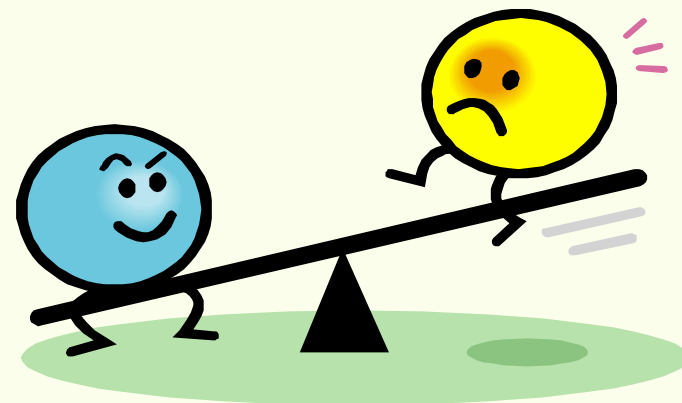
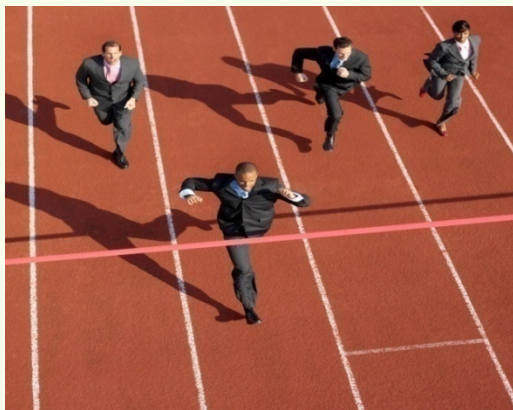


# Tax Competition Among U.S. States for Mobile Business Capital: Racing To The Bottom or Riding On A Seesaw?



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(based on joint research with Robert Chirinko, University  
of Illinois at Chicago)

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## *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?

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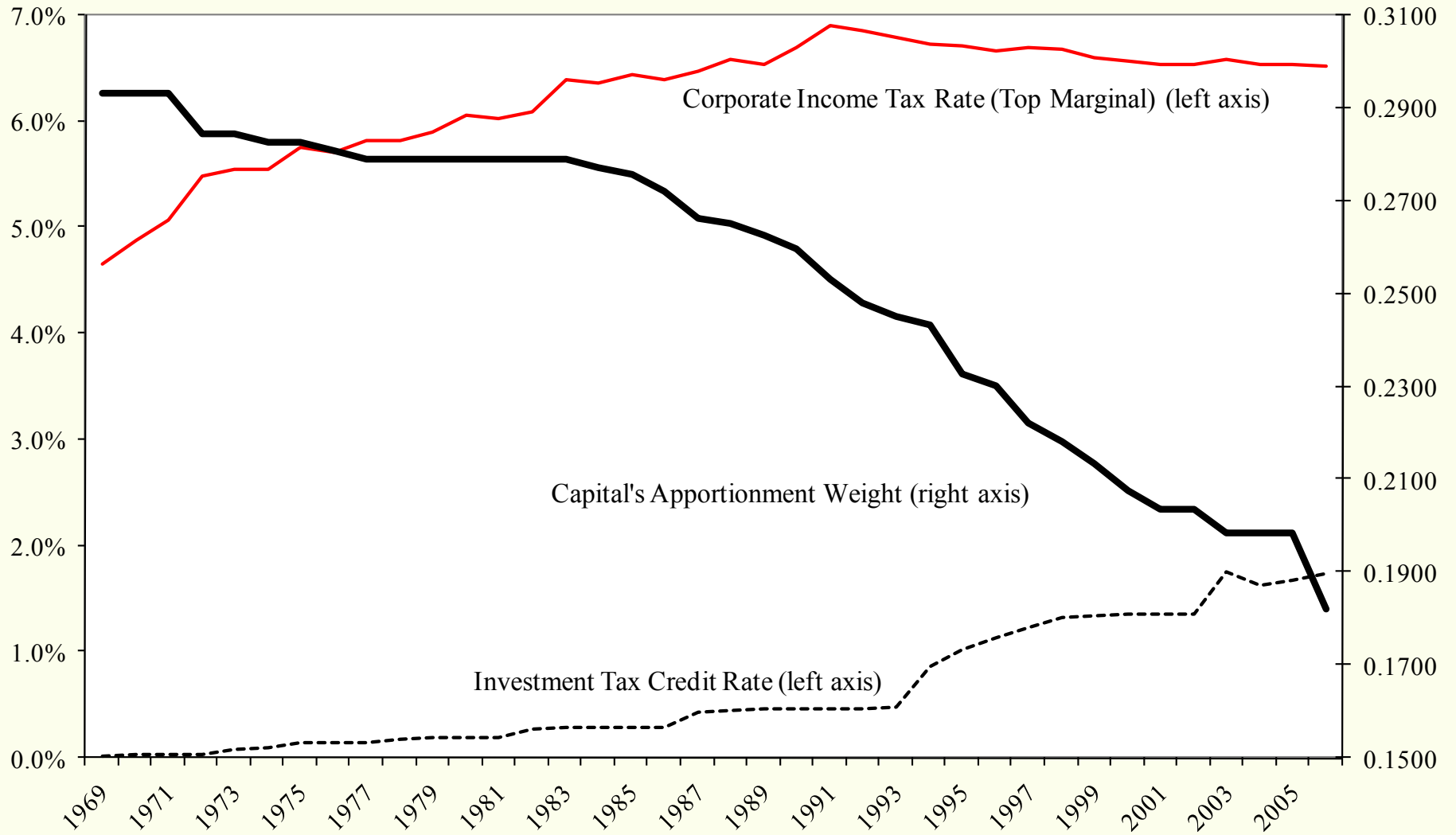
- Concern tax competition leads to **inefficiently low** taxes and public services
- Important public policy debate among states

