

High Yield Position Paper

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PREPARED BY

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Abstract

High yield bonds are a relatively new asset class in the institutional world and consequently not always understood. The following paper seeks to clarify the myths about the asset class, as well as shed light on the benefits and risks of high yield bonds. Critical topics such as return distribution, correlation to the credit cycle, and how to access the asset class are covered. Throughout the paper, a premium is placed on establishing a thorough comprehension of the asset class and why high yield should be included in institutional portfolios.

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History

Although they are one of the most important financial innovations of the past century, high yield bonds are a relatively recent addition to institutional portfolios. So called because of their high coupon (high yield), these bonds have also been called “junk bonds” due to their lower credit quality. For years institutions were limited to owning only higher rated corporate bonds, or bonds rated Baa/BBB or higher by Moody’s/S&P. For this reason, smaller firms with shorter track records were virtually locked out of the bond market, and forced to raise capital through more expensive options such as loans, private placements, or by selling equity. From the postwar period to the 1970’s, the below investment grade universe was populated primarily by “fallen angels,” bonds issued by firms that had previously held investment grade ratings, but seen their credit rating drop over the years. Exhibit 1 details ratings breakdowns for each of the three major ratings agencies.

Exhibit 1: Credit Ratings

		Moody’s	S&P	Fitch
Investment Grade	Highest Quality Rating	Aaa	AAA	AAA
	Very High Quality	Aa	AA	AA
	High Quality	A	A	A
	Moderate Risk	Baa	BBB	BBB
High Yield	Speculative	Ba	BB	BB
	Highly Speculative	B	B	B
	Substantial Credit Risk	Caa	CCC	CCC
	Very High Credit Risk	Ca	CC	CC
	At or near default		C	C
	Default	C	D	D

Source: Moody’s, Standard and Poor’s, Fitch Ratings

Throughout the 1980’s, the advent of the primary market in lower rated bonds led by Drexel Burnham Lambert formed the basis of an explosion in high yield bond issuance. Initially utilized by smaller firms to fund capital-intensive expansions, high yield financing became increasingly driven by the leveraged acquisition boom in the 1980’s. This aggressive borrowing led to record default rates in 1990 and 1991; however, by 1992, the market had bounced back and high yield bonds traded above 94 cents on the dollar. High yield bonds continue to be a source of capital for below investment grade issuers, as well as play a key role in leveraged acquisitions.¹ While smaller than the \$5.9 trillion investment grade corporate universe, at over \$1 trillion the high yield bond market represents a sizeable portion of the investable fixed income universe.² High yield issuers include members of the S&P 500 and many well-known companies. Office Depot, Penske Automotive, Regal Cinema Group, Wendy’s, and Gamestop are all examples of household names who are issuers of high yield debt.³

Features of High Yield Bonds and High Yield Bond Indices

Although high yield bonds were originally cash paying securities, as the market grew there was more innovation in security structure. Examples of these structures include zero-coupon bonds (zeroes) and payment in kind loans (PIKs). Zeroes are sold at a discount and interest accrues as the bonds approach par. PIK loans allow high yield

¹ *High Yield Bonds: market structure, portfolio management, and credit risk*, Theodore M. Barnhill, William F. Maxwell, Mark R. Shenkman.

² Source: Credit Suisse, Securities Industry and Financial Markets Association.

³ Source: BarCap.

borrowers to repay bonds by issuing additional securities in the form of more debt or preferred equity. PIK toggle notes allow borrowers to “toggle” between paying a coupon or paying in kind depending on the availability of cash. More speculative high yield bonds may also come with attached warrants⁴, making the securities more equity-like. All these structures allow growth-oriented, cash constrained borrowers to access capital, thereby resulting in riskier and more speculative securities.

Major high yield indices include the CSFB High Yield II Index, the Merrill Lynch High Yield Master II Index, and the BarCap U.S. Corporate High Yield Index. There are also cash pay versions of these indices, which explicitly exclude securities like PIKs and zeroes. Additionally, issuer cap versions of these indices exist which seek to increase index diversification. For example, the BarCap U.S. High Yield Corporate 2% Issuer Cap index limits any issuer to 2% of the index, regardless of the market value of debt outstanding. This can be beneficial from a diversification perspective, especially during market downturns. As large companies struggle and fall in the credit rating spectrum, they can become a large portion of the high yield index as more traditional high yield issuers are small firms. As all major high yield indices are highly correlated and have similar risk and return characteristics, for the remainder of the paper we will use the BarCap U.S. Corporate High Yield Index data for the purposes of analysis. The following is a summary of securities included in the BarCap High Yield Index:

- Securities are fixed rate, non-investment grade. Bonds must be rated high yield by two out of three ratings agencies. If only two agencies rate the bond, then the lower rating is used.
- Emerging market country issuers are excluded, but global and Canadian bonds that are SEC registered are included.
- Bonds must have \$150 million par outstanding.
- Bonds must be dollar-denominated, non-convertible, and publicly issued.
- Defaulted bonds are not included in the index.

Risks and Characteristics of High Yield Bonds

Because high yield borrowers are riskier credits, high yield bonds have significant credit risk. As more speculative firms, high yield issuers have a higher default risk than investment grade issuers and senior secured loan issuers. Recovery rates also tend to be lower for high yield bonds, resulting in higher default loss rates.⁵ Additionally, similar to all fixed income investments, high yield bonds are exposed to interest risk. As interest rates rise, the discounted value of future interest payments falls, causing a decrease in the bond’s price. However, high yield bonds have less interest risk than investment grade bonds as they tend to be shorter duration, and their wider spread over treasuries causes credit risk to be a more powerful driver of returns. High yield bonds have higher call penalties than senior secured loans, but are typically more callable than investment grade bonds. Finally, high yield bonds are less liquid than corporate bonds, which in turn are less liquid than treasuries. Liquidity risk is defined as the risk that bonds may be more difficult to buy and sell, leading to an adverse price or opportunity cost loss. Exhibit 2 summarizes the characteristics of high yield bonds as compared to investment grade bonds and senior secured loans.

⁴ Warrants are rights to buy stock for a specific price at a future date. They are similar to long dated call options.

⁵ Default loss rate is defined as the default rate * (1 – recovery rate).

Exhibit 2: High Yield Bond Characteristics

	Investment Grade Bonds⁶	Senior Secured Loans⁷	High Yield Bonds⁸
Security	Unsecured	First Lien	Unsecured
Term	10 Years	5 Years	7 Years
Coupon	Fixed	Floating	Fixed
Prepayment Penalty	Typically non-callable	Minimal	Heavy Penalties/Call Premiums
Duration	6.59	0.25	4.32
Default	0.18%	3.00%	4.23%
Recovery	52%	68%	35%
Default Loss Rate⁹	0.03%	1.24%	2.80%
Relative Liquidity	High	Medium/Low	Medium

Source: Moody's, Credit Suisse, Barclays. Default rate is based on dollar amount defaulted within one year of rating.

Critically, because of the inherent credit and liquidity risks in high yield bonds, their risk return profile is asymmetric. Bonds pay par value at maturity, so the upside to any bond investment is limited. However, if a company experiences a credit event, or the market experiences a liquidity shock, bond prices can fall dramatically. Thus, while a bond trading near par has limited upside, it has a much larger downside. Therefore, in this paper, in addition to traditional risk measures we will also focus on risk measures that take the asymmetric nature of credit risk into account. In this paper, we will consider the following measures of risk for investors in high yield:

- Credit Risk – We define credit risk in terms of the default loss rate, which is the percentage of high yield bonds that default adjusted for the amount recovered in bankruptcy.
- Interest Risk – As fixed coupon bonds, high yield bonds are exposed to interest risk, which can lead to lower returns as interest rates rise.
- Standard deviation – We examine the standard deviation of high yield bonds as compared to other asset classes in the context of a balanced portfolio.
- Higher moments¹⁰ – In recognition of the fact that high yield bonds are exposed to asymmetric downside risk, we examine both skewness and kurtosis in high yield bonds as compared to other asset classes. Skewness and kurtosis can serve as quantitative measures of what is commonly referred to as “tail risk.”

