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Key findings:

- The municipal bond market is difficult to define and track broadly.
- Traditional municipal bond indices can be flawed: weighted by debt, exclusive of viable investment opportunities and biased toward quality at the expense of yield.
- These flaws may present opportunities for investors who approach the municipal market with a more strategic approach.

A SMARTER SOLUTION TO MUNICIPAL INVESTING

It's been close to four decades of declining interest rates. Central bank policy rates hitting zero, quantitative easing policies, low inflation and tepid growth drove sovereign bond rates to historic lows. In the municipal bond market, this manifested in yields declining from 13% in 1982 to 2% in 2017.[1] With normalization of central bank monetary policy in 2018, the best-case scenario was for rates to remain stubbornly low. In 2019 that normalization (i.e., raising rates) seems to be on pause, reflecting a global economic slowdown, in part due to trade confrontations, with lower rates a distinct possibility. However, there was, and remains, the risk that an ongoing reliance on fiscal stimuli will create budget strains, which could in time drive inflation and rates higher. Sourcing income and managing potential income volatility in this new rate regime presents unprecedented challenges for fixed-income investors.

Investors looking toward municipal bonds for tax-exempt income may need to consider not only this new rate regime, but how fragmented the muni bond market actually is. They also have to think about how it's changed since the financial crisis, most notably with the dissolution of monoline insurance and certain high-profile municipal bankruptcies. With passively managed vehicles continuing to grow in popularity, we believe investors should consider a more strategic approach to the intricacies of the muni bond market.

The municipal bond market is difficult to define and track broadly

Municipalities have been issuing debt since the early Renaissance when Italian city-states borrowed money from major banking families. American cities have been borrowing since the nineteenth century — records of U.S. municipal bonds indicate use around the early 1800s. The first recorded U.S. municipal bond was issued by the city of New York to construct canals from the Hudson River to Lake Erie and Lake Champlain in 1812. Today, municipal bonds provide public entities with a lower cost mechanism to fund day-to-day operations or finance long-term capital projects.

Indices exist in large part to measure the value of a given market. While stock market indices are very familiar and offer widely accepted benchmarks, several unique intricacies make the municipal market far more difficult to define and track:

- The municipal bond market is composed of $3.6 trillion in market value, which is spread across over 90,000 issuers and roughly one million individual bonds.[2] Any one issuer can have scores of individual bonds outstanding, each providing varying security pledges, maturities, coupons and call structures. The high degree of fragmentation makes it nearly impossible for index providers to replicate the full market opportunity.
- Municipal bonds trade over the counter rather than on a central exchange. Dealers act as market makers by quoting transaction prices for buyers and sellers. Pricing is often influenced by trading frequency or transaction size, both of which can affect transparency and liquidity.
- Unlike the corporate or government bond markets, households own over 41% of all municipal bonds outstanding.[3] Many investors purchase municipal bonds with the intention of holding them to maturity. As a result, many municipal bonds trade infrequently, which makes daily pricing more difficult to calculate.

Despite these challenges, a number of data providers, including Bloomberg, S&P and ICE, have created municipal bond market indices that serve as benchmarks for measuring relative performance. With the proliferation of low-cost solutions, these indices have become the basis of various financial products. As the table below illustrates, due to the narrowness of how publicly available municipal indices are constructed, no single index offers comprehensive exposure to the almost $4 trillion market. In fact, because none of these indices represents more than 20% of the total investable universe, investors are unable to tap into the broader investing opportunity (see Exhibits 1 and 2).

