MARKUP OR MARKDOWN: NATIONAL UNDERWRITERS’ EXIT AND THE CHANGING LANDSCAPE OF MUNICIPAL FINANCE

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\textsuperscript{3}Arizona State University and University of Nicosia
\textsuperscript{4}Pennsylvania State University

July 13, 2024
Lots of Entry/Exit in Municipal Finance

Markets

Citigroup, UBS Exit Munis After Market’s Profits Plummet by 50%

■ New research shows underwriter profit drop from 2005 to 2023
■ Underwriters less able to raise investor markups, issuer costs

By Shruti Singh and Skylar Woodhouse
June 21, 2024 at 6:31 PM GMT+2
Municipal Bond Market:
- $3.8 trillion market for funding public infrastructure and services.
- Underwriters organize bond issuance and resell to investors.

Recent Changes:
- Exits of major underwriters (UBS, Citigroup) in 2023.
- Concerns about access to finance and costs for municipalities.

Possible Explanations:
- Rising “anti-ESG sentiment” by some state legislatures.
- Changes in market microstructure.
- Decline in profits for dealers, especially for large underwriters.
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Summary of the Paper

Data:

Model by Green (2007):
- Dealer-underwriters as Bertrand competitors.
- Price dispersion due to limited price transparency.

Key Findings:
- Increased institutionalization and transparency.
- Large decline in primary market markups.
  - Decline in markups for large underwriters.
  - Nearly 50% reduction in underwriter profits from markups.
- Decline in likelihood of encountering uninformed investors.
- Markups charged to uninformed investors have fallen.

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Theoretical Model
Theoretical Model Overview

Key Components from Green (2007)

- Strategic interaction among issuers, underwriters, and investors.
- Focus on profit function of municipal underwriters.
- Two intermediaries: underwriter-dealers.
- Compete in Bertrand manner for issuer’s business.
- Sell securities to retail and institutional investors.

Secondary Market:

- Retail investors: high valuation and search costs.
- Institutional investors: infinitely elastic demand at a lower price.
- Prioritization: most profitable retail trades first.
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**Profit Maximization**

**Underwriter-Dealer’s Profit:**
- Balance between aggressive bidding and capacity constraints
- Equilibrium: fully utilize retail capacity at institutional price

**Profit Equation:**

\[
\pi(b_i, Q_i) = (\bar{p} - v)q\mu + (v - b_i)Q_i
\]  

- \(b_i\): bid price
- \(Q_i\): allocated quantity
- \(\mu\): mass of retail customers
- \(q\): probability retail customer is uninformed
- \(\bar{p}\): reservation price for retail investors
- \(v\): institutional price
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Empirical Implications

Underwriting Spread and Markup:
- \((v - b_i)\): underwriting spread.
- \((\bar{p} - v)\): markup per bond in new issue market.
- Lower \(\mu\): fewer retail customers.
- Decreased profits for underwriters.

Impact on Profitability:
- Combined markups charged to uninformed customers.
- Spread earned on amount underwritten.
- Rise of separately-managed accounts and muni mutual funds.
- Decline in direct muni retail assets.
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Data Sources and Issuance Information

Data Sources:
- Mergent Municipal Fixed Income Securities database.
- Municipal Securities Rule Making Board (MSRB) trade data.
- SDC Platinum database and Bloomberg for underwriting spreads.

Issuance Information:
- Total issue size, offering date, issuer name.
- Type of offering (competitive vs. negotiated).
- Agents involved in the sale, bond characteristics (coupon rate, maturity, etc.).

Trade Data (MSRB):
- Timestamp, trade size, trade type, and trade price.
- Focus on customer buy trades within 14 days of offering date.

Markup Calculation:
- Difference between customer purchase price and offering price.
- Expressed as a percentage of the offering price.
- Trade-size-weighted average markup for each bond.
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Summary Statistics and Trends

Sample Period: 2005-2023

- 183,502 issues and 2,076,767 bonds.
- 12,389,917 new issue trades.
- 132,588 issues with underwriting spreads data.

