Shedding Light on Fixed-Income Performance Attribution

Fixed-income attribution explains the sources of a manager's active return. A complex process, attribution can be challenging to implement and often plagued by large, unexplained residual returns. Understanding the assumptions underlying a manager's attribution model and their relation to the investment process, along with a qualitative assessment, can help determine how well the attribution reflects the manager's decision-making skills and provide a clearer picture of performance.

Risk-adjusted performance metrics, such as the Sharpe ratio, the information ratio, and tracking error, can indicate how much risk a manager took and how well that risk taking was rewarded. Such metrics do not, however, specify how the risk was taken or whether that risk was consistent with the manager's investment process. Performance attribution reconciles the portfolio's active return—the performance relative to the benchmark—with the manager's active decisions.

Thomas Seay, managing director of research at Hartland & Co., an independent investment consulting firm, evaluates managers' attribution in conjunction with their performance. “I like to see if a manager's stated alpha sources are borne out with attribution,” says Seay. “We want to ensure that the manager is managing money in a manner consistent with why we hired them. If we hire a manager whose investment process is based on bottom-up fundamental analysis, we want to see the security selection come through in the decision-making process.”

An important tool not only for consultants and clients, attribution also provides valuable feedback to portfolio managers on the sources of performance, whether the active return was intentional, and whether their decision making yielded the anticipated results. Attribution methodologies for equities are relatively standard, but fixed-income investors face a myriad of attribution choices and challenges. Understanding issues inherent in fixed-income performance methodologies can lead to more informative performance assessments.

The Challenges of Fixed-Income Attribution

Equity performance attribution has long been standardized by the Brinson methodology, which identifies the value added from sector allocation (geographic, capitalization size, and so on) and security selection decisions using issue weights and prices. The earliest fixed-income attribution models were equity models, which fell short in explaining returns because they failed to reflect the fixed-income decision-making process. Fixed-income managers make more decisions and contend with more risk factors than equity managers. Bond managers may take positions based on their views on interest rates, yield curves, credit and securitized sector spreads, inflation, and idiosyncratic risk, among others.

Fixed-income portfolios also contain more types of securities than equity portfolios, and these securities are more complex. Each bond has not only a price and weighting but also a coupon, maturity, yield, and duration. Moreover, because attribution must also be calculated for the benchmark, the process can entail acquiring detailed information on thousands of bonds. Obtaining pricing information that matches the index can be challenging because bonds are priced by broker/dealers or matrices rather than by exchanges. Because many bonds trade infrequently, large discrepancies can exist between a manager’s pricing source and an index’s pricing source.

In his 2011 paper, “A Sector Based Approach to Fixed Income Performance Attribution,” Stephen Campisi,
CFA, illustrates the differences that can arise between traditional equity attribution and a fixed-income attribution model that decomposes returns by income, Treasury, spread, and selection effects. The sample portfolio generated a total alpha of 5 bps. Using the equity attribution model, the performance contribution from the security selection effect was −2 bps. In contrast, the selection effect from the Campisi fixed-income attribution model was 6 bps, substantially different in both percentage and direction. Based on the equity model, the manager would have been penalized for security selection decisions, whereas security selection made a large, positive contribution to returns according to the fixed-income attribution model.

**UNDERSTANDING FIXED-INCOME ATTRIBUTION**

Fixed-income performance attribution models generally fall into three categories: sector based, factor based, and hybrid models. Sector-based attribution, a variation of the Brinson model, decomposes active return into bond market sectors and security selection within each sector, with securities weighted by duration. Factor-based models explain excess returns based on systematic and nonsystematic risk and return sources. Hybrid models, as the name suggests, combine sector-based and factor-based attribution models. In practice, fixed-income attribution vendors offer an array of model variations, and many managers have their own in-house, customized attribution models as well.

Factor-based models vary by the number and types of factors included. The primary return components for fixed-income managers relate to yield curve changes, sector spread changes, and income. Yield curve movements can be measured by shift, twist, and butterfly effects. Shift refers to a parallel movement in the yield curve, when interest rates rise or fall by the same amount throughout the curve. Interest rates rarely shift uniformly throughout the curve, however, so interest rate changes can also be calculated by the twist effect, which measures changes in the curve’s slope, and by the butterfly effect, which measures changes in the curve’s shape. Interest rate effects can be further refined using key rate duration attribution, which measures the price sensitivity of a security to a change at a single point on the yield curve rather than to global yield curve movements. Attribution may also account for roll down, or the change in a bond’s price as it moves closer to maturity. Additional return sources might include currencies, inflation-linked securities, and derivatives, among others.

Traditional fixed-income attribution builds from the security level, or sometimes the sector level, by decomposing returns into such factors as duration, yield curve, and credit spread, then rolling up to risk or asset return buckets, and finally reaching a top-line performance number. The same operation is carried out for the benchmark. After all specified factor and/or sector returns are explained, any difference remaining between the benchmark and the portfolio returns is termed the residual return, which is typically classified as a “selection effect,” representing in theory the return resulting from idiosyncratic risk. Because bond pricing is heavily determined by such common factors as duration, coupon, and credit quality, bond security selection returns should generally be small compared with equities, which have widely varying returns.

