

CONTRIBUTORS

Hong Xie, CFA

Senior

Global Research & Design

hong.xie@spglobal.com

Aye M. Soe, CFA

Senior Director

Global Research & Design

aye.soe@spglobal.com

The Low Volatility Factor in U.S. High Yield Corporate Bonds

EXECUTIVE SUMMARY

- The low volatility effect in equities has been well documented in academia for decades. In the wake of the 2008 financial crisis, low risk investing has received widespread attention from the investment community.
- Our research shows that low risk investing can be applied to fixed income as well. Duration times spread (DTS) is an effective volatility measure of credit risk for corporate bonds. Overlaying the marginal contribution to risk (MCR) approach on the DTS of a corporate bond portfolio and measuring individual bonds' credit risk in a portfolio context allows for a meaningful way to screen out riskier bonds.
- The [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) is designed to measure the performance of U.S. high yield bonds that exhibit low volatility characteristics. The index selects high yield bonds with low MCR rank, which are deemed to have less credit risk and lower return volatility.
- Back-testing shows that the S&P U.S. High Yield Low Volatility Corporate Bond Index had lower return volatility and better risk-adjusted returns than the broad-based, high yield bond universe, along with relatively attractive yields over time.

THE LOW VOLATILITY EFFECT IN VARIOUS ASSET CLASSES

The low volatility effect in equities has been extensively studied and documented by academics and practitioners alike over the past four decades. Black, Jensen, and Scholes (1972) demonstrated that the expected excess return on a security was not linearly related to its beta. The authors found that the alphas of high-beta securities were negative, while the alphas of low-beta securities were positive. Clark, de Silva, and Thorley (2006) constructed minimum-variance portfolios that had annualized realized volatility at three-fourths that of the broad market (11.7% versus 15.4%, respectively). Blitz and Vliet (2007) created decile portfolios based on the rankings of stocks by their three-year realized volatility. Their study showed that the volatility of the top decile portfolio, which contains the low risk stocks, was about two-thirds of the market volatility, while the volatility of the bottom decile portfolio had a standard deviation that was almost twice that of the market.

Unlike equities, the low volatility effect in fixed income is a relatively new area of study, but recent academic studies have explored it more.

Unlike equities, the low volatility effect in fixed income is a relatively new area of study. Over the past several years, as low volatility investing in equities has gained widespread adoption by market participants, practitioners have started to explore low risk investing in fixed income. Houweling and Zundert (2014) extensively studied the size, low volatility, value, and momentum factors in the U.S. corporate bond market, and they noted that the factors delivered statistically significant premiums over the market. Carvalho, Dugnolle, Lu, and Moulin (2014) noted the presence of the low volatility factor across major developed fixed income markets, and they showed empirical results that lower risk bonds generated positive alpha, irrespective of the currency or market segment that they considered. Frazzini and Pedersen (2014) found that portfolios made up of high-beta assets had lower alpha and Sharpe ratios when compared with those of low-beta portfolios across equities, U.S. Treasury bonds, and U.S. corporate bonds.

Volatility Measures in the Bond Market

Common measures of asset risk in equities are the standard deviation of a security's daily price returns over a certain time period, and beta, which measures the sensitivity of the security's prices to the market. However, in fixed income, measures to capture the volatility characteristics of bonds are not as straightforward as in equities. First, it can be challenging to obtain reliable daily price returns for bonds that do not trade every day. Second, using the simple measure of price return volatility to construct a low volatility bond portfolio could introduce unintended bias to the end portfolio. For example, given that the price return of a bond is determined by the bond's duration and yield change, a bond portfolio constructed using the volatility measure of standard deviation of price return could be biased toward bonds with short duration.

MCR measures the incremental contribution of credit risk of each bond to the portfolio within the framework of DTS.

Some practitioners measure bond volatility using the standard deviation of yield changes (Soe, Xie 2016). Because yield change varies in magnitude depending on level of duration, spread, and credit quality, it can be used as a volatility measure together with control on other variables.

DTS is an industry accepted measure of credit risk for individual corporate bonds. It is calculated by multiplying spread duration and option-adjusted spread (OAS), and it measures the sensitivity of the bond price to the percentage change of OAS (see Equation 1). Ben Dor, Dynkin, Hyman, Houweling, Leeuwen, and Penninga (2007) argue that DTS accurately represents the impact of spread changes on excess credit return. DTS takes both spread duration and OAS into account, and therefore it can be used to measure the credit risk of bonds across the duration spectrum, irrespective of spread level.

$$(1) DTS = Spread\ Duration * OAS$$

To assess an individual bond's credit risk relative to its peers in a portfolio context, we define the MCR (marginal contribution to risk) of each bond as the product of spread duration and the difference between the bond's OAS and the duration-adjusted portfolio average OAS (see Equation 2). This definition allows for measuring the incremental contribution of each bond to the portfolio credit risk within the framework of DTS. Bonds with low MCR are deemed to contribute less credit risk to the portfolio as a whole. In the case of stressed bonds with extremely short spread duration, ranking MCR instead of DTS makes it less likely to rank stressed bonds in the lower end, and therefore it reduces the likelihood of classifying stressed bonds as low volatility.

$$(2) \text{MCR} = \text{Spread_Duration} * (\text{OAS} - \text{Duration_Adjusted_Portfolio_Average_OAS})$$

S&P U.S. HIGH YIELD LOW VOLATILITY CORPORATE BOND INDEX

The [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) is designed to measure the performance of U.S. high yield bonds that exhibit low volatility characteristics, as measured by MCR. The index tracks bonds from the [S&P U.S. High Yield Corporate Bond Index](#) that meet liquidity and low volatility criteria.

