Loop Capital

Municipal Strategy Report

A Monthly Analytical Services Division Publication April 2019

GDP Release Increases Risk, Complicates Fed's Job

In the wake of the 1Q19 GDP report, favorable adjustments leading back to more balanced growth may take longer than anticipated, leaving the economy more vulnerable to any global shocks that may arise.

By Chris Mier, CFA | Strategist

The first pass at 1Q19, which came in at 3.2%, surprised everyone, exceeding even the highest estimate of Bloomberg's survey of 2.9% and well ahead of the consensus of 2.3%. Two weeks prior to the release, before the Trade and Retail Sales data, the market was hunkered down with expectations of a 1.5% figure. Assigning too much emphasis to the data is cautioned due to the government shutdown that did not enable a full calculation of all the components, making it incomplete. Then there is the issue of residual seasonality to consider.

Taken on face value, the release was good politically for the Trump Administration, which wasted no time in extolling the good news of growth exceeding the Administration's promise of 3% growth. The release was largely rationalized by market participants, however, as one that will borrow growth from the 2Q19 before allowing the economy to continue to proceed as expected towards a full-year growth rate of roughly 2.5%.

We think that the release, however, does represent a different, possibly adverse, trajectory for the economy, for the Fed's policy response, and for the level of uncertainty facing the economy.

The releases points to a more protracted resolution of the inventory overhang, increasing the prospect of the adjustment process dragging into the second half of the year, providing an ongoing drain on factory production and growth. The other prominent swing factor in the data, the boost from net exports, similarly suggests payback as the year progresses. With the composition of imports likely to return to more normal configuration, net exports should return to providing a drag on the economy.

The deceleration of consumer spending is our major concern. Given the strong fundamentals of the consumer there should be improvement as the year progresses and as the headwinds of government shutdown, December stock market swoon, and bad weather abate. The magnitude of the slowing, however, raises the prospect that a "buyer's strike" has presented itself, with a continuation of weak durable goods sales restraining growth. While business investment is expected to grow, a less enthusiastic consumer tempers the need for businesses to invest in new plant and equipment, and they will be reluctant to rebuild inventories based on anything but observable increases in consumer activity.

Continued on Page 2

In this Issue

GDP Release Increases Risk, Complicates Fed's Job	1
Economic and Interest Rate Forecast — April 2019	3
Market Review *Data Diffusion / ADS Index*	4
Forward Rates and Bond Total Returns	5
Taxable Munis—Valuable Component of Well Diversified Portfolios	6
Flooding Impacts Midwest and Plain States	8
Market Review *Historical Monthly Bond Price Changes*	9
Market Review *The Yield Curve*	10
Market Conditions	12
Loop Capital Markets Upcoming Negotiated Calendar	13

GDP Release Increases Risk, Complicates Fed's Job

While we suspect that most economists will not downgrade their growth estimates for the full year, the prospect of achieving that growth is facing increased uncertainty. Commentaries seem to implicitly rest on a timely resolution of trade negotiations, something that cannot be assured. Similarly, securing 2.5% growth relies upon the belief that Europe will respond economically on a timely basis, something increasingly open to debate.

We think the 1Q data increases the period the Fed will be on pause. We also think that the decline in Core PCE to 1.3% potentially puts the Fed in play to cut rates later this year, something we regarded as highly unlikely before the release. Fortunately, inflation expectations remain anchored at 2.5% for the 12-month time horizon. Any slippage, however, will present the Fed with something that could be a trigger to cutting rates. It may take a few days for markets to fully digest the significance of the data, but the knee jerk movement to slightly lower treasury rates after the release creates concerns.

We continue to hold the view that the consumption will return to a reasonable level capable of sustaining 2.5% growth and that business investment and the housing market will provide meaningful impetus to growth. Our conviction, however, has been shaken by the increasing uncertainty presented by the report. We feel compelled to think that favorable adjustments leading back to more balanced growth may take longer than anticipated, leaving the economy more vulnerable to any global shocks that may arise.

Economic and Interest Rate Forecast — April 2019

Factors Supportive of Lower Rates

Corporate earnings are forecasted to decline 1.3% in Q1'19 for the first time since 2016, which could dampen the ongoing rally in the stock market.

Industrial production and capacity utilization fell marginally in March, while Philadelphia Fed general business conditions index declined in April.

Global economic outlook remains clouded. The deceleration of Chinese and Eurozone economies has hit earnings of multinationals in cyclical industries.

Factors Supportive of Higher Rates

Real GDP growth in the first quarter surprised on the upside, 3.2% vs. 2.3% consensus estimate, on strength in net trade and growth of inventories.

The U.S. job market bounced back strongly in March, with nonfarm payrolls increasing by 196K, while February figure was revised up by 13K. The unemployment rate held steady at 3.8%, while hourly earnings rose marginally.

Consumer balance sheets are strong, with low debt service burdens, manageable debt levels, high savings and high confidence supported by the continuation of a strong labor market.

Retail sales jumped 1.6% in March, the most since September 2017, on gains in motor vehicles and gasoline.

Vehicle sales were surprisingly strong in March, reaching a 17.5 million annualized rate on strength in the light trucks sector.

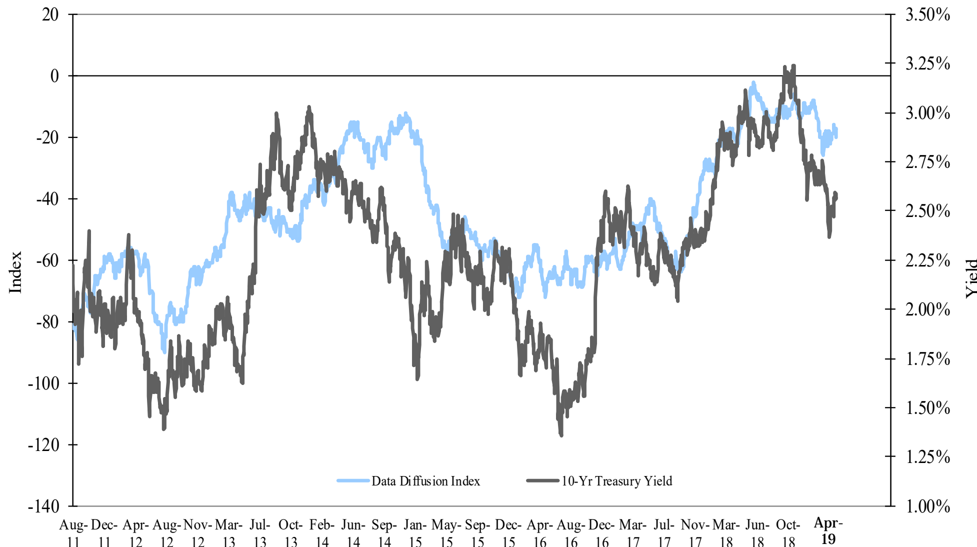
Figure 1 **Economic and Interest Rate Forecast — April 2019**

