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Inflation-Protected Securities—A Further Look

by Chris K. Madsen

It has been almost a year since the U.S. Treasury launched the first Treasury Inflation-Protected Securities (TIPS). This article offers a look into the mechanics of how TIPS have fared so far and how they may fare in the future.

In my article, "Inflation-Indexed Bonds—How Attractive Are They?" in the March 1997 issue of *Risks and Rewards*, I focused on the cash flow of TIPS and demonstrated that for a taxable "buy-and-hold" strategy, these securities did not necessarily offer the inflation protection that they advertise. This is because of the front-loading of taxes, while inflation-adjusted payments are deferred until TIPS maturity. I concluded that the issues would likely attract tax-exempt institutions or investors, as well as speculators, who want to speculate on price moves resulting from changes in inflationary expectations.

Bankers Trust [1] states a similar observation in the *Economics and Risk Focus* newsletter by R. McFall Lamm, Jr.:

"TIPS are consequently disadvantaged because of taxation on 'phantom profits.' For this reason, they are appropriate only for tax-exempt funds, unless short-term trading is the goal."

The yield on TIPS relative to the yield on a conventional nominal bond can be described by the following relationship:

$$\begin{aligned} \text{Nominal Bond Yield} &= \text{TIPS Yield} \\ &+ \text{Expected Inflation} \\ &+ \text{Inflation Risk Premium} \\ &- \text{Liquidity Premium} \end{aligned}$$

Writing this differently:

$$\begin{aligned} \text{TIPS Yield} &= \text{Nominal Yield} \\ &- \text{Expected Inflation} \\ &- \text{Inflation Risk Premium} \\ &+ \text{Liquidity Premium} \end{aligned}$$

It is expected that the liquidity premium will disappear over time as the U.S. Treasury strives to make the market more liquid by continuing to issue TIPS. So far, the U.S. Treasury has been right on schedule with all the planned TIPS offerings (see Table 1).

This adds to the credibility of the Treasury and to the TIPS. The Treasury has an incentive to issue these types of securities, because it is cheaper financing of national debt. The Treasury can pocket the inflation-risk premium.

There is also the issue of Treasury cash flow [2]. The Treasury will not actually make any inflation-adjusted payouts until the bonds mature. Until maturity of the TIPS, the Treasury is paying out much less cash than with nominal coupon bonds.

Inflation-protected securities have already been issued in Canada, Australia, the U.K., and New Zealand. Most of these countries have indicated a desire to continue the issuance of these securities. The U.K. has announced that 20% of the gilts (U.K. government bonds) it issues will be index-linked, up from last year's 16–17%. Canada

announced that it plans to double the issuance of Canadian inflation-linked bonds. In addition, France and Mexico have also expressed interest in issuing inflation-linked bonds [3].

The U.S. Experience

Combing through a year's worth of press releases, I was not surprised to see that analysts' opinions are mixed on the future success of TIPS. But it certainly appears that it is an asset class that is here to stay.

Table 1 summarizes statistics from the first U.S. TIPS auctions, as well as corresponding nominal yields and inflation.

A 30-year TIPS auction has been announced for April 1998. By the end of 1998, the U.S. Treasury expects to have three-year TIPS added to the menu. Continuous quarterly offerings of existing issues are also expected, as Treasury attempts to take advantage of the relatively lower TIPS yields.

With conventional bonds, owners experience a price gain from falling nominal yields. Holders of TIPS experience price appreciation when the price change due to the combined impact of actual inflation and changes in *real yields* is positive [9]. Real yields, as previously pointed out, depend on *expected* inflation. Ignoring inflation risk and liquidity premiums, real yields decline whenever a drop in nominal yields exceeds a drop in inflationary expectations.