Bonds with low MCR are selected to construct the low volatility index.

The construction process of the S&P U.S. High Yield Low Volatility Corporate Bond Index entails two steps.¹ First, bonds from the U.S. High Yield Corporate Bond Index are selected by size and age to form the select universe to act as a proxy of a liquid universe. Next, bonds from the select universe are ranked by their MCR, and bonds within the bottom half of MCR rank are selected to be included in the index. A buffer rule is implemented to relax the MCR rank inclusion criteria for bonds already in the index to reduce index turnover. The index is modified-market-value weighted, with a 3% maximum weight cap on any single issuer.

Historical Performance and Characteristics of the S&P U.S. High Yield Low Volatility Corporate Bond Index

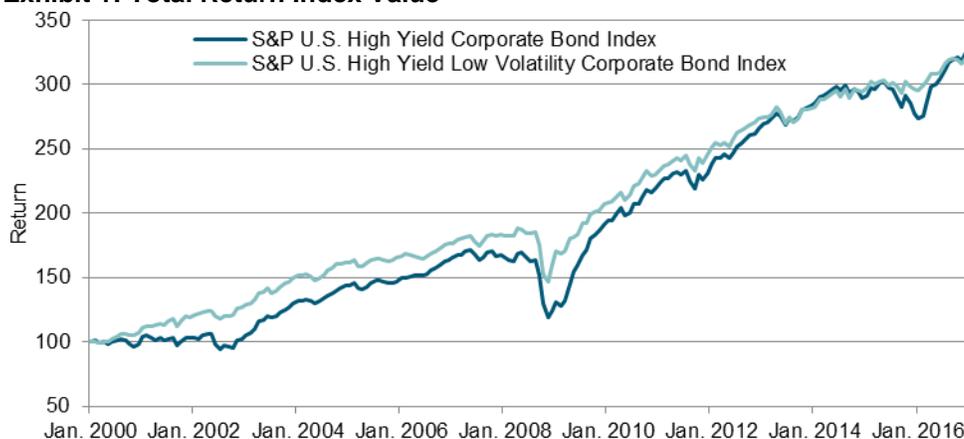
IMPROVED RISK-ADJUSTED RETURN

The S&P U.S. High Yield Low Volatility Corporate Bond Index was launched in December 2016, with a base date of Jan. 31, 2000. Exhibit 1 shows that the index demonstrates trend behavior similar to the benchmark [S&P U.S. High Yield Corporate Bond Index](#), yet with less volatility. Cumulatively, the annualized return of the [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) (at 7.12%) was 7 bps lower than that of the

¹ For more details on the S&P U.S. High Yield Low Volatility Corporate Bond Index, please refer to the index methodology document available at www.spdji.com.

broader universe, but the ratio of return to volatility improved by 0.19 to 1.01 due to reduced volatility (see Exhibit 2).

Exhibit 1: Total Return Index Value



Source: S&P Dow Jones Indices LLC. Data from Jan. 31, 2000, to Dec. 30, 2016. Index performance based on total return in USD. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

The risk/return reward of the S&P U.S. High Yield Low Volatility Corporate Bond Index improved from that of the broader universe due to volatility reduction.

Exhibit 2: Historical Risk/Return Profile

PERFORMANCE	S&P U.S. HIGH YIELD CORPORATE BOND INDEX	S&P U.S. HIGH YIELD LOW VOLATILITY CORPORATE BOND INDEX
Annualized Return (%)	7.19	7.12
Annualized Volatility (%)	8.70	7.02
Annualized Return/Volatility	0.83	1.01
Tracking Error	-	3.83
Correlation	-	0.90
Maximum Drawdown	-30.64	-21.79
1-Year Annualized Return (%)	16.50	8.06
3-Year Annualized Return (%)	4.59	4.40
5-Year Annualized Return (%)	6.98	5.44
10-Year Annualized Return (%)	7.05	6.14
1-Year Annualized Volatility (%)	6.75	3.42
3-Year Annualized Volatility (%)	5.87	4.29
5-Year Annualized Volatility (%)	5.38	4.65
10-Year Annualized Volatility (%)	9.57	7.95
1-Year Annualized Return/Volatility	2.44	2.35
3-Year Annualized Return/Volatility	0.78	1.03
5-Year Annualized Return/Volatility	1.30	1.17
10-Year Annualized Return/Volatility	0.74	0.77

