

High Yield Bonds for Allocators

Evaluating the use of high yield within an investment portfolio

IN A NUTSHELL



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- Investing strategically into high yield corporate bonds can help to supplement yield or income objectives or help to diversify away from traditional equity and fixed income risks.
- Across the high yield investment universe, investors can express views across spread, credit rating, duration, and industry, allowing access to differing levels of risk and yield that may be more or less suitable for different market environments.
- Historically, the higher quality segment of this market has realized better risk-adjusted returns, where lower quality names have provided more return upside in risk-on markets.
- While distressed market environments can introduce significant price volatility, subsequent returns following periods of spread widening have, on average, fared well for higher yield investments.
- In significant selloffs, credit spreads typically widen prior to ratings downgrade and rally following the downgrade. The average issuer experienced nearly 550bps of spread widening three months prior to downgrade and nearly 450bps of spread tightening in the three months following downgrade.

Historically, investors have looked to fixed income markets to access higher quality, fixed rate returns to either supplement yield or income objectives or to help diversify away from traditional equity investments that often dominate portfolios. The growth and expansion of credit markets in recent decades has resulted in the tremendous growth of speculative-grade credit, now more commonly known as high yield. Once considered to be a more exotic, non-core fixed income asset class, high yield has now grown to serve an important strategic and tactical purpose within most investor portfolios across the risk spectrum.

This paper seeks to provide the reader with a broad overview of the high yield market, highlighting the strategic and tactical cases for high yield investing as well as addressing questions such as around liquidity and market technicals, characteristics of different segments of the high yield market, and how to think about the component risks of high yield bonds. The main areas of focus of this paper can be summarized into four main categories:

1. *Strategic Allocations:* What is the strategic risk and return case for high yield within a portfolio, and what is a reasonable credit risk premium to be demanded by high yield investors?
2. *Characteristics:* What are the underlying characteristics of the high yield market, broken down by industry and by quality? How might shifting allocations based on industry or credit rating impact risk and return characteristics?
3. *Market Timing:* On a more tactical basis, when has it historically made more sense to be opportunistically overweight high yield as an asset class?
4. *Component Risks:* Between the credit spread and risk-free treasury yield, how have these component risks interacted or contributed to the total risk of the asset class?

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1 / Strategic high yield

1.1 Historical risk and return characteristics

Within the context of other equity or credit asset classes, U.S. high yield markets have historically generated similar risk-adjusted returns. Looking back to the inception of the ICE BofA U.S. High Yield Index in December of 1996, the realized Sharpe ratios of high yield, equities, and investment grade corporate bonds are coincidentally nearly identical. [Figure 1](#) shows the historical return, volatility, and Sharpe ratios for across these major US equity and credit asset classes.

Figure 1: Returns, volatility, and Sharpe ratio (12/31/1996 to 12/31/2023)

	S&P 500	ICE BofA U.S. High Yield	ICE BofA U.S. Investment Grade	Cash
Return (geometric)	8.10%	5.90%	4.51%	2.07%
Return (arithmetic)	9.06%	6.15%	4.59%	2.06%
Volatility (annualized)	15.65%	8.83%	5.85%	
Sharpe	0.45	0.46	0.43	

Source: Bloomberg L.P., DWS calculations as of 12/31/2023.

*Cash return uses Bloomberg US Treasury Bills 1-3 Month Index.

Looking at returns across asset classes by calendar year, high yield returns have historically been moderate, reflecting moderate levels of risk or volatility, particularly as compared to equities and commodities. In periods of strong market returns, high yield returns have been quite positive, although not the extent of equities markets, where in negative calendar years, high yield has typically experienced less severe drawdowns versus equities. [Figure 2](#) shows the returns across asset classes by calendar year over the past two decades.

Figure 2: Calendar year returns across asset classes (12/31/1996 to 12/31/2023)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
EM 55.8%	EM 25.6%	EM 34.0%	EM 32.1%	EM 39.4%	US Treasuries 13.7%	EM 78.5%	US SC 26.9%	US Treasuries 9.8%	EM 18.2%	US SC 38.8%	S&P 500 13.7%	S&P 500 1.4%	US SC 21.3%	EM 37.3%	Cash 1.8%	S&P 500 31.5%	US SC 20.0%	S&P 500 28.7%	Commodity 16.1%	S&P 500 26.3%
US SC 47.3%	EAFE 20.2%	Commodity 21.4%	EAFE 26.3%	Commodity 16.2%	Cash 1.8%	US HY 57.5%	EM 18.9%	US IG 7.5%	EAFE 17.3%	S&P 500 32.4%	US IG 7.5%	US Treasuries 0.8%	US HY 17.5%	EAFE 25.0%	US Treasuries 0.9%	US SC 25.5%	S&P 500 18.4%	Commodity 27.1%	Cash 1.5%	EAFE 18.2%
EAFE 38.6%	US SC 18.3%	EAFE 13.5%	US SC 18.4%	EAFE 11.2%	US IG -6.8%	EAFE 31.8%	Commodity 16.8%	US HY 4.4%	US SC 16.4%	EAFE 22.8%	US Treasuries 5.1%	Cash 0.0%	S&P 500 12.0%	S&P 500 21.8%	US IG -2.2%	EAFE 22.0%	EM 18.3%	US SC 14.8%	US HY -11.2%	US SC 16.9%
S&P 500 28.7%	S&P 500 10.9%	S&P 500 4.9%	S&P 500 15.8%	US Treasuries 9.0%	US HY -26.4%	US SC 27.2%	US HY 15.2%	S&P 500 2.1%	S&P 500 16.0%	US HY 7.4%	US SC 4.9%	US IG -0.6%	Commodity 11.8%	US SC 14.6%	US HY -2.3%	EM 18.4%	US IG 9.8%	EAFE 11.3%	US Treasuries -12.5%	US HY 13.5%
US HY 28.1%	US HY 10.9%	US SC 4.6%	US HY 11.8%	S&P 500 5.5%	US SC -33.8%	S&P 500 26.5%	S&P 500 15.1%	Cash 0.1%	US HY 15.6%	Cash 0.0%	US HY 2.5%	EAFE -0.8%	EM 11.2%	US HY 7.5%	S&P 500 -4.4%	US HY 14.4%	US Treasuries 8.0%	US HY 5.4%	EAFE -14.5%	EM 9.8%
Commodity 23.9%	Commodity 9.1%	Cash 3.0%	Cash 4.8%	Cash 4.8%	Commodity -35.6%	US IG 19.8%	US IG 9.5%	US SC -4.2%	US IG 10.4%	US IG -1.5%	Cash 0.0%	US SC -4.4%	US IG 6.0%	US IG 6.5%	US SC -11.0%	US IG 14.2%	EAFE 7.8%	Cash 0.0%	US IG -15.4%	US IG 8.4%
US IG 8.3%	US IG 5.4%	US Treasuries 2.8%	US IG 4.4%	US IG 4.6%	S&P 500 -37.0%	Commodity 18.9%	EAFE 7.8%	EAFE -12.1%	US Treasuries 2.0%	EM -2.6%	EM -2.2%	US HY -4.6%	US Treasuries 1.0%	US Treasuries 2.3%	Commodity -11.2%	Commodity 7.7%	US HY 6.2%	US IG -1.0%	S&P 500 -18.1%	Cash 5.1%
US Treasuries 2.2%	US Treasuries 3.5%	US HY 2.7%	US Treasuries 3.1%	US HY 2.2%	EAFE -43.4%	Cash 0.1%	US Treasuries 5.9%	Commodity -13.3%	Cash 0.1%	US Treasuries -2.7%	EAFE -4.9%	EM -14.9%	EAFE 1.0%	Commodity 1.7%	EAFE -13.8%	US Treasuries 6.9%	Cash 0.5%	US Treasuries -2.3%	EM -20.1%	US Treasuries 4.1%
Cash 1.0%	Cash 1.2%	US IG 2.0%	Commodity 2.1%	US SC -1.6%	EM -53.3%	US Treasuries -3.6%	Cash 0.1%	EM -18.4%	Commodity -1.1%	Commodity -9.5%	Commodity -17.0%	Commodity -24.7%	Cash 0.3%	Cash 0.8%	EM -14.6%	Cash 2.2%	Commodity -3.1%	EM -2.5%	US SC -20.4%	Commodity -7.9%

Source: Bloomberg L.P., DWS calculations as of 12/31/2023.

Historical cross-asset correlations show quite intuitive results as well. Whereas high yield corporate bonds are fixed income instruments, the ability of corporations to service their debt is largely a function of corporate earnings and is reflected in stronger positive correlations to equities and weaker correlations to sovereign bonds and cash. [Figure 3](#) shows total return correlations across various asset classes over the past two decades.

