NORTHERN TRUST
ASSET MANAGEMENT

RESEARCH INSIGHTS

SYSTEMATIC VALUE INVESTING IN CORPORATE BONDS

UNCOVERING FUNDAMENTAL VALUE USING A SYSTEMATIC APPROACH IN CORPORATE BOND MARKETS

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Value, across any asset class, refers to the idea that the current market price may deviate from underlying fundamentals and investors can benefit from reversion to fair value. Benjamin Graham, often regarded as the pioneer of value investing, famously stated, “In the short run, the market is a voting machine, but in the long run it is a weighing machine.” This metaphorical statement suggests that in the short-term price movements are influenced by risk sentiment but in the long run prices tend to align with fundamentals.

Although Graham’s quote is commonly associated with equities, the concept of identifying value or short term mispricing is applicable to various capital markets. In corporate bonds, value is discerned by comparing the issuer’s yield spread over a riskless bond, to fundamental credit risk measures, such as leverage, profitability or credit rating. Moreover, structural credit models can be utilized to determine a theoretical fair value spread by estimating default probabilities to spot mispricing. In essence, value investing in credit involves identifying bonds with higher default-adjusted spreads, all else being equal.

THE VALUE FACTOR IN THE CORPORATE BOND MARKET

Both practitioner and academic research has demonstrated that investors stand to benefit by employing a systematic value factor in corporate bond markets[1]. Investing in undervalued bonds has delivered consistent risk-adjusted outperformance relative to more expensive bonds across the investment grade and high yield markets over time.

Common explanations for value factor premiums in corporate bonds are both behavioral and risk based. In corporate bond markets, two phenomena in particular directly contribute to a consistent value factor premium - mean reversion and slow diffusion of information. Investors tend to overreact to negative credit news and underreact to positive credit news,

[1] See “An Introduction to Systematic Fixed Income Investing”, Northern Trust Asset Management, 2021; Houweling, P. and van Zundert, Jeroen., “Factor Investing in the Corporate Bond Market”, Financial Analysts Journal, 73:2, 100-115, 2017

resulting in consistent value factor premiums as the spreads revert over time. Additionally, there is always a risk of a "value trap" where some market participants are aware of something that other investors may not see, which supports the long-run risk factor premium interpretation. The implied market view is that higher yielding bonds may be riskier than otherwise equivalent lower yielding bonds, thus offering higher prospective returns as compensation. This source of risk also offers an opportunity for investors to understand the fundamental drivers of option-adjusted spreads ('OAS') and ultimately identify mispricing.

The notion that less expensive bonds tend to outperform relatively expensive ones is widely supported. However, what might not be immediately clear is how to identify fair value. Specifically, within corporate bond markets, the cornerstone for defining fundamental value lies in evaluating the risk of default or credit migration. This measurement can take the form of a singular, issuer-specific definition such as debt leverage, credit rating, or the distance to default measure of Merton (1974)[2]. Alternatively, a default forecast model may be employed to correlate model output to actual credit spreads for defining value. These models can be developed using accounting-based ratios, a market-implied probability of default, or a combination of these approaches.

OUR APPROACH TO VALUE

Our definition of value utilizes a multi-dimensional approach to identify bonds whose default risk is mispriced relative to its risk equivalent cohort[3]. For each bond issue, our anchor for fundamental value has two dimensions, a distance to default measurement and a group of selected accounting-based ratios derived from the issuer's financial statements. The distance to default measure is a modified version of the Merton model that takes into account the issuer's trailing equity volatility, market capitalization, and book value of debt[4]. Distance to default is inversely related to the leverage of the firm and stock price volatility, thus favoring less levered, more stable companies for a given level of spread. We accompany the distance to default measurement with five accounting based ratios that assess the issuer's ability to cover its financial obligations. These ratios range from gauging the issuer's shorter term working capital to its ability to accumulate earnings over the long-run, and are designed to complement the distance to default measurement.

These two dimensions form the basis for our empirical, regression-based value model. For each issue, the modeled OAS is compared to its current market OAS, with the difference between the two signaling if the issue is cheap or expensive. If the market OAS is higher (lower) than the model spread, then the issue is classified as high (low) value. Further, our approach is sector and duration-band[5] neutral, meaning that each issue's value score is relative to its sector and duration matched peers. This ensures we are able to source value across each sector, and control for risk relative to the underlying index during our portfolio construction process. Lastly, our approach deducts a spread illiquidity

[2] Distance to default is a widely accepted market-based measure of default risk (Merton, 1974)

[3] We start with a bond's cohort to capture the market's compensation for bearing default risk on average. Our objective is to identify securities which are rich or cheap at each point in time, not to time the market's compensation for risk.

