



LDI Solutions

PENSION CURVE INSIDER

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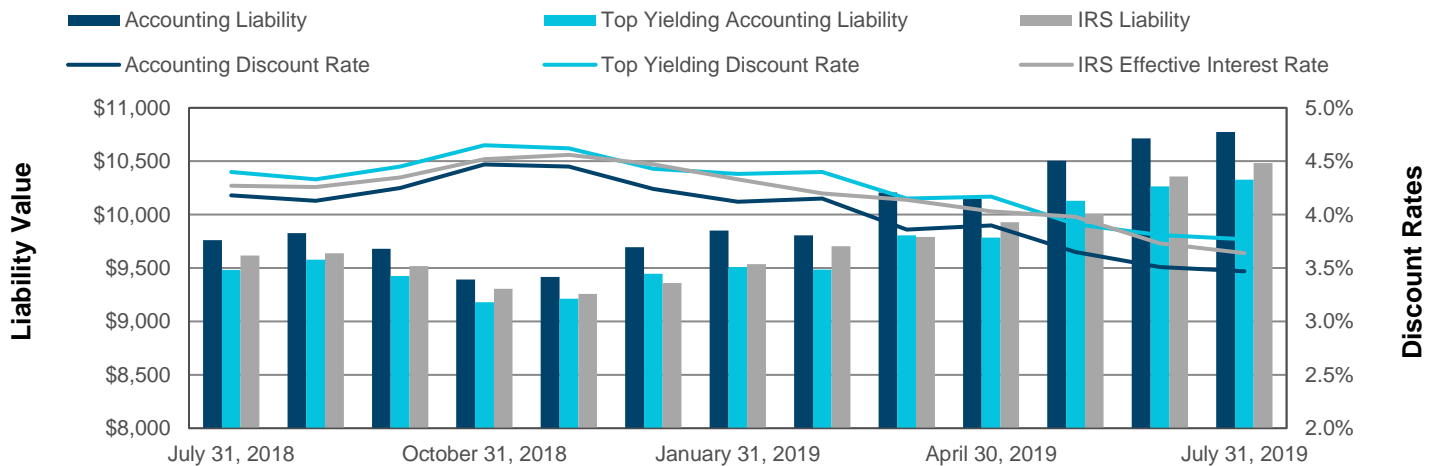
MONTHLY RECAP

Marked-to-market discount rates nudged down in July as short Treasuries followed the Federal Reserve's rate cut. The belly of the curve ticked up around 10 bps while the long end stayed mostly level. Discount rates generated using the AA-rated spot and top-yielding curves fell 4 basis points apiece. Investment grade spreads reversed course and came in as much as 10 basis points. Discount rates based on the IRS curve, with its averaging methodology, also fell during the month.

Liability values continue the march upward, with discount rates now 71 basis points lower than a year ago using the AA-rated credit universe. Top yielding AA-rated bonds are 63 basis points lower than July 2018 and provide 30 basis points of additional yield relative to the broader market.

Turnover activity edged down in July, with just over 1% of the AA-rated index changing eligibility during the month. The month's activity was split evenly between entering and exiting issues, totaling \$7.5B in market value. Apple and TD Bank each contributed to the month's exiting issues, accounting for about \$3B. Total Capital International made up the month's only new issues, totaling 3 bonds worth \$3.2B.

