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Reducing Volatility of IRS Funded Status: A CUSTOM BENCHMARK APPROACH

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.
- We provide a hypothetical example of a sponsor seeking to minimize tracking error relative to plan liability as valued using the IRS yield curve. The IRS's valuation methodology makes cash flow matching and interest rate hedging inherently more difficult than liability valuation using accounting methodology. However, there are still benefits in a custom benchmark approach for sponsors sensitive to IRS valuation.

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: MINIMIZE TRACKING ERROR RELATIVE TO IRS VALUATION OF PLAN LIABILITY

To highlight the potential benefits of T. Rowe Price's LDI customization process, we have created a benchmark for the hypothetical plan liability structure shown in Figure 1 (below, left). In this example, the sponsor's primary LDI objective is to minimize the tracking error of portfolio returns relative to plan liability returns as valued using the IRS's yield curve methodology. In our view, such a benchmark might be appropriate for sponsors who share one or more of the following characteristics:

- are focused on cash contributions,
- are sensitive to the cost of Pension Benefit Guarantee Corporation premiums,
- are considering opening a lump-sum window to participants in the future.

> "The sponsor's primary LDI objective is to minimize the tracking error of portfolio returns relative to plan liability returns as valued using the IRS's yield curve methodology."

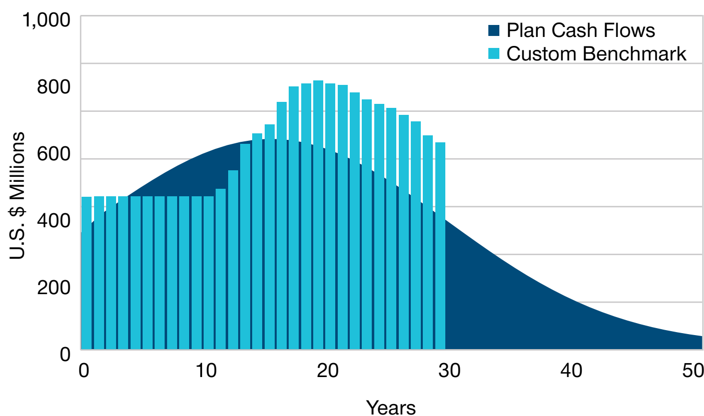
We believe the most appropriate investment opportunity set for this benchmark would be a higher-quality (AAA–A) investment grade corporate bond universe, since those are the bonds used by the IRS to create the yield curve for the liability calculation. The 10 largest issues in our hypothetical custom benchmark are shown in Figure 2 (below, right).

Because of the IRS yield curve methodology, cash flow matching and interest rate hedging precision are inherently more difficult in this example than they would be for sponsors with other objectives, such as hedging plan liabilities calculated using accounting standard codification (ASC) procedures.

The IRS yield curve, while published at the end of each month, is not a true marked-to-market curve. Published yields are determined by averaging market yields over the entire month. In trending or volatile months, these published values may differ significantly from actual month-end yields. However, we believe that over the course of longer periods, custom benchmarks constructed using our methodology still should track IRS valuations more

FIGURE 1: **Hypothetical Custom Benchmark for Client Seeking to Minimize Tracking Error Relative to IRS Valuation of Plan Cash Flows**

Data as of 30 Sept 2015



Source: T. Rowe Price.

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

As of 30 Sept 2015

Issues	Index Weight	Rating
Chrystler 8.5 '31	2.73%	A
GE 6.75 '32	2.27	A
Pacific Gas & Electric 6.05 '34	1.69	A
Medtronic 4.63 '45	1.07	A
GE 6.88 '39	0.98	A
United Technologies 4.5 '42	0.86	A
Walmart 7.55 '30	0.86	AA
Goldman Sachs 6.13 '33	0.84	A
Medtronic 4.38 '35	0.80	A
Shell 4.38 '45	0.78	AA

Source: T. Rowe Price.

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

closely than standard market-based LDI benchmarks (Figure 3 and Figure 4, right). The annual tracking error for our benchmark is slightly less than for the market indexes shown in Figure 4.

CONCLUSIONS

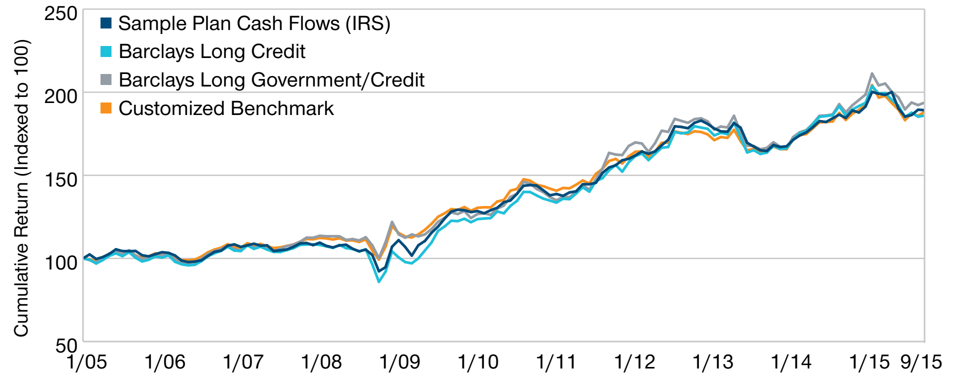
T. Rowe Price believes LDI performance benchmarks should reflect each plan sponsor's specific investment objectives. To that end, we have developed a customization methodology that we believe will enable sponsors to align their fixed income allocations and their LDI objectives with far greater precision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

While hedging a liability valued using the IRS yield curve presents unique challenges—such as concentration risk and smoothed liability returns—a benchmark explicitly constructed to reflect a plan's unique interest rate exposures should better align LDI portfolio performance with sponsor objectives.

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

FIGURE 3: **Cumulative Gross Returns on Hypothetical Plan Cash Flows and LDI Benchmarks, Including a Hypothetical Custom Benchmark**

31 Jan 2005 rough 30 Sept 2015



Sources: Barclays, 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.

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

28 Feb 2005 Through 30 Sept 2015

	Total Annualized Return	Annual Tracking Error Relative to Liability	Average Monthly Return Difference From Liability
Sample Plan Cash Flows (IRS)	6.16%	N/A	N/A
Barclays Long Credit Index	5.99	6.48%	1.41%
Barclays Long Gov't./Credit Index	6.40	7.50	1.61
Custom Benchmark	6.11	6.21	1.39

Source: 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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