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TABLE 1

Date of Auction	TIPS Maturity (Years)	Auction Size (\$ Billions)	Trailing 12-Month Inflation [4] (Percent)	Auction Yield (Percent)	Nominal Bond Yield (Percent)	Difference (Percent)
January 1997	10	\$7	3.0%	3.48%	6.56% [5]	3.08%
April 1997	10	8	2.5	3.59	6.89 [6]	3.30
July 1997	5	8	2.2	3.74	6.14 [7]	2.40
October 1997	5	8	2.1	3.60	6.01 [8]	2.41

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Nominal Bond Return = Income
 + Price Change from Change in Bond Yield (Nominal)

TIPS Return = Income
 + Price Change from Change in Bond Yield (Real)
 + Inflation

As an example, look at the 10-year TIPS issued in late January 1997 compared to a similar conventional bond. By December 15, the nominal U.S. Treasury bond had gained 4.6% (price only), while the TIPS had lost 1.8% (price only). What happened?

The actual 1997 inflation was less than expected.

Real yields have increased since the January auction [10]. This suggests that inflationary expectations have dropped faster than nominal yields. Inflationary expectations have still further to drop before they catch the actual level of inflation. The expected inflation is currently less than 2.33% [11] with current inflation at 1.8% [12]. Inflation expectations (ignoring risk and liquidity premium) still exceed experience by 50 basis points.

It seems the time to buy these instruments for short-term price gain is when inflationary expectations fall below actual experience (the author will not refund any losses from following this strategy). In short, a speculator expecting future inflation shocks would be a buyer of TIPS for price appreciation.

R. McFall Lamm, Jr. points out in his article [13] that there may be a temporary opportunity to reap superior risk-adjusted returns; as the liquidity premium fades, the market learns how to use these new instruments. This seems reasonable, but as we have seen in 1997, it does not guarantee a substantial return.

Asset Allocation

TIPS have some interesting characteristics, which make them viable candidates for asset allocation. Real yields have historically been less volatile than nominal yields. Thus, although the duration of TIPS is actually higher than the duration of nominal bonds of the same maturity, TIPS tend to be less volatile than nominal bonds on an annual basis. In a stable inflation and interest rate environment, the TIPS return should be less than that of a nominal bond because of the inflation-risk premium. However,

FIGURE 1
TIPS and No TIPS Asset Efficient Frontiers for a 10-Year Time Horizon
(Assuming Tax-Exempt Status)

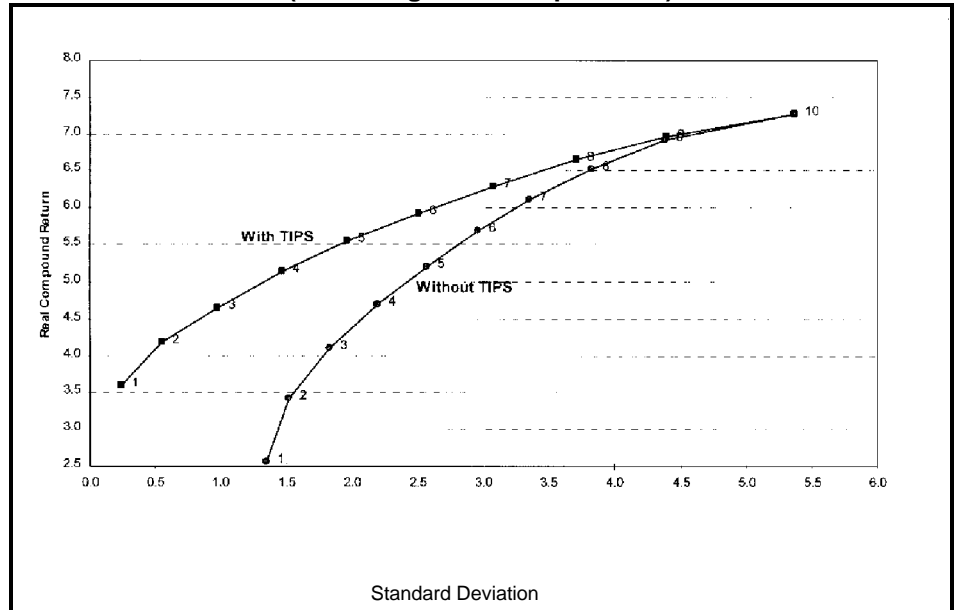
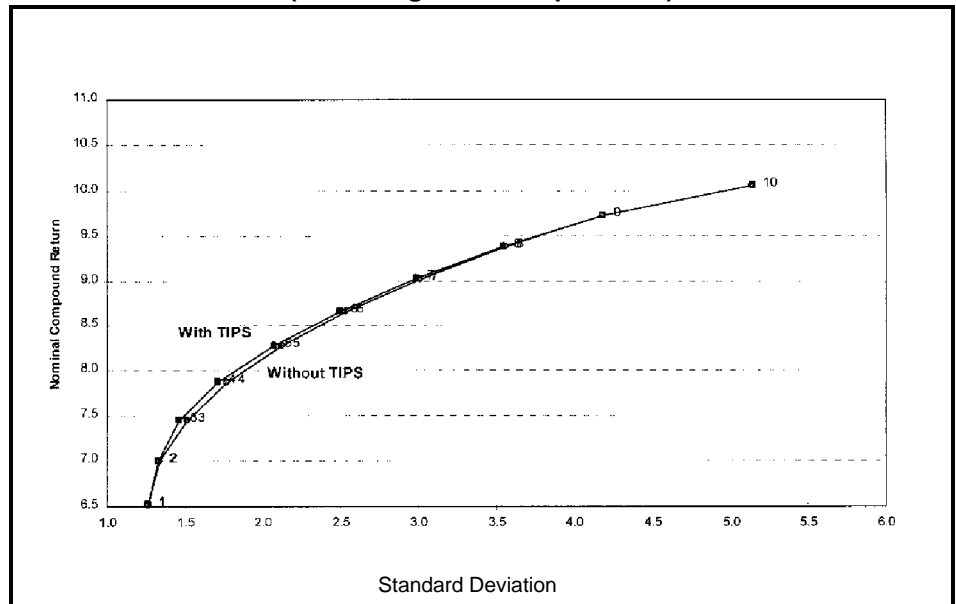