Historic Returns and Correlations

For the purposes of analysis and throughout this paper, we compare the return series of the BarCap High Yield Corporate Index to investment grade core bonds (BarCap Agg), bank loans (CSFB Leveraged Loan), large-cap equities (S&P 500), small-cap equities (Russell 2000), and non-U.S. stocks (MSCI EAFE). Additionally, we separate

⁶ From 1970 to present.

⁷ From 1995 to present.

⁸ From 1977 to present.

⁹ These numbers are averages of annual default loss rates, so will not exactly equate to default rate * (1 – recovery rate).

¹⁰ Moment, a term borrowed from physics, describes variation around the central tendency, or the mean. Standard deviation is typically the only “moment” about the mean considered, but if distributions of returns are not symmetric, e.g. have “fat tails” higher moments can provide additional information.

the treasury and corporate components of the BarCap Agg for additional analysis. Exhibit 3 shows the historic risk and returns characteristics of these indices.

Exhibit 3: Historic Statistics Since Inception for Each Index

	Since Inception Annualized			
	Average Return	Ret-Rf ¹¹	St Dev	Sharpe
High Yield	9.57%	4.85%	8.77%	0.55
Core Bond	8.29%	2.69%	5.67%	0.47
Treasuries	7.98%	2.28%	5.41%	0.42
Inv. Grade Credit	8.28%	2.56%	7.30%	0.35
Bank Loans	6.15%	2.76%	5.56%	0.50
Large-cap stocks	9.90%	6.07%	19.25%	0.32
Small-cap stocks	11.86%	6.10%	20.00%	0.30
Non-U.S. stocks	10.24%	4.46%	17.24%	0.26

Source: Bloomberg

As high yield bonds have more credit risk than investment grade bonds, but more protections for investors than stocks, their expected return should theoretically lie between stocks and investment grade bonds. Indeed, historically that has been the case, with high yield bonds earning 4.85% excess returns over the risk free rate, compared to 2.56% and 6.07% for investment grade credit and stocks, respectively. High yield bonds have accomplished this relatively high return with comparatively low risk, as the historic standard deviation is 8.77%, almost two and a half times less than the standard deviation of stock returns.

High yield bonds also exhibit comparatively low correlation to other asset classes, as shown in Exhibit 4. High yield bonds have a near zero correlation to treasuries and much higher correlations to investment grade credit (0.50) and bank loans (0.74). This makes sense: while there is essentially no credit risk in treasuries, credit risk is one of the primary drivers of high yield, corporate credit, and bank loans. High yield has a similar correlation to stocks as to credit (0.57). The comparatively high Sharpe ratio of high yield, combined with high yield's relatively low correlation to other traditional asset classes indicates that adding high yield to a portfolio comprised of traditional asset classes could potentially lead to equivalent levels of expected return with lower levels of volatility.

Indeed, based on the tenets of Modern Portfolio Theory (MPT), high yield seems to be a beneficial addition to the portfolio as shown in Exhibit 5. Adding high yield to a portfolio of 60% stocks and 40% bonds appears to decrease portfolio risk (as measured by standard deviation), while increasing portfolio return. However, there are a number of known flaws with MPT. While the Sharpe ratio and correlation analysis can be helpful, there are limits to their real world usefulness. The first clue correlation and standard deviation may be misleading is that the MPT framework seems to imply a 40% allocation to high yield would decrease portfolio standard deviation by nearly 1%, while simultaneously increasing returns. This clearly seems too high. In fact, the known flaws of MPT analysis are particularly applicable to high yield. MPT assumes that asset class returns are normally distributed. As high yield returns are highly non-normal, merely relying on the Sharpe ratio is inappropriate to gauge risk and return for investors.

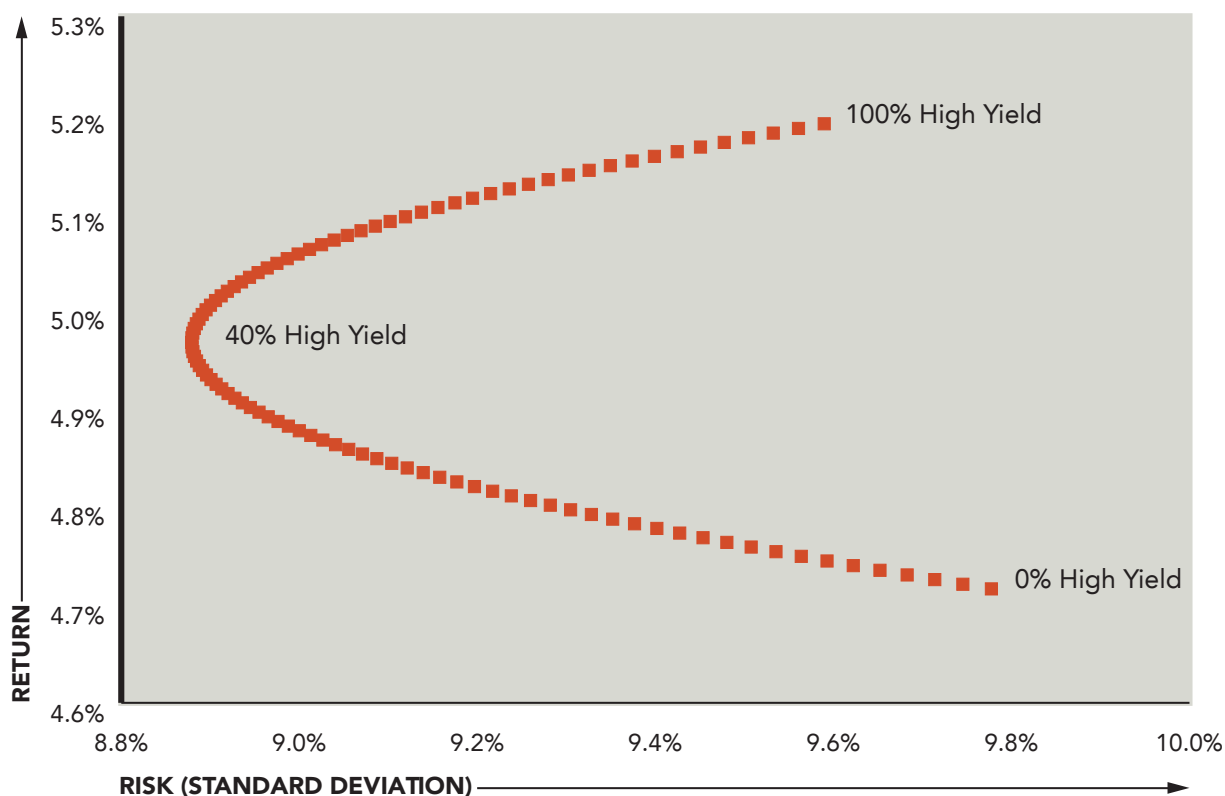
¹¹ Rf here stands for risk free rate. This column shows the returns earned in excess of T-Bills.