[4] We treat bonds issued by private issuers as a separate risk cohort. Relative value scoring relies on credit rating agencies and on the issuers' spread curve relative to the private issuers peers within the same risk cohort.

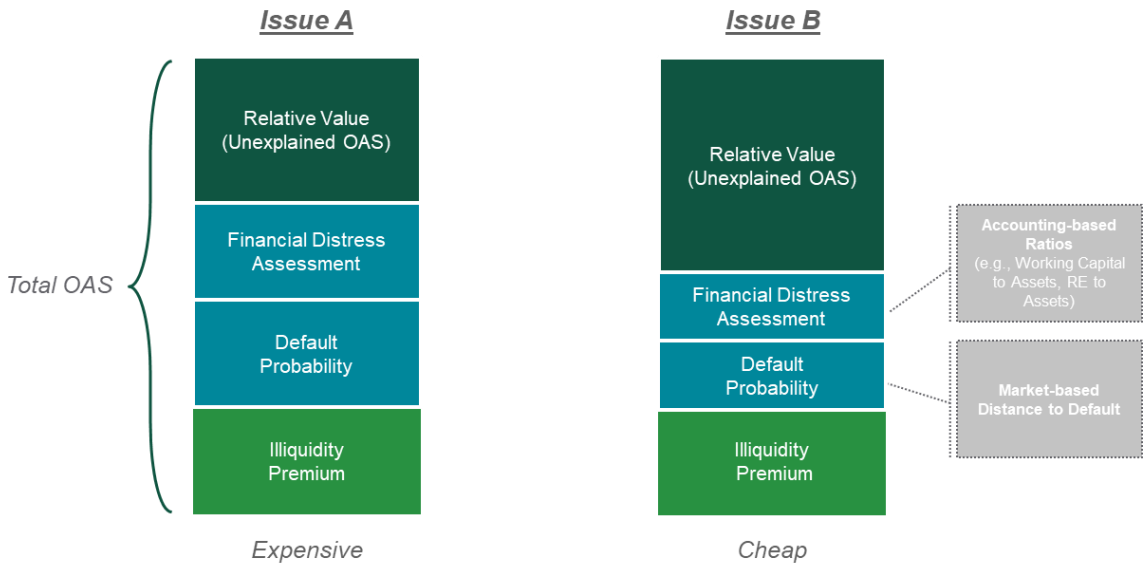
[5] Using super sectors defined as Consumer, Technology & Media, Energy, Banks, Financials, Industrials, and duration bands of 1-3, 3-5, 5-7, 7-10, 10-15, and 15+ years.

premium for each sector and duration band grouping in order to avoid favoring illiquid bonds.

The following illustration in **Exhibit 1** shows two issues with equivalent total OAS. Issue B is considered a higher relative value due to a larger portion of its current market spread not being explained by our credit risk assessment.

EXHIBIT 1: AN ILLUSTRATION OF ASSESSING VALUE

Our value factor identifies bonds with excess (or unexplained) spread relative to their super sector and duration band peers



