Building Better Bond Strategies: Simplicity in Design

by Shane Shepherd, Ph.D.

Research Affiliates strives to develop straightforward investment strategies that harness the primary drivers of portfolio results. In this article, Shane Shepherd recaps empirical bond market research on credit, leverage, and cash flow risk, and summarizes the evidence for mean reversion in spreads. He also shows how these research findings shaped the design of a strategy index for corporate bonds.

The researchers at our firm have a distinctive way of thinking about capital markets and investment strategies. We focus on understanding the primary drivers of risk and return—often discovering, in the process, how the empirical facts differ from theoretical predictions—and we favor building uncomplicated investment solutions. In the arena of fixed income, for example, we have re-examined the relationships between historical returns and credit, leverage, and cash flow risk, and investigated the price impact of mean reversion in credit spreads. We marvel at the engineering refinements in other firms' products, but we prefer to design simple, see-through strategies that work reliably. We strongly believe that solutions without a lot of moving parts and hidden assumptions are most robust.

These principles—realism in research and simplicity in design—guide all our work in asset allocation, equities, fixed income, and alternative assets. This issue illustrates the Research Affiliates approach by discussing the practical significance of risk and return characteristics we've identified in the course of our bond market explorations.

Recent Research on Corporate Bonds

Strategy indices, commonly known as Smart Beta strategies, are gaining broad acceptance among equity investors. They are less well known in the bond markets. However, traditional passive investing in bonds has disadvantages similar to those that are now widely acknowledged in equities. Established bond indices weight constituents on the basis of their market values. This effectively means that the companies which issue the most debt are given the greatest allocations.

But why would investors want to increase their exposure to the biggest debtors? Frequently, a large amount of debt issuance goes hand in hand with increased risk. Our research suggests that these risk exposures often do not provide a satisfactory return premium. To avoid this poor risk–return trade-off, it seems desirable to weight corporate bond index constituents on some basis other than price.

What sort of risks do investors take on as debt issuance increases? Certainly higher debt levels are associated with declining credit ratings. But credit ratings are an imperfect measure of risk, slow to be revised and not always reflective of the debt burden for a company. More focused metrics for our purposes are fundamental characteristics of a company that directly measure their debt service capacity: leverage and cash flow coverage. All else equal, as debt rises relative to the economic size of the corporation, firms will show rising leverage (debt relative to assets) and declining cash flow coverage (cash flow relative to debt).

Our research shows that investors took on additional risk yet were not rewarded for accepting greater leverage over the past 17 years. **Table 1** provides risk and return statistics for bonds sorted into debt-to-long term asset quartiles.[1] Higher leverage comes with higher risk, any way you measure it—by volatility of returns, higher credit spreads, and greater incidence of downgrades. But the bonds of highly leveraged companies have lower Sharpe ratios, or risk-adjusted returns, than the bonds of companies with low debt ratios. This is driven not only by rising volatility (to be expected) but also by declining returns.

We also determined that returns were not commensurate with cash flow risk. **Table 2** shows that bonds issued by companies with higher debt-to-cash flow ratios generated lower risk-adjusted returns than bonds with lower ratios (i.e., greater debt service capacity). Higher risk, lower return—once again, an unattractive trade-off.

Table 1. Simulated Returns and Characteristics by Leverage Quartiles (1997–2013)						
Quartile	Return	StdDev	Sharpe Ratio	Yield	Duration	OAS
1 (low D/A)	6.25	5.66	0.67	4.91	6.13	110
2	6.73	6.05	0.70	5.13	6.06	132
3	6.52	6.33	0.64	5.09	5.76	139
4 (high D/A)	6.22	7.10	0.53	4.55	4.93	140

Source: Research Affiliates, LLC

Table 2. Simulated Returns and Characteristics by Cash Flow Quartiles (1997–2013)						
Quartile	Return	StdDev	Sharpe Ratio	Yield	Duration	OAS
1 (low D/CF)	6.41	5.80	0.68	4.88	5.96	119
2	6.71	6.07	0.70	5.08	6.04	132
3	6.62	6.13	0.68	4.89	5.72	139
4 (high D/CF)	6.00	7.24	0.49	4.60	4.86	140

Source: Research Affiliates, LLC

Astute readers will note that these quartiles show a pattern in duration as well as credit risk and volatility. Not surprisingly, lower credit quality companies tend to issue shorter dated bonds. They also experience a lower present value of future payments due to their higher yield and discount rate (thus mechanically shortening duration). To an extent, then, a portion of these results reflect a trade-off of credit risk for duration risk, and it is important to take this into consideration. After adjusting for the longer duration, the lower leverage and higher cash flow coverage portfolios show a diminished return advantage, but also even lower volatility, thus maintaining their substantial Sharpe ratios. The higher quality corporate bonds deliver a more efficient credit risk exposure, providing the credit risk premium with significantly lower volatility.

