Tax Competition Among U.S. States for Mobile
Business Capital:
Racing To The Bottom or Riding On A Seesaw?

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*The views expressed in this paper are those of the authors should not be attributed to the Federal Reserve Bank of San Francisco or the Federal Reserve System.*
Conventional Wisdom:

U.S. states are engaged in a “race to the bottom” in capital tax policy, as states compete for their share of a mobile capital tax base

We argue conventional wisdom is wrong:

– misled by casual observation and previous empirics
Why do we care?

• Concern tax competition leads to inefficiently low taxes and public services

• Important public policy debate among states
States’ tax rates on business capital have fallen over time (*aggregate time effects*)
Average State Tax Parameters
1969-2006

Corporate Income Tax Rate (Top Marginal) (left axis)

Capital's Apportionment Weight (right axis)

Investment Tax Credit Rate (left axis)
States’ tax rates on business capital appear to be positively spatially correlated (spatially correlated fixed effects)
Capital Apportionment Wgt. (2006)
Previous Empirical Studies

Corporate Tax Policy
- Devereux, Lockwood, & Redoano (2008); Rork & Wagner (2008); Altschuler & Goodspeed (2006); Hayashi & Boadway (2001)

Non-Corporate Fiscal Policy
- Case, Rosen, & Hines (1993); Besley & Case (1995); Egger, Pfaffermayr, & Winner (2005a, b); Heyndels & Vuchelen (1998); Bruecker & Savaadra (2001); Revelli (2002)

• All find positive-sloping reaction functions
What’s Missing from Casual Observation and Previous Empirics?

• **Aggregate Macroeconomic Factors**
  – Downward trends could be due to aggregate/common factors

• **Time Lags**
  – Reaction function arises from capital mobility
  – Mobility of Capital likely to be gradual
  – Implies long-run response of \( \tau_i \) to \( \tau_{-i} \) may take several years
What We Do

• Theoretical Model
  – Concise Strategic Tax Competition model with ambiguous reaction function slope

• Econometric Techniques
  – Control for aggregate effects and delayed response

• Panel Data
  – 2 separate business tax policies
Outline

• Motivation and background
• Key results of strategic tax competition model
• Empirical model
• Empirical results
• Conclusion
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Strategic Tax Competition Model

Result 1: Reaction slope can be positive or negative

Intuition:

- Suppose **out-of-state tax rate rises**
  - → capital flows into state
  - → income \( y = f(k) \) and tax revenues rise
  - → if preferences for private goods relative to public goods increasing in \( y \)
    - → **use windfall to finance tax cuts**
      (can increase private consumption without sacrificing public services)
Strategic Tax Competition Model
Result 2: Size of reaction slope increasing in mobility

Implication:

• *Corporate income tax*, which targets existing in-place (“old”) capital, should have **smaller** reaction slope

• *Investment tax credit*, which targets not-yet-in-place (“new”) capital, should have **larger** reaction slope
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Empirical Model

• Regress in-state tax policy on out-of-state tax policy, controlling for
  – simultaneous setting of in-state and out-of-state policies
    • use “instrumental variables” – predict out-of-state tax policy based on out-of-state political variables (like how Republican the state is)
  – aggregate factors
    • allow for shifts in tax policy that are common to all states (e.g., nationwide downward trend)
  – state permanent characteristics
    • allow for fact that some states ALWAYS prefer lower or higher tax rates
  – lagged out-of-state tax policy
    • allow for gradual response to out-of-state tax policy
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Empirical Results

**\( \tau = \text{Investment Tax Credit Rate} \)**

Estimated Slope of Reaction Function \( \left( \sum_{k=0}^{\infty} \alpha_k \right) \)

<table>
<thead>
<tr>
<th></th>
<th># of Lags of ( \tau_{i,t}^{#} ) included:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
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<tr>
<td>Common Correlated Effects Pooled (CCEP)</td>
<td>1.301</td>
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<tr>
<td></td>
<td>(0.059)</td>
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<tr>
<td>Time Fixed Effects (TFE)</td>
<td>7.534</td>
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<tr>
<td></td>
<td>(2.770)</td>
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<tr>
<td>No Time Fixed Effects</td>
<td>1.670</td>
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<td>(0.180)</td>
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Empirical Results

τ = Corporate Income Tax Rate

Estimated Slope of Reaction Function \( \sum_{k=0}^{\infty} \alpha_k \)

<table>
<thead>
<tr>
<th># of Lags of τ(_{i,t}^# ) included:</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>Common Correlated Effects Pooled (CCEP)</td>
<td>0.512 (0.206)</td>
<td>-0.004 (0.182)</td>
<td>-0.138 (0.210)</td>
<td>-0.077 (0.192)</td>
<td>-0.048 (0.202)</td>
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<tr>
<td>Time Fixed Effects (TFE)</td>
<td>1.418 (0.173)</td>
<td>0.760 (0.809)</td>
<td>0.778 (0.832)</td>
<td>0.781 (0.817)</td>
<td>0.817 (0.818)</td>
</tr>
<tr>
<td>No Time Fixed Effects</td>
<td>1.030 (0.133)</td>
<td>0.767 (0.163)</td>
<td>0.689 (0.165)</td>
<td>0.646 (0.170)</td>
<td>0.566 (0.177)</td>
</tr>
</tbody>
</table>
### Empirical Results

**Extension: Capital Apportionment Weight**

\[ \tau = \text{weight on capital (property) in state’s formula for apportioning a company’s national income to the state} \]

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<th># of Lags of ( \tau_{i,t} ) included</th>
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<td>(0.075)</td>
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<td>Time Fixed Effects (TFE)</td>
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<td>(1.239)</td>
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<td>No Time Fixed Effects</td>
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<td></td>
<td>0.942</td>
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<td>(0.209)</td>
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</tbody>
</table>
Example: New York

ITC net of year effects

Year


S[ITC] net of year effects

-0.003 -0.002 -0.001 0 0.001

-0.02 0.04 0.06
Conclusion

• Positive comovements in state capital tax policy due to **common shocks**,  
  – NOT positive-sloping tax reaction function  
  – Common shocks could be global factors like globalization (competition from low-cost countries) and foreign tax rates.

• True reaction slope is near zero for CIT (old capital...less mobile)  
• True reaction slope is positive for ITC (new capital...mobile)