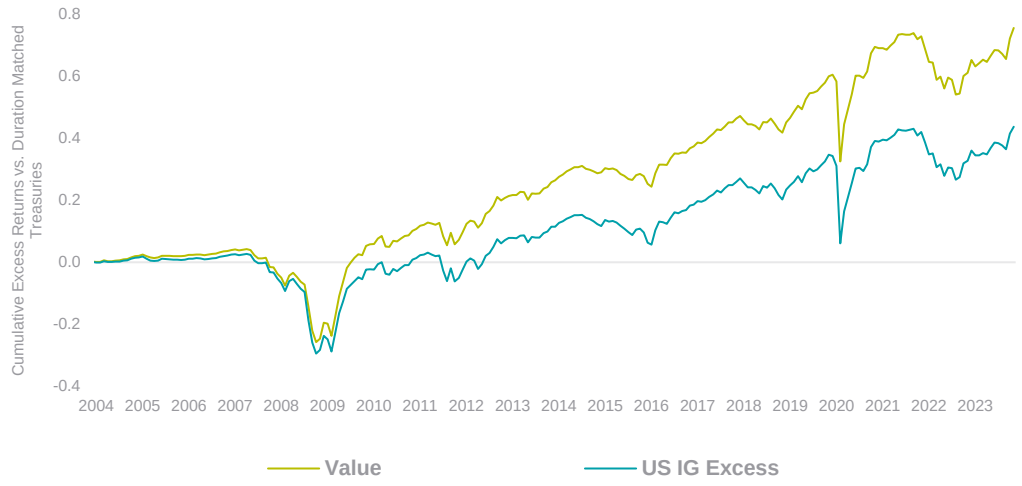
Source: Northern Trust Asset Management

RESEARCH AND SUPPORT

To illustrate the risk and return profile of our value factor in credit markets, we construct a single factor portfolio which matches the benchmark in terms of systematic risk exposures. This exposure matching step orientates the portfolio towards an isolated exposure to the value factor, while controlling for interest rate beta and credit beta relative to the benchmark. **Exhibit 2** plots the cumulative duration matched excess returns of the single factor portfolio compared to that of the investment grade benchmark. As shown in **Exhibit 3**, the analytical effective duration and the option adjusted spread of the portfolio and benchmark are matched, which is a direct result of the construction of the simulated research portfolio. Further, **Exhibits 4** and **5** show the corresponding set of results for our value factor portfolio under the same portfolio construction framework, within the U.S. high yield universe.

EXHIBIT 2: NORTHERN TRUST VALUE FACTOR: U.S. INVESTMENT GRADE CUMULATIVE EXCESS RETURNS (JANUARY 2004 – DECEMBER 2023)

Simulated single factor portfolio outperforms the credit risk premium over time



Source: Northern Trust Asset Management, Index is the ICE BofA U.S. Corporate Index; Data is January 2004 – December 2023

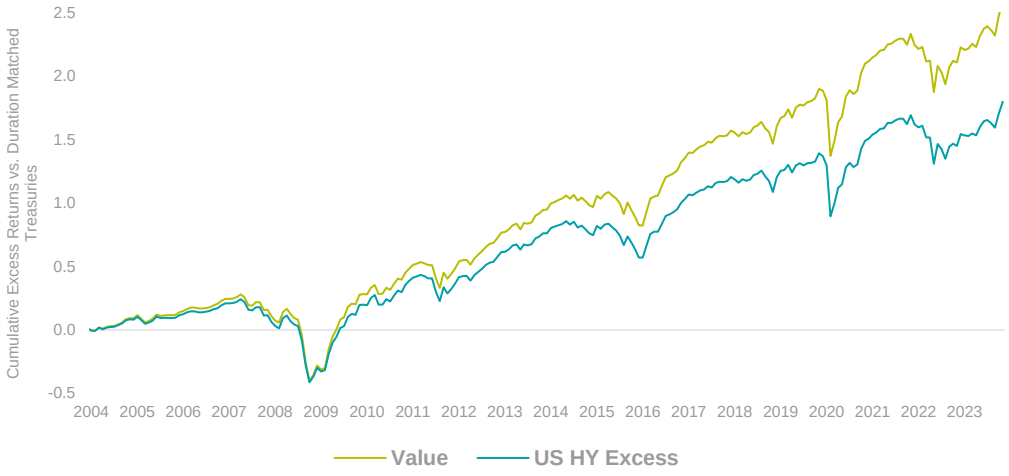
EXHIBIT 3: NORTHERN TRUST VALUE FACTOR: U.S. INVESTMENT GRADE TOTAL RETURN AND RISK SUMMARY (JANUARY 2004 – DECEMBER 2023)

	Value Portfolio	U.S. IG Corporate Index
Annualized Return	4.8%	4.1%
Annualized Volatility	6.1%	6.3%
Active Return	0.7%	-
Sharpe	0.79	0.66
Max. Drawdown	-19.3%	-20.1%
Tracking Error	0.6%	-
Information Ratio	1.09	-
Option Adjusted Duration	*6.73*	*6.74*
Option Adjusted Spread	*155*	*155*
Yield To Worst	*4.13*	*4.13*

Source: Northern Trust Asset Management, Index is the ICE BofA U.S. Corporate Index; Data is January 2004 – December 2023

EXHIBIT 4: NORTHERN TRUST VALUE FACTOR: U.S. HIGH YIELD CUMULATIVE EXCESS RETURNS (JANUARY 2004 – DECEMBER 2023)

Simulated single factor portfolio outperforms the credit risk premium over time



Source: Northern Trust Asset Management, Index is the ICE BofA US High Yield Index; Data is January 2004 – December 2023

EXHIBIT 5: NORTHERN TRUST VALUE FACTOR: U.S. HIGH YIELD TOTAL RETURN AND RISK SUMMARY (JANUARY 2004 – DECEMBER 2023)

	Value Portfolio	U.S. High Yield Index
Annualized Return	7.6%	6.5%
Annualized Volatility	9.5%	9.1%
Active Return	1.1%	-
Sharpe	0.80	0.71
Max. Drawdown	-34.4%	-33.3%
Tracking Error	0.8%	-
Information Ratio	1.39	-
Option Adjusted Duration	4.24	4.23
Option Adjusted Spread	515	514
Yield To Worst	7.59	7.6

