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INVESTMENT GROUP

Short-Term TIPS

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In this paper, we review the case for short-term Treasury Inflation Protected Securities (TIPS). We presume the reader is already familiar with the broad TIPS asset class. Therefore, we focus on the ways in which shorter duration TIPS differ from the overall TIPS market. Specifically, we focus on interest rate and inflation sensitivity.

We find that short-term TIPS can provide a purer hedge against inflation, especially unexpected inflation. Therefore, any investor who is concerned about surprise inflation should consider whether short-term TIPS might deserve a role in their portfolio.

Size of short-term TIPS market

The short-term TIPS market is generally defined as those TIPS issues with less than five years to maturity. By number of issues, it is rather limited, as there were 21 TIPS that met this definition as of March 2022. However, total issuance by dollar amount is skewed to the short term with roughly 50% of outstanding issue amount concentrated in maturities less than five years by market value.

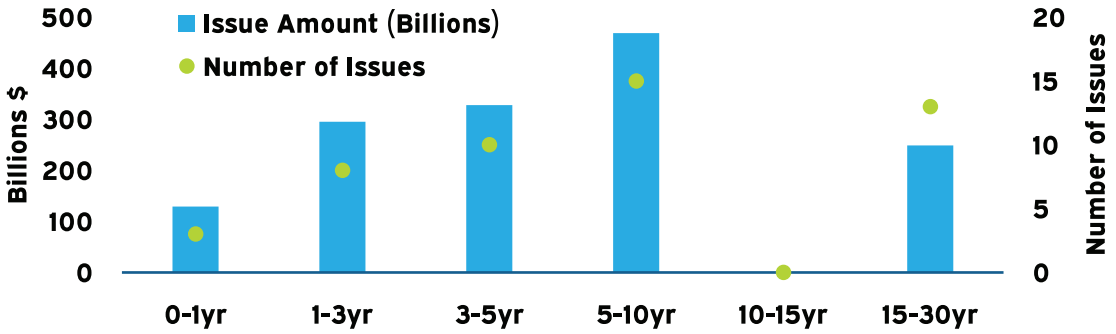

FIGURE 1
Size of TIPS Market by Years to Maturity
Source: Bloomberg data as of March 31, 2022.

Interest rate sensitivity

Short-term TIPS, by definition, have a shorter duration than the broader TIPS market. The duration of a bond estimates how much the price of the bond will change due to movements in interest rates. One of the key benefits of shorter duration TIPS in this context is that they bear significantly less duration and are, therefore, less sensitive to rising interest rates. Figure 2 compares the duration, maturity, and yield for the Bloomberg 1-5 year TIPS index, the Bloomberg US TIPS index, and the Bloomberg Aggregate Bond index. It illustrates that the short-term TIPS index has a duration less than one-half of the other two indices.

	Duration (Years)	Maturity (Years)	Yield to Maturity
Bloomberg 1-5 Year TIPS	2.4	3.0	2.5%
Bloomberg US TIPS	5.8	8.0	2.6%
Bloomberg Aggregate	6.5	8.8	2.9%

FIGURE 2
Duration, Maturity and Yield

Source: Bloomberg data as of March 2022.

Note: The duration for TIPS cannot be precisely calculated as the exact size of future cash flows is unknown (since future inflation is unknown). Hence, duration is estimated based upon market expectations for future inflation. Option-adjusted duration is used for the Bloomberg Aggregate.

For TIPS, the yield to maturity quoted combines the real yield with the prevailing market expectation for inflation.

Shorter duration TIPS, as compared to the aggregate TIPS index, have historically offered lower correlations to the broad bond market, as illustrated in Figure 3. This corroborates the thesis that short-term TIPS are less sensitive to the changes in interest rates that affect the broad bond market.

