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Municipals

- **Municipals outperformed Treasuries across the curve this week, outperforming by 4bps in the 2yr spot, 7bps in the 5yr spot, and 6bps in both the 10yr and 30yr spots**
- **Next week's projected issuance of $10bn would be well above the YTD non holiday average weekly issuance ($8.6bn) and the trailing 3yr average for the last week in August ($4.2bn)**
- **Following this week's inflows of $1.1bn, municipal bond funds extend the current streak of inflows to 46 weeks and cumulative $52.3bn**
- **Investors in bonds with 4-6 years to call earn more on an OAS basis in 15 year maturity bonds than longer term structures**
- **Puerto Rico's July 2016 General fund revenues are $38.6mn (6.2%) higher than the revenues during the same period in 2015**
- **ISDA auction for Puerto Rico CDS resulted in a price of $58.50**
- **We highlight the various appropriation backed obligations issued in the municipal market which include those backed by leases, non-lease annual appropriation, and moral obligations bonds**
- **After GO debt, contingent obligation debt is the most common type of borrowing by state and local governments with 45 states and approximately 700 local governments having issued general government debt**
- **The majority (66%) of contingent obligations issued at the state level are in the form of non-lease annual appropriation bonds while lease-backed obligations (90%) comprise the largest proportion of issuance at the local level**
- **The lease-backed security structure is superior to that of a pure annual appropriation pledge, since the creditor is typically entitled to the leased asset or revenue stream in the event of non-payment, either through repossession or a right to re-lease for the remainder of the term**

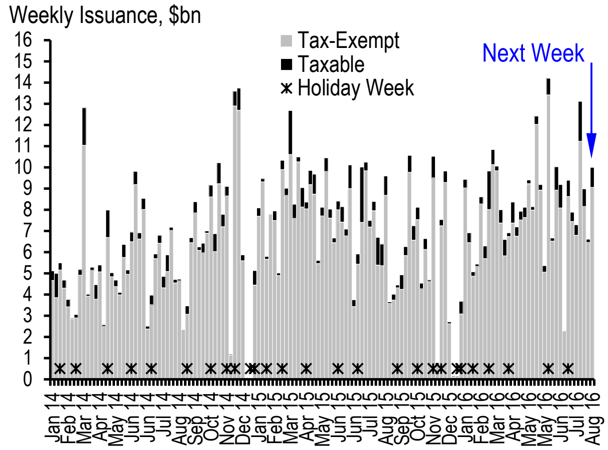
Exhibit 1: Municipals outperformed Treasuries across the curve this week

	HG Municipal Yields		Treasury Yields		HG Muni/Tsy Ratio	
Sector	Current (%)	1wk chg (bps)	Current (%)	1wk chg (bps)	Ratio (%)	change (% pts)
2yr	0.52	0	0.74	4	70	-4
5yr	0.84	-1	1.16	6	73	-5
10yr	1.40	0	1.58	6	89	-4
30yr	2.12	-1	2.28	5	93	-3

Source: Thomson Reuters, J.P. Morgan.

Exhibit 2: Next week's issuance is expected to be $10bn

Weekly Issuance, $bn



Source: IPREO, Bloomberg

- **Essentiality has proven to be a key consideration and input into the strength of a leased backed bond with a more important asset expected to have stronger likelihood of appropriation**
- **We highlight the State of California Public Works Board, which is a lease-backed abatement obligation with $8.5bn in debt outstanding**
- **The State of California Public Works Board bonds are secured by a lease and has a Master Reserve Fund, but are subject to abatement risk**

Municipals significantly outperformed Treasuries as sizable inflows helped digest a busy new issue calendar

Treasury yields rose across the curve this week despite largely weaker economic data and dovish July FOMC meeting minutes. This week's main data deliverable was

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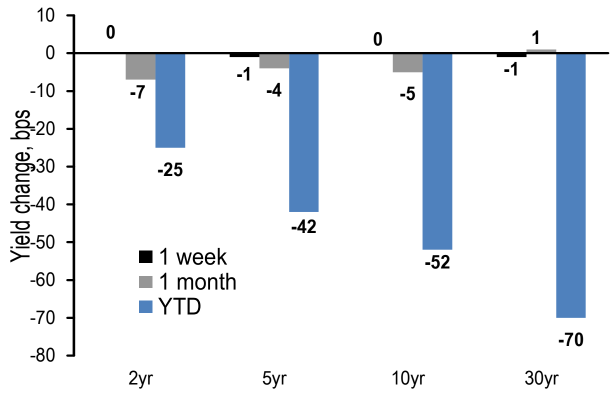
Markets at a glance

5yr/10yr/30yr yields have fallen 42bps/52bps/70bps YTD



Municipals appear close to fair value versus Treasuries and Corporates in most spots of the curve

AAA tax-exempt yield / Treasury yield (%)	Last	Min	Max	Mean	St. Dev.	Z-score 3mo	Z-score 12mo
2yr	73.9	69.5	105.4	84.4	9.2	-1.1	-1.0
5yr	76.5	72.9	92.8	81.2	4.8	-1.0	-0.5
10yr	91.2	86.2	96.1	91.7	2.2	-0.2	-0.3
30yr	93.8	85.7	97.2	92.2	2.6	0.6	-0.9

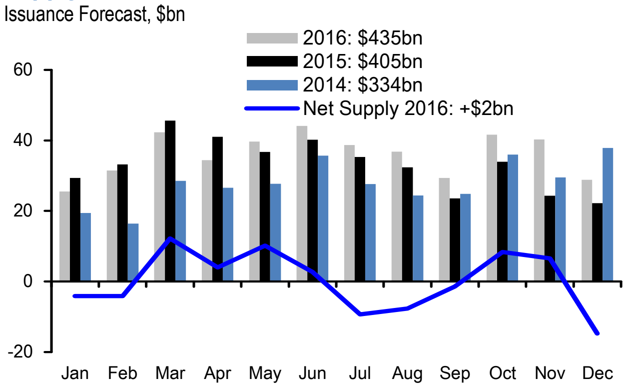
AA corporate yield - AA tax-exempt yield (bp)	Last	Min	Max	Mean	St. Dev.	Z-score 3mo	Z-score 12mo
3-5yr	65.0	47.9	85.5	64.4	7.8	0.1	-1.1
5-7yr	74.3	71.9	110.6	85.2	9.1	-1.2	-1.6
7-10yr	76.9	73.4	102.4	85.6	8.1	-1.1	-1.3
25yr	118.4	113.9	146.7	128.9	9.3	-1.1	-0.3

values over last 3 months displayed, as of 8/18/2016, Z-Score +/- 1.5 Rich / Cheap

yy indicates rich   yy indicates cheap

We project 2016 gross supply of $435bn with net supply of +$2bn

Issuance Forecast, $bn



California accounts for the majority of the nation's contingent debt (18%), and the top 5 states combined to account for 55% of the nation

State	State and Local Contingent Debt Outstanding ($bn)	Proportion of Nation (%)
California	31.60	17.5%
New Jersey	27.18	15.1%
New York	16.44	9.1%
Florida	12.25	6.8%
Kentucky	10.72	5.9%
Indiana	9.73	5.4%
Virginia	8.20	4.6%
North Carolina	5.81	3.2%
Missouri	5.70	3.2%
Michigan	5.24	2.9%
Top 10	**132.9**	**73.8%**
Total Nation	**180.1**	

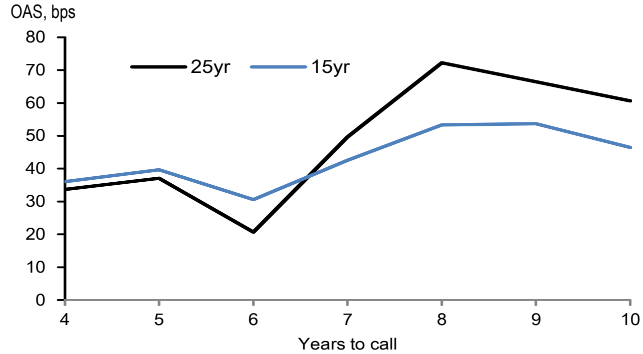
We expect 10yr municipal yields will reach 1.35% by the end of 2016

Yields, %

Treasury	8/19/2016	3Q16 Forecast	4Q16 Forecast	1Q17 Forecast	2Q17 Forecast
2yr	0.74	0.70	0.90	1.15	1.25
5yr	1.16	1.05	1.30	1.55	1.65
10yr	1.58	1.45	1.55	1.70	1.80
30yr	2.28	2.20	2.25	2.35	2.40
AAA Tax-exempt					
2yr	0.52	0.60	0.72	0.94	1.00
5yr	0.84	0.85	1.05	1.25	1.30
10yr	1.40	1.40	1.35	1.55	1.55
30yr	2.12	2.20	2.10	2.20	2.20

Option Adjusted Spread (OAS) for 5% coupon bonds with 15yr to maturity averages 43bps between 4yrs and 10yrs to call

