

The Future of the U.S. Bond Market

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Abstract

In light of today's economic environment and the current level of yields on fixed income investments, investors are faced with a difficult asset allocation decision. Fixed income investments have benefited from declining yields over the past thirty years and returns have been routinely above their historical average. Investors must now decide whether yields will continue to decline, stay low for the foreseeable future, or begin to rise. Once this forecast is determined, then investors can formulate proper expectations for bond returns and execute asset allocation decisions. This analysis examines the current yield environment in a historical context in order to forecast the future yield environment for U.S. fixed income investments. Due to the unique economic and yield environment, this study also examines yields and bond returns in the United Kingdom in order to glean additional insight on the behavior of fixed income markets over varying political and financial environments.

The past three decades have been an extraordinary time for fixed income investments. Yields have persistently declined, leading to impressive total returns. There are a multitude of reasons for the decline of interest rates over the past thirty years (i.e. Volker's taming of runaway inflation, stock market crashes, real estate bubbles, financial institutions collapsing, etc.); however, the result is the same: declining yields led to positive total return for bonds. This is due mainly to the nature of fixed income returns, which are basically just a mathematical formality. Since the price of a bond is essentially the present value of its future cash flows, which are contractually stated and enforced, anyone with a calculator and knowledge of the current attributes (i.e. average coupon and maturity) of the fixed income market can produce forward looking return estimate. The difficult proposition becomes postulating a prediction of the future level of yields. Therefore, the investor must opine whether today's yield levels will: (1) continue to fall due to economic turmoil; (2) stay low for the foreseeable future; or (3) rise back to historical averages. This study will examine the history of interest rates and bond returns in order to gain a historical perspective of the current yield levels and what the future holds for yields and the U.S. bond market.

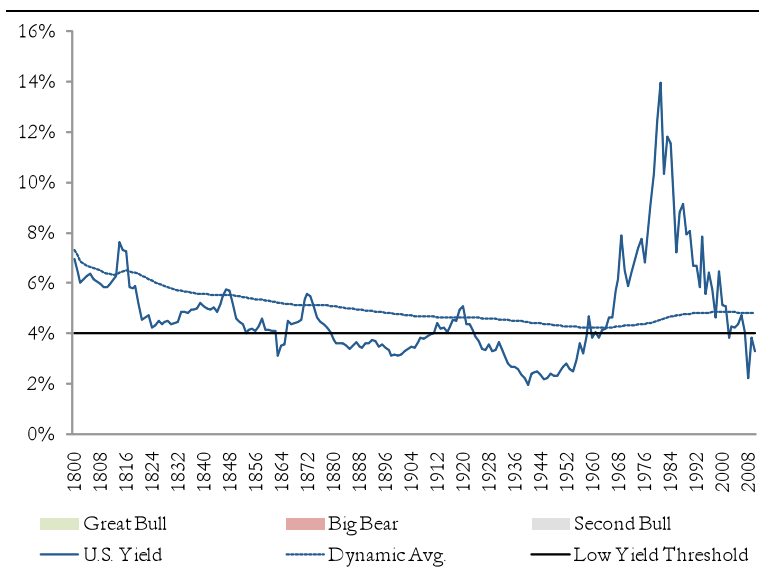
U.S. Economic and Yield Environments

Since 1999, the U.S. has experienced a number of differing economic and political environments that have led to the current level of interest rates. A series of asset price bubbles (i.e. technology stocks, residential real estate, etc.) combined with the U.S. consumer's willingness to not only spend current income but borrowed funds led to an economy that has been saddled with an enormous amount of debt. When the proverbial

music stopped playing and asset prices began to spiral downward, the burden of over-leverage was felt by all and the “Great Recession” was underway. Today, the U.S. has navigated its way out of the recession and now is faced with having to reduce the amount of debt outstanding (private and public) without derailing the economic recovery. This task will prove to be difficult as studies have shown that economies dealing with financial crisis tend to take a long time to recover (Reinhart and Rogoff).

In order to stave off outright deflation, the U.S. Federal Reserve Board of Governors injected vast amounts of liquidity into numerous capital markets and utilized every monetary tool it had at its disposal. The result has been a precipitous drop in interest rates, creating an extremely low rate environment. In order to gain a prospective on the current level of yields, data was collected on long-term U.S. government yields¹ and is shown in **Figure 1**. The yield on the 10-year U.S. Treasury at the end of 2010 was 3.3 percent. While this is low, it is by no means a historical low because yields have fallen below this level many times since 1800. The yield of the U.S. fixed income market can be categorized into three unique periods (Homer and Sylla): (1) the Great Bull from 1800 – 1945 (green shaded area of **Figure 1**), (2) the Big Bear from 1945 – 1981 (red shaded area of **Figure 1**), and (2) The Second Bull from 1981 – 2010 (grey shaded area of **Figure 1**).

