Client Newsletter

SKBA CAPITAL MANAGEMENT

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Tips on TIPS – When Are Treasury Inflation Protection Securities Attractive?

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Executive Summary

Treasury Inflation Protection Securities, nicknamed TIPS, can be quite useful in client portfolios. Introduced in the U.S. back in 1997, we currently have a decade of experience with them, and these fixed-income securities continue to possess some unique and valuable features. TIPS are Treasury bonds with a fixed percentage coupon rate like nominal Treasury bonds but with a final par value at maturity that changes (semiannually) based on changes in the Urban CPI (CPI-U). For example, if the rate of inflation in the CPI-U is 5% per year over the 10-year life of a bond, TIPS bought at a par value of $100 would accrete at 5% per year and pay $164 at maturity. A nominal Treasury bond would only redeem the original $100 par value at maturity. Thus, the TIPS investor would be "protected" from the ravages of such a high inflation rate.

The coupon payment received by the TIPS owner is also protected from the deleterious effects inflation has on real purchasing power. The fixed coupon rate is paid on the adjusted par value of the bonds. Thus, if price inflation adds $25 to the par value of the bond over a period of time, the actual interest payments are adjusted higher at its constant coupon rate (4%, for example) on the higher par, and the annual interest payment would rise by $1.00 per $100 of par value. Coupon payments rise over the life of the bond if the annual rate of inflation averages more than 0%. Interestingly, even if the rate of CPI change is negative over its life, TIPS investors will always receive at least the original $100 par at maturity. Investors don't yet appear to perceive the full value of the inflation-hedge option imbedded in TIPS.

Our main conclusions about various characteristics of TIPS are stated below and highlighted in the text that follows.

Conclusions:

1. TIPS prices only vary with changes in real interest rates, not nominal interest rates. Therefore, short-term price movements are insensitive to changes in the inflation rate assumptions imbedded in T-Bond yields.
2. Since not all yield changes consist entirely of changes in real yields (even with a longer initially calculated Macauley's duration than for nominal T-Bonds), TIPS are likely to experience less price volatility than nominal T-bonds of the same maturity. Consequently, if one can reasonably estimate that the future total return of TIPS would be equal to or better than nominal T-Bonds, TIPS should be a preferred investment.
3. Changes in TIPS yields are normally positively correlated with stock price changes (S&P 500), whereas nominal yields are not consistently so.
4. As a result of #3, TIPS are a more consistent and better diversifier of stock market risk than T-Bonds.
5. The differences in cumulative returns from TIPS and T-Bonds are highly path dependent, and scenario analysis is most capable of identifying when the relative attraction changes from one to the other.
6. While TIPS offer a better matching of the pension asset returns with the rise and fall of the impact of inflation on future benefits liability (for all tax-exempt funds), the inherent higher volatility of nominal T-Bonds probably does a better job than TIPS in hedging the balance sheet risk (from a mismatch of pension asset and liability durations) that impacts a corporation's GAAP income statement.

If you'd really like to get into the heart of the logical and intellectually consistent discussion, please read on.

The Mathematics of TIPS

Figure 1 below contrasts the semiannual cash flows of a current 10-year TIPS issue compared to a 10-year nominal Treasury bond. If we use the current yield to maturity (YTM as of August 31, 2007) of the 10-year TIPS (2.34% real yield) and nominal T-bond (4.53% nominal yield) as if they were the coupon rates on a starting par value of $100.00 for each bond, the table displays how the cash flow (mostly interest payments) would be different for each bond. The difference between the YTM of the T-bond and that of the TIPS is the expected, "imbedded" or "breakeven" inflation rate that would cause the two bonds to have exactly the same total return (and present value) over the life of each bond. This imbedded inflation assumption was equal to 2.19%.

[It should be noted that taxable investors must pay income tax on the accreted par value of the TIPS each year, and if the investor buys a bond with a low coupon rate in a period of high inflation, it is possible that a taxable investor could pay out more in tax liability than he receives in cash flow from interest payments. Aside from this admonition, the tax circumstances of TIPS are beyond the scope of this newsletter.]

Cashflow and Duration Comparisons for 10-Year TIPS Versus T-Bond

Figure 1
as of August 31, 2007

Beginning Par Value	$ 100.00
Beginning TIPS Coupon Rate	2.34%
Beg Nominal Coupon Rate	4.53%
Estimated (Imbedded) CPI Inflation Rate	**2.19%**

Semi-Annual Period (Months)	(Years)	Estimated TIPS Par Value Accretion	TIPS Cash Flows/ Interest Payments	T-Bond Cash Flow /Interest Payments	Difference in Semi-Annual Cash Flows
6	0.5	$ 101.10	$ 1.17	$ 2.27	($1.10)
12	1.0	$ 102.20	$ 1.18	$ 2.27	($1.08)
18	1.5	$ 103.32	$ 1.20	$ 2.27	($1.07)
24	2.0	$ 104.45	$ 1.21	$ 2.27	($1.06)
30	2.5	$ 105.60	$ 1.22	$ 2.27	($1.04)
36	3.0	$ 106.75	$ 1.24	$ 2.27	($1.03)
42	3.5	$ 107.92	$ 1.25	$ 2.27	($1.02)
48	4.0	$ 109.10	$ 1.26	$ 2.27	($1.00)
54	4.5	$ 110.30	$ 1.28	$ 2.27	($0.99)
60	5.0	$ 111.51	$ 1.29	$ 2.27	($0.97)
66	5.5	$ 112.73	$ 1.30	$ 2.27	($0.96)
72	6.0	$ 113.96	$ 1.32	$ 2.27	($0.95)
78	6.5	$ 115.21	$ 1.33	$ 2.27	($0.93)
84	7.0	$ 116.47	$ 1.35	$ 2.27	($0.92)
90	7.5	$ 117.75	$ 1.36	$ 2.27	($0.90)
96	8.0	$ 119.04	$ 1.38	$ 2.27	($0.89)
102	8.5	$ 120.34	$ 1.39	$ 2.27	($0.87)
108	9.0	$ 121.66	$ 1.41	$ 2.27	($0.86)
114	9.5	$ 122.99	$ 1.42	$ 2.27	($0.84)
120	10.0	$ 124.34	$ 1.44	$ 2.27	($0.83)
Return of Adjusted Par Value at Maturity:			$ 124.34	$ 100.00	$24.34
Estimated Macauley's Duration (years):			**8.99**	**8.16**	
Approximate Price Decline with 100 BPS Yield Rise:			**-9.0%**	**-8.2%**	

One can easily see from the table that the semiannual interest payments for the T-bond are higher than for the TIPS, but that the TIPS interest payments rise at the (assumed imbedded) rate of inflation over the life of the bond. At maturity, the T-bond owner would receive the original $100 in par value back, but the TIPS owner would receive $124.34, making its final cash flow $24.34 greater than for the T-bond. This backend loading of the cash flows from TIPS is what makes the bond's Macauley's duration longer (at 8.99 years) than that of the T-bond (8.16 years). One could argue that this longer duration makes the TIPS a more volatile security than a nominal T-bond. This is reflected in the estimated price change for each 100 basis point change in the 10-year Treasury yield. Using this measure of duration, a 100 basis point change

would lead to an estimated 9% price decline for the TIPS and only 8.2% for the T-bond. Yet this common tool of bond management is an **inappropriate way to analyze the price sensitivity of TIPS relative to T-bonds, and short-term price movements are insensitive to changes in the inflation rate assumptions imbedded in T-Bond yields.**

The reason is that the cash flows of TIPS are not stable as the rate of actual inflation varies from the imbedded rate. **Figure 2** highlights this difference using the same initial assumptions as in Figure 1 but by varying the actual inflation from a 1% annual rate to a 3% annual rate. Relative to today's expected inflation rate, TIPS will produce a higher return than nominal treasuries if actual inflation is higher than the imbedded rate (resulting in a higher adjusted par value received at maturity). The opposite would be true if actual inflation came in lower than the imbedded rate.

