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PGIM FIXED INCOME

PERSPECTIVES

October 2017

Municipal Bonds

Financing U.S. Infrastructure Since the 1800s

Among the U.S. administration's key policy initiatives is an infrastructure program that targets $1 trillion in infrastructure investment over the next decade. Key tenets of this initiative include targeted Federal investments as well as leveraging the private sector through public-private partnerships (P3s), among other proposals. The infrastructure needs in the U.S. are significant. In this paper, we explore:

- *The municipal bond market and its role in U.S. infrastructure development.*
- *Why the high-quality, long-duration characteristics of taxable municipal bonds may be attractive to institutional investors.*
- *The benefits of taxable municipal bonds relative to corporate bonds.*

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U.S. INFRASTRUCTURE NEEDS ARE SIGNIFICANT

Every four years the American Society of Civil Engineers (ASCE) examines current infrastructure conditions of the nation's major infrastructure categories and produces a Report Card with an overall grade, as well as recommendations to improve the grade. The 2017 ASCE Infrastructure Report Card gave the U.S. an overall grade of D+ and estimates that the infrastructure investments needed by 2025 total $4.6 trillion, of which $2 trillion is unfunded. Regardless of the administration's success in implementing its infrastructure initiative, the needs are substantial, and the municipal bond market will likely continue to provide the bulk of the infrastructure financing in the U.S.

INFRASTRUCTURE DEFINED

Infrastructure is usually divided into economic and social sectors. Economic infrastructure is typically defined to include ports, airports, roads, bridges, tunnels, water, sewer, waste, power generation and distribution, communication networks, and renewable energy. Social infrastructure typically includes schools, hospitals, courthouses, and prisons, to name a few. Based on this broad definition of infrastructure, it's apparent that the majority of municipal bond issuance has been used to address infrastructure needs in the U.S.

MUNICIPAL BONDS ARE THE PRIMARY VEHICLE TO FINANCE INFRASTRUCTURE

The $3.8 trillion U.S. municipal bond market is the primary vehicle for states, local governments, and other municipal entities to access the capital required to finance infrastructure projects and improvements. In fact, the first issuance of municipal debt can be traced to the Erie Canal project in the early 1800s—at the time, one of the most important civil engineering and construction projects in North America. Since then, the asset class has grown to include numerous sectors and thousands of issuers.

MUNICIPAL SECTORS

- **Revenue bonds** account for 67% of outstanding municipal debt as of June 30, 2017.[1] Revenue bond sectors include transportation, water and sewer, public power, hospitals, higher education, and dedicated tax bonds, to name a few. Revenue bonds are repaid from a dedicated source of funds derived from a project, enterprise system, or a dedicated tax, such as a sales tax.

- **General obligation (GO) bonds** represent 33% of outstanding municipal debt.[1] GO bonds are backed by an issuer's "full faith and credit" and the issuer's ability to raise taxes to cover debt service and other obligations. While states and localities issuing GO debt have the ability to raise taxes to cover obligations, situations exist where the political will to act is lacking and credits have been negatively impacted.

Within each revenue and GO category, municipal bonds are classified as either tax-exempt or taxable. Municipal bond issuers may issue both tax-exempt and taxable bonds, with the principle determinant being the intended use of proceeds.

- **Tax-exempt municipal bonds** are largely exempt from U.S. federal, and often state and sometimes local, income taxes. Given the nature of the tax-exemption, individuals have historically been the primary buyers of municipal debt. While the investor base has broadened in recent years, individual investors own approximately 60% of all outstanding municipal bonds either directly or through mutual funds.