	3Q'17	4Q'17	1Q'18	2Q'18	3Q'18	4Q'18	1Q'19	2Q'19	3Q'19	4Q'19	1Q'20	2Q'20	3Q'20	4Q'20	Avg'17	Avg'18	Avg'19	Avg'20
Economic Forecasts																		
Real GDP	2.8	2.3	2.2	4.2	3.4	2.2	2.0	2.6	2.3	2.2	2.2	2.1	2.0	2.0	2.2	2.9	2.6	2.2
Core PCE Deflator	1.5	1.6	1.7	1.9	2.0	1.9	1.8	1.9	2.0	2.1	2.1	2.1	2.0	2.0	1.6	1.9	2.0	2.0
Unemployment Rate*	4.3	4.1	4.1	3.9	3.8	3.8	3.9	3.7	3.7	3.6	3.6	3.5	3.5	3.6	4.4	3.9	3.7	3.6
Nonfarm Payrolls (chg in 1000s)	409	654	683	728	568	700	525	525	470	460	450	420	375	325	2,164	2,679	1,980	1,570
S&P 500*	2,467	2,603	2,733	2,703	2,850	2,699	2,725	2,853	2,881	2,901	2,925	2,950	2,976	3,003	2,449	2,746	2,840	2,964
Short-Term Interest Rates*																		
Fed Funds Target (%)	1.16	1.20	1.44	1.74	1.92	2.18	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	1.00	1.82	2.38	2.38
3-Month LIBOR (%)	1.31	1.46	1.93	2.34	2.34	2.62	2.69	2.61	2.63	2.63	2.63	2.63	2.63	2.63	1.26	2.31	2.64	2.63
7-Day SIFMA (%)	0.82	1.05	1.21	1.46	1.35	1.63	1.55	1.70	1.65	1.80	1.75	1.85	1.90	1.90	0.85	1.41	1.68	1.85
Treasury Interest Rates*																		
2-Year Treasury (%)	1.36	1.69	2.15	2.47	2.66	2.80	2.49	2.41	2.45	2.48	2.50	2.50	2.50	2.50	1.39	2.52	2.46	2.50
3-Year Treasury (%)	1.51	1.81	2.30	2.61	2.74	2.84	2.46	2.40	2.47	2.52	2.54	2.57	2.58	2.60	1.57	2.62	2.46	2.57
5-Year Treasury (%)	1.81	2.06	2.53	2.77	2.81	2.88	2.46	2.40	2.51	2.58	2.62	2.65	2.66	2.68	1.91	2.75	2.49	2.66
7-Year Treasury (%)	2.06	2.25	2.68	2.88	2.88	2.97	2.52	2.48	2.52	2.59	2.63	2.67	2.69	2.71	2.16	2.85	2.53	2.67
10-Year Treasury (%)	2.24	2.37	2.76	2.92	2.92	3.04	2.65	2.55	2.61	2.65	2.68	2.72	2.75	2.78	2.33	2.91	2.61	2.73
30-Year Treasury (%)	2.82	2.82	3.03	3.09	3.06	3.27	3.01	2.76	2.87	2.92	3.03	3.14	3.15	3.19	2.89	3.11	2.89	3.13
Municipal Interest Rates*																		
30-Year MMD (%)	2.75	2.71	2.91	2.99	3.04	3.27	2.95	2.70	2.80	2.84	2.93	3.03	3.04	3.06	2.85	3.05	2.82	3.01
Muni Yield Curve Slope (%)	1.93	1.58	1.51	1.36	1.47	1.40	1.34	1.15	1.13	1.02	1.08	1.08	1.04	1.06	1.93	1.44	1.16	1.06

P: Preliminary Data
* 3-month average
Source: Loop Capital Markets' Analytical Services Division and Short-Term Desk. Black Text: Actual Blue Text: Forecast as of April 24, 2019

Market Review *Data Diffusion | ADS Index*

Figure 2 **Data Diffusion Index vs. 10-Yr Treasury Yield**

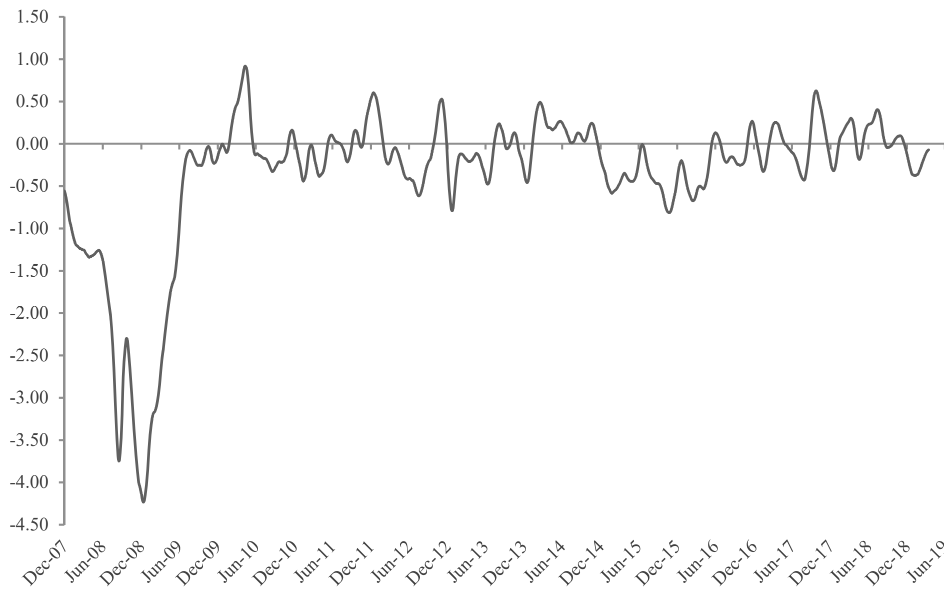


Sources: FRED, Loop Capital Markets

Treasury yields have been volatile recently, reflecting the supply-demand dynamic in addition to economic fundamentals.