Source: S&P Dow Jones Indices LLC. Data from Jan. 31, 2000, to Dec. 30, 2016. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

We applied Jensen’s alpha analysis² by regressing the monthly return of the [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) on that of the underlying [S&P U.S. High Yield Corporate Bond Index](#) (see Exhibits 3 and 4). Historically, the low volatility factor strategy produced an alpha of 0.15% on a monthly basis, which is uncorrelated to the broad high yield market. The beta of 0.73 (less than the market beta) explains the volatility reduction of this factor strategy. The T-statistics shown in Exhibit 3 confirm the statistical significance of the regression result.

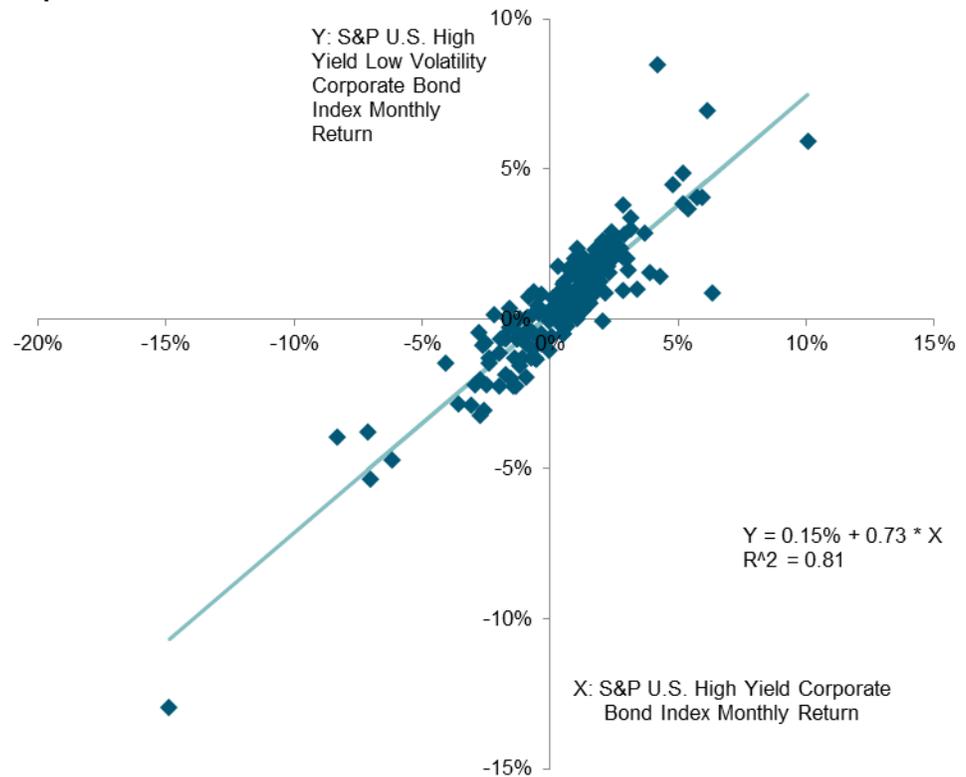
Jensen’s alpha analysis of the low volatility index shows an alpha of 0.15% on a monthly basis and lower beta than broad U.S. high yield market.

Exhibit 3: Jensen's Alpha Analysis

CATEGORY	COEFFICIENTS	STANDARD ERROR	T-STATISTICS
Alpha (monthly)	0.15%	0.06%	2.36
Beta	0.73	0.02	29.76

Source: S&P Dow Jones Indices LLC. Data from Jan. 31, 2000, to Dec. 30, 2016. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 4: Jensen's Alpha Analysis: Regression of Monthly Return of the S&P High Yield Low Volatility Corporate Bond Index on the S&P U.S. High Yield Corporate Bond Index



Source: S&P Dow Jones Indices LLC. Data from Jan. 31, 2000, to Dec 30, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

² Michael C. Jensen. "The Performance of Mutual Funds in the Period 1945-1964." *Journal of Finance*. 1967.

REDUCED RETURN VOLATILITY AND MAXIMUM DRAWDOWN

The objective of the [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) is to measure the performance of a low volatility strategy that delivers higher risk-adjusted returns than the underlying broad-based benchmark. The back-tested results demonstrated that, historically, the low volatility factor successfully achieved this goal with reduced return volatility, better performance in down markets than in up markets, and reduced drawdown in stressed markets.