Exhibit 4: Historic Correlations

	N Periods	High Yield	Core Bond	Treasuries	Inv. Grade Credit	Bank Loans	Large-cap stocks	Small-cap stocks	Non-U.S. stocks
High Yield	332	1.00							
Core Bond	422	0.30	1.00						
Treasuries	457	0.08	0.95	1.00					
Inv. Grade Credit	458	0.50	0.96	0.85	1.00				
Bank Loans	230	0.74	-0.02	-0.30	0.24	1.00			
Large-cap stocks	1,010	0.57	0.24	0.12	0.34	0.40	1.00		
Small-cap stocks	386	0.60	0.13	0.01	0.22	0.42	0.83	1.00	
Non-U.S. stocks	494	0.48	0.16	0.07	0.25	0.41	0.61	0.58	1.00

Source: Encorr

Exhibit 5: Modern Portfolio Theory: Adding High Yield to a 60/40 ¹²



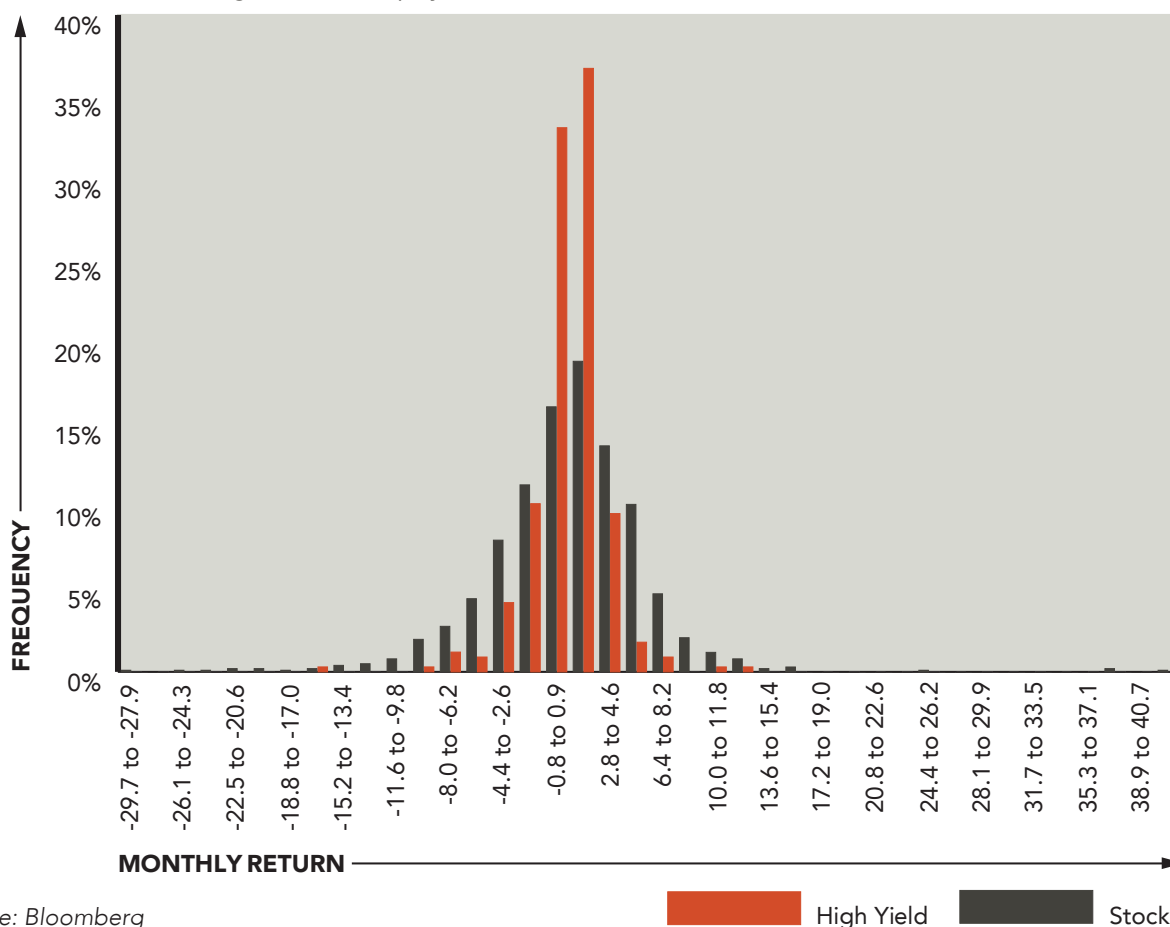
Source: Bloomberg, BarCap

¹² High yield was added to a traditional 60/40 portfolio in 1% intervals with weights of stocks and bonds proportionally decreased.

Beyond MPT: Additional Risk Measures

As seen in the previous section, high yield bonds have a much lower standard deviation of 8.8% than 19.3% for large cap stocks. Because of this, we would expect that high yield monthly returns tend to fall in a narrower range than equity returns, and indeed, that is the case. About 52% of monthly returns for the BarCap High Yield Bond index fall between 0-2%, whereas only 20.8% of returns of the S&P 500 index fall within this range. This narrower range of returns is evident in Exhibit 6, which shows the distribution of monthly high yield returns compared to equity returns. Yet standard deviation is not the whole story. As the events of 2008 made painfully clear, while standard deviation can be a useful proxy for risk, it alone does not adequately describe real world returns.

Exhibit 6: Distribution of High Yield and Equity Returns



Source: Bloomberg

It is well known that asset class return distributions have “fat tails.” That is, unlikely “extreme” events are more likely to occur in reality than expected based simply on the mean and standard deviation of returns. For example, based on the mean and standard deviation of monthly returns of high yield, investors would expect a monthly return of less than -4.26% only 2.28% of the time. Extremely negative monthly returns such as this have actually occurred 3.01% of the time historically. While this seems like a small number in absolute terms, this means that extremely negative monthly returns were 32% more likely to occur for high yield investors than the standard deviation alone would predict. Thus, standard deviation alone is a poor description of the downside risk investors face. One statistic useful to describe distributions with “fat tails” is kurtosis. Kurtosis is a measure of extreme differences from the mean. A return distribution with high kurtosis is more likely to have returns clustered around the mean, as well as more likely to have returns in the tails of the distribution. For investors, this means for asset

classes that exhibit a high degree of kurtosis, such as high yield, standard deviation alone will underestimate risk.

Another assumption of standard deviation as a risk measure is that asset class returns have a symmetric distribution. That is, investors are just as likely to experience a positive return as they are a negative return. In the real world, particularly for investors in credit, this is not the case. For investors in high yield that buy bonds at par, there is little to no upside. However, in the event of default, bondholders could see substantial losses. This risk profile is asymmetric. Large losses are more likely than large gains. Skew is a statistical measure that can quantify an asymmetric distribution. A symmetric distribution has a skew of zero. An asset class with a return distribution that has negative skew is more likely to experience large negative returns; an asset class with a return distribution that has positive skew is more likely to experience large positive returns. If asset class returns exhibit negative skew, standard deviation will again underestimate the risk of a large negative return.

Exhibit 7 shows skew and kurtosis for major asset classes.¹³ As seen in Exhibit 7, high yield bonds exhibit the largest negative skewness of any major asset class, as well as by far the highest kurtosis. In Exhibit 7, a 0.00 skewness value indicates no skewness; the distribution is normal. The higher the negative value of skewness, the more likely are large negative outcomes. A 0.00 for kurtosis indicates no kurtosis¹⁴, or a normal distribution. The higher the value for kurtosis, the more likely are extreme outcomes.

