Impact of Corporate Subsidies on Borrowing Costs of Local Governments

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Place-based Incentives

- Place-based incentives are quite common to reduce spatial disparity in the economy.

- Two Examples from Georgia:
  - **Kia auto assembly plant (2006):** $410 million subsidy for 2,500 jobs to attract $1.2 billion investment, $200 million in state and local tax breaks as well as cheap land, equipment grants, construction of a training facility and infrastructure improvements.
  - **NCR (2009):** $109 million subsidy for 2,000 jobs. The ATM vendor relocated its headquarters from Dayton, Ohio after 125 years. Ohio’s Gov. Ted Strickland cobbled together a last minute $31.1 million incentive package to retain the HQ. But, Georgia had offered roughly $60 million in tax breaks to swing the decision in its favor.
Place-based Incentives

- Amount in USD billion

- States: NY, LA, MI, WA, NJ, IN, OR, WI, TX, KY, MO, NC, TN, CT, IL, CA, AL, OH, NV, IA, MS, PA, MD, GA, MA, NM, CO, KS, AZ, ID, DE, AK, MT, SD, WY, HI
Views on Corporate Subsidies: Proponents vs Opponents

**Proponents**

- States and local governments compete to attract firms into their region
  - During 2005-2018: total non-federal incentives is $155 billion
  - Primary motivation is to boost the economy and create jobs
  - Various consulting firms help determine the multiplier effect. Moretti (2010) find that:
    - 1 job in Manufacturing → 1.6 jobs in nontradable sector
    - 1 job in Hi-Tech → 2.5 jobs in nontradable sector
Views on Corporate Subsidies: Proponents vs Opponents

Proponents

▶ States and local governments compete to attract firms into their region

▶ During 2005-2018: total non-federal incentives $\sim$ $155$ billion

▶ Primary motivation is to boost the economy and create jobs

▶ Various consulting firms help determine the multiplier effect. Moretti (2010) find that:

▶ 1 job in Manufacturing $\rightarrow$ 1.6 jobs in nontradable sector

▶ 1 job in Hi-Tech $\rightarrow$ 2.5 jobs in nontradable sector

Opponents

▶ Often these subsidies are given with no strings attached

▶ $\uparrow$ Demand for Public Services and Foregone Tax Revenue $\rightarrow$

▶ $\uparrow$ Municipal Debt, or

▶ $\downarrow$ Quality of Public Services, or

▶ $\uparrow$ Property Taxes
This Paper

- How do large corporate subsidies affect local governments’ borrowing costs and their investment in public services?

- Setting: *Municipal Bond Market*
  - Large $3.8$ trillion debt market, *households* account for nearly $1.76$ trillion– home bias (Babina et al. (2019))
  - Subsidy impact → long gestation → uncertainty about the level and timing of the proposed investment, the number of jobs and wages offered
This Paper

How do large corporate subsidies affect local governments’ borrowing costs and their investment in public services?

Setting: Municipal Bond Market

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Muni yields (secondary) reflect future expectations of cash-flow streams

\[ y: CF_1 + CF_2 + \ldots + CF_n \]
\[ y_{ps}: (\triangle R_{1s} - \triangle E_{1s}) + (\triangle R_{2s} - \triangle E_{2s}) + \ldots + (\triangle R_{ns} - \triangle E_{ns}) \]

Revenue\(_s\): property taxes, corporate taxes, individual income tax, higher fee-based civic amenities, multiplier effects

Expenditure\(_s\): highways, infrastructure, water-sewer, power, communication, subsidy

Hypothesis: \( NPV \geq 0 \) yields decrease
\( NPV < 0 \) yields increase
Preview: Main Results

- **Borrowing cost for winners** $\uparrow$ by about 8 bps
  - 2.85% $\uparrow$ in muni yields

- **Subsidy of $38$ bn for $131$ bn in investment** $\rightarrow$ $\sim$ **$2.8$ billion** additional cost (7.5%)

