



# BONDS IN A RISING-RATE ENVIRONMENT



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## **EXECUTIVE SUMMARY**

Bond prices move inversely with interest rates, so when rates rise, prices fall. This is one of the basic truths of the market and one of the first lessons taught in any introductory finance course. It's also the dead horse the financial media can't seem to cease beating and what has been on the mind of investors for years. Rates have trended downward for more than three decades and recently touched all-time lows. It's time they go up.

Let's assume we have a crystal ball and know for certain interest rates will continue to move higher, much higher. What will this mean for the average investor with a balanced portfolio? What will happen to bond returns? Exactly how much risk are investors being exposed to? Why would people still hold bonds? This white paper examines those questions and includes some key findings:

1. An evaluation of historical returns in the bond market provides evidence that performance for the asset class is generally positive.
2. Evaluating performance only during adverse environments provides similar results using multiple definitions for a rising-rate environment. Forward returns during these periods have historically been positive but slightly lower in near-term horizons and higher in long-term horizons.
3. Bonds can be described as self-healing assets. Short-term losses are often outweighed in the long run by the reinvestment of principal and interest at more attractive rates. Investors should therefore desire rates to move upward.
4. Volatility is low in the bond market relative to the equity market. Equity market drawdowns are more frequent and substantially more severe. Earning more than half the return on average with a third of the volatility, bonds earn superior risk-adjusted returns.
5. Bonds are excellent diversifiers for a stock portfolio as evidenced by their low historical average correlation. An evaluation of bond performance during equity market drawdowns provides a clear example of why investors should not abandon this asset class.

## WHAT DOES A RISING-RATE ENVIRONMENT MEAN FOR BOND RETURNS?

Past performance is no guarantee of future results. This warning can be found in most financial marketing pieces, and it has its validity. It certainly is dangerous to extrapolate recent returns into the future. This should not, however, discourage investors from seeking a historical perspective. Evaluating asset class behavior across many different market cycles can provide substantial insight and help to establish forward expectations.

In this vein, we will use history to guide our outlook for a future where yields are on the rise. CLS analyzed the returns for intermediate-term U.S. Treasury bonds going back to 1962 based on two different definitions of a rising-rate environment:

### Definition #1: Rate Hike Cycle

A "rate hike cycle" is defined as a period during which the Federal Open Market Committee (FOMC) tightened monetary policy by increasing the federal funds rate. To qualify, there must have been two increases to the federal funds rate totaling more than 50 basis points without an intervening decrease to the rate.

### Definition #2: Rising-Yield Environment

A "rising-yield environment" is defined as a period during which the yield on intermediate-term Treasury bonds, measured monthly, increased by 100 basis points without being interrupted by a consecutive 25 basis point decline.

We use these two definitions because while a rising-yield environment more directly answers the question at hand, it is not yet confirmed that we are currently in a rising-yield environment. Since July 2016, intermediate-term Treasury bonds have only risen 93 basis points. While the future may ultimately confirm this is a rising-yield environment, we do not yet know if this is the case. We can confirm, however, that we are in a rate hike cycle. Since December 2015, the FOMC has increased the federal funds rate target twice, totaling 50 basis points, without an intervening reduction.

Before we evaluate returns based on the various rising-rate definitions, let's first get an idea of how bonds have performed in all environments over time. This will provide us with a baseline to interpret returns from our two scenarios.

Intermediate-Term Treasury Bond Rolling Returns (Baseline)						
	3mo. Rolling Return	6mo. Rolling Return	1yr. Rolling Return	3yr. Rolling Return (Annualized)	5yr. Rolling Return (Annualized)	10yr. Rolling Return (Annualized)
Period Count	657	654	648	624	600	540
Average Return	1.7%	3.4%	6.9%	6.9%	7.1%	7.4%
Positive Return Frequency	76.1%	82.0%	91.4%	100.0%	100.0%	100.0%

*Returns based on IA SBBI Intermediate-Term Treasury Bond Index from 1/1/1962 - 12/31/2016*

There are a number of important takeaways from this baseline data:

1. Bond returns are generally positive, regardless of the timeframe. Even over a three-month period, where the historical probability that returns are positive is the lowest, a positive return is still realized more than 76% of the time.
2. The longer an investor's time horizon, the more likely he or she is to achieve a positive return.
3. Since 1962, there has never been a rolling three-, five-, or 10-year period with a negative return.