Comparison of 10-Year TIPS Adjusted Par Value Under Different Inflation Rates

Figure 2	**Current Imbedded Inflation Rate**	**Higher**	**Lower**
Inflation Rate Assumptions	**2.19%**	**3.0%**	**1.0%**
Return of Adjusted Par Value at Maturity	**$124.34**	**$134.69**	**$110.49**

A rise (fall) in inflation expectations usually has a direct impact on T-Bond yields, causing bond prices to fall (rise) as the bond's future fixed cash flows are discounted at a higher (lower) rate. For TIPS, however, this upward (downward) adjustment of semiannual cash flows and the par value received at maturity (as in Figure 2) with a rise (fall) in the actual inflation rate essentially causes the current price (which is the present value of future cash flows) to be insensitive to changes in interest rates that are caused by changes in the assumed rate of inflation. Thus, its Macauley's duration would not be a good indicator of a TIPS price volatility with changes in nominal interest rates. **Conclusion #1: TIPS prices only vary with changes in real interest rates, not nominal interest rates.**

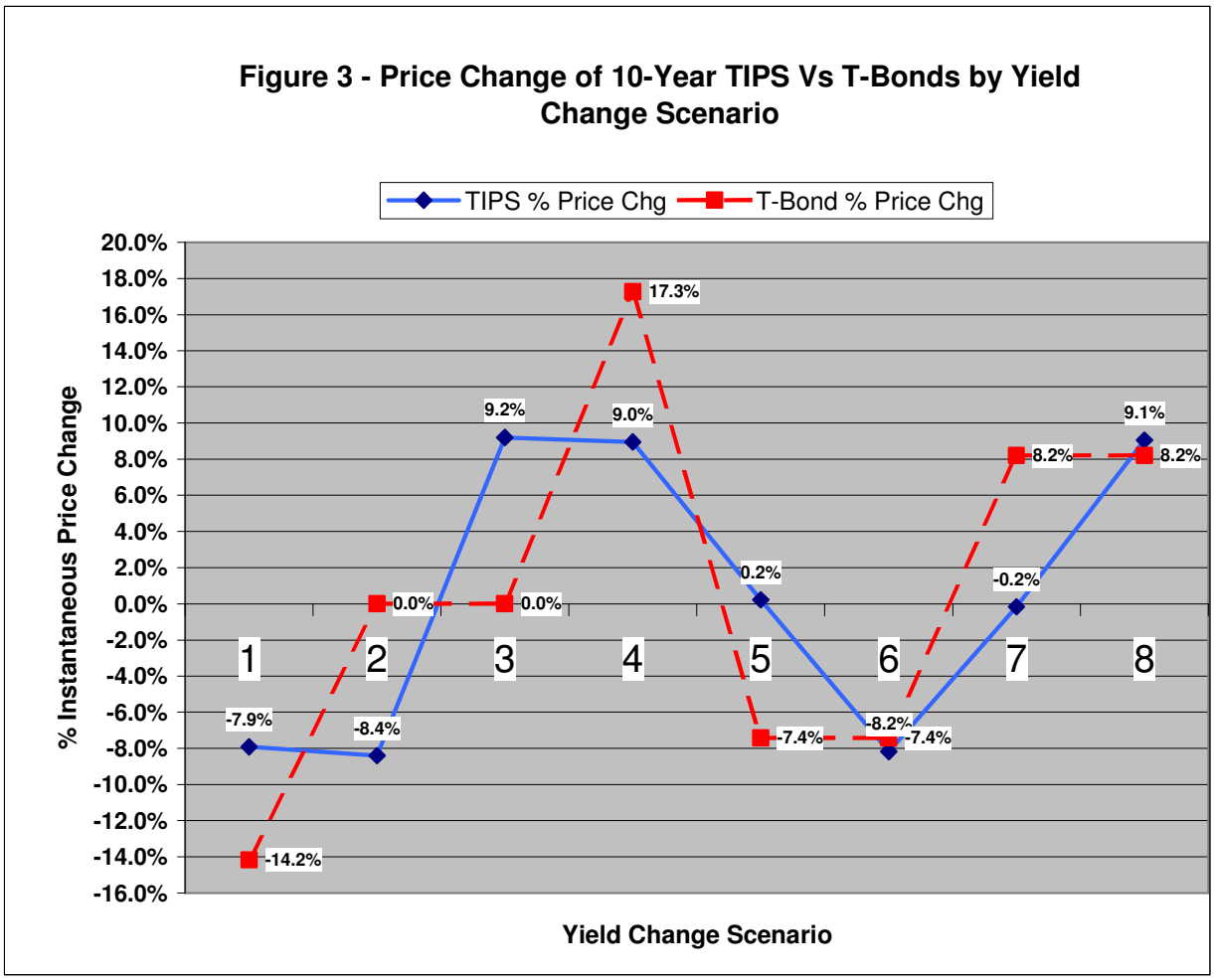
In examining the history since 1997 of 10-Year TIPS yield changes versus nominal T-Bonds, this lower volatility issue becomes more evident. The annualized standard deviation of quarterly yield changes was 95 basis points for T-Bonds and only 57 basis points for TIPS. So TIPS experienced only 60% of the volatility of nominal bond yields. Observations of the actual returns from TIPS in the last decade appear to confirm this conclusion as well. Although the TIPS indexes that have been created don't precisely match the 10-year T-Bond in terms of maturity and other characteristics, since the beginning of April of 1997, the Merrill TIPS Index has produced an annualized rate of return (through June 30, 2007) of 6.7% compared to the 5.5% total return of the constant maturity 10-year T-Bond index and to the 2.6% annual rate of change in the CPI-U. Furthermore, the annualized standard deviation of quarterly returns over this same time period was lower for the Merrill TIPS Index (at 4.5%) than for the 10-year T-Bond (at 7.3%). For purposes of contrast, this same measure of volatility was 17.3% for the S&P 500.

Why is this the case?

Figure 3 displays how the prices of these 10-Year TIPS and T-bonds would respond to an instantaneous "shock" to the yield curve, either driven by a change in inflation expectations, required real yields or both.