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Figure 3: Correlation matrix (12/31/2002 to 12/31/2023)

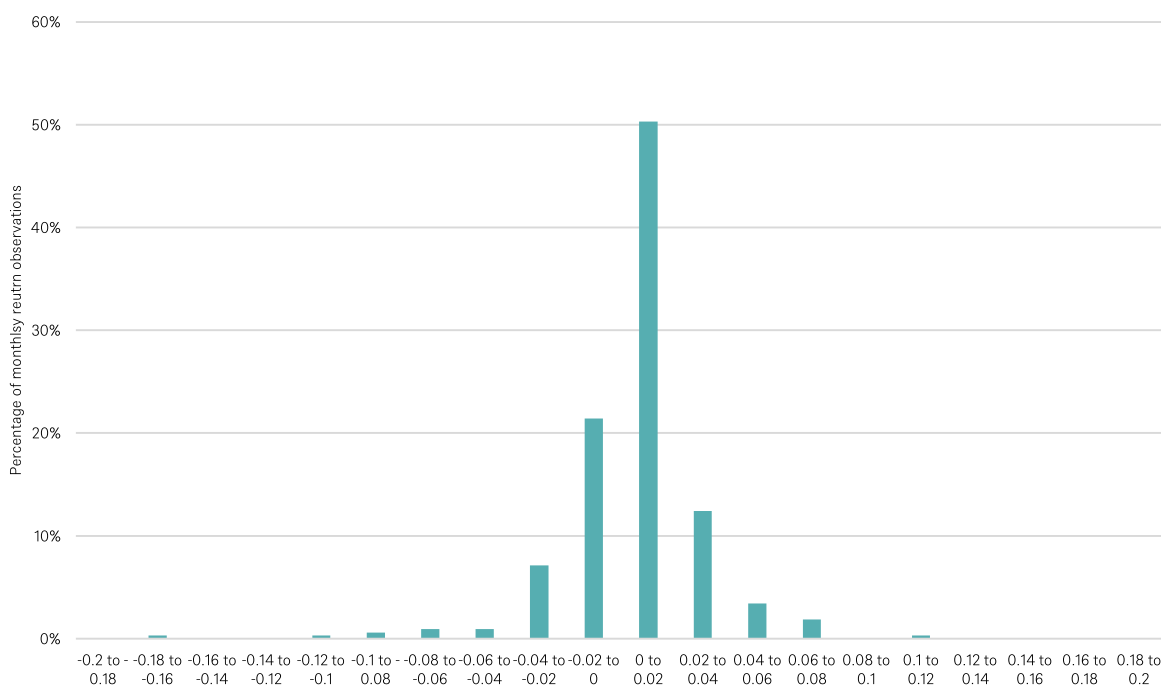
	US HY	S&P 500	EAFE	EM	US SC	Commodities	US Treasuries	US IG	Cash
US HY	1.00	0.74	0.76	0.72	0.71	0.48	(0.02)	0.66	(0.08)
S&P 500	0.74	1.00	0.88	0.74	0.89	0.44	(0.08)	0.45	(0.05)
EAFE	0.76	0.88	1.00	0.86	0.79	0.54	(0.06)	0.50	0.00
EM	0.72	0.74	0.86	1.00	0.70	0.58	(0.05)	0.49	0.02
US SC	0.71	0.89	0.79	0.70	1.00	0.41	(0.16)	0.36	(0.07)
Commodities	0.48	0.44	0.54	0.58	0.41	1.00	(0.17)	0.22	(0.02)
US Treasuries	(0.02)	(0.08)	(0.06)	(0.05)	(0.16)	(0.17)	1.00	0.62	0.11
US IG	0.66	0.45	0.50	0.49	0.36	0.22	0.62	1.00	(0.02)
Cash	(0.08)	(0.05)	0.00	0.02	(0.07)	(0.02)	0.11	(0.02)	1.00

Source: Bloomberg L.P., DWS calculations as of 12/31/2023.

1.2 Liquidity

As is the case with less frequently traded financial instruments, high yield bond prices have historically shown signs of artificial smoothness, as evidenced by the left tail skew in return distributions and by modest positive time series correlations (see Figure 4 and Figure 5).

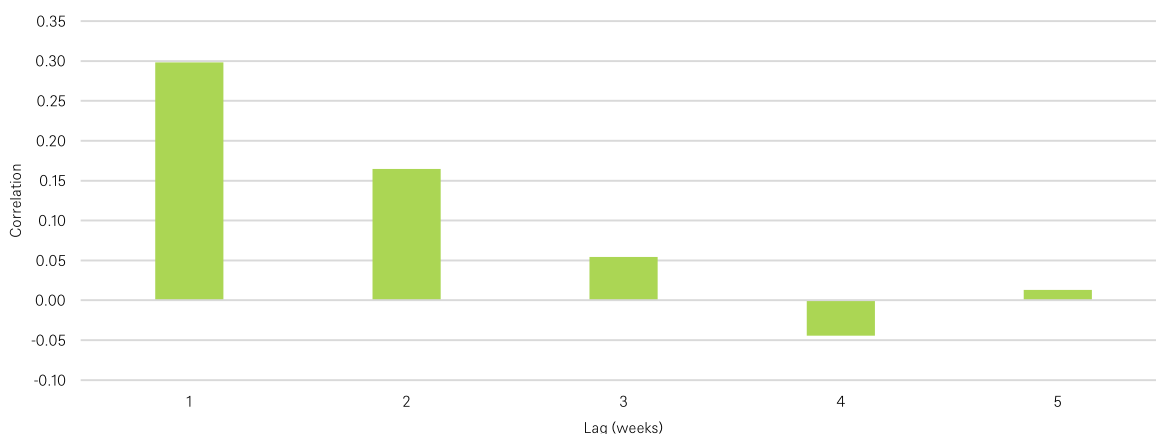
Figure 4: High yield returns show moderate left tail skew (monthly 12/31/1996 to 12/31/2023)



Source: Bloomberg L.P., DWS calculations as of 12/31/2023.

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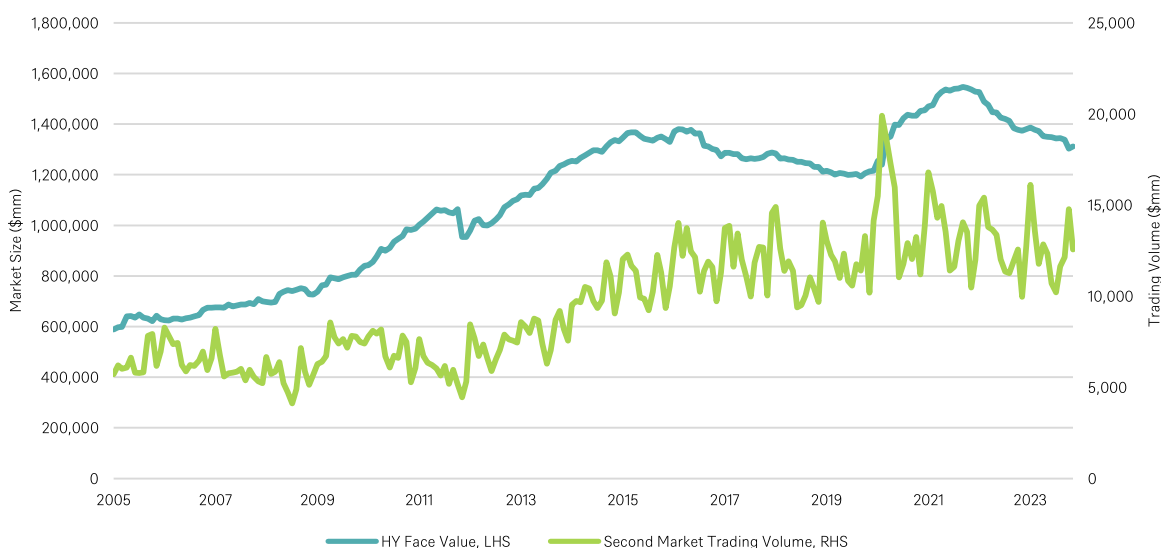
Figure 5: Time series correlation (12/31/1996 to 12/31/2023)



Source: DWS Investment Management GmbH calculations as of 12/31/2023.
 *Correlations are calculated using weekly returns.

As high yield liquidity conditions have improved (high yield now makes up roughly 4% of the investible fixed income universe in the US), with significant increases in market depth and cash bond transaction volumes, managing portfolio risk has been made easier. Figure 6 shows the significant growth in both the size and underlying liquidity of the cash high yield market.

Figure 6: High yield (HY) market size and trading volumes (12/31/1998 to 12/31/2023)



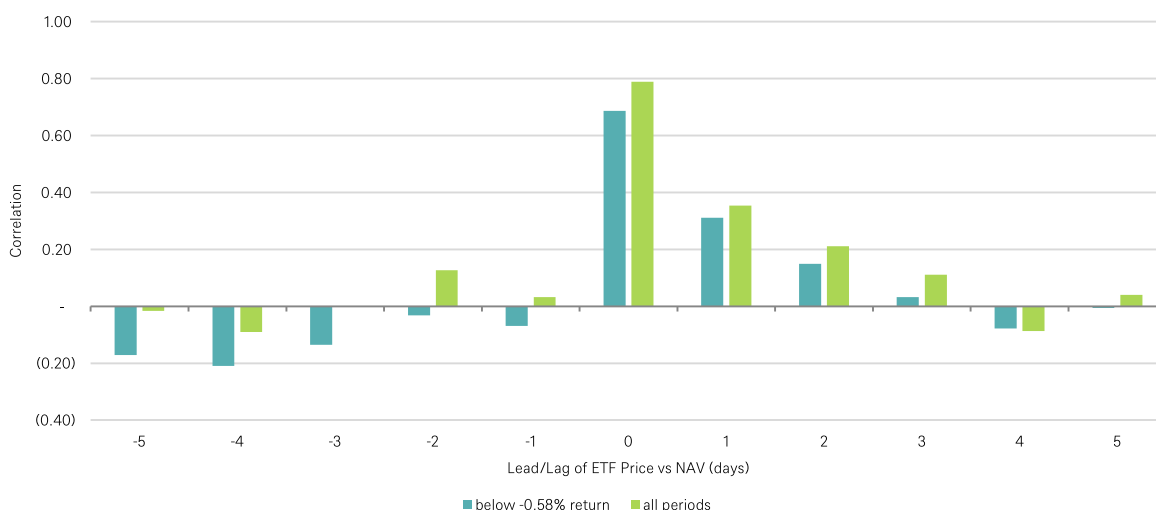
Source: Bank of America Research, FINRA TRACE as of 12/31/2023.

The proliferation of exchange-traded corporate bond funds has also helped to improve the liquidity profile of the asset class, where investors are now able to trade large swathes of credit markets intraday in significant volumes. A particularly noteworthy characteristic of credit exchange-traded funds ("ETFs"), however, is the short-term deviation between the ETF price and the net asset value ("NAV") of the underlying securities. Where traditional investors might deem this to be an inefficiency with the discounted instrument (in this case, the ETF), the ETF price may be a more accurate reflection of the true price of a basket of high yield securities where some bonds may not trade as frequently in market stress environments.