# Casual Observation (1 of 2)

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States' tax rates on business capital have fallen over time (*aggregate time effects*)

### Average State Tax Parameters 1969-2006

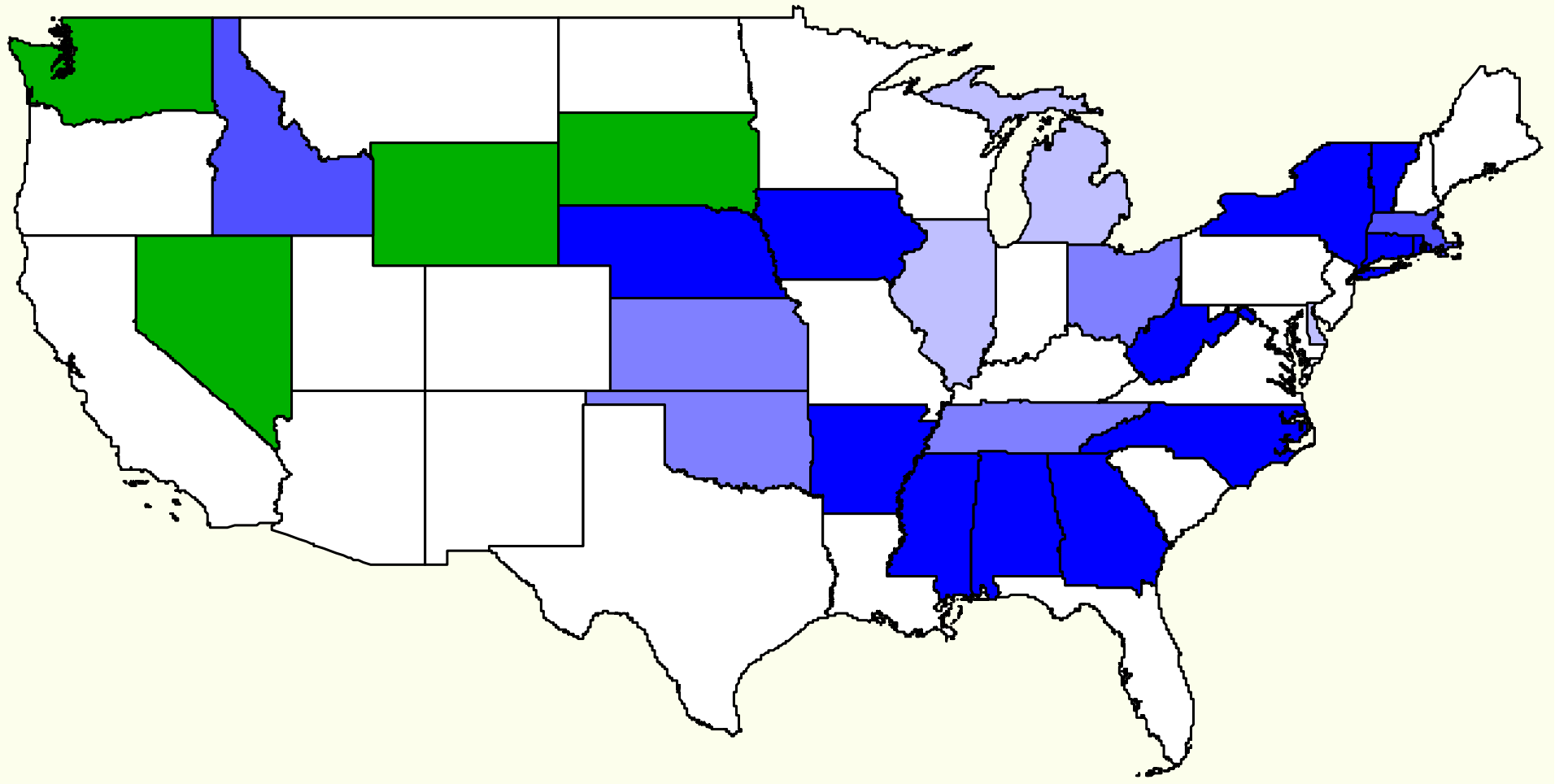