The eight scenarios that can be constructed with varying combinations of 100 basis point changes (+or-) are shown below. The graph highlights the fact that TIPS price changes respond only to real interest rate shocks not to inflation rate shocks, whereas T-bond prices respond to the sum of both changes. In Scenario 1, if inflation rates and real interest rates each rise by 100 basis points (for a total of 200 bps change), T-bond prices would fall over 14% compared to only an 8% decline in TIPS. The opposite shifts (Scenario 4) produce a 17% gain for T-bonds and only 9% for TIPS. Scenarios 2 and 3 have no net change in yields as the changes in inflation assumptions and real yields offset each other. As a result, nominal T-bonds experience no price change, yet TIPS feel the full effect of the rise (Scenario 2) and fall (Scenario 3) in real yields. In Scenarios 6 and 8, where the only change in interest rates arises from a change in real yields, the percentage decline and rise in prices for TIPS and T-bonds are quite similar, mostly reflecting the duration differences. In Scenarios 5 and 7, where the only changes in interest rates come from changes in inflation expectations, price changes in TIPS are nil, versus a decline and rise in price for T-bonds of –7.4% and +8.2%, respectively. **Conclusion #2: Since not all yield changes entirely consist of changes in real yields, even with a longer initially calculated Macauley's duration than for**

nominal T-Bonds, TIPS are likely to experience less price volatility in most environments than nominal T-bonds of the same maturity. Consequently, if one can reasonably estimate that the future total return of TIPS would be equal to or better than nominal T-bonds, TIPS should be a preferred investment.



Yield Change Scenario	1	2	3	4	5	6	7	8
Inflation Shock	1.00%	-1.00%	1.00%	-1.00%	1.00%	0.00%	-1.00%	0.00%
Real Yield Shock	1.00%	1.00%	-1.00%	-1.00%	0.00%	1.00%	0.00%	-1.00%
Nominal Yield Change	2.00%	0.00%	0.00%	-2.00%	1.00%	1.00%	-1.00%	-1.00%

Clearly there is more to total return than just price changes. We know that these yield "shocks" don't really occur instantaneously as reflected in Figure 3, but what has been the frequency since 1997 of the changes (on a year-to-year basis) in imbedded inflation expectations and real yields within each of the above eight scenarios? If one defines a "material" year-to-year change in either inflation expectations or real yields as being greater than 10 basis points, approximately **16%** of the observations occur within **Scenario 1** in which both inflation expectations and real yields rose simultaneously. TIPS display less downside volatility in this scenario. **Scenario 2** in which inflation expectations fell and real yields rose, the single worst environment for TIPS relative to T-Bonds, accounted for **17%** of the rolling year-to-year observations. **Scenario 3**, the best relative performance environment for TIPS, occurred **20%** of the time. **Scenario 4**, the single best environment for T-Bonds (and relative to TIPS) in which both inflation expectations and real yields fall, also accounted for **16%** of the observations. The percentages of observations are substantially lower in the four other scenarios. **Scenarios 6 and 8** in which inflation expectations remained relatively constant while real yields moved higher or lower, respectively, occurred **5%** and **12%** of the time, respectively. Finally, **Scenarios 5 and 7** in which real yields remained stable while inflation expectations rose and fell, respectively, each accounted for only **6%** of the observations.

Observations that did not fall into any of these categories amounted to the remaining 2% of the total. While one cannot say that the distribution of occurrences will be the same in the future as during the last decade, it appears to be a reasonable statement that for issues with the same maturity, TIPS are likely to have a higher percentage of favorable environments than T-Bonds.

It is an interesting question as to whether the advantage TIPS have shown over T-Bonds reflects some systemic bias in the marketplace or simply forecasting errors by market participants (perhaps due to an incomplete understanding of TIPS characteristics). We tend to believe that there is a long-lived bias that exists today since most investors have only experienced periods of relatively low inflation, and they possibly err in assuming that long-term inflation rates will be sustained at low levels not reflective of historical experience. While there are many legitimate reasons for such perceptions, the fact that since 1997 the actual annual rate of CPI-U inflation was 2.6% compared to only 2.1% for the average monthly imbedded rate of inflation indicates that an unfounded optimism existed among market participants.

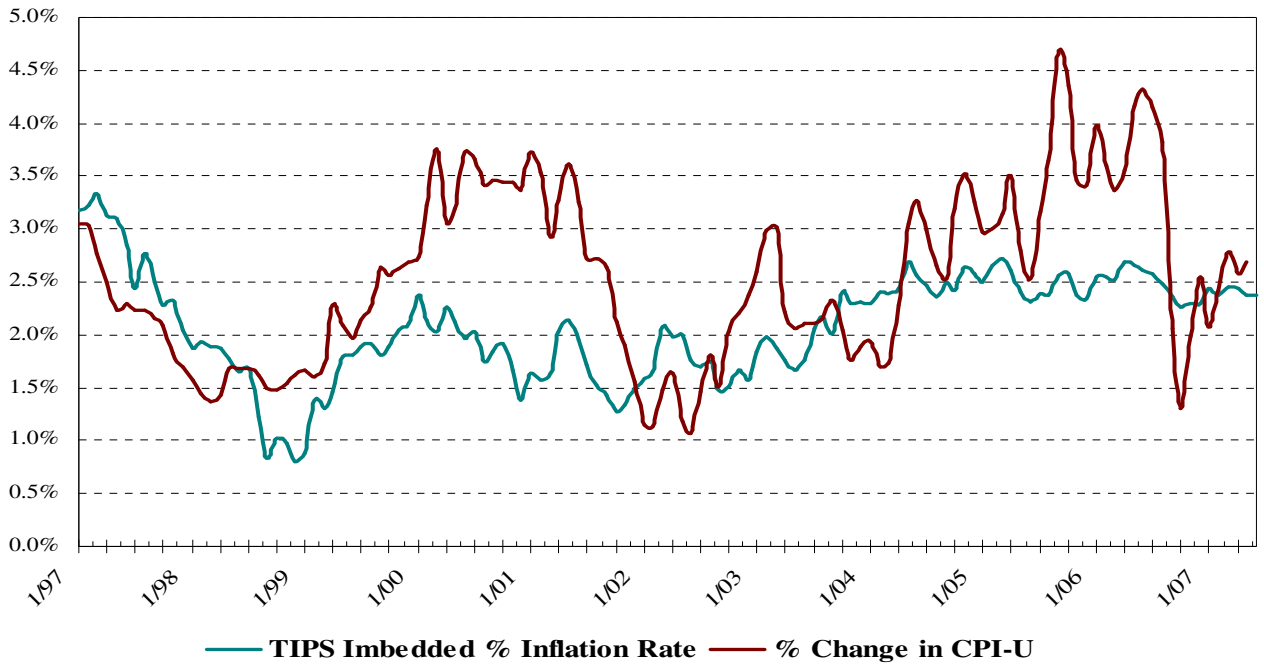
Figure 4 in **Appendix A** displays further evidence of these prior conclusions (but the correlation matrix is shown only in the appendix). Changes in inflation rates, expected inflation rates, real yields, and the S&P 500 will never have perfect correlations over any period of time. Indeed, single variable comparisons leave out all of the nuances of the simultaneous impact that other independent variables may have on return or yield changes. Short measurement periods (such as monthly or quarterly data) are subject to the most instability in the patterns of correlation. Even one-year measurement periods may not capture the change in market sentiment or perception that evolves over a period of sustained change. As a result, Figure 4 examines the correlations between these variables using 2-year rolling periods, under the belief that sustained changes might have a sufficiently long period to cause changes in the other variables.

