

TIPS for Fixed Income Investors

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Summary. Treasury Inflation-Protection Securities (TIPS) are government bonds of impeccable credit quality. The inflation risk has been transferred to the government and the price fluctuates less than with conventional securities. Such bonds should command a premium and yet effective yields have exceeded those of other high quality bond investments. TIPS can provide an inflation-adjusted income stream over many years if held in a retirement account. Because of the peculiarities of trust accounting, owning TIPS can reduce distributions to the beneficiaries of some trusts.

Introduction. As tax planning professionals, we are privy to the details of our customers' financial lives. Our customers are asking about alternatives to the currently dismal returns on CDs and other fixed income investments. It's time to understand Treasury Inflation-Protection Securities (TIPS).

TIPS have offered higher effective yields for some time¹. It was not supposed to be this way. TIPS were introduced to reduce borrowing costs. The Treasury is frustrated by having to pay out more on TIPS than on conventional Treasury securities and it may initiate more frequent or larger auctions so as to reduce the return advantage².

The conventional wisdom is that investors should not buy long-term bonds when interest rates are low. This dictum needs to be balanced against the risks that the Treasury will be successful in lowering returns or, despite denials³, that they will eliminate TIPS. Now may be the time to act!

How TIPS Work. Treasury introduced TIPS in January 1997⁴. They pay a constant rate of interest on an accrued balance which is adjusted daily for changes in the Consumer Price Index (CPI-U). The inflation adjustment is paid when the bonds mature or when they are sold.

The "effective yield" is approximately the coupon yield plus inflation.

Let's examine the performance of a one such bond, specifically the 10-year 3.5% TIPS sold at 99.818 on January 15, 2001, CUSIP 9128276R8. Each thousand dollar par bond cost \$998.18 when issued.

To calculate the first interest payment, we need the inflation adjustment on the first payment date, July 15, 2001. The IRD calls the adjustment the "index ratio" since the factor is the ratio of the Consumer Price Index on the date of interest to the value of the Index on the date the bond was issued. Using the on-line source referenced in endnote 3, the index ratio is 1.01848.

The accrued principal balance on the first payment date is the par value of

the bond times the inflation factor.

$$\$1000 \times 1.01848 \text{ or } \$1,018.48.$$

The first semi-annual interest payment is $\$1,018.48 \times 3.5\% / 2$ or \$17.82.

The index ratio is 1.02022 when the second interest payment is paid on January 15, 2002. The accrued principal balance is \$1,020.22 and the second interest payment is \$17.85.

Subsequent interest payments are calculated in the same manner. If inflation were 3.3% annually over the life of this 10-year bond⁵, the accrued principal balance at maturity would be

$$\$1000 \times (1 + 3.3\%)^{10} \text{ or } \$1,383.58.$$

The bonds would be redeemed for \$1,383.58 per bond and the final semi-annual interest payment would be \$24.21.

Investors receive a Form 1099-INT reporting the interest paid during the year and a Form 1099-OID reporting the inflation accrual. For 2001, the 1099-INT would report \$17.82 per bond.

The inflation accrual is the accrued principal at the end of the year less the accrued principal at the beginning of the year or on the purchase date, if later. The bond is valued at par in these calculations.

The index ratio at year-end 2001 is 1.02111⁶. The ratio was 1.0000 when the bond was issued. The inflation accrual was \$21.11 during 2001

$$\$1000 \times 1.02111 \text{ minus } \$1000 \times 1.00000 = \$21.11$$

and the 1099-OID would report this amount per bond.

The federal tax is calculated on the sum of the interest received plus the inflation accruals⁷. Interest on TIPS is free of state income taxes unless held in a retirement account.

TIPS Offer More Return. Yield to maturity (YTM) is the annualized pre-tax return of a bond purchased at the current market price and held to maturity. YTM will seldom be the same as the coupon yield because bond prices rise when interest rates decline and vice versa.

YTM on conventional bonds reflect many factors, including the market's estimate of future inflation. YTM on TIPS reflect similar factors except that inflation is not part of the equation. Thus the difference in yields is a rough measure of the market's forecast of future inflation.

Conventional Treasury bonds of intermediate maturities have been priced to yield 1 - 2% more than TIPS during the past five years. FYI, historical inflation has been 2.4% over the five years ending May 2003. The differential between long TIPS and long bonds has been 1.5 - 2.5%.

In essence, bond professionals have been betting that inflation will be less than 1 - 2% in the intermediate term and less than 1.5 - 2.5% over the long term.

