When the Thin Bench Gets Thinner: The Effects of Investment Bank Consolidation on Municipal Finance

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Motivation

- DOJ's 1995 Bank Merger Guideline
  - Every M&As among *deposit-taking* institutions are subject to review
  - Investment banking activities not in consideration
- On September 17, 2024, the DOJ updated the guideline
  - Lower threshold on Δ_{HHI} for presumption of harm: 200 $\Rightarrow$ 100
- New guideline still overlooks the *investment banking* industry
  - Scarcity of research

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- Market structure and market power of security underwriters matter

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Short on financial knowledge, some school districts get bad deals on bonds

Districts can fall prey to financial firms that put their own interests first

by **SARAH BUTRYMOWICZ** and **NICHOLE DOBO**
April 22, 2019

Issuers (school districts) can "*easily be taken advantage of—urged to issue needless or poorly structured bonds, pushed to accept high interest rates or duped into paying hundreds of thousands in unreasonable fees*"

Motivation

- Goal: Understand underwriters' market power
- An intuitive strategy: Use M&As as a shifter of market power
- Features of the municipal bond primary market in the US:
  - Finances key public infrastructure and services (Adelino et al., 2017; Yi, 2021)
  - High geographical fragmentation (Butler, 2008; Babina et al., 2020)
  - Significant consolidation
  - $\Rightarrow$ Ideal for the study

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Research Question

1. Do M&As among municipal bond underwriters lead to a higher underwriting fee?
2. From the standpoint of issuers, do these M&As lead to efficiency gains that could offset the rise in the fee?
3. Do these M&As have a quantity effect on the amount of issuance?

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Overview of Findings

1. The underwriting fee rises by ~5% of its sample mean after within-market consolidation
2. Efficiency gains, if any, are too small to offset the rise in the underwriting fee
3. Using Census data, I show a reduction in issuance (~$180 per student per year)

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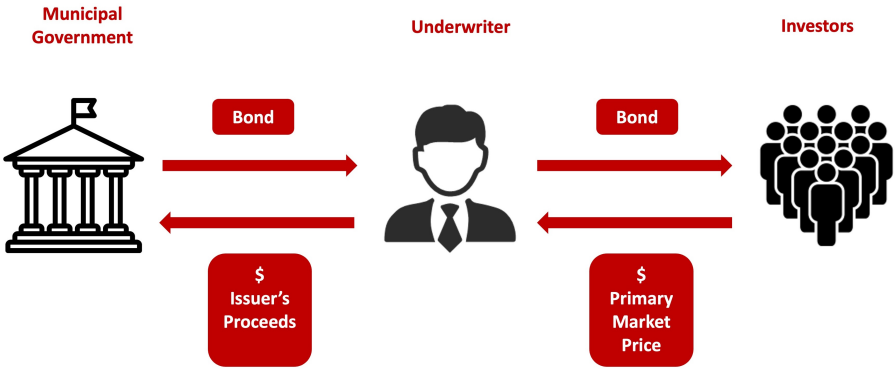
Related Literature

- Underwriter market power: Chen and Ritter (2000), Manconi et al. (2019), Cestau (2019), Cestau (2020), Garrett and Ivanov (2024), and others
- Financial institution M&As: Prager and Hannan (1998), Strahan and Weston (1998), Berger et al. (1999), Sapienza (2002), Focarelli and Panetta (2003), Garmaise and Moskowitz (2006), and others
- U.S. municipal bond market: Butler et al. (2009), Cornaggia et al. (2017), Adelino et al. (2017), Gao et al. (2019), Jeung and Lee (2022), Dougal et al. (2019), Painter (2020), Butler and Yi (2022), Goldsmith-Pinkham et al. (2023), Garrett (2024), Ahn and Jo (2025), and others

- My paper is the first to study the consequences of investment bank consolidation

Institutional Details



Underwriting Spread ($) = Primary Market Price – Issuer's Proceeds

- Underwriters (1) assume inventory risks (2) exert marketing and distributing efforts

Data and Sample

- Municipal bond issuances
  - Source: SDC Platinum Global Public Finance Database
  - Main outcome variable: Underwriting spread expressed as a fraction of the principal amount
- M&A sample:
  - Hand-collect M&As among municipal bond underwriters active in 1970-2022
  - Complement the sample with:
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  - 258 M&A deals, among which 162 have geographic overlaps

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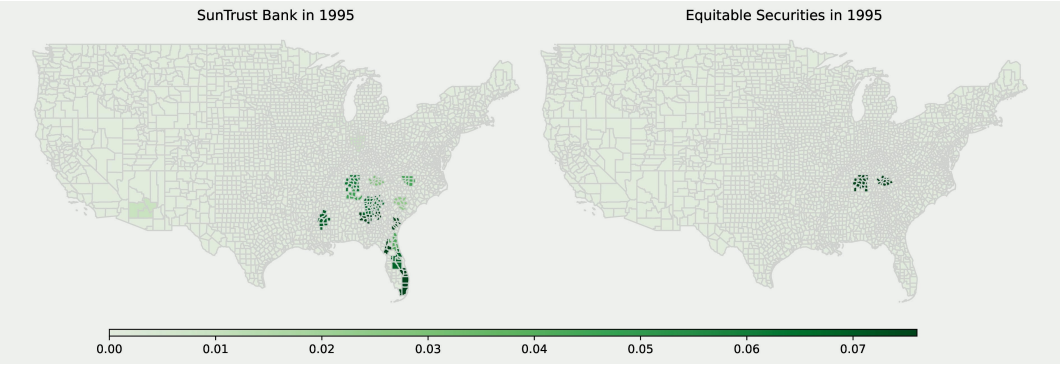
Data and Sample