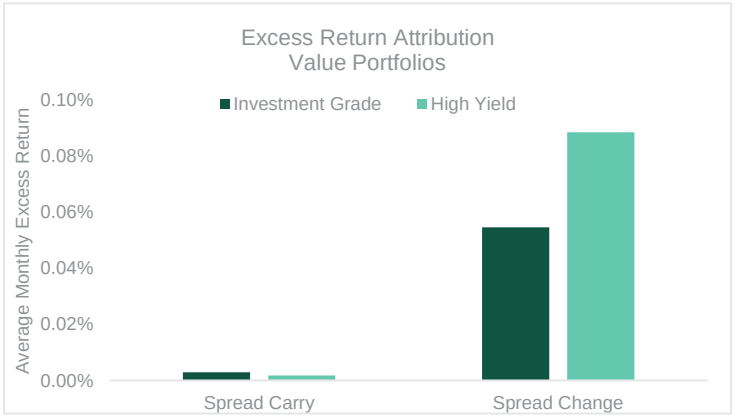
Source: Northern Trust Asset Management, Index is the ICE BofA US High Yield Index; Data is January 2004 – December 2023

VALUE VERSUS CARRY

There are several other factor premiums in credit markets, such as quality, low risk, momentum[6], and carry (the tendency for higher yielding securities to outperform lower yielding securities). The concept of carry in fixed income is similar to that of the well-known FX carry trade, whereby investors seek to exploit interest rate differentials between two countries by borrowing in the lower yielding currency and investing in the higher yielding currency. The trade is profitable with the passage of time assuming all else in the market remains relatively constant. Carry in the bond markets is similarly defined as the expected return given all market circumstances stay the same, including the shape of the risk free curve and credit term. A widely known measure of carry is simply the yield to maturity, with the expected return broken out into the risk free return and the credit or spread return.

The carry factor (higher yielders outperform) can be conflated with the value factor (cheap outperforms expensive) as both concepts *may* favor higher yielding bonds (although this is not necessarily the case for value bonds). In that sense, value and carry are related. However, value is defined as the credit spread relative to its fundamental risk, while the carry factor selects bonds with the highest yields *regardless of the underlying risk*. There is evidence that high-carry bonds do outperform low-carry bonds[7], but carry earns a higher return by taking more risk. Value, by contrast, outperforms by successfully capturing spread changes which is what we illustrate in **Exhibit 6**.

EXHIBIT 6: NORTHERN TRUST VALUE FACTOR: EXCESS RETURN ATTRIBUTION (JANUARY 2004 – DECEMBER 2023)



Source: Northern Trust Asset Management, Index is the ICE BofA US High Yield Index; Data is January 2004 – December 2023 .We decompose duration matched excess returns of the single factor value portfolios into spread

[6] See related reading, “An Introduction to Systematic Fixed Income Investing”, Northern Trust Asset Management; A detailed description and evidence of the quality, low risk, and momentum factors are beyond the scope of this paper.
[7] Israel, R., Kang, J., Richardson, S., “Investing with Style in Corporate Bonds”, 2015

changes and spread carry on a monthly basis . Spread change is the change in OAS implied by the instruments excess return and OAS spread duration whereas spread carry is simply the return

FACTOR PERFORMANCE ACROSS VARIOUS MARKET REGIMES

Robust long run performance of the value factor does not mean that investing in the value factor is without risk. In **Exhibit 7**, our table shows the average monthly duration matched active excess returns of common factors in U.S. investment grade corporates across four different market regimes.

First, we look at the factor performance by stage in the business cycle, as inferred from cyclical and trend components of the Conference Board Leading Economic Index[8], based on the last twenty years. In order to contextualize the performance of the value factor, we focus on the performance of value versus quality and carry factors in corporate bond markets. In periods of economic contraction, the value factor underperforms the broad market by about 1 basis point (bps) per month whereas in the expansion, recovery, and slowdown periods, value outperforms by an average of 48 bps per month. Quality tends to be counter cyclical, outperforming the market by 11 bps per month in periods of economic contraction, whereas it underperforms the market on average by 14 bps in expansion, recovery and slowdown periods.

We also observe similar pattern across credit, inflation, and volatility regimes over the last twenty years. During risk-off regimes, value tends to underperform the market whereas quality tends to provide that risk-off diversification. Notably, when you look at the performance of value and carry during risk-off regimes, value tends to outperform a pure carry factor in corporate bonds. This stronger relative performance in risk-off periods points to the benefit of incorporating fundamental credit risk measures in the value factor definition. Further, combining the quality and value factors results in consistent return premiums across various market regimes.

