

MARKET CONDITIONS AND PREDICTIONS

Market pundits commonly cite observable market conditions and intuitive relationships when developing a narrative about future stock and bond returns. But how empirically valid are those relationships? We shed light on the reliability of commonly cited market indicators and purported relationships for forward-looking investors.

FUTURE BOND & STOCK RETURNS

Many of our tests include the 10-year US Treasury bond yield because it is considered one of the most important prices in financial markets. Since Treasury bonds are deemed to have effectively no default risk, the initial 10-year Treasury yield should closely predict the future returns of intermediate-term Treasury bonds.

Exhibit 1 shows that the level of initial 10-year Treasury yields is closely related to future five and 10-year returns of intermediate-term government bonds over the full history (1926-2020).¹ A long history is required for this test because there are limited independent 5 and 10-year subperiods within the 1926-2020 history. The adjusted R^2 is high, indicating a strong relationship between the two variables. The beta is positive and its t-statistic² is greater than 2.0, which means higher bond yields are related to higher bond returns, and that relationship is statistically significant (i.e. not likely random). Perhaps this result is no surprise, but it serves as a benchmark for the rest of our tests.

¹ Five and 10-year bond returns are represented by the Ibbotson Associates (IA) Intermediate-Term Government Bond Index. The results are similar when testing the returns of a 10-year average maturity index by blending IA Intermediate and Long-Term Government bond indices.

² All t-statistics have been adjusted for overlapping observations where appropriate.

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EXHIBIT 1: INITIAL BOND YIELDS AND FUTURE BOND RETURNS



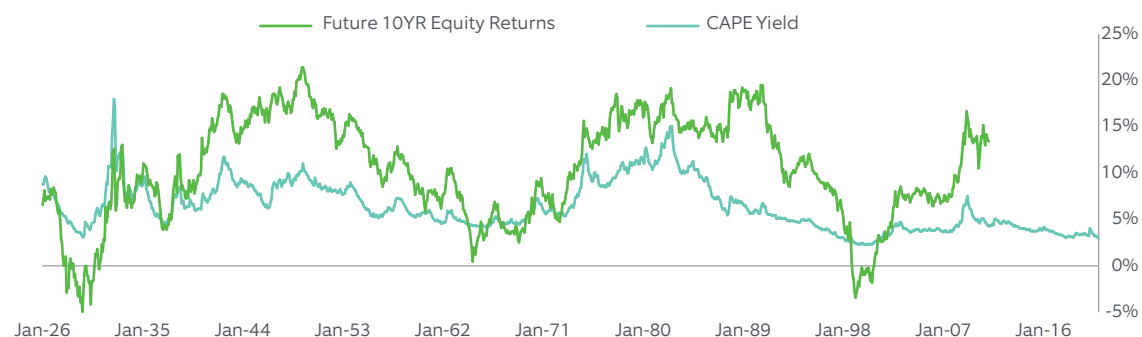
Sources: Robert Shiller Data Library, Morningstar, Northern Trust Research

JAN. 1926 TO DEC. 2020	10YR YIELD BETA	T-STAT	ADJ. R ²
Future 5YR Bond Returns	1.12	11.40	87%
Future 10YR Bond Returns	1.01	9.35	89%

In our 2013 research article “Are Equity Returns Predictable,” we showed that the initial level of global cash flow yields partly predicts global equity returns over the subsequent five years. Other valuation metrics such as the Shiller cyclically-adjusted earnings yield (the inverse of the Shiller cyclically-adjusted price-to-earnings ratio, or CAPE) work about as well. The Shiller CAPE uses trailing ten years of inflation-adjusted earnings, making it a more stable version of the stock market’s price-to-earnings ratio.

Exhibit 2 shows that initial CAPE yields partly predict future 5 and 10-year US equity returns³ over the 1926-2020 history. This relationship is not as strong as it is for bonds in Exhibit 1, but it is statistically significant. The lower adjusted R² suggests many other factors influence equity returns.

