

## Bond Basics

August 2006

### Bond Basics: Treasury Inflation Protected Securities

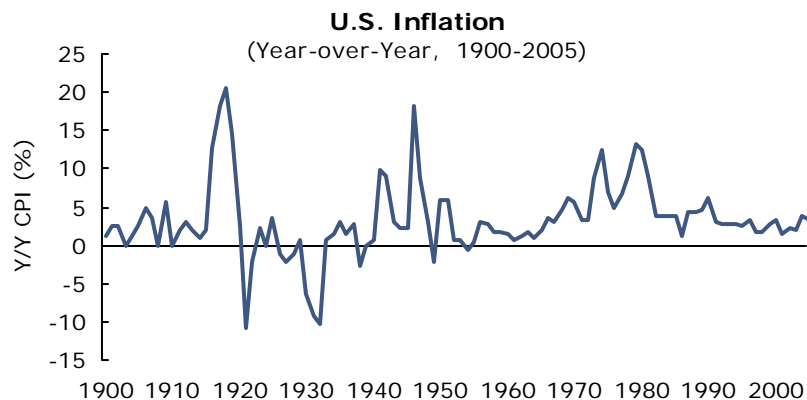
Treasury Inflation Protected Securities, or “TIPS”, are government securities designed by the U.S. Treasury to help protect investors from inflation.

In this article, we will explain how inflation works against investors and how TIPS can provide a hedge against the negative effects of inflation. We will also discuss other potential benefits of including TIPS in a broader portfolio.

#### Inflation: The First Hurdle an Investment Plan Must Overcome

Inflation is an economic term for increases in the cost of consumer goods and services over time. Because the cost of goods is steadily rising, investment returns must be adjusted for inflation, which means the only returns that help investors increase their purchasing power are “real” returns—or those returns left over after subtracting inflation. Therefore, choosing investments that will earn a return above the rate of inflation can protect an investor’s future purchasing power.

How high is the inflation hurdle? Over the last decade, inflation has averaged about 2.5% annually, based on year-over-year changes in the consumer price index (CPI). At a 2.5% inflation rate, goods and services that cost \$100 a decade ago would cost about \$128 today.<sup>1</sup>



Source: U.S. Bureau of Labor Statistics

More recently, inflation has been on the rise, hitting about 3.5% annually in 2005, as the chart above shows. To get the real return on an investment in 2005, we must subtract that 3.5% from the “nominal” return that is reported. For example, the reported total return on the S&P 500 stock index was 4.9%, but once inflation is subtracted, the real return was about 1.5%. That means an investment in the S&P 500 in 2005 increased an investor’s purchasing power by about 1.5% over the course of the year, even though the S&P 500 returned nearly 5%. An investment in a money market, savings account or any other investment earning less than the 3.5% rate of inflation

<sup>1</sup> Source: “What is a Dollar Worth”, Federal Reserve Bank of Minneapolis website. See: [www.minneapolisfed.org/research/data/us/calc](http://www.minneapolisfed.org/research/data/us/calc)

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effectively lost purchasing power in 2005, defeating even the most conservative goal of capital preservation.

### TIPS Offer a Hedge Against the Effects of Inflation

The U.S. Treasury specifically designed TIPS to help protect investors from the negative impact of inflation. TIPS are Treasury bonds, backed by the U.S. government, but unlike a traditional government bond, the principal and interest payments on TIPS adjust to track changes in inflation. Specifically, the principal and interest on TIPS are indexed to the CPI-All Urban Consumers (CPI-U) so that increases in consumer prices are directly translated into higher principal and interest payments on TIPS.

For example, consider a \$1,000 ten-year TIPS note with a 2.5% coupon in an environment of 4% annual inflation. Initially, the interest paid would be 2.5% of \$1,000, or \$25.00. But the principal on the TIPS note will adjust upward on a daily basis to match the inflation rate, reaching \$1,480 (4% per year, compounded annually) at the end of 10 years. Although the coupon rate on the TIPS note will remain fixed at 2.5%, the actual interest payments will also rise as the value of the principal increases; in the tenth year, the annualized interest payment will be 2.5% of the inflation-adjusted principal, or 2.5% of \$1,480, which is \$37.00. At maturity, the investor who purchased the TIPS note when it was issued for \$1,000 will receive the inflation-adjusted principal of \$1,480.

The inflation protection built into TIPS is designed to provide investors with predictable real returns and an explicit hedge against inflation. As the table below shows, monthly returns on TIPS, as defined by the Lehman Brothers U.S. TIPS Index, have had a positive correlation to monthly changes in inflation, while other major asset classes have had a negative correlation to inflation.