If an investor agrees with these forecasts, TIPS are fairly priced compared to conventional Treasury securities. If an investor is concerned that future inflation might exceed these forecasts, TIPS are the better deal.

To compare TIPS to bonds with different marginal tax rates, we need to compare after-tax returns. The after-tax return of a conventional bond is approximately YTM times one minus the marginal tax rate.

$$\text{YTM} \times (1 - \text{Marginal Tax Rate})$$

The after-tax return on TIPS is approximately the sum of YTM plus the assumed inflation rate times one minus the marginal tax rate.

$$(\text{YTM} + \text{Inflation Rate}) \times (1 - \text{Marginal Tax Rate})$$

After-tax returns of bonds of intermediate maturities are displayed as a function of the assumed inflation rate and marginal tax rate in Table 1. Interest rates are as of mid 2002 and have declined since then.

Table 1. Comparison of Future After-tax Returns (%)

Middle income investors pay 27% tax on Treasury securities and 34% tax on GNMA's. High income investors pay 39% and 45% tax respectively. Municipal bonds are tax-free.

<u>Inflation Assumption</u>	<u>Middle Income</u>			<u>High Income</u>		
	<u>2.3%</u>	<u>3.3%</u>	<u>4.3%</u>	<u>2.3%</u>	<u>3.3%</u>	<u>4.3%</u>
Munis @ 3.9%	3.9	3.9	3.9	3.9	3.9	3.9
Treasuries @ 4.5%	3.3	3.3	3.3	2.7	2.7	2.7
GNMA's @ 5.5%	3.6	3.6	3.6	3.0	3.0	3.0
TIPS @ 3.0%	3.9	4.6	5.3	3.2	3.8	4.5

As of mid 2002, TIPS provided the highest after-tax return for middle income investors over the range of inflation forecasts considered by the Social Security Trustees. TIPS also generally provided the highest returns for high income investors.

Table 1 assumes that the bonds are held to maturity and that the returns are therefore independent of future interest rate changes.

Table 2 compares historical returns⁸ which include price changes due to interest rate changes.

To understand these historical results, one needs to remember that the recent past has seen generally falling interest rates. Price appreciation has enhanced recent returns by 2 - 3% and this is why the 1-yr. returns are larger than the 3-yr. returns. Price appreciation is unlikely to continue to

enhance returns since interest rates are currently low.

Table 2. Pre-tax Returns and Standard Deviations

Annualized Returns (%) as of 12/31/2001 are from the funds. Standard deviations (SD, % per month) are calculated using "Investors FastTrack" database and software. Historical returns do not guarantee future results. TIPS won't return 8% annually.

	<u>1-yr. Return</u>	<u>3-yr. Return</u>	<u>1-yr. SD</u>
Vanguard TIPS (VIPSX)	7.6	n/a	1.3
59 Wall Street TIPS (FNISX)	8.4	8.3	1.2
Intermediate Bond Index Fund (VBIIX)	9.4	6.0	1.9

The prices of TIPS are less generally sensitive to interest rate changes than are the prices of conventional securities because yields are automatically adjusted for inflation. One can confirm this from a plot of quarterly prices⁹.