Exhibit 7: Skew and Kurtosis for Major Asset Classes

	July 1983 to Present	
	Skew	Kurtosis
High Yield	-0.979	8.644
Core Bond	0.003	0.801
Treasuries	-0.035	0.522
Inv. Grade Credit	-0.271	2.302
Large-cap stocks	-0.784	2.429
Small-cap stocks	-0.890	3.181
Non-U.S. stocks	-0.415	0.967

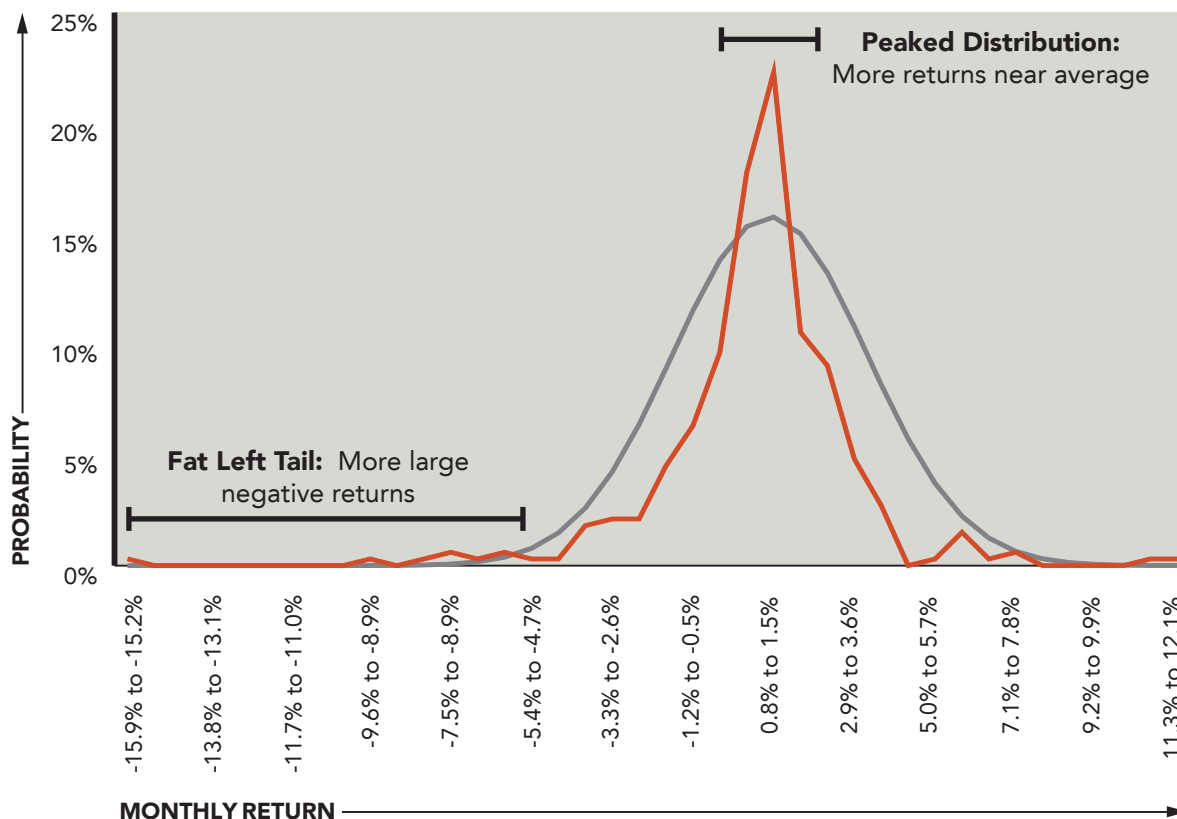
Source: Bloomberg

Exhibit 7 highlights why the discussion of skewness and kurtosis is particularly important to high yield bonds. Because the return series of high yield bonds exhibits negative skewness and a high kurtosis, large negative returns are much more likely than expected based on standard deviation. Exhibit 8 shows these risks visually. In Exhibit 8, the actual distribution of high yield returns is compared to the “expected distribution.” The gray line represents what the distribution of monthly returns would look like if high yield returns were normally distributed. As is clear from Exhibit 8, high yield returns are much more clustered around the average than expected, with a greater risk of large negative events. While high yield bonds can be a beneficial addition to a diversified portfolio, because standard deviation is a misleading measure of risk, the Sharpe ratio for high yield is artificially inflated. This could lead investors making strategic allocation decisions based on MPT to over-allocate to high yield bonds.

¹³ Loans are excluded from this analysis as their time series is relatively short and heavily skewed by recent events.

¹⁴ Technically, “excess kurtosis” is used here, as the normal distribution has a kurtosis of 3.

Exhibit 8: Actual High Yield Distribution vs. Expected



Source: Bloomberg

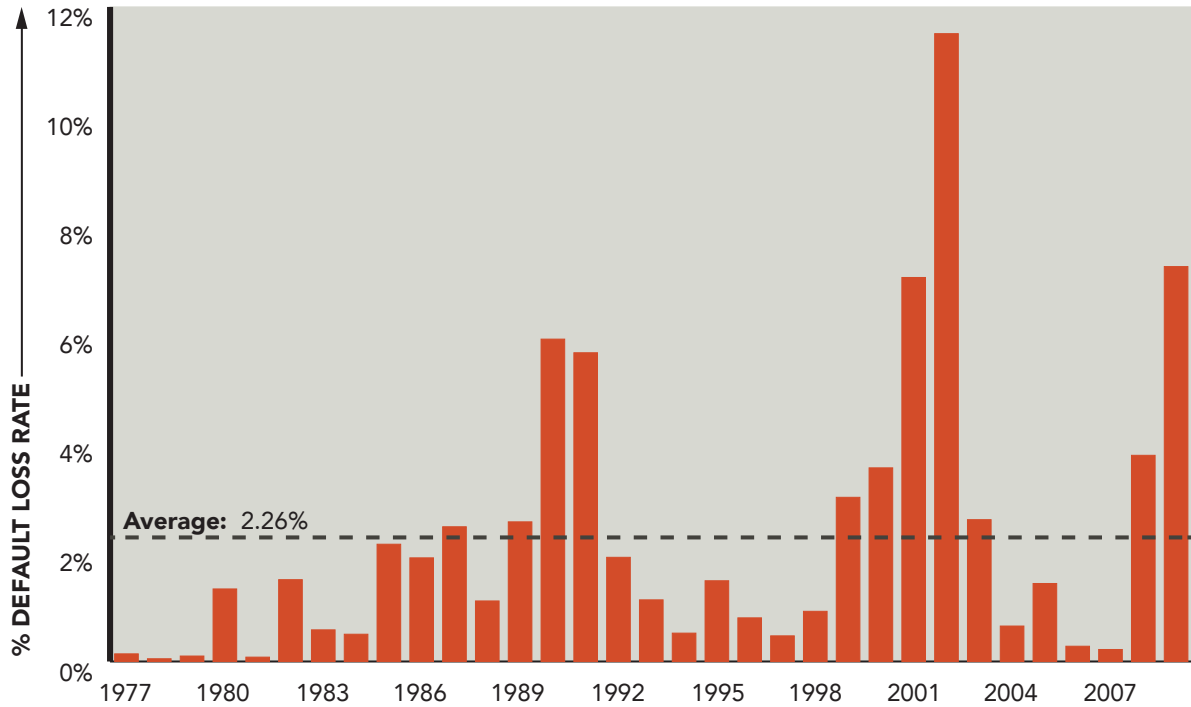
— High Yield — Expected Distribution

Tail Risks Defined: Credit Risk in High Yield Bonds

All non-government portfolios are exposed to credit risk, the risk of principal loss in the event of default. A major reason for the limited upside and extended downside risk in high yield is credit risk. Bonds issued at par have limited upside and a much larger downside in the event of default. Over time, the one-year default rate of high yield bonds has averaged about 3.3%. That is, in any given year, 3.3% of high yield bonds will have defaulted within one year. However, the average default number does not tell the whole story. First, investors in defaulted bonds do not typically lose 100% of principal. The amount recovered by investors in defaulted bonds is known as the recovery rate. Therefore, a better measure of credit risk is the default rate adjusted by the recovery rate. This measure is often called the default loss rate. Over time, the default loss rate for high yield bonds has averaged about 2.3%, much lower than the 3.3% default rate.