Figure 7 shows how a high yield ETF price has tended to lead the underlying index price lower, with strong positive correlations between the ETF price move and the next day move in the NAV, indicating that the ETF price, in many cases, reflected moves in high yield bond prices in a timelier fashion.

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Figure 7: High yield ETF volumes as a percentage of underlying trading (12/7/2016 to 12/31/2023)



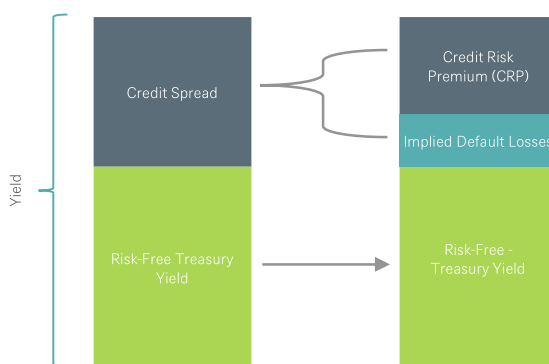
Source: Bloomberg L.P., DWS Investment Management GmbH, DWS calculations as of 12/31/2023.

*Lead/lag compares the returns of the ETF in the days before (lead) or after (lag) the returns of the net asset value or NAV.

1.3 Spreads and default losses

Over a strategic time horizon, yields are the primary driver of long-term returns across most fixed-income asset classes. The same is true of high yield bonds, where yield is comprised of a risk-free component and a spread component that compensates an investor for the risk of issuer default. Due to its more speculative nature, at least relative to investment grade issuers, speculative-rated credit spreads generally embed a risk of the issuer defaulting and the corresponding losses from the partial repayment as well as an additional compensation or return premium for the risk or uncertainty associated with credit loss potential. Figure 8 illustrates the simple decomposition of the yield into its three contributing components: 1. Risk free rate, 2. Credit risk premium and 3. Implied default losses.

Figure 8: Decomposition of high yield index yield

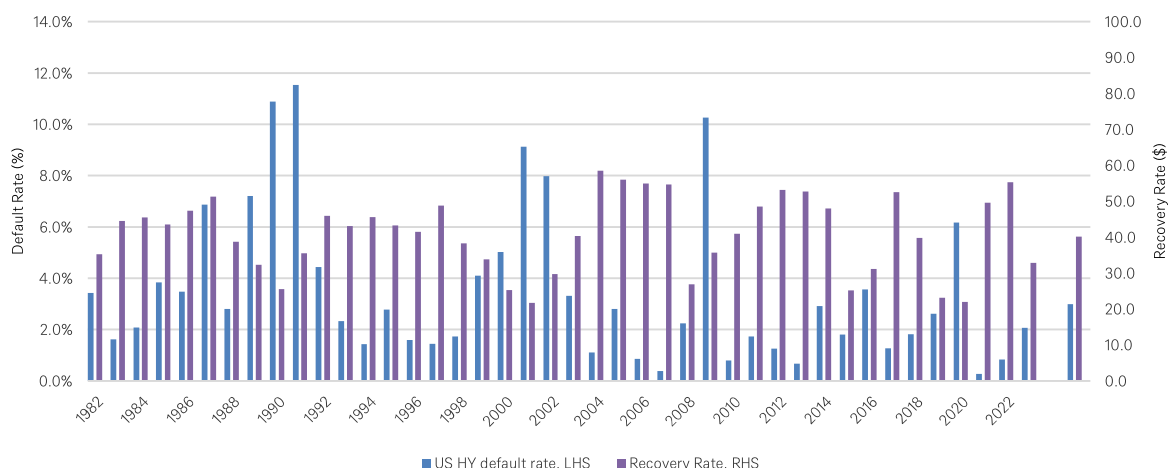


Source: DWS Investment Management GmbH.

Over the past two decades, the average annual default rate across the high yield universe has been between 3.5 and 4%, with an average recovery rate of slightly below \$40 based on a par value of \$100. This roughly 60% default loss rate from par combined with the 3.5 to 4% default rates equates to roughly 2 to 2.5% default losses per annum assuming par value for the defaulted securities. Figure 9 shows the historical trailing-twelve-months default rate and recovery rate from Moody's Investor Services.

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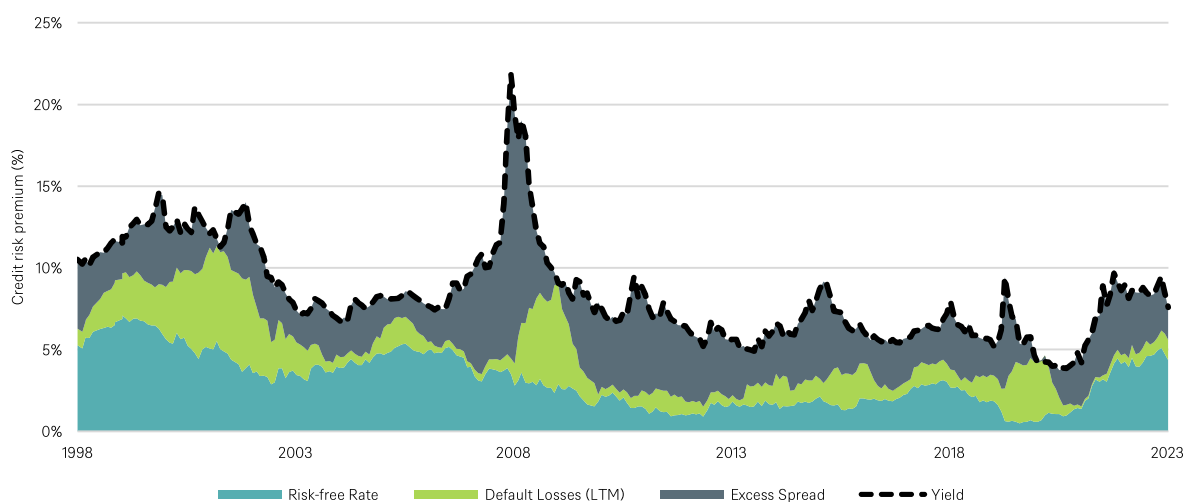
Figure 9: Historical default rate and recovery rate (12/31/1991 to 12/31/2023)



Source: JP Morgan Research as of 12/31/2023.

As we previously discussed, credit investors need to be compensated beyond the credit spread associated with losses from issuer defaults. This additional requirement can be referred to as the “credit risk premium” (“CRP”) or the “excess spread”. Empirically, we can measure the long-term average excess spread over the default loss rate to get a sense of the average “credit risk premium” demanded by high yield investors. Going through this exercise in Figure 10, we can show the historically realized average credit risk premium is roughly somewhere between 300 to 325 basis points (“bps”).

Figure 10: Historical realized credit risk premium (12/31/1998 to 12/31/2023)



Source: JP Morgan Research, PitchBook Data, Inc., DWS calculations as of 12/31/2023.

Using this average historical credit risk premium, we can utilize our views on default rate expectations over the next year to determine whether we believe the credit risk premium is rich or expensive versus the long-term average. Alternatively, if we assume that the CRP is mean reverting at 3.25%, the residual between the options-adjusted spread and that 3.25% CRP can also be interpreted as market-implied default losses. For example, if the current high yield index credit spread is 4.5%, then the market implied default losses would be 1.25%. Assuming par value and an average recovery rate of 40% (default loss rate of 60%), our market-implied default rate is 2.08%.

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2 / High yield characteristics

2.1 High Yield Ratings

Fundamentally, debt issuers are assessed by ratings agencies based on the likelihood that they repay their debt obligations. High yield, sometimes referred to as speculative grade, ranges in credit rating from BB to C (or in some cases, unrated), with each rating representing between a low and high probability of issuer default. According to analysis from S&P Global Fixed Income Research, between 1981 and 2017, the probability of default over a 5-year time horizon was roughly 6.5% for BB-rated issues and 46.2% for CCC/C-rated issues¹

Figure 11: Comparison between Fitch, S&P, and Moody's ratings categories and descriptions

Moody's	S&P	Fitch	Rating Definitions (Moody's)
Aaa	AAA	AAA	Minimal risk
Aa1	AA+	AA+	Very lower credit risk
Aa2	AA	AA	
Aa3	AA-	AA-	
A1	A+	A+	Very lower credit risk
A2	A	A	
A3	A-	A-	
Baa1	BBB+	BBB+	Medium credit risk
Baa2	BBB	BBB	
Baa3	BBB-	BBB-	
Ba1	BB+	BB+	Substantial credit risk
Ba2	BB	BB	
Ba3	BB-	BB-	
B1	B+	B+	High credit risk
B2	B	B	
B3	B-	B-	
Caa1	CCC+	CCC+	Very high credit risk
Caa2	CCC	CCC	
Caa3	CCC-	CCC-	
Ca	CC	CC	In or near default, possible recovery
C	C	C	In default, little prospect for recovery
	SD	DDD	
	D	DD	
		D	

