# Finding Impact in Municipal Bond Documents

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# Municipal Bonds

"Munis" are debt securities issued by **states, cities, counties and other governmental entities** to fund day-to-day obligations and to **finance capital projects** such as building schools, highways or sewer systems.

# General Obligation Bonds

"GO" bonds have their interest paid for in tax revenue, as opposed to revenues from specific projects. This leads them to be a much more **less specific** on average.

# Goal:

To identify opportunities for impact investors in general obligation bonds that stand out against the majority of generic issuances.
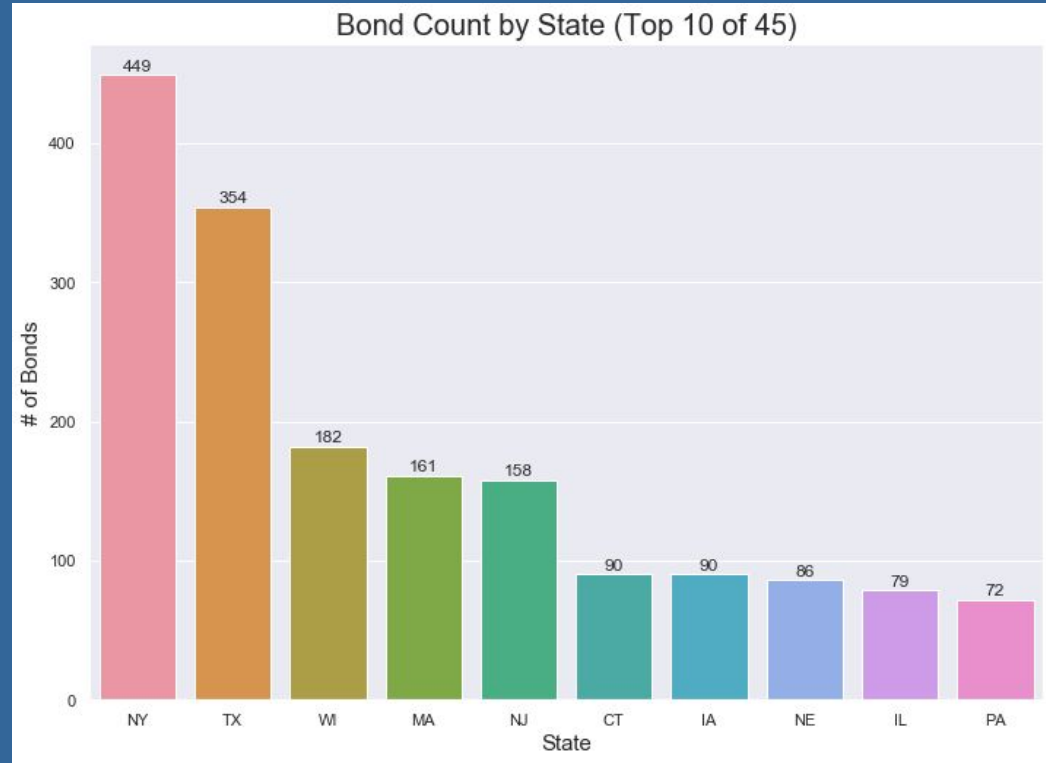
# Data:

The **Electronic Municipal Market Access**, a service of the MSRB.

- **2139** bond documents collected.
- Issued between **06/01/2020 - 11/04/2020**
- No clearly indicated purpose (**"other"** category).

# Top Issuers

Generally, more populated states and cities issue more debt.

We are also only looking at a specific category.



Bond Count by State (Top 10 of 45)