Exhibit 1 and 2: Traditional municipal bond indices limit broader investment opportunities

Exhibit 1: Municipal bond indices

Index name	Index holdings	Index market value (m)
Bloomberg Barclays Municipal Managed Money Index	21,903	$538,978
Bloomberg Barclays AMT-Free Intermediate Continuous Municipal Index	18,063	$424,911
S&P National AMT-Free Municipal Bond Index	11,933	$752,258
ICE BofAML National Long-Term Core Plus Municipal Securities Index	5,680	$416,429

Source: Bloomberg, as of 06/10/19. It is not possible to invest in an index

Exhibit 2: Municipal bond exchange-traded funds (ETFs)

Symbol	ETF name	Underlying index	ETF holdings	Index holdings
TFI	SPDR Nuveen Barclays Capital Municipal Bond ETF	Bloomberg Barclays Municipal Managed Money Index	3,275	21,903
ITM	VanEck Vectors AMT-Free Intermediate Municipal Index ETF	Bloomberg Barclays AMT-Free Intermediate Continuous Municipal Index	2,827	18,063
MUB	iShares National AMT-Free Muni Bond ETF	S&P National AMT-Free Municipal Bond Index	3,823	11,933
VTEB	Vanguard Tax-Exempt Bond Index ETF	S&P National AMT-Free Municipal Bond Index	4,162	11,933
PZA	PowerShares National AMT-Free Municipal Bond Portfolio	The ICE BofAML. National Long-Term Core Plus Municipal Securities Index	402	5,680

Source: Bloomberg, as of 06/10/19. Exchange-traded funds shown represent the largest providers (based on AUM) that track the four municipal indices from Exhibit 1. Securities shown are for illustrative purposes only and should not be construed as a recommendation to buy or sale.

A flawed approach provides a potential opportunity for investors

Unfortunately, many of the indices that prevailing municipal bond ETFs seek to replicate are constructed based on flawed methodologies that may leave investors exposed to less desirable characteristics. However, these flaws may present opportunities for investors who approach the municipal market with a more strategic approach.

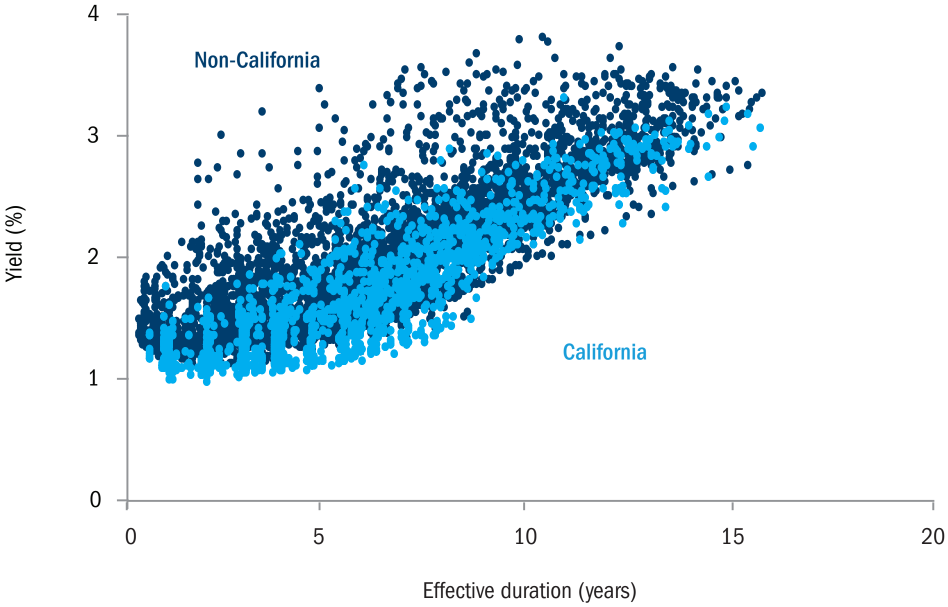
Problem: Traditional indices are debt-weighted

Like their equity counterparts, most municipal bond indices are market-capitalization-weighted. From an equity perspective, this approach makes logical sense — size born from historical success can arguably be associated with value. However, the same does not apply to fixed-income where the largest index exposures simply represent the most prevalent issuers — not the most profitable investment opportunities.

