High Yield Bonds in a Rising Rate Environment

Hotchkis & Wiley

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"An idea isn't responsible for the people who believe in it."

-Don Marquis (1878 – 1937), author/journalist

The financial crisis of 2008-2009 was so disruptive that markets will contend with its repercussions for years to come. A particularly interesting byproduct of this period was the unusual interest rate environment that it spawned. In a span of less than 15 months, the Federal Reserve reduced its Fed Funds rate from 5.25% to 0.25%[1]. This rate, which sets the precedent for interest rates across the economy, remained at this exceptionally low level for seven years. Slowly but surely economic conditions improved and the Fed increased rates—albeit with extreme deliberation—and has signaled that further increases are probable. In view of this, our latest newsletter explores the high yield bond market's behavior during rising rate environments, which differs from most other fixed income securities considerably.

Laying the groundwork

Imagine a scenario where the annual risk free rate is 5% and is expected to remain so indefinitely. A rational investor would be willing to pay $100 today to receive $105 in one year, or $110.25 in two years, or $162.89 in ten years, and so on. Note the investor receives slightly more than $110 in two years and slightly more than $150 in ten years because he earns 5% not only on the original $100 but also on interest earned in prior years—a delightful concept known as compound interest. Warren Buffett once quipped that "my wealth has come from a combination of living in America, some lucky genes, and compound interest."

Present Value	Year 1	Year 2	Year 10
(5% disc. rate)	$105.00	$110.25	$162.89
$100.00	←		
$100.00		←	
$100.00			←

Now assume that the risk free interest rate increases unexpectedly, from 5% to 6%. A rational investor would no longer pay $100 to receive $105 in one year. He would pay something less. Why earn a 5% return when you could earn a risk-free 6% return elsewhere? This investor would now pay $99.06 (the math is $105 / 1.06^1) to receive $105 in one year, $98.12 ($110.25 / 1.06^2) to receive $110.25 in two years, and just $90.96 ($162.89 / 1.06^10) to receive $162.89 in ten years.

Present Value	Year 1	Year 2	Year 10
(6% disc. rate)	$105.00	$110.25	$162.89
$99.06	←		
$98.12		←	
$90.96			←

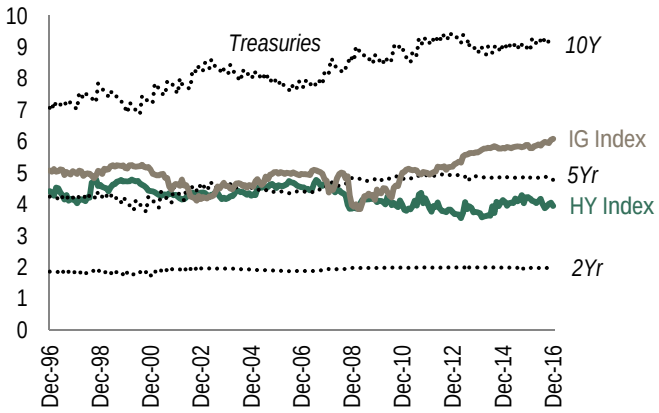
This basic example illustrates the inverse relationship between interest rates and prices—when rates increase prices decrease, and vise-versa—and also the concept of duration risk[2]. Longer duration bonds are more sensitive to changes in interest rates than shorter duration bonds. A bond's duration represents the approximate change in price for a 1% change in interest rates. Continuing with our example, the duration of our Year 1 bond would be about 1.0—the price of the bond fell about 1% (from $100 to $99) when interest rates rose by 1% (from 5% to 6%). Likewise, the duration of our Year 10 bond would be about 9.0—the price fell about 9% (from $100 to $91) when interest rates rose by 1%. The reason "long" bonds are more sensitive to rate changes than "short" bonds is essentially compound interest working in reverse. Investing in long duration bonds prior to a rise in interest rates, therefore, is typically unfavorable.

[1] Upper bound target range

[2] Unless noted otherwise, we are referring to "modified duration" throughout this paper. Not because it is the best measure of duration but because it is the most commonly used/reported, by far.

Chart 1 shows the historical duration for a broad investment grade aggregate index (grey line), a broad high yield index (green line), and Treasuries of various maturities.

