

Municipal Bond Market Performance

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Overview

The municipal bond market, as measured by the Standard & Poor's Municipal Bond Investment Grade Index, had a Total Return of 0.146% in October 2019, consisting of these components:

TABLE 1

Total Return	0.146%
Coupon Return	0.342%
Market Amortization Return	-0.191%
Parallel Shift Return	-0.298%
Non-Parallel Shift Return	0.383%
Sector/Quality Return	-0.141%
Residual Price Return	0.042%

Interpretation

October was an unusual month for the municipal marketplace, in that the overall investment grade total return can be almost completely explained by income effects. The Coupon Return of 0.342% is based on the index's average coupon of 4.449% and the Market Amortization Return -0.191% is based on the index's average beginning-of-month market yield of 1.777%. These two terms sum to a total income effect of 0.151%, which is within half a basis point of the overall total return.

- Coupon Return reflects both interest payments and changes in accrued interest throughout the month.
- Market Amortization Return is negative because of the large number of premium bonds in the index due to the low yield curve environment. Premium bond prices, absent any change in yield, naturally decline over time to their redemption price. This natural decline is called market amortization.

The remaining -0.5 bp of total return is composed of largely offsetting yield curve and spread movements. The Sector/Quality Return of -0.141% reflects the fact that many sectors saw spread increases this month. At the same time, the yield curve experienced a steepening that was modest at the long end and more substantial at the short end, which resulted in an overall positive return from yield curve movement.

Sector/Quality Return captures changes in average option-adjusted spread (adjusted by duration) among various sector/quality categories. One notable trend in October was that the housing sector's AAA and AA groupings saw their OA

spreads decrease overall, while the A and BBB groupings saw substantial overall increases in OA spreads, suggesting a flight to quality. Most other sectors saw an increase in OA spread.

The index's overall Sector/Quality Return was negative. The groupings with the biggest negative contributions, considering both weight and the groupings' own sector/quality returns, are listed in Table 2. The biggest positive contributors were comparatively small in contribution and are listed in Table 3.

TABLE 2

	AA-rated Local GO	AAA-rated Local GO	AA-rated Tax Support	A-rated Trans
Change in Average OA Spread BP ^(a)	2.704	2.963	3.134	3.623
Total Key Rate Duration ^(b)	5.429	5.374	4.965	5.509
Sector/Quality Return ^(-b*a)	-0.147	-0.159	-0.156	-0.200
Market Value Weight ^(c)	9.965%	9.162%	7.790%	5.426%
Contribution to Duration ^(b*c)	0.54104	0.49243	0.38675	0.29891
Contribution to Sector/Quality Return ^(-b*c*a)	-0.0146%	-0.0146%	-0.0121%	-0.0108%

TABLE 3

	AAA-rated Housing	AA-rated Housing	BBB-rated Tobacco	BBB-rated OtherRev
Change in Duration-Adjusted Average OA Spread ^(a)	-2.237	-0.625	-3.342	-2.862
Total Key Rate Duration ^(b)	8.392	7.168	7.403	4.680
Sector/Quality Return ^(-b*a)	0.188	0.045	0.247	0.134
Market Value Weight ^(c)	0.617%	1.662%	0.178%	0.119%
Contribution to Duration ^(b*c)	0.05180	0.11915	0.01315	0.00557
Contribution to Sector/Quality Return ^(-b*c*a)	0.0012%	0.0007%	0.0004%	0.0002%

The spot curve movement for the month is depicted in Figure 1 and was largely a steepening that pivoted around the 8-year point. Because this analysis uses a 10-year pivot point for analysis, the modest increase at the long end was largely captured by Parallel Shift Return (Table 4), and the decrease at the short end of the curve was largely captured by Non-Parallel Shift Return (Table 5). The green dotted line in the graph depicts the parallel shift implied by the 10-year point.