Indeed, using this timeframe for comparison, real yields (on 10-year TIPS) are positively correlated (+0.76) with S&P 500 returns over this 10-year period. This is indeed contrary to the general perception that most increases in interest rates are typically negative for the stock market. So returns from TIPS (as measured by the Merrill TIPS Index) were negatively correlated with stock market returns (–0.77) with almost the same level of correlation. In both cases, this means that a bit less than 60% (the R-squared or coefficients of determination of .58-.59) of the variance of stock market returns was described by the variation in real yields and returns from the Merrill TIPS Index. This supports our theoretical structure that in most environments, TIPS are a better diversifier of risk from stocks than are either 10-year T-Bonds or T-Bills (the latter of which is not shown in the table above nor discussed further in this report). Using this same duration concept applied to 2-year real yield changes versus S&P 500 returns produces a slope coefficient of +27.2 times the real yield change, also indicating the long-duration nature of stocks. **Conclusion #3 – changes in TIPS real yields are positively correlated with stock price changes (S&P 500), whereas nominal yields are not consistently so.**

It's useful to visualize these yield change dynamics in graphs shown below. **Figure 5** compares the actual year-to-year change in the Urban CPI with the inflation rate assumption imbedded in T-Bond yields (which is the difference between the nominal and real yield on 10-year Treasury bonds). One can see from the graph that a sustained change (acceleration or deceleration) in the actual year-to-year change in the CPI tends to lead and pull up or down the imbedded rate. The 10-year forecast of CPI inflation fell rather dramatically to below 1.0% during what we call the "perfection" environment (high real GDP growth with low inflation) of the late 1990s. It hit another low below 1.5% in early 2002 near the recession trough but has generally trended higher (along with the erratic rise in the annual rate of change in the CPI-U) since (through June 30, 2007).

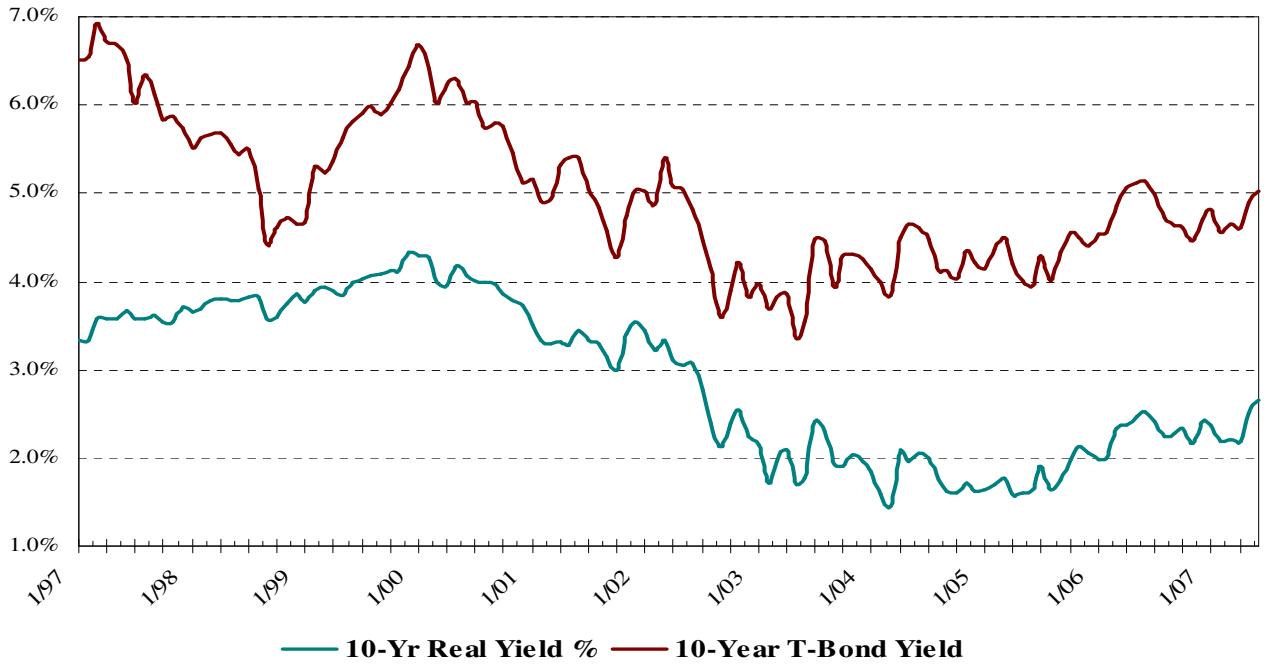
Figure 6 compares the 10-year real and nominal yields since 1997. Note that real yields rose in the late 1990s during the stock market boom, while at the same time nominal bond yields trended down or sideways. Post 2000, real yields fell progressively as the domestic recession and general worldwide slowdown depressed returns on capital and therefore the real returns required from Treasury securities. More on this later when we discuss the nature of real and nominal yields in varying economic environments.

