

City Hall Has Been Hacked!

The Financial Costs of Lax Cybersecurity

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Overview

- The paper examines the effect of data breaches on the cost of municipal borrowing based on 2,582 data breach observations from Advisen
- Findings:
 - ▶ Muni bond prices decline by 15-22 bps
 - ▶ Primary market yields increase by 10-13 bps
 - ▶ Higher share of negotiated bond offerings
 - ▶ Expenditures increase by up to 5% after data breach
 - ▶ Adoption of data breach notification laws do not reduce the risk of future data breaches
- An important study that shows that cyber risk affects borrowing costs and expenditures of state and local governments

Which sensitive PII is being stolen?

DMVs Can (And Do) Collect and Sell Your Personal Data

Locate a Person Nationwide uses a variety of public record sources to find addresses and phone numbers for individuals (e.g. skip trace). Depending on your subscription, sources may include information from Bankruptcy Records, Deeds, Driver's License, Motor Vehicle Registrations, Phones and Voter Registrations, UCC, and Criminal Records sources.



POLITICS | NATIONAL SECURITY | ESSAY

U.S. Spy Agencies Know Your Secrets. They Bought Them.

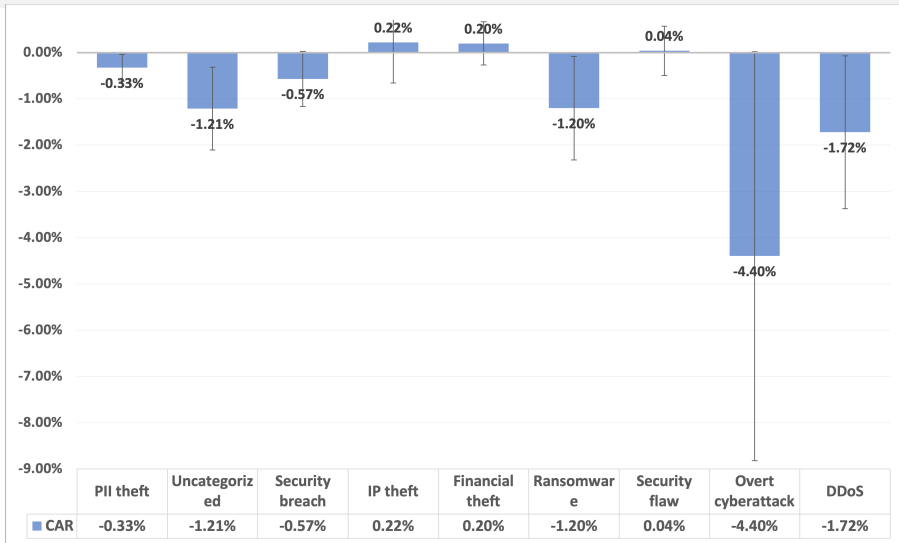
- Large amount of PII collected by state and local governments is already in the public domain (e.g., Public Records)
 - ▶ DOB, phone #'s, EM addresses, voter registration, driver and other licences, bankruptcy, judgement & liens filings, marriage & divorce records, deeds, foreclosures, prior addresses, criminal records, personal property, valuation reports, property loan amounts, etc.
 - ▶ Sources: Bankruptcy Records, Deeds, Driver's License, Motor Vehicle Registrations, Phones and Voter Registrations, Judgments and Liens, Phones, UCC, and Criminal Records
 - ▶ This information is used in academic papers on mutual fund managers, financial advisers, top executives, etc.
- Which (still private) sensitive PII (e.g., medical records credit card info) is collected by which entities, increasing lawsuit probability?

Take a closer look at ransomware attacks

The New York Times *Ransomware Attacks Are Testing* *Resolve of Cities Across America*

- March 2018 ransomware attack on Atlanta estimated to cost \$17 million from lost revenues and expenditures
- May 2019 ransomware attack on Baltimore cost \$18 million
- November 2020 Baltimore ransomware attack cost \$10 million in recovery and upgrade expenses
- ...
- Ransomware attacks capture more news headlines and more difficult to hide than data breaches
- Only 235 observations of ransomware attacks in Advisen
 - ▶ Ransomware attacks have a smaller effect on bond prices than data breaches. Perhaps attacks in this sample are inconsequential
 - ▶ May want to do an event study of ransomware attacks covered by news media on yields and ability to issue new bonds

Take a closer look at ransomware attacks



Source: Scherbina and Schlusche, “*The Effect of Malicious Cyber Activity on the U.S. Corporate Sector*,” 2023.

Warning re. worst-case scenario: cyberattacks on municipally operated critical infrastructures



- Many critical infrastructures are municipally owned (e.g., electric companies, water treatment plants)
 - ▶ Outdated security, no money for upgrades
 - ▶ April 19, 2024, cyberattack on **Tipton Municipal Utilities** by Russian hackers, which resulted in minimal disruption
 - ▶ Cyberattacks on CI can have devastating consequences

CONTROL



- Joe Weiss collected a private dataset of control system compromises

Suggestions

- Condition results on how large the breach was:
 - ▶ what type of PII, how many records stolen, covered in the media?
- Are reactions stronger for lower-rated bonds?
- Are governments less likely to issue a new bond after cyber incident relative to a predictive model (based on existing bond maturing, financial need, etc.)
- Evidence of financial constraints given higher expenditures?
- Are price reactions stronger for states with more computer/cyber-savvy populations?
- Related findings in *"From Bits to Bonds: The Economic Ripple of Local Cyberattacks on Municipalities"* by Andreadis, Kalotychou, Louca, Lundblad and Makridis, 2024:
 - ▶ muni bonds prices respond to news of cyber incidents experienced by local establishments
 - ▶ price reactions are stronger for long-maturity and uninsured bonds

Conclusion

- Valuable contribution to the municipal bond literature and the emerging literature on cyber risk
- Careful empirical work
- Convincingly shows that cyber incidents results in higher borrowing costs for state and local governments
 - ▶ therefore, cyber risk impact may be disproportionately large for poorer municipalities that cannot afford cybersecurity investments
- Would be useful to extend the analysis to different types of cyber compromises when more data become available
- Recommend reading!