OAS, bps



Source: S&P, Bloomberg, Fitch, Moody's, TRACE, Thomson Reuters, J.P. Morgan

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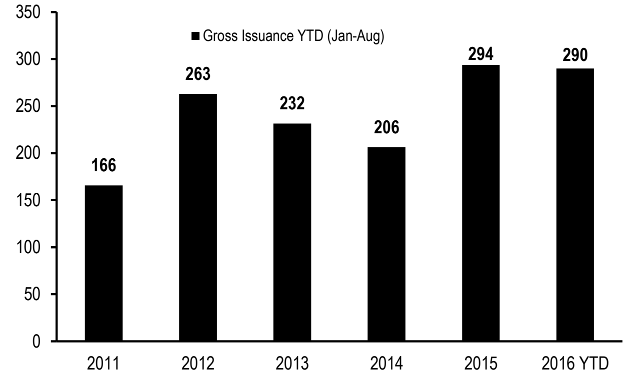
Exhibit 3: YTD Gross Issuance of $290bn is on pace with annual issuance in 2015

YTD Gross Issuance, $bn



Source: Thomson Reuters, J.P. Morgan Note: Issuance through August includes projection of $10bn in issuance for the final week of August

the July CPI report released on Tuesday, which showed nearly flat at -0.04%. **The Core reading lagged the consensus forecast, increasing just 0.1% last month; the year-ago increase is now 2.2%, down from 2.3% last month.**

Core goods prices, which declined another 0.1% in July, are now down 0.7% versus a year-ago. **Given this soft inflation reading (and the weak health care prices reported in PPI), our economists anticipate that core PCE increased 0.07% in July, which would take the year-ago figure down from 1.6% to 1.5%.**

Housing data for July showed mixed results as starts increased 2.1% while housing permits inched down 0.1%. **The starts data were above expectations while the permits data disappointed.** This data however can be choppy and several other recent housing indicators have been relatively more upbeat.

The July IP report was stronger than consensus expectations but not quite as favorable as our forecast. **Overall IP increased 0.7% in July with notable increases related to manufacturing (0.5%), mining (0.7%), and utilities (2.1%).** While we look for improvement in the manufacturing sector over time, auto production schedules signal that some of the recent strength in the auto sector will likely be temporary.

The minutes to the July FOMC meeting on balance reflected a patient approach to resuming rate increases. Among voting members, it was generally agreed that they would like to see firmer growth before acting, while a couple wanted to see 2 percent inflation on a sustained basis before moving again.

Given the inflation data and observation from the FOMC meeting minutes, the probability of a September rate hike is quite low. **We still look for a December move but recognize that the latest round of price data and observations from the Fed meeting place increased emphasis on core inflation, growth, and continued improvement in the employment data between now and the December meeting** (Feroli: No haste evident in latest Fed minutes).

For the week, 2yr U.S. Treasury bond yields rose 4bps while 5yr and 10yr yields both rose by 6bps and 30yr yields rose by 5bps. **Municipals outperformed Treasuries across the curve, outperforming by 4bps in the 2yr spot, 7bps in the 5yr spot, and 6bps in both the 10yr and 30yr spots (Exhibit 1).**

Next week's projected issuance of $10bn would be well above the YTD non holiday average weekly issuance ($8.6bn) and the trailing 3yr average for the last week in August ($4.2bn) (Exhibit 2).

As illustrated in Exhibit 3, year-to-date gross issuance of $290bn is roughly in-line with 2015 ($294bn) and approximately $73bn above the 2011 through 2014 YTD average of $217bn. For full year 2016, we continue to expect gross issuance of $430bn, approximately $30bn higher than total gross issuance of $399bn in 2015. We believe that issuers will add bonds to the market at a robust pace in the low yield environment and ahead of the Presidential elections in mid-November.

Three of the larger anticipated long-term deals next week are the $835mn Commonwealth of Massachusetts (Aa1/-/AA+) Competitive General Obligation deal, the $498mn California Health Facilities Financing Authority (Aa3/AA-/AA-) transaction issued on behalf of Providence St. Joseph Health System, and the $424mn Water Works Board of the City of Birmingham (Aa3/AA-/-) deal in Alabama.

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The Commonwealth of Massachusetts last issued General Obligation bonds on 07/07/2016 (5% coupon, July 2026 maturity, Non-Call, 57582RKL9), which are currently evaluated at a 1.57% yield or a 16bps spread to the high grade scale.

The Providence St. Joseph Health System Revenue bonds issued on 06/26/2014 (5% coupon, Oct 2026 maturity, Oct 2024 Par Call, 13033L3W5), are currently evaluated at a 1.64% yield or 23bps spread to the high grade scale.

The Water Works Board of the City of Birmingham last issued Revenue bonds on 04/07/2016 (5% coupon, Jan 2026 maturity, Jan 2025 Par Call, 091096HT7), and are currently evaluated at a 1.85% yield or 44bps spread to the high grade scale.

For the period ending 8/17/2016, municipal bond funds indicated inflows of $1.1bn

Lipper Flows:

For the period ending 8/17/2016, municipal bond funds indicated inflows of $1.1bn, taking YTD inflows to $44.4bn (Exhibit 4). The current inflow streak is at 46 consecutive weeks for a total of $52.3bn in inflows.

Among the larger fund sub-categories, High Yield funds experienced $254mn of inflows, Intermediate funds took in $148mn in new cash, and Long Term funds indicated $650mn of inflows.

Weekly reporting funds were responsible for the majority of the fund flows recorded this period.

Municipal ETFs recorded $125mn of inflows.

California municipal bond funds took in $113mn in net new investment and New York municipal funds saw $17mn of inflows.

For the period, Tax-exempt money market funds reported outflows of $2.2bn and Taxable money market funds reported net outflows of $18.6bn.

Exhibit 4: Municipal bond funds reported $1.1bn of inflows for the period ending 8/17/2016

	Fund flows			Fund Assets	
Type of funds	Actual	YTD Total	4-wk. avg.	Actual	4-wk. avg.
All term muni funds	1,058	44,353	1,595	682,681	679,392
New York	17	905	16	32,941	32,907
California	113	4,833	171	70,604	70,301
National funds	1,595	43,102	1,526	505,063	502,292
High Yield	254	9,178	269	89,058	88,486
Intermediate	148	14,581	386	176,768	176,031
Long Term	650	25,528	812	378,626	376,859
Tax-exempt money market	-2,207	-81,088	-2,751	177,803	181,943
Taxable money market	-18,624	638	-2,799	2,453,290	2,458,247
Taxable Fixed Income	4,238	78,788	5,879	4,254,945	4,225,406
Equity	238	-82,493	-3,388	9,581,787	9,467,155

Source: Lipper US Fund Flows, J.P. Morgan

Taxable Fixed Income funds reported inflows of $4.2bn and Equity funds (US & Global) saw inflows of $238mn.

EPFR Flows:

For the period ending 8/17/2016, weekly municipal bond funds indicated inflows of $878mn, taking YTD inflows to $26.5bn. This total is for weekly reporting funds only; total YTD fund flows including monthly reporters were $41.0bn as of 8/16/2016.

Municipal ETFs registered $134mn of inflows.

Classifying funds by term structure we find that **Short Term funds indicated $176mn of inflows**, Intermediate funds took in $211mn in new cash, and Long Term funds received $257mn of net new investment.

Classifying funds by ratings we find that **Investment Grade funds indicated $657mn of inflows** and High Yield funds took in $218mn in new cash.

California municipal funds saw $105mn of inflows and New York specific municipal bond funds had $10mn of inflows.

US Money market funds (taxable and tax-exempt combined) indicated $39.1bn of outflows.

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Investors in bonds with 4-6 years to call earn more on an OAS basis in 15 year maturity bonds than longer dated term structures

In a follow up to our analysis of lower coupon bond spreads in the municipal market, we present details including the option adjusted duration (OAD) and option adjusted spread (OAS) for various call dates and maturities for 5% coupon bonds.

As we highlighted in our 7/15/2016 publication, 3% and higher coupon bonds in the 10yr space, and 4% and higher coupon bonds in the 20yr space appear to have ample yield cushions before they face extension or de minimis risks. In this publication, we provide investors with OAD and OAS metrics on 5% coupon bonds in the intermediate and long portion of the market with varying call protection.

In order to derive the OAS and OAD metric we use a proprietary callable municipal bond model. This model discounts the expected cash flows of a given bond using a trinomial tree. **The discount curve used is based on the 5% coupon MMD curve, with the volatility estimated as the LIBOR swaption volatility surface scaled for the beta of the relationship between the MMD and LIBOR curves**.

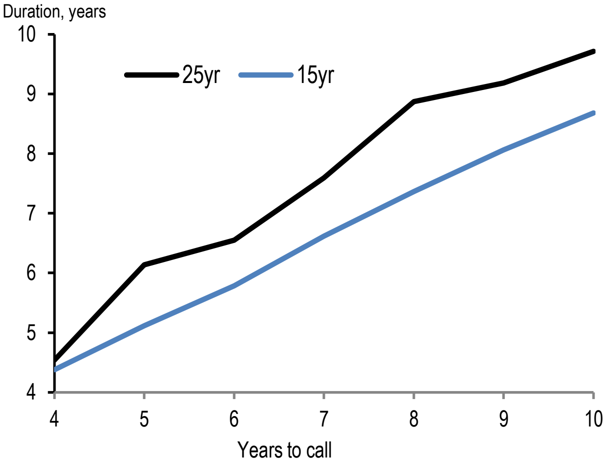
We use this model to calculate OAS and OAD on 5% coupon bonds with various call dates, in the 15yr and 25yr to maturity spots.

As show in Exhibit 5, the option adjusted duration for 15yr and 25yr maturity bonds increase steadily as the years to call increase. **The average duration increase per year of call protection for 15yr to maturity bonds is 0.72years, compared to 0.86years for bonds with 25yrs to maturity**.