Data Diffusion Index: We calculate the Data Diffusion Index based on 30 different weekly, monthly and quarterly economic releases, such as construction spending, capacity utilization and new home sales. If the number came above the consensus estimate (which is positive for economic growth) the index would increase by one, and vice versa. The Treasury yield is expected to track the data diffusion index (the yields would increase as the economy exceeds expectations and vice versa).

Figure 3 **Aruoba-Diebold-Scotti Business Conditions Index (12/31/2007 — 04/13/2019)**



Source: Federal Reserve Bank of Philadelphia

After trending up for several years, the ADS index weakened from December through February and partially recovered since that time. The index is currently slightly below trend growth rate of about 2%.

Reading the ADS Index: The index is designed to track real business conditions at high frequency. Its underlying (seasonally adjusted) economic indicators (weekly initial jobless claims; monthly payroll employment, industrial production, personal income less transfer payments, manufacturing and trade sales; and quarterly real GDP) blend high and low-frequency information and stock and flow data.

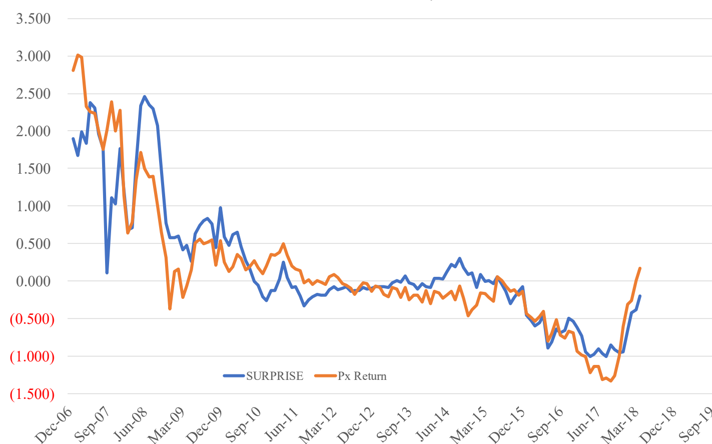
Forward Rates and Bond Total Returns

By Chris Mier, CFA | Strategist

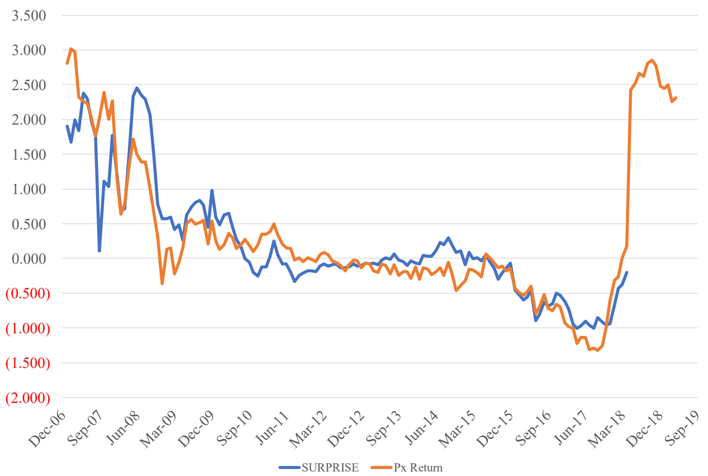
One popular way to assess the current price of shorter term fixed-rate assets with respect to their degree of richness or cheapness is to compare forward rates with the eventual actual rates noting the difference between expectation and realization. This builds upon the work of the BCA, which used their 12-month Fed Funds Rate Surprise Index relative to a 12-month Treasury Index Excess Return series. We use a similar approach using different instruments.

The rate earned on the one-month one-year forward in the future is a bet on where rates will be that can be tested against where rates actually end up. If the future one-month rate is below where the forward rate was at the time of purchase, then the buyer experiences a positive "surprise". Conversely, if the one-month rate is above the forward rate from one year ago, then the buyer experiences a negative "surprise".

The surprises are reflected in the movement of the spot prices of Treasury notes and bonds across the cover as the market moves through time. We can measure the surprise by comparing the initial forward rate with the eventual actual rate 12 months hence. The Surprise Index is graphed below with the contemporaneous price change on the 2-Year Treasury Note. As you can see, price returns closely correspond to surprises across all categories, positive surprises, negative ones, and occasions where expectations are met and price change is minimal as a result.



The usefulness of the chart can be seen by extending the price data on the forward 1-Year/1-Mo to the present. The most recent Surprise Data is from 12-months ago. We can, however, use the correlation of the two series to infer where the 1-month yield would have to get to in order to justify the significant rally that the 2-year has experienced. Unfortunately, if the relationships in the model hold, the one-month rate would have to fall to below zero. Common sense tells us that this is a very unlikely outcome and that, therefore, we have to conclude that the 2-year has over-discounted economic weakness and is currently overpriced.



As the economic data strengthens, as we expect, the yield will rise, its price will decline and the Price Return and the Surprise Index will meet somewhere in-between where the Price Return is now and where they were in December. The conclusion is that the 2-Year Note is likely to experience a price decline.

Taxable Munis—Valuable Component of Well Diversified Portfolios

By Ivan Gulich | Senior Vice President

Modern portfolio theory shows that investors can construct a portfolio of multiple assets that will maximize expected return for a given level of market risk acceptable to investors. According to the theory, pioneered by Harry Markowitz, it is possible to construct an "efficient frontier" of optimal portfolios offering the maximum possible expected return for a given level of risk. Investors can also minimize risk for a portfolio that targets certain return. Guided by the portfolio theory, many public pension plans have expanded their investments into a wide array of alternative asset classes in recent years.

The risk and return characteristics of various asset classes should not be evaluated in isolation, but by how the asset class affects the portfolio's overall risk and return. In allocating the portfolio across asset classes, expected return may not be as important as how the asset class behaves in the context of the entire portfolio.

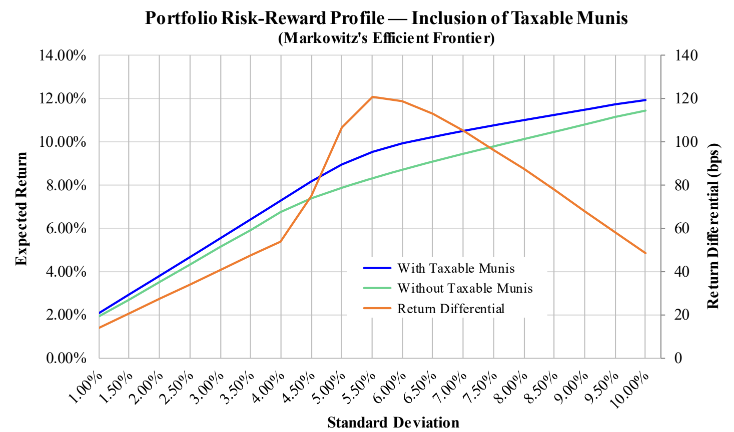
We have evaluated the role of taxable munis in portfolio asset allocation. Taxable munis may be underutilized, given their outperformance of muni tax exempt bonds over 1, 2, 3, 4 and 5-year periods.