Over the back-tested period of over 16 years, the annualized return volatility was reduced by 1.68% to 7.02% from the underlying universe (see Exhibit 2). In percentage terms, the volatility reduction is 19% of broad market volatility. The case for volatility reduction is further strengthened by the benefit of downside protection that is seen in the asymmetric performance of the S&P U.S. High Yield Low Volatility Corporate Bond Index in up and down markets. This property is also observed and noted in the low volatility effect in equities. Exhibit 5 shows the hit ratio and average monthly excess returns for up and down markets for the index. Hit ratio is defined as the percentage of months that the index outperforms the underlying broad [S&P U.S. High Yield Corporate Bond Index](#). For both hit ratio and average monthly excess returns, the S&P U.S. High Yield Low Volatility Corporate Bond Index demonstrated better performance in down markets than in up markets.

The case for volatility reduction is further strengthened by the benefit of downside protection that is seen in the asymmetric performance of the S&P U.S. High Yield Low Volatility Corporate Bond Index in up and down markets.

Exhibit 5: Hit Ratio and Excess Return in Up and Down Markets

HIT RATIO (%)

All Periods	41.9
Up Months	29.8
Down Months	69.4

AVERAGE MONTHLY EXCESS RETURNS (%)

All Periods	0.02
Up Months	-0.32
Down Months	0.68

Source: S&P Dow Jones Indices LLC. Data from Jan. 31, 2000, to Dec 30, 2016. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

In terms of maximum drawdown since 2000, the S&P U.S. High Yield Corporate Bond Index drew down 30.64% in late 2008 from the 2007 peak, while the S&P U.S. Low Volatility High Yield Corporate Bond Index experienced a drawdown of 21.79% in comparison (see Exhibit 2), reflecting a 29% reduction. To see in more detail how the low volatility strategy performed in down markets, we further broke down index performance during historical scenarios of credit market stress. Exhibit 6 shows that the index consistently outperformed the broader high yield bond universe when high yield bonds experienced significant spread widening.

In fact, the more the credit spread widened, the higher the outperformance was. Exhibit 7 overlays high-yield credit spreads with the total return index ratio of the [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) to the underlying [S&P U.S. High Yield Corporate Bond Index](#).

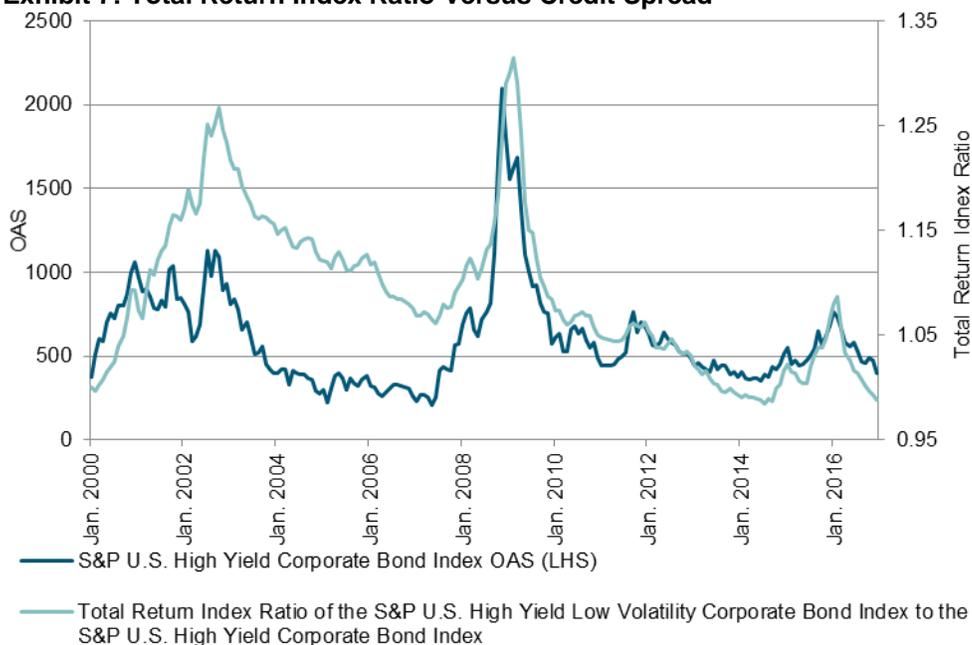
Exhibit 6: Cumulative Performance for Credit Spread Widening Period

CREDIT SPREAD WIDENING PERIOD (TROUGH TO PEAK)	S&P U.S. HIGH YIELD CORPORATE BOND INDEX (%)	S&P U.S. HIGH YIELD LOW VOLATILITY CORPORATE BOND INDEX (%)	LOW VOLATILITY INDEX OUT-PERFORMANCE (%)	TROUGH TO PEAK OAS WIDENING FOR S&P U.S. HIGH YIELD CORPORATE BOND INDEX (BPS)
I. 2000 DOT-COM CRASH				
February 2000-December 2000	-2.19	6.89	9.08	685
April 2002-September 2002	-8.62	-2.59	6.03	543
II. 2008 FINANCIAL CRISIS				
June 2007-November 2008	-30.64	-19.32	11.33	1894
III. U.S. CREDIT DOWNGRADE				
April-September 2011	-3.60	-2.06	1.53	318
IV. OIL PRICE COLLAPSE IN 2015 TO 2016				
July 2014-January 2016	-8.27	0.27	8.54	411

Source: S&P Dow Jones Indices LLC. Data from Jan. 31, 2000, to Dec. 30, 2016. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

The low volatility index outperformed the broader high yield universe when high yield bonds experienced significant spread widening.