Chart 1: Duration Historically
12/31/1996 – 12/31/2016, Monthly



Duration: theory vs. reality

Now that we have reviewed duration basics, let us proceed to explain why it is not a very useful metric—at least when it comes to high yield bonds. First, Chart 2 graphically depicts the how the prices of bonds with different durations are affected by changes in interest rates, assuming duration "works". This is oversimplified (we're ignoring convexity, etc.) but conceptually/directionally accurate. Prices of long duration bonds change more than short duration bonds for the same change in interest rates, i.e. the slope for long duration bonds is steeper, i.e. more negative.

Chart 2: Duration in Theory
Theoretical Change in Price Given Theoretical Change in Yield

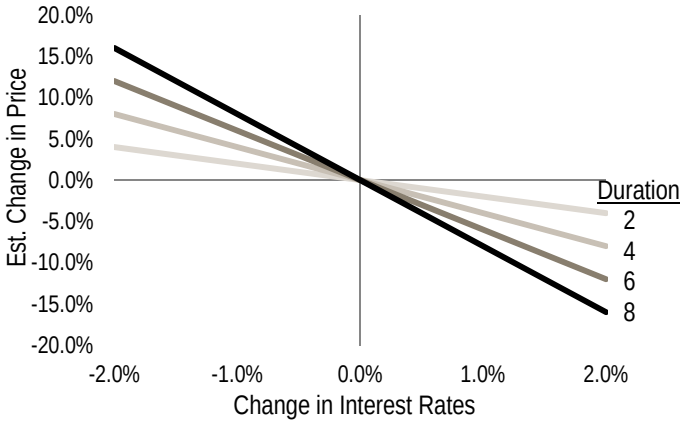


Chart 3 puts this theory to the test empirically, using the 5-year Treasury note. It plots actual monthly interest rate changes (for the 5-Year Treasury Note) on the horizontal axis and actual monthly price changes on the vertical axis. The slope of the trend line is -4.4 which means the *actual observed* duration is 4.4 (the slope's inverse). The average *reported duration* over this period was 4.6 as gathered from information in Chart 1. The R^2 was 0.98, which for those of us that are a little rusty on statistical analysis, means 98% of the change in price can be explained by the change in interest rates. So what does all this mean? Well, *when analyzing Treasuries*, reported duration is a very valuable and efficacious predictor of bond price behavior. In fact, it is essentially the only thing that matters.

Chart 3: Duration in Practice, Treasuries
5-Year Treasury Note, Changes in Price and Changes in Yield
12/31/1996 – 12/31/2016, Monthly

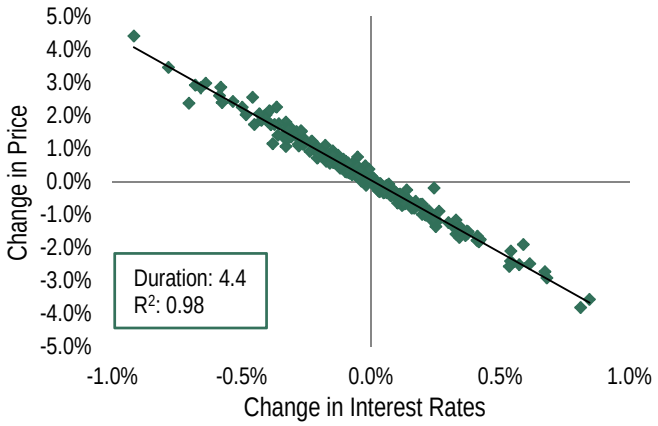


Chart 4 duplicates this exercise, but plots the monthly price changes of an investment grade aggregate index (BofA Merrill Lynch US Corporate, Government, & Mortgage Index) with monthly interest rate changes (again using the 5-year Treasury note). The observed duration is 3.2 compared to the average reported duration of 5.0 over the same period. The R^2 is 0.76, which means about ¾ of the change in price can be explained by duration. In sum, *when analyzing investment grade bonds*, reported duration is a valuable and efficacious predictor of bond price behavior, though certainly not the only factor to be considered.

Past performance is not a guarantee or a reliable indicator of future results.

