

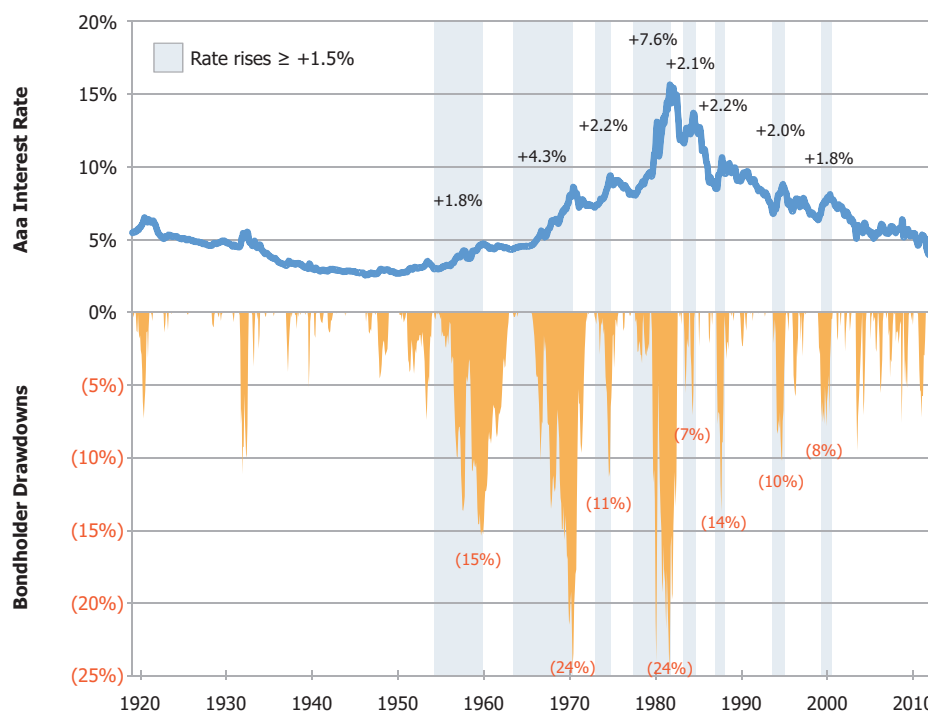
When Bonds Fall: How Risky Are Bonds if Interest Rates Rise?

Thirty-one years ago the yield on corporate Aaa bonds reached its 100-year peak of 15.5%. That date was in September, 1981, and rates for corporate bonds and U.S. Treasuries have fallen ever since, with both rates resting near 100-year lows today. This trend can't last forever of course, and today many bond investors are grappling with the notion of a rising interest rate environment. And because bondholders lose when rates rise, many are now wondering, *how risky are bonds if interest rates rise?* We'll examine rate and bond price behavior over the last 90 years to look for lessons from the past.

The following chart plots eight periods in which Aaa corporate bond rates rose +1.5% or more and the ensuing calculated losses to bondholders.

Despite a three-decade streak of generally falling rates, it reminds us that rates *can*, and *do*, rise, and that these periods can produce sharp losses for years, even for investors in the highest quality Aaa corporate credits.

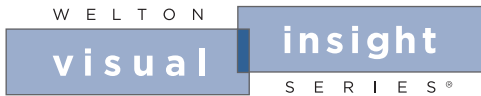
Figure 1: Bondholder Losses When Aaa Corporate Bond Rates Rose By +1.5% or More¹



Past performance is not necessarily indicative of future results.

¹ Bond returns and corresponding drawdowns are calculated from published interest rates for the Moody's Seasoned Aaa Corporate Bond Yield (Jan. 1919 – June 2012). Source: Moody's Corporation.

