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## The Basics of Investing in TIPS

### What are TIPS?

In January of 1997 the Treasury began issuing inflation-indexed bonds in 5, 10, and 30-year maturities (although the Treasury has since suspended issuance of 30 yr. debt) called Treasury Inflation Protection Securities (TIPS). TIPS have unique risk characteristics. Like conventional Treasury bonds they are virtually free of default risk. However, unlike traditional fixed income instruments the value of their principal and future coupon payments isn't eroded by inflation. Both the bonds' coupon payments and principal are linked to the Consumer Price Index for all Urban Consumers (CPI-U). The biggest risk to which investors are exposed is fluctuations in real (after inflation) interest rates. The prices of conventional bonds are affected by changes in both real interest rates and expected inflation.

$$\text{Nominal Interest Rates} = \text{Real Interest Rates} + \text{Expected Inflation}$$

With TIPS the bond's coupon rate remains constant, however, par value is adjusted every six months to reflect the latest available change in the Consumer Price Index for all Urban Consumers (CPI-U). The mechanics work as follows:

**Assumptions:** Purchase an inflation-indexed bond at par for \$1000 on January 1 with a 4% coupon rate. The relevant annualized change in the CPI reference rate over the next six months is 3%. The bond's principal would be adjusted upward to \$1015 and the resulting coupon payment would be \$20.30

<b>Adjustment to Principal:</b> $\$1000 (1 + 3\%/2) = \$1015$
<b>Coupon Payment:</b> $\$1015 (4\%/2) = \$20.3$

At maturity, the bondholder receives the greater of inflation adjusted principal or (in the case of deflation) original par. From a tax standpoint, the coupon payments are taxed as current income the same as traditional treasuries. A disadvantage of inflation indexed bonds in taxable accounts is that the appreciation in principal due to inflation is also taxed as current income, even though it isn't paid out as cash. Mutual funds avoid this problem by distributing taxable gains to shareholders.

TIPS as an investment stand to perform well relative to traditional Treasuries during periods of falling real interest rates and/or when actual inflation turns out to be higher than expected. Rising real yields or inflation below expectations, would cause TIPS to underperform. Compared to regular Treasury bonds, TIPS prices are more sensitive to changes in *real* interest rates (i.e., market yields less inflation), but less sensitive to changes in nominal rates.



	<b>TIPS</b>	<b>Traditional Treasuries</b>
<b>Rising Real Yields</b>	Price Decreases (greater in magnitude than traditional Treasuries)	Price Decreases
<b>Increasing Inflation Expectations</b>	Price may increase modestly as investors increasingly demand inflation protection.	Price Decreases
<b>Actual Inflation Greater than Expected Inflation</b>	TIPS outperform traditional Treasuries	Traditional Treasuries underperform TIPS

### *Why Invest In TIPS*

The unique risk characteristics of inflation-indexed bonds make them attractive as a conservative addition to an investor's fixed income portfolio. TIPS are a "perfect" inflation hedge in that they are the only investment that provides a stream of income contractually tied directly to the CPI.

Inflation-indexed bonds make a valuable addition to an investor's portfolio as a diversification tool. The following table shows the correlation of TIPS to various domestic asset classes over the past five years. The correlation coefficient is a number between  $-1.0$  and  $1.0$ . If there is perfectly positive linear relationship between the historical returns of two assets, the correlation will be  $1.0$ . If there is a perfectly negative linear relationship between the two holdings the correlation coefficient is  $-1.0$ . A correlation coefficient of zero indicates that there is no linear relationship. The significance of looking at the correlations of historical investment returns is that from a diversification standpoint the volatility of an investor's portfolio is ultimately a function of the volatility of the assets in the portfolio and their correlations to each other. Including assets *that have relatively low correlations can act to lower the volatility of an investor's portfolio.*

<b>Five-Year Correlation of TIPS to:</b>	
Government Debt	0.72
Aggregate US Fixed	0.70
Long Term Treasuries	0.70
Investment Grade Credit	0.62
Mortgages	0.61
Short Term Treasuries	0.54
High Yield	0.00
Large Cap Stocks	-0.24
Small Cap Stocks	-0.24

