

STYLE INVESTING IN FIXED INCOME MARKETS

Attakrit Asvanunt,
Vice President

Jordan Brooks,
Managing Director

Scott Richardson,
Managing Director

A Factor-Based Approach in Fixed Income Markets

A disciplined, systematic approach to over/underweight securities based on well-known factors, or styles, such as value, momentum, carry and defensive (sometimes called “quality”), can offer alternative sources of outperformance not only within equities, where these ideas have long been studied and applied, but also within fixed income markets.¹ The fact that these factors work in fixed income markets is both a potential boon to fixed income investors and a wonderful “out-of-sample” test of the original equity-centric results, enhancing our belief that the efficacy of these factors is the result of real forces and not random data mining.

This approach is often described as “smart beta” or “style investing”. The purpose of this article is to provide a brief overview and describe the broad sources of returns in fixed income markets and outline and describe the efficacy of a simple, intuitive framework for harnessing a style-based investing approach within fixed income markets.

Systematic investment strategies are well developed and understood in equity markets, but are scarcely utilized in fixed income markets. This is surprising. After all, both equity and fixed income markets are enormous in size. The MSCI ACWI Index, which accounts for approximately 85% of the global equity opportunity set, was about \$36 trillion (USD) as of the end of 2015. And the fixed income markets are even larger. The combined market value of the Barclays’ Global Aggregate, Global High Yield and Emerging Hard Currency Aggregate indices is almost \$50 trillion (USD).

That said, there is relatively little academic literature on the drivers of relative performance within fixed income markets as compared with the extensive research on equities. This lack of empirical analysis is attributable to at least two forces. First, the broader academic community has only recently started to explore cross-sectional drivers of fixed income returns due to limited access to reliable pricing data. In contrast, equity data has been widely available and many decades of academic research has explored determinants of equity returns. Second, and relatedly,

there is an apparent “skepticism” of a systematic approach to investing in fixed income markets, both because people are often hesitant to embrace something different (there was similar skepticism to systematic investing in equity markets 15 to 20 years ago) and perhaps because these markets, particularly corporate bonds, are less liquid than equity markets. We believe the fundamental drivers of relative performance in fixed income markets can be effectively and efficiently captured using a systematic and risk balanced approach based on factors which are measurable and have worked over time.

Overview of the Fixed Income Market

The Global Aggregate index is a commonly used index for fixed income markets, capturing the majority of “tradeable” fixed income securities. Its constituents

are investment grade bonds that can be broadly categorized into government, government-related, securitized and corporate. In addition, there are two indices that cover “riskier” bonds: the Global High Yield index which primarily consists of corporate bonds and a small fraction of government-related bonds, and the Emerging Hard Currency Aggregate index which consists of

emerging market bonds denominated in USD, EUR or GBP. In Figure 1, we show the relative contribution of each issuer type in terms of count and market value of bonds. The three indices together comprise over 22,000 securities, offering significant breadth of investment opportunities for security selection.

Government bonds, particularly of developed countries issued in their local currencies, are considered to be free from default risk. Hence, the primary driver of government bond returns is interest rate risk. Other types of bond issuers do not have the same status and hence their returns are also driven by credit risk. Some securitized products such as mortgage-backed securities are additionally exposed to prepayment risk. These additional risks usually lead to a higher bond yield or “spread” over duration-matched government bonds, which can vary over time in response to business conditions and risk aversion. In general, bond returns can be decomposed into a “rate” component and a “spread” component.

“We believe the fundamental drivers of relative performance in fixed income markets can be effectively and efficiently captured using a systematic and risk balanced approach based on factors...”

Figure 1: The Fixed Income Markets are Broad and Deep

Decomposition by number of securities and market value across categories as of December 2015

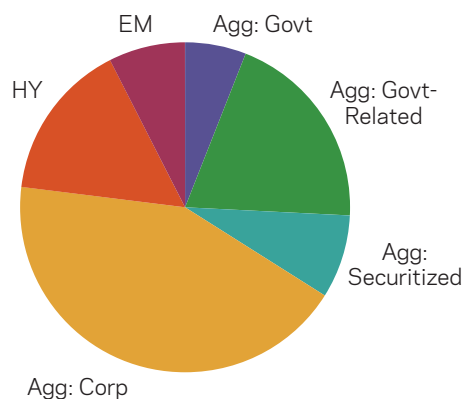


AQR is a global investment management firm that employs a systematic, research-driven approach to manage alternative and traditional strategies.