Figure 5 - Annual CPI-U % Change vs Imbedded Inflation



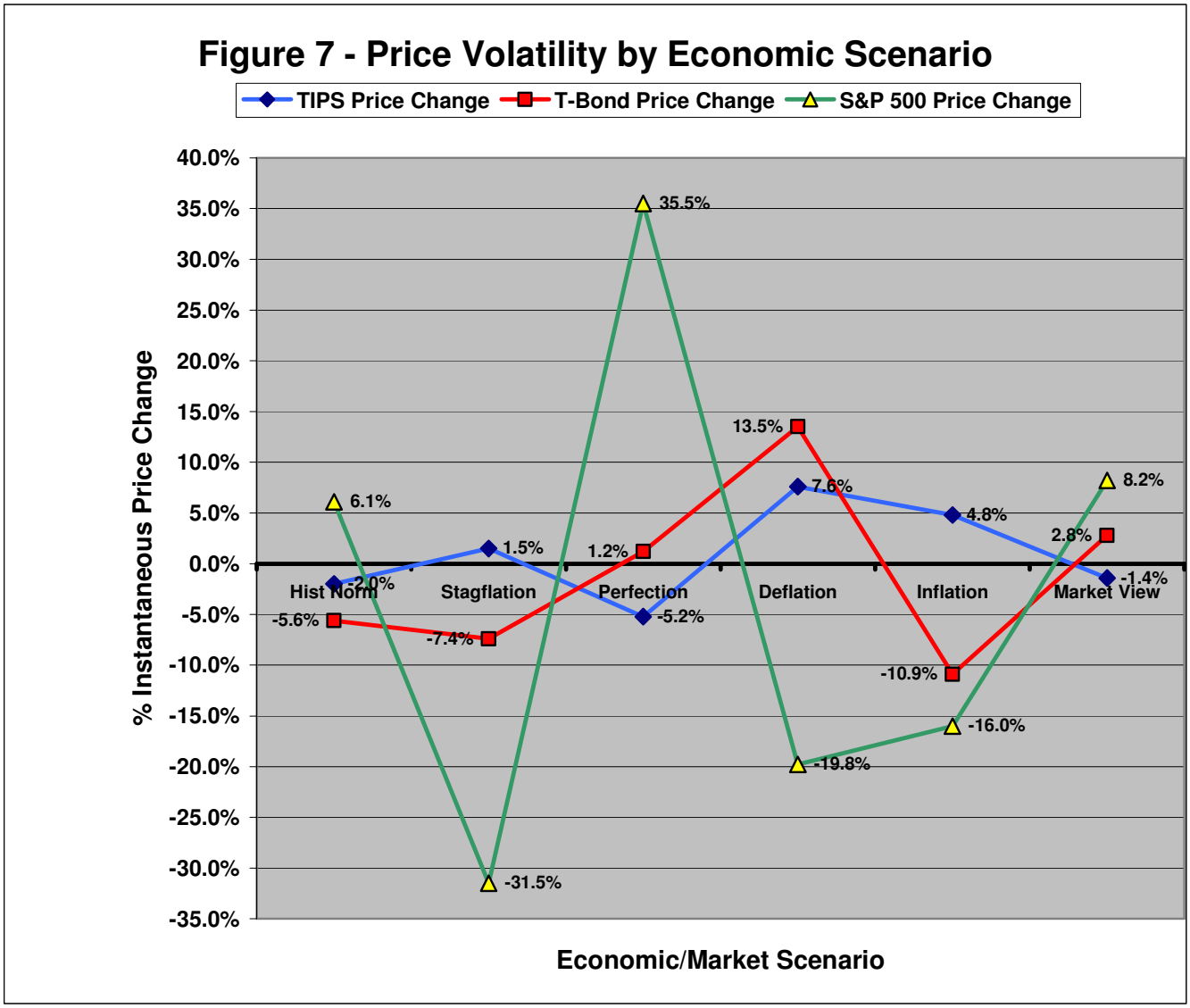
One cannot imagine a better starting point for TIPS investors than the high real yield/low inflation environment of the late 1990s. Transitioning from this kind of environment to virtually any other is a recipe for good TIPS performance versus T-Bonds. So while both real and nominal bond yields have fallen since 1997, with the actual CPI change generally above the imbedded rate, the total return to TIPS has been meaningfully greater than that for T-Bonds.

Figure 6 - 10-Year Treasury Yields - Real Versus Nominal



The periods in which actual inflation is well above the imbedded rate benefit TIPS holders despite relatively low imbedded rates due to the accretion to par value that occurs semiannually, giving TIPS another way to win over T-bonds.

One cannot, therefore, really gauge the relative attraction of TIPS versus T-Bonds without assessing what environment is likely to exist over the next 2-5 years. Based upon our own work on what drives changes in real yields, **Figure 7** below displays what we believe would be the price change (theoretical instantaneous) responses for 10-year TIPS and T-Bonds and the S&P 500 to "shocks" in the market's forecast about the future states of the economy. Six different scenarios are shown including "Historic Norm" (2.5%-3.0% real GDP growth and inflation rate), "Stagflation" (low real GDP growth with a rising inflation rate), "Perfection (high real GDP growth with low inflation), "Recession and Deflation" (0% or negative real growth and low inflation), "Boom with High Inflation," and what we believe to be the "Market View" (falling inflation with improving real growth from rates perceived at the end of August).



Scenario:	Hist Norm	Stagflation	Perfection	Deflation	Inflation	Market View
Inflation Shock	0.50%	1.15%	-0.75%	-0.75%	2.00%	-0.50%
Real Yield Shock	0.25%	-0.15%	0.60%	-0.85%	-0.50%	0.15%
Total Yield Change	0.75%	1.00%	-0.15%	-1.60%	1.50%	-0.35%

The changes estimated above are hypothetical forecasts, and obviously do not constitute a certainty of future returns. Indeed, bond market and stock market investors often react to informational inputs differently and over differing time periods. We do believe, however, that the above inflation and real yield shocks that would accompany the shift from today's economic and market environment to dramatically different scenarios would have significant valuation consequences. We believe these shifts are intellectually consistent with our economic and market framework.

Note how dramatically different and sensitive the "instantaneous" price changes would be to the "shocks" created by such different environments compared to today's market assumptions. If the market suddenly believes we're headed toward Stagflation, the 10-year TIPS price could rise 2%, T-Bonds could fall 7%, and it would be an intellectually consistent perspective to believe that the stock market's "correct" valuation might plunge by 31%. In our estimation, the market's current view would have inflation pressures subside further while the real returns in the economy improve. TIPS prices would fall while the S&P 500 rises 8% toward its recent highs. A return of the late 1990s Perfection scenario could cause TIPS prices to fall 5%, T-Bonds to rise 1%, and the S&P 500 to soar 35%. Note that in each of these environments, TIPS price changes should move inversely to the S&P 500, whereas nominal T-Bond price changes sometimes move inversely (recession and deflation) and in other scenarios (i.e., rising inflation and stagflation) move in the same direction. This leads us to **Conclusion #4: TIPS are a more consistent and better diversifier of stock market risk than T-Bonds.** This is a refinement of the conclusion stated in #3.

Given the typically long duration of pension liabilities, let's shift our attention to 30-year maturities. In determining the structure of real and nominal yields, it is enormously helpful to consider the impact of differing economic scenarios on which asset, TIPS or T-Bonds, provides the superior risk-adjusted return. Strong economic environments, both domestically and worldwide, will command the highest real yields as the rates of return on capital deployed in the real economy rise (improving ROE's and corporate profit growth rates) and provide competition for TIPS real yields. In weaker environments (which may be accompanied by higher or lower inflation rates), real yields fall as fewer high return opportunities exist in which to deploy capital. Because TIPS also possess an option-like protection against future inflation, the cost of that option goes up in high inflation environments (in the form of lower real yields as the future economic environment to support high real returns comes into question) despite what otherwise might be a robust period of real economic growth. At the other extreme (low inflation and weak economic growth), nominal bonds may imbed a higher assumed rate of inflation than the actual current rate of inflation or demand a slightly higher real yield, as a hedge against the risk that inflation might be substantially higher in the future than the current imbedded rate. **Figure 8** below illustrates what we believe are reasonable expectations for terminal TIPS and T-Bond yields over the next two years across these different economic environments shown in Figure 7.