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The Inverse Relationship between Interest Rates and Bond Prices

Bond coupon rates are typically set at, or close to, the prevailing market interest rates when issued. When interest rates rise, the value of these preexisting bonds goes down, and when interest rates fall the value of these preexisting bonds goes up. In other words, rates and bond values are inversely related – but why? When rates rise, investors' preexisting bonds now offer a lower coupon rate than that available in the market for equivalent grade bonds. This imbalance exerts downward pressure on the market price for preexisting bonds in order to compensate prospective buyers for earning below-market coupon rates. And given today's extraordinarily low rate environment, current bondholders are concerned they'll be left holding depreciating assets when rates reverse course. The biggest questions for most are *how much might I lose?* and *for how long?*

Lessons from the Past 90+ Years

Frequency and Magnitude of Bondholder Losses

As indicated by the shaded blue areas in **Figure 1**, since 1919 investors have experienced eight different corporate Aaa rate increase periods of +1.5% or greater, trough-to-peak. From the corresponding drawdown calculations, bond investors would have experienced peak losses between -7% to -24% over each of the eight periods identified. For example, periods like the 1950s were marked by a slow and steady rate rise, with Aaa losses reaching -15.3%. Other periods like the 1970s/early 1980s experienced sharp rate increases and produced deep acute bondholder losses in the -24% range. And although the last 30 years is characterized as one of generally falling rates, this descent also included four Aaa rate spikes of +1.8% or more since 1980.

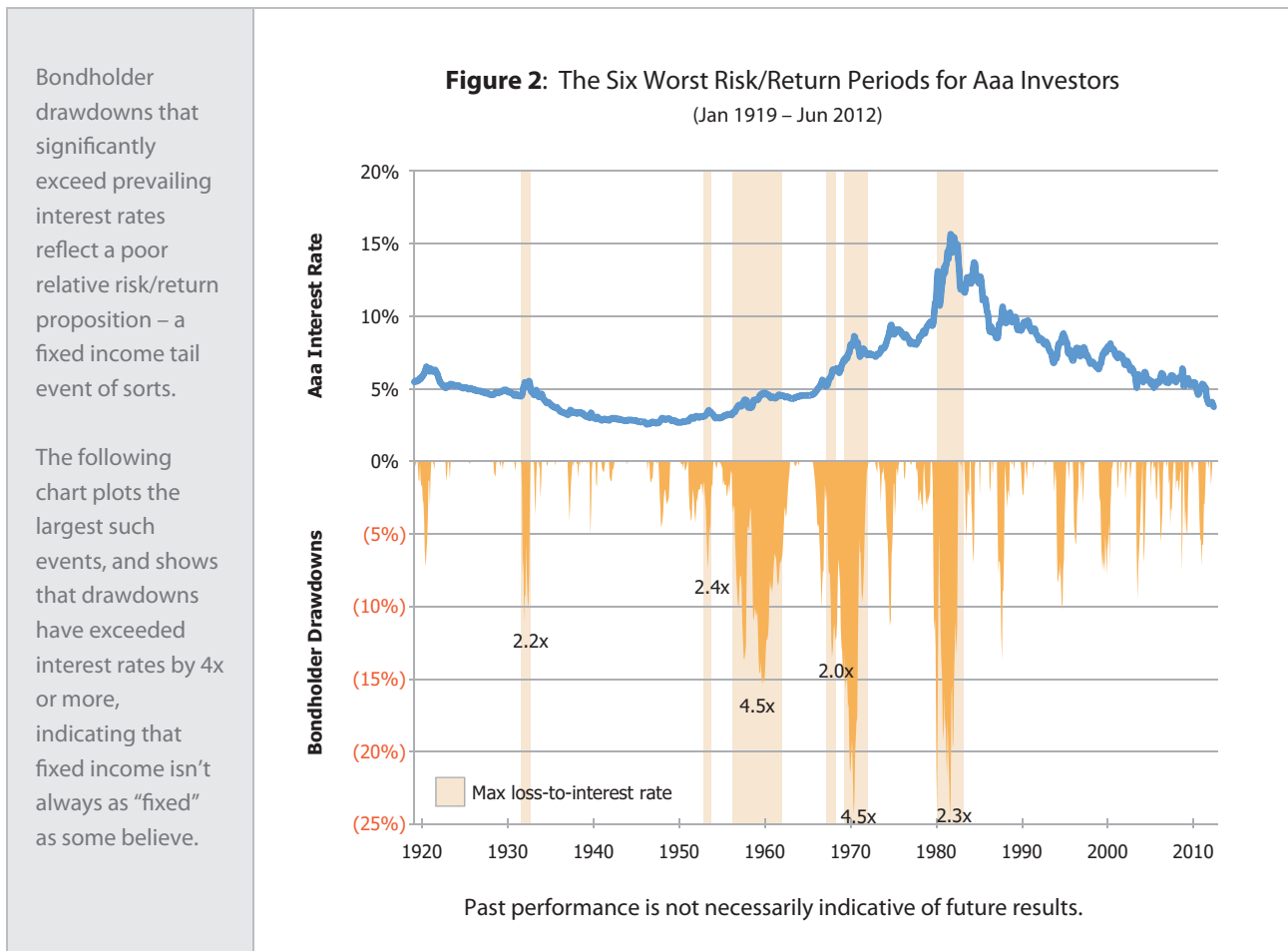
Bondholder Losses from a Risk/Reward Perspective