With a better understanding of how bonds have historically performed over multiple market cycles, we now have a better perspective with which to evaluate returns in the most adverse bond environments. The tables below illustrate forward returns for each period that qualifies for our two definitions of rising rates.

<b>Intermediate-Term Treasury Bond Rolling Forward Returns (Rate Hike Cycle)</b>						
	<b>3mo. Rolling Return</b>	<b>6mo. Rolling Return</b>	<b>1yr. Rolling Return</b>	<b>3yr. Rolling Return (Annualized)</b>	<b>5yr. Rolling Return (Annualized)</b>	<b>10yr. Rolling Return (Annualized)</b>
Period Count	199	196	190	188	188	188
Average Return	0.8%	2.2%	5.4%	6.7%	7.4%	7.5%
Positive Return Frequency	69.8%	78.1%	92.1%	100.0%	100.0%	100.0%

Returns based on IA SBBI Intermediate-Term Treasury Bond Index from 1/1/1962 - 12/31/2016

Rate Hike cycle determined by the Federal Funds Target Rate Mid Point back to inception of 1/1/1971, and the Federal Funds Effective rate between 1/1/1962 - 12/31/1970

<b>Intermediate-Term Treasury Bond Rolling Returns (Rising Rate Environment)</b>						
	<b>3mo. Rolling Return</b>	<b>6mo. Rolling Return</b>	<b>1yr. Rolling Return</b>	<b>3yr. Rolling Return (Annualized)</b>	<b>5yr. Rolling Return (Annualized)</b>	<b>10yr. Rolling Return (Annualized)</b>
Period Count	260	260	260	260	247	242
Average Return	0.2%	1.6%	5.0%	6.6%	7.3%	7.5%
Positive Return Frequency	60.0%	68.8%	85.4%	100.0%	100.0%	100.0%

Returns based on IA SBBI Intermediate-Term Treasury Bond Index from 1/1/1962 - 12/31/2016

Yields are based on the yield-to-maturity of the on-the-run 5-Year Treasury Bond Index from 1/1/1962 - 12/31/2016

What conclusions can be drawn from this data?

1. The results are consistent regardless of which definition of rising rates we use.
2. The average return and frequency of a positive return for the rising-rate periods are generally lower than the baseline for one-year horizons or less (no surprise here).
3. Here is where it gets interesting: Returns are still positive on average, and return frequency remains materially above 50% in a rising-rate environment regardless of horizon.
4. The return has never been negative for any period of three years or longer (we knew this was the case already, but it bears repeating).
5. The realized returns for the five- and 10-year periods are higher for both rising-rate environments than they are in the baseline historical record.

If we are in fact in a rising-rate environment, investors should certainly temper their return expectations for the near term. Historically, returns have still been positive on average over the shorter horizons during these periods. What investors should instead focus on is the long term. Because bonds can be thought of as self-healing assets, when interest rates rise, the ability to reinvest at higher rates will outweigh any paper losses experienced up front. History shows that over five- and 10-year horizons, rising rates have rewarded investors with higher returns.

