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Using an LDI Completion Manager: A CUSTOM BENCHMARK APPROACH

Justin Harvey
ASA, CFA

EXECUTIVE SUMMARY

- Recent improvements in the funded status of many corporate defined benefit plans have accelerated interest in liability-driven investing (LDI) and led many sponsors to more clearly articulate their LDI objectives. However, the fixed income benchmarks typically used to measure the performance of LDI strategies can be improved.
- T. Rowe Price has developed a methodology for constructing custom LDI benchmarks at the most granular level—from the individual cash flows, both principal and coupon, derived from a given fixed income opportunity set.
- Sponsors may be able to preserve existing manager relationships and avoid transition costs by adding a completion manager tied to a custom benchmark. In our hypothetical scenario, adding a completion benchmark to a multi-manager portfolio reduced tracking error against accounting standards codification (ASC) liabilities by more than 40%.

THE NEXT STEP IN LDI EVOLUTION

As corporate defined benefit plans increasingly have shifted their focus to portfolio de-risking, many have sought fixed income benchmarks that are better aligned with the specific objectives they hope to achieve through liability-driven investing (LDI).

Some sponsors have shifted to longer-duration measures, such as the Barclays Long Credit Index or Barclays Long Government/Credit Index, while others have adopted compound benchmarks or duration-targeted indexes.

T. Rowe Price believes an even higher level of customization is both necessary and feasible. Accordingly, we have developed a methodology for constructing custom fixed income benchmarks at the most granular level possible—the individual cash flows, both principal and coupon, derived from a given fixed income opportunity set.

Based on the bonds in the relevant opportunity set, we create a benchmark that matches, as precisely as possible, a plan's projected liability cash flows. To ensure continuous liability matching, this investible benchmark is then reset each year to reflect the plan's actuarial experience, new pension cash flow accruals, and bond market developments.[1]

[1] For a fuller description of T. Rowe Price's methodology, please see the Appendix on page 4.

SPONSOR OBJECTIVE: REDUCE LIABILITY-RELATIVE VOLATILITY IN A MULTI-MANAGER STRUCTURE

As sponsors move along their de-risking glide paths and allocate more plan assets to fixed income, they may find they need to add investment managers to their portfolios. However, as the number of LDI managers increases, it may be more challenging for the sponsor to keep the overall program in line with their objectives.

Sponsors wishing to implement a custom LDI benchmark in a multi-manager structure may choose to designate a completion manager to ensure more precise liability matching. Under this approach:

- Step 1: The sponsor adopts a custom benchmark for the entire fixed income LDI portfolio, reflecting the plan's entire expected cash flow stream.
- Step 2: The completion manager reviews the holdings of current managers to identify gaps in the LDI portfolios relative to the plan's custom benchmark.
- Step 3: A secondary benchmark is created for the completion manager, using the optimal configuration (based on a given opportunity set) for filling the liability gaps.

This approach may require flexibility in security selection. The completion manager may have to take some non-benchmark positions to fill gaps or to diversify away from highly concentrated positions in the benchmark, depending on the breadth of the investment opportunity set and the sponsor's objective.

Figure 1 (left, below) shows a hypothetical example of how a defined benefit sponsor might use T. Rowe Price's custom LDI benchmark framework for their completion manager. In this case, the plan sponsor already has a long credit and a long government/credit manager in place but would like to reduce the volatility of funded status as shown on the sponsor's balance sheet under U.S. accounting standards codification (ASC) rules.

The investment opportunity set is defined by the Barclays AA Credit Index, reflecting the universe used for discounting ASC liabilities. A custom completion benchmark could also use a broader opportunity set depending on what specific objective the sponsor is trying to achieve. Figure 2 (right, below) shows the top 10 holdings of the custom benchmark.

In our hypothetical example, the current managers are underexposed in the first 25 years. This results in lower liability-relative tracking error and reduced monthly return differences (Figure 3 and Figure 4, page 3).

In our example, the custom completion benchmark reduced tracking error in the total portfolio by outperforming liabilities in periods when benchmarks for the other two managers underperformed, and vice versa. Adding the custom completion manager benchmark reduced the performance difference between the total portfolio and the sponsor's U.S. ASC liabilities by more than 40% compared to the Barclays Long Credit Index, achieving the stated LDI objective.