The magnitude of the findings above may surprise some. While investors recognize the capital loss risk associated with high yield bonds, developing market sovereign debt, or securitized debt (for example, large losses in 2008 will stand out for many), the interest rate risk of even high quality bonds is clearly not trivial, particularly given fixed income's accepted place within investors' allocation frameworks as a "safe" investment.

And this leads us to a second way of thinking about interest rate risk, one based on relative risk/reward. To illustrate the point, let's first establish a risk/reward benchmark for public equities. The S&P 500 has

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historically returned about 10% per annum with a max drawdown of 83% during the Great Depression. In other words, the S&P 500's max drawdown (risk) is about 8x as large as one's historical average annual return expectation (reward). That's risky, but we knew that already.² How would Aaa bonds compare on a similar measure historically? This answer appears in **Figure 2** below.



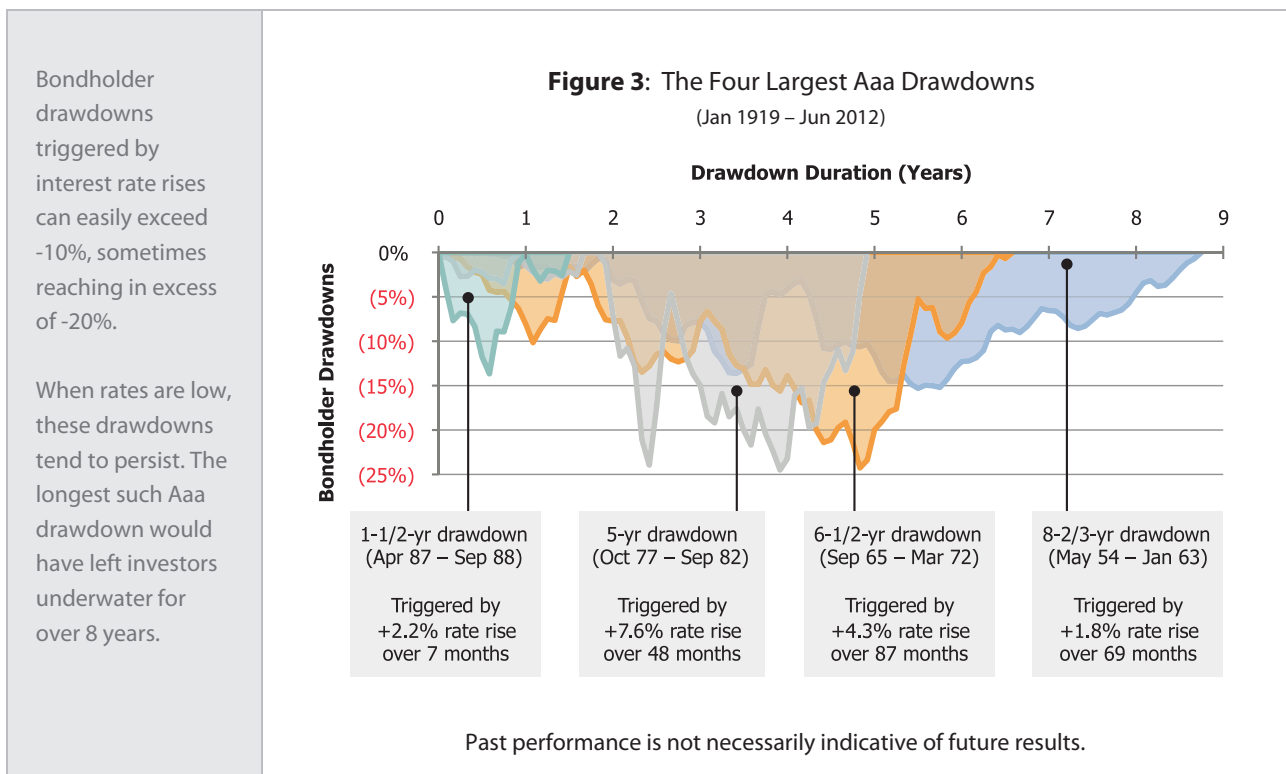
² See "[Tail Risk: About 5x Worse Than You May Think](#)," Welton Visual Insight Series®, Aug 2010.