Figure 1: Long-Term U.S. Yields
Annual Data: 1800 - 2010



Sources: *FactSet, U.S. Treasury, Homer and Sylla, Macaulay, Sylla, Wilson and Jones, Shiller*

The Great Bull phase occurred when the U.S. was growing from infancy to an industrialized nation and can be generalized by numerous periods of greed and fear. The general cycle was a period of growth turning into a time of speculation, leading to a “Minsky Moment”² (Cooper) and an ensuing dosage of fear and panic. Banking crises were frequent, as 14 occurred during this period (Reinhart and Rogoff). This often deepened downturns and led to a change in the behavior of the population/consumer. While each individual cycle was important, the overall theme was that the U.S. was able to avoid collapse and would end this

phase extraordinarily stronger. The result was approximately 150 years of downward trending interest rates.

The Big Bear phase began in 1946 and lasted to 1981, as yields rose from historically low levels to heights never before seen in the U.S. (Homer and Sylla). The U.S. emerged from the second War World as the only major industrialized nation not to suffer widespread destruction. Therefore, the U.S. was able to enjoy economic expansion as the leader of rebuilding efforts in the world economy. A cyclical rise in interest rates due to economic expansion eventually gave way to rising inflation expectations and eventual historic high rates of interest for the U.S.

The Second Bull phase was ushered in with the appointment of Paul Volker as the Chairman of the Federal Reserve Board of Governors. Volker set out to utilize monetary policy to essentially “break the back” of inflation and bring price stability to the forefront of monetary strategy. This action reigned in inflation expectations and interest rates began their second extended period of decline. After Volker’s term as Chairman expired, Alan Greenspan took over the reins and instituted an additional Fed strategy. Under his watch (and now Bernanke’s who has continued this strategy), the Chairman took the stance that the Federal Reserve should also undertake monetary policies that helped support asset prices (lowering policy rates) during times of market stress (this strategy is most commonly known as The Greenspan Put). This policy was executed by the Fed lowering interest rates during market crises (i.e. stock market crash of 1987, emerging market currency crisis, Long-Term Capital Management crisis, dot com crash of 1999, etc.). The increasing frequency of these capital market events led to consistent downward pressure on interest rates.

While understanding why interest rates are at their present levels is beneficial for investors, it is far more important to understand how fixed income investments will perform from this point forward. In order to formulate a well reasoned forecast, it is important to grasp how bonds performed in previous low rate environments.

Bond Return Analysis

Financial theory says that a bond will earn its yield, so long as that bond is held to maturity (barring default) and the income is reinvested at its current yield-to-maturity. While this can be useful for investors holding bonds to maturity, most investors invest in the broad bond market and either actively trade bonds or are subject to circumstances that warrant portfolio adjustments. Therefore, the traditional bond investor can earn a return that is very different that the overall yield of the market. This section will examine low yield environments and analyze how the fixed income market performed³ (on a total return basis) over various time frames.

The first step in the analysis was to identify low yielding environments. For the purpose of this examination, low yielding environments were defined as periods in which the yield on the ten-year (or otherwise equivalent bond¹) was below four percent. This yield level is approximately 0.5 standard deviations below the historical average and occurred 35 percent

of the time. Once a low yield environment was identified, the future returns of the bond market were examined over three-, five-, and ten-year time frames. These time frames were selected because they represent the most common time horizons for investors. The results of the examinations are summarized in **Table 1**.