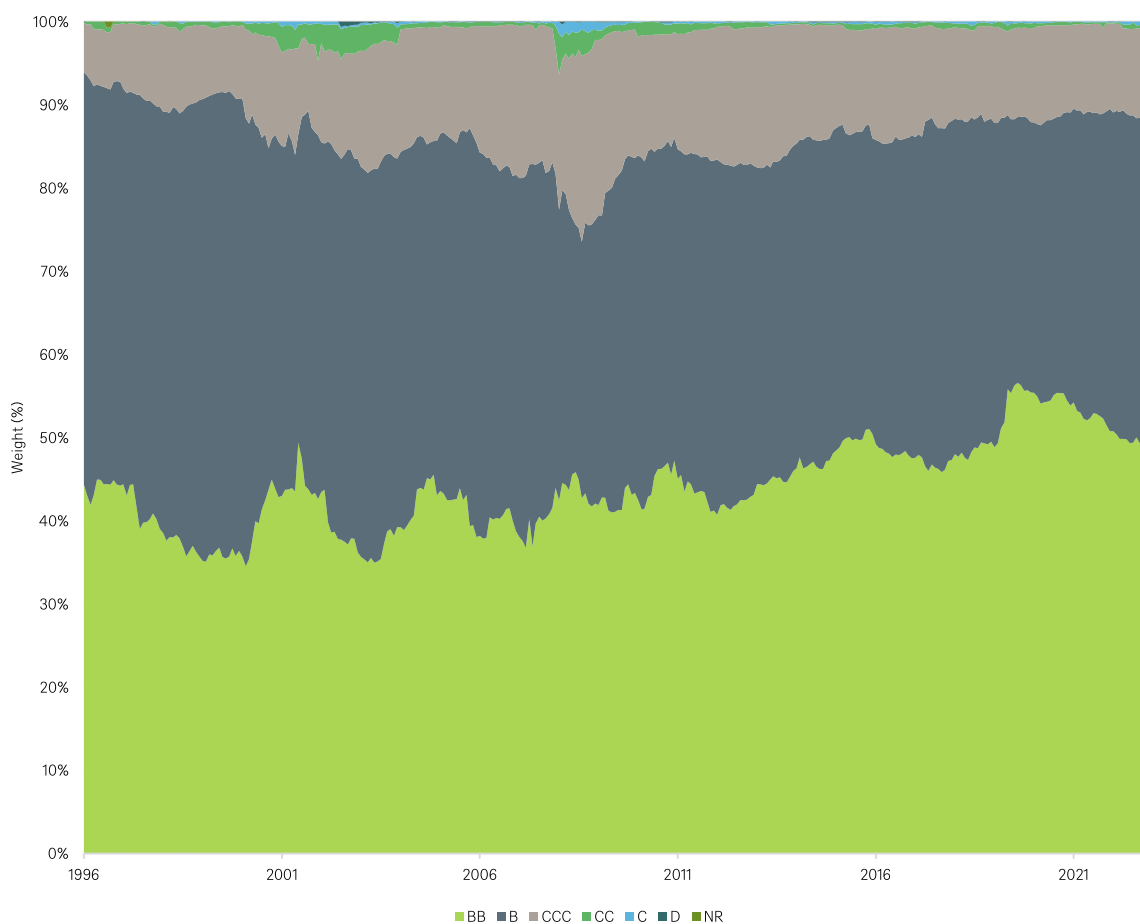
Source: Fitch Ratings Inc., S&P Global Ratings, Moody's Investor Services.

The ICE BofA U.S. High Yield Index universe has historically consisted of relatively proportionate weights to BB and B-rated securities, with CCCs making up, on average, just over 10% of the index. In recent years, the ratings composition has migrated higher in quality, where BB-rated bonds now make up nearly 49% of the index and B-rated bonds just under 40%, with the balance largely consisting of about 11% in CCC-rated securities. Figure 12 shows the historical ratings composition of the ICE BAML U.S. High Yield index.

¹ <https://www.livewiremarkets.com/wires/quantifying-the-risk-of-bonds-with-s-p-credit-ratings>

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Figure 12: High yield ratings composition (12/31/1996 to 12/31/2023)



Source: ICE BAML Indices as of 12/31/2023.

Looking at returns and Sharpe ratios across credit ratings, it's apparent that seldom does the CCC and lower segment of the high yield market generate superior risk-adjusted returns relative to BB/B-rated credits. Only in very strong credit market rallies has the risk-adjusted return of the CCC and lower-rated securities exceeded the broader high yield index as shown in Figure 2.

Figure 13: Returns, volatility, and Sharpe ratio (12/31/1996 to 12/31/2023)

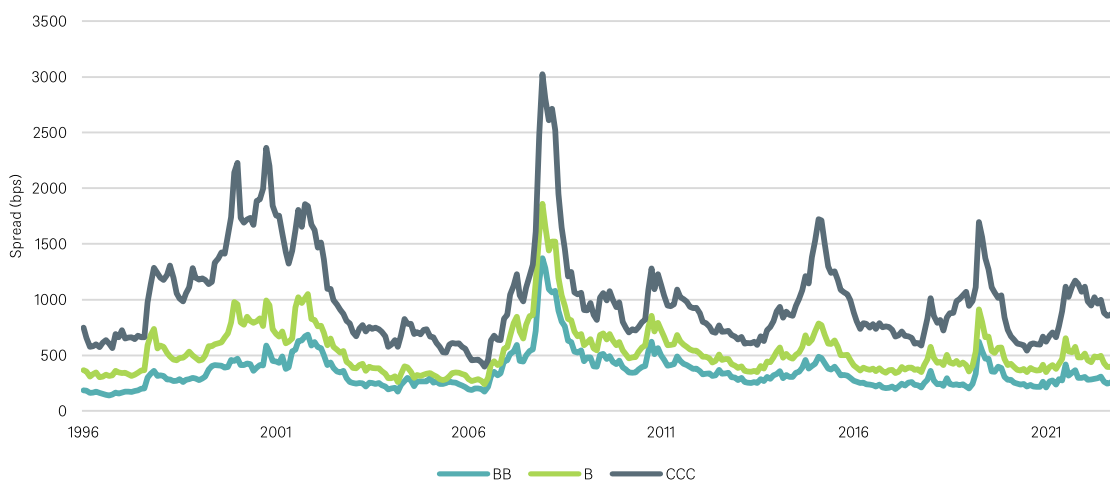
	ICE BofA US High Yield Index	ICE BofA BB US High Yield Index	ICE BofA Single-B US High Yield Index	ICE BofA BB-B US High Yield Constrained Index	ICE BofA CCC & Lower US High Yield Index	Bloomberg U.S. Tr Bills: 1-3 Months TR Index Value Unhedged
Return (geometric)	6.31%	6.63%	5.58%	6.11%	6.41%	2.08%
Return (arithmetic)	6.54%	6.72%	5.86%	6.27%	7.25%	2.06%
Volatility (annualized)	8.87%	7.47%	9.02%	7.97%	14.13%	
Sharpe ratio	0.50	0.62	0.42	0.53	0.37	

Source: ICE BAML Indices, Bloomberg L.P., DWS calculations as of 12/31/2023.

*Cash return uses Bloomberg US Treasury Bills 1-3 Month Index.

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Figure 14: Comparison of Options-adjusted spread ("OAS") and OAS beta across credit ratings (12/31/1996 to 12/31/2023)

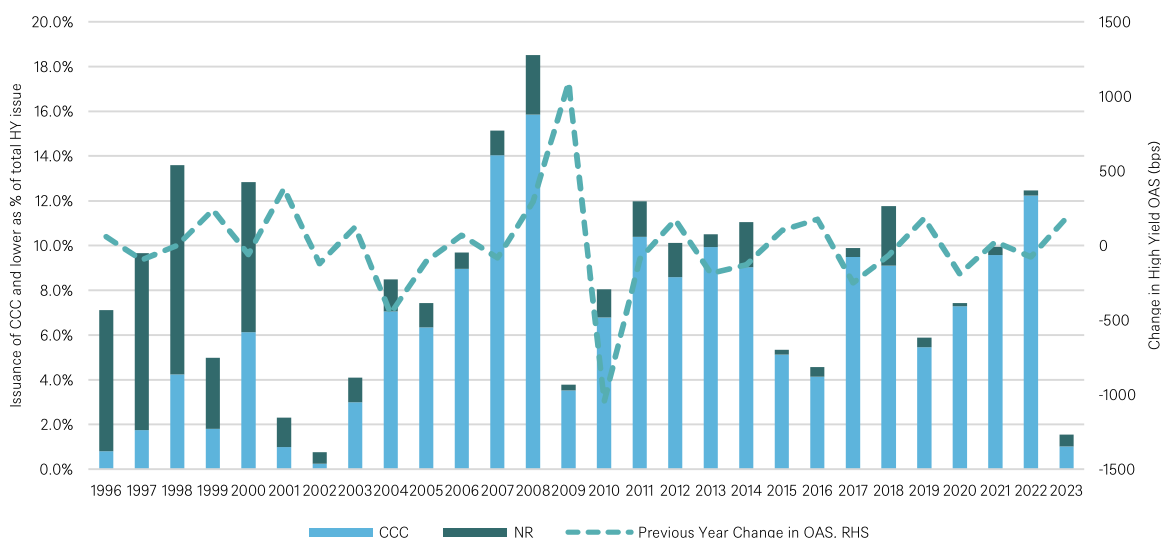


Rating	BB	B	CCC
Beta	0.66	0.92	1.59

Source: ICE BAML Indices, DWS calculations as of 12/31/2023.

In periods of financial and credit distress, lower-rated issuers often bear the brunt of waning demand for new corporate bond issuance, which can potentially compound the risks associated with shorter-maturity borrowing windows that often characterize lower-rated corporates. Figure 15 shows CCC and lower bond issuance as a percentage of the total high yield issuance and its relationship with high yield spreads the previous year. As can be observed, in years where spreads reached distressed levels, the subsequent year's CCC and lower issuance was, in many cases, quite limited. Following the tech bubble in 2000, the financial crisis in 2008, and the energy crisis from 2014-2016, issuance volumes for lower-rated corporates were well below long-term averages.

Figure 15: CCC and lower issuance as a % of total market versus change in OAS



Source: JP Morgan Research, Bloomberg L.P., DWS calculations as of 12/31/2023.

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2.2 High Yield Industries

The industry composition of the high yield universe has changed over the past three decades, where energy has grown to now exceed 11% of the high yield index even after the energy default cycle in 2016. On the contrary, retail has shrunk from just about 10% in 1996 to barely 5% of the current index, and Media, once representing over 22% of the index, is now just 9% of the high yield universe.

Generally macroeconomic trends have driven the shifts in industry composition across the high yield universe, although the size and the creditworthiness of companies has also influenced the breakdown between investment grade and high yield composite indices. Telecommunications and media companies such as Nextel and Adelphia, once sizeable issuers within the high yield universe, are now either merged with other firms or no longer operating, whereas the boom in US energy production has made Houston-based Occidental Petroleum one of the largest high yield issues in recent years. [Figure 16](#) shows the historical changes in the industry composition of the broad high yield index.