Exhibit 7: Total Return Index Ratio Versus Credit Spread

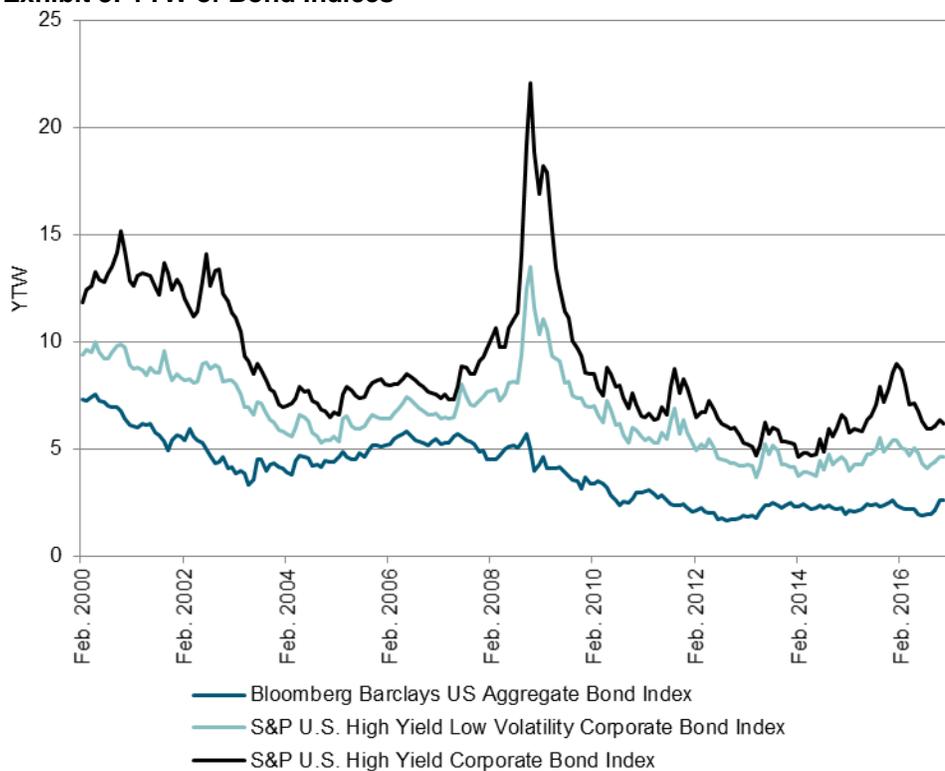


Source: S&P Dow Jones Indices LLC. Data from Jan. 31, 2000, to Dec 30, 2016. Index performance based on total return in USD. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

YIELD AND DURATION

There are trade-offs in achieving risk reduction, as the [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) had lower yields than the broad-based high yield market. However, the S&P U.S. High Yield Low Volatility Corporate Bond Index preserved the yield pickup of high yield bonds over the U.S. investment-grade quality bond market (see Exhibit 8). Exhibit 9 demonstrates the trade-off between credit risk and yield, showing the average yield-to-worst (YTW) for portfolios of bonds with various MCR rank cutoff points in the select universe, as of the December 2016 index rebalance. It shows that all the high yielders (>5%) come from the segment of bonds ranked in the top 20% by MCR (highest credit risk).

Exhibit 8: YTW of Bond Indices

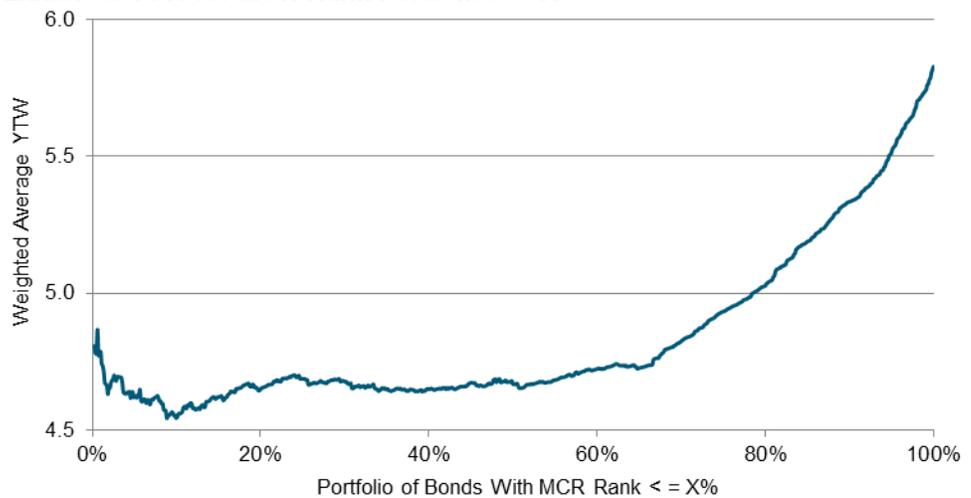


The S&P U.S. High Yield Low Volatility Corporate Bond Index preserved the yield pickup of high yield bonds over the U.S. investment-grade quality bond market.