In Exhibit 6, we provide the OAS for the same 15yr and 25yr to maturity bonds, with 4yrs to 10yrs to call. We find that the OAS curve broadly moves lower as the call dates move closer. The OAS on the 25yr to maturity bonds drops from 66bps for bonds with 10yrs to call to 34bps for 4yrs to call bonds. The OAS for the 15yrs to maturity bonds declines from 54bps in the 10yrs to call spot to 36bps in the 4yrs to call spot.

Exhibit 5: Option Adjusted Duration (OAD) for 15yr and 25yr to maturity bonds steadily increases with years to call

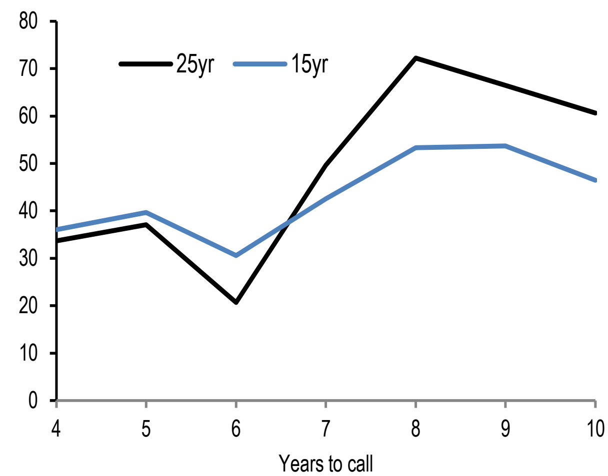
Duration, years



Source: J.P. Morgan. Note: AAA rated fixed coupon bonds, non pre-refunded, 5% coupon, 15yrs and 25yr to maturity.

Exhibit 6: Option Adjusted Spread (OAS) for 5% coupon bonds with 15yrs to maturity averages 43bps between 4yrs and 10yrs to call

OAS, bps



Source: J.P. Morgan. Note: AAA rated fixed coupon bonds, non pre-refunded, 5% coupon, 15yrs and 25yr to maturity.

The OAS for 25yr to maturity bonds stays higher than the OAS for 15yr to maturity bonds with calls between 7yrs to 10yrs. Between 4yrs to call and 6yrs to call, the 15yrs to maturity bonds offer higher OAS.

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Exhibit 7: Puerto Rico's July 2016 revenues were $38.6mn (6.2%) higher than the revenues during the same period in 2015

Items	July 2015-16	July 2016-17	Dif.	Estimate July	Collections vs. Estimate
Gross General Fund Net Revenues	666.5	705.1	38.6	697.7	7.4
Reserve for Refund	(40.0)	(40.0)	0.0	(40.0)	0.0
General Fund Net Revenues	626.5	665.1	38.6	657.7	7.4
Individual	163.5	135.4	(28.1)	150.4	(15.0)
Corporations	96.3	98.5	2.2	88.2	10.3
Non-Resident Withholdings	30.3	20.7	(9.6)	30.3	(9.6)
Sales and Use Tax	11.6	89.8	78.1	86.6	3.2
Property Taxes	0.0	0.0	0.0	0.0	0.0
Foreign (Act. 154)	258.9	256.2	(2.7)	228.3	27.9
Alcoholic Beverages	22.8	10.3	(12.4)	20.7	(10.4)
Cigarettes	9.7	10.3	0.5	9.7	0.6
Motor Vehicles	1.4	5.2	3.8	7.8	(2.6)
Excises on Off-Shore Shipment Rum	0.0	23.9	23.9	18.8	5.1
Others	31.9	14.7	(17.2)	16.9	(2.2)

Source: Puerto Rico Treasury, J.P. Morgan

Investors should be cognizant of more generous market spread for 9-10yr callable structure in longer dated bonds and better OAS for bonds with 6yrs or less to call in the market.

Investors who use OAS to drive their investment process should consider swapping out of longer dated callable bonds into shorter dated structures as the call protection begins to shorten.

Puerto Rico's July 2016 General fund revenues are $38.6mn (6.2%) higher than the revenues during the same period in 2015

Puerto Rico indicated that it's general fund revenues during the first month of the current fiscal year totaled $705.1mn or 6.1% higher than the revenues during the same period in FY 2015. The reported revenues were also $7.4mn higher PR's own estimates.

As shown in Exhibit 7, the increase in sales and use tax revenues, due to the change in legislation, were mainly responsible for the boost in collections. The change in tax legislation increased the sales and use tax levy to 10.5% from 6.0%. Of the total sales and use tax collected, 6.0% or $119.7mn is set to be transferred to COFINA, with the remaining $89.8mn or 4.5% allocated to the general fund. Excises on off-shore shipment of rum were $23.9mn, these were absent in July of last year as they started from August 2015.

Exhibit 8: Initial market bid/offers submitted by market participants during the Puerto Rico GO CDS auction

Dealer	Bid	Offer
Bank of America	56.5	58.5
Barclays	58	60
Citigroup	55.5	57.5
Goldman Sachs	57.5	59.5
J.P. Morgan Securities LLC.	56	58
Morgan Stanley	58	60

Initial Market Midpoint: 58

Source: Creditfixings.com

Exhibit 9: The open interest for the physical settlement was $8.265mn

Dealer	Bid/Offer	Size
Bank of America	Offer	0
Barclays	Offer	0
Citigroup	Offer	6.735
J.P. Morgan Securities LLC.	Offer	0
Morgan Stanley	Offer	0
Goldman Sachs	Bid	15

Source: Creditfixings.com

The most notable decline was in individual income tax collections, which declined by $28.1mn, mainly due to non-recurring revenues in the prior year related to the tax amnesty that ended June 30, 2015.

The Act 154 revenues were the most significant source of revenue at $256.2mn or 36.3% of the revenues. This level of collection was close to unchanged versus the revenue collected in 2015 ($258.9mn).

ISDA auction for Puerto Rico CDS resulted in a price of $58.50

On August 17th, 2016, dealers submitted initial markets, physical settlement requests, and limit

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orders to the Commonwealth of Puerto Rico auction. Creditex and Markit were administered to settle trades across the market referencing Commonwealth of Puerto Rico GO bonds. The final price determined by the auction was $58.5.

The initial market price was established as $58 after the dealers initial markets bid/offers (Exhibit 8). There was net open interest equaling $8.265mn to buy, after netting the $15mn buy order from Goldman Sachs and the $6.735mn sell order from Citigroup. This net open interest was exhausted at $58.5 based on the limit orders placed, setting the final price for Puerto Rico GO CDS (Exhibit 9).

Legacy PR GO bonds are 6% lower in price since mid-year versus a 2% decline for PR GO 8's

In Exhibit 10, we provide price and yield detail on individual Puerto Rico based issuers and credits. **The bonds selected have experienced an average price increase of 0.17% following the announcement of the default.** The 8% coupon GO bonds have seen a price decline of 1.88%, the Puerto Rico Highway and Transportation Authority (Transportation Revenue) bonds have seen a price appreciation of 6.38%, while the COFINA sub-lien 5.25% coupon, 2042 maturity bonds have seen a price appreciation of 4.77%.

The largest price declines have been in the Puerto Rico GDB 5.4% coupon, 2019 maturity bonds which have declined by 15.86%.

Even following the CDS auction, neither the NY Jurisdiction 8% coupon Puerto Rico GOs ($65.5) or the Puerto Rico jurisdiction 5% coupon, 2041 maturity GOs ($61.0) are trading close to the recovery value established by the auction ($58.5). Only the Commonwealth guaranteed Public Buildings Authority bonds with 5% coupon, 2036 maturity ($58.25) are trading close to the recovery price established.

We expect credits near the top of the debt stack such as the Commonwealth GO and COFINA to perform better than more junior debt such as the Highway or GDB debt.

Exhibit 10: Puerto Rico 8% coupon bonds are currently trading at $65.5, compared to $71.5 for the COFINA senior lien bonds