Our base model consists of 7 asset classes: T-Bills, TIPS, Treasuries, tax-exempt munis, investment grade corporates, high yield corporates and stocks. Tax-exempt munis were evaluated on a tax-equivalent basis to reflect the benefit of the tax-exemption.

The proxies for asset classes were diversified liquid ETFs such as MUB (iShares National Muni Bond ETF) and SPY (SPDR S&P 500 ETF).

Expected returns, standard deviations and asset class cross-correlations were calculated using monthly returns from December 2008 through March 2019. These inputs were fed into the model which generates the efficient frontier of optimal portfolios.

We then added taxable munis as eighth asset class available to optimize the portfolio. The results of two portfolio optimizations are shown in the following graph:



By comparing the blue and green line, we see that the inclusion of taxable munis increased portfolio's expected annual return between 14 and 121 bps, depending on the selected risk level (standard deviation of portfolio returns). Taxable munis' risk-return profile is clearly favorable in the portfolio context.

The correlation matrix explains the differences in portfolio performance by various asset classes.

Correlation Matrix

Exchange-traded fund	Ticker	BIL	TIP	IEF	MUB	BAB	HYG	SPY	LQD	Annual Return	Annual Stand. Dev.	Sharpe Ratio
SPDR Barclays 1-3 Mth T-Bill	BIL	-	0.00	0.03	0.01	(0.01)	(0.08)	(0.09)	(0.03)	0.29%	0.20%	N/A
iShares TIPS Bond	TIP	0.00	-	0.72	0.60	0.68	0.24	(0.01)	0.71	2.67%	4.53%	37%
iShares 7-10 Year Treasury Bond	IEF	0.03	0.72	-	0.70	0.84	(0.16)	(0.43)	0.64	3.68%	5.76%	47%
iShares National Muni Bond	MUB	0.01	0.60	0.70	-	0.72	0.07	(0.13)	0.61	4.86%	4.45%	87%
Invesco Taxable Municipal Bond	BAB	(0.01)	0.68	0.84	0.72	-	(0.11)	(0.29)	0.68	6.98%	6.45%	93%
iShares High Yield Corp Bd	HYG	(0.08)	0.24	(0.16)	0.07	(0.11)	-	0.75	0.46	6.47%	6.95%	79%
SPDR S&P 500	SPY	(0.09)	(0.01)	(0.43)	(0.13)	(0.29)	0.75	-	0.14	12.94%	12.37%	97%
iShares Invmt Grade Corp Bd	LQD	(0.03)	0.71	0.64	0.61	0.68	0.46	0.14	-	5.03%	5.29%	76%

Source: Portfolio Visualizer, Sillicon Cloud Technologies, LLC

The highlighted column shows that returns for investment grade and high yield corporates are positively correlated with S&P 500 returns, while other fixed income asset classes, including munis, have negative correlations. High yield corporates have 75% correlation with stocks, yet offer only one-half of stock returns, which makes them an inefficient asset class from the portfolio standpoint. Even though Treasury returns are modest, due to their negative correlation with stock returns, Treasuries are often part of optimal portfolios. Investment grade corporates are positively correlated with every other asset class in the matrix except the T-Bills.

Over the last 10 years taxable munis offered higher returns with lower standard deviations than high-yield corporates. The Sharpe

ratio for taxable munis is significantly higher than for investment grade and high yield corporates.

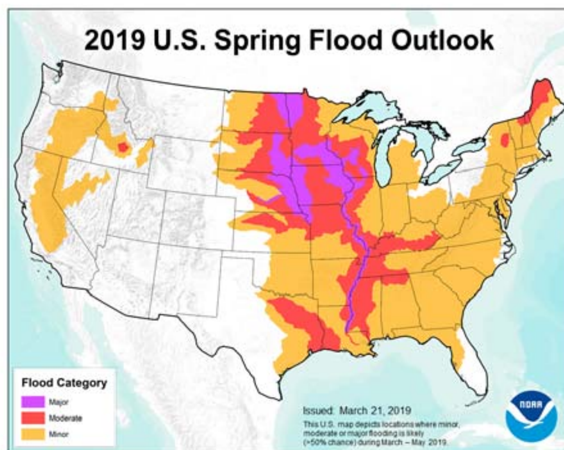
It should be noted that these observations reflect last 10 years of market history, which may not be reflective of future performance. Portfolios consist of many individual securities with risk-return profiles that may differ significantly from aggregate risk-return profiles of asset classes they belong to.

Despite these caveats, taxable munis are an attractive asset for portfolio managers due to their favorable portfolio performance and generally high credit quality. Muni investors should take advantage of this dynamic by increasing allocation to taxable munis.

Flooding Impacts Midwest and Plain States

By Rachel Barkley | Senior Vice President

The National Oceanic and Atmospheric Administration (NOAA) has warned that nearly two-thirds of the Lower 48 states have an elevated risk of flooding through May, while 25 states are at risk of major or moderate flooding.[1] Already many areas of the Midwest and Gulf Coast are experiencing significant flooding along the Missouri and Mississippi Rivers, affecting Arkansas, Illinois, Indiana, Iowa, Louisiana, Mississippi, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.



Source: NOAA

Total damage from the current flood condition is estimated to total more than $3B.[2] Local impacts from the flooding are expected to be numerous including damage to and loss of housing stock and commercial properties. The flooding is estimated to have caused $1.6B of damage in Iowa alone, including $480M in housing damage and $300M is business losses.[3] Assessed value may decline in certain areas in the next valuation, although sales tax collections are expected to increase in the near-term as residents rebuild.

Farming areas will be particularly affected, with over $1B of agricultural losses estimated for Iowa and Nebraska alone.[4] The loss of crops, coupled with flooded and damaged infrastructure, is already being seen with rail grain carloads down 14% YoY as of the beginning of April.[5] Over $100M of crops destroyed by the flooding were uninsured, mostly through stored crops. Federally subsidized crop insurance only covers crops when they are planted, not after harvesting. Challenges are expected to persist through the next harvest, as corn farmers have now missed the peak planting period. A slowdown in corn supplies would have a national impact by increasing gasoline prices, as ethanol is mixed with gasoline to increase fuel efficiency.