Chart 4: Duration in Practice, IG Bonds
Investment Grade Aggregate Index, Changes in Price and Changes in Yield, 12/31/1996 – 12/31/2016, Monthly

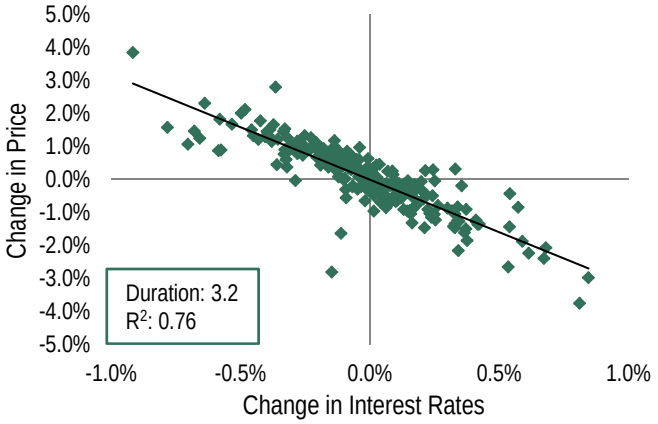
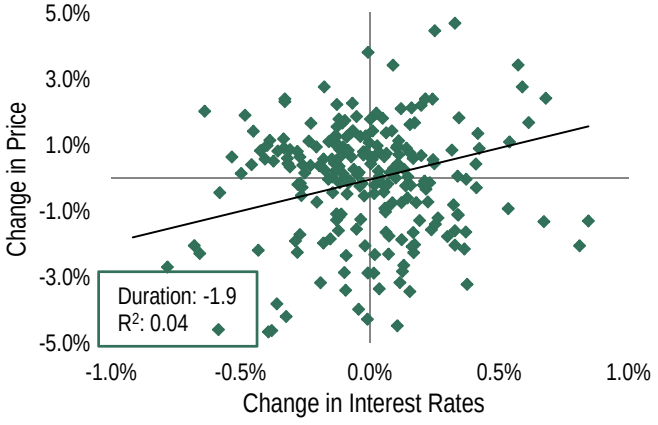


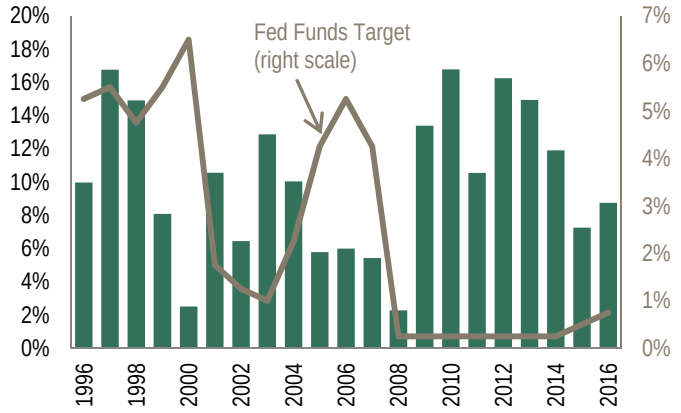
Chart 5 replicates the same exercise once again, but this time we plot monthly price changes of a high yield bond index (BofA Merrill Lynch US High Yield Index) with monthly interest rate changes (once again using the 5-year Treasury note). The observed duration is -1.9 which implies that a rise in interest rates would coincide with a rise in bond prices, and vise-versa—a relationship counter to the basic premise of bond behavior. The R^2, however, is 0.04, which suggests that there is essentially no relationship. In other words, *when analyzing high yield bonds*, reported duration is neither a useful nor efficacious predictor of bond price behavior.

Chart 5: Duration in Practice, HY Bonds
High Yield Index, Changes in Price and Changes in Yield, 12/31/1996 – 12/31/2016, Monthly



There are technical factors that explain the limited use of duration in the high yield market when rates fall; chief among these factors is that most high yield bonds are callable (usually halfway to maturity). Imagine "Rational Company" has bonds issued that have a yield and coupon rate of 10%, and thus trade at par. Now assume the prevailing interest rate declines by half. The price of the bond is unlikely to increase much above par because the company would/should call the bond and refinance at a lower rate. This was an important factor in years following the 2008 recession, as shown in Chart 6, because rates fell and demand for new issuance was strong. Conversely, refinancing wanes when the Fed increases rates.

Chart 6: High yield refinancing
Annual refinancing as a % of the total market



High yield in periods of rising rates

When interest rates fall, the high yield bond's call feature explains (at least partially) why bond prices do not rise as much as reported duration suggests it should. It does not explain, however, why bond prices do not fall like reported duration suggests it should when interest rates rise. In fact, high yield bond prices have often increased when interest rates rise. Chart 7 shows the performance of the high yield market historically, parsed by months of rising interest rates and months of falling interest rates. Over the entire period, the market has returned +8.5% annualized, paradoxically performing better during rising rate periods than during falling rate periods.

