

# Friction reduction in municipal bond market through blockchain technology

---

## Presented to CitiVentures

Andrew Caragher, Cole Evans, Ryan Malloy, Cory Poe, Aaron Rotem, Lindsay Shagrin, Tech Tanasarnsopaporn, Zhijian Yang, Dean Zimberg

May 6<sup>th</sup>, 2019

Lehigh University



# Agenda

- ◎ Introduction
- ◎ Current Situation
- ◎ Retail Market Demand
- ◎ Mini-Bond Offerings
- ◎ Concept Design

# Purpose

- Define issues in the current municipal bond market structure that limit retail investment
- Provide a framework for retail demand for municipal bonds
- Discuss current solutions based on past use cases
  - Mini-Bonds
- Discuss blockchain applications to the municipal bond market



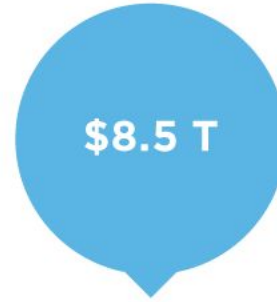
# Largest Bond Markets



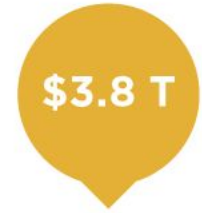
**Treasury**



**Mortgage  
Related**



**Corporate  
Debt**



**Municipal**

# Munis vs Corporates

## A Side-by-Side Comparison

	<b>Municipal Securities</b>	<b>Corporate Securities</b>
Market Size	<b>\$3.8 Trillion</b>	\$9.2 Trillion
No. of Securities	<b>~1,000,000</b>	~30,000
No. of Issuers	<b>~50,000</b>	~10,000
Daily Trading Volume	<b>\$11.6 Billion</b>	\$31.2 Billion
New Issuance Volume	<b>\$388 Billion</b>	\$1,376 Billion
Default Rates <sup>1</sup>	<b>0.18%</b>	1.74%

# Municipal Bond Market Opportunities

- Lack of Regulation
- Untapped Retail Demand
- Portfolio Benefits
  - Tax-exempt status
  - Low default rate
  - Social Investing





**-25%**

Between 2005 and 2016, **new municipal bond issuance fell 25%**  
as compared to issuance of corporate bonds.

# Impediments to Retail Investing

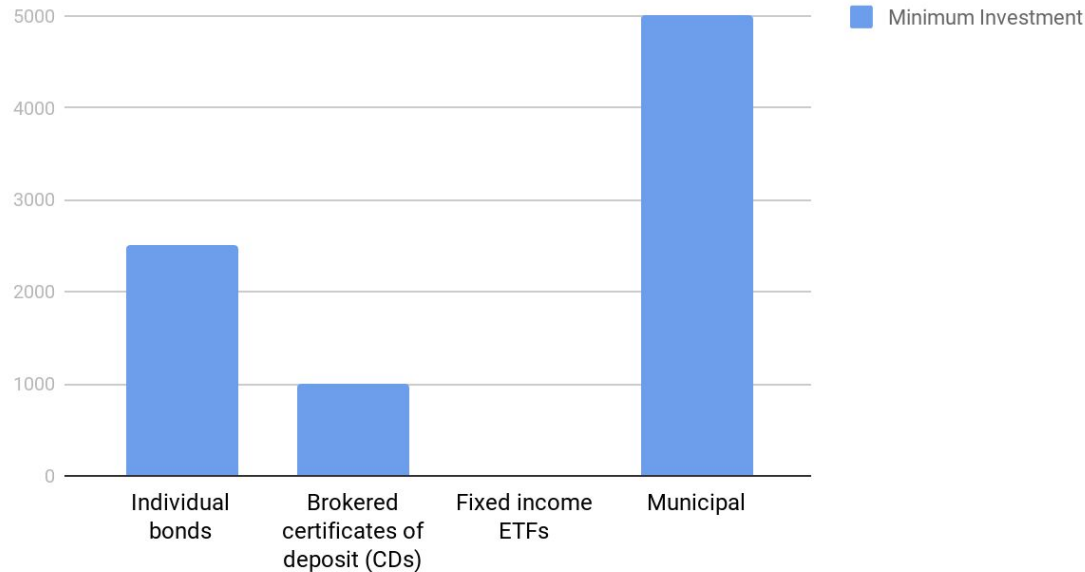
1. High Minimum Investment
2. Illiquidity
3. High Transaction Costs
4. Asymmetric Information





# Impediments to Retail Investing

## 1. High Minimum Investment: \$5,000



# Impediments to Retail Investing

## 2. Illiquidity

- Municipal bonds trade very infrequently
  - About 99% of outstanding municipal securities do not trade on any given day
- Municipal bonds do not have a quoted price
  - Valued using an “estimated price,” which is based upon trading history



# Impediments to Retail Investing

## 3. High Transaction Costs

Factors affecting retail transactions costs (Harris and Piwovar, YEAR)

- Small Trade Size
- Credit Quality
- Instrument Complexity
- Counterparty Search Costs



# Impediments to Retail Investing

## 4. Asymmetric Information

Many of quotes information for Municipal Bonds are available on an alternative trading systems (ATS). Only subscribers to the ATS can view the information which make it difficult for retail investors to gain quotes information and have to rely on a broker-dealer. That consequently creates the information asymmetry and hamper retail investors to go into the market.