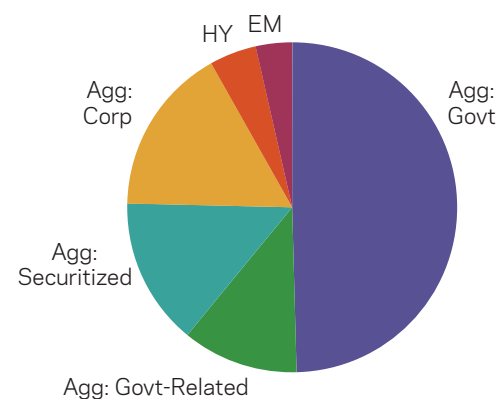
We manage over \$153 billion for institutional investors and investment professionals.⁴

w: aqr.com

Count (Total 22,301)



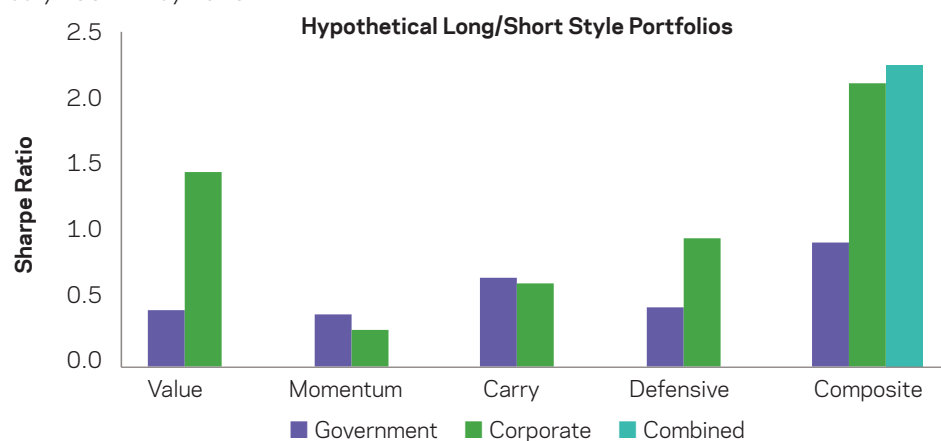
Market Value (Total \$46.7TR)



Source: Barclays. Agg: Govt, Agg: Govt-Related, Agg: Securitized and Agg: Corp are the four sectors (class 1) within the Barclays Global Aggregate index. HY is the Barclays Global High Yield index, and EM is the Barclays Emerging Hard Currencies Aggregate index.

Figure 2: Styles Can be Effectively Applied in Fixed Income Portfolios

January 1997 - May 2015



Source: AQR, Bank of America Merrill Lynch, JP Morgan, Consensus Economics and Bloomberg. For illustrative purposes only and not representative of an actual portfolio AQR manages. Style measures for government bonds and corporate bonds are as defined in main text. Each long/short style portfolio is constructed by first ranking the entire universe of government or corporate bonds based on the style measure, and then standardizing it by subtracting the mean and dividing by standard deviation (i.e., creating a z-score). The combined portfolio is an equal risk weighted portfolio of the four styles, using ex-post standard deviations of each long/short style portfolio. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

Style Investing

Having identified the two primary sources of overall fixed income returns, we now turn to security selection within each source as a way to potentially generate excess returns over the passive fixed income indices. Israel, Palhares and Richardson (2015) and Brooks, Katz and Moskowitz (2016) show that value, momentum, carry and defensive style factors, popular in equity investing, have historically worked well for both credit exposure in corporate bonds and rate exposure in government bonds.² For our purposes here we show one simple and intuitive measure for each of the four styles for government bonds and, separately, for corporate bonds. These are independent exercises using the four styles to choose amongst government bonds and corporate bonds, effectively providing two out-of-sample tests for the efficacy of style investing. The JP Morgan Global Government Bond Index covers the 13 largest and most liquid developed countries across short-, medium- and long-term maturities (see Brooks, Katz and Moskowitz, 2016). Our universe of corporate bonds on average covers 1,300 liquid investment grade and high yield bonds (see Israel, Palhares and Richardson, 2015).

Value is the tendency for relatively cheap assets to outperform relatively expensive ones. Value therefore requires a fundamental anchor for the observed yield (spread). We prefer high yields relative to infla-

tion expectations for government bonds and relative to default expectations for corporate bonds. In other words, a cheap bond is one where the observed yield (spread) is wider than a fundamental anchor would suggest. For government bonds we use real yield computed as nominal yield minus maturity matched forecasted inflation. For corporate bonds, we use a simple fair value model that regresses option-adjusted-spread on credit rating, spread duration and historical bond excess return volatility.

Momentum is fairly straightforward. It is the tendency for an asset's recent relative performance to continue in the near future. We use price based measures for momentum appropriately defined for both government and corporate bonds (based on 6 to 12 month historical returns), preferring the securities that have outperformed relative to those that have underperformed.

Carry is the tendency for higher yielding assets to provide higher returns than lower yielding assets. It is the return you expect to receive from the passage of time holding all else constant. For government bonds, carry is the difference between the yield-to-maturity and the 3-month T-Bill rate, and for corporate bonds, carry is the option-adjusted-spread over treasury yield.

Defensive is the tendency for lower risk and higher quality assets to generate higher risk-adjusted returns than higher risk and lower quality assets. We use a simple measure of low risk (low duration) for government bonds and high quality (low leverage) for corporate bonds.

Across all four styles there is consistent evidence of positive risk-adjusted returns.