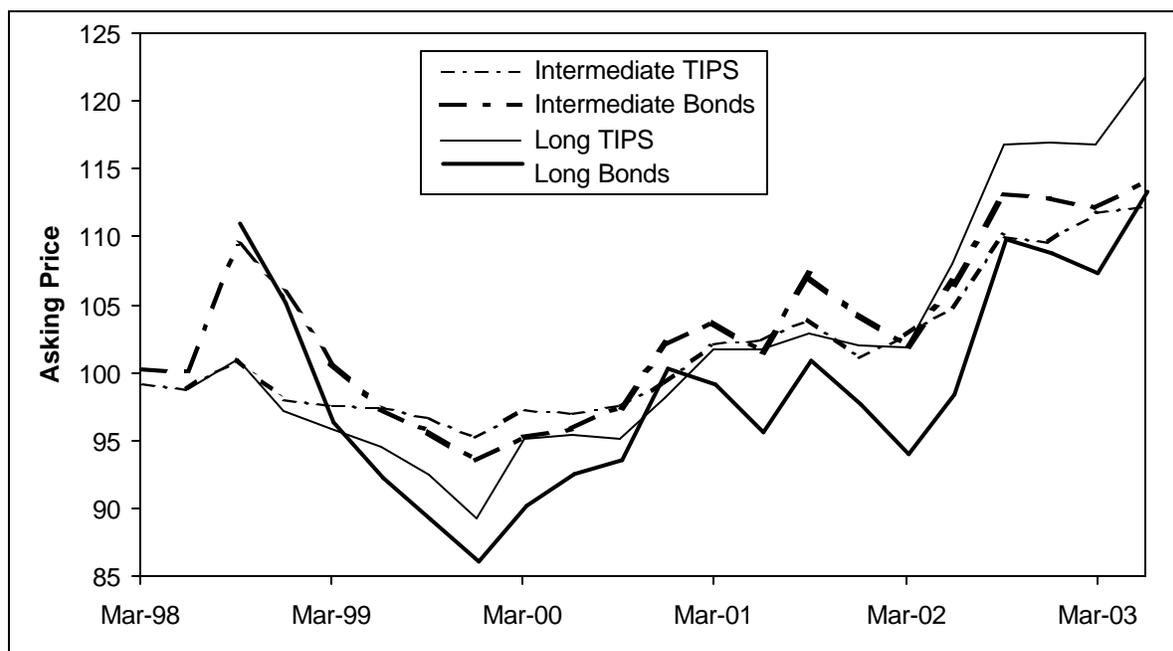


Figure 1. Historical Market Prices. The comparison is between 5.5% conventional Treasury bonds maturing in 2/2008 and 8/2028 and 3.625% TIPS maturing in 1/2008 and 4/2028. Prices do not include the accrued inflation adjustments. 6/30/03.

Since the standard deviation of the price of a bond fund measures price fluctuations, one can also confirm the relative price stability of TIPS by comparing the standard deviation of the TIPS funds in Table 2 to the standard deviation of the Intermediate Bond Index fund, a collection of Treasury bonds and high quality corporate bonds¹⁰.

For reference, the Standard and Poor's 500 Index[®] has a standard deviation of 6% per month. The price fluctuations of the Standard and Poor's stock

index are about five times larger than the price fluctuations of TIPS.

Greater price sensitivity is also the reason that the 1-year return of the Intermediate Bond Index exceeds the return on TIPS. This higher return is not sustainable over intervals long enough to average out interest rate changes as evidenced by the fact that the 3-year return is well below the return for TIPS.

The 59 Wall Street fund outpaced Vanguard's fund during 2001 even though this fund charged higher expenses. The explanation may lie in the fact that the assets under Vanguard management grew six-fold during 2001, a period of rising bond prices, as compared to three-fold for the older 59 Wall Street fund. It is a mathematical fact that a skilled manager who is forced by large cash inflows to invest in ever more expensive bonds will underperform an equally skilled manager with smaller cash inflows.

How Do TIPS Compare to IBonds? I-Bonds are a type of U.S. Saving Bond. They are similar to TIPS in that the principal is guaranteed and in that they pay a fixed rate of interest for thirty years plus an inflation adjustment. The fixed rate for newly-issued bonds is updated each May and November¹.

Interest on I-bonds and EE-bonds issued after 1989 can be excluded from income tax to the extent that the owner pays "qualified higher education expenses" in the same calendar year that the bonds are redeemed. TIPS and HH-bonds do not enjoy this tax benefit.

Both the interest and the inflation adjustment are reinvested and are tax-deferred with I-Bonds. Whereas, with TIPS, only the inflation adjustment is reinvested and neither the interest payment nor the inflation adjustment is tax-deferred (unless the TIPS are in a retirement account).

This difference in tax deferral increases the effective after-tax return of I Bonds by about eighty basis points if held for thirty years. That is, 2% I-Bonds offer an after-tax return comparable to the after-tax return of 2.8% TIPS¹¹. The effect is negligible if the I-bonds are held for short periods.

Another way to value I-bonds is to compare the yield to 1-year or 5-year instruments. I-bonds cannot be redeemed for one year. If the bonds are held less than five years, the redemption value is determined as of three months before the redemption date. That is, you forfeit three months fixed interest and three months inflation adjustment. For example, if you expect 3% inflation and the fixed rate is 1%, I-bonds are comparable to about a 4%

¹ The rate of interest on EE bonds is 90% of the rate paid on 5-year Treasury notes, updated semiannually. There is no formal relationship between the fixed rate paid on I-bonds and the interest paid on other securities. §359.10 of the Code of Federal Regulations Sec. 359.10 says only that the rate is determined by the Secretary of the Treasury. In addition, the fixed rate is not updated during the life of the I-bonds.

yield on 5-year CDs or Treasury notes and are comparable, after penalty, to about a 3% yield on 1-year CDs or Treasury bills.

As shown below, intermediate TIPS have, until recently, provided a larger fixed yield than I-bonds. Long TIPS have provided a larger fixed yield than I-bonds (plus 0.8% to account for 30-years of tax deferral) since late in 2001.