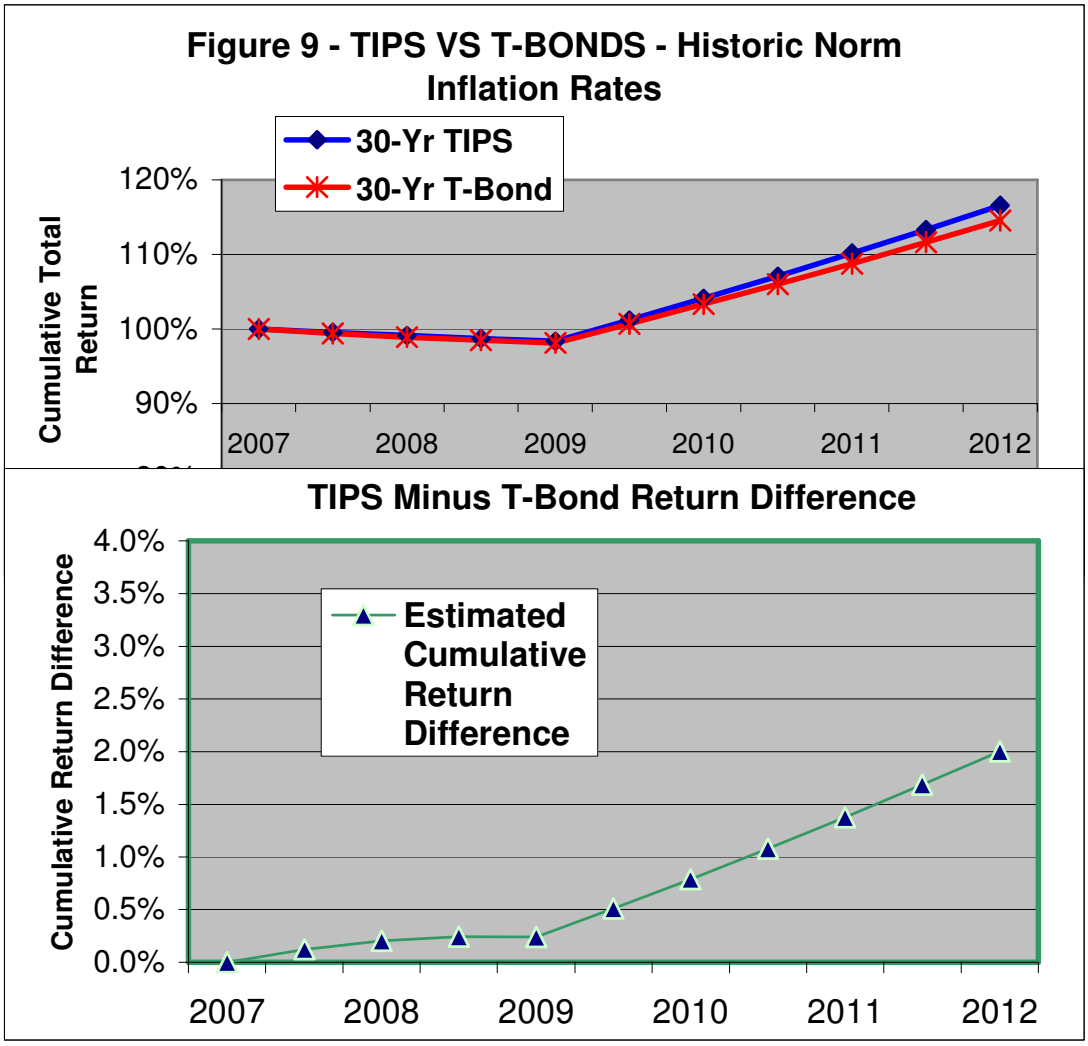
[While there isn't a history for U.S. TIPS before 1997, other markets around the world have offered securities with real yields and inflation protection, such as the UK Gilts market, that have experienced widely varying environments. Such perspectives will not be offered in this report.]

5-Year Horizon Yields by Scenario
Figure 8

	30-Year TIPS	Imbedded Inflation Rate	30-Yr T-Bond Yield
Current (8/31/07)	2.31%	2.52%	4.83%
Mean Expectations			
Boom with High Inflation	2.00%	4.50%	6.50%
Stagflation	2.35%	3.50%	5.85%
Historic Norm	2.90%	2.85%	5.75%
Perfection	3.80%	1.50%	5.30%
Recession then near Deflation	1.75%	0.75%	2.50%

Obviously, the actual results over time will vary, but it is useful to examine how 30-Year TIPS and T-Bonds might perform in such different environments from today's starting yields. **Figure 9** illustrates how in linking our 2-year forecasts to these above 5-year end points the cumulative estimated total returns of each security would be affected. In our "Historic Norm" scenario over the next five years, since inflation rates are somewhat higher than currently assumed,

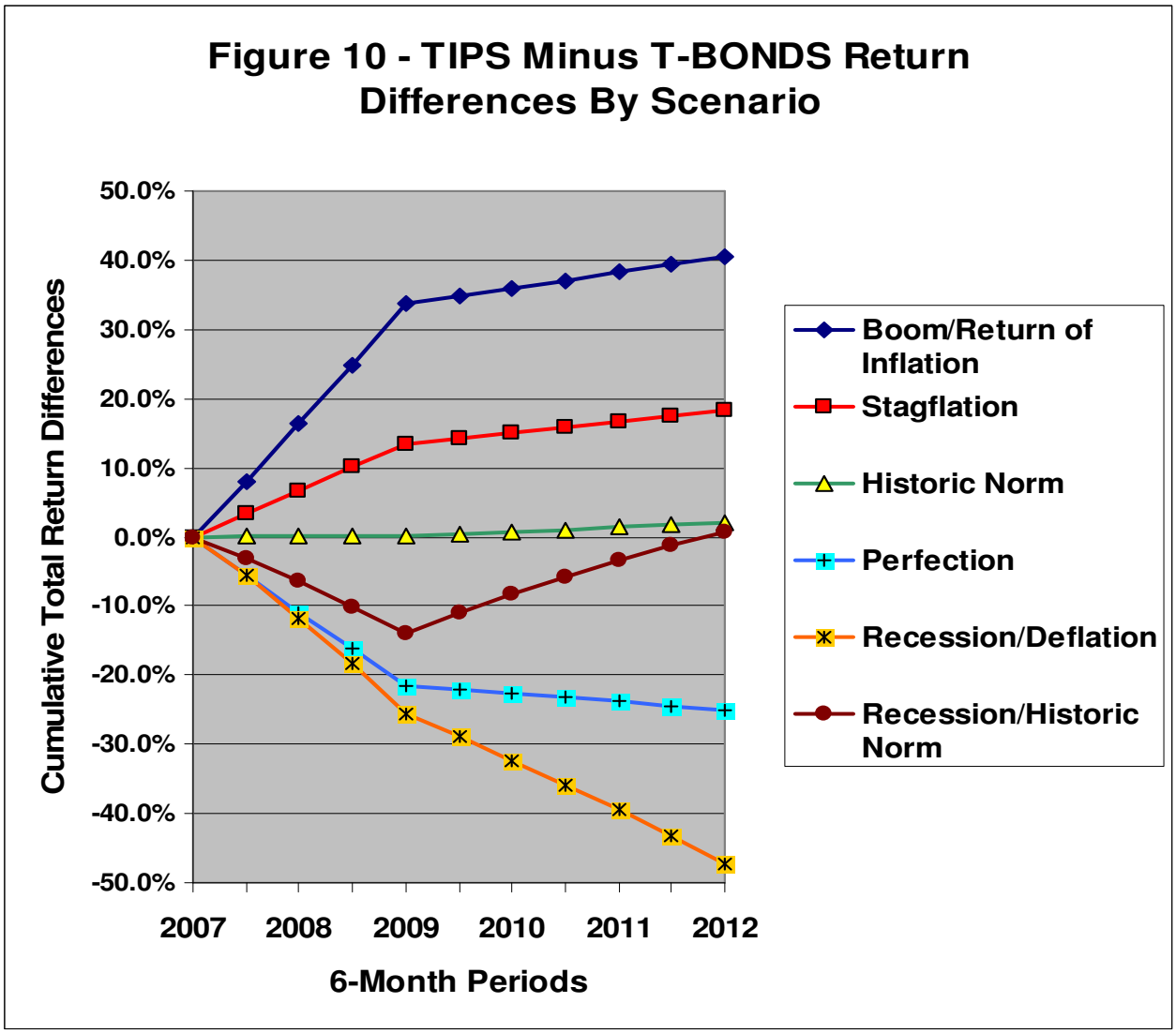
TIPS would outperform T-Bonds by about 200 basis points, with most of the relative return accruing after the first two years. Although we do attach our estimation of the probabilities each scenario is likely to occur, it is the objective of this report to illustrate the impact of path-dependent outcomes on returns, not to project an overall expected-value result.



