Treasuries for the Long Run

Can They Dependably Rally When Stocks Are Falling?

Many institutional investors are considering an allocation to long-term Treasuries to protect against future stock market losses.

In this analysis, we reviewed historical data and concluded that long-term Treasuries have a mixed record of offsetting equity risk.

The potential protection offered by long-term Treasuries comes with the risk of underperformance over some time periods.

Other types of bonds may offer less protection, but also have less volatility.

In the current low-return environment, institutional investors have pursued high-return objectives by increasing their exposure to equity and equity-like investments. However, with uncertain profit growth, high equity valuations, and fresh memories of the Global Financial Crisis (GFC), they are also seeking investments to reduce equity risk.
Since the timing and severity of any equity market retreat is uncertain, investors are anxious to avoid hedges that involve high continuing costs. Under these circumstances many are considering investing in fixed income—primarily long-term Treasuries. Treasuries are considered a reliable “flight-to-quality” asset in a severe equity market downturn. Given their interest rate sensitivity, they are also likely to have the highest returns among flight-to-quality assets and therefore require only a small allocation. This minimizes the displacement of growth assets and their associated returns.

**Performance, in Theory and in Practice**

In theory the returns from Treasury bonds and equity markets should move in opposite directions. At the first signs of an economic upturn, Treasury bond yields are usually low while the outlook for corporate profits is positive. During the course of an expansion, monetary policy and the rising demand for credit normally cause interest rates to rise, resulting in losses for bonds, including Treasury bonds. At the same time the prospects for corporate profits improve, leading to share price gains.

Conversely, an economic downturn cuts profit expectations, causing equity prices to fall. Interest rates tend to decline and bond prices to rise due to reduced credit demand and expansive monetary policy. Bonds with longer maturities (i.e., long duration) have the biggest response to interest rate reductions. Credit bonds are expected to perform poorly relative to Treasury bonds during these time periods since their prices are sensitive to many of the same factors as equity.

To test the thesis that long-term Treasury gains often offset equity losses, we first look at correlations between stocks and bonds. **Exhibit 1** shows the historical correlations between the Bloomberg Barclays U.S. Long Treasury Index and the S&P 500 Index. Although correlations between the two indices were high in parts of both the 1980s and 1990s, they were negative after the 1987 stock market crash and have been below zero since 1998, a period that includes the end of the Tech Bubble as well as the GFC. This performance gives some credence to the idea that long Treasuries can offset equity losses.

**Exhibit 1**

**Rolling 12-Quarter Correlations Relative to S&P 500**

40 Years ending 9/30/2017

Sources: Bloomberg Barclays, Standard and Poor’s
Correlations, however, cannot tell the whole story. Correlations take a significant number of quarterly periods to calculate so they tend to smooth shorter-term return patterns. To avoid this smoothing effect, Exhibit 2 shows the simultaneous quarterly returns for the S&P 500 Index and the Long Treasury Index. Looking at the individual data points over the last 40 years, we note that there is a high degree of randomness in the relationship between the returns of stocks and the Long Treasury Index. While there are periods when the bond market was up while the stock market was down (upper-left quadrant), a number of data points fall into each of the other three return combinations. A statistical regression on the data for the entire time period provides an $R^2$ of 0.0025—very close to the 0 value that would indicate no relationship at all.

Treasuries complemented equities particularly well in some quarters after the GFC. The fourth quarter of 2008—the heart of the financial crisis—was a good example of Treasury bonds benefiting an equity-heavy

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**Exhibit 2**

**Random Relationship Between Stock and Long Treasury Returns**

*Quarterly Returns Comparison for 40 years ending 9/30/2017*

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**R-Squared**

R-squared (or $R^2$) measures the quality of the statistical relationship between different investments. An $R^2$ of 1 means that the investment returns always move up or down by the same relative amounts. An $R^2$ of zero means that the relative magnitude of the return for one investment is independent of the return of the other investment. $R^2$ is independent of the relative sizes of the investment returns.
portfolio. The S&P 500 plunged 21.9%, but the Long Treasury Index jumped 18.7% (Exhibit 3). Prior to the GFC the return differences were not as great. Most institutional portfolios would still suffer losses in these circumstances since bond gains generally do not completely offset stock losses and institutional bond allocations are almost always substantially lower than stock allocations. However, even a small long bond exposure would have cushioned the fall.

Exhibit 3
Periods of Falling Stock Returns and Rising Long Treasury Returns

The data above, however, provide only limited support for the theory. In the third quarter of 2011, the strategy would have worked particularly well: the S&P 500 dropped 13.9% while the Long Treasury Index was up 24.7%, but this was not due to economic and financial forces alone. Long Treasuries rose in part because the Federal Reserve introduced “Operation Twist,” its attempt to lower long-term interest rates by selling short-term Treasuries to buy long-term Treasuries. There are also two other periods (the first quarter of 2010 and the second quarter of 2012) when the high Treasury returns were likely due at least in part to the anticipation of major Fed purchases.