FIGURE 2
TIPS and No TIPS Asset Efficient Frontier for a 10-Year Time Horizon
(Assuming Tax-Exempt Status)



TIPS will likely outperform other asset classes in a high inflation period [14].

The real value of TIPS appears, not surprisingly, when returns are viewed on an inflation-adjusted basis. Figures 1 and 2 show efficient frontiers on a nominal and inflation-adjusted basis. The efficient frontiers were developed using Towers Perrin's Global CAP:Link [15] model and Towers Perrin's Basis Expectations

assumptions [16] as of December 1, 1997. On the conservative end of the inflation-adjusted efficient frontier, TIPS add significantly to the

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risk/reward trade-off. In contrast to this, the aggressive investor does not see much benefit from TIPS over the stated time horizon. Neither does the nominal-return investor, regardless of his or her risk aversion.

The role of TIPS further depends on the time horizon. On a short-term basis, TIPS tend to move in the same direction as nominal yields, because there is no change in inflationary expectations. This makes TIPS less attractive in an asset-allocation framework with a short time horizon. However, on a longer-term basis, TIPS are highly correlated with inflation. The volatility of nominal compound returns of a conventional bond is higher compared to the volatility of TIPS on a short-term basis. On a longer term basis, the volatility of TIPS is actually greater than that of nominal bonds because the cash flow on nominal bonds is fixed, but the cash flow of TIPS varies with inflation (Figure 3).