Take the case of California. As the world's fifth largest economy,[4] it should come as little surprise that the state represents the greatest exposure in national municipal bond indices. Due to persistent demand from the state's highly taxed residents, debt issued in California frequently trades at a premium to other similarly rated opportunities, i.e., they carry higher prices and have lower yields. California bonds tend to yield less than non-California bonds for any given credit quality and level of duration.[5] This means that the largest entities have the greatest representation in traditional indices regardless of their investment merits, which ultimately reduces income and total return potential (see Exhibit 3).

Exhibit 3: California bonds tend to yield less than non-California bonds for any given level of duration

Yield and duration: California vs non-California (Bloomberg Barclays Municipal Bond Index–Aa2)



Source: Bloomberg, as of 06/30/19.

Opportunity: Returns come from multiple sources

In fact, the municipal market's best sources of income and return are not necessarily driven by those entities with the highest propensity to issue debt. Instead, tax-exempt income and total return can be extracted from two primary risk factors: duration and credit — uncorrelated and capable of performing well in different stages of economic cycle (see Exhibits 4 and 5).

Exhibit 4-5: Income and return opportunities in the muni market vary each year across maturity and credit

Exhibit 4: Total return by maturity (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	1H2019
Short (1-3 year index)	4.68	4.89	4.32	1.40	2.15	1.18	1.03	0.74	0.77	0.23	1.11	1.77	1.86
Intermediate (3-15 year index)	4.46	2.27	9.46	3.14	9.63	5.15	-1.24	6.96	3.06	-0.05	4.76	1.54	4.67
Long (22+ year index)	0.46	-14.68	23.43	1.12	14.88	11.26	-6.01	15.39	4.52	0.88	8.19	0.34	6.85

Exhibit 5: Total return by credit quality (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	1H2019
AAA	3.84	1.61	9.06	2.03	8.75	4.52	-1.61	6.34	2.73	-0.17	4.45	1.05	4.56
AA	3.52	-0.76	11.72	2.05	10.28	6.23	-2.12	8.22	3.16	0.05	4.96	1.22	4.80
A	2.67	-5.97	15.87	2.23	12.53	8.16	-2.56	10.52	3.71	0.85	6.16	1.34	5.52
BAA	-2.73	-21.33	26.09	3.75	11.84	9.80	-7.17	14.47	4.25	0.35	8.74	1.96	6.63
High yield	-2.28	-27.01	32.73	7.80	9.25	18.14	-5.51	13.84	1.81	2.99	9.69	4.76	6.66

■ Highest return ■ Lowest return

Sources: Bloomberg Barclays, Columbia Management Investment Advisers, LLC as of 06/30/19.[6] Credit ratings are subjective opinions of the credit rating agency and not statements of fact, may become stale and are subject to change. **Past performance does not guarantee future results.**

By allocating across the maturity and quality spectrums, investors may broaden their opportunity set and introduce more chances for positive outcomes. On one hand, a basket of shorter duration, high-quality municipal securities can serve as a ballast during periods of heightened volatility. On the other, longer and lower quality bonds may offer a significant yield advantage that bolsters total return potential. Blending these exposures with a core allocation to bonds of intermediate maturity and quality may smooth the ride for investors as each component behaves differently across market environments.

Problem: Traditional indices exclude viable investment opportunities

Municipal bonds fall into two primary categories: general obligation (GO) bonds and revenue bonds. GO bonds are backed by the full faith and credit of the issuing municipality and reflect a commitment to use all available funds to repay the debt, including the ability to raise taxes. Revenue bonds are secured by the revenue stream generated from the specific income-producing project that's being financed. Sometimes, in transactions known as conduit financing, municipalities issue revenue bonds on behalf of private entities that subsequently assume full responsibility for debt repayment. Conduit bonds could be issued by hospitals or health systems, private colleges or universities or other charitable organizations. Without direct government ties, such bonds may be perceived as carrying greater risk. This could explain why many indices used by existing ETFs have significant rule exclusions that primarily target revenue sectors.

For example, the S&P National AMT-Free Municipal Bond Index specifically excludes conduit issuers (see Exhibit 6), and the Bloomberg Barclays Municipal Managed Money Index excludes hospitals and housing bonds.