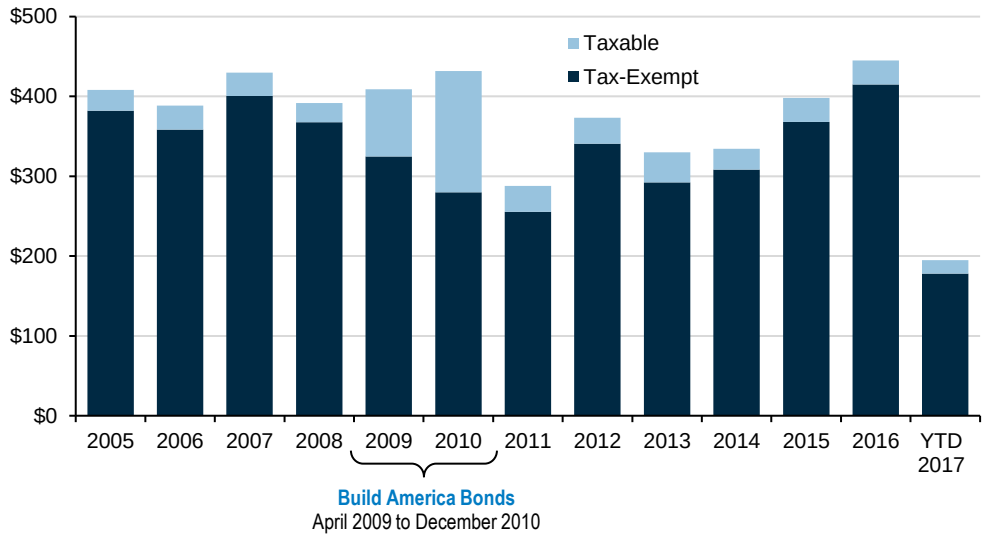
- **Taxable municipal bonds** are generally issued if an entity is looking for flexibility regarding the use of bond proceeds, which would otherwise be more restricted in order to adhere to certain rules for tax-exempt municipal market issuance. For example, a university or hospital may choose to opportunistically issue taxable debt for a future project that may not qualify for tax-exemption for a variety of reasons, including rules requiring the expenditure of proceeds within a set time frame and/or involvement in cooperative research affiliations with for-profit entities.

On the following pages, we take a closer look at taxable municipal bonds, a small, but potentially opportunistic sector for institutional investors.

TAXABLE MUNICIPAL BONDS CAN BE AN ATTRACTIVE ALTERNATIVE

The amount of taxable municipal debt outstanding is less than $500 billion;[1] much of this debt was issued in 2009 and 2010 as part of the U.S. Build America Bond (BAB) program. Since the end of that program in 2010, taxable municipal issuance has averaged about $30 billion annually, a fraction of the total municipal bond supply, but a segment that has become increasingly popular among certain institutional investors.

TAXABLE MUNICIPALS ARE A NICHE MARKET ($BILLIONS)



Source: Bond Buyer as of 30 June 2017.

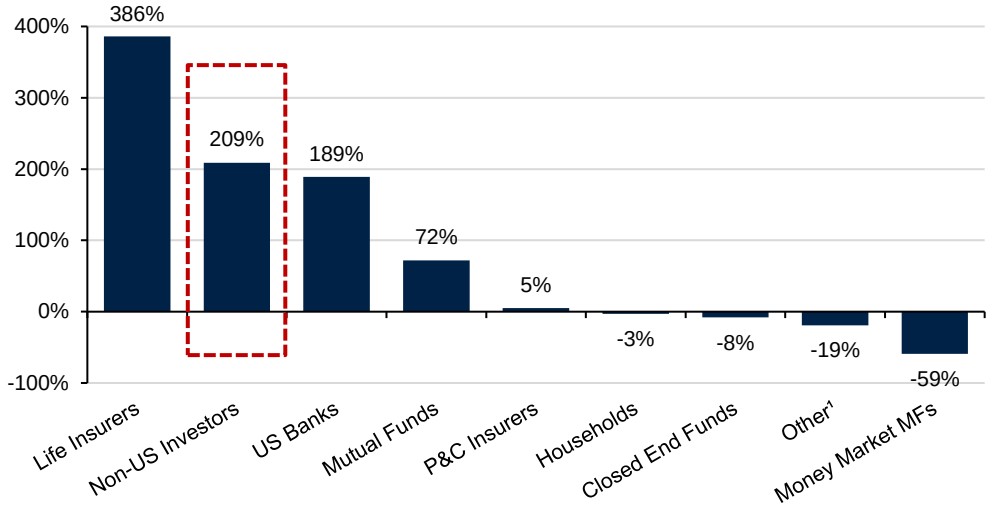
Build America Bonds (BABs)