- Market: A Combined Statistical Area (CSA), 218 in the U.S.
- Treated: CSAs where M&As would lead to *predicted* Δ_{HHI} >= 100
  - $\Rightarrow$ 219 local consolidation episodes

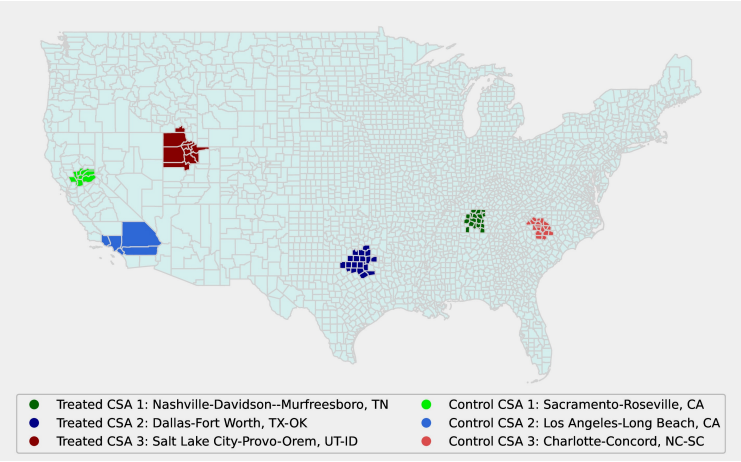


More

Data and Sample

Control: One CSA that is

- Closest in terms of population and income per capita
- Not affected by within-market M&As during $[-4, +4]$



Main Findings: Effects on Underwriting Spread

- I estimate a stacked DID (Gormley and Matsa, 2011, 2016):

$$y_{d,c} = \beta_1 Post_{c,t} + \beta_2 Treated_{a,c} \times Post_{c,t} + \theta_{i,c} + \theta_t + e_{d,c}$$

  where
  - d is for each bond issuance, i.e., each deal
  - a is for each Combined Statistical Area (CSA)
  - c is for each cohort of treated and control CSAs
  - i is for each issuer
  - t is for the calendar year
  - Double-cluster SEs at CSA and year levels

- Direction of the effect is unclear ex-ante:
  - Bolster market power and raise underwriting spread ⇑
  - Create synergies and reduce marginal cost, which might get passed on ⇓

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Main Findings: Effects on Underwriting Spread

	Predicted Δ_{HHI} >= 100	Market Share >= 5%	*Predicted* $\Delta_{Top\ 5\ Share}$ >= 5%
	(1)	(2)	(3)
	Underwriting Spread (bps.)	Underwriting Spread (bps.)	Underwriting Spread (bps.)
Treated × Post	4.98***	4.48***	4.42***
	(3.15)	(4.47)	(2.68)
Observations	79,642	148,352	74,250
Year FE	Yes	Yes	Yes
Issuer × Cohort FE	Yes	Yes	Yes
Clustering	CSA & Year	CSA & Year	CSA & Year
Adjusted R-squared	0.529	0.513	0.506

M&As that would lead to *predicted* Δ_{HHI} >= 100

$\Rightarrow$ A 5.0 bps. increase in underwriting spread from a sample mean of 103.0 bps.

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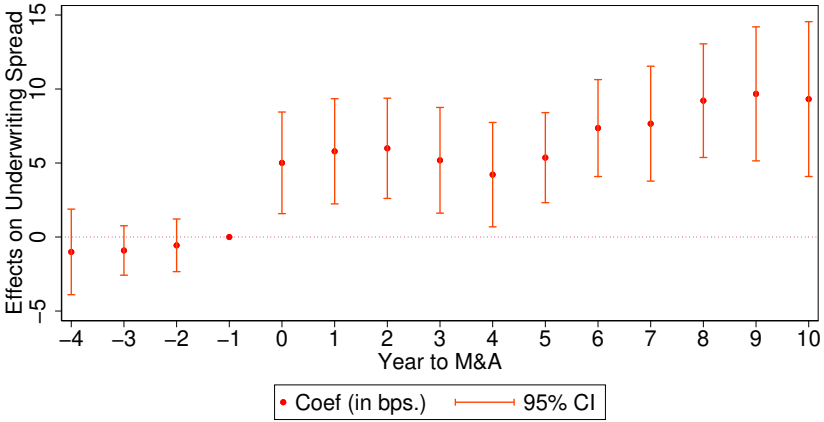