Second, default rates and recovery rates are not constant through time; rather, they vary with the credit cycle. Exhibit 9 highlights this relationship. As seen below, since the 1980's, the U.S. high yield market has experienced a wave of defaults every seven to ten years. During these periods, default rates are higher than average and recovery rates are lower than average, leading to higher than average credit losses. In the intermittent periods, loss rates are typically much lower than average.

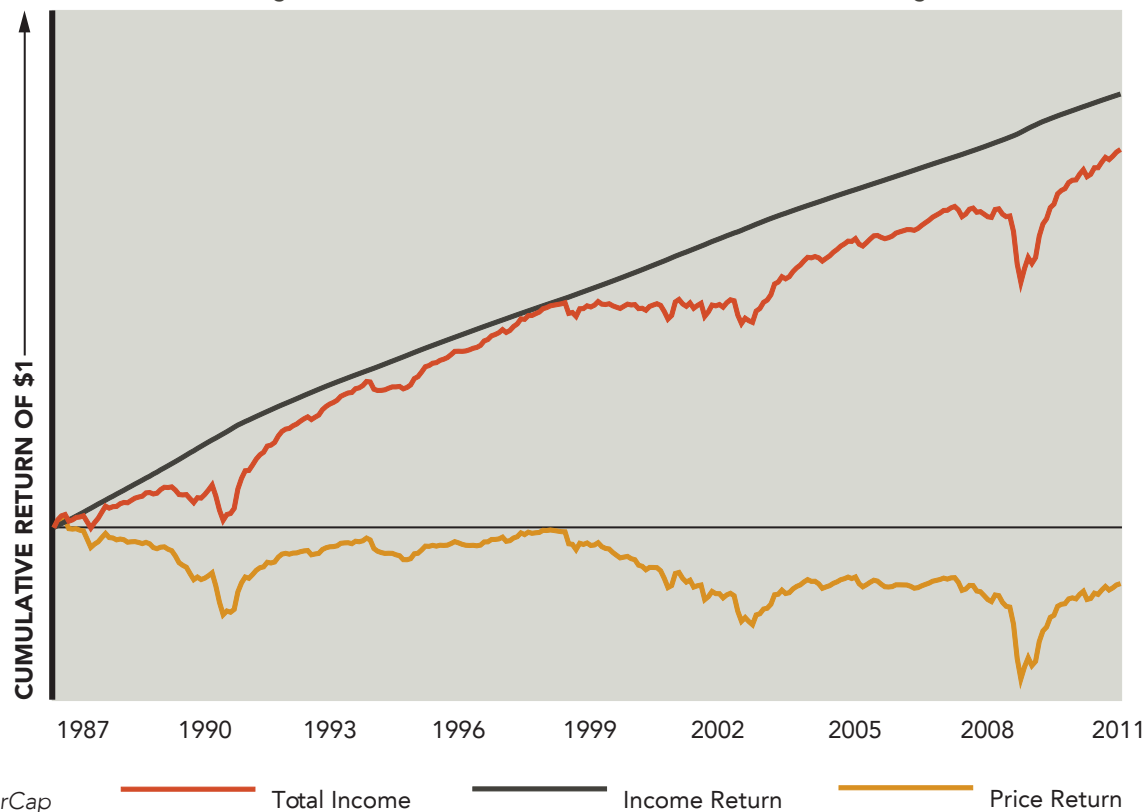
Exhibit 9: Default Loss Rates, 1977-2009



Source: Moody's

It is the cyclical nature of credit risk shown in Exhibit 9 that leads to the distribution of returns shown in Exhibit 8. In most periods, high yield bonds steadily earn a high coupon and experience average or below average defaults. This leads the majority of monthly returns to fall within the 0-2% range, far more than would be expected if high yield returns followed a normal distribution. As the credit cycle turns, high yield bonds experience above average levels of default, leading to loss of principal and causing the high yield return distribution to exhibit large left tails. This pattern of returns is evident from Exhibit 10, which shows cumulative returns of high yield bonds over time. As seen in Exhibit 10, cumulative high yield returns are characterized by steady growth in income returns, and a long term decline in price return. The decline in price return is not steady; rather it is punctuated by sharp draw downs due to an increase in defaults.

Exhibit 10: Cumulative Returns of High Yield (Total Return, Income Return, and Price Return), Log Scale¹⁵



Interest Risk in High Yield

While the primary risk to high yield bond investors is credit risk, because high yield bonds are fixed rate instruments, investors in high yield are still exposed to interest risk. Unfortunately, it is more difficult to break out the effect of rising rates on high yield bonds than it is for investment grade bonds. Because investment grade bonds are predominantly exposed to interest risk, past performance of investment grade bonds in rising rate environments is a reasonable indication of interest risk. However, because the primary driver of high yield bond returns is credit risk, returns in a rising rate environment may be a misleading measure of interest risk. In a traditional economic cycle, interest rates tend to rise as the economy begins to improve. The rise in interest rates puts downward pressure on the price of all fixed rate bonds. However, as the economy improves, credit spreads tend to tighten. This puts upward pressure on the price of credit risk investments, such as high yield bonds. Thus, as rates increase, there tend to be opposing pressures on high yield bond prices.

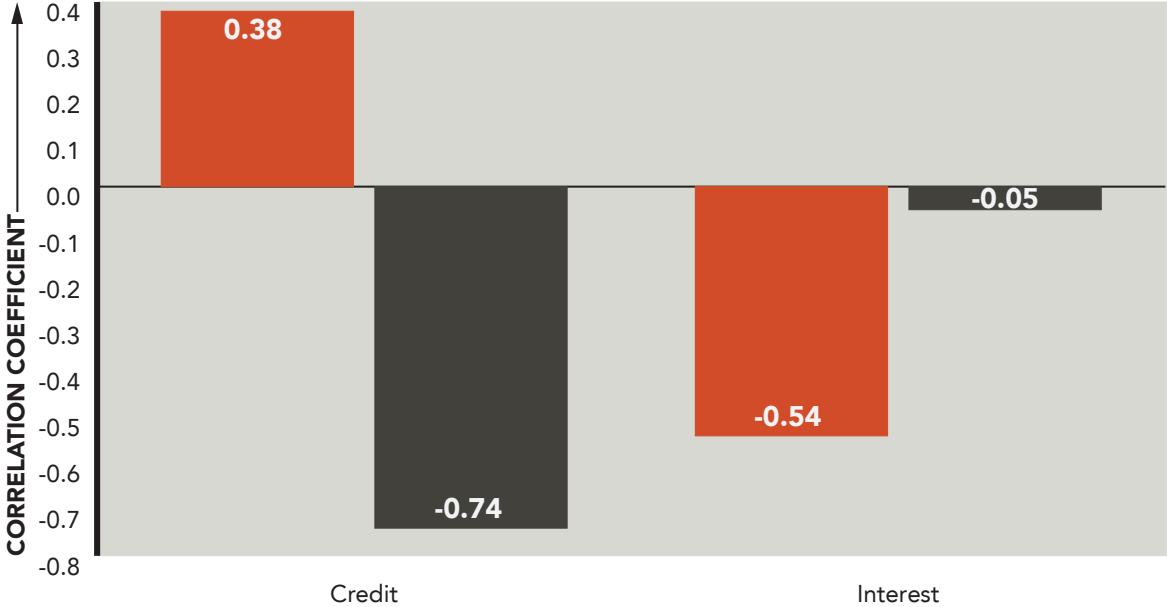
Currently, the BarCap High Yield Index has a lower duration than the BarCap Aggregate. Over time, though, the average duration of these two indices has been roughly in line. While this might suggest that high yield bonds have similar interest risk as investment grade bonds, generally this has not been the case. We can examine these risks historically by comparing the correlations of high yield and investment grade bonds to changes in interest rates and changes in credit spreads. Investment grade bonds have a highly negative correlation (-0.54) with changes in the 10-year interest rate, consistent with a high degree of interest risk. High yield bonds have a near zero (-0.05) correlation with changes in interest rates, indicating marginal interest risk.

