Schroder Investment Horizons

Liability driven investing: alpha matters more than you think

For a hedging allocation, many believe that the main goal should be minimizing tracking error to a suitable benchmark, not seeking benchmark out-performance. We would challenge this view.

For most valuation purposes, long-dated US corporate bonds are the best available hedging assets for pension liabilities. It is, however, widely known that downgraded bonds cause asset indices to underperform “matching” liability valuations. We contend that this underperformance is more significant and persistent than many may realize. In addition, we’d argue that many pension plans also under-appreciate the limitations of asset benchmark tracking error. As such, we do not believe an allocation to an indexed strategy is a fully adequate liability hedge and have analyzed this premise from a number of points of view.

The impact of downgrades on returns of rules-based bond portfolios

First we turn to a related finding, one that is perhaps commonly known but less than fully appreciated. If we were to ask “What is the expected 15-year earned excess return (over duration matched Treasuries) of an A-rated or better long corporate bond index if credit spreads start and end at approximately 1.70%?”, few would answer virtually zero.

If you refer to Figure 1, the “missing” return for the time period shown was about 1.58% (after deducting 0.10% from 1.68% to allow for estimated impact of defaults, based on historical experiences). This appeared to be the result of forced “sales” from the index when a bond’s rating falls below single A – securities are sold at higher yields / lower prices than remaining bonds in the index and newly issued bonds. Once removed from the index, the bonds cannot earn back the higher yields over time. The effect has been evident over multiple periods, for whole maturity and long indices, and has been for virtually all ratings categories (long BB securities being a notable exception).

Executive summary

- The Schroders Fixed Income team examines the phenomenon of the ‘downgrade effect’ by constructing their own LDI models in order to analyze the potential impact security downgrades would have on a hypothetical plan with index matching liabilities.
- While most LDI investors are aware of a “downgrade effect”, many may be surprised at its magnitude and persistence. A large part of this phenomenon can be attributed to the fact that liability valuation discount rates “have no memory” of bonds that are downgraded out of the ratings universe, while their impact remains with corresponding assets.
- A similar effect is evident in the realized excess returns of credit indices. These fail to achieve the yield spreads at purchase as “forced sales” of downgraded bonds essentially lock in downgraded prices.
- Earned excess return has been highly dependent on spreads at purchase.
- The team then goes on to examine how comparing manager performance versus an asset benchmark can provide a misleading view of “risk” for a corporate pension plan.
- Relying solely on a low index tracking error/passive corporate bond strategy will almost certainly “lock in” persistent underperformance and meaningful tracking error vs. liabilities. Therefore, investors should consider the merits of active management in LDI, which offers the potential to buy and sell the ‘right’ bonds at the ‘right’ time in order to improve liability returns.

1 Source: Barclays, Schroders. Analysis and results based on the difference between compound index return and compound matching treasury return from March 31, 2000 (OAS 171 bp) to June 30, 2015 (163 bp). Average OAS for the period was 156 bp.
A purely A-rated long bond index even exhibited negative excess returns over some periods with the same starting and ending spreads.  

**Figure 1: The depletion of purchase spread from following index rules**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Starting OAS</th>
<th>Excess Return</th>
<th>“Missing” Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inv. Grade</td>
<td>1.49%</td>
<td>0.71%</td>
<td>-0.79%</td>
</tr>
<tr>
<td>A or better</td>
<td>1.12%</td>
<td>0.43%</td>
<td>-0.69%</td>
</tr>
<tr>
<td>AA</td>
<td>0.84%</td>
<td>0.39%</td>
<td>-0.44%</td>
</tr>
<tr>
<td>A</td>
<td>1.18%</td>
<td>0.27%</td>
<td>-0.91%</td>
</tr>
<tr>
<td>BBB</td>
<td>1.89%</td>
<td>0.96%</td>
<td>-0.92%</td>
</tr>
<tr>
<td>BB</td>
<td>3.28%</td>
<td>2.78%</td>
<td>-0.50%</td>
</tr>
</tbody>
</table>

Source: Barclays, Schroders for period between March 31, 2000 through May 29, 2015. Chart shown for illustrative purposes and does not reflect any actual portfolio. Performance for other periods would differ. Past performance is no guarantee of future results. Please refer to the appendix for additional information.