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Figure 2 identifies six periods when bondholders’ peak losses would have exceeded coupon rates for six months or more. For example, during the late 1960s investors would have experienced a -24.3% loss on their existing bonds while initially earning only 5.4% in interest. In other words, their capital loss (i.e., their risk) was 4.5x larger than their annual coupon payment (their reward). While the late 1950s period was equally as skewed, the remaining four periods identified were generally less severe, topping out between 2.0 – 2.5x from a risk/reward perspective. So compared to public equities, Aaa bonds are indeed less risky, but perhaps not quite as safe as some investors today assume.

Duration of Past Bondholder Drawdowns

During past interest rate rises, *were bondholder drawdowns acute or gradual? Were losses deep or moderate?* **Figure 3** compares the length and magnitude of the four largest drawdowns from the previously identified rate increase periods.



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Put into this context, investors quickly notice that perhaps the *greatest* (or at least the longest and most enduring) pain felt by bondholders occurred during the *slowest* of the studied rate increase periods: 1954-1963. Marked by an economic slowdown following World War II and the Korean War, and accompanied by a heavy debt burden, the period from 1954 to 1960 featured very slow but steadily rising rates. The yield rose only +1.8% peak-to-trough, but the rate increase spanned nearly 6 years with a drawdown exceeding 8 years.

Contemplating the Future

While it is impossible to predict exactly how interest rates may change in the future, there are still key lessons worth remembering. Moreover, we now have the historical data to model the range of likely bondholder outcomes based on past scenarios. Let's begin.

Interest Rate Risk is Highest When Starting Yields Are Low

First, it's important to recognize that bondholders are subject to additional interest rate risk when rates are low – in other words, at times like today. The most notable example of this occurred between 1954-1963. As pointed out in **Figure 3**, this period had one of the *slowest* and more *moderate* rate increases (just +1.8% peak-to-trough), and yet it produced one of the *deepest* (-15.3%) and *longest* (8+ years) drawdowns for bondholders. Why? After all, rates rose by a much greater +7.6% from 1977 to 1981. Faster rate increases should mean worse returns, right? In most cases, yes, but a key factor is that the starting yield in 1954 was only 2.85%, and for bondholders, the starting yield is critically important.

To understand why, it's important to recall that bond returns consist of two primary components: (i) capital gains/losses, and (ii) interest receipts or coupon payments. As interest rates rise, bonds experience capital losses. Coupon payments help to buffer investors from these capital losses, but the thickness of this insulation is measured by the initial coupon rate on the portfolio. For example, a portfolio throwing off 10% interest per year is far better equipped to handle a +3% rate hike than a portfolio yielding only 2%. To illustrate this point, **Figure 4** dissects two past Aaa bondholder drawdowns into their interest and capital loss components.

Investors will notice how the drawdown of the 1950s steadily moves along as the years go by. Despite being a less volatile period than the late 1970s/early 1980s, the painfully slow rate rise from a miniscule initial yield resulted in an extremely bearish environment for bonds. Conversely, although the late 1970s/early 1980s was a more volatile environment, greater interest was available to offset capital losses and bonds recovered more quickly as rates stabilized.

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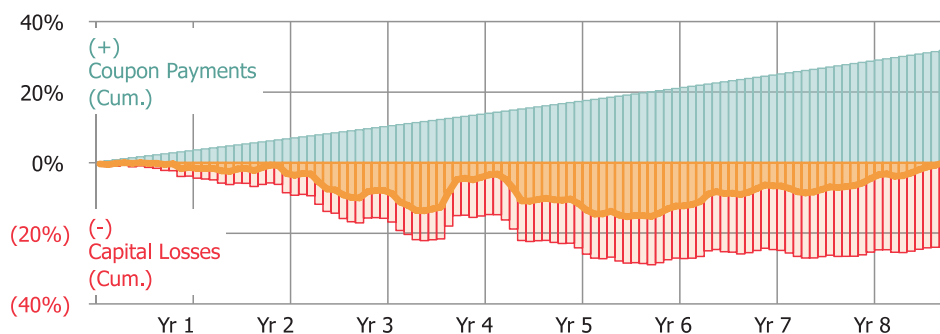
Drawdown duration and severity is not determined by the magnitude of an interest rate spike alone. Why? The answer is starting yield.