EXHIBIT 2: INITIAL EQUITY VALUATIONS AND FUTURE EQUITY RETURNS



Sources: Robert Shiller Data Library, Northern Trust Research

JAN. 1926 TO DEC. 2020	CAPE YIELD BETA	T-STAT	ADJ. R ²
Future 5YR Equity Returns	1.81	2.65	30%
Future 10YR Equity Returns	1.47	5.18	48%

³ Five and 10-year equity returns are represented by the Ibbotson Associates (IA) US Large Stock TR Index.

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The combined results in Exhibits 1 and 2 beg the question as to whether the level of initial 10-year Treasury yields is related to future equity returns. Market pundits often suggest Treasury yields influence equity returns, either through the discounting of future earnings or as the opportunity cost investment. However, we find no significant relationship between initial Treasury yields and future equity returns. This suggests investors should forecast future equity returns from current equity valuations, and not from current bond yields.

Bond yields are nominal, whereas CAPE yields are real (inflation-adjusted). Using various ways to estimate real Treasury yields back through history (e.g., subtracting trailing inflation or ex-post future inflation from yields), we still find no significant relationship between initial real 10-year Treasury yields and future 5 and 10-year nominal or real equity returns.

BOND YIELDS & EQUITY VALUATIONS

The “Fed Model” – which is not an official model of the Federal Reserve – proposes a relationship between the level of the 10-year Treasury bond yield and the level of the stock market’s earnings yield. This seems intuitive, as the general level of bond interest rates could have an effect on current equity valuations through the discounting of future earnings or as the opportunity cost investment.

Exhibit 3 shows that empirically there is no significant relationship between the level of Treasury yields and the level of Shiller CAPE yields over the full history (1926-2020). Since we are not dealing with long-term future returns in this test, we can break the full history into shorter subperiods for examination. There seems to be a positive relationship over the 1970-2000 subperiod, when high inflation and inflation expectations may have been a factor. But that relationship was in the wrong direction over the earlier 1926-1969 sub-period, and it completely disappears in the 2000-2020 subperiod. Overall, we judge the Fed Model to be unreliable at demonstrating a relationship between bond yields and equity valuations.

EXHIBIT 3: 10-YEAR TREASURY YIELDS AND EQUITY VALUATIONS

CAPE YIELD	10YR YIELD BETA	T-STAT	ADJ. R ²
Jan. 1926 to Dec. 1969	-1.08	-3.98	26%
Jan. 1970 to Dec. 1999	1.06	3.78	65%
Jan. 2000 to Dec. 2020	-0.15	-0.23	6%
Jan. 1926 to Dec. 2020	0.34	0.87	13%

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Once again, using various ways to estimate real Treasury yields back through history, we find no significant relationship between the level of real 10-year Treasury yields and CAPE earnings yields.

INFLATION & EQUITY VALUATIONS

We do find that current earnings yields are explained in part by trailing inflation volatility. Inflation volatility may be a good proxy for perceived inflation risk and macroeconomic instability. We use trailing 3-year inflation volatility⁴ in Exhibit 4.

EXHIBIT 4: INFLATION VOLATILITY AND EQUITY VALUATIONS

CAPE YIELD	INFL VOL BETA	T-STAT	ADJ. R ²
Dec. 1928 to Dec. 1969	1.30	6.08	37%
Jan. 1970 to Dec. 1999	8.02	2.68	57%
Jan. 2000 to Dec. 2020	1.62	2.04	57%
Dec. 1928 to Dec. 2020	1.28	2.02	16%

The relationship is significant over each subperiod and the full history, though the explanatory power (R²) over the full history is lower than each subperiod, suggesting an unstable relationship. Interestingly, the relationship between trailing inflation volatility and 10-year Treasury yields is not statistically significant.