- **Mechanism:** lower debt capacity $\rightarrow$ cost of outstanding debt $\uparrow$
Agenda

▶ Identification

▶ Data

▶ Results
  ▶ Impact on borrowing cost
  ▶ Mechanism:
    ▶ Debt Capacity
    ▶ Expected Multiplier Effects
    ▶ Interaction of Debt Capacity and Multiplier Effect
    ▶ Bargaining Power: County vs Firm

▶ Implications: Local Economy
Identification

- Ideal experiment:
  \[ \text{BorrowingCost}^{\text{CountyA}} | \text{subsidy} > 0 \text{ vs } \text{BorrowingCost}^{\text{CountyA}} | \text{subsidy} = 0 \]

- Limitation: unobserved counterfactual

- Proposed solution: runner-up county (Greenstone et al. (2010))
  \[ \text{BorrowingCost}^{\text{Winner}} | \text{subsidy}^w > 0 \text{ vs } \text{BorrowingCost}^{\text{Loser}} | \text{subsidy}^l \geq 0 \]

\[
y_{i,c,d,t} = \alpha + \beta_0 * \text{Winner}_{i,c,d} * \text{Post}_{i,c,t} + \beta_1 * \text{Winner}_{i,c,d} + \beta_2 * \text{Post}_{i,c,t} \tag{1}
\]

\[
+ \text{BondControls}_{i,c,d,t} + \text{CountyControls}_{c,d,t} + \eta_d + \gamma_t + \epsilon_{i,c,d,t}
\]

**Figure:** Multiple Deals-Total 127 Events
Identification Challenge: Winner vs Loser Pre-trends

\[ y_{i,c,d,t} = \alpha + \beta_0 \times \text{Winner}_{i,c,d} \times \text{Post}_{i,c,t} + \beta_1 \times \text{Winner}_{i,c,d} + \beta_2 \times \text{Post}_{i,c,t} \]

\[ + \text{BondControls}_{i,c,d,t} + \text{CountyControls}_{c,d,t} + \eta_d + \gamma_t + \epsilon_{i,c,d,t} \]
Data

- Sample period: 2005-2018
- Data on Corporate subsides from Good Jobs First Subsidy Tracker
  - Information on govt. (federal, state, local) incentives to firms
  - Focus on subsidy deals over $50 million
  - 127 (county-level) deal pairs; Subsidy $38 bn; Investment $131 bn
  - Includes firm, year, winning state, subsidy amount → hand-collection
- Data on municipal bonds from two sources:
  - Bond level information from FTSE Russell Muni Data
  - Includes: bond coupon, maturity, amount, call-date, rating
  - Supplements: Bloomberg (issuer name) and EMMA (issuer type)
  - Transaction level data from MSRB
  - Includes: volume traded ($), date, yield(%), buy/sell indicator
- Other economic data:
  - Census Survey of Local Government Finances: county/state level fiscal metrics
  - Internal Revenue Services: county level personal income
  - Annual Survey of Public Employment: employment
  - Elementary and Secondary Information System
Results: Gradual increasing in borrowing cost

\[ y_{i,d,t} = \alpha + \beta_0 \times Winner_{i,d} \times Post_{i,t} + \beta_1 \times Winner_{i,d} + \beta_2 \times Post_{i,t} + BondControls_{i,d,t} + CountyControls_{c,d,t} + \eta_d + \gamma_t + \epsilon_{i,d,t} \]

*Gradual increase*: From 5 bps to 12 bps over 6 to 60 months after deal
Mechanism: Debt Capacity based on County Financials