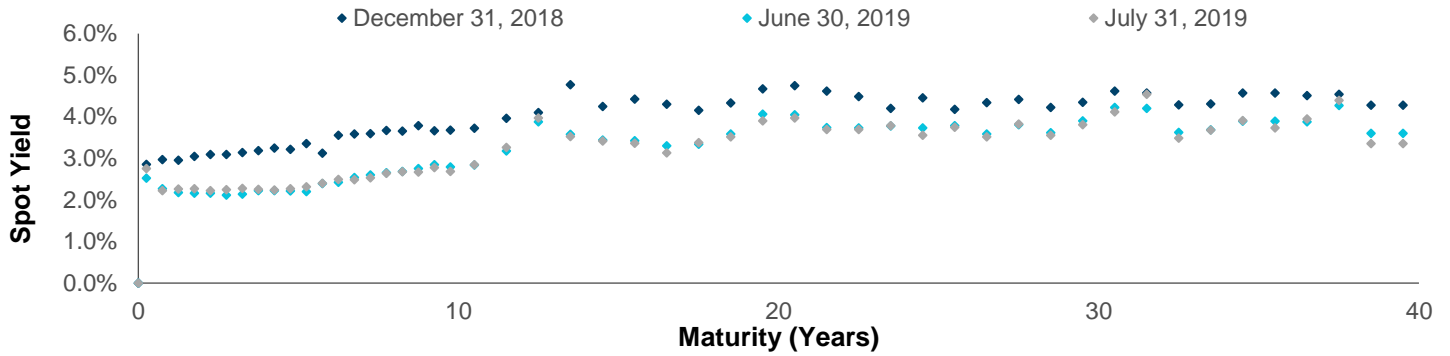
LIABILITY IMPACT



Yield Curve	Liability Value 7/31/19	Discount Rate 7/31/19	Liability Value 6/30/19	Discount Rate 6/30/19	Liability Value 12/31/18	Discount Rate 12/31/18
Accounting Yield Curve	\$10,773	3.47%	\$10,713	3.51%	\$9,695	4.24%
Top Yielding Accounting Curve	\$10,327	3.77%	\$10,264	3.81%	\$9,446	4.43%
IRS Yield Curve	\$10,483	3.64%	\$10,358	3.73%	\$9,400	4.44%

Sources: Bloomberg Barclays. Bloomberg Index Services Ltd. Copyright 2019, Bloomberg Index Services Ltd. Used with permission. IRS, and T. Rowe Price. Sample plan cash flows have a liability of \$10,000 at 4.0% discount rate.

ACCOUNTING CURVE



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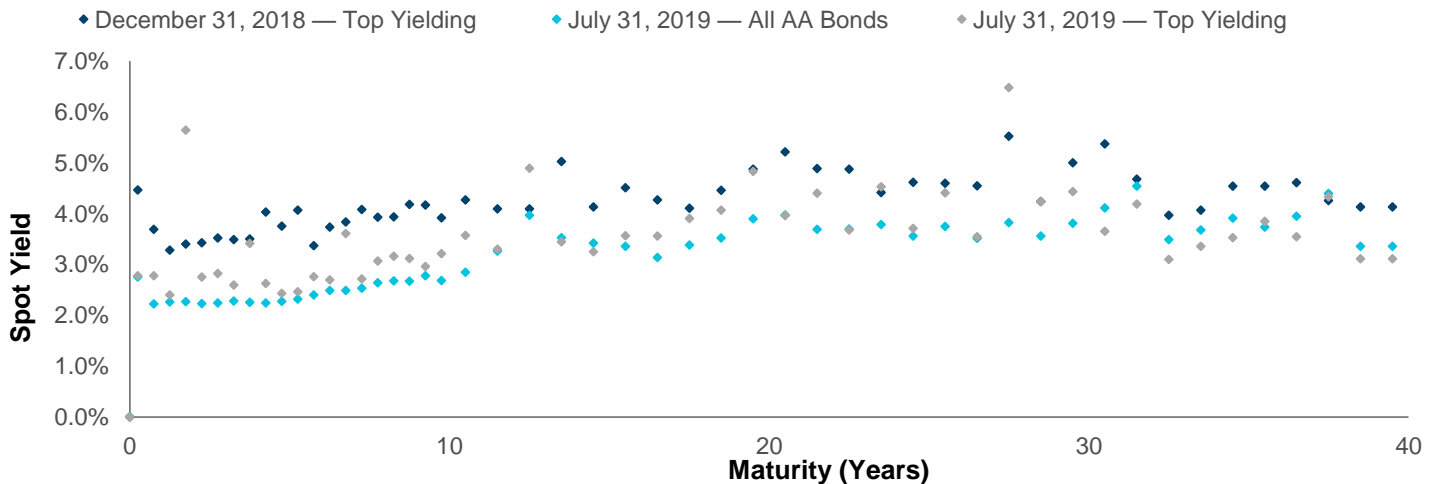
Issuer	Event	Curve Impact
Total Capital International	New Issues (3 bonds)	Total Capital's issuance in July made up the entirety of the month's new entries into the AA-rated credit index. The total market value impact was about \$3.2B with maturities ranging between 2025 and 2049. The impact on the discount curve was muted due to the relatively small market values of each tranche issued.
Apple	Exiting Issues (2 bonds)	Apple made up about half of the month's exiting market value from the AA-rated index in July. The company saw 2 bonds totaling \$2.2B move out of the index. Maturities for the two are slated for later in 2019 and 2020, so the resulting impact on the liability values was negligible due to extensive issuance at short durations and minimal discounting of short dated benefit payments.