Figure 16: High yield industry composition (%) (12/31/1996 to 12/31/2023)



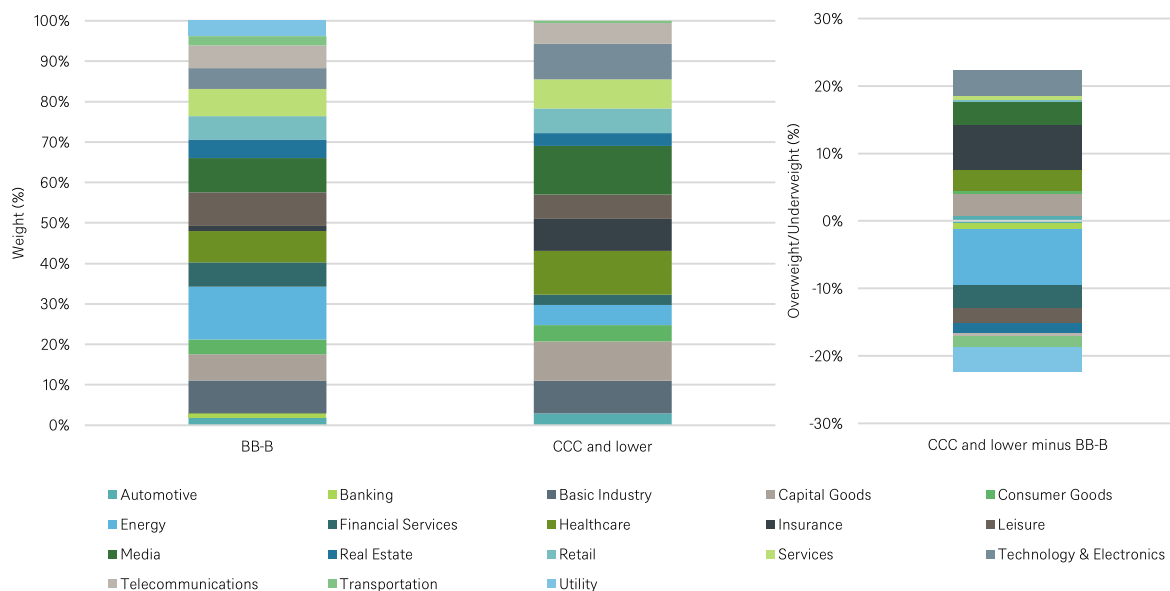
Source: ICE BAML Indices as of 12/31/2023.

The CCC and lower segment of the market can, at times, be dominated by single issuer downgrades or industry-specific turmoil, which can drive significant differentials in industry composition between higher quality and lower quality indices.

[Figure 17](#) shows the most recent industry weightings for the BB-B segment of the high yield market as compared to the CCC and lower segment.

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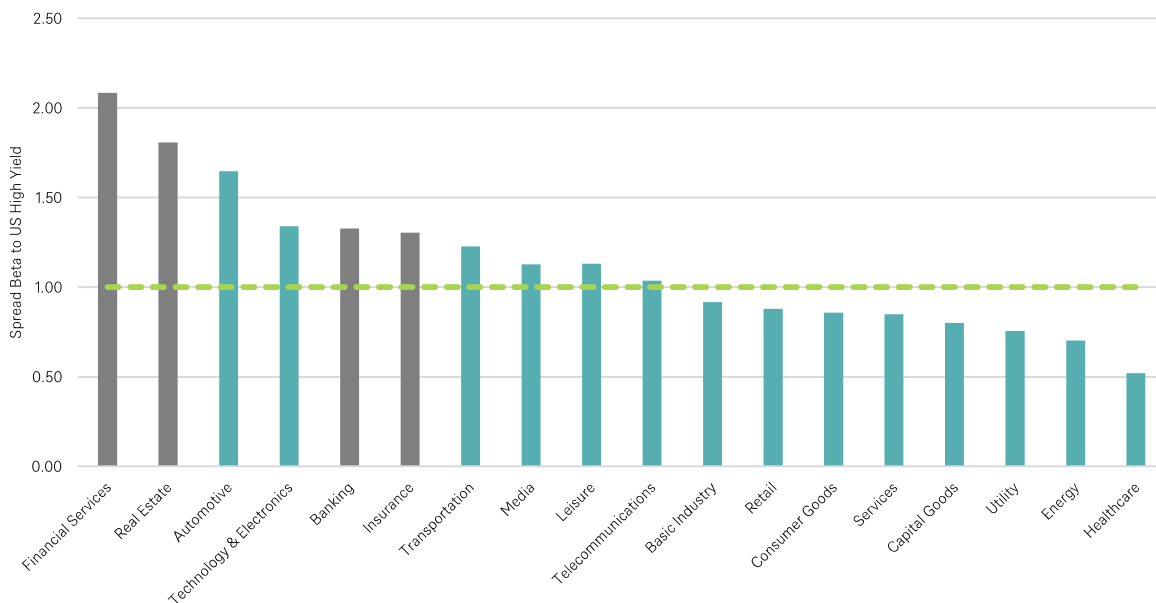
Figure 17: High yield industry weights by rating (12/31/2023)



Source: ICE BAML Indices as of 12/31/2023.

While industry-specific risks factors can be influenced by idiosyncratic economic or market events, as with equity markets, certain high yield industries have empirically demonstrated more defensive behaviors in terms of their credit spreads. Looking across high yield industries, we can show which areas of the market have historically experienced the highest and lowest spread betas, or directional sensitivity to the spread behavior in the broader high yield market. Figure 18 shows the historical spread betas by industry, highlighting the empirically higher spread beta of financials-related industries.

Figure 18: Options-adjusted spread beta by industry (12/31/1996 to 12/31/2023)

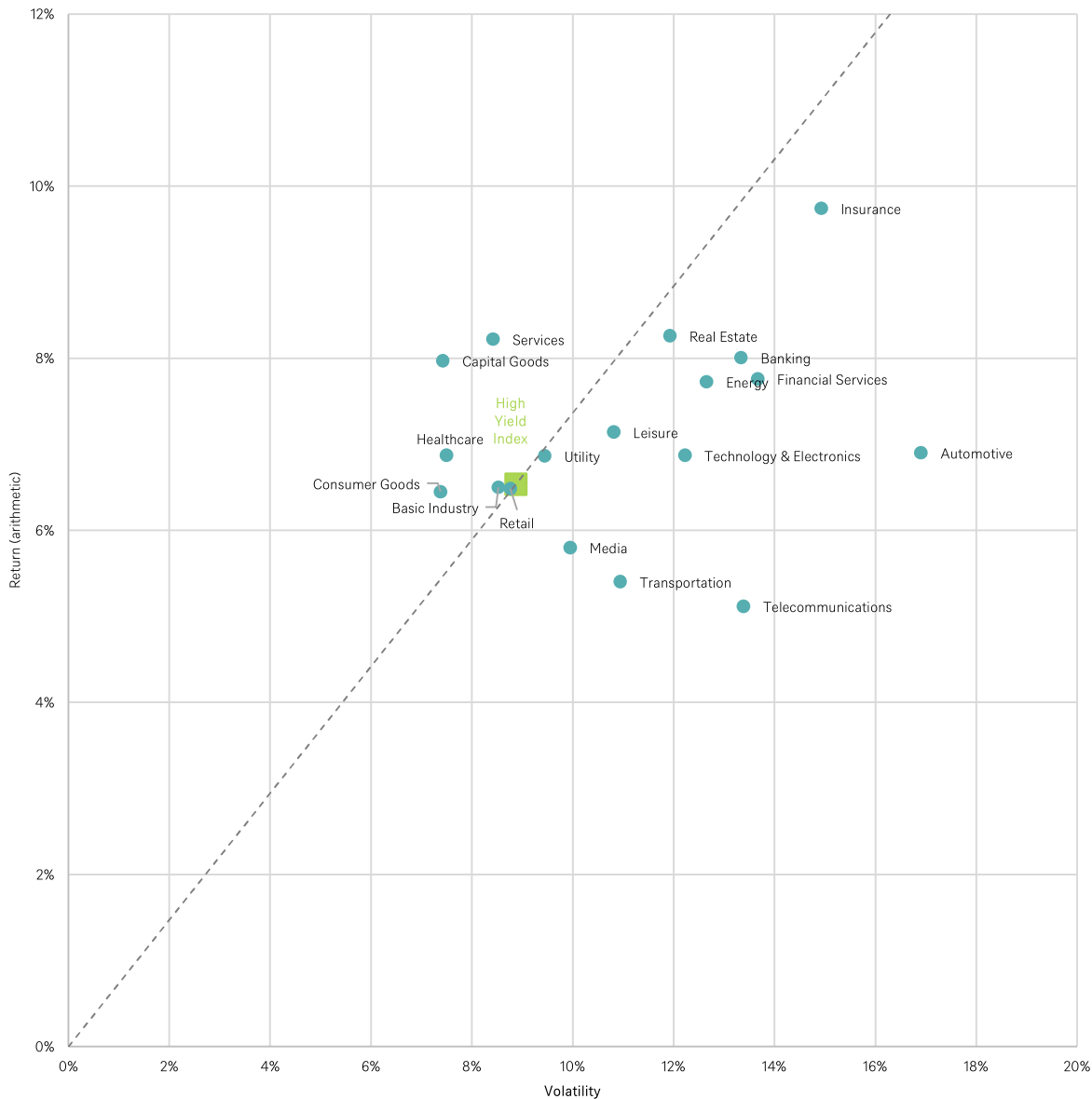


Source: ICE BAML Indices, DWS calculations as of 12/31/2023.

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On a risk-adjusted return basis, certain industries have also historically fared better than others. Looking at the Sharpe ratios of each high yield industry from 1996 to 2023, Services and Capital Goods industries have realized the strongest arithmetic excess return (over cash) proportionate to their realized volatility. Automotives and Telecommunications industries, on the other hand, driven by significant default and downgrade risks realized by large, concentrated issuers such as GM, Ford, Adelphia, have realized the lowest risk-adjusted returns as shown in [Figure 19](#).