- Local governments face a trade-off in using targeted business incentives:
  - Foregoing future tax revenue v/s anticipated multiplier benefit (Greenstone & Moretti 2004)
- Demand for civic service $\uparrow \rightarrow$ Municipal debt $\uparrow$
- Underlying debt capacity of the county $\rightarrow$ cost of borrowing
- Whereas, multiplier effect from subsidized plant may boost the county
- Measures for **county level** debt capacity:
  - Based on interest expenditure
  - Based on county credit ratings
  - Based on tax privilege (Babina et al. 2019)
- Measures for expected multiplier effects:
  - Knowledge spillover using firm patents
  - National industry-specific jobs multiplier
- Finally, interaction of county debt capacity & expected multiplier effects
Mechanism: Debt Capacity based on interest expenditure

- Debt capacity indicators using county level fiscal metrics
- Higher value of interest → lower debt capacity → higher impact

Similar results with credit ratings: lower rating → higher impact
Mechanism: Debt Capacity based on tax privilege

- Tax privilege = Highest income tax\_OtherState - Highest income tax\_HomeState
- Tax privilege gap = Tax Privilege\_Winner - Tax Privilege\_Loser
- *Low Tax Privilege → Lower supply of capital → Higher impact*

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>After-tax Yield Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tax Privilege</td>
</tr>
<tr>
<td></td>
<td>All bonds</td>
</tr>
<tr>
<td>Winner x Post</td>
<td></td>
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<tr>
<td>Low</td>
<td>21.61***</td>
</tr>
<tr>
<td></td>
<td>[0.00]</td>
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<tr>
<td>Medium</td>
<td>4.89***</td>
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<tr>
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<td>[0.00]</td>
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<td>Low vs High</td>
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<td>P-value</td>
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<tr>
<td>Deal FE</td>
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</tr>
<tr>
<td>Month-Year FE</td>
<td>✓</td>
</tr>
<tr>
<td>County Controls</td>
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<tr>
<td>Group-Month FE</td>
<td>✓</td>
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<tr>
<td>Adj.-R(^2)</td>
<td>0.539</td>
</tr>
<tr>
<td>Obs.</td>
<td>2,440,871</td>
</tr>
</tbody>
</table>
Mechanism: Expected multiplier effects based on innovation

- Multiplier effect due to innovation using value of firm's patents (Kogan et al. 2017)
- Lower value of patents → lower multiplier effect → higher impact

Similar result using industry level jobs multiplier → lower multiplier effect → higher impact
Mechanism: Interaction of county debt capacity & multiplier effects

Find similar results using industry-level jobs multiplier
Bargaining Power: County vs Firm

- Interaction between firm and county
  
  - High $\frac{\text{Firm Asset}}{\text{County Revenue}}$ → lower bargaining power → higher impact
  
  - High $\frac{\text{Subsidy}}{\text{County Surplus}}$ → lower bargaining power → higher impact

![Graph showing yield with different levels of firm asset to revenue and subsidy to surplus, indicating differences in bargaining power and impact.](image-url)
Implications: Local Economy

▶ Primary market bond issuance increases by about 5 times for winners with high debt capacity
▶ Meanwhile, local property tax revenue per capita increases for winners with low debt capacity
▶ But this increase is without a commensurate rise in house price index among winners
▶ Offering yields in the primary market $\uparrow$ by 4.7 bps
▶ Not much change in expenditure on local public services
Conclusion

- Additional costs borne by local governments beyond corporate subsidies ($38 billion) to attract $131 billion of investments
- Increased borrowing cost on debt $\sim 2.8$ billion
- Counties with a lower debt capacity or a lower bargaining power relative to the firms experience higher borrowing costs
- Counties winning deals with a higher multiplier effect experience lower borrowing costs.