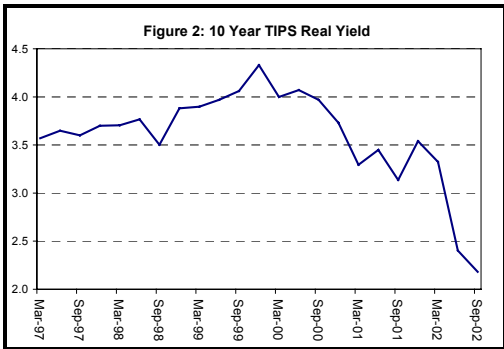
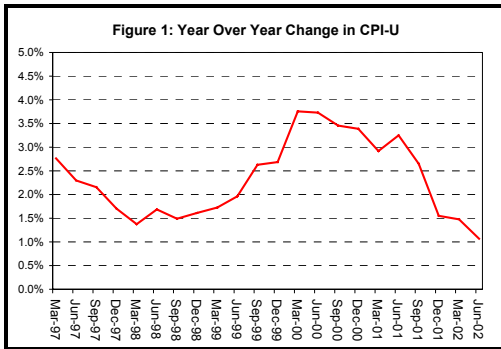
As the table indicates, over the past five years TIPS returns have been negatively correlated to US equity market performance (as have other fixed income indices with the exception of high yield), and have had fairly low correlations to other sectors of the domestic fixed income market. Not surprisingly, the correlation of inflation-indexed Treasuries has been highest to Government debt.

To summarize, TIPS are attractive for their defensive characteristics. The inflation protection serves them well in rising or high inflation environments, which hurt regular bonds. Their negative correlation to US equity markets indicates that they (like traditional treasuries) have tended to perform well when the US equity markets struggle. Thus, inflation indexed bonds can serve as a hedge against both inflation *and* equity market weakness

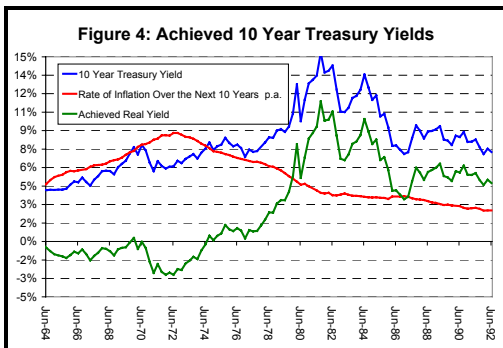
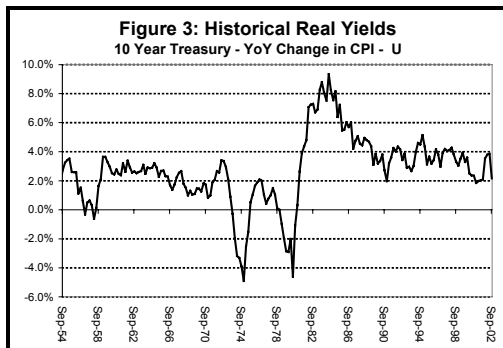
*Performance & Outlook*

	Rate of Return			Standard Deviation	Sharpe Ratio
	1 Year	3 Year	5 Year	5 Year	5 Year
Long Treasuries	14.4%	12.7%	10.2%	7.5%	0.76
<b>TIPS</b>	<b>14.7%</b>	<b>12.3%</b>	<b>8.8%</b>	<b>3.6%</b>	<b>1.20</b>
Aggregate US Bonds	8.6%	9.5%	7.8%	3.2%	1.04
Mortgages	7.4%	9.0%	7.6%	2.5%	1.24
US Credit Bonds	8.2%	9.0%	7.3%	3.9%	0.70
Short Treasuries	5.6%	7.2%	6.6%	1.5%	1.35
High Yield Bonds	-3.3%	-2.8%	-0.5%	9.2%	-0.54
Small Cap Stocks	-9.3%	-4.1%	-3.2%	23.6%	-0.32
Large Cap Stocks	-20.5%	-12.9%	-1.6%	18.3%	-0.33

The strong returns and low volatility achieved by TIPS over the past five years has attracted considerable attention from the institutional investment community. This strong performance wasn't due to the bonds' inflation-hedge characteristics (Figure 1), but due to falling real yields (Figure 2). Since mid-2000, inflation rates have dropped significantly. However, as investors sought safety amid plunging equity markets, Treasuries (TIPS included) rallied. TIPS yields have fallen from an attractive 4.3% in late-1999 and early-2000 (as they were being ignored by investors enamored with tech stocks), to their current 2.2% level. At today's prices, they really aren't poised to repeat the last three years' impressive returns.



Prior to the introduction of TIPS in 1997, investors commonly tried to gauge real yields indirectly, by using the previous year's inflation as a proxy for expected inflation. While using recent experience as the "plug" for investor's expectations isn't perfect (especially at economic turning points), it does help give some historical perspective.