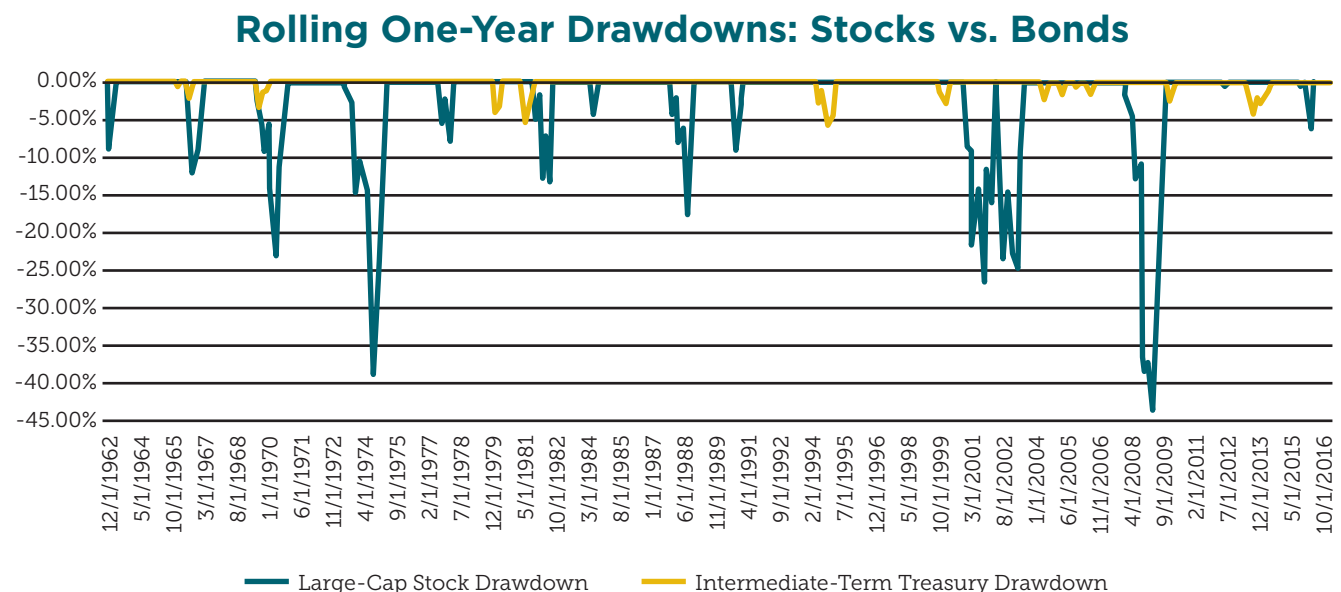
## HOW DOES INTEREST RATE RISK COMPARE TO EQUITY RISK?

Though bond returns are generally positive, even in rising-rate environments, there is still risk in holding them. How does this risk compare to the stock market? Historically, intermediate-term Treasury bonds have exhibited approximately a third of the volatility of stocks but delivered well over half of the return. This means these bonds have superior risk-adjusted returns over time.

	Intermediate-Term Bonds	Large-Cap Stocks	Bonds/Stocks
Standard Deviation	5.2%	14.8%	34.7%
Return	6.9%	11.3%	60.5%

Data as of 1/1/1962, Returns based on the IA SBBI Intermediate-Bond Index, and the IA SBBI Large-Cap Stock Index

Let's evaluate the relative risk profiles a different way. Consider the chart below, which illustrates rolling one-year drawdowns for each asset class going back more than 50 years. The results are stunning. In any given 12-month period, the stock market is 2.5 times more likely to experience a negative return, and that negative return is 5.6 times larger than the average for the bond market. In fact, the worst 12-month return for bonds in the last half century was less than half of the average 12-month stock market drawdown.



Source: IA SBBI US IT Govt TR USD Index, and IA SBBI US Large Stock TR USD Index. Date as of: 12/31/2016

## WHY OWN BONDS?

Investors should own bonds for one clear reason: diversification. Bonds are some of the best diversifiers for an equity portfolio because returns for the two asset classes have historically been uncorrelated. Since 1962, the average rolling three-year correlation between large-cap stocks and intermediate-term Treasury bonds has been below 0.10. Over the last 20 years the correlation has averaged -0.20.