Figure 19: Risk-adjusted return by industry (12/31/1996 to 12/31/2023)



Source: ICE BAML Indices, DWS calculations as of 12/31/2023.

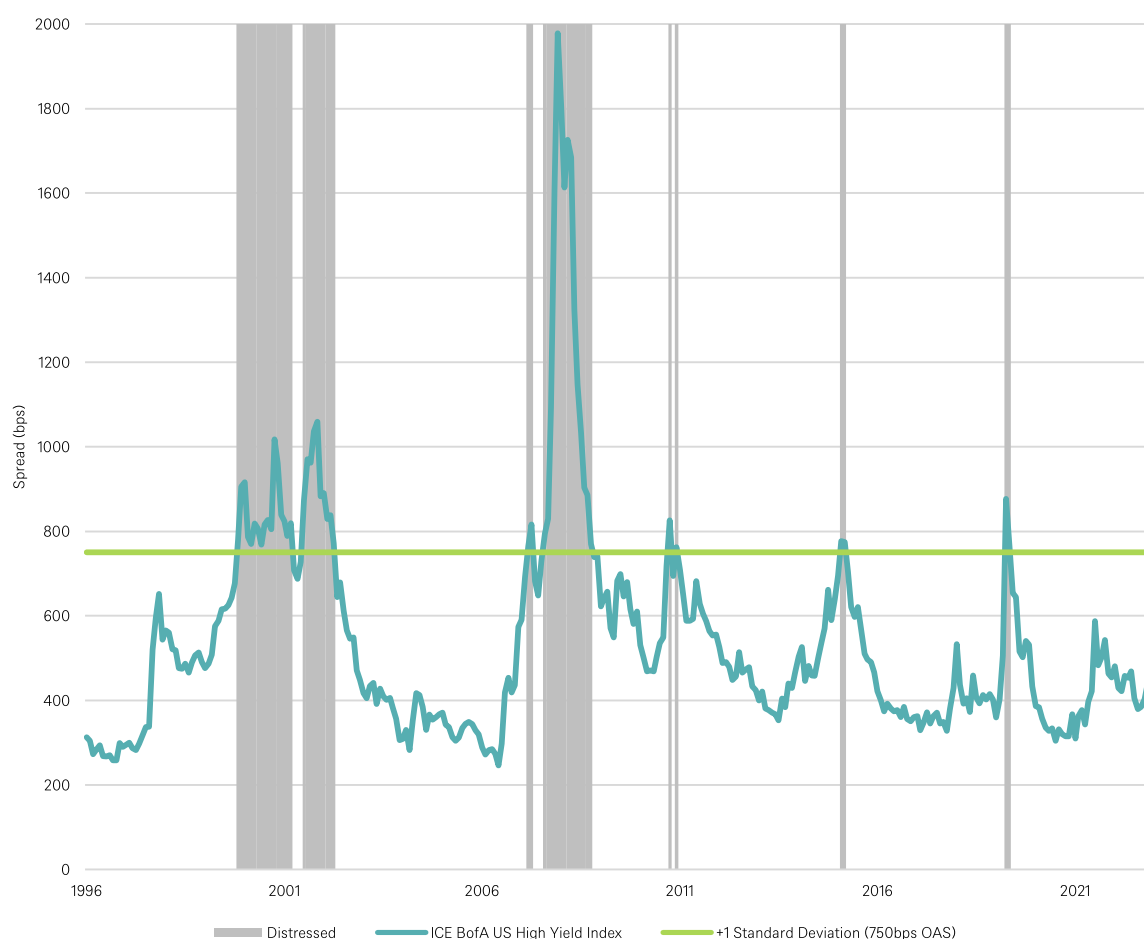
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3 / Market timing

3.1 Spreads and returns during and following stressed credit environments

In distressed market environments, the extent to which high yield spreads can widen is not uniform across historical bear markets. The average OAS experience in distressed markets is heavily skewed by the Global Financial Crisis ("GFC") when high yield spreads reached nearly 2000bps, implying a nearly 40% default rate. While high yield total returns were quite challenging during this period of market turmoil, the realized default rate was significantly lower and the subsequent returns to the asset class were quite favorable for investors. Figure 20 shows how high yield spreads behaved during these periods of financial stress, which we have defined as 750bps or roughly 1 standard deviation above the long-term average spread level.

Figure 20: High yield spreads in distressed periods (12/31/1996 to 12/31/2023)



Source: ICE BAML Indices, Bloomberg L.P., DWS calculations as of 12/31/2023.

The widening in credit risk premia has spurred the creation of risk rotation strategies from asset allocations that are looking to take advantage of wide credit spreads. If the peak in spreads can be estimated with any accuracy, monetizing temporarily high credit risk premia following these market selloffs can help generate quite favorable investment returns. Figure 21 and Figure 22 show the rolling 12-month returns of segments of the high yield market, average next twelve-month returns have been far more favorable following periods of market distress. As expected, the higher risk CCC and lower segment of the market has captured the most return upside in these rallies.

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Figure 21: Rolling 12-month total returns (%) (12/31/1996 to 12/31/2023)



Source: ICE BAML Indices, DWS calculations as of 12/31/2023.

Figure 22: Average rolling 12-month total returns across segments of high yield (12/31/1996 to 12/31/2023)

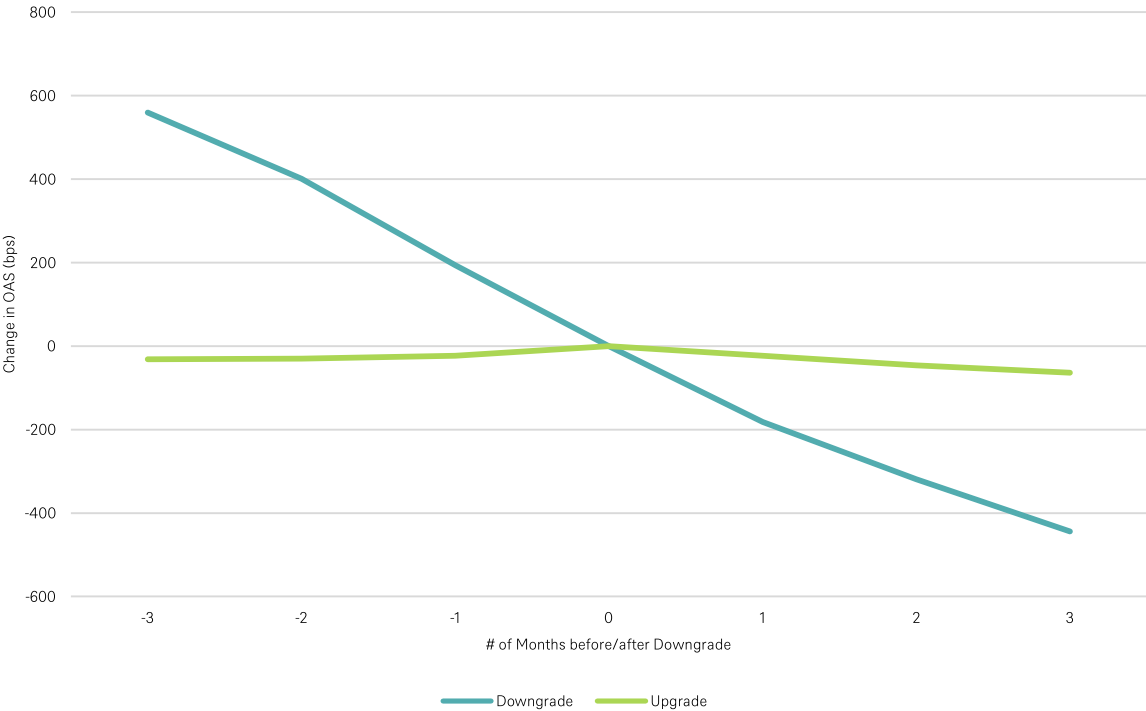
	ICE BofA BB-B US High Yield Constrained Index	ICE BofA CCC & Lower US High Yield Index	ICE BofA US High Yield Index	Cash
Avg 12mo Rolling Return	6.26%	6.05%	6.64%	1.98%
Avg 12mo Rolling Return (Distressed)	14.50%	12.14%	17.11%	1.28%

Source: ICE BAML Indices, Bloomberg L.P., DWS calculations as of 12/31/2023.

Fundamental credit impairment is often measured by changes in credit ratings for an issuer of a bond. While the credit rating is a good proxy for the issuer's ability to service its debt, ratings downgrades can often lag changes in credit spreads, with the market often pricing in the increased risk of default losses prior to the bond's actual downgrade. Figure 23 shows the average issuer spread behavior within the high yield universe of issuer credit spreads in the 3 months before and 3 months following a ratings downgrade. As the exhibit illustrates, on average, the issuer credit spread has widened by nearly 600bps three months prior to the actual downgrade and rallied over 400bps following the downgrade.

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Figure 23: Average high yield issuer change in options-adjusted spread 3 months prior to and following ratings down-grade (12/31/1996 to 12/31/2023)



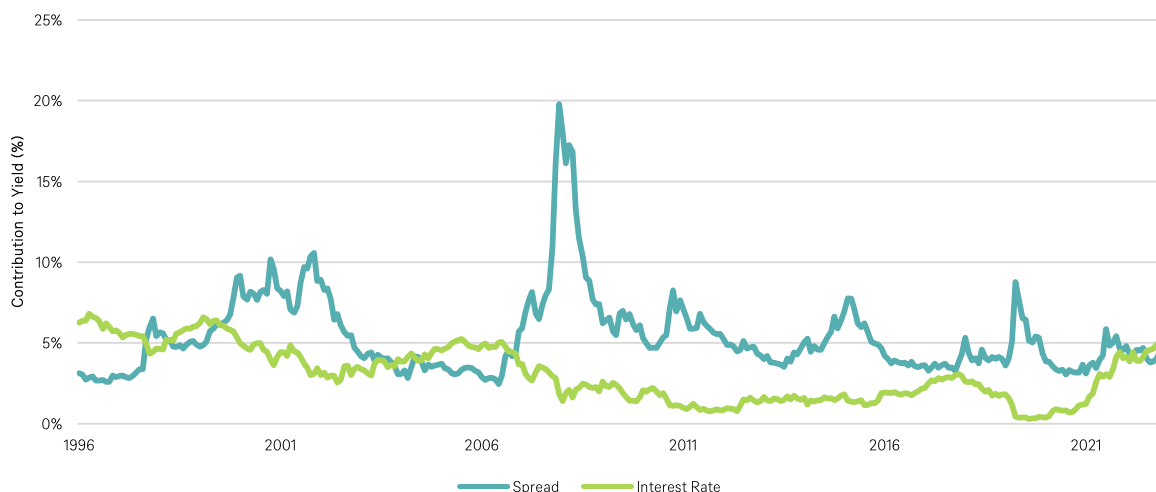
Source: ICE BAML indices, DWS calculations as of 12/31/23.

