

Political Risks in Municipal Bonds

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BONDS MARKET

Introduction and Background

- The Size of the US Municipal bond market is \$4 Trillion
- States, cities and counties issue Municipal Bonds
- Essentially represents a loan for some interest (yield)
- Offering documents describe various risks - credit risk, inflation etc

Research Question

Primary Research Question: How is political risk information reflected in municipal bond documents?

Our test hypothesis is:

H₀: Political risk information is **not systematically** shared in municipal bond documents

H₁: Political risk information is **systematically** shared in municipal bond documents

Uniqueness

- Large corpus of documents (N = 845)
- Developed a new dictionary for political risk
- Research Design: supervised and unsupervised methods
- Can be easily replicated for other types of risks (Environmental Risk)
- Wide impact: Increased market efficiency and transparency

Literature for Dictionary Creation

- Schragger (2006) - Mayor's office is symbolic, cities are subordinate
- Salanick and Pfeffer (1977) - Mayor is a power broker (businesses and politicians)
- Kirkland (2021) - businessman mayor more infrastructure development
- e Benedictis-Kessner and Warshaw (2016) - Mayor's partisanship matters
- Staff (2001) - Mayors and Governors lobby to oppose budget cuts
- Condray and Conlan (2019) - States try to amend to amend Article V
- Gillette and Skeel (2015) - political interference in municipal bankruptcy laws

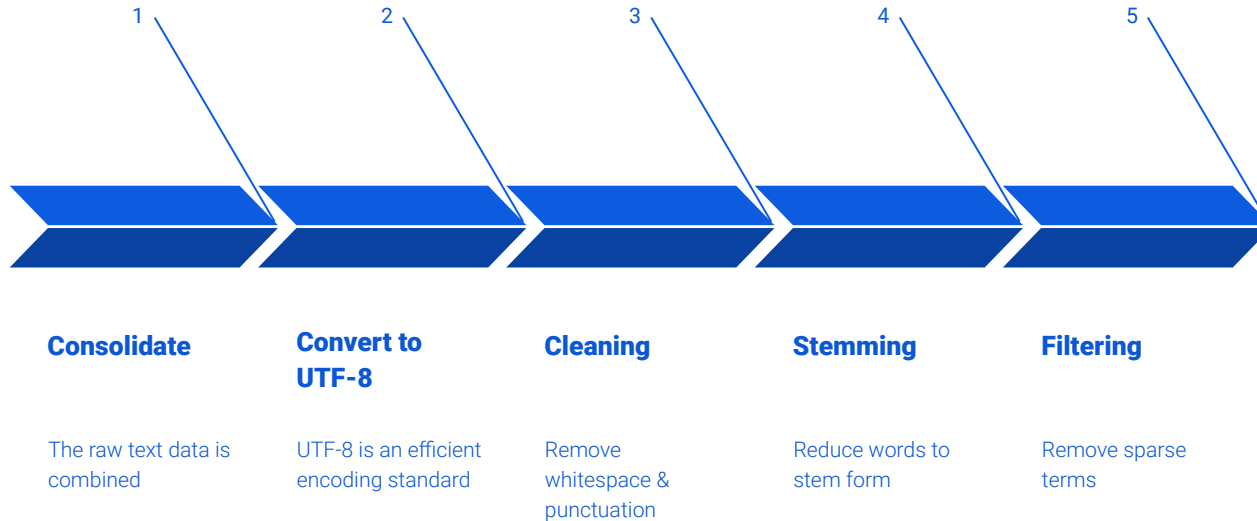
Dictionary for Political Risk

Structural Terms: mayor, budget, expenditures, city, revenue, administration, Tax, lobby, property, budget, bureaucracy, spending, cuts, funds

Political Power: partisanship, election, power, separation, federalism, fiscal, executive, reforms, constitution, district, officer, authority, governor, president

Pre-Processing

Steps



1. Consolidate raw text
2. Convert to UTF-8
3. Cleaning
4. Stemming
5. Filtering

Supervised Methods

Why Supervised??