Source: S&P Dow Jones Indices LLC and Bloomberg. Data from Jan. 31, 2000, to Dec. 30, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

All the high yielders (>5%) come from the segment of bonds ranked in the top 20% by MCR (highest credit risk).

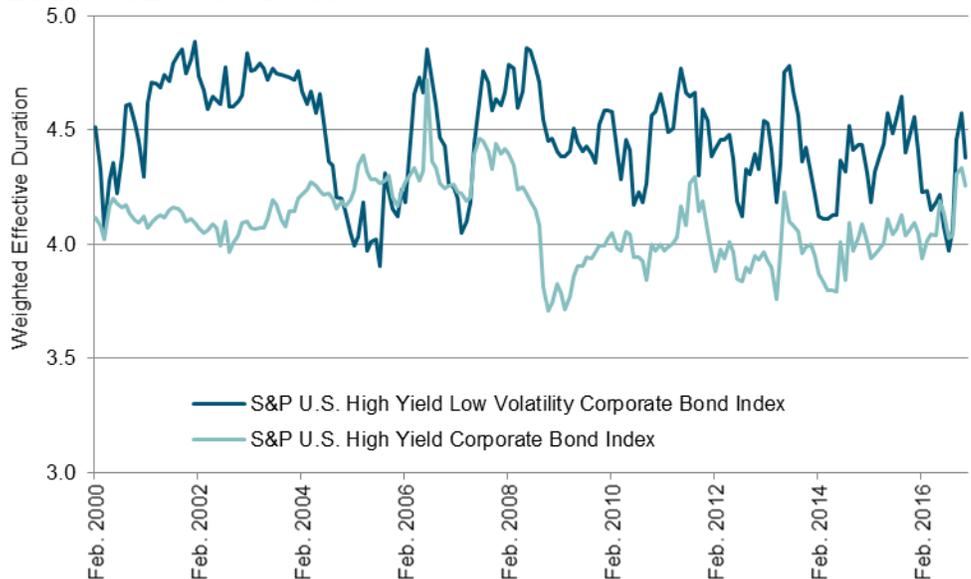
Exhibit 9: YTW for MCR Rank Portfolios <=X%



Source: S&P Dow Jones Indices LLC. Data as of Dec. 27, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Duration deviation of the index is limited (see Exhibit 10). Historically, the difference in the index’s effective duration oscillates between -0.36 and 0.79. However, Exhibit 10 shows that oftentimes the [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) has a longer effective duration than the underlying investment universe. There are a couple explanations for this. First, issuers of relatively higher-quality credit are able and are more likely to issue bonds with longer maturities. Second, with the same maturity, bonds with relatively better credit quality tend to show longer duration because they are less likely to default.

Exhibit 10: Effective Duration



Source: S&P Dow Jones Indices LLC. Data from Jan. 31, 2000, to Dec. 30, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Empirically, interest rate sensitivity of high yield bonds is much lower than indicated by their duration measures. Back-testing shows that low volatility, high yield bonds have lower correlation and therefore were less sensitive to interest rates than the broad high yield market.

Empirically, rate sensitivity of the total return of high yield bonds is much lower than indicated by their duration measures, due to the negative correlation between rates and credit spread changes. In a rising-rate environment, credit spreads tend to tighten in response to a growing economy. The positive credit return due to spread tightening could cancel out part or all of the negative return from increasing rates. Exhibit 11 shows correlation analysis among various variables. Historically, the [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) demonstrated lower correlation (0.04) and therefore was less sensitive to interest rates than the broad [S&P U.S. High Yield Corporate Bond Index](#) (0.22). OAS movement of the S&P U.S. High Yield Low Volatility Corporate Bond Index is more negatively correlated (-0.62) to interest rate changes than its underlying index (-0.55), indicating that when interest rates move higher, bonds of higher credit quality and less credit risk tend to benefit more from spread tightening.