# Topic Modeling - NMF

Topic 0 : mortal, retire, commission, enterpris, airport, electr

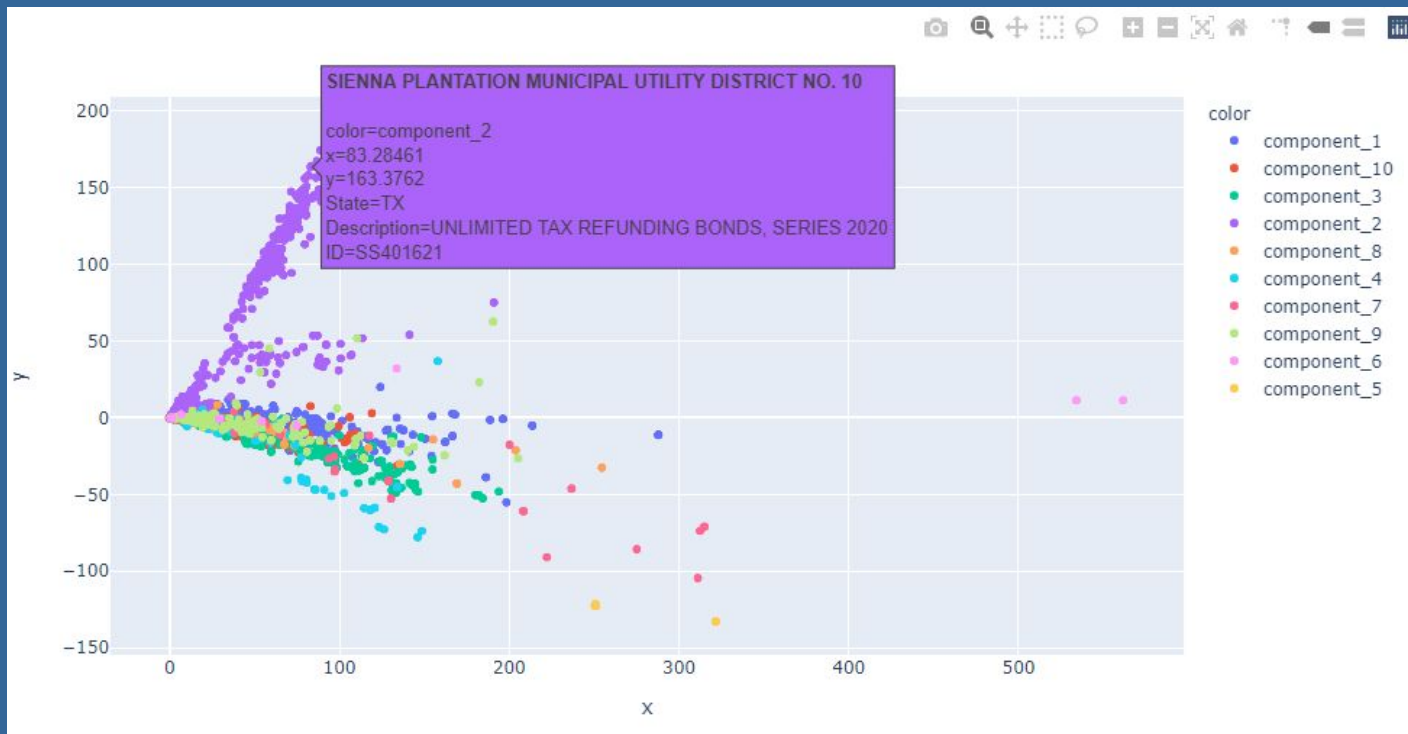Topic 1: apprais, wastewat, drainag, homestead, flood