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	New Issues	Other Bonds Entering	Downgrades	Other Bonds Exiting
July 2019				
Count	3	0	0	4
Market Value (\$M)	\$3,269	\$0	\$0	\$4,444
Market Value (%)	0.50%	0.00%	0.00%	0.67%
2019 YTD				
Count	54	14	10	35
Market Value (\$M)	\$50,049	\$20,222	\$13,975	\$34,969
Market Value (%)	7.65%	3.11%	2.14%	5.38%

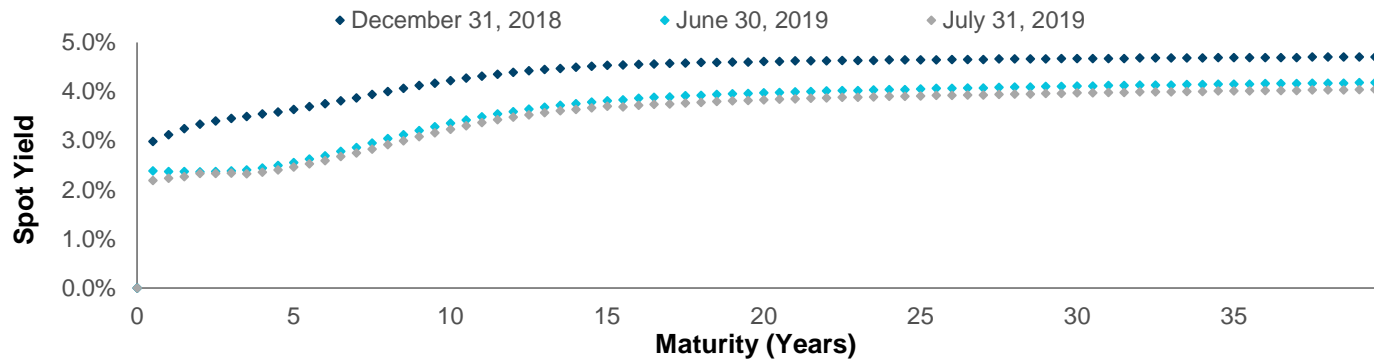
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TOP YIELDING ACCOUNTING CURVE



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IRS CURVE

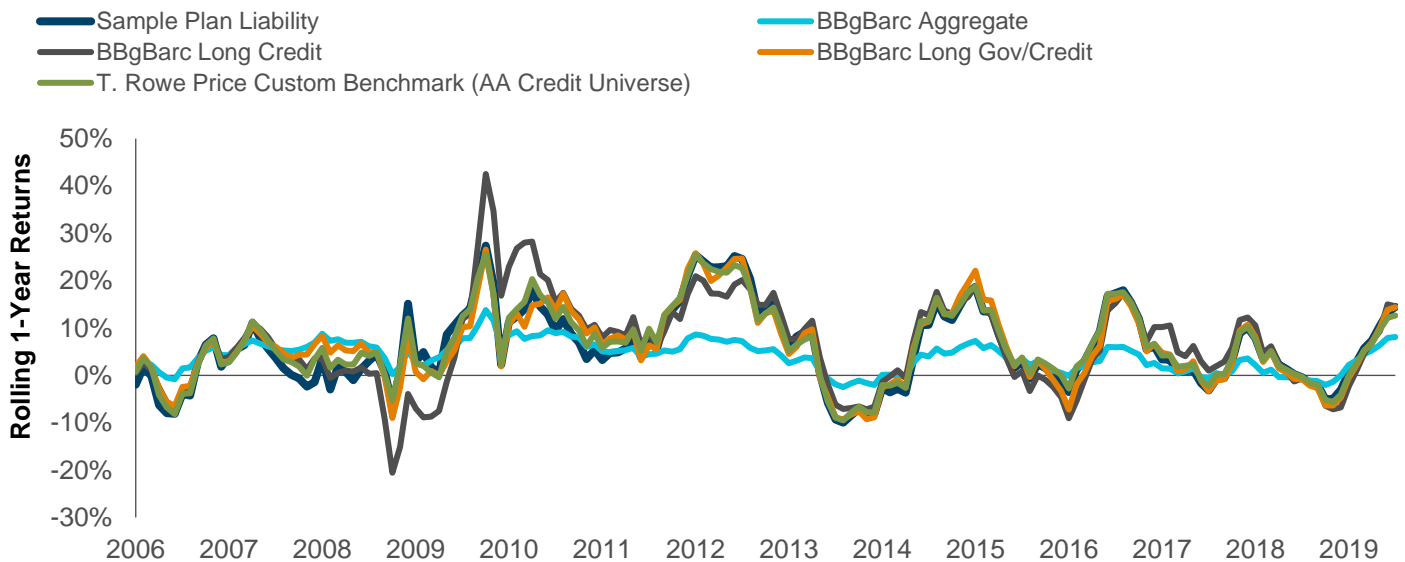


Sources: IRS and T. Rowe Price

Dates	AAA Corporate OAS (basis points)	AA Corporate OAS	A Corporate OAS
June Monthly Average	61	56	91
July 1, 2019	56	51	82
July 15, 2019	55	50	82
July 31, 2019	60	46	78
July Monthly Average	57	49	81