Late 1970s investors were able to earn their way out of steep rate rises (with rates eventually peaking at 15.5%!) thanks to rich initial coupon rates of 7.92% which helped to offset capital losses.

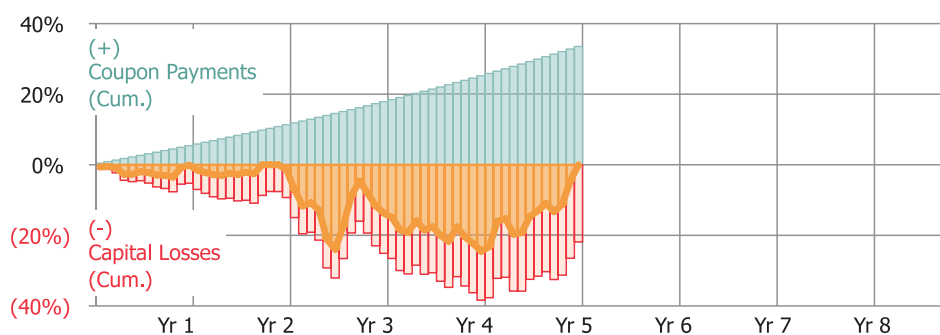
Mid-1950s investors were not so lucky, earning an initial yield of just 2.85% when rates began to climb, giving them little capital loss protection and producing a lengthy drawdown of almost 9 years.

Figure 4: The Starting Yield Matters: Bondholder Drawdowns Broken into Their Interest and Capital Loss Components

Lengthy Drawdown, Triggered by a *Modest +1.8%* Rate Rise (May '54 – Jan '63)



Sharp Drawdown, Triggered by a *Large +7.6%* Rate Rise (Oct '77 – Sep '82)



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So What Happens if History Repeats Itself?

Armed with (i) a historical analysis of rising interest rate periods in the U.S., (ii) an understanding of how the initial yield impacts bond returns, and (iii) an assessment of the current low-yield environment, we asked the question many investors are currently pondering: *What would happen if rates began rising from today's historically-low levels?*

Whether slow and steady, or sharp but short-lived, the answer is sobering – any meaningful rate increase from today's historically low levels would likely lead to significant losses. To estimate what those losses could look like, we applied the slowest, fastest, and average rate increase scenarios from the past starting at today's interest rate levels.³ These results appear on the following page in **Figure 5**.

And as the results show, any rate increases from today's yield levels are likely to be accompanied by outsized losses. The *Slowest* rate increase scenario is the most favorable of the three. It projects annual losses of just -0.03% as coupon payments generally keep pace with capital losses. While investors avoid acute loss periods, this scenario also forecasts almost six years of near zero returns. The *Fastest* rate increase scenario produces much sharper losses, while the *Average* scenario (representing the average rise and length of each of the observed historical occurrences) produces annualized losses of -7.3% over about three years.