TABLE 4

Change in 10-Year Spot Rate ^(a)	5.62
Total Key Rate Duration ^(b)	5.1362
Parallel Shift Return ^(-b*a)	-0.289

FIGURE 1

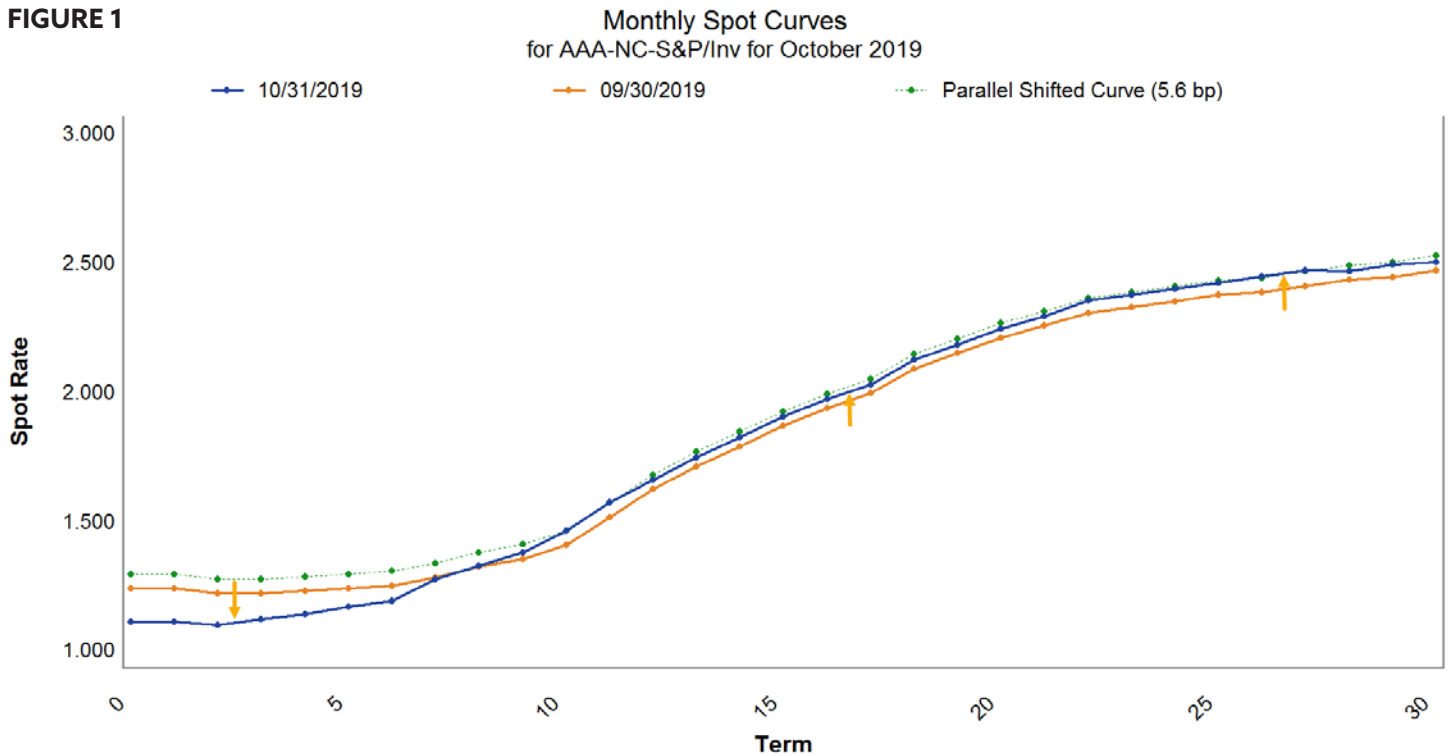


Table 5 shows that the bulk of the positive Non-Parallel Shift Return comes from substantial key rate durations at the 2-, 3-, 5-, and 7-year terms, combined with a decline in the spot curve at those terms. Each value in the table's Non-Parallel Shift Return row is calculated by multiplying together the two cells above it and reversing the sign.

TABLE 5

	6 Mos	1 Yr	2 Yrs	3 Yrs	5 Yrs	7 Yrs	10 Yrs	20 Yrs	30 Yrs
Key Rate Duration	0.029	0.099	0.242	0.567	0.989	1.330	0.988	0.703	0.191
Non-Parallel Change	-18.6	-18.6	-17.6	-15.6	-12.5	-6.3	0.0	-2.1	-2.4
Non-Parallel Shift Return	0.005	0.018	0.043	0.088	0.124	0.084	0.000	0.015	0.005

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