Underwriting Activity:

- National underwriters account for nearly 50% of total volume.
- Large regional underwriters hold a 30% market share.
- Small regional + single-state underwriters account for 20%.
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<table>
<thead>
<tr>
<th>Filters</th>
<th># Issues</th>
<th># CUSIPs</th>
<th># Trades</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full Mergent sample</strong></td>
<td>509,163</td>
<td>4,596,452</td>
<td></td>
</tr>
<tr>
<td>Bonds issued since 1/1/2005 and not by US territories</td>
<td>309,283</td>
<td>2,672,141</td>
<td></td>
</tr>
<tr>
<td>0&lt;offering yield&lt;50% and 50&lt;offering price&lt;150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0&lt;coupon&lt;20% and offering size&gt;0</td>
<td>2,565,007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt-type='BND' and face value = 100</td>
<td>2,523,419</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed rate coupon</td>
<td>2,299,523</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purpose of issuance either NEW or REF</td>
<td>2,298,466</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remove bonds with offering date after maturity date</td>
<td>2,286,565</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underwriter information available</td>
<td>189,373</td>
<td>2,275,525</td>
<td></td>
</tr>
<tr>
<td><strong>Merged with MSRB trade data:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New issue trades ([-30;+14] of offering date)</td>
<td>183,502</td>
<td>2,076,767</td>
<td>18,306,168</td>
</tr>
<tr>
<td>Remove trades of less than $5,000 par</td>
<td></td>
<td>18306987</td>
<td></td>
</tr>
<tr>
<td>50 ≤ trade price ≤ 150</td>
<td>183,502</td>
<td>2,076,767</td>
<td>18,306,168</td>
</tr>
<tr>
<td><strong>Sample for new issue markup analysis:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer buy trades [0; +14] of offering date</td>
<td>183,502</td>
<td>2,076,767</td>
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</tr>
<tr>
<td><strong>Sample for underwriting spread analysis:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issues with underwriting spread data</td>
<td>132,588</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single-state</td>
<td>Small regional</td>
<td>Large regional</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>--------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td><strong>Panel A: Average annual underwriting activity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of states served</td>
<td>1.00</td>
<td>6.87</td>
<td>27.75</td>
</tr>
<tr>
<td>Number of deals per underwriter</td>
<td>6.67</td>
<td>53.48</td>
<td>254.92</td>
</tr>
<tr>
<td>Volume ($m) per underwriter</td>
<td>66</td>
<td>615</td>
<td>5,517</td>
</tr>
<tr>
<td>Number of underwriters</td>
<td>111</td>
<td>97</td>
<td>18</td>
</tr>
<tr>
<td>Market share (% deal count)</td>
<td>4.65</td>
<td>32.47</td>
<td>28.02</td>
</tr>
<tr>
<td>Market share (% volume)</td>
<td>2.29</td>
<td>18.56</td>
<td>30.16</td>
</tr>
<tr>
<td><strong>Panel B: Markups in the new issues market</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean markup (bps)</td>
<td>22.49</td>
<td>14.91</td>
<td>14.38</td>
</tr>
<tr>
<td>Median markup (bps)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>StDev markup (bps)</td>
<td>70.47</td>
<td>61.65</td>
<td>62.19</td>
</tr>
<tr>
<td>Average bond size ($m)</td>
<td>0.66</td>
<td>0.95</td>
<td>3.27</td>
</tr>
<tr>
<td>Number of bonds</td>
<td>100,026</td>
<td>598,503</td>
<td>520,128</td>
</tr>
<tr>
<td><strong>Panel C: Underwriting spreads</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean spreads (bps)</td>
<td>160.99</td>
<td>111.99</td>
<td>89.95</td>
</tr>
<tr>
<td>Median spreads (bps)</td>
<td>126.70</td>
<td>89.80</td>
<td>69.90</td>
</tr>
<tr>
<td>StDev spreads (bps)</td>
<td>130.47</td>
<td>88.88</td>
<td>91.26</td>
</tr>
<tr>
<td>Average issue size ($m)</td>
<td>7.00</td>
<td>10.04</td>
<td>37.99</td>
</tr>
<tr>
<td>Number of issues</td>
<td>11,428</td>
<td>63,398</td>
<td>49,106</td>
</tr>
</tbody>
</table>
Reduced-form Evidence
Introduction to Profitability Analysis

Key Trends:
- Dominance of national underwriters.
- Declining markups in new issue market.