Exhibit 6: Common index methodology exclusions can lead to concentrated exposures
S&P National AMT-Free Municipal Bond Index exclusions

- Bonds subject to alternative minimum tax
- Housing bonds
- Insured conduit bonds where the obligor is a for-profit institution
- Non-insured conduit bonds
- Non-rated bonds (except pre-refunded/escrowed to maturity bonds)
- Tobacco bonds

Source: S&P Dow Jones Indices, as of November 2017

Such exclusions in turn concentrate exposure in the few remaining sectors that are more explicitly tied to governmental activities: tax-backed, water and sewer, public education and transportation. This approach forfeits access to a broad swath of the market opportunity and results in an over-representation of lower yielding general obligation debt.

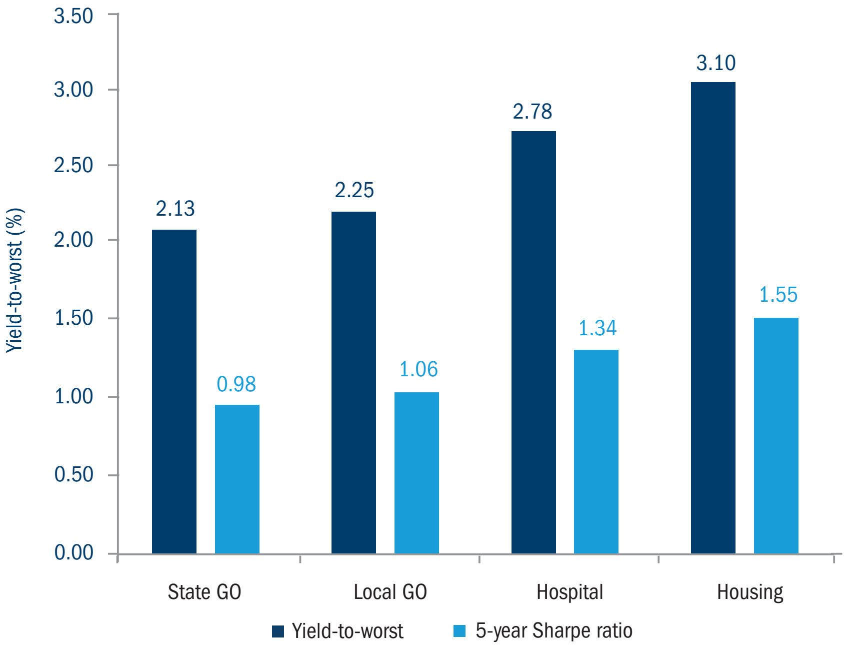
Opportunity: Revenue sectors offer higher yields

In the last decade, several high profile municipal downfalls driven by long-term budget mismanagement have challenged the sanctity of the GO pledge. More importantly, bond investors have found themselves at the mercy of not only a municipality's ability to pay, but also of their willingness to do so. Detroit and Stockton, for example, emerged from bankruptcy by making cuts to bondholders while largely preserving pensions for retirees. These and other recent experiences suggest that GO debt, often valued for its perceived safety and security, is not immune to impairment.

Despite this, GOs experience persistent demand that drives yields lower than many similarly rated alternatives. Representing over 65% of the market, revenue bonds lack the taxing authority of state and local governments and often trade at a discount to their GO counterparts[7]. This represents ample opportunity for investors to pick up incremental income and potentially improve risk-adjusted returns — particularly in housing and hospitals, two sectors often excluded from prevailing indices (Exhibit 7).