Conclusion #5: The differences in cumulative returns from TIPS and T-Bonds are highly path dependent, and scenario analysis is most capable of identifying when the relative attraction changes from one to the other.

Figure 10 illustrates the cumulative 5-year return differences for each of the scenarios specified in Figure 8 with an additional view that forecasts a recession in the next two years followed by an "Historic Norm" economic recovery over the following three years. The potential cumulative return differences are huge! If a higher inflation rate prevails (most likely in some kind of stagflation environment), TIPS will continue to provide far superior returns to T-Bonds. An outright decline into recession and a near 0% inflation rate is clearly the worst environment for TIPS relative to T-Bonds given where we are starting in terms of real yield. In addition, a return to the perfection environment of the late 1990s (a very low probability in our view) is the second worst for TIPS because real yields would rise substantially at the same time that inflation expectations would fall. Yet even if the economy falls into recession followed by an economic rebound, the relative underperformance of TIPS over the next two years would be more than fully recaptured in the subsequent three years.

If the CPI-U is at all a reasonable proxy for what happens to employee compensation over time, the huge variation over time in the cash flows from TIPS investment is a valuable feature.



In the context of managing the assets and liabilities of a pension fund, the returns from long-duration TIPS (30-year maturity) are likely to provide a better matching than nominal T-Bonds of the long-term changes future retirement benefits that would rise or fall in a similar magnitude to the changes in the CPI-U. It is not obvious, however, that TIPS represent a superior hedge against the short-term balance sheet risks that a rise or fall in the PBO (accompanying a decline or rise in nominal Treasury yields that impacts the discount rate on these future liabilities) has on the GAAP corporate income statement. Where predictability of the long-term matching of asset and liability duration is desired, TIPS have far better characteristics and an inherently longer duration (due to back ended cash flows) than nominal T-Bonds, but with less sensitivity to the volatility in nominal interest rates that would be helpful in managing the balance sheet risk. Whether one should pursue the better asset diversification and performance of TIPS versus the possibly better GAAP liability performance with nominal T-Bonds is a matter than can only be assessed by each plan. **Conclusion #6: While TIPS offer a better matching of the pension asset returns with the rise and fall of the impact of inflation on future benefits liability (for all tax-exempt funds), the inherent higher volatility of nominal T-Bonds probably does a better job than TIPS in hedging the balance sheet risk (from a mismatch of pension asset and liability durations) that impacts a corporation's GAAP income statement.**

Conclusion

When one considers all of the above analysis, are these conclusions both straightforward and yet surprising? We recognize these observations and conclusions are a lot to digest in one sitting, and perhaps you are now experiencing "brain freeze." Yet hopefully this analysis enables you to better understand the rather unusual and attractive characteristics of TIPS and their value in fixed income portfolios or as a way to reduce overall portfolio risk. As we've pointed out, this analysis suggests that there's no simple answer to the question about when it is best to invest in TIPS rather than T-Bonds because the probability placed on each scenario results in substantially different outcomes. TIPS should not be avoided as somehow less predictable than nominal T-Bonds, although clearly their cash flows are indeed more uncertain than for T-Bonds, which pay fixed semiannual interest and $100 of par value at maturity. Yet TIPS can offer a far more rewarding investment, particularly in regard to the risk/return trade offs.

Yet we live in a "nominal" world, not a "real" return world. We face nominal dollar increases in the cost of living and in our investment returns. The nominal T-Bond yield is the sum of the parts of real yield and inflation expectations. With the introduction of TIPS in the U.S., what investors demand in terms of real yield can now be explicitly observed. It is the imbedded inflation rate that becomes the residual calculation. But does the market systematically misprice inflation expectations? So for those of you who slogged through this analysis and held on to the end, we'll offer this final conclusion not included in the six listed in the Executive Summary. **Conclusion #7: There are good reasons to believe the market is still systematically underpricing inflation rate risk, and if it is, TIPS returns will continue to compare favorably to those of T-Bonds.**

Let's end by reviewing once again why imbedded or breakeven inflation rates seem, at times, to be biased on the low side relative to actual inflation as measured by the Urban CPI. The reason we believe is inherent in the nature of worldwide capital flows. Investors, both domestic and foreign, don't always invest in U.S. Treasury securities with a concern about what might happen to U.S. domestic inflation rates or real returns. The impact of currency hedging, the desire to invest in the U.S. versus other regions of the world (with the glut of world saving), the safe haven benefit from owning U.S. Treasuries in times of turmoil and market uncertainty, the use of the U.S. dollar as a reserve currency, and the Fed's intervention to shift short-term interest rates, each can cause T-Bond yields to deviate from what might otherwise be "correct" pricing in terms of discounting future inflation risks and desired real returns. If these investors are, for reasons that make perfect sense to them, not making investment decisions based on inflation-rate concerns, the imbedded rate of inflation can be driven below what either the short-term or long-term fundamentals would imply is reasonable.

In addition, both the normal real and nominal yield curves should be monotonic (continuously upward sloping from short to long maturities). In real terms, a 30-year investment in plant and equipment contains higher risk and therefore should earn a higher real expected return than short payback investments. Yet they are often not this way. Inverted yield curves are inherently unstable, but can be maintained for a time through Fed actions. At the other extreme, the Fed drove short-term real interest rates down to below 1% (during and after the last recession), causing real short-term interest rates to be negative for months! This was and is also unsustainable. Longer-term historical perspectives suggest that real short-term T-Bill yields should be low, 0.5% to 0.75%, and that long-maturity real Treasury yields ought to be near 3%.