¹⁵ Log scale is used here to better show percentage changes over time. On a log scale graph, an equal percentage change takes an equal amount of space on the y-axis.

It turns out that while high yield bonds are exposed to some interest risk, the majority of the variation in high yield returns is explained by changes in the credit risk premium. High yield bonds have a highly negative correlation (-0.74) to changes in the BBB spread. This makes sense: as spreads rise, high yield bond prices drop, leading to negative returns. Investment grade bonds actually have a positive correlation (0.38) with changes in credit spreads, due to investor “flight to quality.” When credit risk premiums increase, investors seek the relative safety of treasuries.

These relationships are summarized in Exhibit 11. The conclusion to draw here is not that high yield bonds are free of interest risk. As fixed rate instruments, high yield bonds would very likely suffer should interest rates spike dramatically. However, as the correlations demonstrate, over most periods volatility in high yield is predominantly due to credit risk, as opposed to interest risk.

Exhibit 11: Correlations to changes in Credit Spreads and Interest Rates



Source: BarCap, St. Louis Federal Reserve

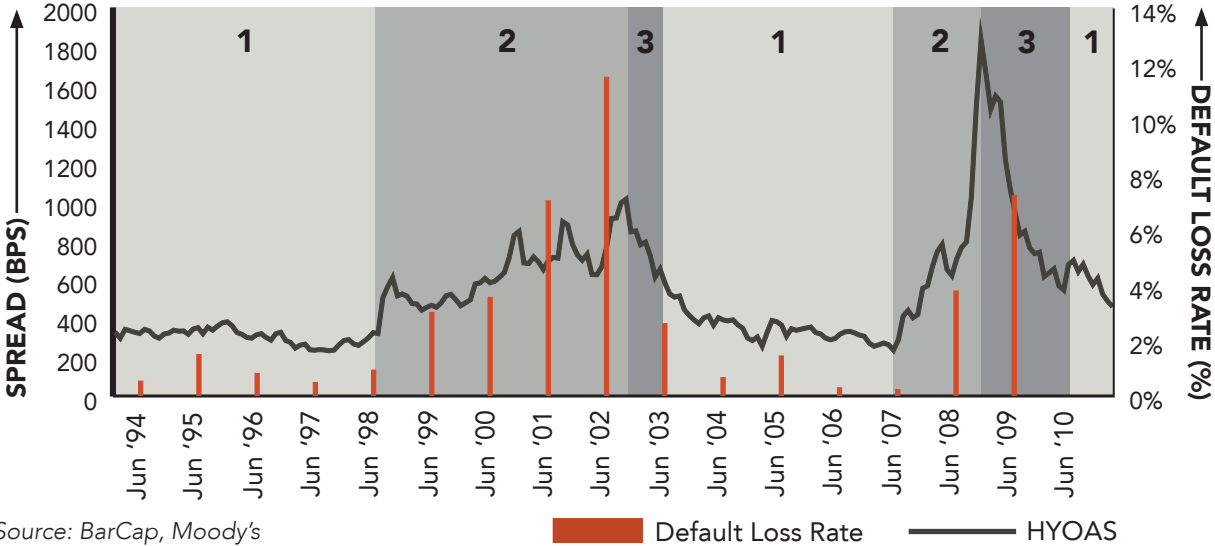
Investing in High Yield

As previously discussed in this paper, adding high yield to traditional portfolios constructed from equity and investment grade fixed income can potentially boost risk-adjusted returns. Prospective investors in high yield should be aware of the effects of the credit cycle on high yield bond returns. Generally speaking, the credit cycle is characterized by three stages:

1. A period of relative calm, characterized by tighter spreads and relatively low default rates. This stage tends to be the longest part of the cycle.
2. A period of increasing credit risk, characterized by higher than average defaults and spreads.
3. A period of recovery, as defaults decrease and credit spreads return to normalized levels. This stage tends to be shorter than the previous stage.

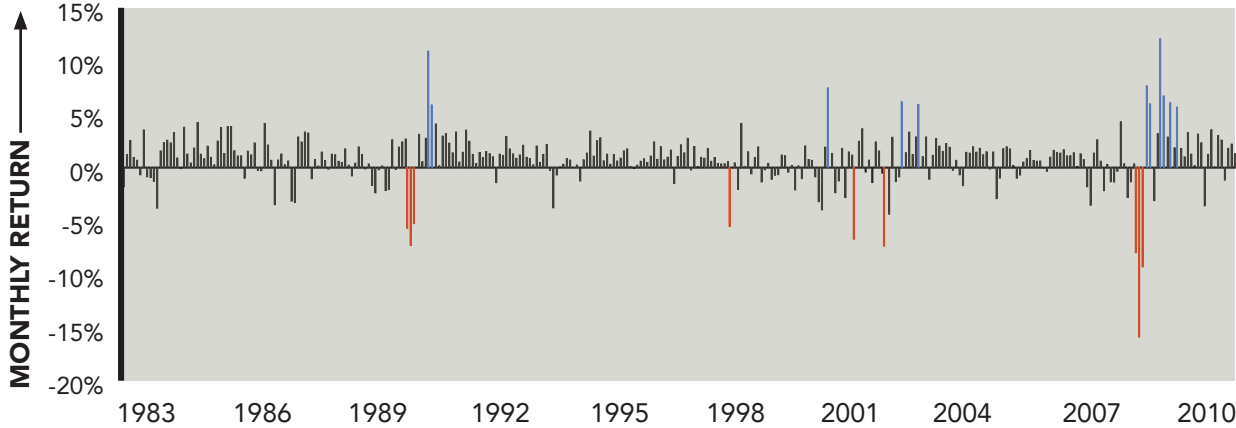
Exhibit 12 shows these numbered stages over time. Even for strategic allocators that eschew tactical investments, understanding the credit cycle is important. As defaults start to spike in unexpected economic downturns and high yield experiences large losses ("fat tail" events discussed earlier in this paper), risk averse investors may wish to decrease high yield allocations. History suggests this is likely imprudent. As credit spreads tend to widen and then snap back relatively quickly, volatility in high yield returns is clustered around these periods. Of the ten best single month returns, nine of them occurred within one year of one of the ten worst months. In other words, extreme monthly returns tend to beget more extreme monthly returns, and investors that experience large negative returns are much more likely to experience large positive returns in the near futures. This relationship is highlighted in Exhibit 13. Exhibit 13 shows historic monthly returns, with returns two standard deviations below the mean highlighted in red, and two standard deviations above the mean highlighted in blue. As seen in Exhibit 13, the vast majority of extremely negative returns have historically been followed by extremely positive returns.