Focus:
- Investigate whether underwriters’ profitability has declined over time.
- Control for changes in bond characteristics and macro environment.

Findings:
- Decline in profitability for national underwriters.
- Increased transparency reduces markups and spreads.
- Lower profitability linked to increased institutional investor participation.

Implications:
- Policy changes impact underwriter profitability.
- Market dynamics favor institutional investors over retail.
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Regression Model for Markups

Markup Regression Model:

\[ \text{Markup}_{i,t} = \delta' \text{Year}_t + \beta_1 \text{National}_i + \beta'_2 \text{National}_i \times \text{Year}_t + \beta_3 \ln \text{IssueSize}_i \]
\[ + \beta_4 \ln \text{BondSize}_i + \beta_5 \text{Maturity}_i + \beta_6 \text{Maturity}_i^2 + \beta_7 \text{Coupon}_i \]
\[ + \beta_8 \text{Premium}_i + \beta_9 \text{Callable}_i + \beta_{10} \text{Insurance}_i + \beta_{11} \text{AddCredit}_i \]
\[ + \beta_{12} \text{BankQlf}_i + \beta_{13} \text{OfferType}_i + \gamma'_1 \text{BondType}_i + \gamma'_2 \text{Rating}_i \]
\[ + \gamma'_3 \text{Proceeds}_i + \eta' \text{State}_i + \epsilon_{i,t} \]

(2)

Variables:

- \( \text{Markup}_{i,t} \): Average markup on customer buy trades.
- \( \text{National} \): Dummy for national underwriter
- Control variables: Bond characteristics, state fixed effects, etc.
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Identification Strategy

Year Fixed Effects:
- Coefficients ($\delta_t$) show average markups over years.
- Markups increased post-2008 financial crisis, then declined to 2005 levels, so we remove aggregate trends.

National Underwriters:
- $\beta_2$ estimates: Differential markups for national underwriters.
- National underwriters generally charge lower markups.
- Higher share of institutional trades contributes to lower markups.
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Markups (Unconditional Correlations)

Panel A: Average Bond-Level Markups

Panel B: Average Issue-Level Underwriting Spreads
Markups (Conditional Correlations)

Panel A: Year Fixed Effects

Panel B: National x Year Fixed Effects
Underwriting Spreads and Transparency

Underwriting Spread Model:

\[ \text{UndSpread}_{j,t} = \delta' \text{Year}_t + \beta_1 \text{National}_j + \beta_2' \text{National}_j \times \text{Year}_t + \beta_3 \text{LnIssueSize}_j \]
+ \beta_4 \text{Callable}_j + \beta_5 \text{Insurance}_j + \beta_6 \text{AddCredit}_j \\
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Transparency Shock:

- Significant reduction in markups post-policy change.
- National underwriters unable to compensate with higher spreads.
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\]

(3)

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<thead>
<tr>
<th></th>
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<th>GO Bonds</th>
<th>Issue $100m+</th>
<th>GO &amp; $100m+</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>0.012***</td>
<td>0.023***</td>
<td>0.028***</td>
<td>0.045***</td>
</tr>
<tr>
<td></td>
<td>(4.78)</td>
<td>(6.97)</td>
<td>(4.14)</td>
<td>(3.17)</td>
</tr>
<tr>
<td>National x Post Markup Rule</td>
<td>-0.041***</td>
<td>-0.055***</td>
<td>-0.037***</td>
<td>-0.041**</td>
</tr>
<tr>
<td></td>
<td>(-10.77)</td>
<td>(-10.33)</td>
<td>(-4.42)</td>
<td>(-2.55)</td>
</tr>
<tr>
<td>Bond Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Proceeds Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Ratings Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>State and Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.114</td>
<td>0.106</td>
<td>0.063</td>
<td>0.064</td>
</tr>
<tr>
<td>Observations</td>
<td>1,705,648</td>
<td>1,006,900</td>
<td>192,744</td>
<td>59,501</td>
</tr>
</tbody>
</table>