Issuer	Insurance	Rating after insurance	Maturity	Par Call	Coupon	8/18/2016 Price	8/18/2016 Yield	Price Change (Since 6/30/2016)	6/30/2016 Price	6/30/2016 Yield	Price Change (Since 5/18/2016)	5/18/2016 Price	5/18/2 Yiel
PR COFINA Senior Lien	-	B3/CCC+/B	8/1/2040	8/1/2021	5.00%	$71.51	7.60%	2.32%	$69.89	7.79%	21.19%	$59.01	9.28
	-	B3/CCC+/B	8/1/2046	8/1/2021	5.00%	$71.38	7.39%	2.15%	$69.88	7.55%	20.98%	$59.00	8.95
	NATL	A3/AA-/B	8/1/2046		0.00%	$17.85	5.84%	**3.94%**	$17.17	5.94%	**27.22%**	$14.03	6.61
PR COFINA Sub Lien	-	Caa1/CCC+/B	8/1/2043	8/1/2021	5.25%	$48.77	11.40%	**4.77%**	$46.55	11.90%	**21.91%**	$40.00	13.6
	AGM	A2/AA/B	8/1/2042	8/1/2020	5.125%	$104.59	3.86%	-0.35%	$104.96	3.80%	1.50%	$103.05	4.32
Puerto Rico Commonwealth GO (NY Jurisdiction)	-	Caa1/CCC+/B	7/1/2035	7/1/2020	8.00%	$65.50	-	-1.88%	$66.75	12.66%	*0.00%*	$65.50	12.8
Puerto Rico Commonwealth GO*	-	Caa1/CCC+/B	7/1/2041	7/1/2022	5.00%	$61.00	-	*-5.99%*	$64.89	8.37%	1.65%	$60.01	9.06
	AGM	A2/AA/B	7/1/2037	7/1/2016	5.75%	$100.16	3.79%	0.00%	$100.15	3.84%	*-0.05%*	$100.21	3.91
	NATL	A3/AA-/B	7/1/2020		5.50%	$106.10	3.79%	-0.55%	$106.68	3.69%	0.39%	$105.68	3.99
	AGM	A2/AA/WD	7/1/2020		5.25%	$106.28	3.50%	1.63%	$104.57	4.00%	1.54%	$104.66	4.01
	XLCA	Caa1/CCC+/WD	7/1/2017		5.50%	$97.71	8.28%	0.07%	$97.64	8.00%	0.37%	$97.35	8.01
Puerto Rico GDB (Taxable)	-	Caa1/B-/-	8/1/2019	3/13/2015	5.40%	$24.40	-	*-15.86%*	$29.00	52.01%	*-16.58%*	$29.25	50.1
Puerto Rico Electric Power Authority (PREPA)	-	Caa3/CCC-/CC	7/1/2042	7/1/2022	5.00%	$64.40	8.39%	*-2.77%*	$66.23	8.15%	11.28%	$57.87	9.33
	AGM	A2/AA/CC	7/1/2023	7/1/2017	5.00%	$101.98	2.68%	0.98%	$100.98	3.99%	0.94%	$101.03	4.05
	XLCA	Caa3/CCC-/CC	7/1/2025	7/1/2015	5.00%	$85.62	7.22%	0.58%	$85.12	7.28%	4.68%	$81.79	7.83
Puerto Rico Highway and Transpo Auth - Highway Rev	-	Caa2/CCC+/-	7/1/2028	3/23/2015	5.00%	$62.32	10.67%	0.17%	$62.22	10.65%	0.26%	$62.16	10.6
	AGM	A2/AA/-	7/1/2026	7/1/2020	4.95%	$101.86	4.42%	-0.06%	$101.93	4.42%	0.11%	$101.75	4.48
Puerto Rico Highway and Transpo Auth - Transportation Rev	-	Caa2/CCC+/-	7/1/2042	3/23/2015	5.00%	$25.00	20.39%	**6.38%**	$23.50	21.62%	**33.33%**	$18.75	26.7
	FGIC	Caa2/CCC+/WD	7/1/2039		5.25%	$49.99	11.47%	-0.47%	$50.23	11.41%	6.37%	$46.99	12.1
	AMBAC	Caa2/CCC+/WD	7/1/2038		5.25%	$102.00	5.10%	2.38%	$99.63	5.28%	2.00%	$99.99	5.25
	NATL	A3/AA-/WD	7/1/2033		5.25%	$104.33	4.87%	1.92%	$102.37	5.04%	2.48%	$101.81	5.09
	AGM	A2/AA/-	7/1/2032	3/23/2015	5.00%	$100.26	1.84%	-0.01%	$100.27	1.74%	0.00%	$100.26	1.79
Puerto Rico Highway and Transpo Auth - Sub Transpo Rev	FGIC	Caa2/CCC+/WD	7/1/2018	3/23/2015	5.25%	$53.40	44.46%	3.62%	$51.53	44.14%	12.22%	$47.58	46.8
	NATL	A3/AA-/WD	7/1/2018	7/1/2015	5.00%	$100.93	2.44%	0.28%	$100.65	3.69%	0.85%	$100.08	4.23
Puerto Rico Public Buildings Authority - CW Guaranteed	COMWLTH GTD	Caa1/CCC+/-	7/1/2036	3/23/2015	5.00%	$58.25	9.81%	-1.09%	$58.89	9.69%	14.74%	$50.77	11.2
Puerto Rico Aqueduct and Sewer Authority (PRASA)	-	Caa1/CCC+/B	7/1/2047	7/1/2022	6.00%	$72.13	8.58%	2.86%	$70.13	8.83%	12.49%	$64.12	9.66
	AGC	A3/AA/B	7/1/2047	7/1/2018	5.125%	$103.39	3.24%	-0.33%	$103.73	3.19%	1.40%	$101.96	4.15

Sources: Bloomberg, S&P, J.P. Morgan. As of 8/18/2016

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U.S. State and Local Government Contingent Obligation Debt Overview & Analysis

In this publication, we highlight the various appropriation backed obligations issued in the municipal market which include those backed by leases, non-lease annual appropriation, and moral obligations bonds. After General Obligation debt, contingent obligation debt is the most common type of borrowing by U.S. state and local governments with 45 states and approximately 700 local governments having issued general government debt as of June 15, 2016 according to Moody's. A common reason for contingent obligations is that they are usually exempt from statutory and constitutional restrictions on debt issuance.

In Exhibit 11, we provide a high-level breakdown of the contingent obligations by State and Local government. **As illustrated, the large majority (66%) of contingent obligations issued at the state level are in the form of non-lease annual appropriation bonds while lease-backed obligations (90%) comprise the largest proportion of issuance at the local level.** Moral Obligation bonds, which are the weakest of the three, are less common, accounting for 13% and 2% of State and Local government contingent obligations, respectively.

It is important to emphasize that each of these structures are highly idiosyncratic requiring careful examination of both the bond documents as well as the fundamentals of the obligor, lease, and intended revenue streams supporting the transaction.

We rank strength of contingent obligations by type, assuming equivalent fundamentals, as follows:

1) Lease-backed obligations securing *essential asset*
2) Lease-backed obligations securing *non-essential asset*
3) Annual Appropriation Obligations with dedicated revenue streams
4) Annual Appropriation Obligations and unsecured lease-backed obligations
5) Moral Obligation

Exhibit 11: Annual Appropriation bonds without leases are most prevalent at the State level while Local governments favor lease-backed appropriation obligations

Sector	Contingent Obligation Type	Approximate % of Total
State Governments	Lease Backed Obligation	21%
	Annual Appropriation	66%
	Moral Obligation	13%
Local Governments	Lease Backed Obligation	90%
	Annual Appropriation	8%
	Moral Obligation	2%

Source: Moody's Investor Service, As of June 15, 2016

Lease-Backed Obligation

The most common type of contingent obligation at the local government level are lease-backed obligations, which generally take the form of either a lease revenue bond or certificates of participation. These obligations are typically secured by a lessor's pledge of the revenue stream created by a long-term capital lease between a governmental lessee and a lessor created conduit and controlled by the lessee.

Security for leases take two forms in that they either have the annual, legal right to appropriate (Appropriation leases) or the lease payment is appropriation backed contingent upon the continued use and occupancy of the leased asset (abatement leases). Debt service for these obligations is secured by the lessor's pledge of lease payments.

Appropriation leases and Abatement leases

In an *appropriation lease backed obligation*, the government typically covenants to make the annual lease payments through the inclusion of the lease payment in the government's operating budget. This inclusion requires the governing body to take specific action to exclude the lease payment from the budget should it choose not to appropriate. Once the appropriation is made, the obligation to pay is absolute and unconditional for the time period, usually one year. While the decision not to appropriate is typically not an event of default, the actual event of default usually does not occur until there is an actual debt service payment not made to creditors. Further, given that a non-

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appropriation is not considered an event of default, there are no remedies for bondholders upon non-appropriation.

In an *abatement lease-backed obligation*, lease payments are contingent upon an annual appropriation and the continued availability of the leased asset for use by the lessee. In the event that continued use is compromised, the lessee must abate the lease payment in proportion to its reduction in use. Abatement lease-backed obligations are used predominately by California local governments, which we will discuss in detail later in the publication.

Notably, for an abatement lease financing, the government typically covenant to maintain property insurance covering an amount sufficient to fully repair the property or call the remaining debt. **That being said, seismic event coverage is typically only required if commercially available at a reasonable expense as determined by a Board or Governing entity, which is usually not met. As a result, California creditors typically take seismic risk even if the debtor has property and rental interruption insurance.** Further, losses in the event of abatement due to a seismic event would likely be mitigated by federal disaster assistance for rebuilding certain government facilities although lease payments during the rebuilding period would likely not be reimbursed.

Importantly, creditor recourse in the event of non-payment of lease-backed obligations is relatively limited as compared to typical state and local government debt including a full faith and credit pledge or lien on specific property tax revenues. In the event of non-payment of a lease, creditors typically only have the right to repossess or re-let the leased asset, putting heightened focus on essentiality, which we discuss later.

According to Moody's, 90% of lease backed debt is favorably secured by a pledged asset, while the remaining 10% are unsecured leases without recourse to a leased asset. We include unsecured lease obligations with annual appropriation bonds given the parity security structure and lack of a pledged asset.

<u>Annual Appropriation (Non-Lease) and *Unsecured* Lease-backed Obligation bonds</u>

Annual appropriation bonds refer to non-lease government obligations that have an annual appropriation contingency. From a security standpoint, the key distinction between the two security structures is the lack of pledged assets. Unlike secured lease backed bonds, annual appropriation bonds lack a lease structure and don't have any recourse to an asset in the event of default.

