

#### **Research Series**



# **Growth of**

# **Municipal Bonds in the Great Lakes Region**

**Projection Through 2030** 

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## Acknowledgments

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"Growth of Municipal Bonds in the Great Lakes Region: Projection Through 2030," Peter Adriaens and Dan Li. University of Michigan, September 2021



### Summary

The objective was to project municipal bond offerings through 2030, based on trends in historical issuances. To help understand the opportunity, we sought to analyze the vanilla and green municipal bond market in the Great Lakes Region, by issuer (municipality or agency), tenor and amount outstanding (or future amount issued). We sourced all issues between 2010-2020, as available on Bloomberg, applied regression models to the data, and projected from 2021-2030 based on the historical rate. This type of projection inherently has caveats given that for example green bond issuances have been growing faster in the last two years, and that agencies/municipalities have a debt cap on how much they can bond. Hence projections have to interpreted carefully, and mainly reflect future opportunity.

# **Project Scope and Background**

Previous work has shown significant growth in the issuance of green bonds in the Great Lakes region, in particular in the last two years, relative to the previous 10 years. This is even more impressive since only four Great Lakes states in the US have issued green bonds. No information was available on Canadian green bonds in the Bloomberg terminal repository. The total value of green bonds is a multiple of that of vanilla bonds (Chart 1). As shown previously (Adriaens report to GLPF, July 5, 2021), the majority of issues (both green and vanilla) are deployed in the water and sewerage area.



Chart 1. The Green Bond Universe in the Great Lakes – St Lawrence Region (2019-2020).

This report expands on this work to explore total issuance of municipal bonds (US side) historically and project the rate of issuance to the future. In addition, the rate, face value, and use of proceeds of the issuances provide insights in the capacity of the region to effect change towards sustainable growth should conversion of vanilla to green continue when measured against key performance indicators.



# **Methodological Approach**

#### **Bond Universe**

The Bloomberg fixed income search tools were used to uncover municipal bonds issued between 2010 and 2021. To capture the broadest possible universe, all filters for bonds including 'green' (as designated under the American Recovery and Reinvestment Act of 2009), and use of proceeds/purpose such as water, energy, industrial improvements and similar were used. The search criteria further included time of issue, maturity, and locality of registration. Following the initial results, a deeper analysis was conducted within each area of use of proceeds purpose to gather data on the bond rating, performance and coupon. In addition to the performance data, data was gathered on the issuer of the bonds (municipality or agency).

#### Analysis

Regression models in Excel were applied to explore the rate of growth historically and project forward. Both the number of issuances, type of issuer and face value of the bonds were used for future projections. Future issuances based on historical trends depend on a municipality's or agency's capacity to borrow and their infrastructure needs.

#### RESULTS

Following the search criteria, 2,345 municipal bonds outstanding were identified across all states and use of proceeds areas, between 2010–20121. Out of this universe, there were 804 green-labeled bonds under ARRA, or other green bond designations. Green bonds are only issued in 4 US states (NY, PA, OH, IL).

#### **Rate of Growth of Municipal Bond Issuances**

Green and vanilla bonds were grouped together because of the volatility in green bond issuance from year to year, and all issues were aggregated by year. The year of issue was plotted against annual issuance volume, and indicated that the regression was strong (R2 = 0.8). This allowed us to use the equation to infer an annual growth rate, which in this case was 41 bonds per year. When just vanilla bonds were plotted, the regression was equally strong (R2 = 0.78), but the rate of growth was indicated at 19 bonds per year over the past 10 years. Given the spread of the number of issuances along a linear trend, the standard deviation around the historical projection is +/- 46%, or we can treat the **boundary conditions between 19 and 41 issues per year**.





Chart 2. Historical trends of vanilla+green (left, 2,345 total) and vanilla (right, 1,541 total) bond issuances.

Using historical trends driven by vanilla bonds only (19 issues/year) or vanilla+green (41 issues/ year), the projected issuances by 2030 range from 5,675 to 6,665. By 2025, the projected issues total 2,600 to 2,820. The historical trends indicate that up to 35% of the total issues may be classified as green bonds.



Chart 3. Forward projection of bond volume based on upper and lower bound growth rates

#### **Growth of Municipal Bonds by Issuer**

The relative impact of agency- vs municipality-issued bonds on the growth rates was explored. Agency bonds represent 24% of the total municipal bonds over the past decade. Bonds issued by municipalities outpaced those issued by agencies in the past 10 years, with a growth rate of 36 bonds per year vs. 5 bonds per year for agency bonds. Chart 4 indicates the historical growth of bonds by both types of issuers, as well as the impact of their respective rate of growth over the next 10 years.





Chart 4. Historical trends (left) and future projections (right) of municipal bond issuances by agencies and municipalities

The number of bonds issued by municipalities will be 7x when compared to those issued by agencies in 2030 based on the current growth rates, **totaling 6,456 bonds over 10 years**. This total falls in between the high/low values of Chart 3, because a different propagation rate was chosen in Chart 4. The standard error is 109 municipal and 16 agency bonds. In 2025, municipal bond issues will total 532, with agency bonds standing at 93; in 2030, there are projected to be 713 municipal and 119 agency bonds.

#### **Growth of Municpal Bond Value**

Exploring historical trends of the value of the bonds issued is harder to determine than bond volume. For example, a regression analysis of aggregated face value by year shows a poor correlation (R2 = 0.43). This means that only 42% of the trend can be explained by the time variable, and thus this data results in a more uncertain future projection than total bond issuance, or issuer-driven bond issuance (Chart 5). Part of the challenge is that amounts outstanding are not normally distributed. There are 676 out of the total of 2,585 bonds that have a face value below \$1 M., 594 with a value between \$1 to \$2 M. Hence, about 50% of the bonds have a face value lower than \$2 M. On the higher face value, 20% of bonds are over \$10M and 4% of bonds have a value of over \$100M. Hence, the distribution is right-skewed, with an 80:20 ratio (below:above \$10M).



Chart 5. Historical trend and future projection of bond value issued in Great lakes States (n = 2,585).

With this context and caution, we proceeded to use the total aggegrate bond value rate of \$462 million/year to project future value. By 2025, the total estimated value of municipal bonds issued will be \$7.7 bn. This value increases to \$10.2 bn in 2030 if the growth rate is the same as the past 10 years.

Given the low (below 50%) reliability of historical trend estimates, the uncertainty much higher than standard error would indicate. Particularly, since 50% of the bonds have a low face value (below \$2M.), it is likely that the total growth rate and estimate will be lower than presented in Chart 5. Hence, the estimates presented in the Chart should be seen as upper bound values that will be driven by 20% of the higher bond value issuances.

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