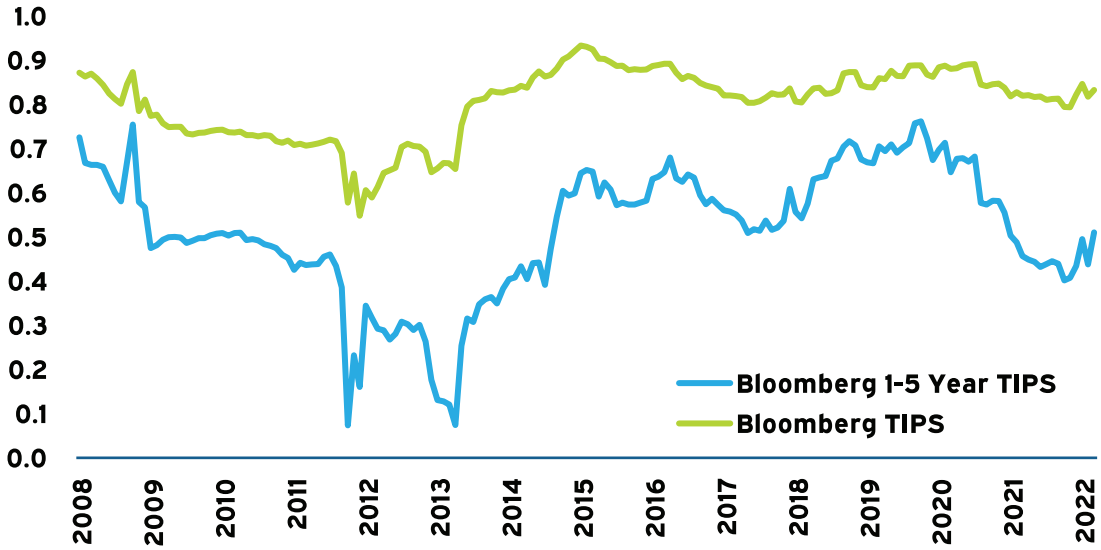

FIGURE 3
Rolling 3-Year Correlation vs. the Bloomberg Aggregate Index

Source: Bloomberg data as of March 31, 2022.

It is worth noting that the nature of a rising rate environment will impact TIPS in differing ways based on their duration. For example, if longer-term rates are rising faster than shorter-term rates (i.e., a rate rise accompanied by a steepening yield curve), longer-term TIPS will perform far worse than short-term TIPS. However, in an environment where short-term rates rise faster than long-term rates, then short-term TIPS will share the pain.

Lower yield

The primary trade-off of short-term TIPS is that they typically offer a lower yield than longer-term TIPS, consistent with the term structure premium of nominal bonds. The amount of this trade-off (i.e., yield give-up) depends on the steepness of the yield curve. During a period with a fairly flat yield curve, the trade-off is minimal and hence the opportunity cost of holding short-term TIPS versus market duration TIPS is likewise small. But a steep yield curve provides a long-term return advantage to market duration TIPS over short-term TIPS.

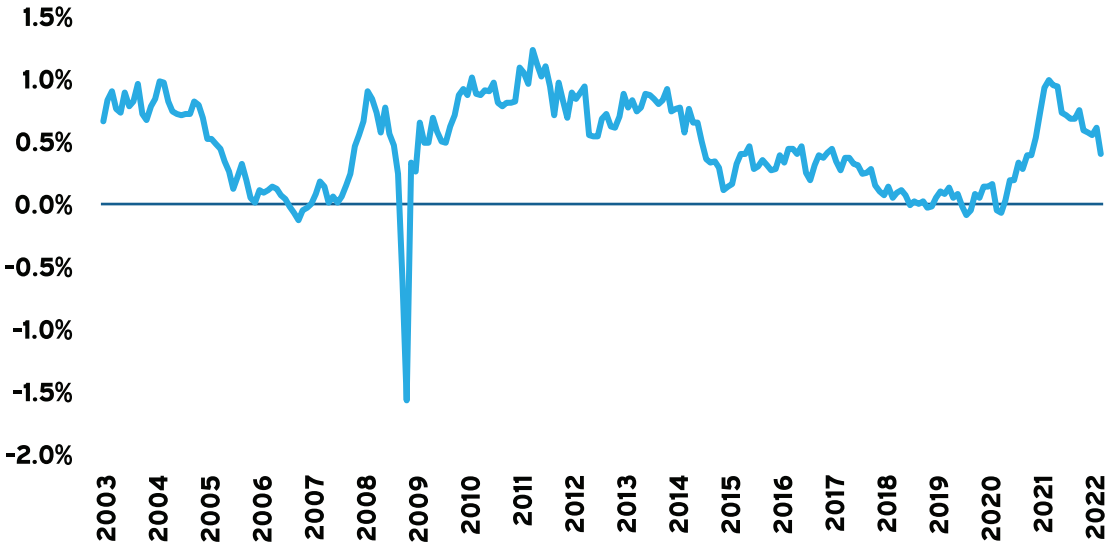

FIGURE 4
Historical 10-5 Yield Curve Steepness for TIPS
Source: Meketa analysis of Bloomberg data for the period from 2003 through 2022.

Inflation protection

TIPS have exhibited positive correlations to both realized inflation as well as unexpected (i.e., "surprise") inflation historically, unlike nominal bonds, which have been slightly negatively correlated on average. Figure 5 illustrates that shorter duration TIPS have been even more highly correlated with inflation, both to surprise inflation as well as realized inflation.[1]

[1] Surprise Inflation is defined as the difference between the rolling 12-month inflation (CPI-U) value and the rolling 12-month inflation value one year prior.