### Monthly Return Correlations to Inflation

(February 1997- March 2006)

	Correlation To Monthly Changes in CPI
U.S. TIPS <sup>1</sup>	0.1
Intermediate Treasuries <sup>2</sup>	(0.1)
U.S. Investment-Grade Bonds <sup>3</sup>	(0.1)
Non-U.S. Bonds (Dollar Hedged) <sup>4</sup>	(0.1)
U.S. High Yield Bonds <sup>5</sup>	(0.1)
Non-U.S. Equities <sup>6</sup>	(0.1)
S&P 500 Index	(0.1)

**Source:** Bloomberg Financial Markets, JPMorgan, Lehman Brothers, Merrill Lynch, PIMCO

<sup>1</sup> Lehman Brothers U.S. TIPS Index

<sup>2</sup> Lehman Brothers Intermediate Treasury Index

<sup>3</sup> Lehman Brothers Aggregate Bond Index

<sup>4</sup> J.P. Morgan Non-U.S. Hedged Index

<sup>5</sup> Merrill Lynch U.S. High Yield Index, BB-B Rated

<sup>6</sup> MSCI EAFE Index

The explicit inflation hedge offered by TIPS is important because inflation can rise suddenly and unexpectedly, as it has on many occasions in the past, as illustrated in

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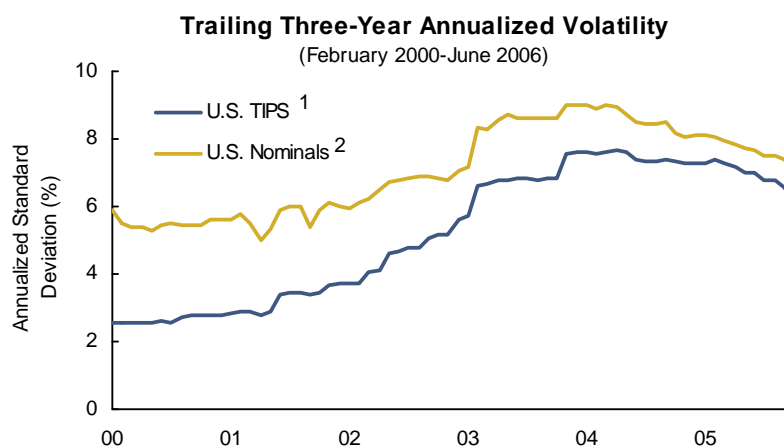
the first chart. An unexpected surge in inflation poses a significant threat to portfolio returns. Unexpected inflation causes economic uncertainty that may lower nominal returns from traditional asset classes such as stocks and bonds, which tend to dominate most investors' portfolios. Lower nominal returns and rising inflation can potentially result in significantly lower real returns. TIPS, with their explicit link to changes in inflation, should continue to provide predictable real returns even when inflation rises abruptly.

In the unusual event of deflation, which is a sustained fall in prices, the U.S. government guarantees repayment of principal; at maturity, investors receive the greater of the inflation-adjusted principal or the initial par amount. Interest payments on TIPS would decrease in a deflationary environment because interest payments are always based on the inflation-adjusted principal amount, which could potentially be lower than the face value of the bond in a deflationary environment.

### It's Not Just About Inflation: Other Potential Benefits of TIPS in a Portfolio

Including TIPS in a portfolio of stocks and traditional bonds may provide investors with benefits in addition to inflation protection, including enhanced diversification and capital preservation.

Inflation adjustments on TIPS remove the uncertainty associated with inflation risk, so TIPS tend to be less volatile than nominal bonds, as shown in the chart below, and significantly less volatile than equities. Because of their lower volatility, TIPS can serve as a lower-risk alternative to nominal bonds, providing the potential for enhanced capital preservation in a portfolio containing riskier asset classes.



Source: Barclays Capital

<sup>1</sup> Barclay's US Government Inflation Linked Bond All Maturities Index

<sup>2</sup> The Barclay's US Government Break-Even Inflation Linked Bond Index

TIPS, because of their low volatility and link to inflation, can also enhance the diversification of an overall portfolio. In a diversified portfolio, the investment returns of the assets in the portfolio are non-correlated, meaning that a change in economic

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conditions may affect one investment in the portfolio but not another. Diversification does not ensure against loss, but can smooth a portfolio's performance and is perhaps the most effective strategy for shifting the tradeoff between risk and return in an investor's favor. As the table below shows, TIPS have had a negative correlation with equities, and relatively low correlations with several other asset classes, notably high-yield bonds. TIPS may therefore enhance the diversification of a broader portfolio, reducing the portfolio's volatility and potentially improving overall returns.