Following Israel, Palhares and Richardson (2015) and Brooks, Katz and Moskowitz (2016³), each month we form a hypothetical long/short portfolio amongst government and, separately, corporate bonds based on each style measure and report the results in Figure 2. The figure highlights three important points. First, it shows the efficacy based on risk-adjusted returns of each style within government bonds and corporate bonds on their own. Across all four styles there is consistent evidence of positive risk-adjusted returns. This is an impressive result in itself as, again, these factors or styles were originally identified in other asset classes, primarily equities. That they hold up, in rather simple form here (actual models can delve deeper than the simple style measures used here for expositional purposes) is a very useful out-of-sample test of the concepts behind the equity results. Second, the exhibit demonstrates the diversification benefit that comes from combining multiple styles within government bonds and corporate bonds separately (the purple and green composite bars). In both cases, there is consistent evidence that the risk-adjusted return of the hypothetical multi-style portfolio (equally weighting amongst the four styles) improves upon any one style alone because the returns to each style are lowly, or negatively, correlated to each other. Third, we can see the potential diversification benefit from an equal risk allocation to the government bond and corporate bond multi-style composites (shown by the turquoise 'combined' composite bar).

One of the major benefits of this multi-style composite is its low correlation to traditional indices. The combined multi-style portfolio has a 0.13, 0.00, and 0.00 correlation to the Barclays Global Treasury index, Barclays U.S. Corporate Investment Grade index (excess of treasury) and the S&P 500 index, respectively.

The risk-adjusted returns shown here may be better than can be achieved in practice as they are gross of transaction costs, financing charges and fees, and done in the context of a long/short portfolio, whereas sometimes these factors are only used to "tilt" a long-only portfolio in a more traditional setting. Still, it is clear that this composite portfolio harvesting style exposures across the breadth of fixed income instruments in a systematic manner offers attractive diversifying returns.

Conclusion

Fixed income is a significant portion of most investors' portfolios. The primary drivers of fixed income asset class returns are rate and spread exposures. In this article, we demonstrate the efficacy of style investing for security selection within rate exposure for government bonds and spread exposure for corporate bonds. Either in a long-only or long/short context, when implemented efficiently and properly, we believe these style premia can add significant long-term value to an investor's portfolio.

1 In a long/short context styles have been studied across many different markets. See Asness, Moskowitz and Pedersen (2013) and Asness, Ilmanen, Israel and Moskowitz (2015).

2 As always, we use the word "works" as statisticians and economists, meaning delivering extra return on average with, in our view, acceptable risk and reasonable periods of underperformance. Nothing "works" all the time in investing.

3 Israel, Palhares and Richardson (2015) and Brooks, Katz and Moskowitz (2016) demonstrate the efficacy and diversification benefits of multi-style long-only corporate bond and government bond portfolios that account for estimates of transaction costs and other real-world portfolio constraints.

4 As of March 31, 2016, includes assets managed by CNH Partners, an affiliate of AQR.

The information set forth herein has been obtained or derived from sources believed by AQR Capital Management, LLC ("AQR") to be reliable. However, AQR does not make any representation or warranty, express or implied, as to the information's accuracy or completeness, nor does AQR recommend that the attached information serve as the basis of any investment decision, and does not constitute an offer or solicitation of an offer, or any advice or recommendation, to purchase any securities or other financial instruments, and may not be construed as such. AQR hereby disclaims any duty to provide any updates or changes to the analyses contained in this article.

The data and analysis contained herein are based on theoretical and model portfolios and are not representative of the performance of funds or portfolios that AQR currently manages. There is no guarantee, express or implied, that long-term return and/or volatility targets will be achieved. Realized return and/or volatility may come in higher or lower than expected. **Past performance is not a guarantee of future performance. Diversification does not eliminate the risk of experiencing investment losses.**

Hypothetical performance results (e.g., quantitative backtests) have many inherent limitations, some of which, but not all, are described herein. No representation is being made that any fund or account will or is likely to achieve profits or losses similar to those shown herein. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently realized by any particular trading program. One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or adhere to a particular trading program in spite of trading losses are material points which can adversely affect actual trading results. The hypothetical performance results contained herein represent the application of the quantitative models as currently in effect on the date first written above and there can be no assurance that the models will remain the same in the future or that an application of the current models in the future will produce similar results because the relevant market and economic conditions that prevailed during the hypothetical performance period will not necessarily recur. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results, all of which can adversely affect actual trading results. Discounting factors may be applied to reduce suspected anomalies. This backtest's return, for this period, may vary depending on the date it is run. Hypothetical performance results are presented for illustrative purposes only.

Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investments cannot be made directly in an index.

The information contained herein is only as current as of the date indicated, and may be superseded by subsequent market events or for other reasons. Neither the author nor AQR undertakes to advise you of any changes in the views expressed herein.

This information is not intended to, and does not relate specifically to any investment strategy or product that AQR offers. It is being provided merely to provide a framework to assist in the implementation of an investor's own analysis and an investor's own view on the topic discussed herein.