Exhibit 12: The Credit Cycle



Source: BarCap, Moody's

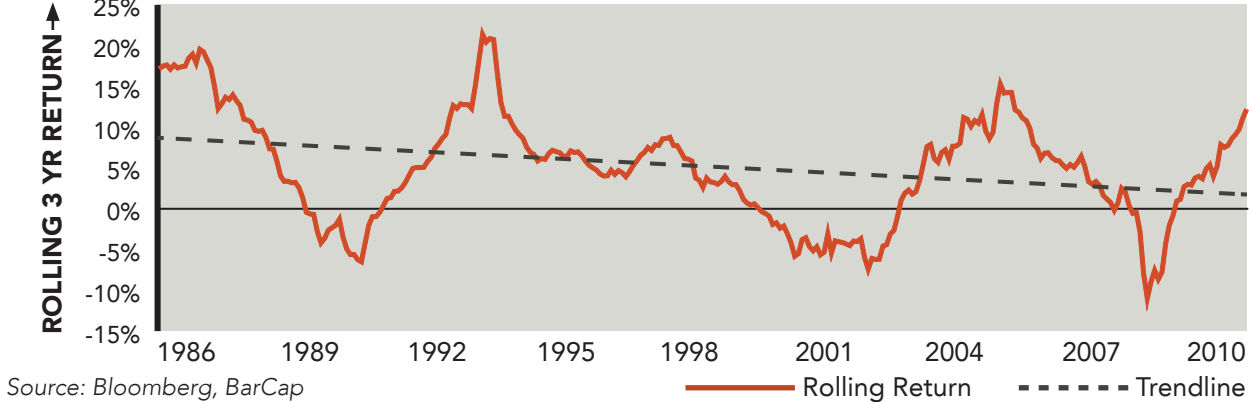
Exhibit 13: Monthly Returns



Source: BarCap

Another related consideration for high yield investors is expected future returns. In order to construct strategic allocations, investors must make assumptions about correlations, volatility, and expected returns. While for asset classes such as equity long run historic returns might be a reasonable proxy for expected future returns, because high yield is a relatively “young” asset class, using this assumption may not be reasonable. As shown in Exhibit 14, as high yield has matured as an asset class, excess returns over the risk free rate have trended downward over time (though this trend-line does seem more negative due to recent history). Thus, merely using an average of historic returns as an estimate of future expected returns may lead investors to overestimate returns to high yield investing.

Exhibit 14: Rolling 3-Year excess returns¹⁶ (Excess Returns Have Trended Down Over Time).



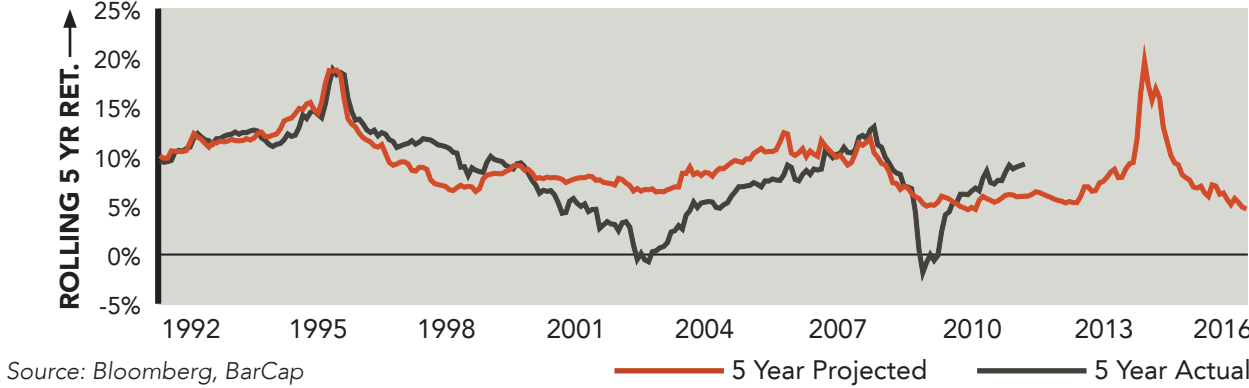
Source: Bloomberg, BarCap

While our proprietary asset allocation software is more complex, it is possible to get a rough estimate of future high yield returns through a relatively simplistic estimate process. Theoretically, over the long run the return to high yield investors should equal the yield earned, minus the principal and income lost due to default. Thus, we can crudely estimate future high yield returns as:

$$\text{Expected Future Returns} = \text{Current Yield} \times (1 - \text{Average Default Loss Rate})$$

The historical results of this projection are shown in Exhibit 15 over a five-year time horizon. As seen in Exhibit 15, using this methodology to estimate future returns leads to overestimation for periods that end during periods of high default, and underestimation during periods of recovery. Though this simple model clearly should not be used as the sole determinant of capital market expectations, it is a useful illustration of what high yield investors can expect over time. The graph in Exhibit 15 shows five year projected returns, along with actual returns over the same period. The similarity of the two lines shows the usefulness of projecting returns in this way to get a rough estimate of expected returns.

Exhibit 15: Projected Five-Year Returns vs. Actual



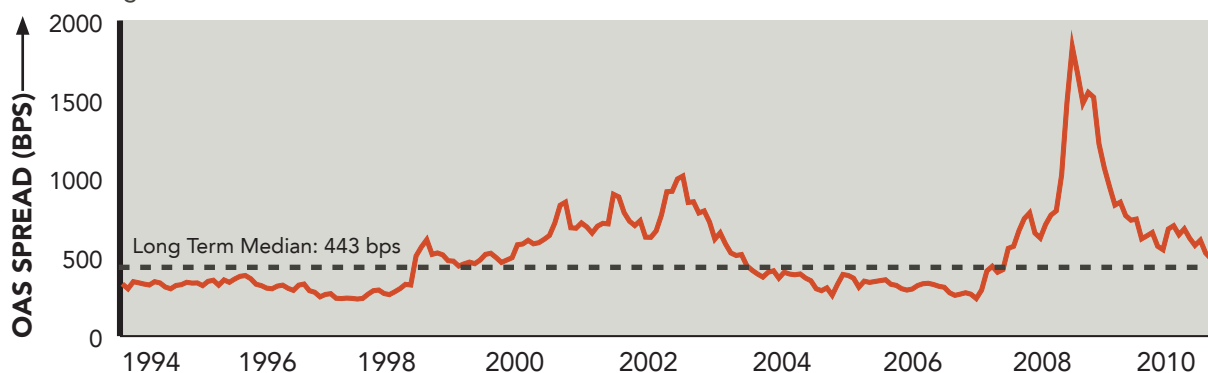
Source: Bloomberg, BarCap

¹⁶ Returns over risk free rate

High Yield Relative Valuation

In addition to absolute return prospects, high yield investors often consider the relative value of high yield as compared to investment grade bonds. One common metric, option adjusted spread¹⁷, is shown in Exhibit 16. OAS can be thought of as the extra amount investors are “paid” to take on credit risk over treasuries. The long run median OAS of 443 bps is also shown on the graph in Exhibit 16. We use the median as opposed to the mean as large spikes in OAS that occur at the troughs of the credit cycle may bias the average upward. Traditionally, high yield is often viewed as overvalued when the OAS is below the long-term average, and undervalued when spreads rise above the long-term average. However, the experience of the past 20 years suggests that investors take a more nuanced perspective. Option adjusted spreads on high yield bonds spend very little time at historical medians. For the majority of the cycle spreads sit below medians, indicating steady return potential from income, and little return potential from price appreciation due to spread compression. Then, as a credit event occurs, spreads gap out causing price losses. Thus, when spreads are below the long-term median investors can expect to experience lower potential returns and lower volatility, with higher event risk. When spreads are above the long-term median investors can expect higher return potential and higher volatility, though they are not immune to event risk as spreads may continue to widen as in 2008.