- *Part of the American Recovery and Reinvestment Act (ARRA) passed in February 2009.*
- *The primary goal was to broaden the investor base for municipal issuers during a period of market dislocation following the financial crisis.*
- *Issuers of these taxable municipal bonds received a direct subsidy from the Federal government equal to 35% of the bond coupon.*
- *$180 billion issued from April 2009 to December 2010 with the bulk of issuance comprised of 20+-year maturities.*

[1] *Securities Industry and Financial Markets Association (SIFMA) as of 30 June 2017.*

The BAB program successfully introduced a broader group of investors to the municipal bond market, including institutional investors and those who traditionally invest in corporate bonds. Aside from the credit and sector diversification, these investors have been drawn to the high-quality and long-duration characteristics of the sector while avoiding mergers and acquisitions and other event risk associated with segments of the corporate bond market. As is illustrated below, three types of institutional investors—life insurers, non-U.S. investors, and U.S. banks—account for the largest percentage increase in municipal ownership over the past decade.

SIGNIFICANT INCREASE IN OWNERSHIP BY LIFE INSURERS AND NON-U.S. INVESTORS OVER THE PAST DECADE



Outstanding ($Billions)	Life Insurers	Non-U.S. Investors	U.S. Banks	Mutual Funds	P&C Insurers	House-holds	Closed End Funds	Other[1]	Money Market MFs	Total Outstanding
2006	38	34	190	368	342	1694	95	132	393	3,285
2016	185	106	549	633	360	1644	87	108	162	3,834
Change	147	72	359	265	18	-50	-8	-24	-231	549

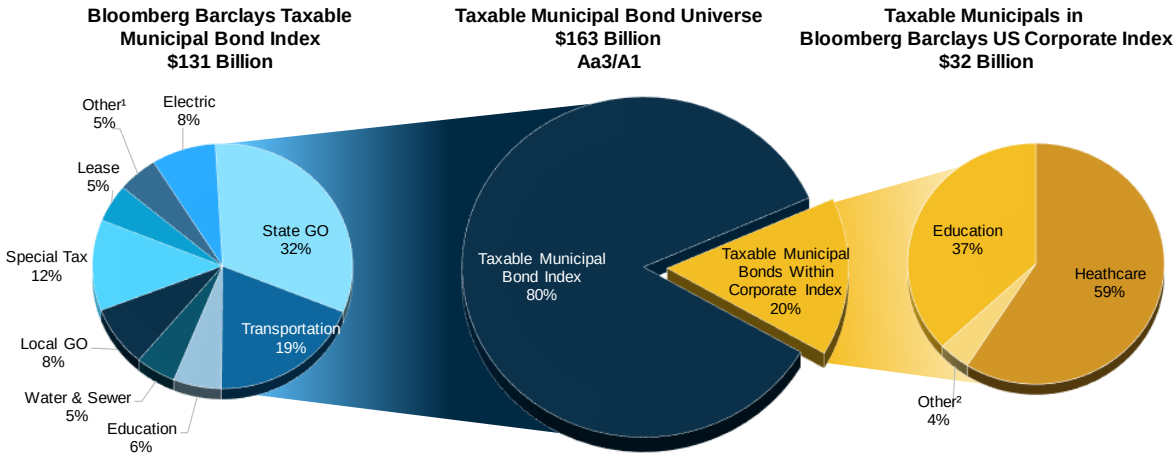
Represents change in municipal bond ownership from January 2007 to December 2016. Source: Citi Research, Federal Reserve. [1]Other includes non-financial corporates, broker dealers, ETFs, state/local governments, government-sponsored entities, credit unions, and pensions.