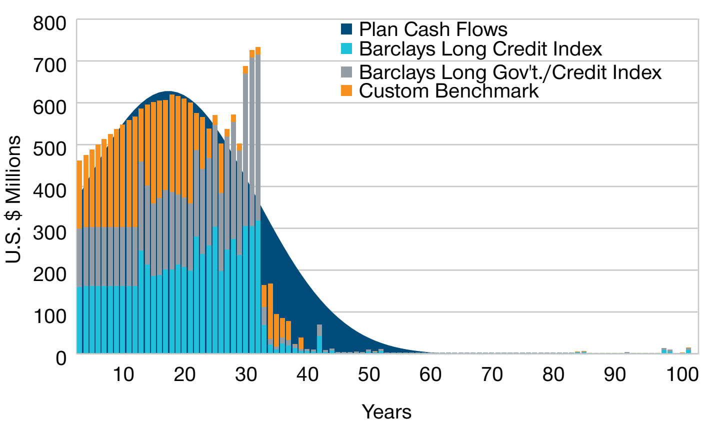
CONCLUSIONS

T. Rowe Price believes LDI performance benchmarks should reflect each plan sponsor's specific investment goals and objectives. To that end, we have developed a customization methodology that we believe will enable sponsors to align their fixed income allocations and their LDI objectives with far greater precision than either standard market benchmarks or more specialized duration-targeted or compound indexes.

FIGURE 1: **Example of a Hypothetical Custom LDI Completion Manager Benchmark**

Sponsor's Assumed Target Is a 100% Hedge Ratio

Data as of 30 Sept 2015



Source: T. Rowe Price.

FIGURE 2: **Ten Largest Issues in a Hypothetical Custom Completion Manager Benchmark**[2]

As of 30 Sept 2015

Issues	Index Weight
Verizon 4.86 '46	2.00%
University of California 6.55 '48	1.30
Illinois 5.10 '33	1.19
Port Authority of NY & NJ 4.93 '51	1.03
GE 6.75 '32	1.00
San Diego 5.91 '48	0.86
Deutche Telecom 8.75 '30	0.78
British Telecom 9.63 '30	0.72
Pacific Gas & Electric 6.05 '34	0.71
Verizon 4.52 '48	0.70

Source: T. Rowe Price.

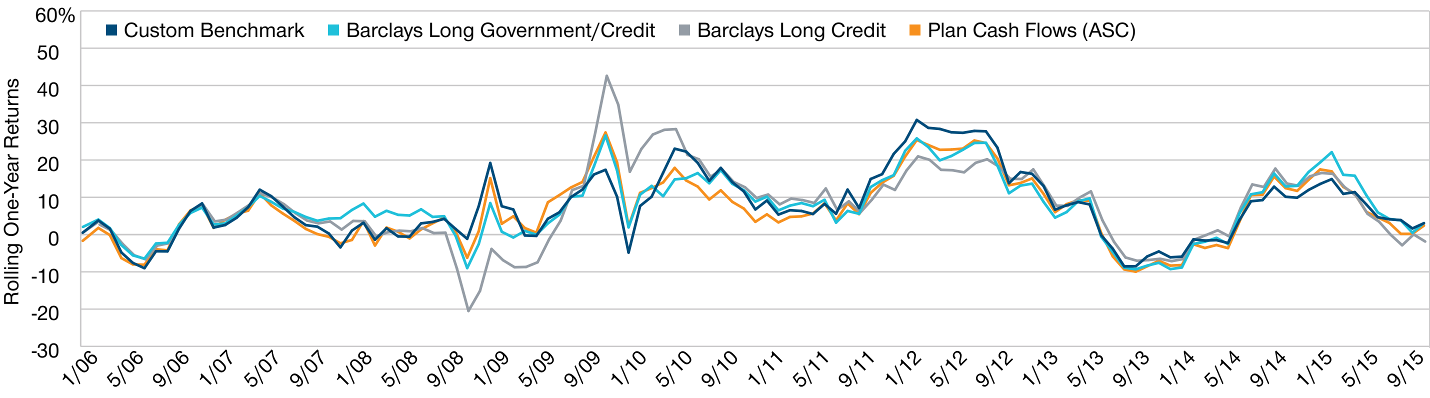
[2] Please refer to the disclosures at the end of this material for important additional information.