**Changes to bonds in an index**

The phenomenon is a feature of “rules based” bond selection, such as, index inclusion rules (and by extension, close portfolio adherence to benchmarks). Liability valuations are, in many ways, an example of such rule based bond selection. The yields used for discounting the liabilities are derived from a bond universe with clearly defined ratings rules. As a bond’s yield increases up to the point of a downgrade, asset and liability values suffer equally. Once the bond is removed from the index/portfolio and liability valuation universe, the index/asset portfolio losses remain. However, losses reflected in the liability valuation disappear as discount rates fall to those derived from the remaining bonds.

**Figure 2: The impact on funded ratio of extra liability return due to changes in index bonds**

Put another way, at the end of each valuation month, the bonds used to discount liabilities deviate from those held over the month as issues are added to the index and securities downgraded below a certain threshold are removed. These changes do not produce an actual return on the asset side, but the liabilities “earn” an extra return as they are re-valued at the lower average discount rates of the newly constituted bond universe. It is possible to estimate this extra return for an asset index by examining the actual bond movements each month and calculating changes in average yields for various maturity/duration buckets.

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2 Negative excess returns could be expected and do occur when spreads widen sufficiently.
This second part of our analysis of “the downgrade effect” focuses on a set of bonds which approximates the universe for determining funding discount rates published by the IRS – the Barclays Long Corporate A-rated or better Index. Figure 2 shows the cumulative deterioration in funded ratio if a fully funded pension plan had the same liabilities as this index and its assets were fully invested in the index on the assumption that the liabilities increased by the extra amount (discussed in the previous paragraph) over and above the index return earned by both assets and liabilities. This amounted to a compound deterioration of 61 b.p. (p.a.) over the period shown.

**Estimating liability outperformance: a hypothetical plan with asset index matching cashflows**

For the final method of estimating the extent of the effect, we once again assume liabilities match the cashflows of the Barclays Long Corporate A-rated or better Index. This time, however, we calculated liability returns directly from published valuation discount rates.

![Figure 3: Funded ratio depletion of passive index matched plan](image)

Source: IRS, Barclays, Schroders as of March 2015. Cash flows are matched with index at December of each year.

Once again, a fully funded plan invested in a “matching” index saw significant and persistent deterioration in funded ratio – in this case averaging 1.30% p.a. With this method, there is no attempt to attribute the cause, and the results in our view reflect the combined effect of various factors such as specifics of the discount rate determination methodology in addition to the main driver – “downgrade bleed”.

It is, however, interesting to note that the average annual underperformance was similar to the “missing” credit premium for the Long Corporate A-rated or better index in Figure 1. Even at the more conservative levels estimated from bond composition changes in asset indices, the long term impact on funded status was sufficiently large to question the utility of passive credit allocations for hedging. In conclusion, alpha matters.

**Valuations matter**

In the above analysis of “missing” credit premium, we have purposely removed the impact on excess return of changes in starting and ending spreads. This can be significant. In fact, a focus on valuation (spread levels) when increasing or decreasing allocations to credit can be a driver of outperformance.

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3 Source: Barclays, Schroders  
4 Source: IRS, Barclays, Schroders
Figure 4: Earned excess return has been highly dependent on purchase spreads

Figure 4 shows that earned excess return has been highly dependent on spreads at purchase (here we have assumed an arbitrary and fixed 3 year holding period). Selling successfully at tight spread levels could potentially add further outperformance. A simplistic look at Figure 3 suggests that an excess return of approximately 1.8% p.a. would have been earned with spreads at current levels.

Of course, past performance is no guarantee of future performance. Many other factors play a role in determining prospective returns from holding credit, including “technicals” (corporate bond supply and demand), macro-economic factors, risk appetite and trends and shocks in industry and individual company creditworthiness.