CHARACTERISTICS OF TAXABLE MUNICIPAL BONDS

The investor base for taxable municipal bonds continues to expand for several reasons:

New Credits and Sectors: Taxable municipals can offer an attractive diversification option to investors who are approaching capacity limits in certain corporate credits. The sectors and individual issuers in the taxable municipal index, illustrated below, do not overlap with those in corporate bond indices. As you can see, the taxable municipal index is comprised primarily of GOs and a variety of revenue bond issues, while the taxable municipal bonds in the major corporate bond indices are concentrated in the education and healthcare revenue sectors.

TAXABLE MUNICIPAL BONDS OFFER EXPOSURE TO NEW SECTORS AND ISSUERS



Source: Bloomberg Barclays as of 30 June 2017. Represents benchmark-eligible tranches of at least $300 million. [1]Other includes healthcare and industrial development bonds. [2] Other includes foundation and museum bonds.

High Credit Quality: The relatively high credit quality of taxable municipals is another draw—the average credit rating for the Bloomberg Barclays Taxable Municipal Bond Index is Aa3/A1 compared to the average credit rating of A3/Baa1 for the Bloomberg Barclays U.S. Corporate Index.[2]

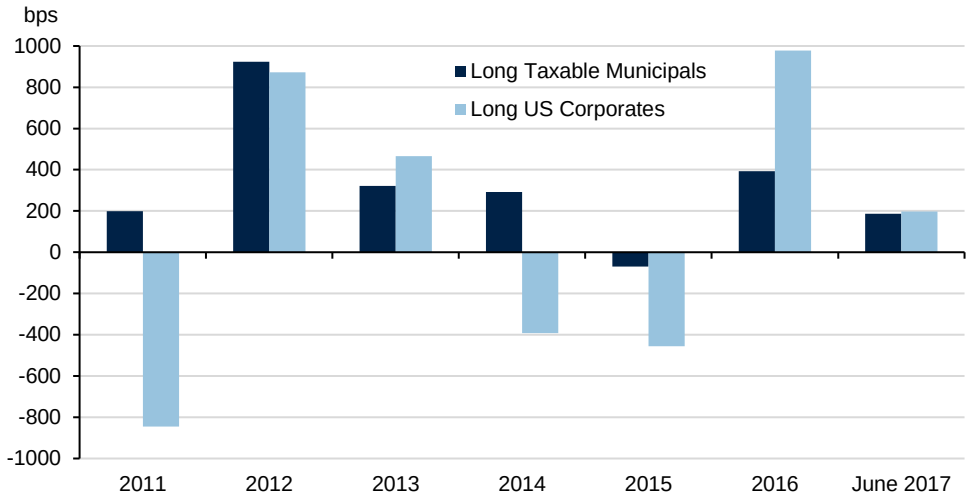
Negligible Event Risk: While not immune to headline risk, municipal credits are generally not susceptible to event risk in the traditional corporate sense—a key risk in today's investment grade corporate market. Since non-profits are free from equity ownership, shareholder-friendly uses of capital, such as funding dividends and share repurchases, are not an option, and consolidation activity that may adversely impact creditors (leveraged buyouts or other acquisitions) is highly improbable.

In fact, the combination of higher credit quality and lack of event risk has contributed to the competitive performance and lower volatility of long-term taxable municipal bonds versus long-term U.S. corporate bonds, as is illustrated in the following chart.

[2] *Source: Bloomberg as of 30 June 2017.*

TAXABLE MUNICIPALS CAN OFFER SOLID RETURNS WITH LOWER VOLATILITY THAN LOWER-QUALITY CORPORATE BONDS

ANNUAL EXCESS RETURNS: LONG TAXABLE MUNICIPALS (AA3/A1) VS. LONG U.S. CORPORATES (A3/BAA1)



Source: Bloomberg Barclays as of 30 June 2017.

Longer Maturities: The taxable municipal universe presents an opportunity to investors seeking to add ultra-long maturities while maintaining a high credit quality bias. In fact, of the 17 issues in the Bloomberg Barclays U.S. Aggregate Bond Index maturing beyond 50 years, 11 are municipal credits that account for nearly half of the market value of this sub-category, while carrying an average rating of AA+. A typical high-quality, 100-year offering can be expected to offer 70-80 basis points of additional yield spread relative to a like credit with a maturity of 30 years, while carrying approximately 3 years of incremental duration.