Exhibit 7: The housing and hospital sectors can offer higher yield and risk-adjusted returns

Comparative yields of select investment-grade sectors



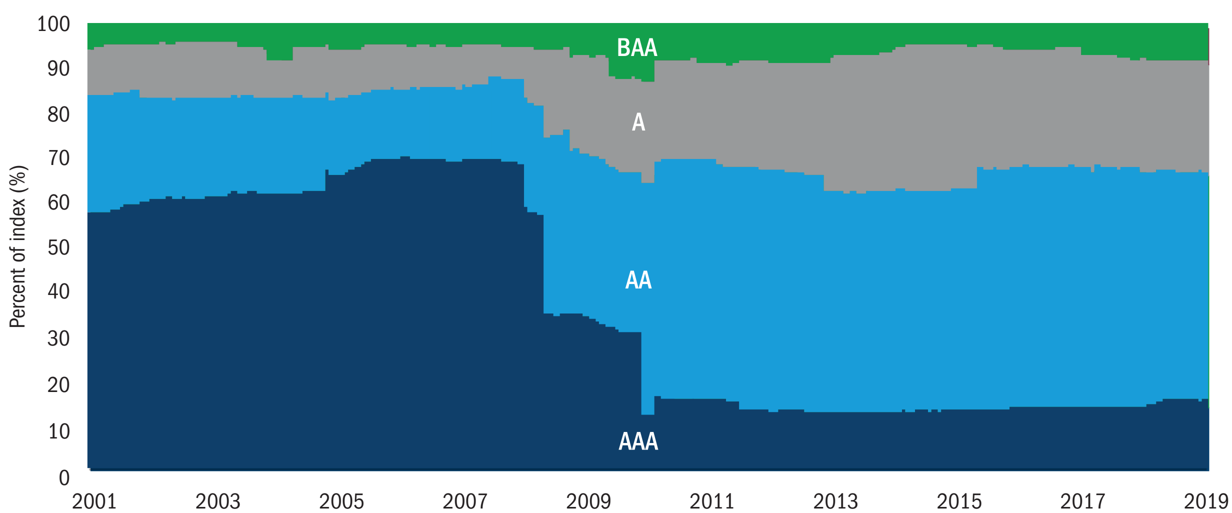
Source: Bloomberg as of 03/29/19. **Yield-to-worst** is the lowest potential yield that can be received on a bond without the issuer actually defaulting. **Sharpe ratio** divides gross return in excess of the Bloomberg Barclays U.S. Treasury Index by the investment's standard deviation to measure risk-adjusted performance. See back page for more information.[8]

Problem: Traditional indices demonstrate a distinct quality bias

Municipal bonds have long been viewed as high-quality assets, in part because the majority of municipal bonds had historically carried a AAA rating. Until 2008, monoline insurance existed to enhance the credit rating of a bond and provide additional protection to investors in the case of default. However, subprime casualties during the financial crisis caused insurers to lose their coveted AAA ratings and forced bonds to be recognized based upon their underlying creditworthiness. Whereas nearly 70% of the municipal market used to be rated AAA, just above 15% is today (see Exhibit 8).

Exhibit 8: AAA-rated muni bonds make up less than 20% of the market today

Credit quality breakdown of Bloomberg Barclays Index



Source: Barclays Live and Columbia Threadneedle as of 03/29/19. Credit ratings are subjective opinions of the credit rating agency and not statements of fact, may become stale and are subject to change.

The majority of the municipal market remains investment-grade-rated, and many municipal indices have been designed to focus exclusively on a higher quality subset. However, defaults across all municipal quality tiers — including high-yield — have always been few and far between. Consider that all rated municipal bonds have a lower 10-year cumulative default experience than even AAA-rated corporate bonds (see Exhibit 9). Limiting the universe to investment-grade credit quality omits many higher yielding opportunities despite an exceptionally low incidence of default in lower rated credits.