### Panel B: Underwriting Spreads %

<table>
<thead>
<tr>
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<th>GO Bonds</th>
<th>Issue $100m+</th>
<th>GO &amp; $100m+</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
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<td>0.032***</td>
<td>-0.021***</td>
<td>-0.034**</td>
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<td></td>
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<td>(6.67)</td>
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<td>National x Post Markup Rule</td>
<td>-0.047***</td>
<td>-0.083***</td>
<td>-0.010</td>
<td>-0.043</td>
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<td>(-6.92)</td>
<td>(-9.01)</td>
<td>(-0.52)</td>
<td>(-0.65)</td>
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<td>Bond Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Proceeds Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Ratings Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>State and Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Adjusted $R^2$</td>
<td>0.272</td>
<td>0.322</td>
<td>0.103</td>
<td>0.056</td>
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<td>105,002</td>
<td>56,250</td>
<td>11,006</td>
<td>3,062</td>
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</table>
SHARE OF INSTITUTIONAL PARTICIPATION
Underwriting Spreads

Panel A: Year Fixed Effects

Panel B: National x Year Fixed Effects
Refining the Green (2007) Model
Introduction to Declining Profitability

Model Ingredients:
- Increased investor sophistication reduces underwriter profitability.
- Institutional investors and greater market transparency.

Model Structure:
- Two classes of investors: informed and uninformed.
- Investor becomes informed if benefits exceed costs.

Equations:

\[ y^U_i = x_i \beta^U + \epsilon^U_i, \]
\[ y^I_i = x_i \beta^I + \epsilon^I_i. \]  \hspace{1cm} (4)

\[ y_i = \begin{cases} y^U_i & \text{if } z^*_i < 0 \\ y^I_i & \text{if } z^*_i \geq 0 \end{cases} \]  \hspace{1cm} (5)
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\[
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y_{i} &= \begin{cases} 
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y_{i}^{I} & \text{if } z_{i}^{*} \geq 0
\end{cases}
\end{align*}
\]
Time Series Results

Proportion of Uninformed Trades:
- Steady decrease from 55.5% in 2006-2007 to 25.2% in 2022-2023.

Markups for Uninformed Investors:
- Decrease from 152 bps in 2008-2009 to 96 bps in 2023.
- Increased proportion of informed traders.

National Underwriters:
- Less likely to trade with uninformed investors over time.
- Lower markups on uninformed trades compared to regional underwriters.

Tradeoff in Profit Sources:
- Markups vs. underwriting spreads.
- Decline in retail participation leads to lower markups.
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PROBABILITY OF UNINFORMED TRADE
MARKUPS ON UNINFORMED TRADES
NATIONAL UNDERWRITER AND $P(\text{Uninformed})$
National Underwriter and $\mu(\text{Uninformed})$
Nat’l Underwriter and Spreads (Uninformed)
## Money Left on the Table (MLOT)