Affected states and local governments are likely to increase debt issuance to repair damaged infrastructure. Nebraska estimates its infrastructure losses total more than $160M, with necessary repairs needed for its highways and bridges.[6]

Areas that require federal assistance are likely to be left waiting for quite a while. A bill in U.S. Senate (S. 572) authorizing $13B in aid for natural disasters, including flooding from the recent rainfall, has failed to advance in Congress.[7] However, assuming a bill were to be passed, a considerable wait for a significant portion of aid to be dispensed would still be ahead based on prior precedent. A recent report by the Governmental Accountability Office (GAO) highlighted how FEMA funding often takes over a year.[8]

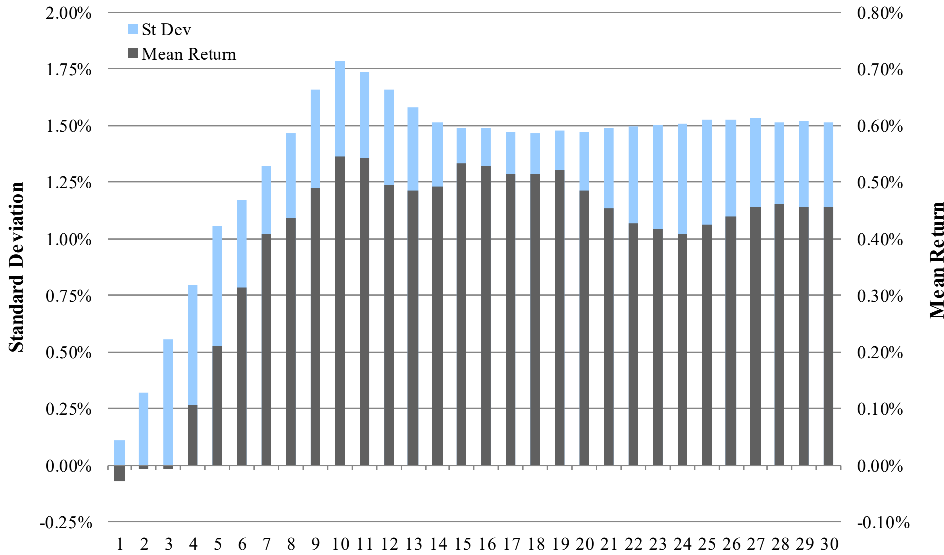
Financial flexibility, including reserve levels, are especially necessary for states and local governments prone to flooding, allowing them to better weather revenue declines and adjust their budgets to include unexpected capital needs. Iowa, which ended fiscal 2018 with $9.7B in governmental reserves, is seeking to use $15M of fund balance to jump start repair work on its infrastructure, as well as $10M in revenues in the fiscal 2020 budget for housing repairs.[9]

Going forward, states prone to flooding will need to prepare for future episodes, which may be more frequent and more intense as times goes on. A number of states are taking concrete steps to position themselves in the future, including North Dakota, which is currently working on a $2.8B public private partnership project to provide long-term flood relief to the Fargo metro area.

[1] Spring Outlook. NOAA. 2019.
[2] Midwest flooding opens spigot on fiscal and policy debates. The Bond Buyer. April 2, 2019.
[3] Midwest flooding costs skyrocket as Iowa announces $1.6 billion in damages. The Washington Times. March 22, 2019.
[4] Midwestern farmers devastated by uninsured flood losses. UPI.com. March 29, 2019.
[5] Grain Transportation Report. USDA. April 18. 2019.
[6] Flood relief for Nebraska. FleetOwner. April 15, 2019.
[7] S. 811: Additional Supplemental Appropriations for Border Security and Disaster Relief, 2019. Govtrack.com
[8] 2017 Hurricanes and Wildfires. GAO. September 2018.
[9] Iowa governor seeks state flood-relief money in advance of federal dollars.WOWT.com. April 15, 2019.

Market Review *Historical Monthly Bond Price Changes*

Figure 4 **Muni Benchmark Callable Scale — Average Bond Price Changes (April)**



Sources: Loop Capital Markets, TM3

We show historical bond price changes for each point on the muni benchmark callable curve during the month of April for the last 18 years.

The returns in April were positive about 3/4 of the time, with bond prices rising, on average, 0.40% across the curve.

Figure 5 **Muni Benchmark Callable Scale — Average Bond Price Changes (April)**

AAA MMD - MONTHLY PRICE CHANGE

Maturity	5	10	15	20	25	30
Apr-01	-0.92%	-2.15%	-1.90%	-1.60%	-1.52%	-1.44%
Apr-02	2.49%	2.52%	1.71%	1.08%	0.85%	0.84%
Apr-03	0.27%	0.72%	0.79%	1.11%	0.95%	0.94%
Apr-04	-2.60%	-4.13%	-2.73%	-2.86%	-3.09%	-3.08%
Apr-05	1.03%	2.17%	1.92%	1.91%	1.67%	1.66%
Apr-06	-0.04%	-0.71%	-0.71%	-0.39%	-0.47%	-0.39%
Apr-07	-0.18%	0.08%	0.00%	0.00%	0.00%	0.16%
Apr-08	-0.40%	0.32%	1.19%	2.14%	2.38%	2.22%
Apr-09	1.04%	1.87%	2.09%	2.15%	2.22%	2.14%
Apr-10	0.22%	1.21%	0.80%	0.48%	0.79%	0.95%
Apr-11	1.22%	2.77%	2.25%	1.83%	1.74%	1.74%
Apr-12	0.73%	1.98%	1.80%	1.62%	1.21%	1.13%
Apr-13	0.45%	1.82%	1.89%	1.55%	1.79%	2.03%
Apr-14	0.36%	1.56%	1.30%	1.21%	1.12%	1.28%
Apr-15	-0.27%	-1.30%	-1.53%	-1.68%	-2.00%	-1.99%
Apr-16	0.41%	0.74%	0.82%	0.82%	0.90%	0.89%
Apr-17	0.63%	0.90%	0.73%	0.40%	0.24%	0.24%
Apr-18	-0.67%	-0.57%	-0.81%	-1.04%	-1.12%	-1.12%
Mean	0.21%	0.54%	0.53%	0.48%	0.43%	0.46%
St Dev	1.05%	1.79%	1.49%	1.47%	1.52%	1.51%