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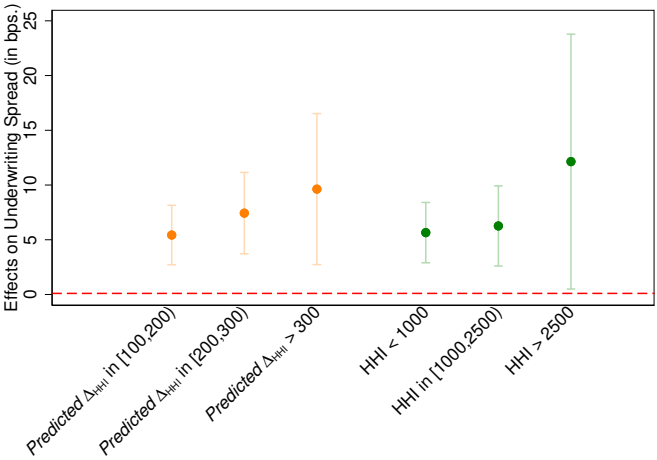
Consistent with increased market power:



Main Findings: Addressing Endogeneity Concerns

- Main concerns:
  - Omitted Variable Bias: Local economic dynamics drive both M&As among underwriters and the underwriting spread
  - Reverse Causality: Underwriters merge because they anticipate future changes in underwriting spread in the local market
- Effects hold when considering only
  - #1: Scenarios where the consolidation-affected markets are peripheral to the merging underwriters (Garmaise and Moskowitz, 2006; Sunderam and Scharfstein, 2017)
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CSA	Significance of CSA for RBC Bank	Significance of CSA for Dain Bosworth	
Minneapolis-St. Paul, MN-WI	10.6%	9.5%	✗
Albuquerque-Santa Fe-Los Alamos, NM	5.4%	3.9%	✗
Milwaukee-Racine-Waukesha, WI	2.2%	1.9%	✓
Brownsville-Harlingen-Raymondville, TX	2.1%	1.8%	✓
Omaha-Fremont, NE-IA	1.0%	1.0%	✓

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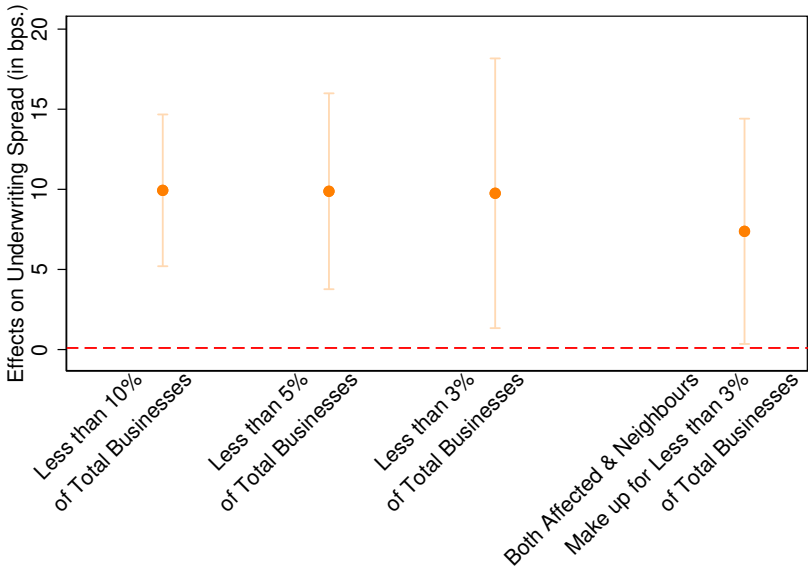

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PNC Bank & Midlantic Bank, 1995

The Morning Call: *"The move, along with PNC Bank's pending acquisition of 84 branches of Chemical Bank New Jersey, will strengthen PNC Bank's position in the New Jersey and Philadelphia markets, placing it second in those areas."*

⇒ **The acquiror's desire to gain local/regional dominance**

Main Findings: Addressing Endogeneity Concerns

Stifel Nicolaus & City Securities, 2016

Indianapolis Business Journal: *"'Post Dodd-Frank, one of the effects that it had on the entire industry was to lay a lot of additional regulatory costs on everybody—probably disproportionately on smaller firms,' Bosway (City Securities CEO Mike Bosway) said. 'So that was clearly a factor in considering this more so than I had in the past. The need for scale today, because of that, is greater than it ever had been.'"*

$\Rightarrow$ **Synergy from cost management**

Main Findings: Addressing Endogeneity Concerns

Reason for M&A	Count
The acquiror's desire to gain local/regional dominance	24
The acquiror's desire to expand geographically	19
The acquiror's desire to gain industry-wide dominance	15
Synergy from combining different lines of business	14
Financial stress of the target	13
Synergy from cost management	12
The acquiror's desire to diversify its revenue sources	12
Acquiror or target's desire to fend off a hostile takeover	1