### Rolling 3-Year Correlation of Stocks & Bonds

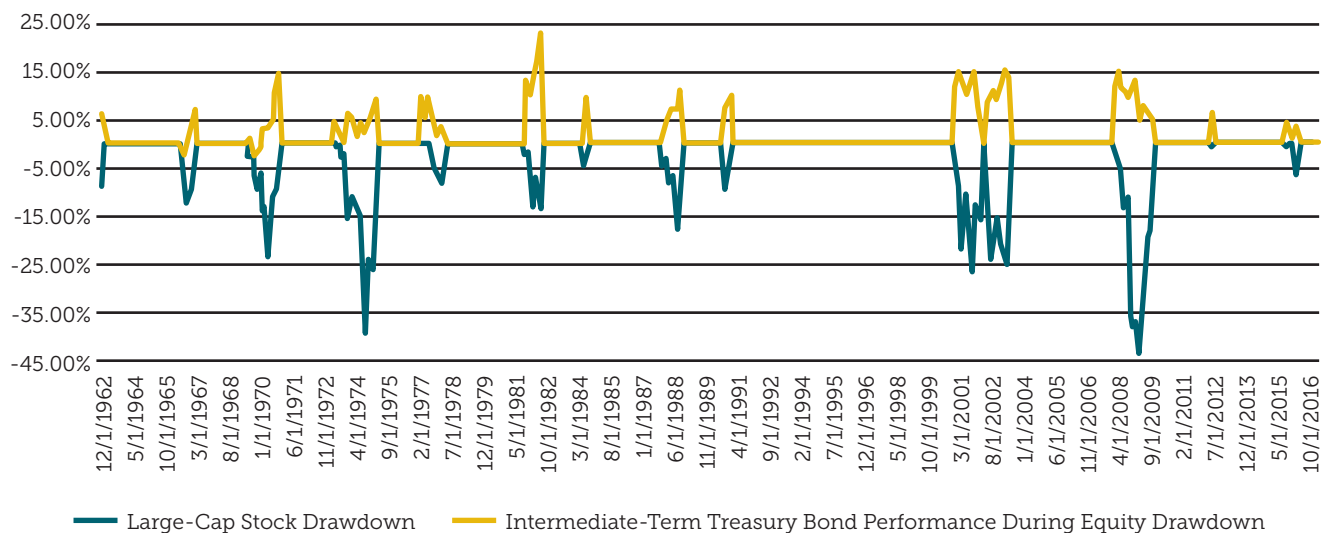


Source: IA SBBI US IT Govt TR USD Index, and IA SBBI US Large Stock TR USD Index. Date as of: 12/31/2016

Reviewing statistics is helpful, but it is still difficult to visualize how a 0.10 correlation translates to bonds protecting an investor's downside during equity market volatility. Let's try harder. The chart below illustrates how bonds have performed in rolling 12-month periods where large-cap stocks have had negative performance.



## Rolling One-Year Drawdowns: Stocks vs. Bonds



Source: IA SBBI US IT Govt TR USD Index, and IA SBBI US Large Stock TR USD Index. Date as of: 12/31/2016

The pattern is clear. Bonds are overwhelmingly positive when stocks are down with an average return of 7.2% over those timeframes. Even in earlier periods where the correlation between the two was elevated, bonds still did their job. What is more impressive is the fact that nearly a third of these negative equity market events occurred during a time that met our definition of a rising-rate environment.

## **SUMMARY**

We have looked at many years of market performance in order to build a framework for establishing our expectations moving forward. This exercise was not done to forecast what is about to happen but merely to provide perspective. The result of this analysis provides clear evidence that the fears regarding bonds are often overblown. Bond returns are generally positive over time, especially over long horizons. By using multiple definitions for rising rates, we know investors should temper their expectations in the short term, but they have ultimately benefited from higher rates by earning a higher return in the long run. Bonds are self-healing assets, a function of reinvesting at higher rates.

Volatility is low in the bond market relative to the equity market. Equity market drawdowns are more frequent and substantially more severe. Earning more than half the return on average with a third of the volatility, bonds earn a superior risk-adjusted return.

Bonds are exceptional diversifiers for a stock portfolio. Using basic statistical analysis, we can quantify the benefit with correlation, which historically has averaged around zero. The diversification benefit of bonds is most clear when the equity market experiences downside volatility. In periods where equities have sustained losses, bonds have picked up the slack, even during rising-rate periods. Ultimately, selling out of bonds could save investors from the near-term volatility of rising rates, but it leaves them defenseless in the much riskier equity market.



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Standard Deviation is a statistical measure of the historical volatility of a mutual fund or portfolio, usually computed using 36 monthly returns. A measure of the extent to which numbers are spread around their average. The greater the standard deviation, the greater the fund's volatility. The drawdown is a peak-to-trough decline during a specific record period of an investment, fund or commodity. A drawdown is usually quoted as the percentage between the peak and the trough. Correlation is a statistic that measures the degree to which two securities move in relation to each other. A perfect positive correlation means that the correlation coefficient is exactly 1. This implies that as one security moves, either up or down, the other security moves in lockstep, in the same direction. A perfect negative correlation means that two assets move in opposite directions, while a zero correlation implies no relationship at all.

IA SBBI U.S. Intermediate-Term Government Bond Index is a custom index designed to measure the performance of intermediate-term U.S. government bonds. The IA SBBI U.S. Small-Cap Stock Index is a custom index designed to measure the performance of small capitalization U.S. stocks. An index is an unmanaged group of stocks considered to be representative of different segments of the stock market in general. You cannot invest directly in an index.



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