Table 1: Summary of Low Yield Environments
1800 - 2010

Time Period	Years of Low Yield	Yield Levels		Change in Basis Points	Forward Return (CAGR)			Forward Real Return (CAGR)			Period Return (CAGR)	
		Begin	End		3-Years	5-Years	10-Years	3-Years	5-Years	10-Years	Nominal	Real
1863-1865	3	3.1%	3.6%	47	-0.8%	1.1%	2.9%	-1.0%	2.8%	5.5%	5.8%	-9.9%
1880-1910	31	3.7%	4.0%	25	3.0%	3.0%	2.8%	3.2%	3.1%	2.1%	3.3%	3.5%
1924-1958	35	3.9%	3.9%	-2	3.8%	3.8%	3.6%	2.4%	2.3%	1.7%	3.9%	2.3%
1960	1	3.8%	4.1%	22	3.8%	2.5%	3.7%	2.5%	-0.4%	0.0%	NA	NA
1962	1	3.9%	4.1%	29	2.1%	0.3%	3.0%	0.6%	-1.9%	-0.4%	NA	NA
2002	1	3.8%	4.3%	44	3.6%	4.4%	NA	0.8%	1.4%	NA	NA	NA
2008-2010	3	2.3%	3.3%	105	NA	NA	NA	NA	NA	NA	5.9%	4.5%
Average	10.7	3.5%	3.9%	39	2.6%	2.5%	3.2%	1.4%	1.2%	1.8%	4.7%	0.1%
Min	1.0	2.3%	3.3%	-2	-0.8%	0.3%	2.8%	-1.0%	-1.9%	-0.4%	3.3%	-9.9%
Max	35.0	3.9%	4.3%	105	3.8%	4.4%	3.7%	3.2%	3.1%	5.5%	5.9%	4.5%

Sources: U.S. Treasury; Barclay's Capital; Bureau of Labor Statistics; Shiller, Homer and Sylla; Macaulay, Sylla, Wilson and Jones; Officer

CAGR = Compound Annual Growth Rate

Since 1800, there have been seven periods in which yields were below the four percent threshold. Looking at the data, there appear to be two distinct types of low rate environments. Five of the seven periods were relatively short in nature and lasted a maximum of three years. The two longer periods were extremely long, as they lasted over thirty years each. As for the returns, all of the time periods examined experienced below average returns (both nominal and real) following the low yield environment. The below long-term historical average performance was also significant, as bonds trailed by 2.5, 2.5, and 1.8 percent per year over the rolling three-, five-, and ten-year periods. On a real basis, the underperformance was approximately 1.3, 2.4, and 2.0 percent per year over the three-, five-, and ten-year periods.

Understanding the history of bond returns during low yield environments is an important step to formulate future expectations; however, it is not the only step. Currently, the U.S. is in the midst of an extremely difficult economic period, largely driven by leverage and put into motion by a crisis in financial institutions. Determining how to invest during this type of environment must begin with an analysis of past financial shocks and learning how bonds performed.

Common Period Analysis

The common period analysis begins by examining yield levels and bond returns for the U.S. post financial shocks. These periods were determined by Reinhart and Rogoff in their book *This Time is Different: Eight Centuries of Financial Folly*. The authors examined global history and defined banking crises as periods in which “. . . (1) bank runs that lead to the closure, merging, or takeover by the public sector of one or more financial institutions (as in Venezuela in 1993 or Argentina in 2001) and (2) if there are no runs, the closure, merging, takeover, or large-scale government assistance of an important financial institution (or group of financial institutions) that marks the start of a string of similar outcomes for other financial institutions (as in Thailand from 1996 to 1997).”

The data collected by Reinhart and Rogoff paints an interesting picture, as there have been 15 crises since 1800 in the U.S.; however, only one has occurred post World War II. This illustrates that the U.S. is currently in a period that has not been experienced for quite some time and that investors must look at pre-World War II history and other countries in order to gain a proper perspective on how fixed income investments act in times of low yields combined with times of financial crisis.

In looking at other countries that exhibited the same characteristics as the United States, the one most striking and most relevant was the United Kingdom. The U.K. has been at the forefront of money and finance since the seventeenth century (Homer and Sylla) and was the financial capital of the world until World War II. Examining the U.K.'s financial history presents an interesting parallel to the modern day U.S., as the U.K. has experienced high levels of leverage and banking crises. They have been able to survive these crises and continue to maintain a large role in the global economy.

The last factor used to find common periods was the level of leverage utilized by the central government. This allows the analysis to take into account the ability of the central government to intervene during the crisis and the aftermath the excess debt has on the performance of the fixed income markets. **Table 2**^{4 5 6} summarizes the data of this analysis.