Strong Legal Features: Many municipal credits enjoy strong legal features, including, but not limited to, a statutory lien on a dedicated revenue stream (tax receipts, tolls, etc.), strong non-impairment covenants, debt service reserves, and additional bonds tests that prevent excess enterprise leverage.

Bondholder Friendly: While municipal credit quality is generally correlated to the broader economy, the essential and monopolistic nature of certain service providers can provide an element of stability to fixed income portfolios. User fee increases for essential services, such as water and sewer, public power, or toll road enterprises, can be politically unpopular, but these issuers tend to exhibit somewhat autonomous rate-setting authority and impressive demand elasticity, providing ample protection for bondholders through many different economic cycles.

Lower Defaults and Higher Recoveries than Corporate Credits:[3] The average 10-year cumulative default rate for investment-grade municipal defaults averaged 0.09% compared to 2.38% for investment-grade global corporate bonds from 1970 to 2016, while speculative-grade defaults totaled 8.17% versus 29.7%, respectively, for the same period. The average recovery on municipals—about 66% from 1970 to 2016—was also higher than corporate senior secured bonds at 53% over a similar time period.

That said, municipal recovery rates vary widely across individual bonds, ranging from 100 cents to two cents on the dollar. The municipal sectors with the highest 10-year cumulative default rates were housing (44%) and hospitals and health service providers (22%). The median rating for defaulted issuers one year prior to default was Ba3, while the median rating five years prior to default was Baa3.

[3] *Source: Moody's 10-Year Cumulative Default Rates. Average from 1970 to 2016. Municipal vs. corporate issuers based on bonds rated by Moody's. Past performance is not a guarantee or reliable indicator of future results.*

STRUCTURAL ASPECTS OF TAXABLE MUNICIPAL BONDS

Since taxable municipals are generally targeted to traditional corporate bond investors, they tend to have many structural features that are amenable to that audience. For example, a typical long duration, tax-exempt offering will be issued with an American par call beginning in 10 years. However, taxable municipal bonds are instead generally offered with a make-whole call provision, a feature more common in corporate bond offerings. Even so, certain features more common in municipal finance are generally found in these deals, which may detract from the universe of potential investors.

Perhaps the most common example of these features is amortization. While corporate bonds typically issue debt with bullet maturities, many municipal bonds are issued with mandatory sinking fund amortization payments, which both shortens the average life of the bonds in question and diminishes the risk of potential capital market access needs at maturity. While market convention is to price bonds on a yield to average life basis, the reference U.S. Treasury to which some longer maturity/shorter average life structures are quoted does not have a uniform approach across the dealer community. These convoluted structures and inefficiencies can, at times, present relative value opportunities for investors.

Build America Bonds were generally issued with extraordinary redemption provisions (ERPs) that afforded the issuer a conditional option to call bonds at a pre-determined spread (typically comparable U.S. Treasury +100 basis points, with some variations). These options were triggered upon the interest subsidy reduction that resulted from the Federal government's budget sequestration that went into effect in 2013. Close attention must be paid to the value of these embedded options and the degree to which their exercise might have economic value to the issuing entity.

LIQUIDITY IS STRONGER FOR MUNICIPALS IN CORPORATE INDICES

The liquidity of taxable municipals can be impacted by the breadth of investor participation, the credit sector, and its Bloomberg Barclays U.S Aggregate Bond Index categorization. For example, when issuing taxable debt, private universities and not-for-profit hospitals will predominantly issue debt directly rather than through a conduit issuer, which is typically required for traditional municipal debt issuance. Consequently, these transactions will reside in the corporate bond index, ensuring increased liquidity versus credits issuing taxable municipal debt through a conduit issuer, which reside in the smaller taxable municipal index. The size and scope of the corporate bond market, largely driven by corporate benchmark focused investors, contributes favorably to the liquidity profile of bonds in the corporate index relative to those credits in the taxable municipal index.