In other periods the strategy simply did not work (Exhibit 4). A good example is the first quarter of 2009 when both the S&P 500 (-11.0%) and the Long Treasury Index (-5.2%) fell. These periods occur both before and after the GFC and show that even two asset classes with low correlations do not always move

Exhibit 4
Periods When Both Stocks and Long Treasuries Fell
in opposite directions. Periods when stocks and bonds sell off at the same time can occur when there are concerns about rising inflation.

An even more challenging situation is displayed in Exhibit 5, where we show periods in which long-term Treasury losses exceeded equity gains in a given quarter. Poor bond performance when the stock market is up is consistent with negative correlations.

Positive performance for long Treasuries in every quarter in which the equity market is down is certainly a more stringent hurdle than most institutional investors require. Exhibit 6 reflects the same type of analysis as Exhibit 2, but each point represents one year rather than one quarter. Over this longer time interval

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**Exhibit 5**

**Long Treasuries Can Have Losses When Stocks Are Up**

<table>
<thead>
<tr>
<th>Quarter Ending</th>
<th>S&amp;P 500</th>
<th>Bloomberg Barclays U.S. Long Treasury Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/31/1996</td>
<td>-6.7%</td>
<td>5.4%</td>
</tr>
<tr>
<td>6/30/2004</td>
<td>-5.2%</td>
<td>1.7%</td>
</tr>
<tr>
<td>6/30/2013</td>
<td>-5.6%</td>
<td>2.9%</td>
</tr>
<tr>
<td>6/30/2015</td>
<td>-8.3%</td>
<td>0.3%</td>
</tr>
<tr>
<td>12/31/2016</td>
<td>-11.7%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

Sources: Bloomberg Barclays, Standard and Poor’s

**Exhibit 6**

**Fewer Simultaneous Losses for Stocks and Treasuries Over Annual Periods**

Sources: Bloomberg Barclays, Standard and Poor’s
the statistical relationship between stocks and bonds is still very poor ($R^2 = 0.0102$), but the number of periods with negative returns for both markets is much smaller. Only the years ended in the third quarter of 1981 and the second quarter of 1984 resulted in simultaneous losses for both stocks and long Treasuries. Investors with even modestly long time horizons would generally be satisfied by the performance of long-term Treasuries when the stock market is down.

**Prospects for Future Long Treasury Returns**

Since yields are currently at very low levels, they will likely rise at some point, resulting in capital losses for bonds. The size of the potential losses depends on the duration of the bond portfolio. **Exhibit 7** compares the durations of the Long Treasury Index with the Bloomberg Barclays U.S. Aggregate Bond Index. The duration of the Long Treasury Index has been 16 or more since the end of 2011. A duration of 16 means that for every 1 percentage point increase in long Treasury rates, the Index will experience a 16% capital loss. That contrasts with an Aggregate duration of 6 or less. This is particularly relevant today when the difference in durations has reached historically high levels. From 1999 until 2008 the average difference in the durations of the two indices was almost 6.5. More recently differences have been greater than 11 due in large part to low yields for long-term Treasuries.

If long Treasury rates increase less than 1 percentage point, then the capital loss will be less than the duration. Also, the difference in return between the Long Treasury Index and the Aggregate is likely to be less than the difference in their durations since long-term yields tend to be more stable than intermediate yields. However, long-term Treasuries can still be very volatile. **Exhibit 8** shows that their average

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**Exhibit 7**

**Long Treasury Interest Rate Risk at Historic Highs**

18 ¼ Years ending 9/30/2017

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**Exhibit 8**

**Rolling 12-Quarter Standard Deviations**

20 Years ending 9/30/2017
rolling three-year standard deviation was about three times as high as that of the Aggregate. In fact, long Treasuries have actually had the same or higher volatility than the stock market index since 2012.

The volatility of an individual asset class is not as important as how that asset class impacts the volatility of the overall portfolio. An asset class with low correlations to other asset classes in the portfolio may reduce the total portfolio volatility even if the asset class itself is volatile. **Exhibit 9** shows that adding 30% long Treasuries to a pure equity portfolio would have reduced average volatility by almost one-third: from 15.4% to 10.7%.

**Exhibit 10** shows that the portfolio containing 30% long Treasuries lagged the average rolling three-year performance of a pure equity portfolio by 170 basis points on average over the most recent 20 years.