Exhibit 9: Muni default rates are significantly lower than similarly rated corporates
Average cumulative default rates

Time period		Municipal bonds %	Global corporate bonds %	Difference
1970-2017	Inv. grade	0.10	2.32	23x
	All rated	**0.17**	**10.24**	**60x**
2007-2017	Inv. grade	0.29	1.39	5x
	All rated	**0.43**	**9.61**	**22x**

Source: Moody's Investors Service, as of 06/27/17.[9]

Opportunity: Lower quality sectors may enhance yield and lower interest rate sensitivity

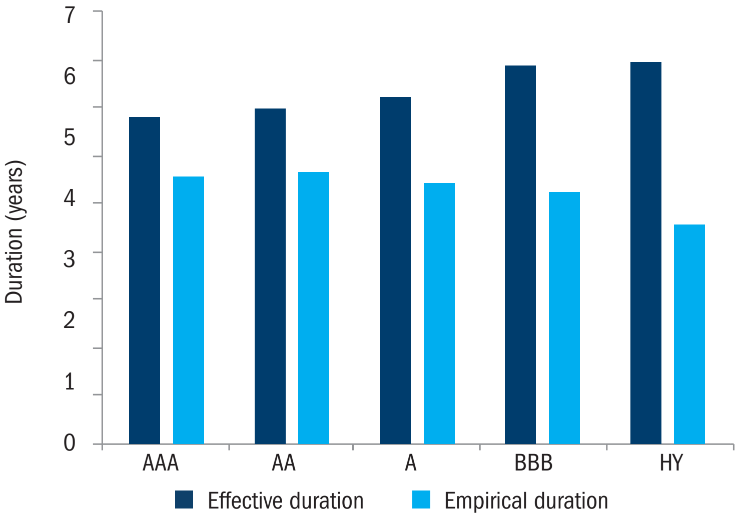
The ratings recalibration that followed the financial crisis ultimately created a tremendous opportunity for municipal investors. The market now differentiates between issuers based primarily on credit fundamentals and applies a risk premium reflective of sector and idiosyncratic factors. This results in investors earning more yield over AAA-rated bonds for moving down the quality spectrum than in the past. This yield advantage also helps to buffer interest rate volatility, which is more pronounced in highly rated market segments that offer narrow risk premiums due to their limited credit risk.

We use a metric called empirical duration to measure this. Investors often focus on effective duration — a theoretical measure of interest rate sensitivity based primarily upon the maturity of the bond. But empirical duration uses real historical price changes to show the true sensitivity of a bond to observed changes in interest rates. As a general rule, true interest rate sensitivity tends to fall — or the gap between effective and empirical duration increases — as one moves down the credit quality spectrum. For lower quality bonds, the effect of changes in risk premiums dwarfs the effect of changes in benchmark interest rates (see Exhibit 10). The very low empirical durations of lower rated investment-grade or high-yield municipal bonds highlight that investors are not primarily taking interest rate risk when allocating to these sectors — credit risk matters much more. Because duration and credit risk are negatively correlated, introducing the latter into an otherwise high-quality portfolio can provide much needed diversification benefits.

Diversification does not assure a profit or protect against loss.

Exhibit 10: True interest-rate sensitivity decreases as credit quality goes down

Bloomberg Barclays Municipal Bond Index — Duration comparison by credit rating



Source: Barclays, Municipal Strategy and Research, Muni Empirical Duration: When Your 30s Are Just Like Your Teens, as of April 18, 2018. See back page for more information.[10]

Conclusion

The municipal market, in its highly fragmented state, has undergone quite the transformation since the financial crisis. Not all segments of the municipal market offer the same income opportunities or risk-adjusted return potential, and sourcing income and managing potential volatility in the new rate regime presents myriad challenges.

When analyzing municipal bond benchmarks, there are a number of challenges translating these benchmarks to financial investments. There are exclusions (e.g., conduit bonds) that reduce diversification by clustering investments into a narrower range of sector baskets while simultaneously limiting performance potential. Additionally, issuance weighting overrepresents prolific issuers that often trade at a higher price than other viable credits due to persistent sources of investor demand.

However, the market's evolution has also unearthed new opportunities for those willing to take a new approach. A thoughtful, multi-sector municipal bond approach should be designed to address both credit and interest rate risk, while capitalizing on strong risk-adjusted opportunities in higher yielding sectors or maturities. The approach would also be enhanced by excluding tail risk, i.e., lower yielding opportunities that offer no risk premium and high-yield/high-volatility issues.