Q&A: Municipal Bond Market

Q. IS A NEW U.S. INFRASTRUCTURE PROPOSAL LIKELY IN THE NEXT YEAR?

We would expect the new U.S. administration to focus on infrastructure at some point within the next year; however, despite the success of the BAB program, there does not appear to be enough bi-partisan support for another BAB-like program in the foreseeable future.

Q. HOW DO PUBLIC-PRIVATE PARTNERSHIPS (P3S) WORK?

According to Moody's, a P3 is a long-term contractual agreement between a public sector governmental entity and a private developer to design, build, finance, operate and/or maintain an infrastructure asset for a specific period. The governmental entity generally maintains ownership of the asset throughout the contract term but shares long-term rehabilitation and life cycle risks with the private developer.

Q. IN WHAT SITUATIONS WOULD AN INVESTOR CONSIDER NON-INDEX TAXABLE MUNICIPALS?

Buy and maintain fixed income strategies may be appropriate, as they are generally not as sensitive to liquidity pressures. Total return strategies that don't need the liquidity may also benefit from the incremental spread offered by non-index bonds.

Q. SHOULD INSTITUTIONAL INVESTORS CONSIDER BUYING TAX-EXEMPT MUNICIPAL BONDS?

As highlighted earlier, approximately 60% of outstanding tax-exempt municipal bonds are held by retail investors (either directly or through mutual funds) given the tax benefits to these investors. However, there are periods of dislocation in the municipal market (i.e., financial crises) when it might make sense for institutional investors to buy tax-exempt bonds for the capital appreciation potential, even if they cannot benefit from the tax exemption.

Q. WHAT EFFECTS ARE THE HIGH-PROFILE CREDIT TROUBLES OF PUERTO RICO, ILLINOIS, AND OTHER MUNICIPALITIES HAVING ON THE MARKET?

The broader municipal market has not been impacted by the credit problems impacting Puerto Rico. Investors recognize that Puerto Rico is unique among municipal credits and we do not expect a similar scale credit problem in the municipal market in the near term.

Illinois' troubles were largely self-inflicted as the political gridlock resulted in years without a budget, which in turn led to a growing backlog of unpaid bills. Politicians in Illinois finally demonstrated their willingness to make difficult decisions and passed a budget in July 2017 that boosts revenues and cuts expenditures. As a result, a credit rating downgrade to below investment grade was averted.

Q. DESPITE THE HIGH-QUALITY NATURE OF THE MUNICIPAL SECTOR, AREN'T THERE RISKS?

The biggest systemic risk to the municipal market is the long-term risk of unfunded pension obligations and other post-employment benefits (OPEB). In fact, one of Illinois' most significant long-term credit challenges is its large unfunded liabilities. Since the financial crisis, several states and localities have experienced credit rating downgrades due to large, and growing, unfunded pension and OPEB liabilities. While many entities have implemented some level of liability reform in an attempt to address these issues, we expect states and localities to remain focused on reforms when possible. Given this long-term risk, we favor revenue bonds over general obligation bonds. This strategy also provides a degree of protection from political risk.

Conclusion

Municipal bonds have provided an efficient means for states, localities, and municipal entities to finance U.S. infrastructure needs. Given the aging infrastructure and focus on the vast needs of the country, it's no surprise that the current administration has touted infrastructure as a key component of its agenda. Further, while there appears to be broad bi-partisan support in Congress for an infrastructure program, agreement on how to finance such programs can be contentious, and implementation is not guaranteed. Therefore, we believe that municipal bond financing will continue to provide the bulk of the capital required to repair and improve the nation's infrastructure. Taxable municipal bonds have grown in prominence since the Build America Bond program and demand remains robust as the asset class is an attractive alternative for investors seeking high-quality, long-duration investments. Sector and credit diversification, as well as an opportunity to satisfy demand for infrastructure opportunities, are added benefits.

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NOTICE: IMPORTANT INFORMATION

Source(s) of data (unless otherwise noted): PGIM Fixed Income as of 16/10/2017.

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