As of: 8/31/2007

Current Treasury Yields

Figure11	TIPS Real Yield	Nominal Bonds	Imbedded Inflation Rate Current 5 Years	Next 5	Next 20
5-Year	2.33%	4.26%	1.93%		
10-Year	2.34%	4.53%	2.19%	2.45%	
30-Year	2.31%	4.83%	2.52%		2.69%

Figure 11 above highlights the real yields and imbedded inflation rates along the yield curve at the end of August 2007. Note that while the nominal yield curve is upward sloping with longer maturities, the real yield curve is relatively flat. The consequence is that the market's inherent assumption on inflation is that inflation rates in the CPI-U will accelerate progressively over the next 10- and 30-year periods. Not only that, but the TIPS investor can receive the same real yield

in a 5-year maturity issue as in 10- and 30-year issues with the assumption that the inflation rate will only be 1.93% per year over the next five years, which is a level well below the near 2.6% year-to-year change in the actual CPI-U. Yet the world seems to be telling us that it doesn't fear acceleration in the rate of inflation, as all of the focus is on the benign "core" rate of inflation. We would argue that the plunging exchange value of the U.S. dollar, the rise in gold prices, the commodity price boom (that could last for decades), and high energy prices seem to suggest that the long-term risk of experiencing stagflation (rising inflation rate with slowing real economic growth), now is a higher risk than the market yet perceives. As a result, each year the inflation rate is above this benign imbedded 1.9% annual rate, TIPS investors win relative to nominal bonds.

Furthermore, in order for the inflation rate to average the 2.19% level imbedded in 10-year TIPS, the rate must accelerate to 2.45% per year over the following (next) five years. So if current inflation stays well above the 5-year imbedded rate of 1.9%, the 10-year TIPS will be well on their way to exceeding the 2.2% imbedded inflation rate and the 2.45% inflation rate expected during the second 5-year period of the 10-year TIPS. Again, sounds like a winner.

The story is less convincing for the 30-Year TIPS, as in the last 20 years of its life, the inflation rate would need to be 2.69% per year to reach the 30-year average of 2.52%. Yet once again, the longer current inflation remains above the imbedded 30-year rate, the more return that accrues to TIPS over T-Bonds. One now needs to make a much more heroic assumption that there are no real inflationary pressures building in the U.S. These pressures are unlikely to dissipate even in a relatively mild U.S. recession.

Hopefully, you'll find these tips to be useful.

Appendix A

In this appendix, we discuss in more detail some of the characteristics and correlations between the individual variables in the matrix below. While of great interest, most of what is discussed below is not essential to the discussion in the main body of the report.

Correlation Matrix of 2-Year Total Returns and 2-Year Yield Changes

Figure 4

Correlation Coefficients		% 2-Year Total Returns/Change				2-Year Yield Changes	
		Merrill TIPS	10-Year T-Bond	S&P 500	CPI-U 2Yr Rate	T-Bond Yield	Real Yield
% 2-Year Total Returns/ Changes	Merrill TIPS Index	1					
	10-Year T-Bond	0.71	1				
	S&P 500 Index	-0.77	-0.58	1			
	CPI-U 2Yr Rate	-0.30	-0.57	0.28	1		
2-Year Yield Changes	T-Bond Yield	-0.72	-0.93	0.66	0.56	1	
	Real Yield	-0.96	-0.70	0.76	0.40	0.77	1

Figure 4 displays further evidence of these prior conclusions regarding the characteristics of TIPS. As stated earlier, changes in inflation rates, expected inflation rates, real yields, and the S&P 500 will never have perfect correlations over any period of time. Indeed, single variable comparisons leave out all of the nuances of the simultaneous impact that other variables may have on returns or yield changes. Short measurement periods (such as monthly or quarterly data) are subject to the most instability in the patterns of correlation. Even one-year measurement periods may not capture the change in market sentiment or perception that evolves over a period of sustained change. As a result, Figure 4 examines the correlations between these variables using 2-year rolling periods, under the belief that sustained changes might have a sufficiently long period to cause changes in the other variables.

The correlation matrix is color coded to highlight certain characteristics of the relationship between any two of the variables shown. Note first in the **blue-shaded box** that Merrill TIPS Index returns (2-year total) are highly inversely correlated (–0.96) with 10-year real yields. So changes in the 10-year TIPS do a nice job of describing the return characteristics of the Merrill TIPS Index, even though the latter contains a wide range of maturities. Also note as an

interesting confirmation of this correlation over 2-year periods, the change in the 10-Year TIPS yield translated into total return on the Merrill TIPS Index by a coefficient (the slope) of –9.5 times, very similar to the 9.0 year Macauley's duration of the a 10-year TIPS in Figure 1.

Note next in the **violet-colored boxes** that as expected, 10-year T-Bond returns are highly inversely correlated with changes in nominal T-Bond yields (–0.93), but less so with real yields (–0.70), as during this period, real yield moved less (about 68%-a slope of .68) than the change total yield.

Note in the **green-shaded boxes** that changes in real yields (on 10-year TIPS) are positively correlated (+0.76) with S&P 500 returns over this 10-year period. This is indeed contrary to the general perception that most increases in interest rates are typically negative for the stock market. So returns from TIPS (as measured by the Merrill TIPS Index) were negatively correlated with stock market returns (–0.77) with almost the same level of correlation. In both cases, this means that a bit less than 60% (the R-squared or coefficients of determination of .58-.59) of the variance of stock market returns was described by the variation in real yields and returns from the Merrill TIPS Index. This supports our theoretical structure that in most environments, TIPS are a better diversifier of risk from stocks than are either 10-year T-Bonds or T-Bills (the latter of which is not shown in the table above nor discussed further in this report). Using this same duration concept applied to 2-year real yield changes versus S&P 500 returns produces a slope coefficient of +27.2 times the real yield change, indicating the long-duration nature of stocks. This led us to **Conclusion #3 – changes in TIPS yields are positively correlated with stock price changes (S&P 500) (and TIPS returns are inversely correlated), whereas nominal yields are not consistently so.**

In the **yellow-colored boxes**, one can see that an increase in the 2-year rate of change in the CPI is inversely correlated with T-Bond returns (-0.57) and nearly equally positively correlated to T-Bond yields (+0.56). While these are not strong correlations, they do suggest that the actual acceleration or deceleration in the rate of CPI change impacts perceptions of future inflation but with a lag, and 2-year changes in the 2-year rate of CPI-U change was a better measure of this than quarterly or annual CPI changes. As an additional observation, such CPI changes were not highly correlated with either TIPS returns nor S&P 500 returns.

Finally, the one anomaly in the table is reflected in the **red-shaded box**. 10-year T-Bond total returns were inversely correlated with S&P 500 returns (–0.58) over the entire period. One might expect that over long periods of time, stock and bond returns would be positively correlated (at a correlation coefficient closer to or less than +0.50). A strong negative correlation in returns usually occurs in recession-like (or deflationary) periods. If one divides the entire period into three sub periods, however, this anomaly mostly disappears as there was little correlation through the end of 2000, a highly inverse correlation during the "recession" years of the early part of this decade, and more modest positive correlation in the last three years.