### TIPS Monthly Return Correlations to Major Asset Classes

(February 1997- March 2006)

	Correlation to U.S. TIPS <sup>1</sup>
U.S. TIPS <sup>1</sup>	1.0
Intermediate Treasuries <sup>2</sup>	0.8
U.S. Investment-Grade Bonds <sup>3</sup>	0.8
Non-U.S. Bonds (Dollar Hedged) <sup>4</sup>	0.6
U.S. High Yield Bonds <sup>5</sup>	0.1
Non-U.S. Equities <sup>6</sup>	(0.2)
S&P 500 Index	(0.2)

**Source:** Bloomberg Financial Markets, JPMorgan, Lehman Brothers, Merrill Lynch, PIMCO

<sup>1</sup> Lehman Brothers U.S. TIPS Index

<sup>2</sup> Lehman Brothers Intermediate Treasury Index

<sup>3</sup> Lehman Brothers Aggregate Bond Index

<sup>4</sup> J.P. Morgan Non-U.S. Hedged Index

<sup>5</sup> Merrill Lynch U.S. High Yield Index, BB-B Rated

<sup>6</sup> MSCI EAFE Index

### Gauging the Value of TIPS Using the Breakeven Inflation Rate

To compare TIPS with nominal Treasury bonds and determine which is the better investment at any given time, investors can look at the difference in yields between the two types of bonds relative to the actual rate of inflation. The difference in yields is called the breakeven inflation rate. For example, if a 10-year nominal Treasury note yields 4.4% and a 10-year TIPS note has a real yield of 2.4%, then the breakeven inflation rate is 2%. When the breakeven inflation rate is less than the actual rate of inflation for the period to maturity, TIPS should provide a higher total return than conventional Treasuries of the same maturity.

### Conclusion

While there are no guarantees when investing, TIPS can provide investors with a potential hedge against the negative effect that a surge in inflation can have on a portfolio. TIPS can also enhance the capital preservation and diversification of a broader portfolio that contains equities, traditional nominal bonds and other asset classes.

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investment advice or a recommendation of any particular security, strategy or investment product. Information contained herein has been obtained from sources believed reliable, but not guaranteed.

**Past performance is no guarantee of future results.** Each sector of the bond market entails risk. Inflation-indexed bonds issued by the U.S. Government, also known as TIPS, are fixed-income securities whose principal value is periodically adjusted according to the rate of inflation. Like any other bonds, TIPS are subject to capital gains or losses in the marketplace prior to maturity; TIPS may be particularly sensitive to capital losses during deflationary environments. Interest payments on TIPS are based on the inflation adjusted principal value of the bond, which can adjust below the bond's face value before maturity for the purpose of calculating interest payments, potentially causing decreasing interest payments in deflationary environments. The U.S. Government guarantees repayment of either the inflation adjusted or original principal amount (whichever is greater) at maturity. Neither the current market value of inflation-indexed bonds nor the value a portfolio that invests in inflation-indexed bonds is guaranteed, and either or both may fluctuate.

The correlation of various indices or securities against one another or against inflation is based upon data over a long time period. These correlations may vary substantially in the future or over shorter time periods, resulting in greater volatility.

The Standard & Poor's 500 Composite Index (S&P 500) is an unmanaged index of U.S. companies with market capitalizations in excess of \$4 billion. It is generally representative of the U.S. stock market. The Lehman Brothers U.S. TIPS Index is an unmanaged market index comprised of all U.S. Treasury Inflation Protected Securities rated investment grade (Baa3 or better), have at least one year to final maturity, and at least \$250 million par amount outstanding. Performance data for this index prior to 10/97 represents returns of the Lehman Inflation Notes Index. The Lehman Brothers Intermediate Treasury Index is an unmanaged index comprised of various intermediate fixed income maturities. Lehman Brothers Aggregate Index (LBAG) is an unmanaged index, considered generally representative of investment-grade fixed income securities issued within the U.S. JPMorgan Non-U.S.(Hedged) Index is an unmanaged market index representative of the total return performance in U.S. dollars of major non-U.S. bond markets. The Merrill Lynch U.S. High Yield BB-B Rated Index is an unmanaged market index comprised of various fixed income securities rated BB and B. Prior to 12/31/96, performance reflects the Merrill Lynch U.S. High Yield BB-B Rated Cash Pay Index. The MSCI EAFE (Morgan Stanley Capital International Europe, Australasia, Far East Index) is an unmanaged index of over 900 companies, and is a generally accepted benchmark for major overseas markets. Index weightings represent the relative capitalizations of the major overseas markets included in the index on a U.S. dollar adjusted basis. It is not possible to invest directly in an unmanaged index. Barclays U.S. Government Breakeven Inflation-Linked Bond Index provides a simple framework for comparing returns on an inflation-linked bond market with a nominal bond market. The basis for this technique is to construct an index of nominal bonds that are maturity matched with a inflation-linked bond index. These so-called "breakeven indices" provide a much better comparison of relative performance between these asset classes than comparing the linker index with a conventional bond market index. In this case, the nominal bonds utilized have similar maturities to the Barclays U.S. Government Inflation-Linked Bond Index. The Barclays World Government Inflation-Linked All Maturities Bond Index measures the performance of the major government inflation-linked bond markets. The index is designed to include only those markets in which a global government linker fund is likely to invest. This makes investability a key criterion for inclusion in the index. Markets currently included in the index (in the order of age) are, the UK (1981), Australia (1985), Canada (1991), Sweden (1994), US (1997), France (1998) and Italy (2003).

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