Closing Comments

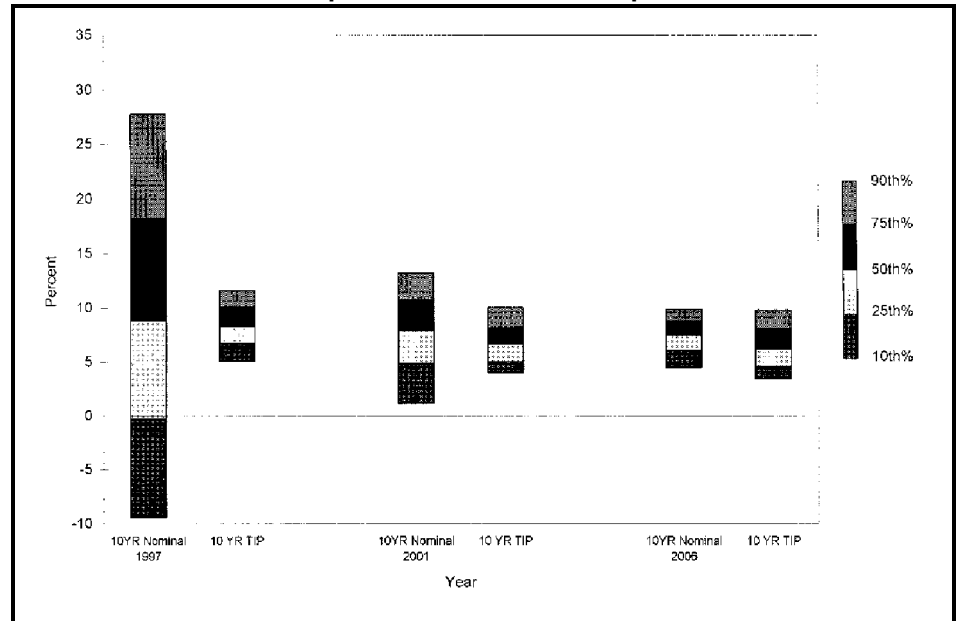
If we are indeed entering a low inflation era, and much currently points to this, then the government treasuries across the world have an added incentive to issue these instruments. If inflation is a no-show or the treasuries/central banks believe inflation can be managed, then treasuries can pocket the risk premium and finance their government debt at lower yields.

There is much left to be learned about TIPS. Further study will include how TIPS might fare when optimized on an asset/liability basis. The more liabilities tend to move with the Consumer Price Index, the more attractive TIPS are likely to be. One must distinguish between TIPS' price change, pre-tax cash flow, and post-tax cash flow. The main advantage of TIPS is on an inflation-adjusted basis. As the Treasury continues to issue TIPS, liquidity should increase, but interest in these instruments will most likely be subdued until inflationary expectations surface.

END NOTES

1. Bankers Trust New York Corp. offers some TIPS research and data on its web site at www.bankerstrust.com. Access is restricted, but I spoke to Mr. Steve

FIGURE 1
U.S. 10-Year Nominal T-Bond Versus
TIPS Compound Returns Basic Expectations



Salvadore, who generously offered me access. The site is geared for institutional clients. For further information, contact Mr. Salvadore at (212) 250-TIPS.

2. *Risks and Rewards*, March 1997: "Inflation-Indexed Bonds—How Attractive Are They?"
3. *Wall Street Journal*, March 14, 1997.
4. Calculated as the ratio of the Consumer Price Index—All Urban Consumers City Average, Bureau of Labor Statistics, U.S. Department of Labor.
5. Average yield on 10-year nominal U.S. Treasury bond for the week ended January 17, 1997, Federal Reserve H.15 Release.
6. Average yield on 10-year nominal U.S. Treasury bond for the week ended April 18, 1997, Federal Reserve H.15 Release.
7. Average yield on five-year nominal U.S. Treasury bond for the week ended July 18, 1997, Federal Reserve H.15 Release.
8. Average yield on five-year nominal U.S. Treasury bond for the week ended October 17, 1997, Federal Reserve H.15 Release.
9. The comments here ignore that the U.S. Treasury guarantees that no

TIPS will mature at less than par value.

10. As of December 1, 1997, the yield on the original January 10-year TIPS was 3.53%.
11. As of December 1, 1997, the yield on the conventional January 10-year bond was 5.86%. $[5.86\% - 3.53\% = 2.33\%$ (see Equation (1)].
12. Year-over-year change in CPI ending in November 1997.
13. *Economics and Risk Focus*: "The Exotica Portfolio: New Financial Instruments Make Bonds Obsolete," R. McFall Lamm Jr., Bankers Trust New York Corp., 5/9/97.
14. On a price basis. This should not be confused with after-tax cash flows to the taxable investor, which may not be favorable—even in a high-inflation environment.
15. Global CAP:Link is a stochastic scenario generator—see *Interfaces* (An International Journal of the Institute of Operations Research and the Management Sciences), Volume 26, Number 2, March-April 1996: "Generating Scenarios for the Towers Perrin Investment System," John M. Mulvey.

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16. Towers Perrin's basic-expectations assumption set reflects probability distributions built around the current long-bond yield. Other probability distributions are based on historical yield spreads and inflation-adjusted returns.

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Thanks to Our 1997 Authors!

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