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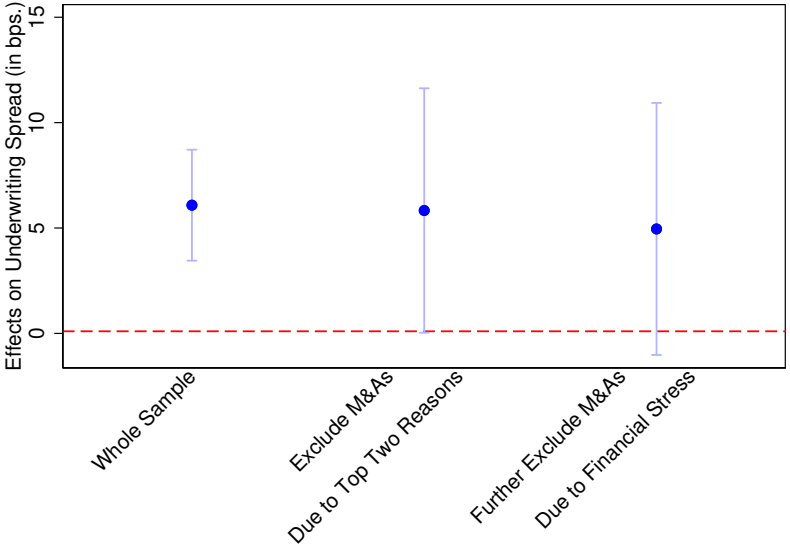

Main Findings: Placebo Tests

Effects are absent for

- #1: Cross-market underwriter M&As ⏩ Findings
  - ⇒ Findings not driven by factors that lead to M&A activities of underwriters in general
- #2: Within-market (purely) commercial bank M&As ⏩ Findings
  - Trace out geographical distribution using Summary of Deposits (Cetorelli and Strahan, 2006; Bouwman and Malmendier, 2015)
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- #3: Within-market withdrawn underwriter M&As ⏩ Findings
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Efficiency Gains

Two themes of M&A research: Efficiency gains vs. Market power (Berger et al., 1999; Amel et al., 2004; DeYoung et al., 2009)

Efficiency Gains

Efficiency gains that could compensate issuers for the higher underwriting spread?

Examine potential efficiency gains as:

- Lower bond yield?
  - No evidence of decrease in bond yield ✗
- Reduced need for other issuer-paid services?
  - Bond insurance, credit ratings, and financial advisors Skip
  - Little evidence of substitution ✗

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Local Government Finances

- Data: Annual Survey of State and Local Government Finances by the U.S. Census Bureau (Pierson et al., 2015; Adelino et al., 2017; Yi, 2021)
- Motivation:
  - Validate findings from issuance-level outcomes
  - Fully quantify the total effects of M&As on local government financing costs
    - Hard-to-quantify complex features (Brancaccio and Kang, 2024)
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- Outcome variables:
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Local Government Finances

	(1) Interest Paid/ Exp. (in %)	(2) Issuance/ Exp. (in %)
Panel A: Municipality/township/county		
Treated × Post	0.16*	−0.31
	(1.84)	(−1.14)
Panel B: School district		
Treated × Post	−0.02	−1.20***
	(−0.53)	(−2.70)
Government × Cohort FE	Yes	Yes
Year FE	Yes	Yes
Clustering	CSA & Year	CSA & Year

- School districts: Issuance drops by \$178.9 (t = -2.19) and expenditure changes by -\$279.7 (t = -1.60) per student Dynamics

Conclusion

- Underwriting spread rises after underwriter consolidation
- Cross-sectional heterogeneities are consistent with a market power interpretation
- Effects hold in scenarios where endogeneity concerns are less likely
- Efficiency gains, if any, are insufficient to offset this increase
- Census data confirm elevated financing costs and show reduced issuance

- The findings provide a novel perspective on bank antitrust regulations
  - The investment banking industry demands antitrust attention
  - Narrower market definition in settings with geographical segmentation
  - Regulators can adopt simple rules based on historical data
  - Arguments for consumer benefits from M&As require evidence

⏩ More Discussion

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Motivation


FINANCIAL TIMES

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OECD criticises high fees and tacit collusion in IPO underwriting

Costs for European issues about half that paid by US and Japanese companies

OECD

- "*(For corporate IPOs,) high levels of fees and parallel pricing (akin to tacit collusion) appear to have increased (in recent years)*"
- This could have contributed to the "*decline in the number of companies tapping the public equity markets over the past decade*"