Term Frequency &
Term Frequency - Inverse Document
Frequency

Word Pairs &
n-grams

Dictionary
Analysis

Supervised methods
allow for a targeted
approach for answering

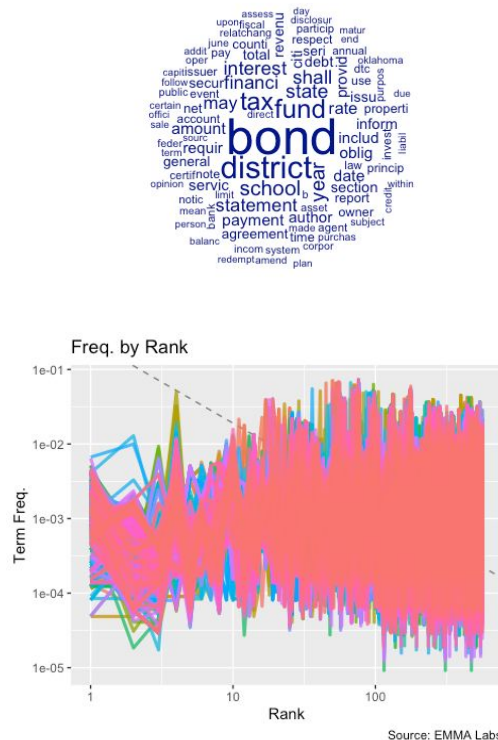
Term Frequency: # of times
a word appears

TF-IDF - frequency relative to
the corpus

Which words
commonly appear
together?

What topics are
present in the
document?

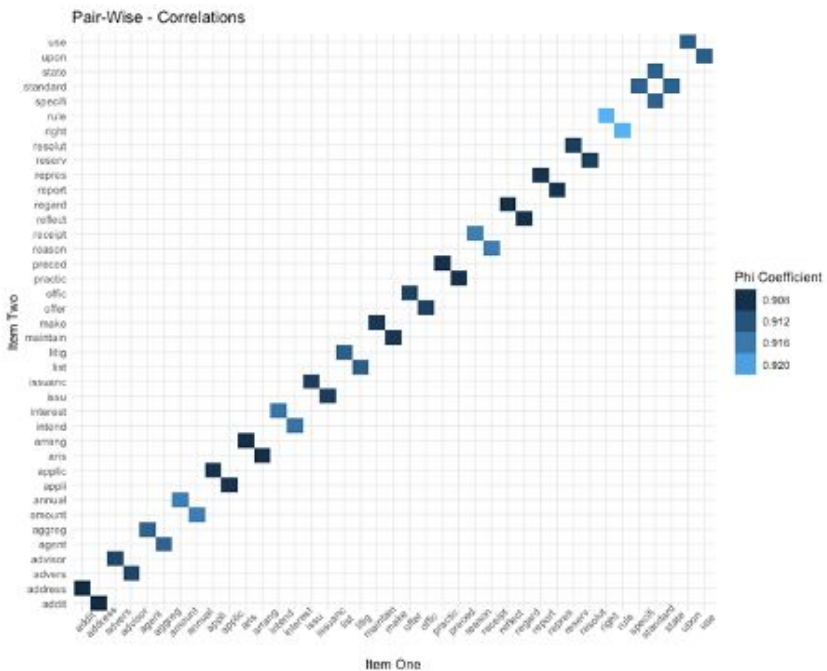
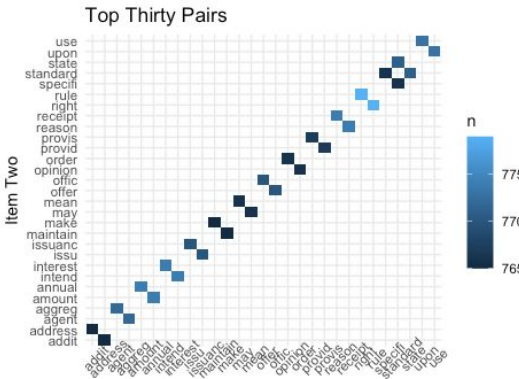
Insights



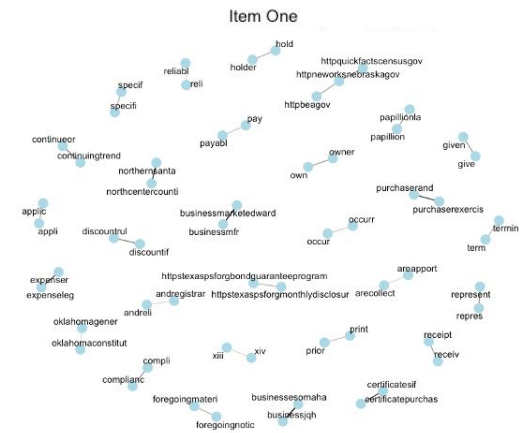
- Expected word-distro
- Not a usual random english-language document