Exhibit 11: Correlation Analysis of Interest Rates and Credit Spreads

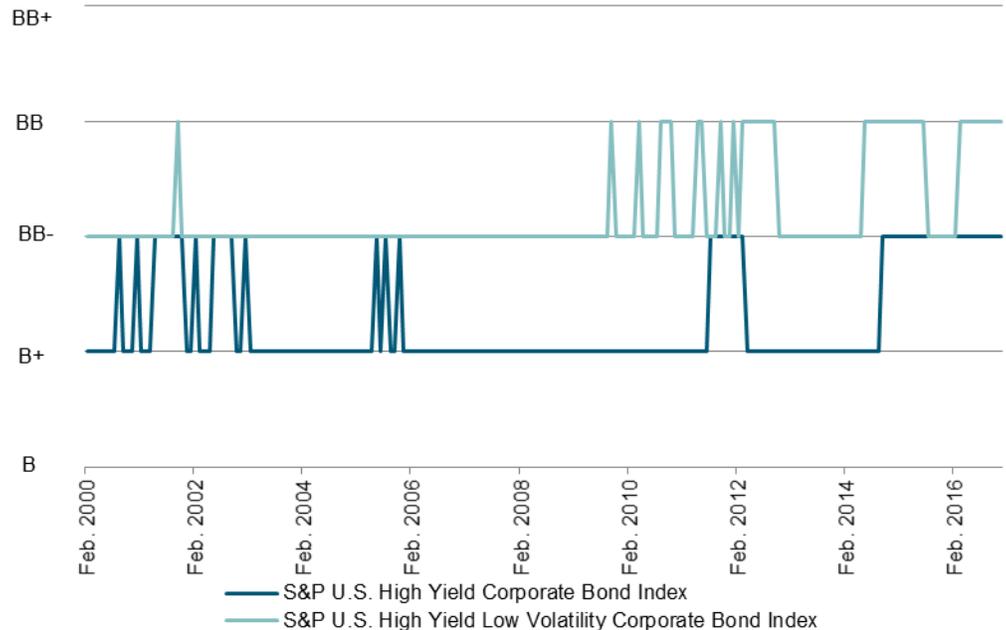
STRATEGY	S&P U.S. HIGH YIELD CORPORATE BOND INDEX OAS MONTHLY CHANGE	S&P U.S. HIGH YIELD LOW VOLATILITY CORPORATE BOND INDEX OAS MONTHLY CHANGE	5-YEAR GOVERNMENT BOND YIELD CHANGE	S&P U.S. HIGH YIELD CORPORATE BOND INDEX MONTHLY RETURN	S&P U.S. HIGH YIELD LOW VOLATILITY CORPORATE BOND INDEX MONTHLY RETURN
S&P U.S. HIGH YIELD CORPORATE BOND INDEX OAS MONTHLY CHANGE	1	-	-	-	-
S&P U.S. HIGH YIELD LOW VOLATILITY CORPORATE BOND INDEX OAS MONTHLY CHANGE	0.92	1	-	-	-
5-YEAR GOVERNMENT BOND YIELD CHANGE	-0.55	-0.62	1	-	-
S&P U.S. HIGH YIELD CORPORATE BOND INDEX MONTHLY RETURN	-0.86	-0.77	0.22	1	-
S&P U.S. HIGH YIELD LOW VOLATILITY CORPORATE BOND INDEX MONTHLY RETURN	-0.77	-0.75	0.04	0.90	1

Source: S&P Dow Jones Indices LLC and Bloomberg. Data from Jan. 31, 2000, to Dec. 30, 2016. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

CREDIT QUALITY

An important characteristic of a corporate bond portfolio is its credit quality profile. Exhibit 12 shows the average credit rating by S&P Global Ratings for the [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) and the [S&P U.S. High Yield Corporate Bond Index](#). The improved credit quality of the S&P U.S. High Yield Low Volatility Corporate Bond Index reflects and confirms its reduced volatility, given the observation that bonds of higher quality are expected to exhibit lower volatility in general.

Exhibit 12: Weighted Average Rating from S&P Global Ratings



Source: S&P Global Ratings. Data from Jan. 31, 2000, to Dec. 30, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

SECTOR ANALYSIS

The S&P U.S. High Yield Low Volatility Corporate Bond Index has displayed a fair degree of dynamic sector allocation throughout its history.

The S&P U.S. High Yield Low Volatility Corporate Bond Index has displayed a fair degree of dynamic sector allocation throughout its history. Exhibit 13 highlights the active sector over- and underweights of the index relative to the broad-based underlying S&P U.S. High Yield Corporate Bond Index. By using DTS as a risk measure and overlaying the MCR approach, the strategy was able to underweight volatile sectors. For example, leading into the 2008 financial crisis, the strategy had its biggest underweight in the financials sector. By the same token, the strategy maintained its biggest underweight in the energy and materials sectors in 2015 and 2016, coinciding with the volatility in energy and commodity markets.