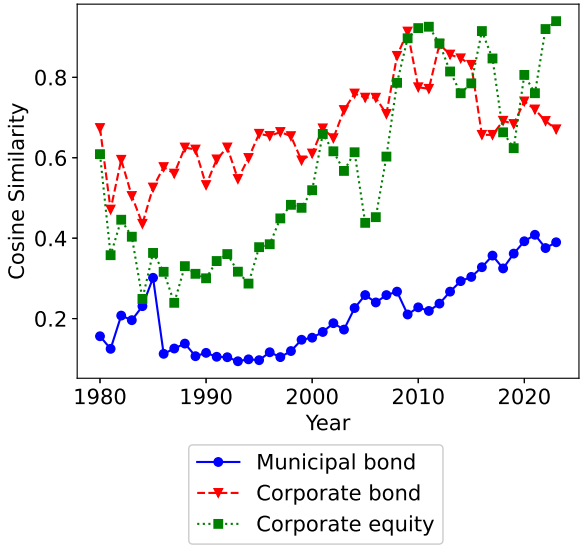
Back

Motivation

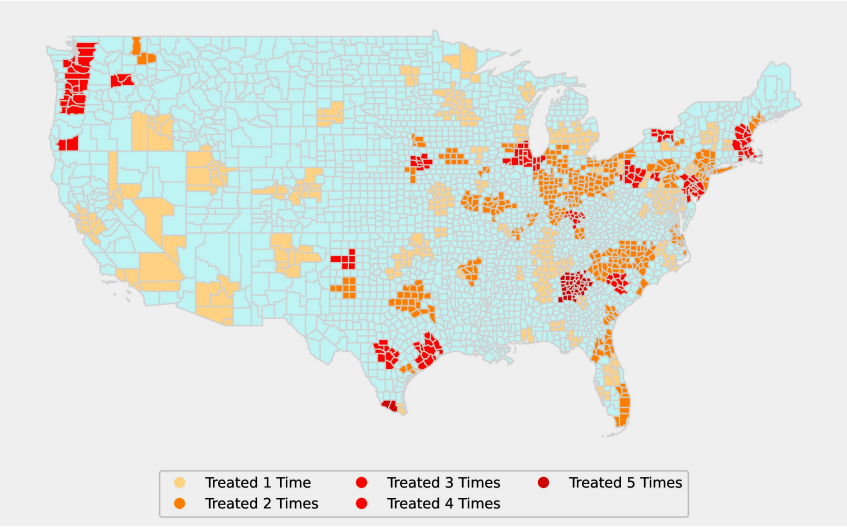
Reuters

- "*Cities led by Baltimore, Philadelphia and San Diego accused the banks of colluding to raise rates on more than 12,000 variable-rate demand obligations (VRDOs) from 2008 to 2016.*"

Data and Sample: Geographic Fragmentation



Data and Sample: Frequency of Treatments



Back

Main Findings: Effects on Underwriting Spread

	(1) Underwriting Spread (bps.)	(2) Underwriting Spread (bps.)	(3) Underwriting Spread (bps.)	(4) Underwriting Spread (bps.)
Treated × Post	5.79*	3.69**	3.91*	5.22***
	(1.98)	(2.32)	(2.00)	(3.21)
Observations	79,552	78,417	57,112	79,642
Year FE			Yes	Yes
Issuer × Cohort FE	Yes	Yes		Yes
State × Year FE	Yes			
Underwriter × Year FE		Yes		
Issuer × Underwriter × Cohort FE			Yes	
Clustering	CSA & Year	CSA & Year	CSA & Year	CSA & Year
Weights	None	None	None	Wing et al. (2024)
Adjusted R-squared	0.540	0.621	0.671	0.553

Table: Robustness Tests to Alternative Regression Specifications, Part I Back

Main Findings: Effects on Underwriting Spread

	(1) Underwriting Spread (bps.)	(2) Underwriting Spread (bps.)	(3) Underwriting Spread (bps.)
Treated × Post	3.84**	4.50***	4.41***
	(2.21)	(2.82)	(2.78)
If Commercial Banks Eligible			-15.92***
			(-8.17)
Observations	79,641	64,664	79,642
Controls		Yes	
Year FE		Yes	Yes
Issuer × Cohort FE	Yes	Yes	Yes
Taxable × Year FE	Yes		
Method of Sale × Year FE	Yes		
Source of Repayment × Year FE	Yes		
Clustering	CSA & Year	CSA & Year	CSA & Year
Adjusted R-squared	0.548	0.577	0.533

Table: Robustness Tests to Alternative Regression Specifications, Part II Back

Main Findings: Effects on Underwriting Spread

	(1) Underwriting Spread (bps.)	(2) Underwriting Spread (bps.)	(3) Underwriting Spread (bps.)	(4) Underwriting Spread (bps.)	(5) Underwriting Spread (bps.)
Treated × Post	4.03**	3.84**	3.80***	3.90***	3.36**
	(2.63)	(2.51)	(2.79)	(2.89)	(2.52)
Observations	103,956	123,364	76,104	79,527	1,000,870
Year FE	Yes	Yes	Yes	Yes	Yes
Issuer × Cohort FE	Yes	Yes	Yes	Yes	Yes
Clustering	CSA & Year	CSA & Year	CSA & Year	CSA & Year	CSA & Year
Number of Matches	2	3	1	1	Unlimited
Matching Co-variates	Local Income and Population	Local Income and Population	Local Income and Population plus Demographics Dynamics	Local Income and Population plus Issuance Outcomes	None
Adjusted R-squared	0.513	0.511	0.535	0.529	0.537