Descriptive Stats, Cont'd

Insights



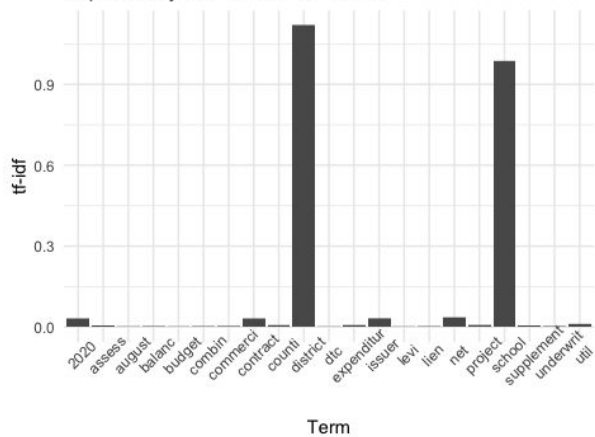
- Standard financial/legal stems
- Pairs vs. Pair-wise
- Phi-Coefficient of .88 (together at least 88% of the time)



Source: EMMA Labs

Descriptive Stats, Cont'd

Top Twenty via TF-IDF of Terms



Source: EMMA Labs

$$w_{x,y} = \text{tf}_{x,y} \times \log\left(\frac{N}{\text{df}_x}\right)$$

TF-IDF

Term x within document y

$\text{tf}_{x,y}$ = frequency of x in y

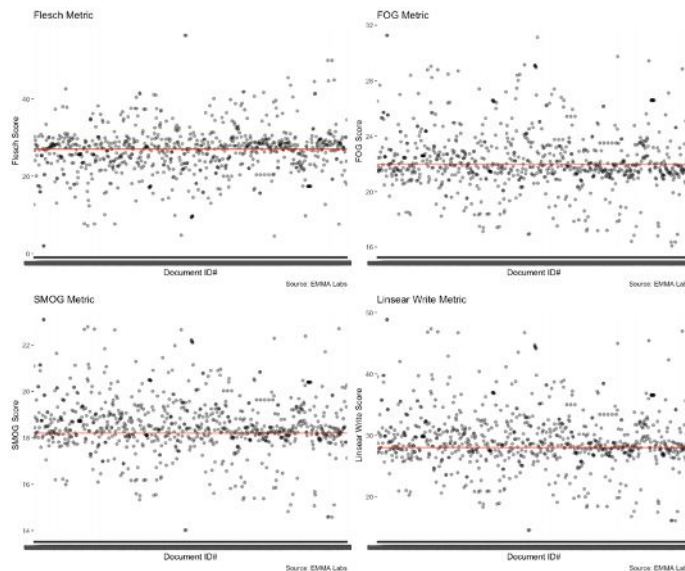
df_x = number of documents containing x

N = total number of documents

Ted Mai, Medium

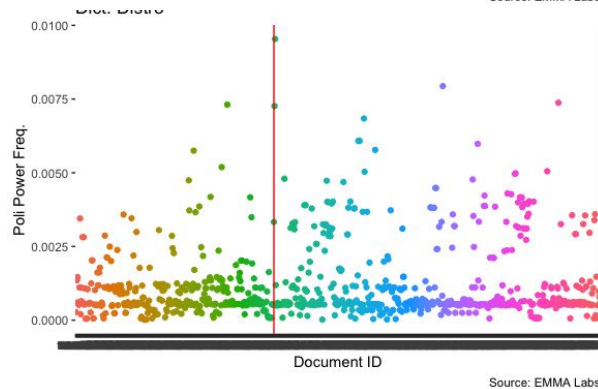
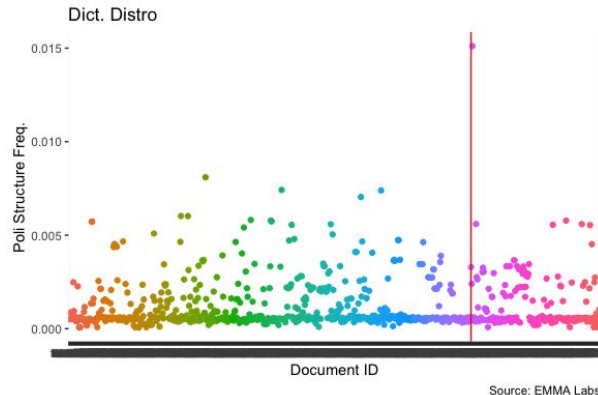
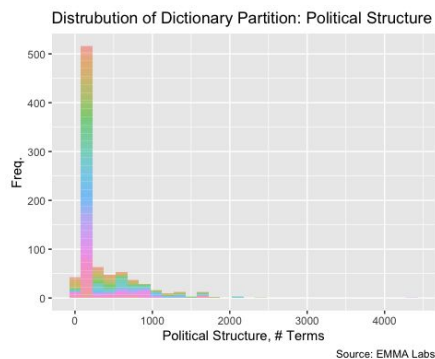
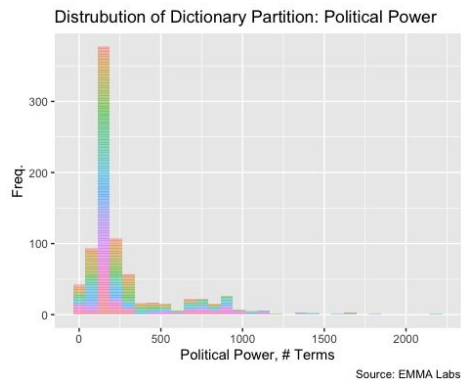
Insights

- TD-IDF: Frequent but not too frequent...
- How hard to comprehend?