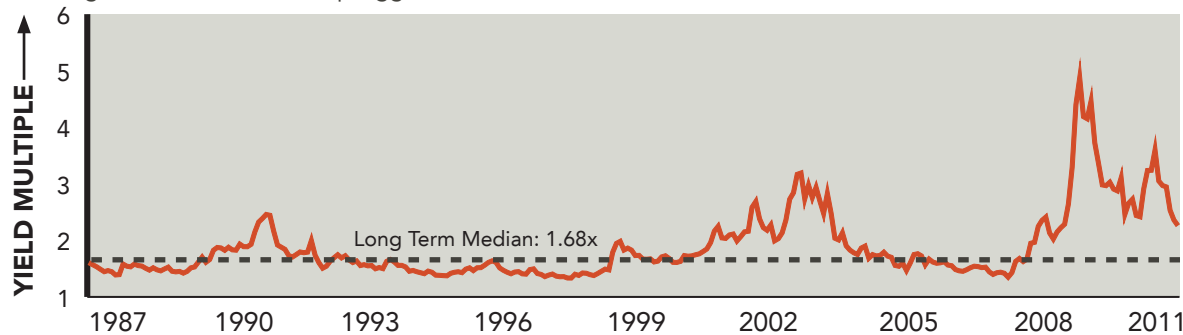
Exhibit 16: High Yield OAS



Source: BarCap

Another metric to measure relative value in high yield is yield relative to core bonds.¹⁸ Using this measure, which implicitly accounts for spreads as well as levels of interest rates, high yield valuation typically tracks fairly closely to the historic median. Importantly, this multiple can return to historic levels in one of two ways. First, high yield spreads could tighten, leading to high yield investor gains in the short-term. Second, interest rates could rise while OAS stays constant, depressing fixed income returns.

Exhibit 17: High Yield YTW vs. BarCap Agg YTW



Source: BarCap

¹⁷ The option adjusted spread is the spread over treasuries that would discount a bond's future cash flows back to its current price.

¹⁸ Data for BarCap yields go back further in time, enabling a more long-term comparison than OAS.

While evidence suggests a strategic allocation may benefit portfolios, these measures can give investors an indication of the state of the market, and potentially suggest particularly attractive times to increase allocations or rebalance, such as 2003 and 2008.

High Yield Manager Selection

Because of a lack of passive investment options and relative inefficiency in high yield markets, investors seeking to add high yield to their portfolio should pursue active management for high yield allocations. For active management, fees average around 60bps depending on mandate size and investment vehicle.¹⁹ As long-term investors' returns to credit are driven by income (shown previously in Exhibit 10), effective high yield managers balance portfolio yield while controlling for loss of principal. Effective credit research is paramount. It should be noted that while understanding portfolio defaults are important, merely minimizing defaults in the portfolio does not necessarily equate to protecting principal. Selling a bond after a precipitous drop in price may lead to less defaulted securities in the portfolio, but it still results in a realized loss. Likewise, owning a security that goes into default but emerges from bankruptcy with strong returns to debt holders will result in a portfolio default, but may still be an attractive investment.

As a corollary to the importance of credit analysis, overall portfolio quality can also be an important driver of long-term returns. Exhibit 18 shows historical risk and return statistics by credit quality for high yield and the lowest rated investment grade securities (BBB). Predictably, average yield increases as credit quality decreases. Investors demand a higher yield for riskier securities. Surprisingly, yields for lower rated bonds have not been high enough to adequately compensate investors for increased default risk. The highest returns have come from BB rated bonds, with BBB and B rated bonds posting similar returns even though B rated bonds have higher levels of risk. In addition to having markedly higher risk, CCC bonds also posted lower historic returns.

Exhibit 18: Risk and Return by Credit Quality

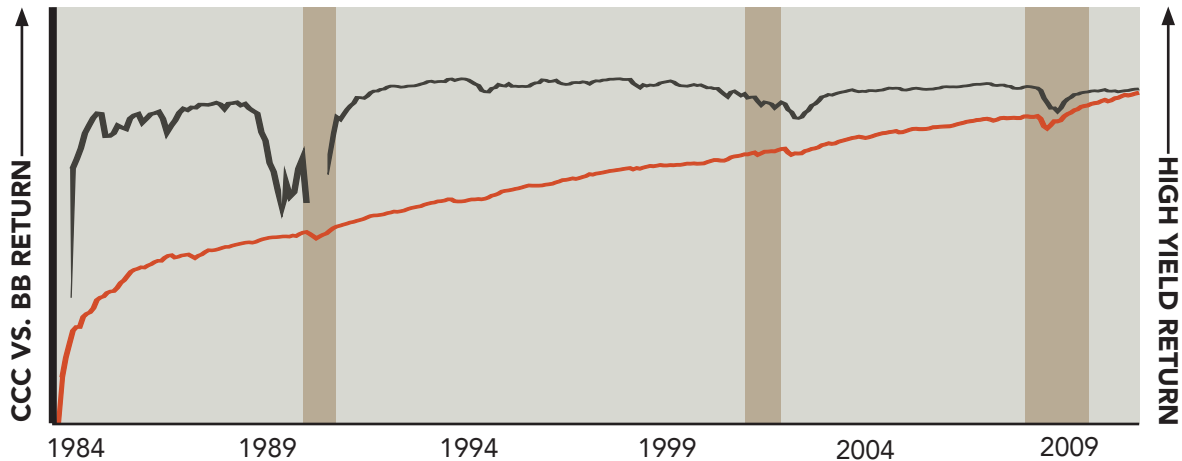
Credit Quality	Avg. Yield	Avg. Return	Ret - Rf	St Dev	Sharpe	Skew	Kurtosis
BBB	7.44%	9.13%	4.44%	6.07%	0.73	-0.81	6.15
BB	9.31%	10.23%	5.49%	6.73%	0.82	-1.65	11.24
B	11.17%	8.90%	4.20%	8.78%	0.48	-0.90	6.88
CCC	15.61%	6.91%	2.28%	13.99%	0.16	-0.45	6.73

Source: BarCap

For these reasons, many managers typically overweight BB and B credits in high yield portfolios. Over long time horizons, this has produced both better risk adjusted and absolute returns. Nevertheless, this does not necessarily mean that lower rated credits are always bad investments. As the old value investor saying goes, "there are no bad bonds, only bad prices." Over short time horizons, CCC performance can drive high yield bond returns. The historical relationship between CCC relative performance and high yield returns is shown in Exhibit 19.

¹⁹ Source: eVestment Alliance

Exhibit 19: CCC vs. BB performance & Cumulative High Yield Returns (log scale), Recessions Shaded²⁰



Source: BarCap

As seen in Exhibit 19, CCC performance typically lags in periods surrounding recessions. Sometimes this drop in relative performance is dramatic, as in the early 1990's and late 2000's, or more gradual, as in the late 1990's and early 2000's. During these periods, managers invested in higher quality credits should outperform. After a period of underperformance, CCC credits tend to snap back relatively quickly and dramatically, driving high yield returns. In times of recovery, strategically conservative high yield managers tend to give back some performance gains earned in the preceding downturn, and managers able to cycle into riskier credits outperform their peers.

While proper credit analysis is important for all managers, it is also important to understand manager style. Managers that are more conservative tend to have somewhat lower risk, but will also tend to underperform during risk rallies seen in years like 2009. Riskier or more benchmark aware managers will underperform conservative managers in times of crises, such as 2008, but have potential to make up losses as credit rallies. Managers that opportunistically weight CCC effectively have the largest potential for outperformance over an entire cycle, but as much of this outperformance relative to other managers is driven by one or two years it can be difficult to judge whether returns are driven by skill alone.

Conclusion

Adding high yield bonds to a portfolio can potentially improve risk-adjusted returns. High yield bond volatility sits somewhere between equities and investment grade bonds, but has more significant tail risk than these asset classes. While high yield is much more correlated with equities than bonds, high yield bonds are still fixed income instruments: returns are derived from income as opposed to capital appreciation. However, because of the correlation of credit risk to equity risk, the decision to allocate to high yield needs to be made in the entire portfolio context.

²⁰ The gap in the graph is a result of negative numbers being omitted as the y-axis is log-scale.



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