Table: Robustness Tests to Alternative Matching Back

Main Findings: Effects on Underwriting Spread

	(1) *Predicted* Δ_{HHI}	(2) $1_{Predicted\ \Delta_{HHI} \geq 100}$ ×100	(3) Underwriting Spread (bps.)	(4) Underwriting Spread (bps.)
Treated × Post			5.12***	4.60**
			(3.16)	(2.49)
Prior HHI	-0.0016	-0.0012***	0.00	0.00
	(-0.84)	(-4.13)	(1.28)	(1.46)
Population	0.0001	-0.0000		-0.01**
	(0.12)	(-0.17)		(-2.47)
Population Growth Rate	324.0629	68.8836*	-4.13	40.94
	(1.65)	(1.98)	(-0.05)	(0.55)
Income	0.0185	0.0820		0.00
	(0.02)	(0.56)		(0.01)
Income Growth Rate	-18.6023	-5.8455		-32.58
	(-0.20)	(-0.36)		(-1.01)
Age	2.1907	-0.0606		-2.37
	(1.19)	(-0.20)		(-0.68)
Minority Ratio	64.4586	2.8297		232.36
	(1.03)	(0.34)		(1.58)
Past Issuance Per Capita	-0.0022	0.0000		-0.00
	(-1.30)	(0.01)		(-0.57)
Observations	8,357	8,357	79,109	79,109
Year FE	Yes	Yes	Yes	Yes
CSA × Cohort FE			Yes	Yes
Clustering	CSA & Year	CSA & Year	CSA & Year	CSA & Year
Adjusted R-squared	0.064	0.082	0.529	0.529

Main Findings: Effects on Underwriting Spread

	(1) Underwriting Spread (bps.)
Treated × Post	6.02***
	(4.23)
Observations	71,247
Year FE	Yes
Issuer × Cohort FE	Yes
Clustering	CSA & Year
Number of Matches	1
Matching Co-variates	Propensity Score
Adjusted R-squared	0.524

Table: Robustness to Matching on Propensity Score Back

Main Findings: Effects on Underwriting Spread

	(1) Underwriting Spread (bps.)	(2) Underwriting Spread (bps.)
Treated × Post	4.94	4.31*
	(1.19)	(1.98)
Observations	17,419	70,402
Year FE	Yes	Yes
Issuer × Cohort FE	Yes	Yes
Clustering	CSA & Year	CSA & Year
Number of Matches	1	1
Matching Co-variates	Local Income and Population	Local Income and Population
Restrictions	Treated Once	Requiring No Prior Treatment
Adjusted R-squared	0.492	0.522

Table: Robustness Tests to Addressing Concerns in Baker et al. (2022) Back

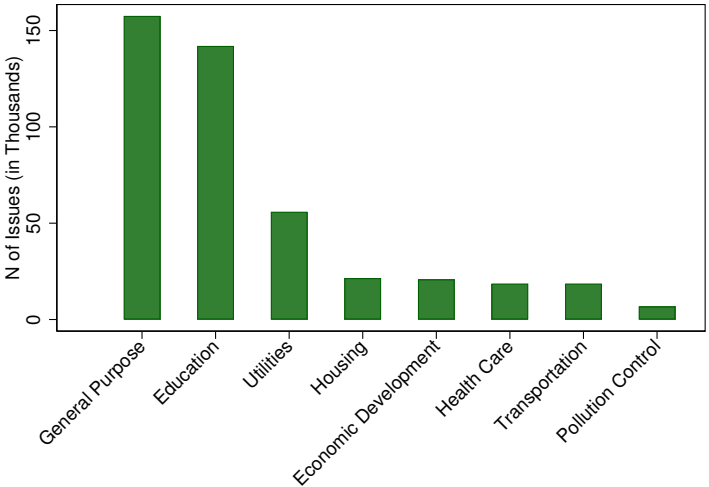
Main Findings: Effects on Underwriting Spread

	(1) Underwriting Spread (bps.)	(2) Underwriting Spread (bps.)	(3) Underwriting Spread (bps.)
Treated × Post	7.04***	5.84***	7.71***
	(4.18)	(3.79)	(4.81)
Observations	76,821	125,303	63,450
Year FE	Yes	Yes	Yes
Issuer × Cohort FE	Yes	Yes	Yes
Clustering	CBSA & Year	CBSA & Year	CBSA & Year
Adjusted R-squared	0.536	0.528	0.531

Table: Robustness Tests to Defining Markets at the CBSA Level Back

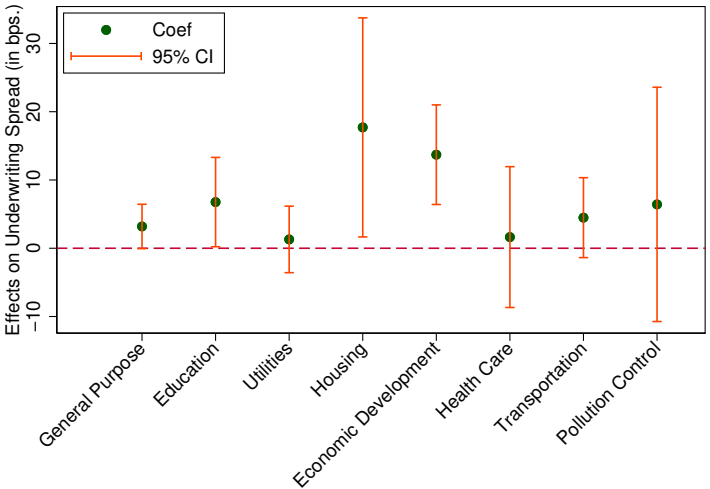
Main Findings: Effects on Underwriting Spread