**Table 2: Summary of Yields and Bond Returns After Financial Shocks
1727 - 2010**

Date of Crisis	Yield Level	Debt as % of GDP	Forward Return (CAGR)			Forward Real Return (CAGR)		
			3-Years	5-Years	10-Years	3-Years	5-Years	10-Years
<i>U.S. Data</i>								
1864	3.5%	25.6%	0.0%	1.4%	2.9%	2.0%	4.4%	6.3%
1884	3.5%	13.3%	4.6%	4.1%	3.3%	5.6%	5.5%	4.7%
1929	3.3%	14.9%	5.5%	8.1%	6.9%	15.5%	13.6%	9.2%
1945	2.2%	112.7%	1.1%	1.8%	1.9%	-7.9%	-4.5%	-2.0%
<i>U.K. Data</i>								
1729	3.2%	81.4%	5.3%	3.4%	3.6%	NA	NA	NA
1751	3.0%	106.4%	4.3%	0.9%	0.7%	NA	NA	NA
1768	3.3%	153.5%	1.2%	2.5%	0.5%	NA	NA	NA
1792	3.3%	168.0%	-5.8%	-6.6%	2.4%	NA	NA	NA
1824	3.3%	256.0%	0.6%	3.3%	3.5%	-0.6%	3.4%	5.2%
1837	3.3%	187.2%	2.7%	3.5%	2.8%	-0.5%	3.6%	2.1%
1857	3.3%	124.7%	4.0%	3.4%	3.4%	6.4%	4.9%	3.2%
1878	3.1%	70.5%	4.7%	4.2%	3.6%	5.7%	4.7%	4.6%
1890	2.7%	48.8%	4.5%	5.5%	2.8%	4.3%	6.1%	2.4%
1946	2.6%	274.3%	-4.8%	-4.2%	-1.3%	-10.0%	-9.5%	-6.3%
Average	3.1%	117.0%	2.0%	2.2%	2.6%	2.1%	3.2%	2.9%
Min	2.2%	13.3%	-5.8%	-6.6%	-1.3%	-10.0%	-9.5%	-6.3%
Max	3.5%	274.3%	5.5%	8.1%	6.9%	15.5%	13.6%	9.2%

Sources: U.S. Treasury; Barclay's Capital; Bureau of Labor Statistics; Shiller, Homer and Sylla; Macaulay; Sylla, Wilson and Jones; Officer; Reinhart and Rogoff; U.S. CBO; U.K. Office of National Statistics; Ci.

When examining the data, a similar pattern to the previous analysis (see **Table 1**) arises. Considering that financial stresses often lead to investors seeking shelter in high quality securities (i.e. government bonds), one might infer that this “flight-to-quality” would benefit government bonds. This does not seem to be the case, as bonds underperformed their long-term averages by 2.8, 2.4, and 2.0 percent per year over the three-, five-, and ten-year periods on a nominal basis.

Looking at the returns minus inflation (on a real basis), the analysis proved that bonds did perform better than in standard low yield environments. On average, bonds underperformed their long-term average by 0.7 and 0.3 percent per year for the three- and ten-year periods and outperformed by 0.1 percent per year over the five-year time horizon. On the surface this seems to show a slight flight-to-quality effect; however, under closer examination this effect is not as beneficial as it first appears. Of the ten periods, in which inflation data is available, six of the periods experienced some form of deflation. The most prominent period was during the U.S.’s struggle with declining consumer prices during the Great Depression. This one period was the outlier, as bonds earned double digit real returns. Excluding this one instance transforms the overall return profile to one in which bonds underperformed their long-term average by 2.2, 1.1, and 1.0 percent per year over the three-, five-, and ten-year time frames.

Conclusion

U.S. bond investors are in the midst of a difficult market, as U.S. bonds are at very low yield levels and the economy is in an era of slow growth. Periods of slow growth (combined with high levels of uncertainty) usually offer fixed income investors attractive returns because a “flight-to-quality” drives prices higher and yields lower. While price appreciation is a benefit in the short-run, lower yields ultimately lead to lower future returns. If investors continue to be unwilling to take on additional risk (i.e. purchasing stocks, real estate, etc.) in their portfolio, yields will continue to decline and prices will be pushed higher. Unfortunately, yields have a theoretical lower bound of zero and can only go down so far; therefore, investors will eventually have to earn the yield level in which they are purchasing. The difficult proposition facing investors today is how far yields can fall and how long they can sustain that level?

While trying to accurately forecast future returns is a difficult exercise and will be grossly inaccurate more times than not, investors need to formulate an expectation of future bond returns that is rooted in realistic and fundamental analysis. In doing this, investors can accurately assess the opportunity cost of capital and allocate their investment portfolio in an efficient manner.