We also found promising results when we tested published hypotheses that there is mean reversion in corporate bond markets. We grouped companies into deciles based on the change in option-adjusted spreads (OAS) over the prior 12 months, and measured the average change in OAS over the following 12 months.

The striking results are displayed in **Table 3**, showing strong evidence of mean reversion in these spreads. Those that have shrunk the most over the prior 12 months show the greatest increase over the subsequent 12 months, with a near-monotonic trend in declining subsequent spreads as we move down the table. This shows that the market tends to overshoot when re-pricing credit risk; about 10–15% of the spread movement is reversed within the next 12 months. This behavior reflects partially, not perfectly, efficient markets; the market usually gets the direction right, but often gets the magnitude wrong. The evidence of mean reversion suggests that rebalancing a portfolio on an annual basis, shifting weight away from bonds whose credit spread has decreased (and are now more expensive) and buying more of bonds whose credit spread has increased (thus becoming cheaper), should add value over the long run.

To recap, we did not find strong evidence that increased debt—measured via leverage and cash flow risk exposures—reliably produced incremental returns over the measurement period. On the contrary, we saw that accepting more risk might result in lower Sharpe ratios. Additionally, we identified another market inefficiency where spreads and prices tend to mean revert.

Designing a Corporate Bond Strategy

How then to use this knowledge in portfolio construction? Designing an index that systematically exploits established patterns of price anomalies or efficiently captures designated risk premia involves a rigorous process of formulating selection and weighting factors, evaluating hypothetical results, and refining the factor specifications. Design criteria include simplicity, efficiency, and cost-effectiveness. A core belief to guide this process is one of parsimony: an investment product should be as simple as necessary and no simpler. Strategy indices should have embedded selection, weighting, and rebalancing rules that are intuitive and easy to explain. They should create the desired risk exposures and net most of the targeted excess return with low leakage. And their liquidity and turnover characteristics should keep estimated implementation costs low relative to the potential for long-term value-added returns.

We saw that investors would benefit from a safer credit quality corporate bond index that avoided exposure to unpriced leverage and cash flow coverage risk and the

Table 3. Evidence of Mean Reversion in Corporate Bond Spreads		
	Average OAS Changes*	
Decile	Last 12 Months	Next 12 Months
1 (Low)	-127	15
2	-51	11
3	-29	9
4	-14	9
5	-1	6
6	12	4
7	26	5
8	43	4
9	73	7
10 (High)	200	-15

*Measurement period 1997–2013.
Source: Research Affiliates, LLC.

whipsaw and return drag induced via mean reversion in credit spreads. The portfolio construction process then worked out the best way to implement this goal in a liquid, scalable, rules-based index.

We achieved this goal by weighting according to two fundamental factors—long-term assets and cash flow—which impose a natural preference for lower leverage and higher cash flow coverage corporations relative to a market value-weighted index. Annually rebalancing to target fundamentals requires selling bonds whose spreads have shrunk and reinvesting in bonds whose spreads have opened up, leading to a natural buy low-sell high discipline. Such a rebalancing plan adds value in the presence of mean reversion. These factors form the basis for our new fundamentals-weighted corporate bond index.

Endnote

1. Long term assets, as used here, refers to the assets on which a company's long-term bondholders would have a claim in the event of default. It deducts the amount of short-term liabilities which rank higher than long-term bonds in the capital structure. As a practical matter, we calculate long term assets by adding shareholders equity to long-term bonds on the most recent balance sheet.

ABOUT THE AUTHOR

Dr. Shane Shepherd focuses on research into the company's alternative bond approach. In addition, he conducts quantitative research used to strengthen and expand the RAFI Fundamental Index concept, and to support the global tactical asset allocation model.

Prior to joining Research Affiliates, Shane served as a research assistant at the University of California, Davis Graduate School of Management, where he investigated issues in behavioral finance, and as a legal assistant at Morrison & Foerster, LLP.

Shane earned his Ph.D. in finance from the University of California, Los Angeles. He holds a BA in political science and philosophy from Duke University.

research affiliates®
620 Newport Center Drive, Suite 900
Newport Beach, California 92660
www.researchaffiliates.com