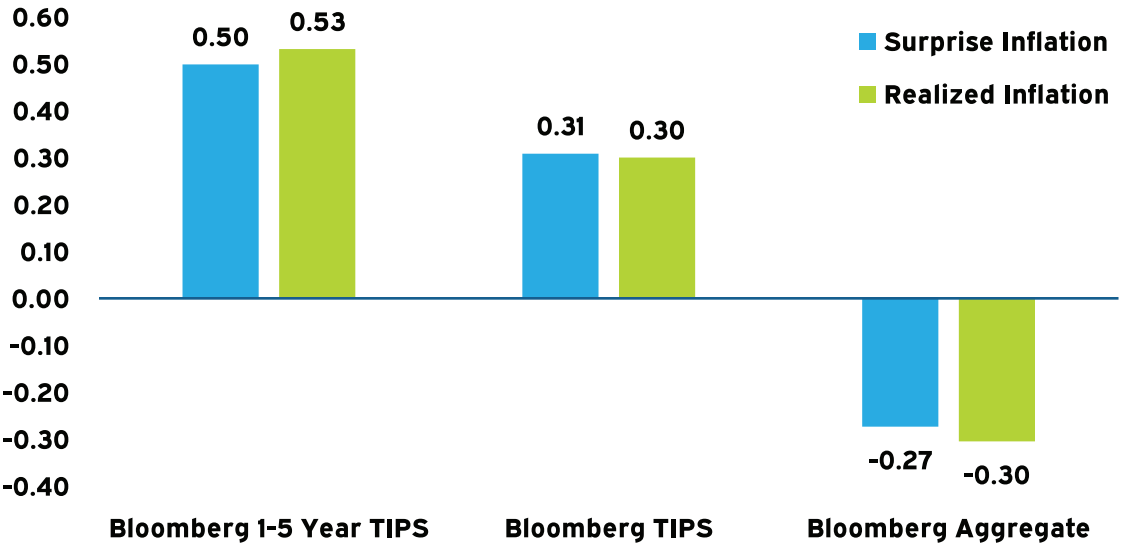

FIGURE 5
Correlation with Inflation
Source: Meketa analysis of Bloomberg data for the period from 2005 through 2022.

The fact that short-term TIPS are less sensitive to changes in interest rates but more sensitive to changes in inflation is not a coincidence. Rate changes are one of the major drivers of TIPS returns, along with inflation. Short-term TIPS, which minimize exposure to interest rates, effectively leave inflation as the primary driver of their performance. Hence, short-term TIPS can help held reduce short-term volatility from changes in inflation more effectively than longer duration TIPS.

The components that drive the changes in the consumer price index (CPI) have also been found to impact TIPS along the duration spectrum differently. TIPS returns, by definition, are a product of movement in the CPI. Using a 1-Year TIPS as an example, the value change of the security is determined in part by the remaining 12 times the CPI is published until maturity, whereas a 10-Year TIPS security would be based on the remaining 120 times the CPI is published. An investor looking at shorter duration TIPS must therefore be more concerned with the short-term forecasts for each component of the CPI, including, but not limited to, the most volatile components such as energy.

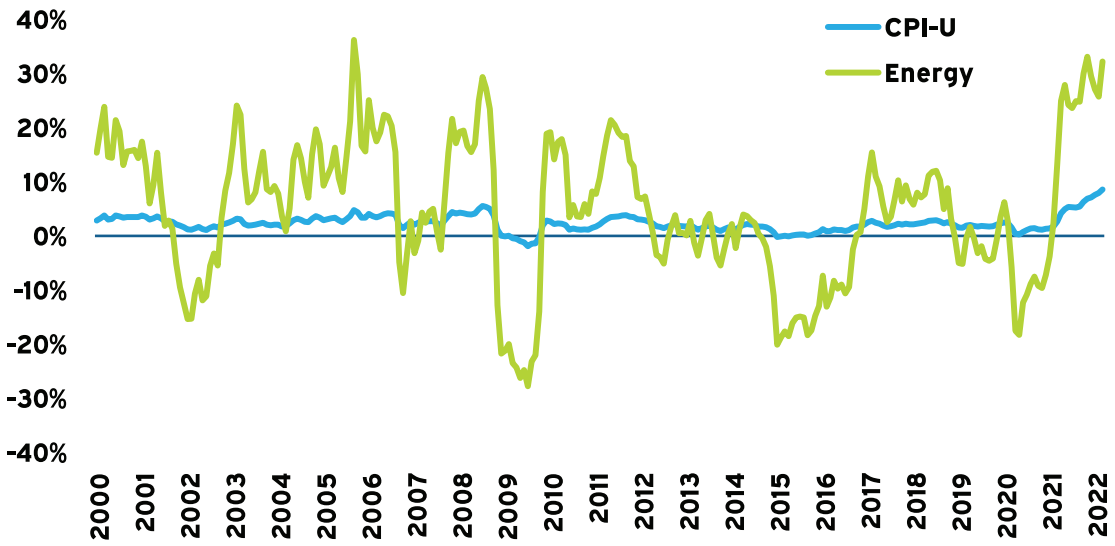

FIGURE 6
Year-over-Year Change in Inflation vs. Energy Prices
Source: Meketa analysis based on annual percentage change data from FRED for the period from 2000 through 2022. Inflation is proxied by the CPI-U, and Energy is proxied by the special aggregation published as part of the CPI-U, which includes utility natural gas, fuel oil, electricity and gasoline.