Chart 7: High yield performance history since inception
8/31/1986 – 12/31/2016, monthly

	Rising Rates	Falling Rates	Total
Number of Months	176	188	364
Annualized Performance	8.8%	8.2%	8.5%

Chart 7, however, derives returns over brief, one-month intervals. Let us now consider periods when interest rates rose for more extended periods and assess how the high yield performed during these periods. Chart 8 depicts four different periods when

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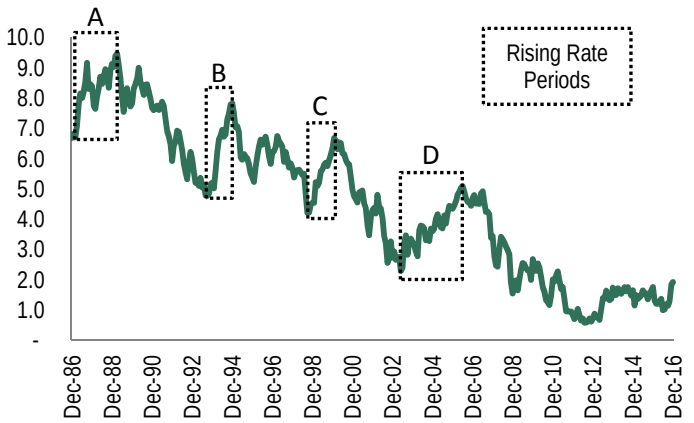
interest rates rose by more than 2 percentage points; the table below Chart 8 highlights the performance of high yield bonds, investment grade bonds, and the 5-year Treasury note during each of these periods.

Chart 8: 5-Year Treasury Yield
8/31/1986 – 12/31/2016, monthly



Annualized Performance

Period	HY	IG Agg	5-Yr Tr
A: 11/30/86 – 03/31/89	8.6%	5.1%	2.8%
B. 09/30/93 – 12/31/94	1.9%	-2.2%	-3.5%
C. 09/30/98 – 01/31/00	3.7%	-0.6%	-2.8%
D. 05/31/03 – 06/30/06	9.2%	2.0%	-0.2%

The reason high yield bonds performed reasonably well despite the rise in rates is due to the business/credit cycle. Part of the premium embedded in high yield spreads is intended to compensate investors for the risk of timely payment of interest and repayment of principal. In expansionary periods, investors view this risk as low and in recessionary periods view this risk as high. The Fed typically raises rates during expansionary periods and reduces rates in more stagnant periods to reinvigorate the economy. Periods of rising rates, therefore, often coincide with periods of economic expansion which is good for credit conditions—revenue and earnings are growing, default activity is benign, credit markets are open, liquidity is abundant, etc.

Chart 9 provides an illustration of what can occur in high yield markets when interest rates rise. The chart covers "period D" from Chart 8, the most recent period when rates rose by more than 2 percentage points. The period begins after the collapse of the internet bubble, as the economy began to recover. Real GDP growth accelerated from zero to 3%. The default rate for high yield bonds averaged 2.3% over this period, well below the historical average of 4% and substantially below the 10% level reached just one year prior. The Federal Reserve increased its Fed Funds target rate from 1.0% to 5.0% over this period of economic expansion, and the direction of Treasury yields followed suit. As shown in Chart 9, however, the high yield market "absorbed" the rise in interest rates. The yield-to-worst for the high yield market remained relatively constant; its spread over Treasury rates compressed.