INFLATION, BOND YIELDS & EQUITY RETURNS

The prior result suggests digging deeper into inflation relationships. Surprisingly, we do not find a significant relationship between initial 10-year Treasury yields and subsequent realized inflation rates over the next 1, 5 or 10 years. Are bond investors poorly anticipating inflation?

We do find a significant relationship between the initial 10-year Treasury yield and prior 10-year realized inflation rate (Exhibit 5), and this relationship is stronger since the 1970s inflationary era. We interpret this result to mean that investors form expectations about future inflation based on their past experience with inflation, at least since 1970.

EXHIBIT 5: 10-YEAR TREASURY YIELDS AND PRIOR INFLATION RATES

PRIOR 10YR INFLATION RATE	YIELD 10YR BETA	T-STAT	ADJ. R ²
Dec. 1935 to Dec. 2020	0.57	2.56	50%
Jan. 1970 to Dec. 2020	0.61	10.48	84%

The introduction of Treasury inflation protected securities (TIPS) in 1997 helps investors gauge market-based inflation expectations and perhaps recalibrate their own views. But data on market-based 10-year inflation expectations is only available since 2003, providing a relatively short history over a relatively stable inflationary environment to evaluate. This is a significant limitation.

⁴ We tested trailing inflation volatilities of 1 to 5 years, with the strongest relationship at 3 years.

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We find no correlation between the level of inflation expectations (the difference or “breakeven rate” between 10-year nominal Treasury bond yields and 10-year TIPS yields) and contemporaneous equity returns (at daily, weekly and monthly frequencies). Similarly, we do not find a significant relationship between the level or change in 10-year real (TIPS) yields and contemporaneous equity returns.

However, we find a positive but weak relationship between the change in inflation expectations and contemporaneous equity returns. Exhibit 6 shows the relationship between the monthly change in 5 and 10-year breakeven inflation and the monthly returns on the S&P 500, from Jan. 2003 to Feb 2021. The relationship is statistically significant but the effect is perhaps too small to be reliable, as many other factors affect equity returns.

EXHIBIT 6: CHANGE IN INFLATION EXPECTATIONS AND EQUITY RETURNS

S&P 500 VS BREAKEVEN INFLATION	BETA	T-STAT	ADJ. R ²
Δ Breakeven Inflation 5YR	6.44	3.15	12%
Δ Breakeven Inflation 10YR	10.38	3.07	12%

The direction of this relationship must be interpreted carefully. It suggests increased (decreased) inflation expectations are associated with positive (negative) equity returns. The time period of the test captures deflationary shocks, but not extreme inflationary shocks – whereas both deflationary and severe inflationary shocks are likely to produce negative equity returns. Therefore, we interpret this result as capturing sensitivity to a significant inflation/deflation shock, rather than an inflation correlation per se. Such an interpretation is also consistent with our prior inflation volatility finding.

MARKET VOLATILITY & EQUITY RETURNS

The VIX – or “fear index” – is a real-time gauge of the market’s volatility expectation over the next 30 days. It is derived from S&P 500 options contracts. Based on available VIX data from 1990 to March 2021, we do not find a significant relationship between the level or change in VIX and subsequent equity returns at 1, 3, 6 or 12 months out in time.

However, we do find above average returns over the next one to 12 months when the VIX is extremely high (top decile), which is consistent with a higher expected return in the presence of high volatility risk. However, this finding is not particularly reliable because it depends on cherry picking a small subset of the data, while the relationship does not hold across the rest of the data.

In conclusion, the most reliable results are the simplest and most intuitive. Bond yields predict long-term future bond returns. Equity valuations predict – at least in part – long-term future stock returns. We incorporate these predictive relationships in our capital market assumptions process. Patience and a long-term view are required to benefit from this information.

Our inflation tests produced some interesting results. Perhaps with observable, market-based inflation expectations since the introduction of TIPS, investors do not have to rely as much on prior inflation to help calibrate their inflation expectations. The other relationships produce far less reliable results for forward-looking investors.

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