Nonetheless, we believe that an active credit allocation strategy with a strong focus on valuation can go a long way in earning back the “missing” credit premium and allow a pension hedging allocation to keep pace with liabilities.

Source: Barclays, Schroders. Based on Rolling 3-year periods beginning May 31, 1993 through June 2015. Past performance is no guarantee of future results. Other periods would have achieved different results.
Why tracking error matters less than you think

We now turn to the industry focus on asset benchmark tracking error. Figure 5(a) is a familiar asset “risk” / return graph for various asset classes. It also shows a point for the returns of a hypothetical liability over the period. We believe that the essence of LDI is contained in the change of view represented by moving from the “risk” / return graph on the left, which plots absolute returns and volatilities to that on the right, which plots returns and tracking error relative to liabilities.7

Figure 5a, b: Volatility and liability tracking error across asset classes
12-year period ended June 30, 2015

Looking at a number of different periods, we can see from Figure 6 that the long bonds of the Barclays Long Gov/Credit Index have tracked the liabilities most closely. Shorter-dated bonds of the Barclays Aggregate Index have been “more risky” and have generally underperformed more over periods of falling rates. The high “risk” / hugely variable return outcomes of equities are also clearly evident.

Figure 6: Long-dated bonds as de-risking assets for pension plans
June 2001-June 2015

Source: Barclays, eVestment, IRS, Schroders through June 2015. Liability cash flows assumed equal to Barclays Long Gov. / Credit Index at December of each year; valued monthly using Citi Pension discount rates. Tracking Error (TE) reflects the difference in price changes between a given portfolio relative to a benchmark (BM) index. Past performance is no guarantee of future results. Please refer to the appendix for definitions.

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Figure 6: Long-dated bonds as de-risking assets for pension plans
June 2001-June 2015

Source: Barclays, Bloomberg, Society of Actuaries, Schroders through June 2015. Past performance is no guarantee of future results. Please refer to the appendix for additional information.

7. Source: Barclays, eVestment, IRS, Schroders. Liability cash flows assumed equal to Barclays Long Gov. / Credit Index every December 31st; valued monthly using Citi Pension discount rates.
Allocating to a Long Gov/Credit benchmarked bond manager would have been likely to produce returns that match changes in liability values more closely than allocating to a Barclays Aggregate benchmarked manager (let alone an equity manager). It is tempting to make the further assumption that a manager who matches this better benchmark most closely will produce the best hedging outcome. In our view this would be wrong. We can see in the following Figure why judging the effectiveness of liability hedging through the use of asset benchmark tracking error may provide a misleading view.

Figure 7(a) below shows “risk” and return versus the (Long Gov/Credit) asset benchmark. Low tracking error managers (shown in dark blue) matched the index within 2% standard deviation; mid-range managers (shown in yellow) between 2% and 4% and most high “risk” managers (shown in light blue) above 4%. Figure 7 (b) on the right shows the returns of the same managers over the same period but measured against liability returns. The apparent advantage of low benchmark tracking error in terms of risk reduction disappears. In effect, those managers have merely locked in the tracking error of the liabilities to the benchmark – which is of a similar level as the benchmark tracking error of “high risk” managers.

**Figure 7a, b: Asset benchmark tracking error can provide misleading view of risk**

10-year period ended March 2015

This phenomenon has been apparent, although to differing extents, over all periods. Although some residual tracking error can be attributed to the significant weighting to Treasuries in the Long Gov/Credit index, similar results hold for managers using asset benchmarks which aim to more closely match bond universes used for liability valuations: Long Credit and even Long Corporate A-or-better benchmarked managers.

We believe that the inherent limits to the degree to which any asset benchmark can match liability returns limits the value of the metric – and more importantly of the goal of an index-hugging strategy.
Conclusion: Why alpha matters

As we’ve demonstrated through our analyses, obtaining alpha over an asset benchmark is necessary for hedging assets to keep pace with liability returns because “downgrade bleed” can almost certainly impact mandates that look to closely match an asset benchmark – regardless of whether the plan is tracking a traditional or more customized benchmark index. While this is not a new revelation, we’d argue that many plans may not be aware of the magnitude nor the persistence of the potential deterioration over time.