For example, energy has comprised approximately 8%[2] of the CPI over the past 20 years. Yet in a single year, energy has contributed to over 60% of the movement in the CPI. However, over longer-term periods, the volatility in this component is muted and contributes 10% to the movement in CPI, closer to its relative weight in the index.

[2] Source: Meketa analysis based on relative importance data from FRED for the period from 2000 through 2022. Energy is proxied by the special aggregation published as part of the CPI-U, which includes utility natural gas, fuel oil, electricity and gasoline.

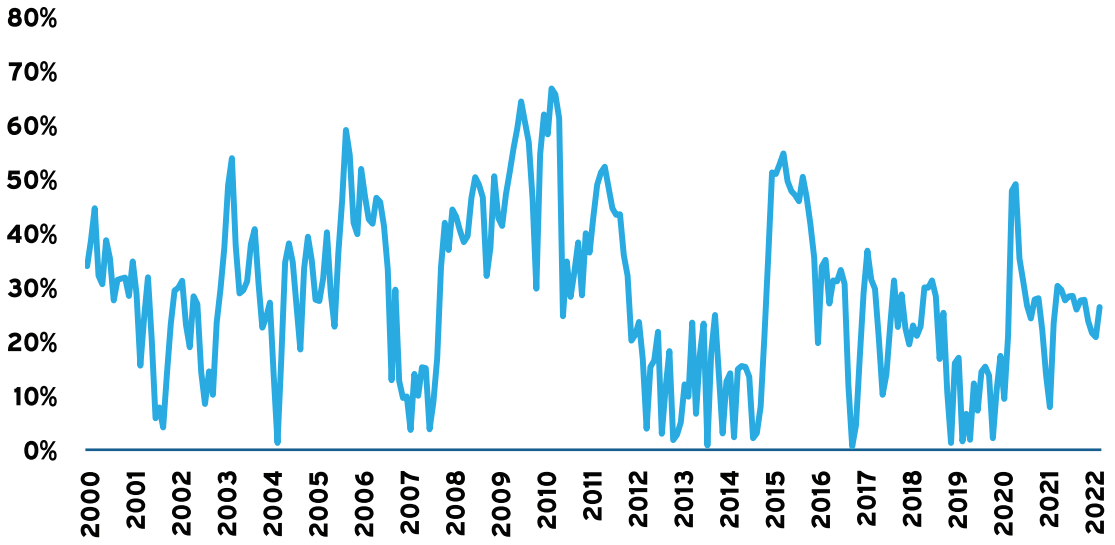

FIGURE 7
Contribution of Energy Sector to Changes in CPI
Source: Bureau of Labor Statistics data from 2000 through 2022.

The data in Figure 8 shows the correlations among the CPI, core CPI, and the energy component of CPI, to short-term TIPS and the aggregate TIPS index. It shows that shorter-term TIPS are more closely correlated to the volatile energy sector than to the core CPI. In contrast, the broad TIPS index is less sensitive to the energy sector than it is to the core CPI, implying they are less sensitive to short-term disruptions in the trend of the broader CPI.

	Correlation to Headline CPI	Correlation to Core CPI	Correlation to Energy
1-5 Year TIPS	0.24	0.09	0.20
US TIPS	0.03	0.05	-0.02

FIGURE 8
Return Correlation to CPI Components (2/2005 – 3/2022)

Source: Meketa analysis based on data from Bloomberg and FRED for the period from February 2005 through March 2022. Headline CPI is defined as all components of the consumer price index. "Core CPI" is defined as headline CPI less food and energy. Represents correlations for monthly data.

Deflation floor

One aspect of TIPS that is generally overlooked is the embedded floor offered by the Treasury that guarantees the payment of principal at maturity. When a TIPS security is originally issued, they are offered to the market at an "index ratio" of 1.0, which translates to the par value of the security at the time of issuance. The "index ratio" is used in the calculation of the inflation adjusted principal, and this ratio will increase, or decrease, by the percentage change in the CPI over the life of the security. Once the TIPS security matures, the government guarantees payment at maturity of principal that corresponds to the greater of either the current index ratio or the original par value. Hence, there is deflation protection[3] embedded in TIPS, and this protection is more likely to be valuable for short-term TIPS given that past deflationary experiences have tended to be fairly brief in length.