Figure: Effects by the Main Use of Proceeds



Main Findings: Effects on Underwriting Spread

Figure: Effects by the Main Use of Proceeds Back



Main Findings: Addressing Endogeneity Concerns

PNC Bank & Midlantic Bank, 1995

The Morning Call: *"The move, along with PNC Bank's pending acquisition of 84 branches of Chemical Bank New Jersey, will strengthen PNC Bank's position in the New Jersey and Philadelphia markets, placing it second in those areas."*

⇒ **The acquiror's desire to gain local/regional dominance**

Back

Main Findings: Addressing Endogeneity Concerns

RBC Bank & Dain Bosworth, 2000

The Wall Street Journal: *"The acquisition, which is subject to approval by regulators and Dain Rauscher shareholders, would give Royal Bank the toehold it has long sought in the U.S. wealth-management market."*

⇒ **The acquiror's desire to expand geographically**

Back

Main Findings: Addressing Endogeneity Concerns

JP Morgan & Banc One, 2004

The New York Times: *"The merger would create a financial behemoth and a true rival to the world's largest banking company, Citigroup , with $1.1 trillion in assets and 2,300 branches in 17 states."*

⇒ **Acquiror's desire to gain industry-wide dominance**

Back

Main Findings: Addressing Endogeneity Concerns

Wells Fargo & First Security, 2000

The New York Times: *"(First Security) operates similar to a savings institution, with a business that is generally weighted toward low-return products like mortgage and car loans. 'The mortgage business has gotten really crushed in this rate environment,' Mr. Ryan (of the research firm Byrne-Ryan) said. 'But Wells Fargo is one of the top operators in the mortgage business and is well positioned to resuscitate First Security.'"*

$\Rightarrow$ **Financial stress of the target (vulnerability to the rate environment)**

Back

Main Findings: Addressing Endogeneity Concerns

Capital One Financial & North Fork Bank, 2008

The New York Times: "*'With North Fork, Capital One will be more balanced and more diversified and my growth prospects will be enhanced,' Mr. Fairbank said during a conference call today with investors and analysts. 'That is a very important milestone in a journey that started many years ago.'*"

⇒ **Acquiror's desire to diversify its revenue sources**

Back

Main Findings: Placebo Tests

	Market Share >= 10%		Market Share > 0%	
	(1)	(2)	(3)	(4)
	Underwriting Spread (bps.)	Underwriting Spread (bps.)	Underwriting Spread (bps.)	Underwriting Spread (bps.)
Treated × Post	-3.01	-0.26	-0.22	1.19
	(-1.36)	(-0.13)	(-0.14)	(0.67)
Observations	33,997	54,052	118,497	113,959
Year FE	Yes	Yes	Yes	Yes
Issuer × Cohort FE	Yes	Yes	Yes	Yes
Clustering	CSA & Year	CSA & Year	CSA & Year	CSA & Year
If Similar Population	No	Yes	No	Yes
Adjusted R-squared	0.607	0.608	0.588	0.580

Back

Main Findings: Placebo Tests

	Predicted $\Delta_{CB\ HHI}$ >= 100	*Predicted* $\Delta_{CB\ HHI}$ >= 50	*Predicted* $\Delta_{CB\ HHI}$ >= 20
	(1)	(2)	(3)
	Underwriting Spread (bps.)	Underwriting Spread (bps.)	Underwriting Spread (bps.)
Treated × Post	1.45	3.76	3.33
	(0.55)	(1.41)	(1.44)
Observations	10,969	15,883	20,014
Year FE	Yes	Yes	Yes
Issuer × Cohort FE	Yes	Yes	Yes
Clustering	CSA & Year	CSA & Year	CSA & Year
Adjusted R-squared	0.521	0.535	0.547

Back

Main Findings: Placebo Tests

	Predicted Δ_{HHI} >= 50	*Predicted* Δ_{HHI} >= 20	*Predicted* Δ_{HHI} >= 10
	(1)	(2)	(3)
	Underwriting Spread (bps.)	Underwriting Spread (bps.)	Underwriting Spread (bps.)
Treated × Post	-5.80	-9.85	6.02
	(-0.49)	(-1.71)	(0.58)
Observations	129	1,358	3,972
Year FE	Yes	Yes	Yes
Issuer × Cohort FE	Yes	Yes	Yes
Clustering	CSA & Year	CSA & Year	CSA & Year
Adjusted R-squared	0.168	0.471	0.384

Back

Main Findings: Effects on Underwriting Spread

- "Modified True Interest Cost" accounts for
  - Underwriting spread
  - Bond yield at initial offering
  - Costs of three other kinds of issuer-paid services