<table>
<thead>
<tr>
<th>Year</th>
<th>Per Trade (bps)</th>
<th>Per Bond (bps of Par)</th>
<th>Per Issue (bps of Par)</th>
<th>Underwriting Spread (bps)</th>
<th>MLOT in % of Total Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>129.79</td>
<td>51.89</td>
<td>14.89</td>
<td>98.05</td>
<td>13.41</td>
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<td>2007</td>
<td>129.05</td>
<td>51.84</td>
<td>15.25</td>
<td>99.19</td>
<td>13.18</td>
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<td>2008</td>
<td>179.72</td>
<td>73.18</td>
<td>28.39</td>
<td>91.25</td>
<td>20.94</td>
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<tr>
<td>2009</td>
<td>178.66</td>
<td>63.14</td>
<td>22.73</td>
<td>97.86</td>
<td>16.24</td>
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<td>2010</td>
<td>173.38</td>
<td>67.61</td>
<td>20.47</td>
<td>95.53</td>
<td>15.45</td>
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<td>2011</td>
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<td>70.73</td>
<td>21.42</td>
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<td>2012</td>
<td>172.41</td>
<td>64.98</td>
<td>17.06</td>
<td>91.02</td>
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<td>2013</td>
<td>177.97</td>
<td>70.35</td>
<td>17.40</td>
<td>89.86</td>
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<tr>
<td>2014</td>
<td>160.39</td>
<td>63.60</td>
<td>15.91</td>
<td>86.42</td>
<td>13.81</td>
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<tr>
<td>2015</td>
<td>164.38</td>
<td>66.38</td>
<td>17.86</td>
<td>82.98</td>
<td>15.89</td>
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<tr>
<td>2016</td>
<td>155.98</td>
<td>62.89</td>
<td>15.61</td>
<td>82.09</td>
<td>14.15</td>
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<tr>
<td>2017</td>
<td>152.94</td>
<td>63.72</td>
<td>15.68</td>
<td>90.73</td>
<td>13.55</td>
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<td>2018</td>
<td>118.48</td>
<td>44.08</td>
<td>10.48</td>
<td>100.50</td>
<td>9.55</td>
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<tr>
<td>2019</td>
<td>117.15</td>
<td>49.15</td>
<td>12.04</td>
<td>91.59</td>
<td>11.02</td>
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<td>2020</td>
<td>113.50</td>
<td>52.98</td>
<td>10.20</td>
<td>94.01</td>
<td>8.80</td>
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<td>2021</td>
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<td>46.94</td>
<td>8.02</td>
<td>93.39</td>
<td>7.45</td>
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<td>2022</td>
<td>110.61</td>
<td>36.83</td>
<td>8.06</td>
<td>102.53</td>
<td>6.22</td>
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<tr>
<td>2023</td>
<td>112.51</td>
<td>30.70</td>
<td>3.06</td>
<td>102.58</td>
<td>2.59</td>
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<tr>
<td><strong>Average</strong></td>
<td><strong>157.64</strong></td>
<td><strong>59.13</strong></td>
<td><strong>14.79</strong></td>
<td><strong>93.11</strong></td>
<td><strong>12.37</strong></td>
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<td><strong>Observations</strong></td>
<td><strong>3,518,135</strong></td>
<td><strong>359,840</strong></td>
<td><strong>125,926</strong></td>
<td><strong>125,926</strong></td>
<td><strong>125,926</strong></td>
</tr>
</tbody>
</table>
DISCUSSION AND IMPLICATIONS
Decline in Underwriting Profits

Recent Exits:
- UBS exited in October 2023.
- Citigroup exited in December 2023.

Concerns:
- Impact on bond yields for municipal issuers.
- Increase in markups for municipal bond investors.

Competitive Market:
- Potential for other underwriters to fill the void.
- No expected increase in bond yields or markups.

Information Asymmetry:
- Importance of issuer-intermediary relationships.
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**Texas Senate Bills 13/19 as a Natural Experiment**

**Legislation Impact:**
- SB-13/19 prohibits contracts with financial companies boycotting Texas energy and firearms.
- Targeted banks temporarily exited Texas market.

**Study Design:**
- Use of Texas Senate Bills 13/19 as a shock.
- Comparison of Texas bonds with similar non-Texas bonds.
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CEM Approach:
- Non-parametric estimate of average treatment effects.
- Matching based on bond type, offering type, rating, maturity, and bond size.

Yield Differentials:
- No significant yield differential among similar bonds.
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- Slight evidence of increased markups.
- Distribution capability not perfectly substituted.
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## Non-Parametric Estimates on TX

### Panel A: Pre-Policy Period

<table>
<thead>
<tr>
<th></th>
<th>Off. Yields</th>
<th>Markups</th>
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<tr>
<td>TX</td>
<td>1.228</td>
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<td>Other States</td>
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<td></td>
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### Panel B: Policy Period

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### Panel C: After-Policy Period

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<td>TX</td>
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<td>0.118</td>
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<td>Other States</td>
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<td>Sample ATT</td>
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<td>(0.95)</td>
<td>(4.57)</td>
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<td>Observations</td>
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<td>16,980</td>
</tr>
</tbody>
</table>


**CONCLUSION**

**Comprehensive Analysis (2005-2023):**
- National underwriters dominate in quantity and value of deals.
- Declining markups for national underwriters over time.

**Key Findings:**
- Increased institutionalization and market transparency drive markup declines.
- Validation of Green (2007a,b) models.

**Implications:**
- Increased informed trading compresses underwriter markups.
- Underwriters need competitive pricing and operational efficiencies.

**Future Research Directions:**
- Track market dynamics and underwriter entry/exit.
- Investigate effects of market power concentration on smaller municipalities.
- Explore role of technology and digital platforms in democratizing market access.
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