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ONE-YEAR ROLLING RETURNS AND TRACKING ERROR



	July 2019 Return	YTD Total Return	Annual Tracking Error Relative to Liability	Average Monthly Return Difference from Liability
Hypothetical Sample Plan Liability	0.82%	13.34%	NA	NA
BBgBarc Aggregate	0.22%	6.36%	6.41%	1.40%
BBgBarc Long Credit	1.16%	16.78%	4.50%	0.92%
BBgBarc Long Gov/Credit	0.73%	14.31%	3.08%	0.63%
Hypothetical T. Rowe Price Custom Benchmark	0.33%	12.70%	2.01%	0.32%

Sources: Bloomberg Index Services Ltd., T. Rowe Price; Analysis by T. Rowe Price. Performance shown in graph and tables above shown from February 1, 2005 through July 31, 2019.

Past performance cannot guarantee future results. Custom Benchmark returns do not reflect the deduction of management fees. Please refer to the disclosure at the end of the article for important additional information.

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GLOSSARY

IRS Yield Curve: Plan sponsors of qualified defined benefit pension plans use this yield curve to determine funding requirements per IRS regulations. These funding requirements are disclosed on form 5500 annually. Yields on AAA, AA, and A corporate securities determine the yield curve for discounting purposes. The yield curve is not a marked-to-market curve representing any single date, but rather an average yield over the course of the entire month. For more information on the IRS methodology, please see [treasury.gov/resource-center](https://www.treasury.gov/resource-center) and [irs.gov/Retirement-Plans](https://www.irs.gov/Retirement-Plans).

Accounting Yield Curve: US GAAP requires pension plan sponsors to disclose pension obligations using “fixed-income debt securities that receive one of the two highest ratings given by a recognized ratings agency”. As a proxy for bonds useable for accounting purposes, we use the constituents of BBgBarc AA credit universe to develop the accounting yield curve shown. Please see [fasb.org](https://www.fasb.org) for more information.

Top Yielding Curve: Since the US GAAP rules allow the use of a fairly broad range of securities for accounting purposes, some plan sponsors use an optimized yield curve approach to value their pension liabilities on the disclosure dates. Bonds trading at higher yields than other bonds of similar maturity tend to be used for this purpose. To quantify the effectiveness of this approach, T. Rowe Price developed a yield curve using the highest yielding bonds designed to meet SEC requirements at each node.

Annual Tracking Error Relative to Liability: Calculated as the standard deviation of return differences between a fixed income index and a set of cash flows discounted using the accounting yield curve. The liability return has two components: an interest cost component analogous to roll return on a bond, and yield change component analogous to price return on a bond. The table shows annualized ex-post tracking error.

Average Monthly Return Difference: Similar to the tracking error metric, this metric demonstrates how closely a fixed income benchmark tracks a set of liability returns. We calculate this measure by simply averaging the difference in returns over the period shown.

Sample Plan Liability: Pension plan sponsors must account for the cost of their retirement plan on their financial statements. The amount of this liability can fluctuate over time based on several factors, including benefits earned, benefits paid out, mortality experience, and most significantly, interest rates. The Sample Plan is intended to be a representative defined benefit pension plan and does not reflect the cash flows from any specific plan.

T. Rowe Price Custom Benchmark: An index of fixed income securities created using T. Rowe Price proprietary methodology that attempts to replicate interest rate exposures embedded in a pension plan’s liability structure.

To learn more, please visit [troweprice.com](https://www.troweprice.com)

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The illustrations presented are hypothetical and used to demonstrate capabilities. Certain assumptions have been made for modeling purposes and with the benefit of hindsight and are unlikely to be realized. The specific issuers and bond issues mentioned in this document had significant impact on liability curves calculated using BBgBarc index universes. The modeling used for plan and benchmark development has certain inherent limitations. Benchmark construction may not reflect all material economic and market factors that could have impacted implementation or weighting decisions if the modeled plan actually existed during the time period presented. Actual T. Rowe Price Custom Benchmark characteristics, including (among other things) yield, annualized return, liability-relative tracking error and average monthly returns difference relative to plan liability may differ substantially from the hypothetical scenario presented.

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