Municipal bond investors should consider a strategic approach, informed by insights, to manage the complexities of the changed market.

To find out more, call **800.426.3750**
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Bloomberg Barclays Municipal Managed Money Index is an unmanaged index that is rules-based, market-value weighted engineered for the tax exempt bond market. All bonds in the National Municipal Bond Index must be rated Aa3/AA- or higher by at least two of the following statistical ratings agencies: Moody's, S&P and Fitch.

Bloomberg Barclays Municipal Bond Index is an unmanaged index that is considered representative of the broad market for investment grade, tax-exempt bonds with a maturity of at least one year.

Bloomberg Barclays AMT-Free Intermediate Continuous Municipal Index is intended to track the overall performance of the U.S. dollar denominated intermediate-term tax-exempt bond market.

S&P National AMT-Free Municipal Bond Index is a broad, comprehensive, market value-weighted index designed to measure the performance of the investment-grade tax-exempt US municipal bond market. Bonds issued by US territories, including Puerto Rico, are excluded from this index.

The ICE BofAML National Long-Term Core Plus Municipal Securities Index is composed of US dollar-denominated, investment grade, tax-exempt debt publicly issued by US. states and territories, or their political subdivisions, in the US domestic market with a term of at least 15 years remaining to final maturity.

Indices shown are unmanaged and do not reflect the impact of fees. It is not possible to invest directly in an index.

[1] Source: Thomson Reuters as of 05/22/18.

[2] Source: Securities Industry and Financial Markets Association and the Municipal Securities Rulemaking Board as of 07/09/19.

[3] Source: Bank of America Merrill Lynch, "Primer on Municipal Bonds," January 2018.

[4] Source: "California now world's 5th largest economy, surpassing UK," USA Today, as of May 5, 2018.

[5] Duration measures the sensitivity of bond prices to changes in interest rates. Bonds with a higher duration experience greater price volatility from interest rate movements.

[6] Maturity periods and credit qualities represented by the following subsets of the Bloomberg Barclays Municipal Bond Index: Bloomberg Barclays 1-3 Year Muni Bond Index, Bloomberg Barclays 3-15 Year Muni Bond Index, Bloomberg Barclays 22+ Year Muni Bond Index, Bloomberg Barclays AAA/AA Municipal Bond Index, Bloomberg Barclays A/BAA Muni Bond Index, Bloomberg Barclays High Yield Muni Bond Index.

[7] Source: Bloomberg, data as of 06/30/19.

[8] Exhibit 7: The following sectors are based on subindices of the Bloomberg Barclays Municipal Bond Index as follows: State GO–Bloomberg Barclays State GO Index, an index of state general obligation bonds; Local GO–Bloomberg Barclays Local GO Index, an index of local general obligation bonds; Hospital–Bloomberg Barclays Municipal Hospital Index, an index of municipal hospital bonds; Housing–Bloomberg Barclays Municipal Housing Index, an index of municipal housing bonds.

[9] The table presents one-year through ten-year average cumulative default rates (CDR) for municipal and corporate issuers over the entire period of study. CDRs are calculated by averaging the default experience of cohorts made up of Moody's-rated credits formed at monthly frequencies throughout the study period. The average CDR tells us the historically-observed probability that a credit with a particular rating that would have otherwise remained outstanding will default during a specified length of time. Because cohorts are formed at a monthly frequency and then averaged over, these rates are only conditional on a credit's rating independent of its seasoning. The first cohort considered is the 1-year cohort starting on January 1, 1970. The last cohort considered is the 1-year cohort starting on December 1, 2016. Transition rates are averaged over cohorts spaced 1 month apart. Ratings outstanding at the time of recalibration have been adjusted to be consistent with the Global Rating Scale. Withdrawn ratings were not recalibrated.

[10] Exhibit 10: Investment-grade-rated credit qualities shown (AAA-BBB) are sub–components of the Bloomberg Barclays Municipal Bond Index, HY is represented by the Bloomberg Barclays High Yield Muni Index.

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