	Predicted Δ_{HHI} >= 100	Market Share >= 5%	*Predicted* $\Delta_{Top\ 5\ Share}$ >= 5%
	(1)	(2)	(3)
	Modified TIC Spread (bps.)	Modified TIC Spread (bps.)	Modified TIC Spread (bps.)
Treated × Post	8.22*	10.41**	9.83**
	(1.70)	(2.09)	(2.31)
Observations	55,132	99,728	50,860
Year FE	Yes	Yes	Yes
Issuer × Cohort FE	Yes	Yes	Yes
Clustering	CSA & Year	CSA & Year	CSA & Year
Adjusted R-squared	0.410	0.390	0.407

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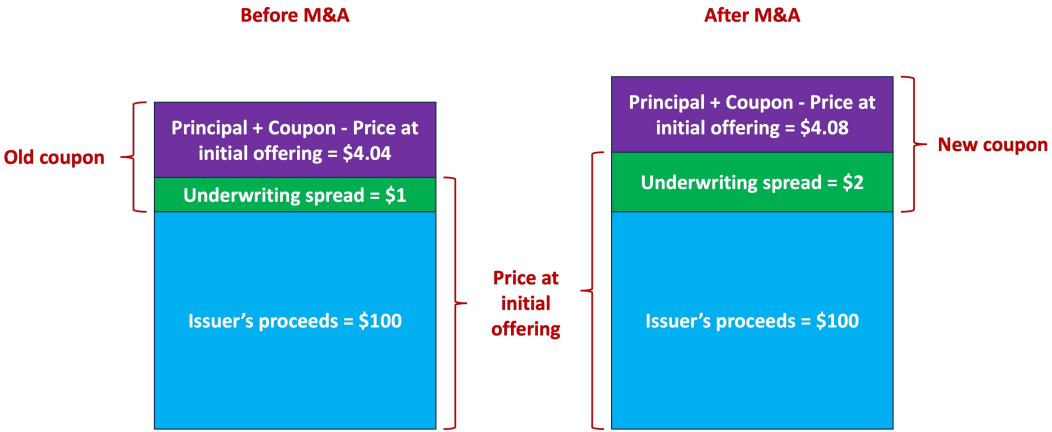
Local Government Finances



- "Interest paid" reflects coupon amount rather than yield at initial offering

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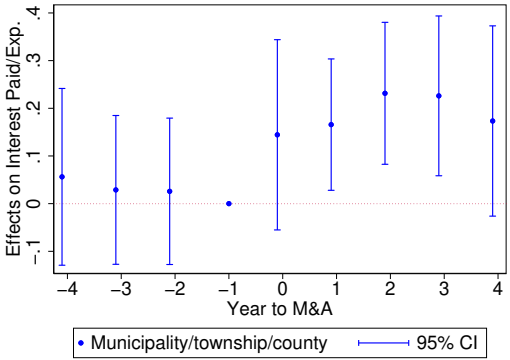
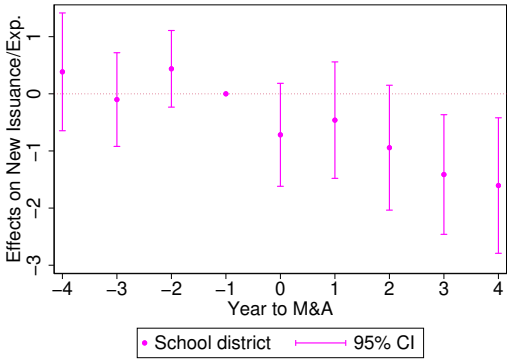
Local Government Finances

Panel A: Interest paid/exp.



Panel B: Issuance/exp.



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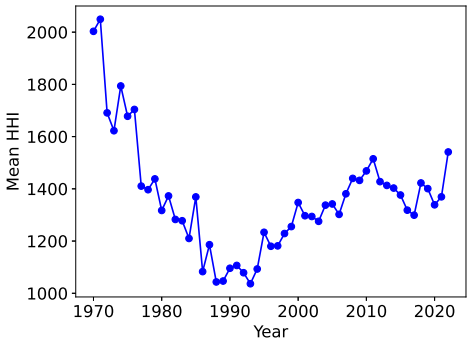
Discussion

- My findings echo research on market power in corporate security underwriting
  - Staffs in corporations might have more effective financial training
  - However, potential collusive benefits per deal is greater for corporate securities
  - I call for future research building on the contribution of Chen and Ritter (2000) and Manconi et al. (2019)
- My findings are not at odds with the secular trend in underwriting spread
  - In a counterfactual absent consolidation, the underwriting spread would be lower
- My findings are not at odds with internal efficiency gains from M&As

Local Government Finances

Panel A: HHI



Panel B: Underwriting spread

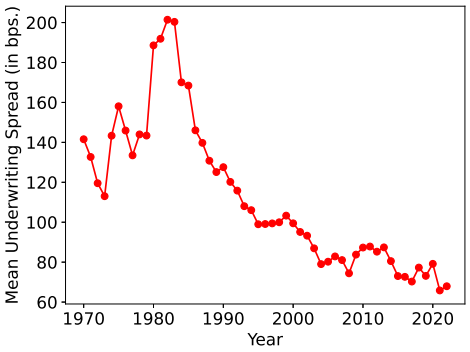


Figure: Time trends, 1970-2022