Customized benchmarks also should allow sponsors to provide investment managers with more precise mandates and allow more granular performance attribution for both plan assets and plan liabilities.

Plans employing multi-manager structures may be able to leverage these benefits further by designating a completion manager to fill gaps in the liability exposure that are not hedged by the fixed income managers currently in place. By using a completion manager with their own custom benchmark, sponsors may be able to minimize changes to their existing portfolios, preserve existing manager relationships as they de-risk, and avoid transition costs—while still benefiting from a customized LDI strategy tailored to their objectives.

FIGURE 3: **Rolling One-Year Gross Returns on Hypothetical Plan Cash Flows and LDI Benchmarks, Including a Hypothetical Custom Completion Manager Benchmark**

31 Jan 2006 Through 30 Sept 2015



Sources: Barclays and T. Rowe Price.
Past performance is no guarantee of future results. Custom benchmark and Sample Plan returns do not reect the deduction of management fees.

FIGURE 4: **Key Characteristics of Hypothetical Plan Cash Flows, Barclays Benchmarks, and a Hypothetical Custom Completion Manager Benchmark**[3]

28 Feb 2005 Through 30 Sept 2015

	Duration as of 30 Sept 2015	Total Annualized Return	Annual Tracking Error Relative to Liabilities	Average Monthly Return Difference From Liabilities
Sample Plan Liability (ASC)	12.5	5.58%	N/A	N/A
Barclays Long Credit	13.3	5.99	4.85%	0.98%
Barclays Long Gov/Credit	14.8	6.40	3.45	0.73
Sample Completion Manager Portfolio	10.4	6.48	3.63	0.75
Total Plan Assets	12.9	6.34	2.73	0.51

Source: Barclays, T. Rowe Price; data analysis by T. Rowe Price.
Past performance is no guarantee of future results. Custom benchmark and Sample Plan returns do not reflect the deduction of management fees.

[3] Please refer to the disclosures at the end of this material for important additional information.

Appendix: Constructing Custom LDI Benchmarks

T. Rowe Price has developed its own custom LDI benchmark methodology, which we believe has the potential to:

- reduce liability tracking error compared with market cap-weighted benchmarks and composites,
- allow managers to tailor their investment process more closely to sponsor objectives in terms of spread, duration, and curve sensitivities,
- demonstrate their performance relative to plan liabilities more precisely.

STEP ONE: DEFINE THE OPPORTUNITY SET BASED ON THE SPONSOR'S LDI OBJECTIVES

Hedging asset performance should be monitored as closely as possible against the liability measurement most meaningful to the sponsor. Because different regulatory and accounting regimes use different discount rates, the optimal opportunity set will depend on the sponsor's de-risking priorities.

STEP TWO: CONSTRUCT A YIELD CURVE

Once the relevant fixed income opportunity set has been defined, bonds are broken down into their discrete coupon and maturity cash flows. In essence, this procedure treats every cash flow as if it were a separate zero-coupon bond, then uses those flows to construct a zero-coupon yield curve that can be matched against the plan's cash flows.

STEP THREE: ESTIMATE THE PRESENT VALUE OF LIABILITIES

Discounting plan cash flows using the model curve provides the yields needed to determine the plan's interest rate sensitivity at each point on the curve. The curve is stressed by incrementally increasing and decreasing the yields at each point in order to determine key rate durations (KRD).

STEP FOUR: OPTIMIZE THE BENCHMARK

Asset cash flows are matched to liability KRDs, taking into account how much impact each point on the curve has on the overall present value of plan liabilities. The result is a customized benchmark in which asset and liability weights are matched relatively precisely, especially in the most interest rate sensitive portion of the curve.

With the structure in place, the mandate to the asset manager becomes relatively straightforward: either replicate or outperform the liability-matching cash flow benchmark, while also matching spread and curve sensitivities as closely as possible using instruments that are actively traded and have a reasonable degree of market liquidity.

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