[3] Note that this "floor" may only apply to recently issued TIPS of short maturity. It is quite likely that TIPS with an original issuance of five years or more have seen their index ratio grow sufficiently with inflation that it would take a very large deflationary spike for the floor to kick in.

Historical evidence

Figure 9 illustrates how TIPS with different durations would have performed during the highest 20% and lowest 20% of annual inflation periods since 1971. It shows that average performance during the highest inflation periods was better for shorter duration TIPS than longer duration TIPS, and that it was very strong in absolute terms. Historically when inflation has been higher, rates have moved upwards, which caused a drag on performance for longer duration assets. Conversely, when inflation has been lower, rates have generally declined, which supported prices for longer duration assets.

1971-3/2022	Inflation	Change in 10-Year Treasury Yield	US TIPS 1-5 Year	US TIPS 5-Year Constant Maturity	US TIPS 10-Year Constant Maturity
Top 20% of Inflation Periods*	9.0%	0.7%	7.7%	5.7%	2.9%
Bottom 20% of Inflation Periods	1.1%	-0.5%	2.0%	2.7%	4.0%

FIGURE 9

TIPS Performance During Top 20% and Bottom 20% of Inflationary Periods

Source: Meketa analysis based on data from Bloomberg and FRED for the period from 1971 through 2022.

Note; One traditional difficulty in analyzing TIPS returns is their relatively short history as the first TIPS was issued in 1997. To compensate for this drawback, the results use simulated TIPS returns based on an internal Meketa Investment Group model that is built upon industry and academic research.

*Represents ranked rolling 12-month inflation. Performance represents average of rolling 12-month returns during these periods. Treasury yield change represents average rolling 12-month change in yields during these periods.

Figure 10 shows performance during five historical scenarios. The first three are rising interest rate scenarios of different magnitude and length. Unsurprisingly, short-term TIPS outperformed market duration TIPS during each scenario. The last two are inflationary scenarios, again of different magnitude and length. The 1973-74 period was accompanied by a severe bear market, and longer duration bonds outperformed in this period, though short-term TIPS did produce positive absolute returns. The 1980 period saw a more modest downturn for equities, and short-term TIPS outperformed.

Scenario	Investment Grade Bonds	TIPS	Short-Term TIPS
COVID Rebound/Supply Shock (Apr 2021 – Apr 2022)	-7.2%	2.0%	3.3%
Taper Tantrum (May - Aug 2013)	-3.7%	-8.5%	-2.1%
Rate Spike (1994 Calendar Year)	-2.9%	-7.5%	-3.8%
Volcker Recession (Jan - Mar 1980)	-8.7%	-7.8%	-3.9%
Stagflation (Jan 1973 - Sep 1974)	7.9%	4.3%	2.3%

FIGURE 10

Historical Scenario Analysis

Source: Meketa historical scenario analysis based on Bloomberg Aggregate, Bloomberg US TIPS, Bloomberg US TIPS 1-5 Year. TIPS and short-term TIPS are backdated, prior to their inception, using a Meketa simulated TIPS model.

Volatility

As illustrated in Figure 11, shorter duration TIPS have typically experienced less volatility over time compared to both the Bloomberg Aggregate and the broader TIPS index. This is to be expected given the lower sensitivity to changes in interest rates.