- Flesch's Reading Ease Score (Flesch), Gunning's Fog Index (FOG), Simple Measure of Gobbledygook (SMOG), and the Linsear Write Metric
- Graduate level reading difficulty



Dictionary Analysis

Insights



- Two-Tiers: 'Power' and 'Structure'
- Matches!
- Clustered around docs #320, #640 respectively

Unsupervised Analysis of Municipal Bond using STM

INSIGHTS

Objective

Use STM to analyze 850 municipal bond documents

Purpose

Identify latent topics and their relation to political risks

Methodology

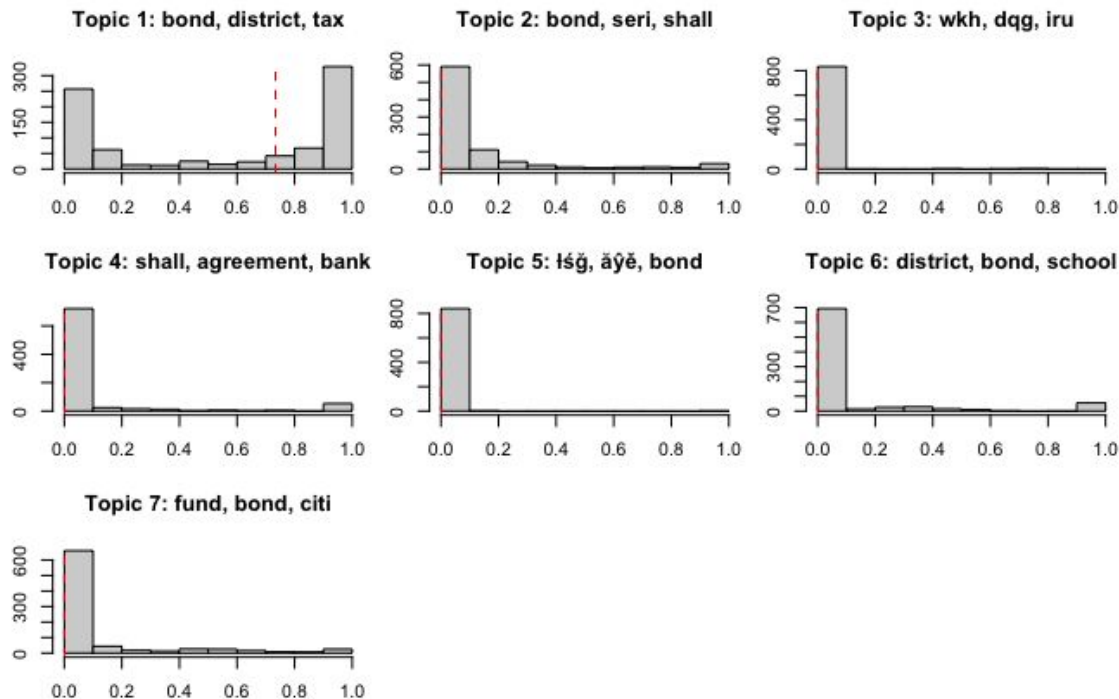
- Text preprocessing (cleaning, standardizing, stemming)
- STM for uncovering hidden patterns
- Visualizations of topic proportions and correlations

- STM reveals latent themes in offering documents.
- Provides a fresh perspective on political and fiscal risks.