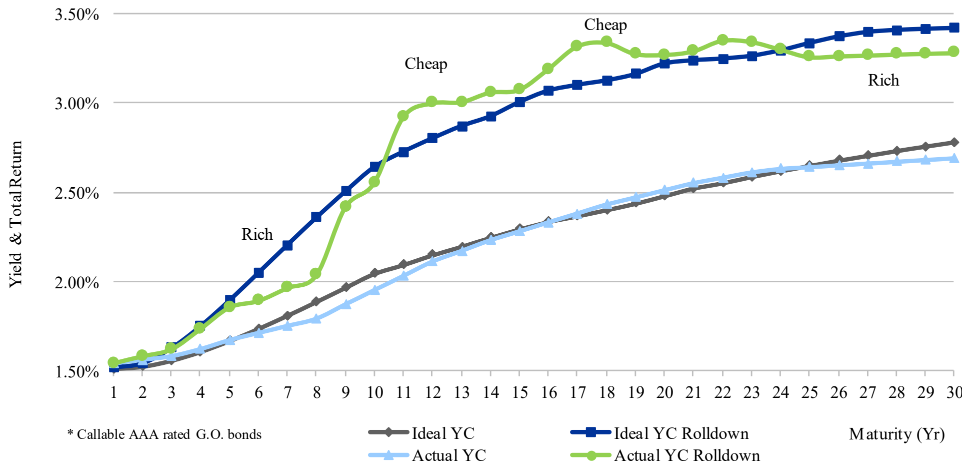
Sources: Loop Capital Markets, TM3

The 10-yr point has the highest expected return.

The 9 to 13-year range was most volatile, with standard deviation of monthly bond price changes of 1.68%.

Market Review *The Yield Curve*

Figure 6 **1-Year Forward Roll-down—Muni Benchmark Curve* (April 23, 2019)**

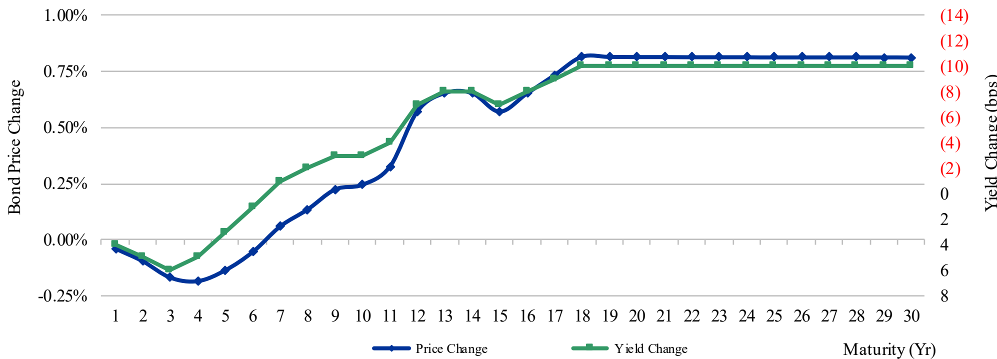


Sources: Loop Capital Markets, TM3 | *Callable AAA-rated G.O. bonds

The yield curve shows rich (6 to 10-yr and 25+ yr) and cheap (11 to 23-yr) points on the AAA MMD curve, based on one year holding period returns and assuming no change in the yield curve. 9-yr maturity currently offers 38 bps higher expected 1-yr holding period return than the 8-yr maturity.

Actual returns will depend on the level and shape of the yield curve a year from now.

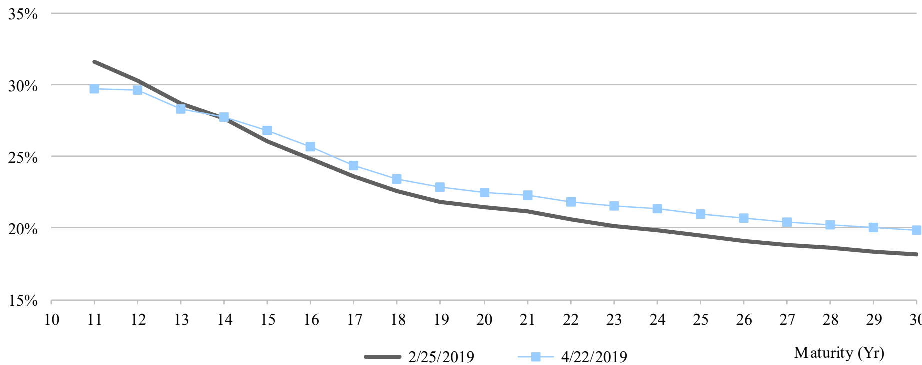
Figure 7 **Monthly Price Change — AAA GO Bonds* (03/26/19 — 04/26/18)**



Sources: Loop Capital Markets, TM3 | *Price Change Only

Yields rose 5 to 6 bps on the front end and fell 10 bps on the long end of the curve last month.

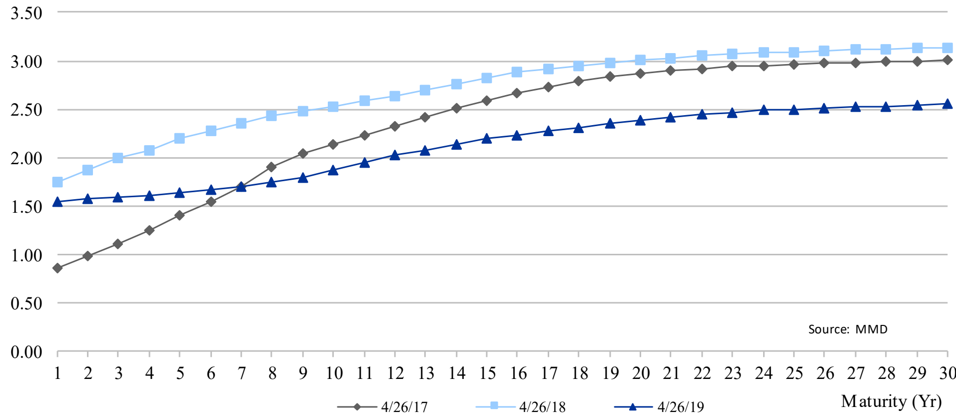
Figure 8 **Implied Municipal Volatilities**



Sources: Loop Capital Markets, TM3 | *10-year call

Implied volatility curve flattened over the last 2 months, with volatilities rising for longer maturities.