**ASSESSING THE ATTRIBUTION**

The methodology of an attribution model should be consistent with the manager’s decision-making process. “The most important factor when selecting an attribution model is that it reflects the investment approach and philosophy of the investment manager,” says Dan Griffiths, consultant at Fixed Income Analytics Limited and founder of Attribution LAB. Factors to consider in evaluating a manager’s fixed-income attribution include the sources of return and risk used in the model, how the residual is determined, the manager’s investment style, and the types of securities held in the portfolio. Understanding the assumptions underlying a manager’s attribution model can help determine how well the attribution explains the investment process.

For managers who source alpha from duration and yield curve bets, for example, the value added from barbell or bullet positioning will be unidentifiable in an attribution model that aggregates all yield curve movements into a shift effect. An attribution model that decomposes returns into shift, twist, and curvature effects offers more insight into the manager’s interest rate calls. Models that use key rate durations, or partial durations, are particularly useful for liability-driven investment portfolios or portfolios with large allocations to securitized or amortizing assets that spread cash flows over a range of maturities.
High-yield bonds pose a unique challenge. Their performance is not driven primarily by sovereign curve movements and thus can be more akin to equity performance. Using an equity model to capture sector allocation and security selection within the high-yield market is often effective, although not without limitations. “One widely used approach is Brinson attribution, but this model can also miss numerous attribution return factor effects since high-yield bonds are not equities,” says Griffiths. “A hybrid attribution approach provides for different drivers of performance to be treated in different ways.”

A large selection effect or residual will always raise a red flag as to whether an attribution is meaningful because it leaves a sizable portion of performance unexplained. Differences between a manager’s pricing source and the benchmark index are one common source of residuals. Others include price differences between transaction prices and closing prices, overly simple attribution models that fail to account for enough return sources and, conversely, overly complex attribution models. Some managers use one attribution model for their entire suite of products, and the chosen model may suit some product types better than others. In general, a performance attribution system’s sophistication should reflect the sophistication of a manager’s investment process as well as the types of securities held in the portfolio.

Numbers, however, often fail to tell the whole performance story. Perhaps the simplest way to assess an attribution’s robustness is to see if it makes sense and whether the portfolio manager can explain it. Seay cites the case of a core bond manager whose stated investment process was based primarily on mortgage bond security selection, yet performance attribution showed that significant alpha was added by a short-duration position relative to the benchmark. In a follow-up conversation, the manager explained that when interest rates rose, the index’s duration had extended whereas the durations of their mortgage securities had not. The short-duration positioning resulted not from a macro call but from security selection. “Without knowing the manager or asking questions, one might think they were changing their strategy,” Seay says. “The attribution prompted me to ask a question, and in the discussion, I learned that they were doing what I hired them to do.”

**TRENDS TOWARD BETTER MODELS**

As fixed-income attribution methodologies have evolved, they have become more precise but not always more useful. In 2011, Campisi developed a sector-based model to “balance simplicity, clarity and understanding with rigor and accuracy” (p. 23). At the time, he wrote of the quest for precision: “Most recently we have seen a swing to the other extreme of complexity, with several versions of highly mathematical, multi-factor models that incorporate both structural and complex issue-specific factors. By mixing risk factors with issue selection parameters, these models produced results that were often incomprehensible due to their complexity and lack of intuitiveness—sometimes even for bond portfolio managers!” (p. 24). Such complex models tend to be the province of large asset managers because the cost of highly complex vendor solutions or internal constructs remains out of reach for most investment managers. Small firms with limited resources may find that a less resource-intensive system can explain most of their returns based on key risk factors in a way that most consultants find acceptable.

Recent developments in fixed-income attribution models include returns-based methodologies that are less data-intensive than factor-based methodologies but retain high explanatory power. Compared with the newer “data-light” models, traditional perturbational models have several drawbacks. “The obvious limitations are the vast amounts of fixed-income analytics required and the need for the data quality to be 100% accurate 100% of the time,” Griffiths notes. “A bad price or duration can throw off the whole attribution, and it then becomes a case of hunt the basis point and try to quantify the residual.”

**CONCLUSION**

Fixed-income performance attribution has a long history of being vexing to implement and even to decipher. Seay calls it an “imprecise science,” noting that he has seen many types of attribution reports and there is no industry standard. “The details of the attribution are not as important as alignment between the firm’s style and its results,” he says. Knowing that a manager’s active return was intentional and that the manager understands the source of that return increases Seay’s confidence in the manager’s skill.

Fixed-income attribution methodologies continue to evolve as managers seek models that reflect the complexity of the investment process but demand fewer resources and are more intuitive than current models. Ultimately, the most appropriate attribution model for a manager will balance the needs and sophistication of his or her
clients with a fair representation of the investment process. Attribution itself cannot tell the performance story in its entirety, however, so asking follow-up questions is an important piece of the puzzle.

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REFERENCES

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