4/ Other considerations

4.1 Spreads and yields

As previously shown in [Figure 8](#), the all-in index yield of high yield is made up of the spread (consisting of credit risk premium and implied default losses) and the risk-free equivalent yield. [Figure 24](#) shows the historical breakdown of these two yield components

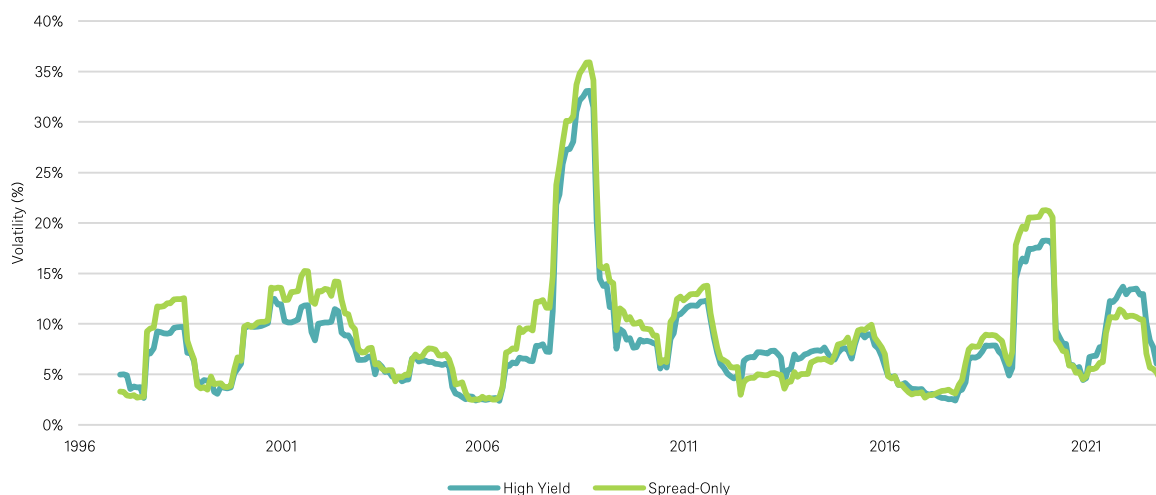
Figure 24: Spread and interest rate contribution to yield (%) (12/31/1996 to 12/31/2023)



Source: ICE BAML indices as of 12/31/2023.

An interesting observation about high yield total returns is that the volatility of the returns of the ICE BAML U.S. high yield index is, on average, actually lower than an interest rate-hedged version of the index. Said otherwise, eliminating the interest rate duration risk of high yield would in fact *increase* the average volatility or risk of a high yield investment. [Figure 25](#) shows the rolling 12-month volatility of both the high yield cash index and an interest rate-hedged version of the high yield index.

Figure 25: Volatility of high yield versus spread-only (12/31/1996 to 12/31/2023)

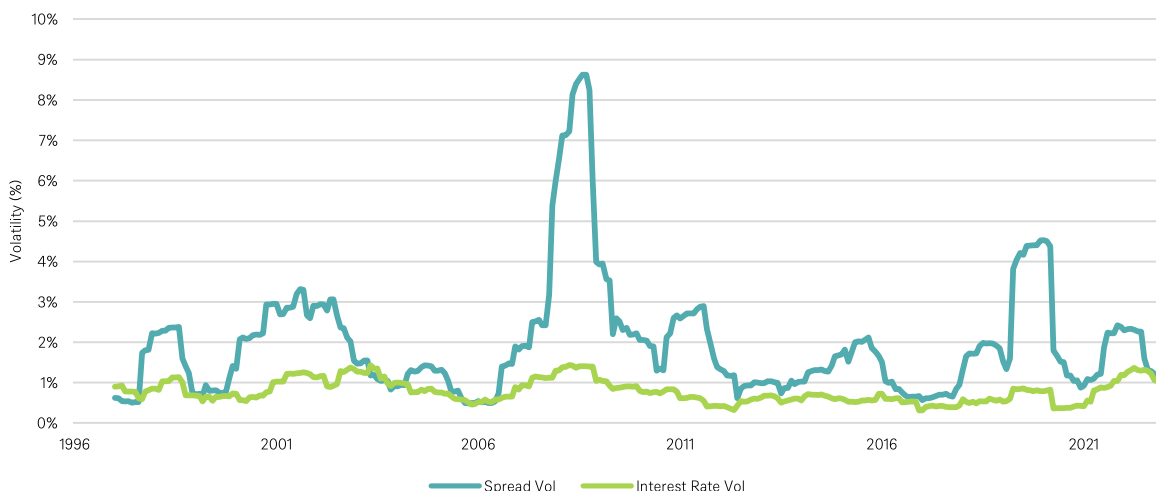


Source: ICE BAML indices, DWS calculations as of 12/31/2023.

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Examining the two component risks and their respective volatilities, we can show the proportion of the spread volatility to the interest rate volatility is roughly 3 to 1, on average. The ratio of these two risks is, however, time-varying, and in particular instances, the interest rate volatility has exceeded the spread volatility for short periods of time. Figure 26 shows the 12-month rolling volatility of the spread and interest rate components of the yield and Figure 27 shows the ratio of the volatility of these two component risks over time.

Figure 26: Volatility of spread and interest rate components (12/31/1996 to 12/31/2023)



Source: ICE BAML indices, DWS calculations as of 12/31/2023.

Figure 27: Ratio of spread volatility to interest rate volatility of high yield (12/31/1996 to 12/31/2023)



Source: ICE BAML indices, DWS calculations as of 12/31/2023.

As we established in our research on currency hedging², when a portfolio consists of two component risks that are additive i.e. the high yield portfolio is exposed to 100% credit spread risk and 100% interest rate risk, the necessary conditions for the two risks to have diversification benefits is significant negative correlations between the two component risks. In Figure 28, periods in which the realized correlation between the spread and risk-free components (teal line) were below the correlation breakeven (green line) denote when high yield volatility was lower than spread-only volatility. Said otherwise, when the

² <https://www.dws.com/en-us/insights/blog/authors/jason-chen/currency-hedging-how-has-it-worked-and-how-might-it-work-going-forward/>
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realized correlation was below the breakeven, which happened quite frequently, the interest rate risk of high yield reduced the volatility experience for high yield investors.

Figure 28: 12-month rolling correlation between spread and interest rate risk (12/31/1996 to 12/31/2023)

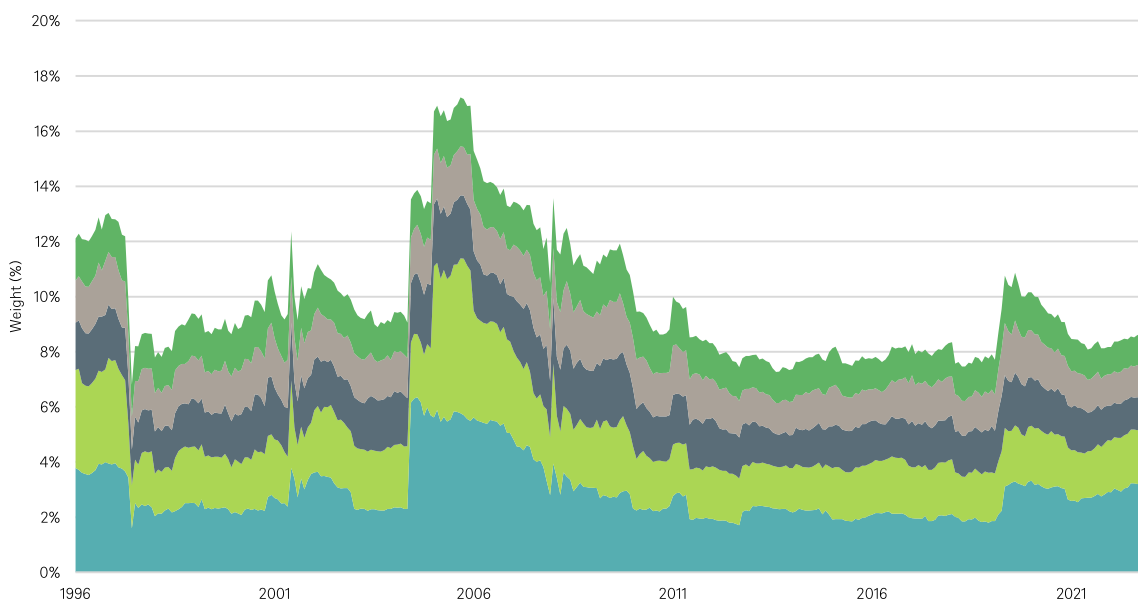


Source: ICE BAML indices, DWS calculations as of 12/31/2023.

4.2 Issuer concentration risk

The notional value of the high yield bond universe has grown considerably over the past two decades, with the total size of the market going from \$600bn in 2005 to over \$1.3tn as of the end of 2023 (see Figure 6). One consequence of this significant market growth is issuer concentration. Looking at the weight of the five largest issuers as a percentage of the index, this weighting has come down gradually since 2005, although not in a linear way (see Figure 29).