Annual appropriation bonds are backed solely by the issuing government's covenant to appropriate for debt service in each budget cycle. Notably, most state governments issue this weaker type of contingency debt. **Importantly, the lease-backed security structure is superior to that of a pure annual appropriation pledge since in the event of non-payment of a lease-backed obligation, the creditor is typically entitled to the leased asset, either through repossession or a right to re-lease for the remaining term of the obligation.**

This right to repossess an asset or lease payment stream is a key security feature, which can have a significant impact on recovery rates in the case of a

Exhibit 12: Essentiality of pledged asset is a key determinant for the strength of leased backed transactions

More Essential to Government ⟵	⟶ Less Essential to Government
Police and fire stations	Community/senior centers
Roads,streets, and interchanges	Convention centers
Water and sewer system facilities	Golf courses
School buildings	Hotels
Courthouses	Ice Rinks
Jails	Marinas
Landfills	Animal Shelters
Affordable/senior housing	Miscellaneous economic development projects
Continuing care centers/nursing homes	Parking garage attached to non-essential facility
Parking garage attached to essential facility	Sports stadiums
	Theaters and concert halls
	Parks and undeveloped land

Source: Moody's, J.P Morgan

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default and heightens the need to conduct a thorough analysis into the essentiality and commercial viability of a particular pledged asset.

Pledged Asset Essentiality remains a key driver of lease-backed credit quality

Essentiality of a particular asset has proven to be a key consideration and input into the strength of a leased backed bond. The more important an asset is to the borrower, the higher the likelihood that the government will make the necessary appropriation. Similarly, for abatement leases, the more important the pledged asset, the more likely the borrower will ensure that the asset gets returned to working order in a timely matter.

In Exhibit 12, we provide an example of pledged assets that are considered more or less essential to government operations, as indicated by Moody's. **As shown, critical governmental assets include police and fire stations, roads, streets, and water and sewer facilities to name a few. Less essential assets may be recreational in nature, including convention centers, golf courses, ice rinks, and hotels.** Depending on the level of essentiality for each asset, the rating agencies typically rates the lease-backed obligations between 1 and 3 notches below the GO rating of the government.

Notably, the importance of asset essentiality has been proven out through the recovery experience of defaulted entities in the municipal market. As illustrated in Exhibit 13, there have been a few appropriation backed municipal defaults, based on those rated by Moody's since 1970. **For example, the Town of Cicero, NY appropriation default in 2003 secured by an ice rink and City of Detroit, MI COP's issued for the purpose of pension funding, both received low recovery rates of 10% and 12%, respectively**. Of the more recent bankruptcies, the Jefferson County, AL Lease Warrants secured by the more essential Jail and Courthouse received a 100% recovery.

The most recent bankruptcy proceeding in the City of Stockton, California, is the latest example of the relative strength and recovery rates of essential versus non-essential assets for lease-backed securities. As we highlighted in detail in our publication on 08/22/2014, the majority of the City's debt obligations were in the form of certificates of obligations to fund various purposes, providing a clear precedence as to the relative seniority of certain pledged assets. **As illustrated in Exhibit 14, leases securing essential administrative buildings, fire, police, and library properties received full recoveries, while leases**

Exhibit 13: Essentiality of underlying pledged asset has been a strong determinant of recovery rates in past municipal defaults

Defaulted Obligor	Date	Purpose	Series	Par Amount ($mn)	Recovery Rate
Polk County, IA	Dec-91	Racetrack	1984 Sports Facility Revenue	39	100%
Orange County, CA	Dec-94	Pensions	Series B Pension Obligation	110	100%
Town of Cicero, NY	Nov-03	Ice Rink	2001A Annual Appropriation	15	10%
Jefferson County, AL	Jan-13	Jail/Courthouse	2006 Lease Revenue Warrants	78	100%
City of Detroit, MI	Jun-13	Pensions	2005 & 2006 COP's	1,450	12%

Source: Moody's, JP. Morgan

Exhibit 14: City of Stockton, CA creditor recovery rates

Debt Issue	Underlying Asset	Amt Outstanding ($000)	Insured	Recovery as % of Oustanding Debt
Series 2006 Lease Revenue Bonds	Administrative buildings, parking and city repayment promise	11,270	NPFG	100%
Series 2003A and B Certificates of Participation	Fire, police and library properties and city repayment promise	12,265	Ambac	100%
Series 2004 RDA	Stockton Arena, tax increment and city repayment promise	44,615	NPFG	95%
Series 2004 Lease Revenue Bonds	Parking garages and city repayment promise	38,870	NPFG	77%
Pension Obligation Bonds (Series 2007A and B)	Unconditional repayment promise	121,770	AGM	50%-55%
VRDB Lease Revenue Bonds (Series 2007A and B)	Office building and city repayment promise	40,035	AGM	Uncertain*
Series 2009A Capital Improvement Lease Revenue Bonds	Golf course, park and city repayment promise	34,555	None	1%**

Source: Moody's, Stockton Plan of Adjustment Note:*City will transfer office building to Assured Guaranty, which can sell it. In exchange, Assured will extinguish the city's obligation to repay Liquidation value uncertain. **Judge Klein valued the collateral at $4mn, which could raise its recovery rate from its proposed 1% under the plan. Possibly higher if bondholder is able to return the golf courses and park to profit.

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Exhibit 15: California accounts for the majority of the nation's contingent debt (18%), and the top 5 states combined to account for 55% of the nation

State	State and Local Contingent Debt Outstanding ($bn)	Proportion of Nation (%)
California	31.60	17.5%
New Jersey	27.18	15.1%
New York	16.44	9.1%
Florida	12.25	6.8%
Kentucky	10.72	5.9%
Indiana	9.73	5.4%
Virginia	8.20	4.6%
North Carolina	5.81	3.2%
Missouri	5.70	3.2%
Michigan	5.24	2.9%
Top 10	**132.9**	**73.8%**
Total Nation	**180.1**	

Source: Bloomberg, JP. Morgan Note: Includes all lease backed and COP's, fixed and zero coupon, not refunded, maturities greater than 1yr and excluding taxable bonds.

securing non-essential parking garages, golf courses, and parks experienced significantly lower recovery rates.

As illustrated in Exhibit 15, there is $180bn in contingent debt outstanding in the municipal market, with California accounting for the majority (29%), and the top 5 States combining to make up 59% of the nations contingent debt. Contingent debt includes lease backed, appropriated, non-ad valorem revenue lease backed, intergovernmental lease, and certificates of participation. For purposes of this analysis we looked exclusively at fixed and zero coupon, tax-exempt lease and COP's outstanding with maturity of at least 1 year.

In Exhibit 16, we provide the largest issuers of contingent obligation debt with at least $1bn outstanding, listed by security type. As illustrated, Florida school districts benefit from the strong contingent obligation security, secured by an annual appropriation pledged on highly essential school district assets. In addition, Florida school district COP's additionally benefit from a master lease structure and all-or none provision whereby the district is required to appropriate for either all or none of the COP's securing different properties. The school districts of Miami-Dade and Broward County are the two

Exhibit 16: Selected municipal issuers with at least $1bn in contingent obligations outstanding, listed by security type

Issuer	State	Security Type	Debt Outstanding ($bn)
Secured Lease (Appropriation)			
Miami-Dade School Board	FL	Secured Lease (Appropriation)	2.25
Broward County School Board	FL	Secured Lease (Appropriation)	1.19
State of Colorado Building Excellent Schools Today	CO	Secured Lease (Appropriation)	1.09
State of Arizona	AZ	Secured Lease (Appropriation)	1.02
Indiana Finance Authority	IN	Secured Lease (Appropriation)	0.25
Secured Lease (Abatement)			
California State Public Works Board	CA	Secured Lease (Abatement)	8.51
Michigan State Building Authority	MI	Secured Lease (Abatement)	3.59
Los Angeles County Public Works Financing Authority	CA	Secured Lease (Abatement)	1.63
Indiana Finance Authority	IN	Secured Lease (Abatement)	1.52
Anaheim Public Finance Authority	CA	Secured Lease (Abatement)	1.12
Non-Lease Appropriation (Dedicated Rev)			
New Jersey Transportation Trust Fund	NJ	Non-Lease Appropriation (Dedicated Rev)	19.67
Texas Transportation Commission State Highway	TX	Non-Lease Appropriation (Dedicated Rev)	3.43
Virginia State Commonwealth Transportation Board	VA	Non-Lease Appropriation (Dedicated Rev)	2.33
New York State Thruway Highway & Bridge	NY	Non-Lease Appropriation (Dedicated Rev)	1.84
Metropolitan Pier & Exposition Authority	IL	Non-Lease Appropriation (Dedicated Rev)	1.33
Kentucky Turnpike Authority	KY	Non-Lease Appropriation (Dedicated Rev)	1.14
Indiana Finance Authority	IN	Non-Lease Appropriation (Dedicated Rev)	0.61
Unsecured Lease (Appropriation)			
New York TFA Building Aid	NY	Unsecured Lease (Appropriation)	7.77
Virginia College Building Authority	VA	Unsecured Lease (Appropriation)	3.43
Kentucky State Property & Building Commission	KY	Unsecured Lease (Appropriation)	3.40
Virginia Public Buildings Authority	VA	Unsecured Lease (Appropriation)	1.36
Indiana Finance Authority	IN	Unsecured Lease (Appropriation)	0.63
Non-Lease Appropriation (No Dedicated Rev)			
New Jersey Economic Development Authority	NJ	Non-Lease Appropriation (No Dedicated Rev)	5.36
State of Wisconsin	WI	Non-Lease Appropriation (No Dedicated Rev)	2.56
State of North Carolina	NC	Non-Lease Appropriation (No Dedicated Rev)	1.33

Source: Bloomberg, J.P Morgan. Note: Selected issuers with at least $1bn in contingent debt outstanding

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largest in the State with a combined $3.4bn in COP's outstanding.