	<u>TIPS 2028</u>	<u>TIPS 2008</u>	<u>I-Bonds</u>
Nov, 2003	2.5%	0.8%	1.1%
June, 2003	2.4%	0.9%	1.1%
Dec, 2002	2.8%	1.7%	1.6%
June, 2002	3.2%	2.7%	2.0%
Dec, 2001	3.5%	3.4%	2.0%
June, 2001	3.5%	3.2%	3.0%
Dec, 2000	3.7%	3.7%	3.4%
June, 2000	3.9%	4.1%	3.6%
Dec, 1999	4.3%	4.3%	3.4%
June, 1999	3.9%	4.0%	3.3%
Dec, 1998	3.8%	3.9%	3.3%

There are several operational differences between I-bonds and TIPS. Of most importance, I-Bonds cannot be held in a brokerage account¹² and it is difficult to accumulate large holdings since investors are limited to \$30,000 per Social Security number per year. I-Bonds also require special care in estate planning because they represent income in respect of a decedent (IRD) and because I-Bonds pass to the heirs via a beneficiary designation rather than by a will or living trust.

Managing a TIPS Portfolio. In some ways, it is easier to manage a TIPS portfolio because one does not have to worry about the bonds being called before maturity and because the relative price stability of TIPS reduces the need to ladder bonds over a range of maturities.

TIPS do represent two management challenges. The first is cash flow. Cash flow is less than with a conventional bond because the inflation adjustment is not paid until maturity. Indeed, for an investor in the highest federal tax bracket, the tax liability would exceed the interest paid by 3% TIPS if inflation were to exceed about 5%.

Cash flow is not an issue for an investor with a large portfolio since they can simply sell bonds as needed, but this is not practical for the smaller investor.

One solution to the cash flow challenge for smaller investors is to invest via a TIPS-based mutual fund since these funds distribute the interest payments and the inflation adjustments¹³. Another possibility is to own the TIPS in a retirement account where income tax is deferred.

Another advantage of owning the TIPS in a retirement account is that interest payments will keep pace with inflation. (If TIPS are owned in a taxable account, tax is paid on the inflation accruals and the periodic interest payments grow a little more slowly than inflation.) Someone aged sixty, who purchases a million dollars worth of 30-year TIPS, could withdraw an inflation adjusted \$30,000 annually, probably for the rest of their lives.

There are small difficulties with these solutions. Mutual funds change expenses and performance is less predictable than owning individual bonds. Holding TIPS in a retirement account could mean more income tax¹⁴.

The second challenge appears when the TIPS are owned within a simple trust since a simple trust must distribute all income to the beneficiaries. "Income" in this context means receipts like interest and dividends.

If a simple trust is invested in conventional bonds, the trustee distributes all of the bond interest and the trust does not pay any income tax.

The 1997 Uniform Principal and Income Act has been adopted by many states including California. This Act defines the interest payments as "income" and the inflation accruals as "principal." If this rule applies in your locality, the beneficiaries receive less if a simple trust invests in TIPS rather than conventional bonds, even though the TIPS provide a larger return, since the inflation accruals are retained by and taxed to the trust.

Investing in TIPS within a trust will be a hardship in some situations, prudent management of the family resources in others and irrelevant with complex trusts where distributions are specified as a fixed amount or as a fixed percentage of assets or where distributions are at the discretion of the trustee. It is prudent, therefore, to consider the fiduciary accounting implications before purchasing TIPS in a trust account.

Finally, the prices quoted by brokers and financial newspapers do not include the accrued interest or the inflation accruals. This has no practical significance but it can be disconcerting when an investor gets the bill if they have bought TIPS without knowing this peculiarity.

Income Tax Treatment on Sale. There is no gain or loss on disposition for federal or state purposes if the bond is bought at the auction and held to maturity, neglecting the small premium or discount at issue and the small commission if the bond is not bought through Treasury Direct.

However, there is a capital gain or loss realized for both federal and state purposes if you buy TIPS in the secondary market and hold to maturity or if you buy TIPS at the auction and sell before maturity.

For a bond bought at auction, the initial basis is the par value plus or minus and small premium or discount. This basis increases daily by the change in accrued principal because the change in accrued principal is taxable income. When redeemed at maturity, you receive the par value plus all of the accrued

principal, which equals your basis at the time of redemption. Therefore, the gain or loss equals the initial premium or discount less the purchase commission, which are usually *de minimis* and neglected.