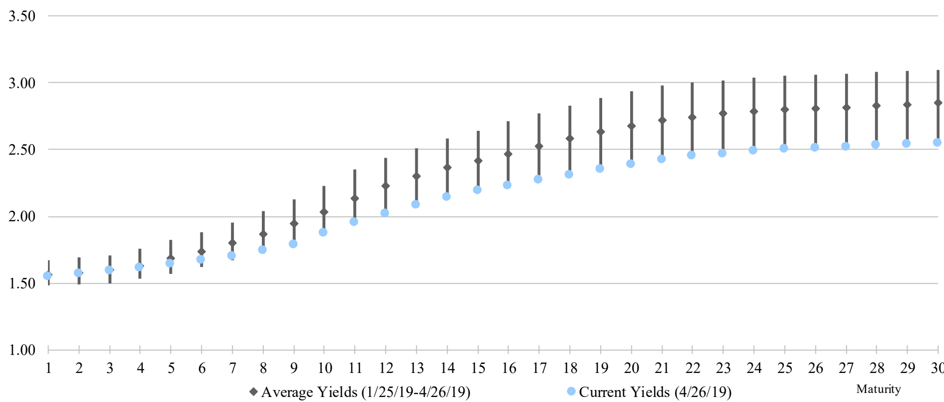
Figure 9 **Current vs. Historical Municipal Yield Curves (%)**



Source: TM3

Yields are lower across the curve compared to where they were in April 2018 and across much of the curve compared to April 2017.

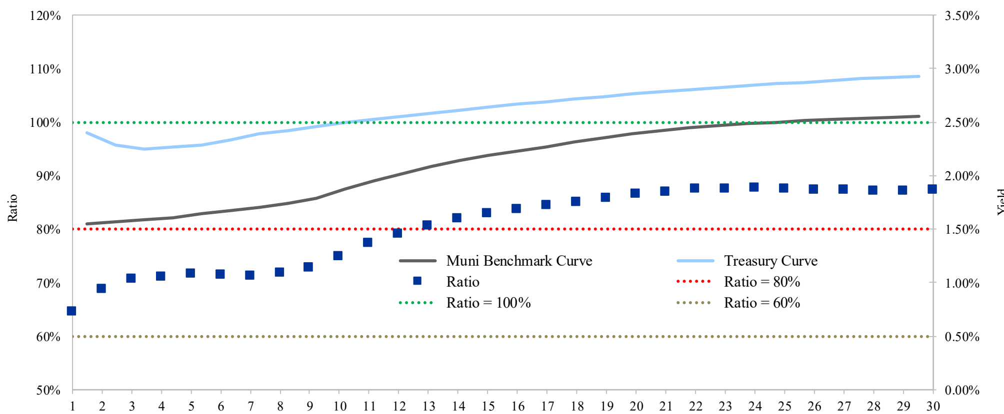
Figure 10 **3-Month Average Benchmark Muni Curve Yield**



Source: TM3

Muni yields are at their lowest levels in the last 3 months in the 11 to 30-yr range of the curve.

Figure 11 **Muni and Treasury Yield Curves and Ratios**

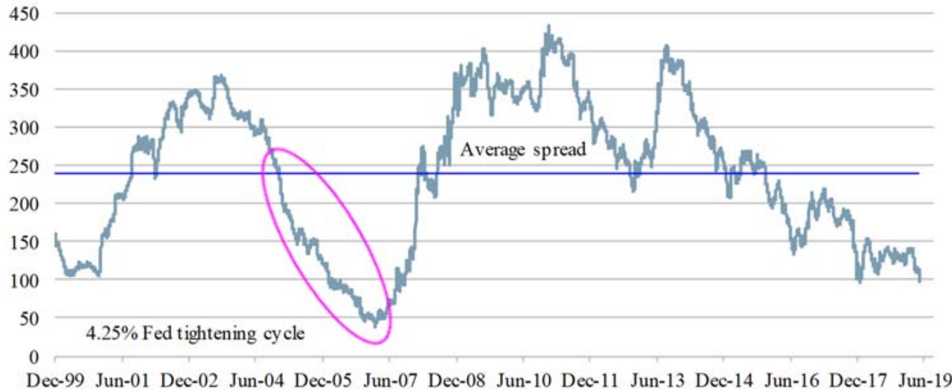


Sources: Eikon, TM3

As the spread between Treasuries and munis widened, M/T ratios declined across the curve.

Market Conditions

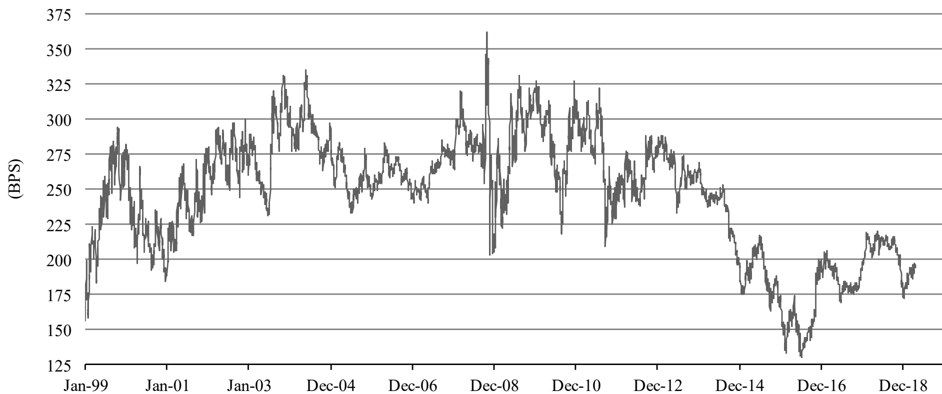
Figure 12 **2 to 30-Yr Muni Spread (bps)**



Source: TM3

The slope of the muni curve is the flattest it has been since December 2017.

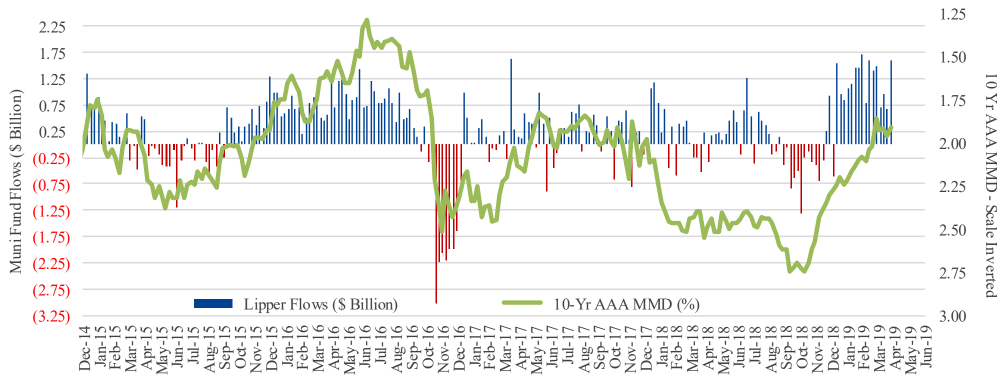
Figure 13 **Inflation Expectations**



Source: FRED

Fed's five-year forward breakeven inflation rate, derived from TIPS and regular Treasury yields, rose 18 bps year-to-date and is currently 1.96%.