As illustrated, certain securities within the Indiana Finance Authority, specifically the Facilities Revenue Bonds, benefit from a security interest in the pledged leased assets. This security structure is additionally found in certain State of Arizona COP's and the State of Colorado Building Excellent Schools Today (BEST) Program.

Similar to the secured, lease-backed obligations secured by appropriations, the secured leased back obligations subject to abatement additionally provide a stronger relative security than the sole annual appropriation bonds. As illustrated, the California State Public Works Board, Michigan State Building Authority, Los Angeles County Public Works Financing Authority, Anaheim Public Finance Authority, and certain Indiana Finance Authority are all issuers of size that have the secured lease-backed structure subject to abatement risk. **Notably, while these securities are subject to abatement risk, they typically secure highly essential assets and have a reasonable level of insurance, which provides mitigating characteristics**.

Next we highlight the State of California Public Works Board, which is a lease-backed abatement obligation with $8.5bn in debt outstanding, securing mostly highly essential public building projects around the state.

State of California State Public Works Board Secured Lease-backed Debt

As an example of a secured lease-backed appropriation credit, albeit containing abatement risk, following is a detailed analysis of a State Public Works Board issuance in the State of California.

The purpose of the State Public Works Board of the State of California is to acquire, construct, improve, and operate public buildings and related faculties for State agencies. The bonds issued under the Authority are payable solely from certain revenues and other pledged monies.

The bonds are not debt obligations of the State, any political subdivision thereof, the Board, or Department of General Service (DGS). The bonds are not backed by the full faith and credit of the State, the general fund, and taxes shall not be levied or collected for payment of the bonds. Neither the Board nor the Department of General Services (DGS) has the power to pledge the credit or taxing power of the State.

Highlights:

- Solid fundamental underpinning of the State
- **Established legal process for capturing lease payments, first pledge on Fund deposits, and sole use of lease revenue provision.**
- Master Reserve Fund backing a portion of debt service.
- **Continuing appropriation when the appropriation is not included in the budget.**
- **Ability to capture rent at that facility or re-let to alternative tenant in the event of default.**

Risks:

- State credit deterioration.
- Declining political will to appropriate funds.
- **Risk (abatement) that the Facility will be unavailable to lessee due to an event that is not covered by insurance.**
- Inability to re-let facility.

The bonds are payable solely from and secured by a first pledge of Revenues under the Indenture consisting of:

1) **All Base Rental payments received by the Board pursuant to the Facility Lease. The Base Rental, if paid as scheduled, will be sufficient to pay the principal of and interest on the bonds.**
2) Amounts deposited in the Interest Account.
3) All other benefits, charges, income, proceeds, profits, receipts, rents, insurance proceeds, revenues, derived by the Board from the ownership, operation, or use of the Facility, including interest and profits from the investment money from the bonds.

Except as expressly permitted in the Indenture, the Revenues shall not be used for any other purpose while any of the bonds remain outstanding.

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The bonds are also secured by a first pledge of the amounts on deposit in the funds and accounts that are established in the Indenture.

The Indenture provides that as soon as practical after the beginning of the State's fiscal year, DGS, the Board and the State's Treasurer shall coordinate and they will determine whether the DGS has made the appropriate provisions in the budget for the payment of all rental due under the facility lease in the fiscal year.

Under the State Constitution, money can be drawn from the State Treasury only through an appropriation made by law. An appropriation may be made as part of the Budget Act or in other legislation, which must be approved by the State Legislature and signed by the Governor. **The annual Budget Act is subject to the power of the Governor to veto specific line items. Budget Act appropriations are generally limited to one year period of availability.**

Under the State's budget process, an appropriation for the rental payments will be included in the operating budget of DGS, and the appropriations for such rental payments will be supported by companion appropriation in the annual State operating budget for Caltrans. These annual appropriations may come from various sources such as the General Fund, special funds, and other funds of the State.

Section 15849.2 of the State Building Construction Act of 1955 requires that any State agency that has leased or otherwise contracted with the Board for a public building financed by revenue bonds issued by the Board to allocate from the **"first lawfully available funds"** appropriated to such State agency an amount necessary to pay all amounts anticipated to become due and payable during such fiscal year, including rental payments. The OS further goes on the stipulate that:

- **"the statutory provisions of the Act regarding priority with respect to the allocation of funds have not been interpreted by any court."**

Additionally, Section 15848 of the Act provides a continuing appropriation of moneys from the fund in the State Treasury from the DGS, as the State agency in legal possession of the Facility, when Rental payments are due during the a period that the State is operating without funds appropriate by a budget or when required rental payments have not been included in the budget adopted by the State, provided that the Department of Finance certifies that sufficient funds are available for use by the State agency.

DGS will covenant in the Facility Lease to take all necessary and appropriate actions to make rental payments if those payments were not included in the annual budget or if the State is operating without a budget. The OS further goes on the stipulate that:

- **"the statutory provisions of the Act regarding continuing appropriations have not been interpreted by any court."**

A substantial portion of the DGS's 2015-16 State operating budget is made up of payments from the operating budget of various entities such as Caltrans, for services performed by DGS.

Importantly, rental payments shall be abated proportionately during any period which the facility is not available due to "damage, destruction, partial condemnation or title defect, and there is substantial interference with the availability of the Facility.

The Base Rental payments following abatement, together with moneys from insurance, condemnation proceeds and moneys available in the Master Indenture Reserve Fund may not be sufficient to pay all interest and principle due on outstanding bonds. **In such cases, abatement is not an event of default and no remedy is available under the Facility Lease or the Indenture to the Holders of the Bonds for nonpayment under such circumstances.**

With respect to insurance proceeds, the Faculties Lease requires the DGS, to maintain:

(A) Fire, lighting and extended coverage insurance in an amount equal to 100% of the replacement cost of the facility.
(B) **Earthquake insurance, at the discretion of the Board, if insurance is available at a**

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reasonable cost, in an amount equal to the full insurable value of the structure or the principal amount of the Outstanding Bonds.

Neither the Board nor the DGS expects to maintain earthquake insurance on the Facility in the Series Official Statement used in this report. For these bonds, the Board is unable to, predict when or if such insurance will be available at a reasonable cost.

The proceeds of property and title insurance obtained on the Facility shall be at the discretion of the Board to either:

- Redeem outstanding bonds
- Repair the Facility

If the Board decides to repair the facility with insurance proceeds, any remaining balance shall be treated as Revenue and applied as defined in the Indenture**. In the event of an earthquake, if earthquake insurance is not acquired, there is no assurance that the State will repair the Facility.**

The Facility Lease requires the DGS to maintain total or partial rental interruption insurance due to certain hazards covered by fire, lightning, or earthquake (if insurance is obtained), **in an amount not less than the succeeding two years.**

If the Facility is damaged by a hazard not covered by insurance, DGS' obligation to make rental payments would be proportionally abated.

<u>Master Indenture Reserve Fund</u>

The Bonds are secured by an equal pledge on the Master Indenture Reserve Fund, along with all other Master Indenture Bonds and Incorporated Bonds. The Board reserves the right to determine which bonds will be secured by the Master Indenture Reserve Fund or separately.

Monies in the Master Reserve Fund can only be used for the payment of principal and interest in the event that funds are available. No assurances can be provided that there will be monies available in the Master Reserve Fund.

The Master Reserve Fund Requirement is defined as the sum of:

(A) The greatest of:
- **(i) The sum of the largest single payment of semiannual debt service remaining on the *specific facility* covered by the Master Indenture Reserve Fund.**
- **(ii) The sum of the largest single payment of semiannual debt service remaining on *all facilities* covered by the Master Indenture Reserve Fund within the locality.**
- (iii) Ten percent of the Maximum Aggregate Semi annual debt service or
- (iv) Largest single payment(s) for any interest payment dates due in any calendar month, plus

(B) an amount not to exceed 1% of the amount calculated in (A) above, as determined by the State Treasurer at the time of issuance of any Series of Master Indenture Bonds.

Under the Master Indenture, the State Treasurer shall, on or before December 1st, or on the withdrawal date from the Master Indenture Reserve Fund or any Master Indenture Bonds have been defeased, calculate whether the balance in the Master Indenture Reserve Fund is equal to the Requirement. In the event of a shortfall, funds can be replenished from any of the following:

- Deposit of a Reserve Credit Facility.
- Proceeds from additional series of bonds.
- Application of other lawfully available funds.

<u>Remedies Upon Default</u>

If DGS defaults, recall that abatement is not considered a default, remedies include:

- **(i) Maintain the Lease Facility and receive all rent from the DGS as it becomes due.**
- **(ii) Terminate the Lease Facility and DGS' right of possession and re-let the Facility**

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and recover damages as a result of the default.

The Indenture provides that any Holder may by legal action compel the Board to carry out its duties under the Act, including maintaining and enforcing its rights under the Facilities Lease. While the Facilities Lease allows for a re-let following a default, this may not be practical due to lack of a replacement lessee, the specialized nature of the Facility, or other reasons.