If the bond is sold before maturity, the gain or loss is the sales price (net of the accrued interest paid by the buyer) less the initial basis less the principal change accrued to the date of sale less any commission paid on the sale. The broker will provide a Form 1099-B showing the sale proceeds and a Form 1099-OID showing the principal accrued to the date of sale.

It is a worthwhile exercise to confirm the broker's OID calculation. Usually, but not always, the broker's calculation is within a few dollars.

For a bond bought in the secondary market, the initial basis is the purchase price plus any purchase commission. This price includes a market discount or premium which **MUST** generally be amortized for state purposes and which **MAY** be amortized for federal purposes.

The amount of the market premium/discount is the purchase price (net of any interest paid to the seller) less the original par value less the principal accrued to the date of purchase. The broker will not be providing this premium/discount but it is easy to calculate as discussed previously.

The Treasury sometimes reopens TIPS auctions, meaning that they sell the same bond a later date at a different price/yield to maturity. The initial basis is the reopened price. The principal accrued at some future time is the total accrual from the date of the original issue less the principal accrued to the date of the reopening.

If you own TIPS in a pension account, these complexities disappear.

¹ In 1999, John Dizard wrote that "The Treasury is probably paying you between 50 and 100 basis points (0.5% to 1.0%) more than it should" in "TIPS for Getting Safe, High Returns," *Fortune*, **140**(5), p. 310.

² This is my interpretation of remarks by Brian Roseboro, Treasury assistant secretary for financial markets, as reported in *The Wall Street Journal*, February 27, 2002. "... the Treasury is seeking ways to make its Treasury Inflation Protected Securities program 'more viable' and broaden participation in the program. Among the initiatives being examined are more frequent or larger TIPS auctions."

³ "Treasury Plans to Continue to Offer TIPS Instruments" by Rebecca Christie and Jacob M. Schlesinger, *The Wall Street Journal*, March 26, 2002.

⁴ TIPS are further described at www.publicdebt.treas.gov/com/comnewmk.htm.

For inflation adjustment factors, see "Historical Reference CPI Numbers and Daily Index Ratios" which is available at www.publicdebt.treas.gov/of/ofhiscpi.htm. Cumulative inflation factors are also quoted in the "Treasury Bonds, Notes & Bills" section of *The Wall Street Journal* as well as in other sources.

⁵ The Social Security Trustees use three sets of economic and demographic assumptions in their forecasts. Their inflation assumptions are 2.3, 3.3 or 4.3% annually. The intermediate assumptions "reflects the Trustees' best estimates of future experience ..." See www.ssa.gov/OACT/TR/index.html.

⁶ Deflation, or a decline in the CPI, causes TIPS to decline in nominal value and this is why the December factor is slightly larger than the January factor mentioned previously. However, TIPS never decline in purchasing power and the nominal value at maturity cannot be less than par.

⁷ IRS Temporary Regulation 1.175-7T.

⁸ American Century and Pimco funds invest in a mixture of TIPS and other securities. These funds have higher standard deviations and lower returns than the TIPS funds shown. Fidelity has introduced a TIPS fund, ticker FINPC. Performance is likely to be similar to the Vanguard and 59 Wall Street offerings.

⁹ See Figure 1.

¹⁰ The prices of bonds of comparable duration (or, less precisely, comparable maturity) generally respond similarly to interest rate changes. *This principle does not apply to inflation-indexed bonds.* The TIPS funds fluctuated less than the conventional securities in the bond index even though the duration of the TIPS is about twice that of the index.

¹¹ 2.0% Series-I Bonds, 27% tax, 30 years: $[1 + (2.0 + 3.3) / 200]^{60} = 4.80$ before-tax, 3.78 after tax.
2.8% TIPS, interest reinvested, 27% tax, 30 years: $[1 + 0.73 \times (2.8 + 3.3) / 200]^{60} = 3.75$ after-tax.

¹² "Although most bonds are issued to individuals, they may also be issued in the names of certain fiduciaries, including guardians and similar representatives of minors' and other living individuals' estates, as well as trustees of living owners' personal trust estates. - "Who Can Own Bonds?" at www.savingsbonds.gov.

¹³ Spending the entire distribution reduces return as compared to spending the interest and reinvesting the inflation adjustment. This effect is small however, on the order of 10 bp over ten years.

¹⁴ Determining the change in tax is tricky since there is extra state tax but less federal tax due to deferral and this deferral might be the larger effect. The change in tax liability also depends on the type of investments you would be holding in the retirement account if you were to own the TIPS in a taxable account. For example, if you were to move stocks to the taxable account so as to hold TIPS in the retirement account, the combined federal and state tax liability might actually decrease.