Chart 9: Yield comparison, Treasury vs. HY
5/31/03 – 6/30/06, monthly

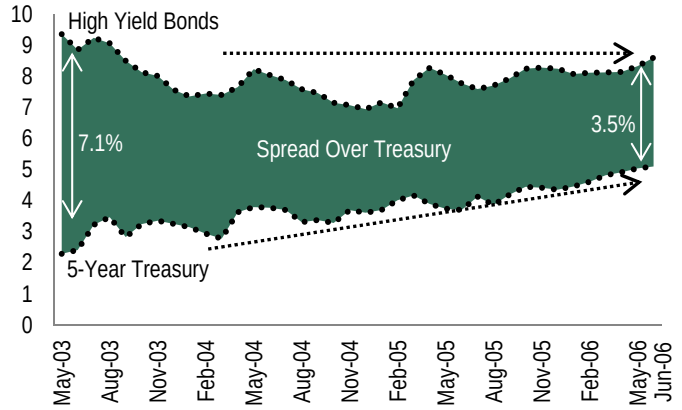
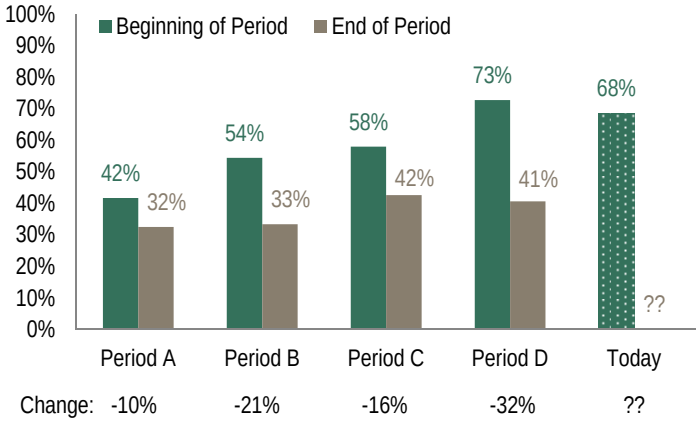


Chart 10 depicts the high yield market's spread as a percentage of its yield-to-worst for periods A, B, C, and D from Chart 8. High yield spreads need to be sufficiently wide in order to absorb a rise in rates. Today (as of 12/31/16), spreads comprise more than 2/3 of the market's yield, slightly higher than the historical average, which suggests the market has room to absorb a rate hike.

Chart 10: HY spreads as a % of YTW
Select periods from Chart 8



Summary

High yield bonds react differently to changes in interest rates as compared to most other fixed income instruments. Accordingly, industry-standard metrics for measuring interest rate sensitivity

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(e.g. duration) are much less useful for assessing high yield bond risk. In fact, high yield bonds have performed quite well during previous episodes of rising interest rates. We believe this apparent paradox is explained by the environment most often associated with rising interest rates—economic expansions. Such environments generally involve growing revenue, improving profitability, and open capital markets. Each of these factors reduces credit risk, which is the true driver of high yield performance. The high yield market's valuation is currently richer than we would prefer but fundamentals are strong and spreads remain sufficiently wide to at least partially absorb an increase in interest rates—as it has consistently done in the past.

Hotchkis & Wiley High Yield Research

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Any data or reference to the "High Yield Market" refers to the BofA Merrill Lynch US High Yield index; "Investment Grade" refers to the BofA Merrill Lynch US Corporate, Government, & Mortgage Index.

Chart 1: BofAML, Barclays; Chart 3: Bloomberg, Barclays; Charts 4-5, 7: BofAML, Bloomberg, Barclays; Chart 6: JPMorgan; Chart 8: Bloomberg (graph), BofAML, Bloomberg, Barclays (table); Chart 9: BofAML, Bloomberg; and Chart 10: Periods A, B, and Today: Bloomberg, BofAML. Periods C, D: Credit Suisse. Diversification does not assure a profit or protect against loss in a declining market.

The BofA Merrill Lynch US High Yield Index tracks the performance of below investment grade, but not in default, US dollar-denominated corporate bonds publicly issued in the US domestic market, and includes issues with a credit rating of BBB or below, as rated by Moody's and S&P. The BofA Merrill Lynch US Corporate, Government & Mortgage Index is a broad-based measure of the total rate of return performance of the U.S. investment grade bond markets. The Barclays 2, 5, or 10-Year US Treasury Bellwethers represent investment in Treasury bonds with various maturities. The indices do not reflect the payment of transaction costs, fees and expenses associated with an investment in the Fund. It is not possible to invest directly in an index.

Spread is the percentage point difference between yields of various classes of bonds compared to treasury bonds. Spread over Treasuries is the difference in yield between a fixed-income security and a Treasury security of similar maturity. R^2 is the proportion of the variability in one series that can be explained by the variability of one or more other series in a regression model. Yield-to-Worst is the lowest possible yield from owning a bond considering all potential call dates prior to maturity. Modified Duration measures the price sensitivity of a bond to interest rate movements. Risk free rate represents the interest that an investor would expect from an absolutely risk-free investment over a given period of time. Convexity is a measure of the curvature in the relationship between bond prices and bond yields that demonstrates how the duration of a bond changes as the interest rate changes. Coupon rate of a bond is the amount of interest paid per year as a percentage of the face value or principal. Par indicates that the bond is trading at its face value.

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