Although acceleration is a remedy provided in the Indenture, the Base Rental payable pursuant to Facility Lease may not be accelerated. **As such, the circumstances under with the State Treasurer might declare that the principal and accrued interest payable immediately is limited.**

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Trading recommendations

- **Investors can look to 3% coupon bonds in the10yr space and 4% coupon bonds in the 20yr area of the curve to pick up incremental yield (***US Fixed Income Markets Weekly, 7/15/2016***)**

- **Slower global growth and increasing uncertainty are likely to extend the period of municipal fund inflows, resulting in lower municipal bond yields for a protracted period of time and further tightening of credit spreads** *(2016 Mid-Year Outlook, 6/24/2016)*

- **The 10yr-15yr portion of the curve are expected to offer the best total returns in 2H2016** *(2016 Mid-Year Outlook, 6/24/2016)*

- **Consider selling callable bonds prior to the sharp price decline as they approach 5 years or shorter time to call date** *(US Fixed Income Markets Weekly, 3/4/2016)*

- **We recommend 3% coupon bonds in 10-15yr and 4% bonds in 15-25yr portions of the curve are expected to outperform similarly structure 5's through year-end** *(US Fixed Income Markets Weekly, 04/04/2016)*

- **Long dated municipal taxable and tax-exempt bond yields are trading at attractive levels relative to European and Asian sovereign government debt yields. Moreover, investors can pick up incremental yield, and add diversification, without taking outsized duration or credit risk** *(US Fixed Income Markets Weekly, 06/10/2016)*

- **We believe the State of Arizona's fundamentally improved credit profile, increased exposure to an improving economy** *(US Fixed Income Markets Weekly, 05/15/2015)*

- **New Jersey State investors could maintain the State tax-benefit and significantly increase credit quality by swapping out of the State General Obligation credit and into the New Jersey Turnpike Authority revenue bonds***(US Fixed Income Markets Weekly,(06/03/2016)*

- **A stabilizing housing market is supportive of property tax-backed debt** *(2016 Mid-Year Outlook, 6/24/2016)*

- **We recommend low AA and A rated airport bonds that have limited local competition, a diversified revenue base, a sizeable and strong home service area, and solid airline relationships, marked by a track record of low enplanement costs** *(US FIMS Weekly, 3/11/16)*

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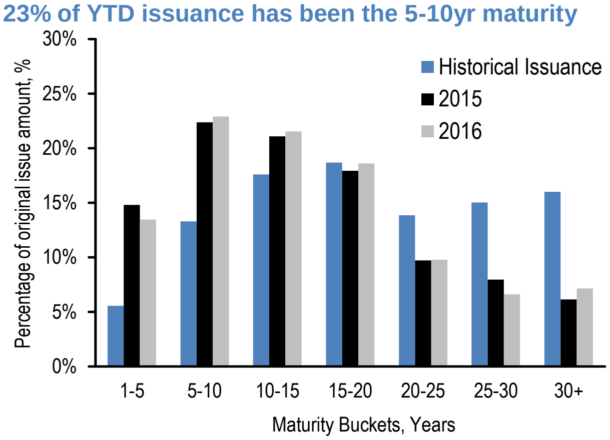
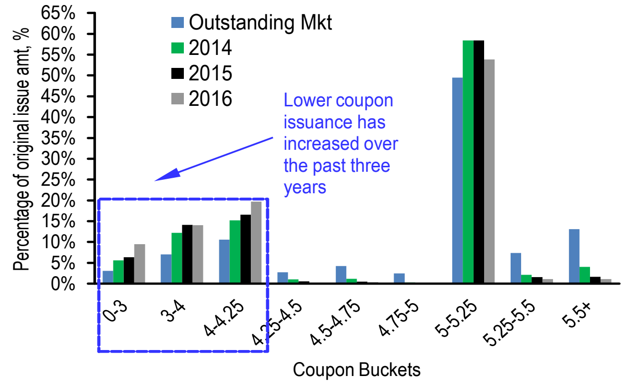
Issuance and Trading Trends

23% of YTD issuance has been the 5-10yr maturity



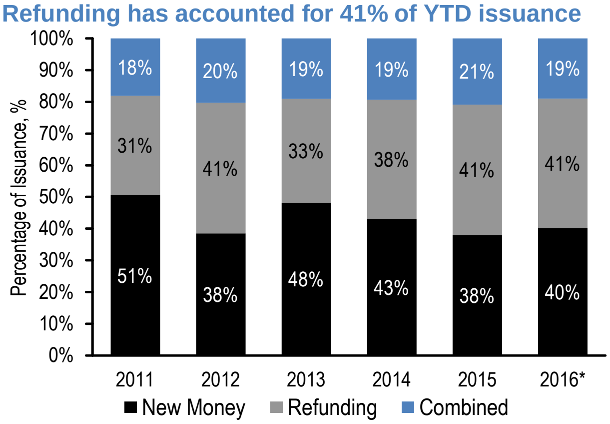
Source: S&P, J.P. Morgan
Note: Long term, fixed coupon, tax-exempt bonds only

54% of YTD issuance has been in 5%-5.25% coupon bonds



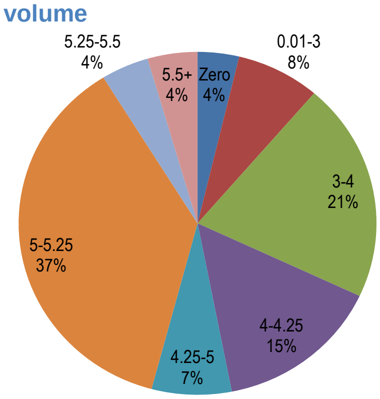
Source: S&P, J.P. Morgan
Note: Long term, fixed coupon, tax-exempt bonds only

Refunding has accounted for 41% of YTD issuance



Source: Thomson SDC, J.P. Morgan
Note: Long term bonds only

3% to 4.25% coupon bonds have accounted for 36% of YTD trading volume



Source: S&P, J.P. Morgan
Note: Long term, tax-exempt bonds only

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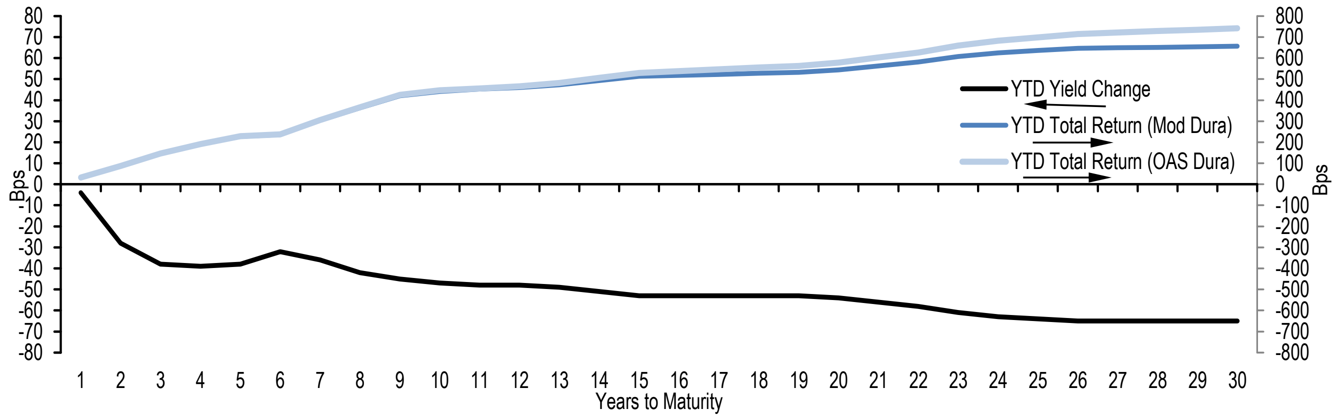
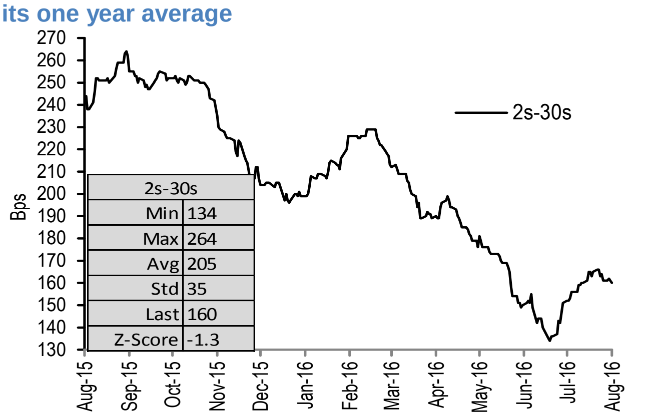
Total return and Curve Spreads

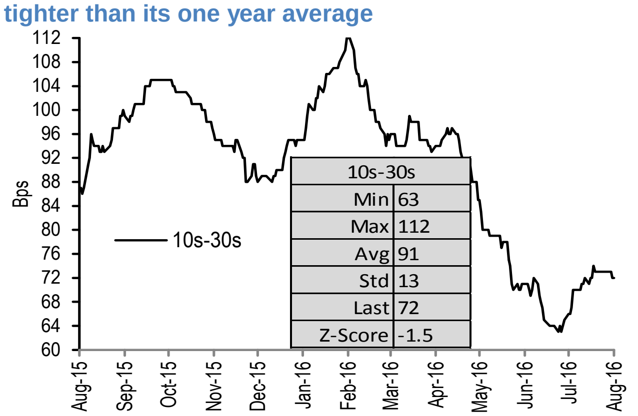
YTD, yields have declined driving positive total returns across the curve