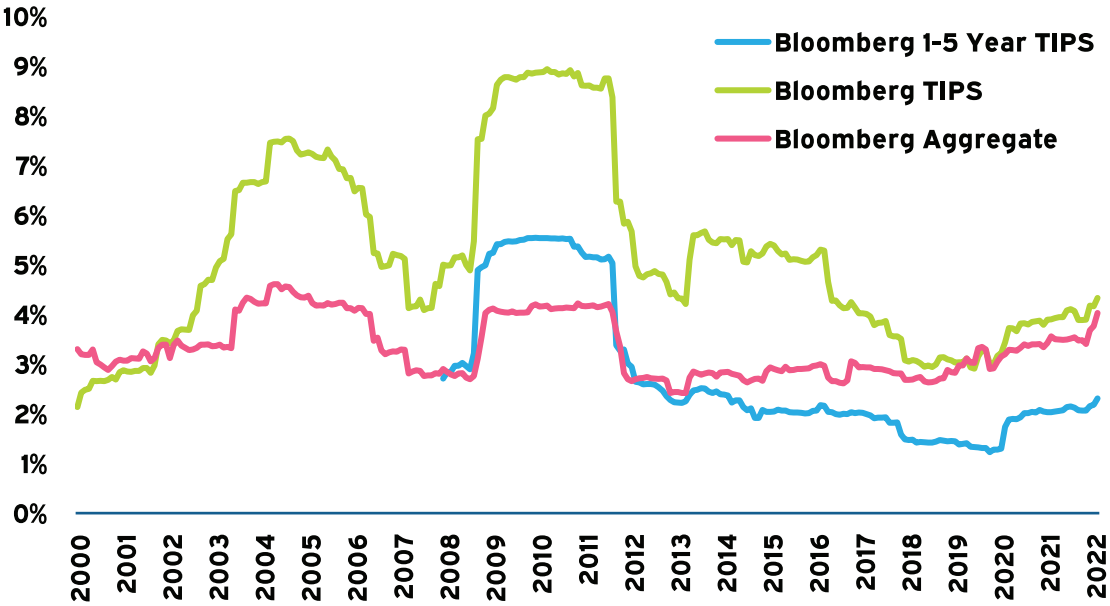

FIGURE 11
Three-Year Rolling Standard Deviation
Source: Meketa analysis based on d Bloomberg data for the period from 2000 through 2022.

Market liquidity

As of March 2022, the market value of the 40 outstanding TIPS issues was roughly $1.8 trillion, representing about 8% of the total outstanding issuance of the US Treasury. TIPS are generally auctioned four times per year.[4] The TIPS market is not as liquid as that for nominal Treasury bonds. This is due to several factors, including the smaller size of the TIPS market, the fact that TIPS constitute a non benchmark investment for many bond managers, and TIPS' attractiveness as a buy and-hold investment. Consequently, it is slightly more expensive to trade TIPS than it is to trade nominal Treasuries. On the other hand, the TIPS market is more liquid than that for most investment grade corporate bonds.

In recent years, the trading spread has been approximately 0.10% of principal value for TIPS versus approximately 0.05% for Treasuries.[5] Therefore, for every trade, Treasuries have a one-time 0.05% advantage on average. Of course, it is possible that during periods of heightened volatility the spreads for TIPS could widen just as they do for other securities. This happened during the Global Financial Crisis, when TIPS spreads grew to as large as 14/32nds[6] as well as during the early days of uncertainty in March 2020 related to COVID-19, when TIPS spreads grew to over 3%.

[4] For more information on recent and future auctions, see https://www.treasurydirect.gov/instit/marketables/tips/tips.htm

[5] Source: Bloomberg, average monthly bid-ask spread of on-the-run 10-year TIPS and Treasuries between September 30, 2018 and September 30, 2021.

[6] Source: Bloomberg, bid-ask spread of 30-Year TIPS issuance with expiration of 2032.

Implementation

Passive management is widely available for TIPS. Typically, offerings are designed to replicate the broad TIPS index. However, some of the large purveyors of passive strategies offer off-the-shelf passive TIPS strategies that target the shorter end of the curve (e.g., 0-5 years or 1-5 years). This can include mutual funds and ETFs as well as institutional commingled fund structures. Short-term TIPS can be implemented in a separate account format as well, but the funding requirement for a separate account generally precludes smaller investors.

The fees for an institutional off-the-shelf passive short duration TIPS strategy are expected to be in the lower single digits, typically around five basis points. Larger investors may be able to negotiate even lower fees or other favorable terms. Note that large institutional investors who have a staff capable of internal fixed income management may be able to run a short-term TIPS portfolio effectively with a passive or quasi-index-like approach at an even lower net cost.

Conclusion

TIPS have become an established asset class in many institutional investors' portfolios over the past quarter century. Some of those investors have looked to short-term TIPS given their unique profile of low sensitivity to interest rates and high sensitivity to inflation while benefiting from the full faith and backing of the US Treasury. While short-term TIPS are not as liquid as nominal Treasuries, they are still far more liquid than the riskier assets that tend to comprise the majority of many investors' portfolios.

We find that short-term TIPS can provide a purer hedge against inflation, especially unexpected inflation. This is partly because short-term TIPS have less sensitivity to changes in interest rates than do intermediate and long duration TIPS. We also find that short term TIPS have higher correlations to the more volatile aspects of the CPI. The primary trade-off is that short-term TIPS offer a lower yield, and the amount of this trade-off depends on the steepness of the yield curve. Therefore, short-term TIPS might seem particularly attractive for an investor who is concerned about rising interest rates and increases in inflation driven by the more volatile components of the CPI.

Appendix

Advantages of Short Duration TIPS	Disadvantages of Short Duration TIPS
Less exposure to interest-rate risk	Long-term return potential is lower
Preservation of principal in a rising interest rate environment	Investors in the 1-5 Year TIPS index receive lower yield
Better inflation hedge than traditional TIPS index	Long duration assets would be expected to outperform during a market crisis, especially if inflation expectations were unchanged
Less volatility than core, longer duration TIPS	

FIGURE 12
Advantages and Disadvantages of Short Duration TIPS
Source: Meketa Investment Group.