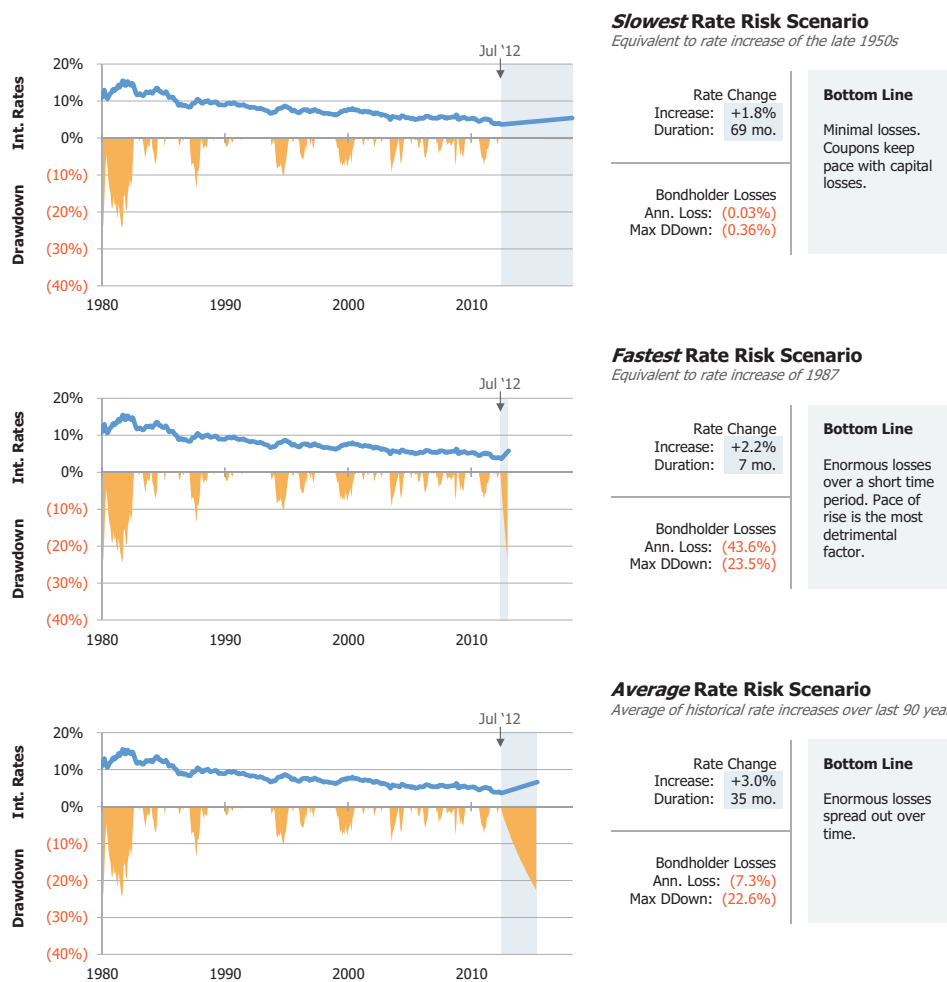
³ Moody's Seasoned Aaa Corporate Bond Yield as of month ending June 2012.

The following three charts depict the calculated drawdown for bondholders at today's current low interest rates according to three historically-based rising interest rate scenarios: *Slowest*, *Fastest*, and *Average*.

Bondholder results range from generally flat (*Slowest*), to deep losses over the course of just a few months (*Fastest*), to deep losses over three years (*Average*).

Regardless of the scenario or outlook for rates, recall that investors are currently accepting paltry returns to bear these risks.

Figure 5: Three Possible Rate-Rise Scenarios
 Based on Prior Aaa Bond Experiences



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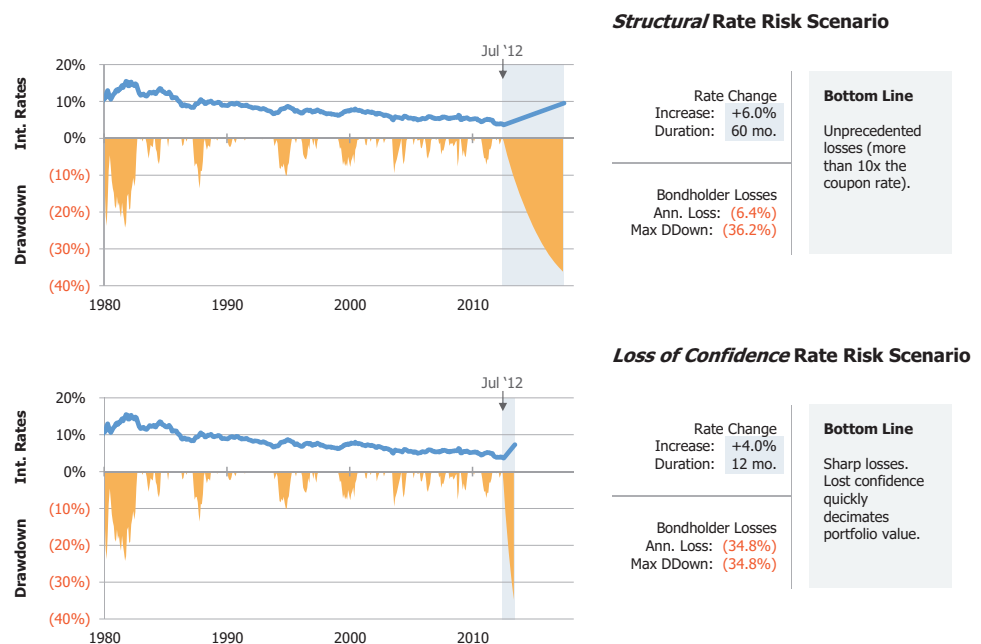
But What If the Future Differs from the Past?