Topic 2: townTM, success, preserv, enterpris, vehicl, excis

Topic 3: colleg, technic, student, technolog, enrol,

Topic 4: swapsrec, lotteri, mortgag, univers, assembl, common

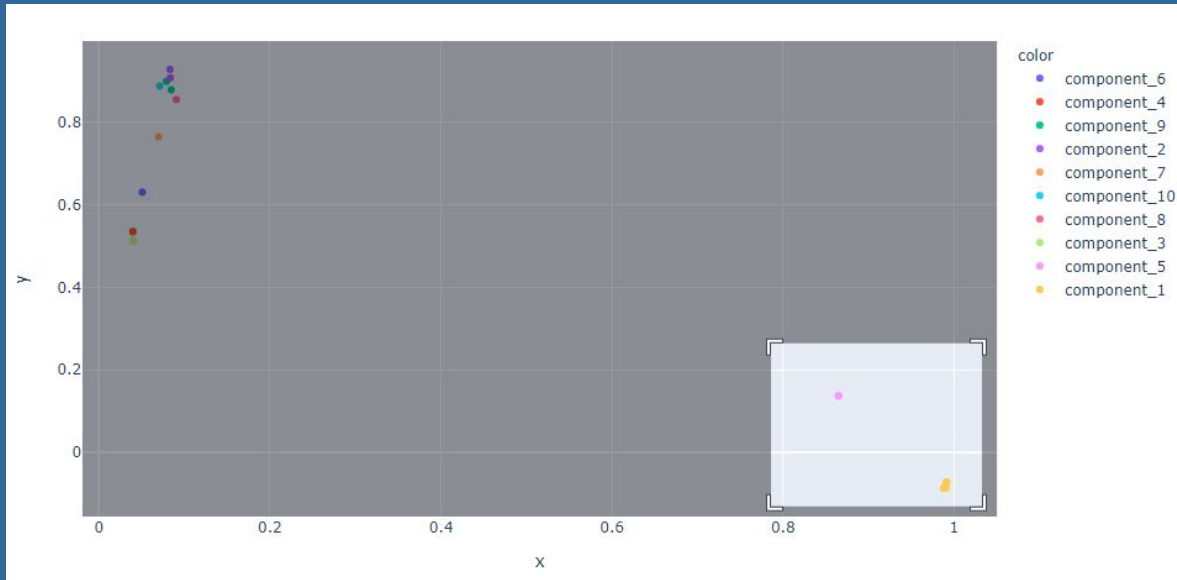Topic 5: energi, electr, airport, retire, citi, solar, plant, fuel

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# SVD Dimension Reduction
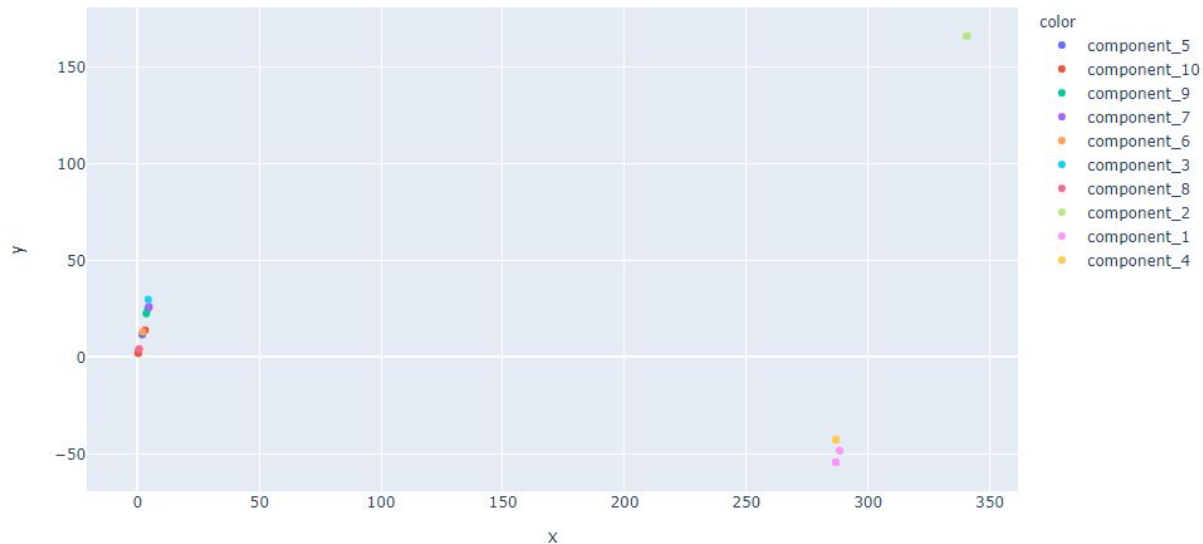
# SVD Dimension Reduction

# Oregon



Here we identify outlier bond documents that seem to be focused on **housing veterans** and funding **education**.

# Oregon



The distance is more exaggerated when using a countvectorizer instead of tf-idf.

# Findings

- We are able to detect **some** amount of **difference** between documents.
- It is **hard to remove the geographic bias** when looking across states.
- Because of this, topic modeling to reveal **underlying bond purposes is difficult**.

# Improvements

- Training **separate models** at the **state level** could yield better results.
- Collecting **more documents** in fewer states over a **longer timeline**.
- Collect information on legal firms to try and **control for boiler plate language**.