Key Findings

INSIGHTS

Distribution of MAP Estimates of Document-Topic Proportions

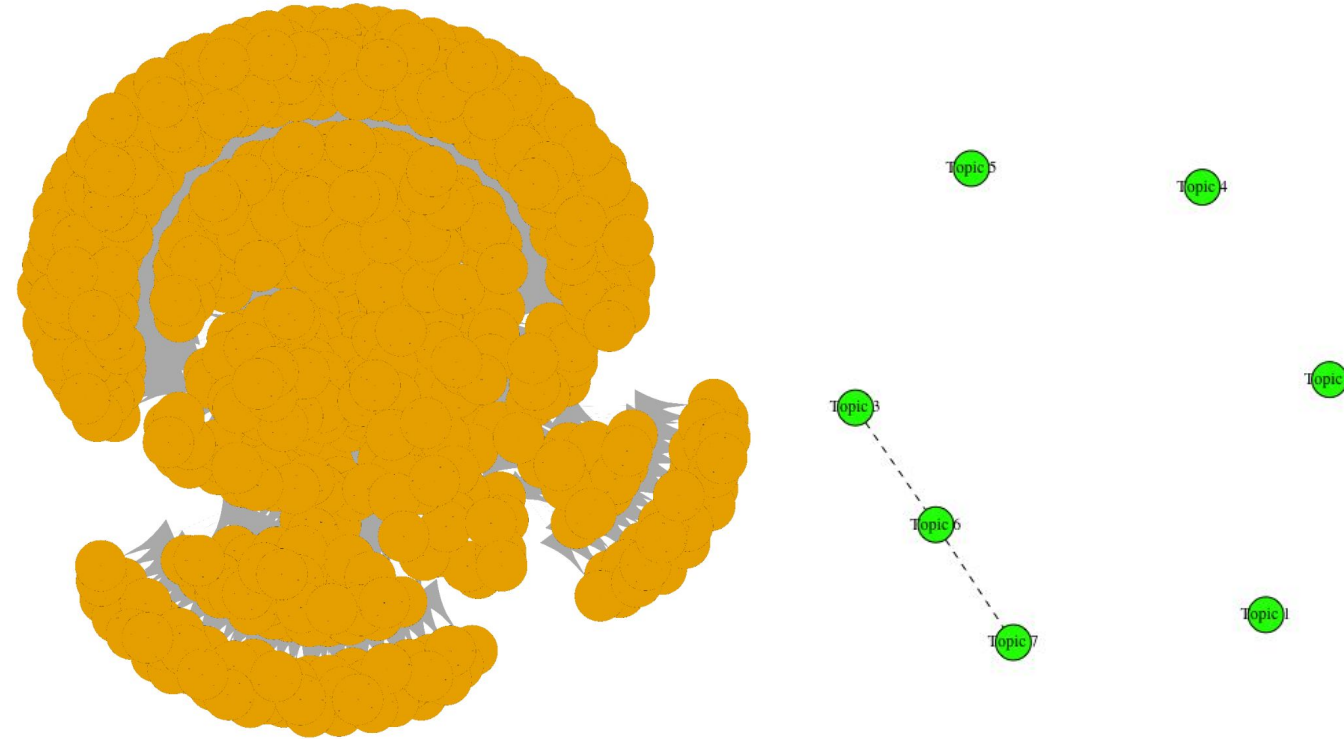


- STM uncovered prominent themes in offering documents.
- Dominant topics include governance, fiscal policies, and tax management.
- Topic correlations reveal subtle overlaps, suggesting interconnected governance and fiscal risk factors.

Implications to STM Findings

INSIGHTS

- STM provides nuanced insights into governance and fiscal disclosures
- Highlights political risks embedded in offering documents.
- Suggests enhanced transparency in disclosure practices



QUESTIONS