EXHIBIT 7: FACTOR PERFORMANCE ACROSS MARKET REGIMES: U.S. INVESTMENT GRADE ACTIVE EXCESS RETURNS (JANUARY 2004 – DECEMBER 2023)

Economic Regimes	Contraction	Expansion	Recovery	Slowdown
High Quality	0.11%	-0.14%	-0.01%	0.01%
High Value	-0.01%	0.48%	0.86%	0.10%
High Quality & Value	0.15%	0.11%	0.36%	0.09%
High Carry	-0.06%	0.69%	0.78%	-0.01%
Low Volatility	0.18%	-0.39%	-0.22%	0.05%
High Momentum	0.01%	0.19%	-0.72%	-0.14%
Small Size	0.05%	0.09%	-0.33%	0.04%
Count	52	62	26	101

Credit Regimes	Credit Downturn	Credit Expansion	Credit Recovery	Credit Repair
High Quality	0.19%	-0.06%	0.00%	-0.14%
High Value	0.04%	0.25%	0.10%	0.51%
High Quality & Value	0.19%	0.08%	0.11%	0.15%
High Carry	-0.18%	0.25%	-0.04%	0.70%
Low Volatility	0.33%	-0.11%	0.04%	-0.40%
High Momentum	-0.20%	-0.07%	-0.41%	0.10%
Small Size	-0.09%	0.06%	0.02%	0.07%
Count	68	68	24	78

[8] We use business cycle indicator from the Conference Board as the input for our economic regime model. The chose the Conference Board Leading Economic Index(LEI) for this study because investors tend to watch LEI and it has shown predictive power on economic turns as documented in various research publications(see Vaccara and Zamowitx[1988].

Inflation Regimes	Falling High Inflation	Falling Low Inflation	Rising High Inflation	Rising Low Inflation
High Quality	0.05%	-0.02%	0.04%	-0.08%
High Value	0.23%	0.42%	-0.04%	0.39%
High Quality & Value	0.16%	0.19%	0.08%	0.12%
Low Volatility	-0.03%	-0.14%	0.18%	-0.24%
High Momentum	-0.13%	-0.28%	0.02%	0.06%
High Carry	0.26%	0.34%	-0.14%	0.50%
Small Size	0.02%	-0.06%	0.02%	0.10%
Count	49	69	60	63

Volatility Regime	High & Falling	High & Rising	Low & Falling	Low & Rising
High Quality	-0.09%	0.06%	-0.04%	0.08%
High Value	0.38%	0.59%	0.19%	-0.05%
High Quality & Value	0.15%	0.32%	0.08%	0.09%
Low Volatility	-0.12%	-0.15%	-0.15%	0.26%
High Momentum	0.01%	-0.37%	0.03%	-0.15%
High Carry	0.40%	0.60%	0.26%	-0.29%
Small Size	0.12%	-0.18%	0.04%	0.05%
Count	55	44	94	48

Source: Northern Trust Asset Management, Index is the ICE BofA US Investment Grade Corporate Bond Index; Data is January 2004 – December 2023; For illustrative purposes only. Factor returns are duration matched excess returns of the top factor quintile minus the benchmark's duration matched excess returns. For regime analysis, annual averages are displayed. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index.

LOOKING FORWARD: CONSIDERATIONS FOR INVESTORS

Systematic value investing in corporate bonds presents a compelling strategy for investors seeking consistent risk-adjusted returns. By leveraging empirical models that integrate distance-to default measurements and accounting based ratios, investors can identify mispriced bonds and capitalize on the value premium. While acknowledging the presence of other factor premiums like carry, momentum, and quality, the robust performance of the value factor across various market regimes underscores its significance in generating alpha over the long run. However, investors should remain mindful of market and factor dynamics, as demonstrated by differing performance through the business and credit cycle stages. Overall, a disciplined approach to value investing in corporate bonds offers a pathway to enhancing portfolio performance and managing risk effectively.

OTHER REFERENCES AND RELATED READING:

1. See Northern Trust Research Insights, “Northern Trust Quantitative Credit Strategies”
2. Correia, M., Richardson, S., Tuna, I., “Value Investing in Credit Markets”, 2012
3. Altman, E.I., “Predicting Financial Distress of Companies: Revisiting the Z-Score and Zeta Models”, 2000
4. van Binsbergen, Jules H. and Nozawa, Yoshio and Schwert, Michael, “Duration-Based Valuation of Corporate Bonds”, October 10, 2023.

IMPORTANT INFORMATION

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