# Retail Investor Opportunities

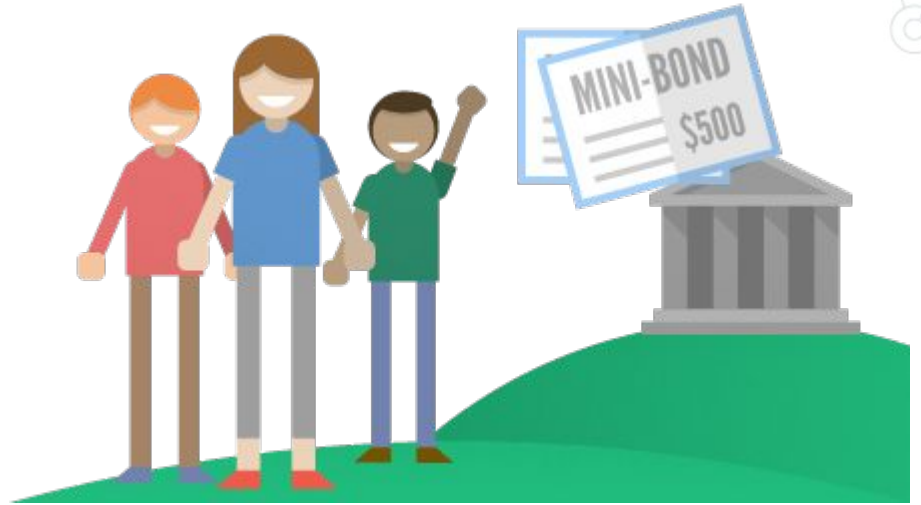
## Why include retail investors in the municipal bond market?

- Combat the problem of reduced demand
  - Higher retail demand allows municipalities to offer lower coupons
- Reduce reliance on larger Wall Street institutions
- Ability to finance smaller infrastructure projects
- Source of long-term sustainable capital



# Mini-Bond Offerings

Democratized municipal bonds that sell directly to investors in much lower increments, usually in smaller denominations of \$500.



# Mini-Bond Offerings

## Case Studies

- ◎ Denver
- ◎ Vancouver
- ◎ Cambridge



# Mini-Bond Offerings

## Case Studies

- ◎ Denver
- ◎ Vancouver
- ◎ Cambridge
- ◎ Berkeley





# Socially Responsible Investing

Socially responsible investing in the U.S. can be defined most succinctly as *the process of integrating personal values and societal concerns into investment decision-making.* (Steve Schueth)

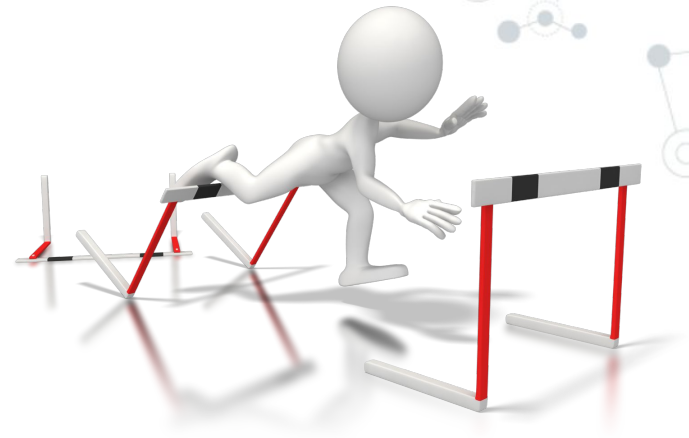
- Socially Responsible Investing
  - Market size
  - Community investing
- Mini-Bonds, in effect, securitize local government projects
  - Financial benefits as well as community improvements



# Potential Challenges with Mini-Bonds

What additional frictions are caused by the use of mini-bonds?

- Traditional issuance method is not feasible
- Must have physical delivery of certificates
  - No book entry
- Unestablished buyer networks



# The Blockchain Solution

Permissioned blockchain platform issuing “muni tokens” through smart contracts.

- “Muni tokens” can be created by issuers and municipal advisors
  - Can issue tokens and accept price transactions
- **Approval & rating** transactions
  - Rating agencies, legal counsel(s)
- **Price** transactions by underwriter(s)
  - Place bids for newly created tokens



# The Solution to Mini-Bond Frictions

## Blockchain Technology

Reduce frictions and lower costs

- Eliminate centralized clearinghouse maintaining records
- Remove trustee agent
- Efficiently distribute to investors
- Removal of CUSIP fees
- Create more a liquid market



# Remaining Challenges

- Marketing the offerings
- Legal counsel required
- Blockchain adoption
- Added transaction costs



# Conclusion

Municipal bonds are known to be an attractive investment due to their tax benefits, low volatility and negligible default risk. However, excessive costs in both the primary and secondary markets of municipal bonds limit their effectiveness in capital formation and investing. Our solution integrates blockchain technology and mini-bonds in order to decentralize the market, lower costs and increase secondary market liquidity.