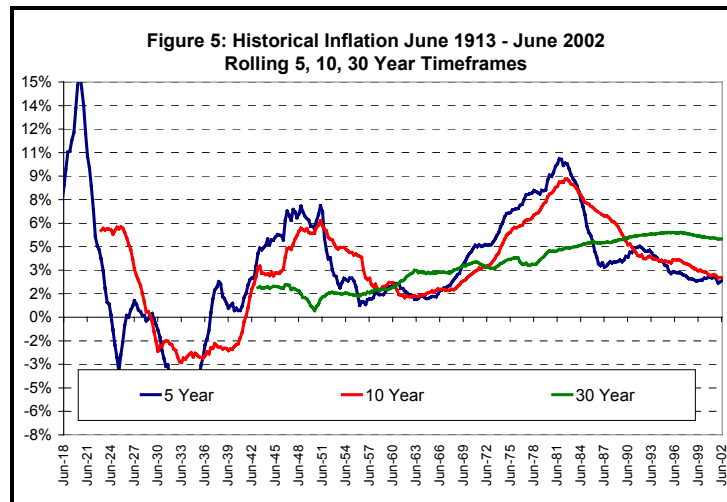
## The Basics of Investing in TIPS

Based on Figure 3, a real yield of 2.5%-3% seems like a reasonable long-term number, suggesting that TIPS may be a bit richly priced today. But, there are additional factors affecting the prices of inflation-indexed bonds. First, investors may be willing to “pay up” (accept a *lower* yield) to protect themselves from inflation *risk*. Investors realize that regardless of what they expect inflation to be, the future is uncertain. Actual realized real yields on ten-year Treasuries have ranged from nearly –3% to 11% (Figure 4). Conversely, investors may demand *higher* yields from TIPS because they are still less liquid than regular Treasuries. TIPS represent only about 4.5% of the outstanding marketable debt issued by the Treasury.

Another way to look at inflation-indexed treasuries is to gauge their *relative* attractiveness versus traditional Treasuries. The current difference between Treasury and TIPS yields is the level of expected inflation implied by inflation-linked bond prices. Said differently, it is the breakeven level of inflation where holding TIPS and Treasuries to maturity would provide investors with the same rate of return. If actual inflation turns out to be higher, the TIPS investor will be better off.

	Treasury Yields	TIPS Yields	Implied Inflation
<b>5 Year</b>	2.7	1.3	1.4
<b>10 Year</b>	3.7	2.2	1.5
<b>30 Year</b>	4.7	2.6	2.1

By way of providing some perspective, the current year-over-year change in the CPI through September 30<sup>th</sup> was 1.6%, which is quite low by historical standards. The median since 1980, when the Fed’s primary focus became inflation control, is about 3.2%. Every January and July the Wall Street Journal publishes a semi-annual survey of economic forecasts from about fifty economists. Their collective average estimate for the November 2002 year-over-year change in the CPI was 2.2%, ranging from 0.5% to 3%. Thus, the current break-even inflation rate embedded in TIPS prices is low by historical standards. In fact you would have to go as far back as the 60’s to find inflation that low over 5, 10, or 30 year timeframes (Figure 5).



When you buy an inflation-indexed bond, you lock in a real yield and the value of your principal **at maturity** is protected from inflation. That doesn’t mean you can’t achieve a negative return in the short term. TIPS market prices are affected by changes in real yields and investors’ demand for the inherent inflation protection. If a portfolio is marked to market, as is the case with a pension plan sponsor’s balance sheet or a mutual fund, it will fluctuate with the market prices of TIPS.

### ***Conclusions:***

The ideal environment for investing in TIPS is during periods of falling real interest rates and unexpectedly higher inflation rates. The former leads to rising market prices for the bonds, while the latter rewards an investor with greater than expected semi-annual adjustments to underlying principal. Prospective investors need to remember -

- TIPS market prices are more sensitive to changes in real interest rates than regular Treasury bonds of the same maturity. Rising real yields or actual inflation below expectations, will cause inflation-indexed Treasuries to underperform nominal Bonds.
- Adding TIPS to an investor's portfolio can provide significant diversification benefits. Over the past five years, TIPS returns have been negatively correlated to the US equity markets, have displayed relatively low correlation with other high-grade sectors of the domestic bond markets, and a zero correlation with high yield bonds.
- For taxable investors, one disadvantage of inflation-indexed bonds is that the semi-annual upward adjustment to the bond's principal is taxable as current income. Mutual funds mitigate this problem by making cash distributions to shareholders of the taxable gains.

In the current market environment TIPS are not poised to post the strong returns experienced since their inception in 1997. As investors have fled to safety amid plunging equity markets, real bond yields have fallen from a very attractive 4.3% to current levels of 2.2%. We believe the potential for rising real yields is significant over the next two years. In the absence of changing inflation expectations, this would cause TIPS to underperform Treasuries.

Alternatively, comparisons to regular Treasury bonds indicate TIPS are being priced with very low breakeven inflation expectations. The implications of this are twofold – First, TIPS yields *relative to traditional Treasury yields* are attractive for investors who plan on holding the securities to maturity. Second, unexpectedly higher inflation will unexpectedly increase the principal adjustments. This will offset some of the “coupon advantage” nominal Treasuries have in a rising real yield environment.

On balance, it's a mixed bag for TIPS right now. The negative prospect of rising real yields combined with the positive prospect of higher future principal adjustments. Even so, the unique characteristics of TIPS have made them attractive as both a hedge against inflation *and* equity market weakness.