We acknowledge that tracking error does have its use within LDI. However, we believe that benchmark tracking error for gauging “risk” to hedging outcome provides a rather misleading view. Relying solely on a low index tracking error/passive corporate bond strategy will almost certainly “lock in” persistent underperformance – and meaningful tracking error to liabilities.

In short, active management should be a strong consideration for LDI plans. In our minds, a value focused active management strategy that looks to buy and sell the ‘right’ bonds at the ‘right’ time can ameliorate liability outperformance at insignificant marginal tracking error to liabilities.

About the author

Jeff Connor is a Senior Investment Risk Strategist with the Schroder US Fixed Income team. He is responsible for developing long duration bond portfolio based de-risking strategies for pension funds and other institutional investors, and working more broadly with investment teams in the US on enhancing risk management strategies and tools. Jeff commenced working at Schroders in 2012.

Jeff was Director of Research and Co-Portfolio Manager of Emerging Markets Hedge Funds for Atticus Capital from 2003 to 2008 and for Oppenheimer & Co. Inc. from 1993 to 1998.

Prior to working for a number of hedge funds, his previous investment career included assisting in the establishment of an equity derivatives group at Deutsche Bank’s stock broking subsidiary in Australia in 1993. Prior to that, he was a Manager in the commodity derivatives and structured finance groups at Bankers Trust Australia after joining them in 1987 as a Fixed Income analyst.

Jeff started his career as an actuarial assistant in the Superannuation division of the AMP Society in Australia.
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Appendix

Figure 1: Excess Return is the difference between the per annum compound return of the relevant corporate index over the entire period and the per annum compound return of duration matched treasuries. Duration matched treasury returns over the period is calculated by compounding the monthly implied treasury return for each month. The monthly implied treasury return for each month is calculated by subtracting the excess return from the index return for that month. Results for other periods would vary.

Figure 6. A point in the graph is shown for each asset class for each five year period from June 2001 to June 2015. Each point shows the outperformance and tracking error over the five years of the asset class monthly returns to the returns of a hypothetical plan. The cashflows of the hypothetical plan are adjusted every June 30 to match the cashflows of the Barclays Long Government Credit Index as of December 31 of that year and remain constant for the start of each of the following 12 months. Results for other periods would vary.

Figure 7. Performance is shown for each manager in eVestment with a Long Government Credit benchmark and 10 year track record. Figure (a) shows a traditional view of benchmark outperformance / tracking error. Figure (b) calculates outperformance and tracking error to liability returns of a hypothetical plan – which are calculated as for Figure 6. Tracking errors are calculated as the average over the 12 calendar months of tracking error of annual returns ending each respective calendar month. Results for other periods would vary.

Each of the indices referenced herein are a fully invested, unmanaged, widely used proxy for their respective investment universe and do not include any transaction costs, management fees or other costs. The Barclays Aggregate Bond Index is a widely used, unmanaged proxy for the US fixed income market. The Barclays Long AAA Rated Credit Index is a broad bond market index covering the US investment-grade fixed corporate bond market. The Barclays Long Corporate Index is a broad bond market index covering the US investment-grade fixed corporate bond market. The Barclays Long Corporate Index, A rated and above is a broad bond market index covering the US investment-grade fixed corporate bond market. The Barclays Long Government/Credit Bond Index is a bond market index covering the US investment-grade fixed corporate and government bond market. For purposes of the illustration, ‘US Equities’ were represented by both the S&P 500 and Russell 2000 indices. The S&P 500 Index is a widely used proxy for U.S. stock market performance. The Russell 2000 index is an unmanaged small-cap stock market performance proxy. For purposes of the illustration, ‘International Equities’ were represented by both the MSCI Emerging Markets and MSCI World ex US indices. EM equities were represented by the MSCI Emerging Market Index, a widely used EM stock market performance measure. The MSCI World ex US Index is a widely used foreign stock market performance measure. Investors cannot invest directly in any index.

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