondary market trading in TIPS, this would shift the cost-benefit analysis more firmly in TIPS direction.

A change in the TIPS illiquidity premium can have a notable impact on *ex-ante* cost analysis. For example, at the time this speech was written, the 10-year TIPS breakeven rate was approximately 1.10 percent, compared to the SPF forecast of 2.50 percent. This is in contrast to the end of our sample period, which showed them to be about equal. This means that today TIPS issuance is not very compelling. But it is important to emphasize that this shift has occurred at a time when the preference for liquidity is especially strong, benefitting nominal Treasuries versus TIPS. When the market turmoil subsides and this illiquidity premium shrinks, one might expect TIPS to again move ahead on an *ex-ante* basis.

So, at this point, the TIPS versus nominal issuance debate is inconclusive. But that's before we have included some of the other considerable – although more difficult to quantify – benefits associated with TIPS issuance.

Let me now discuss some of these other benefits.

### **Inflation hedge for households**

First, TIPS offer a benefit to investors because they have less risk than any other asset class. With virtually no credit risk or inflation risk, TIPS are one of the safest of investments.<sup>4</sup> For investors that want such safety, TIPS offer significant benefits. Furthermore, the ability for investors to choose the amount of inflation risk they hold may result in a more optimal allocation of risk among investors with different tolerances.<sup>5</sup> How much is this worth? Is the value of this completely captured in the relative interest costs of TIPS? Probably not, because the relative interest costs between TIPS and nominal Treasuries are set at the margin. We think there is some value in having a high-quality hedge to inflation risk, especially one that is available to less sophisticated investors.

### **Improved monetary policy**

The second noteworthy benefit from the TIPS program is that it helps improve the conduct of monetary policy. Foremost, the program provides up-to-date information about the evolution of inflation expectations and real interest rates. Because keeping inflation expectations well-anchored is so important in keeping inflation itself in check, real-time measures of inflation expectations may lead to better monetary policymaking. This, in turn, should improve macroeconomic performance. Although this is very difficult to quantify in terms of value, I think it is safe to say that in a \$14 trillion economy, even a modest improvement in performance generates large dollar benefits.

U.S. policymakers focus on a variety of inflation expectation measures, including private surveys of inflation expectations and market based measures, such as TIPS breakeven inflation rates. But in practice, the value of the survey-based measures is limited by the lack

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<sup>4</sup> There is some inflation basis risk in that TIPS are based on the non-seasonally-adjusted consumer price index, and a household's expenditure basket might differ from the basket in the CPI. Also, pension and endowment liabilities may be more closely related to other inflation or wage measures than the CPI.

<sup>5</sup> See Campbell and Shiller, 1996.

of timeliness – new data become available only monthly, quarterly or about every six weeks. Also, real money isn't riding on the accuracy of the survey responses. In contrast, the comparison between nominal Treasury and TIPS yields represents the consensus of market participants.

For these reasons, policymakers rely importantly on the long-term inflation expectations proxied by the difference between nominal Treasury note and TIPS yields.

So, how much is this tool worth? Of course, it is very difficult to say. Perhaps, we would flatter ourselves and think that we could do just as well without such a market-based, real-time measure of inflation expectations. But I doubt it. After all, inflation expectations, when untethered, are very difficult to re-anchor. TIPS help make it easier to keep inflation expectations in check.

### **Improved fiscal policy**

The third less quantifiable benefit of TIPS is that the program may create incentives that can improve the conduct of fiscal policy. TIPS provide an explicit incentive for the fiscal authorities to conduct policy with an eye toward the consequences for inflation. The public's recognition of this incentive may help hold down inflation expectations and cause inflation expectations to be more firmly anchored.

In addition, TIPS may give the Treasury access to a broader investor base, which also may reduce the Treasury's overall borrowing costs. The comparison between the prevailing interest rates on TIPS versus nominal Treasuries provides insight into the relative costs associated with issuing a marginal dollar of debt. But just as important is whether TIPS issuance, by displacing nominal Treasury issuance, reduces the level of interest rates that the Treasury pays on its nominal issuances. This would occur if TIPS were not perfect substitutes for nominal Treasury securities and if the demand for nominal Treasuries were downward sloping – that is, not completely elastic.

The first condition almost certainly holds given the different attributes of TIPS versus nominal Treasuries. If they were perfect substitutes, then there would not be a liquidity premium for nominal Treasuries relative to TIPS. The second condition seems likely to hold since numerous studies have found that an increase in the net amount of Treasury borrowing leads to higher expected borrowing costs for the Treasury.

How big might this effect be? That's difficult to estimate. A few studies<sup>6</sup> have found that an increase in supply in a particular segment of the Treasury yield curve has contributed to a rise in yields. As a result, by issuing securities in a segmented TIPS market, the Treasury may keep realized yields on bill and nominal coupon securities lower than they otherwise would have been.

The last noteworthy fiscal benefit from TIPS issuance is the fact that it reduces risk to the U.S. government in terms of the variability of its net financial position. The rate of inflation influences both the cost of TIPS and the government's tax receipts. Thus, some level of TIPS issuance may reduce the variability of the government's net financial position. This, in turn, should lead to a more regular and predictable pattern of issuance, which should help minimize interest costs.

In summary, our analysis of the *ex-ante* costs of the TIPS program and the more difficult-to-measure benefits suggests that TIPS issuance provides at least a modest net benefit to the Treasury. So, now I want to turn to a related question: Are there ways to increase the benefits?

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<sup>6</sup> See Fleming (2002), Krishnamurthy (2002), Laubach (2003).

I would be willing to make two modest suggestions here. First, it may make sense to emphasize longer-dated TIPS issuance rather than shorter-dated issuance. Analytically, the logic goes as follows. Inflation uncertainty is likely to increase at longer time horizons. Thus, investors are likely to pay a greater premium for inflation protection at longer-time horizons. This implies that the cost savings associated with TIPS are likely to be greater for longer maturities rather than shorter maturities.

This prediction is supported by empirical studies that have examined the premium that investors pay for inflation protection both in the United States and elsewhere. For example, a study by Brian Sack of Macroeconomic Advisors finds that forward breakeven inflation rates increase as maturity lengthens. In contrast, the level of survey-based measures of inflation expectations is quite constant beyond a time horizon of a few years. This means that the difference between forward breakeven inflation and inflation expectations climbs as the time horizon extends. This strongly suggests that the premium investors pay for inflation protection increases as maturities lengthen.

Second, it may make sense to structure the TIPS program in a way that would help reduce the illiquidity premium associated with TIPS relative to on-the-run nominal Treasuries. Some of the current illiquidity premium is likely to shrink as financial markets stabilize. However, further improvements may require a change in either the structure of the TIPS program or the secondary market trading environment.

On that note, I leave you with two outstanding questions:

- 1) What are the best ways for the U.S. Treasury and the trading community to improve secondary market liquidity in TIPS?
- 2) Given that TIPS appear attractive for the U.S. Treasury, what is the optimal allocation of the Treasury's liability portfolio between TIPS and nominal securities?

Thank you for your attention.