Figure 29: Concentration of top five largest issuers within high yield (12/31/1996 to 12/31/2023)



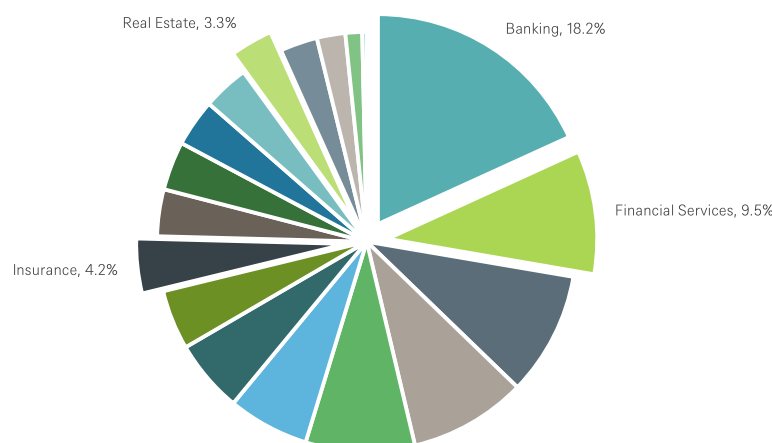
Source: ICE BAML Indices as of 12/31/2023.

4.3 Industry comparison and overlap versus investment grade bonds

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For broad fixed income or credit investors, industry exposure can be an important consideration for portfolio diversification. Looking at the US investment grade corporate bond universe, financials make up a large proportion of the universe, constituting more than 35% of the market capitalization, with banking and financial services as the two largest industries at 18.4% and 9.7%, respectively (see Figure 30). For investors who are allocating across both high grade and speculative grade corporate credit markets, this may or may not be an important consideration for industry or sector diversification purposes.

Figure 30: Investment Grade industry weights (12/31/2023)



Source: ICE BAML Indices as of 12/31/2023.

For many corporate issuers, managing their liabilities can involve issuing debt across their capital stack. What this means, in some circumstances, is that there may be issuer overlap between the Investment Grade ("IG") and HY universes (with senior debt being IG-rated and subordinate debt being HY-rated). When investors look to allocate across IG and HY credit, understanding the extent of issuer overlap or duplication can be an important risk to monitor. Figure 31 shows the degree of overlap across industries between IG and HY indices, where about 7.5% of the U.S. HY index overlaps with IG.

Figure 31: Investment grade overlap across high yield indices (12/31/2023)

	US High Yield	US HY BB-B Constrained	BB-B Non- FNCL Non- Distressed		US High Yield	US HY BB-B Constrained	BB-B Non- FNCL Non- Distressed
Utilities	1.68%	1.90%	2.10%	Utilities	9	9	9
Financial	1.19%	1.35%	0.00%	Financial	11	11	0
Industrial	0.55%	0.62%	0.69%	Industrial	5	5	5
Telecommu- nications	0.13%	0.15%	0.16%	Telecommu- nications	2	2	2
Communica- tions	2.49%	2.52%	2.57%	Communica- tions	3	3	3
Consumer, Cyclical	0.48%	0.54%	0.60%	Consumer, Cyclical	2	2	2
Energy	0.15%	0.18%	0.19%	Energy	1	1	1
Consumer, Non-cyclical	0.70%	0.80%	0.88%	Consumer, Non-cyclical	2	2	2
Technology	0.43%	0.49%	0.54%	Technology	2	2	2
Healthcare	0.06%	0.07%	0.08%	Healthcare	1	1	1
	7.87%	8.61%	7.81%		38	38	27

Source: ICE BAML Indices as of 12/31/2023.

5 / Conclusion

For investors across capital return and income-based strategies, high yield is an integral component of a well-diversified portfolio, offering attractive all-in yield levels that combine risk-on exposures with sensitivity to interest rates. As a fixed income instrument, high yield bonds have realized strong empirical risk-adjusted returns while helping to diversify away from traditional equity or core fixed income-only portfolios. These characteristics have demonstrated the value of high yield as a strategic allocation in a multi-asset or fixed-income portfolio.

As high yield has gained prevalence in investor portfolios, the size and depth of the high yield market has expanded considerably, allowing both active and index-based approaches to high yield investing to navigate market conditions more easily, particularly when liquidity was more historically challenged. For investors, the ability to dynamically reallocate in and out of high yield has made it easier to express tactical views when yields and spreads have become more attractive.

Furthermore, the depth of the high yield market has also allowed investors to take more nuanced views on their high yield investments. Tilting into or away from certain industries, expressing quality preferences across ratings or spreads/yields to reflect either strategic or tactical market views can help investors more thoughtfully gain exposure to the high yield asset class with greater consideration for management of portfolio opportunities and risks.

Glossary

Beta is a measure of volatility that captures a security's systematic risk according to the capital asset pricing model.

The **Bloomberg US Treasury Bills 1-3 Month Index**

Core fixed income refers to a capital preservation-based approach to allocating to investment grade-rated bonds.

A **corporate bond** is a bond issued by a corporation in order finance their business.

Correlation is a measure of how closely two variables move together over time.

Correlation Breakeven is a measure of the correlation between the local equity and the currency such that the unhedged and hedged index volatilities are equivalent.

A **credit rating** is a standardized assessment of the creditworthiness of the issuer and its debt instruments by specialized agencies. The main three rating agencies are the Moody's (Aaa over Baa1 to C, best to worst) , S&P (AAA over BBB+ to D, best to worst) and Fitch (AAA over BBB+ to D, best to worst).

Credit Risk (Default Risk) refers to the risk that principal or interest may not be paid to the investor when due.

The **credit risk premium** or **excess spread** is the expected return on a credit investment minus the return that would be earned on a risk-free investment.

Credit migration refers to the ratings of a bond moving higher or lower based on assessed changes in the fundamental health of the issuer and its ability to repay its debt obligations based on the review of credit agencies.

Credit **spread** refers to the excess yield various bond sectors offer over financial instruments with similar maturities. When spreads widen, yield differences are increasing between bonds in the two sectors being compared. When spreads narrow, the opposite is true.

Default losses are investment losses in price based on an issuer default and inability to repay principal.

A **distressed** strategy is an investment strategy that seeks profit by investing in companies or other investment opportunities that face financial difficulties.

Duration is a measure expressed in years that adds and weights the time periods in which a bond returns cash to its holder. It is used to calculate a bond's sensitivity towards interest-rate or credit spread changes.

Equity market refers to a market in which equities (stocks) are traded. The term can be used to refer to an actual market (e.g. the New York Stock Exchange) or to general trends in equity trading. Equities are securities which certify rights of ownership of (parts of) a company.

Exchange traded funds (ETFs) are a sort of exchange traded product (ETP) that can hold a variety of underlying assets and that can be traded on a stock market.

Fixed Income broadly refers to those types of investment security that pay investors fixed interest or dividend payments until its maturity date.

High yield (HY) bonds are issued by below-investment-grade-rated issuers and usually offer a relatively high yield.

The **ICE BofA U.S. Investment Grade Index** tracks the performance of US dollar denominated investment grade corporate debt publicly issued in the US domestic market.

The **ICE BofA U.S. High-Yield Index** tracks the performance of dollar-denominated below investment grade, including zero-coupon and payment-in-kind (PIK) bonds.

Interest rate-hedging refers to a technique to offset the risks of adverse interest rate movements on a financial instrument

Investment grade (IG) refers to a credit rating from a rating agency that indicates that a bond has a relatively low risk of default.

Liquidity refers to the degree to which an asset or security can be bought or sold in the market without affecting the asset's price and to the ability to convert an asset to cash quickly.

NAV (Net Asset Value) is usually determined at 4:00 pm Eastern Time on each day that a fund's exchange is open for trading. It is calculated by dividing a fund's total net assets less total liabilities by the number of shares outstanding.

The **option-adjusted spread ("OAS")** is a commonly used measure for fixed-income securities with embedded options (call, put or sink). It makes the yield of such instruments comparable to similar securities without such embedded options.

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Typically, the OAS for credit sensitive instruments is quoted vis-à-vis the respective Swap spread curve. Technically, option pricing methods are used to evaluate the instruments with embedded options.

Par value refer to the original or face value of the bond.

The **recovery rate** is the extent to which principal and accrued interest on a debt instrument can be recovered in default, expressed as a percentage of the instrument's face value.

Risk-on refers to a market environment where investors are willing to take risks, often when market returns are strongly positive.

The **risk premium** is the expected return on an investment minus the return that would be earned on a risk-free investment.

Return (arithmetic) is the simple average return.

Return (geometric) is the return compounded over time.

The **return premium** refers to the excess return over a reference market that is associated with the risk premium.

The **Sharpe ratio** puts an asset's excess return (the return above the risk-free rate) in relation to the asset's risk as measured by its standard deviation.

Skew is a measure of the asymmetry of the distribution of a data set.

Sovereign bonds are bonds issued by governments.

Standard deviation is often used to represent the volatility of an investment. It depicts how widely an investment's returns vary from the investment's average return over a certain period.

Volatility is the degree of variation of a trading-price series over time. It can be used as a measure of an asset's risk.

Yield refers to the ratio of cash outflows to cash inflows from an investment.

Appendix

The following indexes were used to proxy the asset classes mentioned in the paper:

Asset Class	Index
S&P 500	S&P 500 Net Total Return USD Index
US Small Cap	Russell 2000 Net Total Return USD Index
EAFE Equities	MSCI Europe, Australasia, and Far East (EAFE) Net Total Return USD Index
EM Equities	MSCI Emerging Markets Daily Net Total Return USD Index
Commodity	Bloomberg Commodity Index Total Return
US IG	ICE BofA U.S. Corporate Index
US HY	ICE BofA U.S. High Yield
US Treasuries	Bloomberg US Treasury Total Return Unhedged USD
Cash	Bloomberg U.S. Treasury Bills: 1-3 Months Total Return Index Value Unhedged

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