Recent events

As of March 2022, the Federal Reserve owned $388.2 billion dollars of TIPS, representing approximately 25 percent of the total TIPS market in terms of market value. The Federal Reserve's asset purchase program may contribute to TIPS scarcity in the TIPS market. The COVID response asset purchase program has been intentionally focused on lowering short-term borrowing costs and bond yields so that short-term TIPS yields have moved into negative real yields, even as inflation rises. Figure 13 shows the nominal Treasury bond yield curve compared to the TIPS real yield curve so that the inflation breakeven rate is above yield of both types of securities.

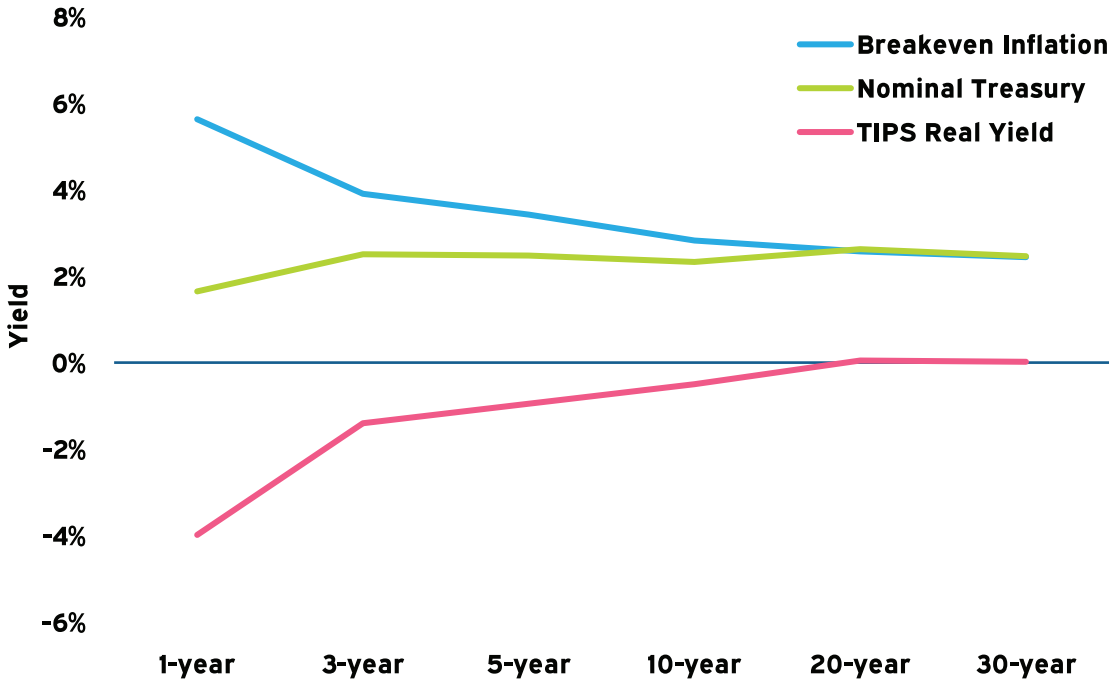

FIGURE 13
TIPS and Nominal Treasury Yield Curve & TIPS Real Yield
Source: FRED and US Treasury as of March 2022.

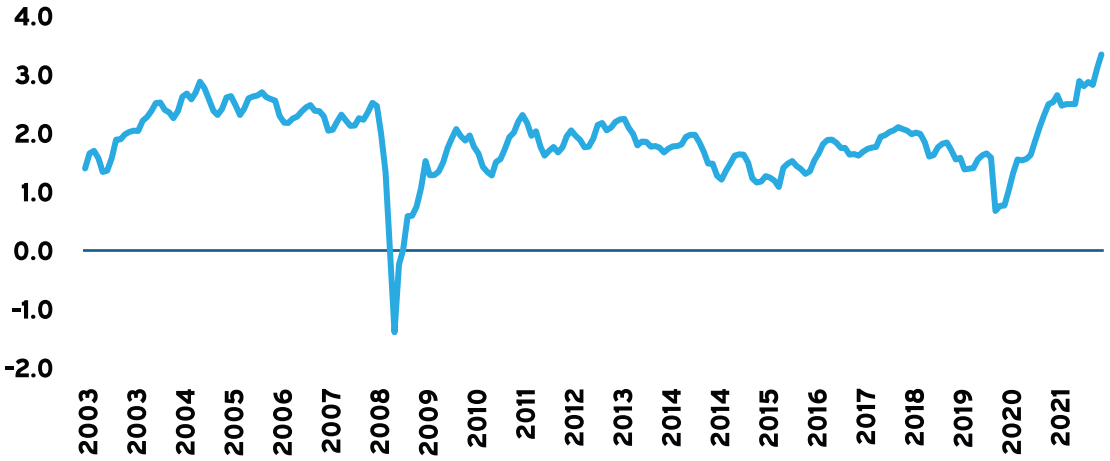

FIGURE 14

5-Year Breakeven Inflation Rate (%)