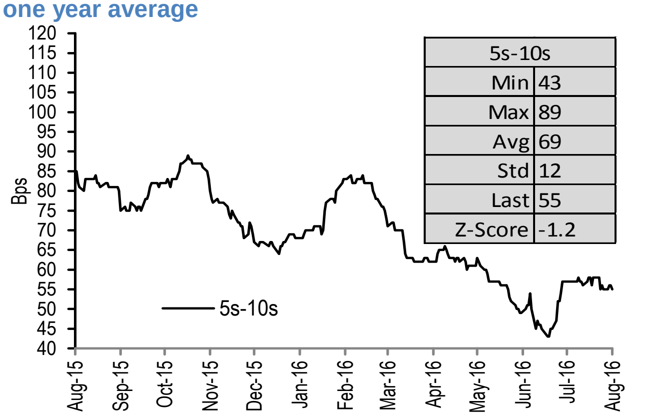
The 2s/30s curve is -1.30 sigma or 45bps tighter than its one year average



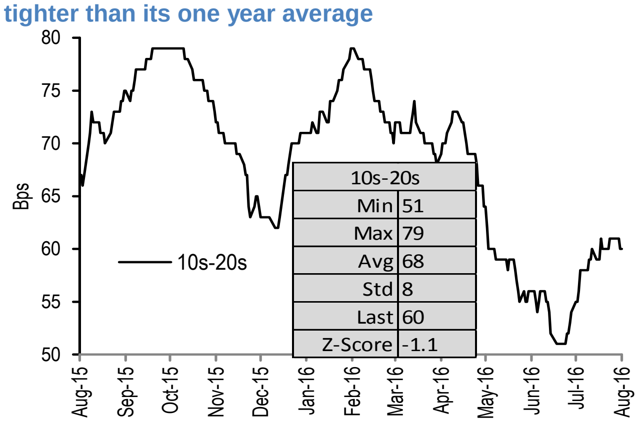
At 72bps, the 10s/30s curve is -1.5 sigma or 19bps tighter than its one year average



The 5s/10s curve is -1.2 sigma or 14bps tighter than its one year average



At 60bps, the 10s/20s curve is -1.1 sigma or 8bps tighter than its one year average



Source: Thomson Reuters, Bloomberg, J.P. Morgan
Note: As of 8/18/2016

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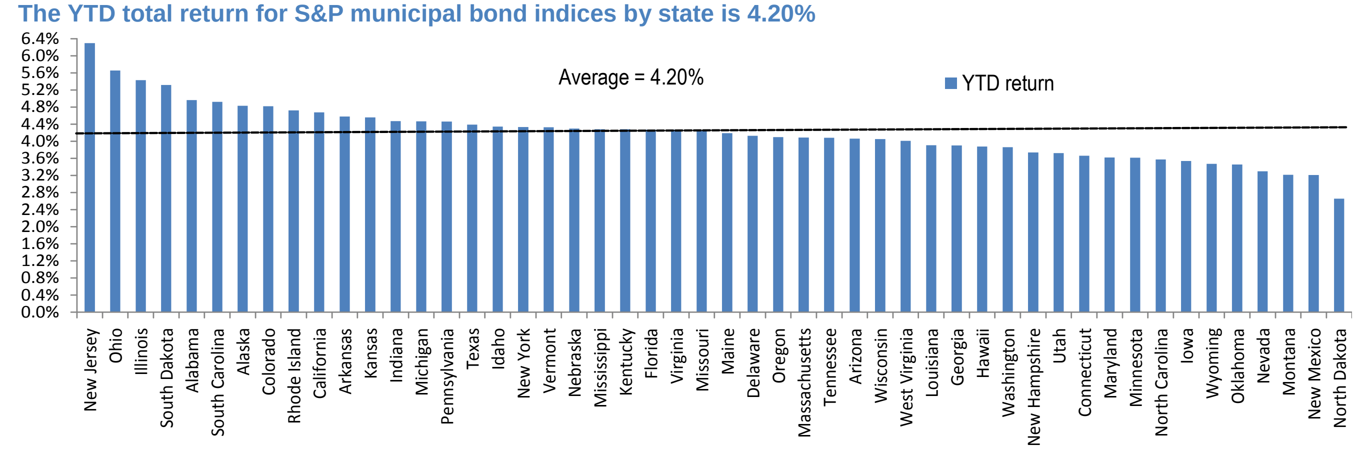
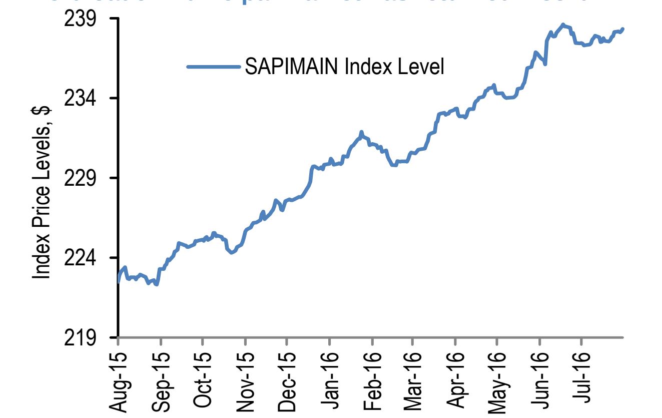
Total return by State and Sector

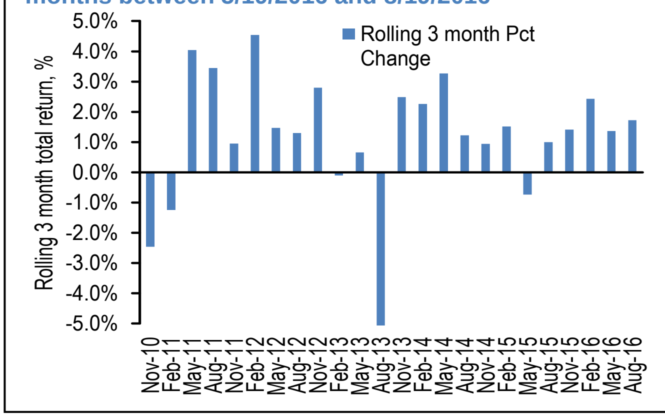
The YTD total return for S&P municipal bond indices by state is 4.20%



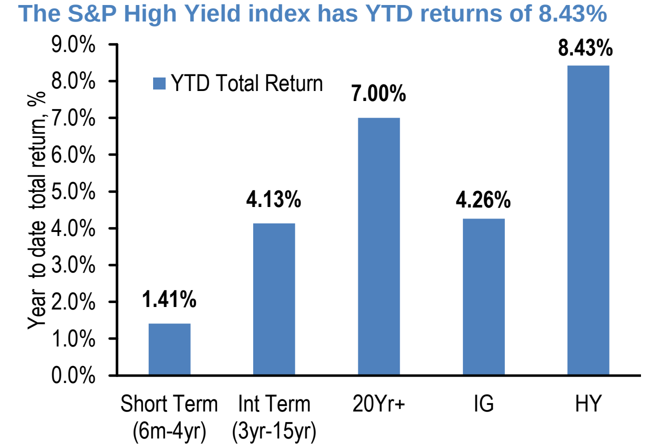
The broader municipal market has returned 4.55% YTD



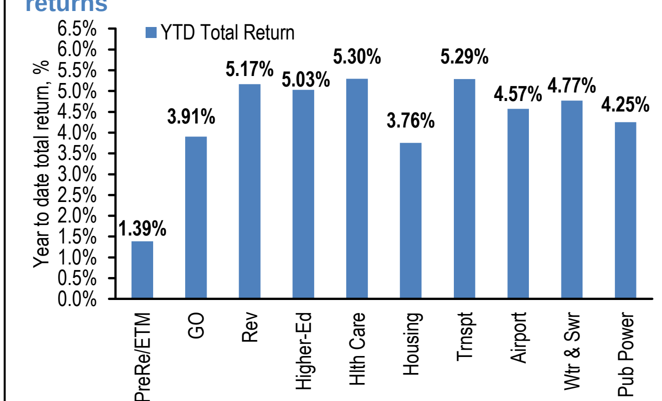
The SAPIMAIN index has returned 1.72% in the three months between 5/19/2016 and 8/19/2016



The S&P High Yield index has YTD returns of 8.43%



The S&P health care sector index shows the best YTD returns



Source: S&P, Bloomberg, J.P. Morgan, as of 8/18/2016
Note: Total return calculated as the percentage change in index levels. S&P Municipal bond total return indices used, please refer to http://us.spindices.com/index-family/fixed-income/municipals

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Glossary of Publication Topics

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Special Note: Puerto Rico Update & Commentary

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- Charter Schools: 1/10/2014
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- Double-Barreled Bonds: 05/13/2016
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- Highway Transportation Fund: 12/11/2015
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- Total Return & Performance: 06/10/2016, 05/13/2016, 03/11/2016, 03/04/2016, 06/22/2015, 06/05/2015
- Trading Volumes: 12/18/2015

Municipal Market Outlook

- 2H16 Mid-Year Outlook: 06/24/2016
- 2016 Outlook: 11/25/2015

Weekly Updates

- Comparisons versus Corporates, Treasuries, and Global Sovereigns
- Full year gross and net supply estimates
- Fund flows
- Interest rate forecast
- Next week's supply

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