**Exhibit 9**
**Rolling 12-Quarter Standard Deviations**
*20 Years ending 9/30/2017*

**Exhibit 10**
**Rolling 12-Quarter Returns**
*20 Years ending 9/30/2017*
Although it is clear that the volatility specific to the Long Treasury Index does not completely translate into higher portfolio volatility, its high standalone risk raises a question: are there other types of bonds with lower levels of risk that also have the potential to offset equity losses? Exhibit 11 shows two decades of correlations between the S&P 500 Index and five bond indices including the Long Treasury Index. It demonstrates two key patterns:

1. Credit bonds have higher correlations with the S&P 500 than Treasury bonds. While this is generally consistent with theory, note that the averages of both intermediate and long credit correlations are still very low (-0.03 and -0.02, respectively). Credit bonds may not have diversified equity as well as Treasuries, but they have still provided substantial diversification.

2. Interest rate sensitivity is not as important as whether the bond is issued by a company or by the U.S. government when it comes to equity correlation. Most of the time, similar indices with different maturities have similar correlations with equity. The patterns as well as the averages are similar for bonds with different durations.

Given that a range of bond sectors seems to diversify equity, is there any reason to invest in bonds other than those in a standard broad market bond portfolio?

Exhibit 11

Rolling 12-Quarter Correlations Relative to S&P 500
20 Years ending 9/30/2017

Historical Note

Credit bonds had low correlations with equity in the early 2000s even though the Enron and Worldcom scandals, which led to a lack of confidence in corporate financial statements, coincided with the bursting of the Tech Bubble.

Sources: Bloomberg Barclays, Standard and Poor’s
Exhibit 12 replicates Exhibit 2, but replaces long Treasuries with the Bloomberg Barclays U.S. Aggregate Bond Index. This chart leads to several interesting observations.

First, credit exposure in the Aggregate Index contributed to several quarters with losses when the stock market was down. Even with these periods, the Aggregate was up in the preponderance of quarters when the stock market was down.

Second, the Aggregate showed much more subdued returns than long Treasuries. This is consistent with its relatively modest level of risk as indicated by its relatively low standard deviations. The consequence of this low risk is that returns were generally positive but often below 5% when the equity market was down.

Finally, there was still significant noise in the statistical relationship with equity. The Aggregate had an $R^2$ of 0.0166, which is not high enough to assume anything other than a random relationship with stocks.

Sources: Bloomberg Barclays, Standard and Poor's
Exhibit 13 replicates Exhibit 3 by showing select quarters when the equity market was down substantially but the Aggregate Index is now included. Long Treasuries had better performance in all but the first time period, but returns for the Aggregate were still positive in all of these quarters.

Exhibit 14 parallels Exhibit 4 by showing periods when both the stock and bond markets were generally down but adds the Aggregate. The most notable periods were the third quarter of 1990 and the first quarter of 2009, when the Aggregate Index was positive while both the stock market and long Treasuries were negative. In the other periods when all of the indices were negative, the Aggregate was the least negative in every quarter.

Exhibit 13
Positive Bond Index Performance in Select Down Markets for Equity

Exhibit 14
Poor Bond Index Performance in Select Down Equity Markets

Sources: Bloomberg Barclays, Standard and Poor's
Exhibit 15, like Exhibit 5, shows periods when the equity market was up and the bond markets were down. The Aggregate Index was down, but it was down less than long Treasuries.

Conclusions

This analysis leads us to several key conclusions:

- First, the data clearly show that long-term Treasuries can have high returns in quarters when equity markets perform poorly. They can also have poor returns when equity is down (as well as up). Consequently, the first conclusion is that long-term Treasuries are not an equity hedge. They have the potential to offset equity losses but there is certainly no guarantee. The opportunity for positive long Treasury returns when equity markets are negative improves if time periods are lengthened from one quarter to one year.

- Second, both the Long Treasury and Aggregate indices generally moved in the same direction under the same circumstances. Performance differences were in terms of degree rather than kind because interest rates are the primary determinate of bond performance. Consequently, fixed income investments generally cushion equity losses. Investors who hold long duration Treasuries in an effort to increase the potential offset for equity losses have to be able to accept the largest potential losses from these bonds in either up or down stock markets. Diversified bond portfolios with shorter durations reduce the potential for both gains and losses at the expense of some, but certainly not all, equity diversification. The additional duration of the Long Treasury Index is likely to cause it to underperform the Aggregate benchmark in a rising interest rate environment.
The benefits of investing in long Treasuries may be limited not only by uncertainty over the magnitude and direction of their returns, but also by practical limitations on the size of the allocation. In an environment like the Global Financial Crisis—when many investments are suffering losses simultaneously—it would take a large allocation to long Treasuries to make a meaningful difference in the overall portfolio return. The ability to hold a larger allocation to a broad market bond portfolio may actually result in better diversification of the equity holdings.

Finally, time frame is a key consideration. Institutional investment programs are almost always strategic in nature. Losses during the Global Financial Crisis were painful but stock markets recovered relatively quickly. If time horizons are measured in years rather than quarters, an allocation to long Treasuries may not be necessary.
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