Recognizing that the past rarely unfolds exactly the same in the future, we took this analysis a step further and analyzed the expected impact of two additional scenarios. Specifically, what if we were to experience a structural shift over a long time horizon, or a sharp reversal from a loss in confidence? We calculate these two additional scenarios in **Figure 6** below.

The following two charts depict the calculated drawdown for bondholders at today's current low interest rates according to two theoretical scenarios.

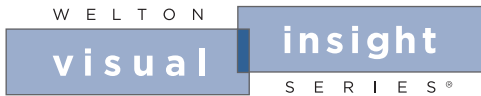
Structural is characterized by a gradual +6% rate-rise over 5 years, while *Loss of Confidence* depicts a sudden +4% increase over 1 year.

**Figure 6: Two Additional Rate-Rise Scenarios:
Structural and Loss of Confidence**



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These results shed additional light on the degrading risk/reward characteristics of an investment that many believe to be *the safest* in their portfolio. And naturally, while any losses would only be on paper until realized, such results would likely create a tremendous strain on investor portfolios, tying up valuable capital in products with vastly inferior performance traits. We acknowledge that investors' actual experience will vary across these scenarios, as our analysis reflects nominal returns associated with a single Aaa corporate index of long duration. As investor portfolios will naturally be diversified across risk profile, duration, structure, and issuer, such analysis could be customized for Treasury securities or lower-rated bonds and further studied in real terms.

Conclusion

Let's conclude as we began. That is, with a simple question: *How risky are bonds if interest rates rise?*

And as before, one's perception will be heavily influenced by one's forecast for how interest rates will rise over time. Some investors will anticipate deflation and expect subdued rates well into the near or intermediate future. Others will point to recent activity by the world's central banks as hope for continued rate suppression in bond markets. Others still will note the fiscal drums which are beating ever louder. How long indeed before investors begin requiring greater recompense for the treasury notes of increasingly indebted developed nations?

And while all of these perspectives warrant merit, the first noteworthy conclusion from our analysis is that the Armageddon scenario is not the only one worthy of concern – a number of *normal* scenarios could lead to significant losses. Even our most gradual rate increase scenario (*Slowest*, in **Figure 5**) models an annualized return expectation of 0% for almost six years. Of course, history reminds us that large bondholder tail events have occurred in the past too and that today's low yield environment leaves investors particularly exposed when rates begin to climb. And importantly, the rewards for bearing these significant risks are rates of return that, at-best, narrowly outpace inflation.

Of course, while the risk/reward analyses above may be new to some, investors are already painfully aware of the yield drought that low rates have brought. And while investors are understandably disappointed by the performance of the fixed income *asset class*, they should not conclude that *the benefits* they have come to associate with fixed income are no longer attainable. Some of these beneficial traits can be isolated, replicated, and diversified.

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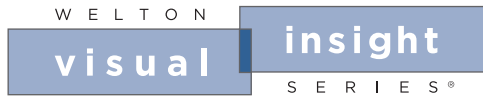
Income, for example, could be augmented with strategies such as direct infrastructure investments, income-based real estate, or low beta / attractive-yield equities. Portfolio diversification, and potentially even outright protection, might be achieved by utilizing strategies capable of harnessing rate changes and global capital flows such as managed futures and global macro. Both have generally protected investor capital while also delivering capital appreciation and tail risk protection during times of equity market stress.

One of the benefits of these challenging times is a general change in portfolio construction theory toward combing investments based on their beneficial diversifying traits as opposed to their asset classification.⁴ This is a positive shift, and one that should advantage investors in reaching their goals both near and far.



⁴ See "[Diversification: Often Discussed, but Frequently Misunderstood](#)," Welton Visual Insight Series® Jan 2011.

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