Figure 14 **Lipper Weekly Municipal Mutual Fund Flows ($ Billion)**



Source: Lipper

A remarkable trend of very strong muni fund inflows continued in April. Sixteen consecutive weeks of net inflows boosted fund assets by almost $20 billion.

Loop Capital Markets Upcoming Negotiated Calendar

Date	Par Amount ($ mil)	Issue	Loop Capital's Role
4/30/19	26.63	Massachusetts HFA Single Family Housing Revenue Bonds (AMT, Non-AMT)	Co-Manager
4/30/19	18.0	Massachusetts HFA Single Family Housing Revenue Bonds (Taxable)	Co-Manager
5/9/19	471.3	Miami-Dade County Aviation Revenue and Revenue Refunding Bonds Series 2019A&B	Co-Manager

"Doc, so you're saying that I shouldn't view this thing about the dead pig's brain being brought back to life as a possible reprieve for my career?"

Analytical Services Division

Loop Capital Markets' Analytical Services Division (ASD), established in 2002, publishes a variety of reports that provide clients with relevant and timely information about the bond market and investor demand. The ASD is one of the largest analytics groups dedicated to investment banking, providing analytics and commentary on the economy, monetary policy, and a variety of public finance issues.

Chris Mier, CFA, Managing Director
312.356.5840 | christopher.mier@loopcapital.com

Ivan Gulich, CFA, Senior Vice President
312.913.2204 | ivan.gulich@loopcapital.com

Rachel Barkley, Senior Vice President
312.913.2297 | rachel.barkley@loopcapital.com

Loop Capital® is a registered trademark of Loop Capital Holdings, LLC. Securities and investment banking services are offered through Loop Capital Markets LLC. Loop Capital Markets LLC is a registered broker-dealer and a member of the Financial Industry Regulatory Authority (FINRA), the Municipal Securities Rulemaking Board (MSRB) and the Securities Investor Protection Corporation (SIPC). Swap related services are offered through Loop Capital Strategies, LLC. Loop Capital Strategies is an Introducing Broker registered with the Commodity Futures Trading Commission (CFTC) and member of the National Futures Association (NFA). Loop Capital prepared this product for informational purposes only. This product and the information herein (collectively "Information") is not a research report and it should not be construed as such. The Information has been gathered from sources believed to be reliable, but is not guaranteed and is not a complete summary of all available data. Any historical price(s) or value(s) are also only as of the date indicated and from any source that may be noted. Loop Capital is under no obligation to update opinions or other information. Any opinions expressed by Loop Capital represent our present opinions as of the date of this Information and are subject to change without further notice. The Information, including proposed terms and conditions, are indicative and for discussion purposes only. Finalized terms and conditions of any transaction or engagement are subject to further discussion and negotiation and will be evidenced by a formal agreement. Any reproduction, redistribution or transmission of the Information, in whole or in part, without the prior written permission of Loop Capital is prohibited. Except as required to comply with applicable law or regulation, Loop Capital makes no warranty whatsoever (including but not limited to, warranties as to quality, accuracy, performance, timeliness, continued availability or completeness) as to the Information contained herein. This product may not be posted to a website without prior approval by Loop Analytical Services Division. The Information contained is not an offer to buy or sell or a solicitation of an offer to buy or sell any security or instrument or to participate in any trading strategy. Loop Capital does not provide accounting, tax or legal advice; however, you should be aware that any proposed indicative transaction could have accounting, tax, legal or other implications that should be discussed with your advisors and or counsel. The Information should not be relied upon for the maintenance of your books and records or for any tax, accounting, legal or other purposes. Subject to applicable law, you may disclose any aspects of any potential transaction or structure described herein that are necessary to support U.S. federal income tax benefits. The fact that Loop Capital has made the Information or other information available to you constitutes neither a recommendation that you enter into or maintain a particular transaction or position nor a representation that any transaction is suitable or appropriate for you. Transactions involving derivative or other products may involve significant risk and you should not enter into any transaction unless you fully understand the risks and have independently determined that such transaction is appropriate for you. Loop Capital shall have no liability, contingent or otherwise, to you or to any third parties, or any responsibility whatsoever, for the correctness, quality, accuracy, timeliness, pricing, reliability, performance or completeness of the Information, data or formulae provided herein or for any other aspect of the performance of the Information. In no event will Loop Capital be liable for any damages (including special, indirect, incidental or consequential damages) which may be incurred or experienced on account of your use of the information provided herein or this website, even if Loop Capital has been advised or the possibility of such damages. Loop Capital will have no responsibility to inform you of any difficulties experienced by Loop Capital or any third parties with respect to the use of the Information or to take any action in connection therewith. Loop Capital and its affiliates, officers, directors, and employees, including persons involved in the preparation of this website, may from time to time have "long" or "short" positions in and buy or sell, the securities, derivatives (including options) or other financial products thereof, of entities mentioned herein. In addition, Loop Capital and/or its affiliates may have served as manager or co-manager of an offering of securities by any such entity. Further information may be obtained upon request. Unless otherwise agreed in writing between you and Loop Capital, Loop Capital is acting solely as a principal/underwriter in an arm's length commercial transaction in which Loop Capital has financial and other interests that differ from yours. Loop Capital is not acting as a municipal advisor, financial advisor or fiduciary and the information provided should not be construed as "advice" within the meaning of Section 15B of the Securities Exchange Act of 1934.

Loop Capital, founded in 1997, is a highly client-focused investment bank, brokerage and advisory firm that provides capital solutions for corporate, governmental and institutional entities across the globe.

Loop Capital Markets and its affiliates serve clients in corporate and public finance, financial advisory services, taxable, tax-exempt and global equity sales and trading, analytical services, and financial consulting services.

Headquartered in Chicago, the firm has over 180 professionals in 21 offices across the country. Find more information at www.loopcapital.com.