Source: FRED data is monthly breakeven inflation rates as of March 2022. Breakeven inflation is calculated as the difference of a nominal and an inflation adjusted bond yield of similar duration. FRED five-year breakeven inflation is calculated as the difference between the 5-year Treasury's constant maturity and the 5-year Treasury Inflation-Indexed constant maturity security yields.

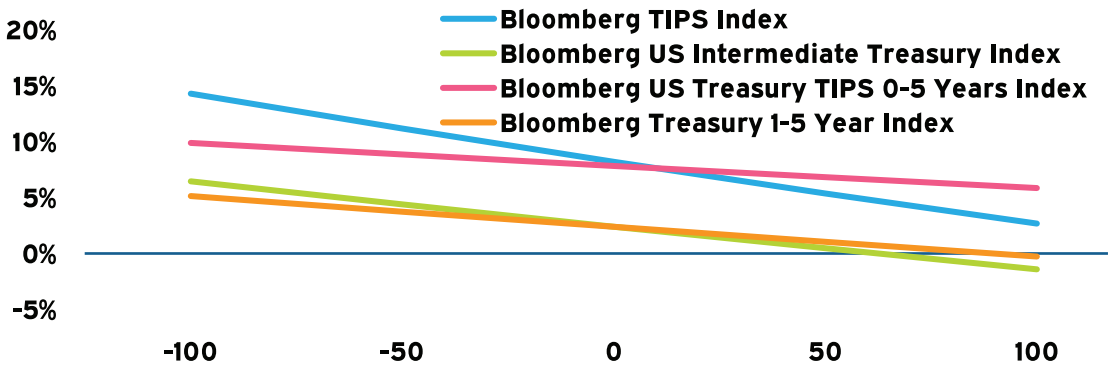

FIGURE 15

Changing Interest Rate Scenario Analysis: 1-Year

Source: Meketa analysis with constant inflation assumption based on 3/31/2022 1-year breakeven inflation rate of 5.63%.

FIGURE 16

Impact of Changes in Rates of Interest and Inflation on TIPS

Source: Bloomberg data as of 2022 and Meketa analysis.

Bloomberg TIPS

Changes In Interest Rates (bps)

Inflation Rate Scenarios	-500	-400	-300	-200	-100	-50	0	50	100	200	300	400	500
8.0%	47.1%	38.6%	30.7%	23.4%	16.7%	13.5%	10.6%	7.7%	5.1%	0.2%	-4.1%	-7.8%	-10.9%
6.0%	45.1%	36.6%	28.7%	21.4%	14.7%	11.5%	8.5%	5.7%	3.1%	-1.8%	-6.1%	-9.8%	-12.9%
4.0%	43.1%	34.6%	26.7%	19.4%	12.7%	9.5%	6.6%	3.7%	1.1%	-3.8%	-8.1%	-11.8%	-14.9%
2.0%	41.1%	32.6%	24.7%	17.4%	10.7%	7.5%	4.6%	1.7%	-0.9%	-5.8%	-10.1%	-13.8%	-16.9%
0.0%	39.1%	30.6%	22.7%	15.4%	8.7%	5.5%	2.6%	-0.3%	-2.9%	-7.8%	-12.1%	-15.8%	-18.9%

Bloomberg TIPS 0-5 Year

Changes In Interest Rates (bps)

Inflation Rate Scenarios	-500	-400	-300	-200	-100	-50	0	50	100	200	300	400	500
8.0%	21.1%	18.8%	16.5%	14.4%	12.2%	11.2%	10.2%	9.2%	8.2%	6.3%	4.5%	2.7%	1.0%
6.0%	19.1%	16.8%	14.5%	12.4%	10.2%	9.2%	8.2%	7.2%	6.2%	4.3%	2.5%	0.7%	-1.0%
4.0%	17.1%	14.8%	12.5%	10.4%	8.2%	7.2%	6.2%	5.2%	4.2%	2.3%	0.5%	-1.3%	-3.0%
2.0%	15.1%	12.8%	10.5%	8.4%	6.2%	5.2%	4.2%	3.2%	2.2%	0.3%	-1.5%	-3.3%	-5.0%
0.0%	13.1%	10.8%	8.5%	6.4%	4.2%	3.2%	2.2%	1.2%	0.2%	-1.7%	-3.5%	-5.3%	-7.0%

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