This analysis set out to examine historical bond yields and total returns in order to gain a historical perspective and apply this perspective to today’s environment in order to formulate an accurate direction of bond returns going forward. After careful examination of the data, several key conclusions can be drawn. First, low yield environments in the U.S. have been either short-term in nature (three-years or less) or very long-term (thirty-years or

more). Either way, investors in fixed income securities in the U.S. experience lower than long-term average returns over the next ten-years. Further, when examining low yield environments combined with banking crises and over leverage, bonds again experienced lower than long-term average nominal returns. These periods also tended to exhibit slight deflationary periods that benefited real returns; however, once the “Great Depression” outlier is excluded, the real returns exhibited below average future performance. Finally, it appears that the “flight-to-quality” benefit seems to be short-term in nature and does not drastically effect forward returns over five- and ten-year periods.

While past performance does not equate to future performance, examining historical periods that have the same characteristics as today can be a useful guideline for future expectations. Based on historical analysis, bonds are faced with some serious headwinds and investors should expect to earn below average returns going forward. There can be a short-term benefit to bonds during times of uncertainty; however, investors must balance short-term safety with the possibility of below average returns going forward and adjust their asset allocation accordingly.

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Notes

¹ Numerous different data sources were utilized to construct a continuous stream of long-term U.S. yields. The individual sources and methods of compiling are summarized below:

- For 1800 to 1857, the selected market yields for Federal Government Bonds and New England Municipal Bonds were used (Homer and Sylla).
- For 1857 to 1871, the yields on the five best railroad bonds were used (Macaulay) (Sylla, Wilson and Jones, *U.S. Financial Markets and Long-Term Economic Growth, 1790-1989*).
- For 1871 to 1963, the U.S. long government bond yield was used (Shiller).
- For 1963 to 2010, the 10-year U.S. Treasury bond yield was used from the U.S. Department of Treasury (via FactSet).

² Minsky Moment is a reference, coined by PIMCO's Paul McCulley, to Hyman Minsky's hypothesis in which extended periods of stability begot periods of instability (Minsky).

³ Due to limited information on broad bond market returns, several sources were utilized to determine the performance of the bond market. The sources and methods are summarized below:

- For 1800 to 1857, the total return was calculated utilizing the methods of Sylla, Wilson and Jones and the data of Homer and Sylla.
- For 1857 to 1871, the total return was calculated using Sylla, Wilson, and Jones' method and Macaulay's data.
- For 1871 to 1926, the total return was calculated using the method described in Sylla, Wilson, and Jones's research and Shiller's data.
- For 1926 to 1976, the Wilshire Associates calculation of a Core Bond Index (based on Ibboston's data) was used.
- From 1976 to 2010, the Barclay's Capital U.S. Aggregate Bond Total Return Index was utilized.

⁴ Numerous different data sources were utilized to construct a continuous stream of long-term U.K. yields. The individual sources and methods of compiling are summarized below:

- For 1727 to 1960, the yield on the U.K. Consolidated Stock ("Consol") was utilized (Homer and Sylla). There are several periods in which the Consol was not the only debt security utilized by the U.K. (i.e. prior to the Consol, the U.K. used perpetual annuities). During these periods, a blend of the market rates was used.
- For 1960 to 1982, the yield on U.K. ten-year debt was used and was provided by the Organisation for Economic Co-Operation and Development (OECD) via FactSet.
- For 1982 to 2010, the yield on the U.K. ten-year debt was used and was provided by Tullet and Prebon via FactSet.

⁵ Due to limited information on broad bond market returns, several sources were utilized to determine the performance of the bond market. The sources and methods are summarized below:

- For 1727 to 1955, the total return was calculated by utilizing Consol coupons and prices published by Homer and Sylla. These securities were due to their overall proportion of the U.K. debt outstanding. Post 1955, the Consols became a reduced amount of the overall debt outstanding; therefore, their importance dwindled (Homer and Sylla) (Dimson, Marsh and Stauton).
- For 1955 to 1985, the total return was calculated utilizing the methods of Sylla, Wilson and Jones and the data of Homer and Sylla.
- For 1985 to 2010, the total return (in local currency) of the Citigroup U.K. Government Index was used.

⁶ Prior to 1800, Reinhart and Rogoff did not provide banking crisis data; therefore, debt levels and yield levels were utilized to identify periods. On numerous occasions the yield level of stayed below the 0.5 standard

deviations threshold; therefore, the data selected was the one in which the debt level peaked. Also, the U.K. Office for National Statistics doesn't provide inflation levels prior to 1800; therefore, real returns are not calculated. Two additional U.K. periods were analyzed: 1821 and 1946. Two additional time periods for each country were utilized: one pre-World War II and one post-World War II years in which debt levels reached peaked (or near peak) and yield levels were below the low yield threshold.