# Data Collection

## Table: Comparison of Datasets

### Data from Good Jobs First

<table>
<thead>
<tr>
<th>Company</th>
<th>Year</th>
<th>Date</th>
<th>Subsidy ($ mil)</th>
<th>Investment ($ mil)</th>
<th>Winner State</th>
<th>Winner County</th>
<th>Loser State</th>
<th>Loser County</th>
<th>Jobs</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baxter International</td>
<td>2012</td>
<td>4/19/2012</td>
<td>211</td>
<td>1000</td>
<td>GA</td>
<td>???</td>
<td>???</td>
<td>???</td>
<td>1500</td>
<td>New</td>
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<tr>
<td>Foxconn</td>
<td>2017</td>
<td>7/26/2017</td>
<td>4792</td>
<td>10000</td>
<td>WI</td>
<td>Racine</td>
<td>MI</td>
<td>Wayne</td>
<td>13000</td>
<td>New</td>
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<tr>
<td>Vertex Pharmaceuticals</td>
<td>2011</td>
<td>9/15/2011</td>
<td>72</td>
<td>2500</td>
<td>MA</td>
<td>???</td>
<td>MA</td>
<td>Middlesex</td>
<td>500</td>
<td>Relocation</td>
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</table>

### Completed Dataset

<table>
<thead>
<tr>
<th>Company</th>
<th>Year</th>
<th>Date</th>
<th>Subsidy ($ mil)</th>
<th>Investment ($ mil)</th>
<th>Winner State</th>
<th>Winner County</th>
<th>Loser State</th>
<th>Loser County</th>
<th>Jobs</th>
<th>Purpose</th>
</tr>
</thead>
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<tr>
<td>Baxter International</td>
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<td>GA</td>
<td>Newton</td>
<td>NC</td>
<td>Durham</td>
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<tr>
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<td>7/26/2017</td>
<td>4792</td>
<td>10000</td>
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<tr>
<td>Vertex Pharmaceuticals</td>
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<td>72</td>
<td>2500</td>
<td>MA</td>
<td>Suffolk</td>
<td>MA</td>
<td>Middlesex</td>
<td>500</td>
<td>Relocation</td>
</tr>
</tbody>
</table>

▸ ?? denotes some information may be available

Back
### Sample Generation

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of CUSIPs</th>
<th>Number of Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSRB CUSIPs (Customer Purchase) (2005-2019)</td>
<td>2,499,014</td>
<td>59,890,438</td>
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<tr>
<td>Drop if maturity (days) &gt; 36,000 or &lt; 0 or missing</td>
<td>2,496,350</td>
<td>59,877,834</td>
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<tr>
<td>Drop if missing coupon or maturity</td>
<td>2,434,644</td>
<td>56,312,228</td>
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<tr>
<td>Drop if USD price &lt; 5 0 or &gt; 150</td>
<td>2,427,575</td>
<td>55,680,832</td>
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<tr>
<td>Drop primary market trades</td>
<td>1,711,814</td>
<td>44,073,138</td>
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<tr>
<td>Drop trades within 15 days after issuance</td>
<td>1,663,827</td>
<td>41,754,985</td>
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<tr>
<td>Drop trades with less than 1 year to maturity</td>
<td>1,556,152</td>
<td>40,151,034</td>
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<td>Drop if yield &lt; 0 or &gt; 50%</td>
<td>1,543,510</td>
<td>39,394,883</td>
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<td>Drop if &lt; 10 transactions</td>
<td>572,392</td>
<td>36,154,927</td>
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<td>Match CUSIPs from MSRB txns to MBSD features</td>
<td>572,285</td>
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<td>Matching to FIPS using Bloomberg</td>
<td>564,517</td>
<td></td>
</tr>
<tr>
<td>Matching to corporate subsidy locations by FIPS</td>
<td>218,377</td>
<td>14,358,884</td>
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<tr>
<td>Aggregating to CUSIP-month txns and plugging tax rates</td>
<td>215,184</td>
<td>4,465,916</td>
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<tr>
<td>Creating event panel for 3 years using local bonds</td>
<td>123,187</td>
<td>2,612,055</td>
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<tr>
<td>- Winner</td>
<td>60,579</td>
<td>872,016</td>
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<tr>
<td>- Loser</td>
<td>82,118</td>
<td>1,740,039</td>
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</tbody>
</table>