Exhibit 13: Sector Allocation

YEAR	ENERGY (%)	MATERIALS (%)	INDUSTRIALS (%)	CONSUMER DISCRETIONARY (%)	CONSUMER STAPLES (%)	HEALTH CARE (%)	FINANCIALS (%)	INFORMATION TECHNOLOGY (%)	TELECOM-MUNICATIONS (%)	UTILITIES (%)	REAL ESTATE (%)
2000	1	-4	-5	2	1	-3	-4	4	5	2	1
2001	1	-3	-2	1	-1	7	0	2	-5	0	1
2002	0	0	-2	10	-3	2	-4	1	-4	-3	2
2003	-2	4	-3	13	1	-2	-2	-3	-2	-5	2
2004	0	-1	1	6	0	-1	-2	1	0	-1	-1
2005	0	1	-3	1	-1	1	-2	-1	-2	6	1
2006	4	-4	-2	-5	-1	0	-9	-2	6	10	2
2007	5	-4	0	-6	2	-3	-7	-2	4	8	2
2008	6	1	2	-6	-1	2	-9	-2	2	4	1
2009	3	-2	-2	-2	0	5	-8	-3	6	4	0
2010	3	3	-5	0	1	5	-9	-3	1	3	2
2011	7	2	-1	-3	0	2	-6	-4	3	0	0
2012	9	1	-2	-3	-1	1	-6	-3	1	2	0
2013	2	-6	3	-4	-1	3	-2	-2	4	2	1
2014	-2	-3	0	0	-1	4	4	-2	0	0	0
2015	-5	-5	1	1	-2	3	5	-1	2	1	0
2016	-9	-5	2	3	1	1	0	3	3	0	0
2017	-6	-1	-1	5	-1	1	-3	3	3	-1	1
MINIMUM	-9	-6	-5	-6	-3	-3	-9	-4	-5	-5	-1
MAXIMUM	9	4	3	13	2	7	5	4	6	10	2

Source: S&P Dow Jones Indices LLC. Data from Jan. 31, 2000, to Jan. 3, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Note: numbers are for relative allocation as of beginning of each year, except for 2000, which denotes February 2000 as the beginning date of the S&P U.S. High Yield Low Volatility Corporate Bond Index. Historical sector classification is back-filled using data as of December 2016.

CONCLUSION

We explored the low volatility factor strategy in the U.S. high yield bond sector, overlaying the MCR approach to the DTS of corporate bonds to measure individual bonds' credit risk in a portfolio context. The resulting [S&P U.S. High Yield Low Volatility Corporate Bond Index](#) is designed to measure U.S. high yield bonds that exhibit low volatility characteristics, as measured by low MCR rank. A historical back-test of the low volatility index has shown several noteworthy features.

- Effective volatility and drawdown risk reduction and improved risk-adjusted returns compared to the broad high yield index.
- Statistically significant beta-adjusted excess return, which provides evidence of a low volatility effect in high yield corporate bonds.
- Less correlation and therefore less sensitivity to interest rates than the broader high yield index.
- Significant improvement in credit quality compared to the broader high yield market and still attractive yield compared to investment-grade bonds.
- Outperformance during stressed credit environments was driven by dynamic sector allocation and security selection that avoid highly volatile bonds.

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S&P DJI RESEARCH CONTRIBUTORS		
Charles Mounts	Global Head	charles.mounts@spglobal.com
Jake Vukelic	Business Manager	jake.vukelic@spglobal.com
GLOBAL RESEARCH & DESIGN		
AMERICAS		
Aye M. Soe, CFA	Americas Head	aye.soe@spglobal.com
Dennis Badlyans	Associate Director	dennis.badlyans@spglobal.com
Phillip Brzenk, CFA	Director	phillip.brzenk@spglobal.com
Smita Chirputkar	Director	smita.chirputkar@spglobal.com
Rachel Du	Senior Analyst	rachel.du@spglobal.com
Bill Hao	Director	wenli.hao@spglobal.com
Qing Li	Associate Director	qing.li@spglobal.com
Berlinda Liu, CFA	Director	berlinda.liu@spglobal.com
Ryan Poirier, FRM	Senior Analyst	ryan.poirier@spglobal.com
Maria Sanchez	Associate Director	maria.sanchez@spglobal.com
Kelly Tang, CFA	Director	kelly.tang@spglobal.com
Peter Tsui	Director	peter.tsui@spglobal.com
Hong Xie, CFA	Director	hong.xie@spglobal.com
APAC		
Priscilla Luk	APAC Head	priscilla.luk@spglobal.com
Utkarsh Agrawal, CFA	Associate Director	utkarsh.agrawal@spglobal.com
Liyu Zeng, CFA	Director	liyu.zeng@spglobal.com
Akash Jain	Associate Director	akash.jain@spglobal.com
EMEA		
Sunjiv Mainie, CFA, CQF	EMEA Head	sunjiv.mainie@spglobal.com
Leonardo Cabrer	Senior Analyst	leonardo.cabrer@spglobal.com
Andrew Innes	Associate Director	andrew.innes@spglobal.com
INDEX INVESTMENT STRATEGY		
Craig J. Lazzara, CFA	Global Head	craig.lazzara@spglobal.com
Fei Mei Chan	Director	feimei.chan@spglobal.com
Tim Edwards, PhD	Senior Director	tim.edwards@spglobal.com
Anu R. Ganti, CFA	Director	anu.ganti@spglobal.com
Hamish Preston	Senior Associate	hamish.preston@spglobal.com
Howard Silverblatt	Senior Index Analyst	howard.silverblatt@spglobal.com

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