## Casual Observation (2 of 2)

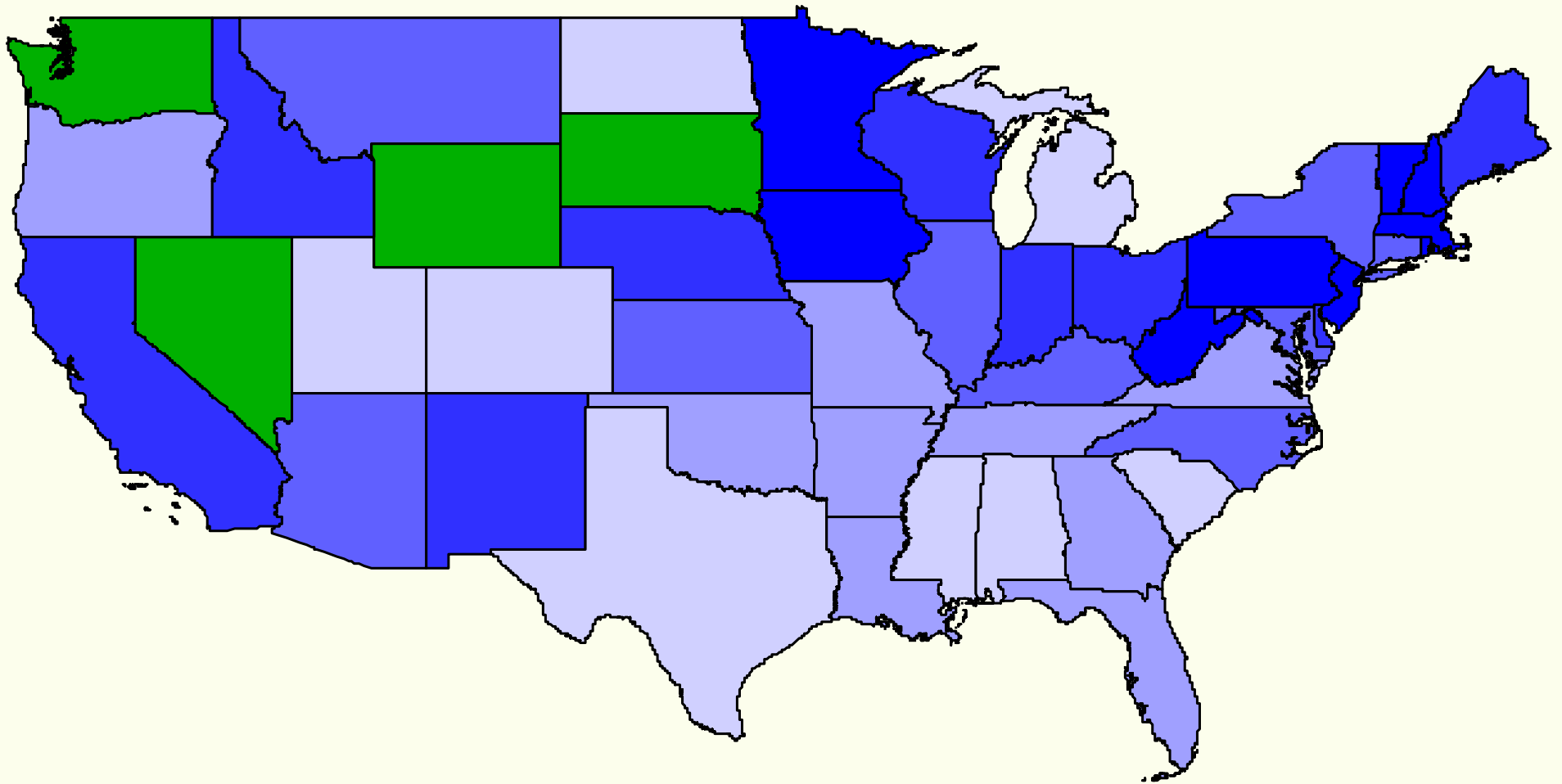
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States' tax rates on business capital appear to be **positively spatially correlated**  
(*spatially correlated fixed effects*)

# Investment Tax Credit Rates (2006)

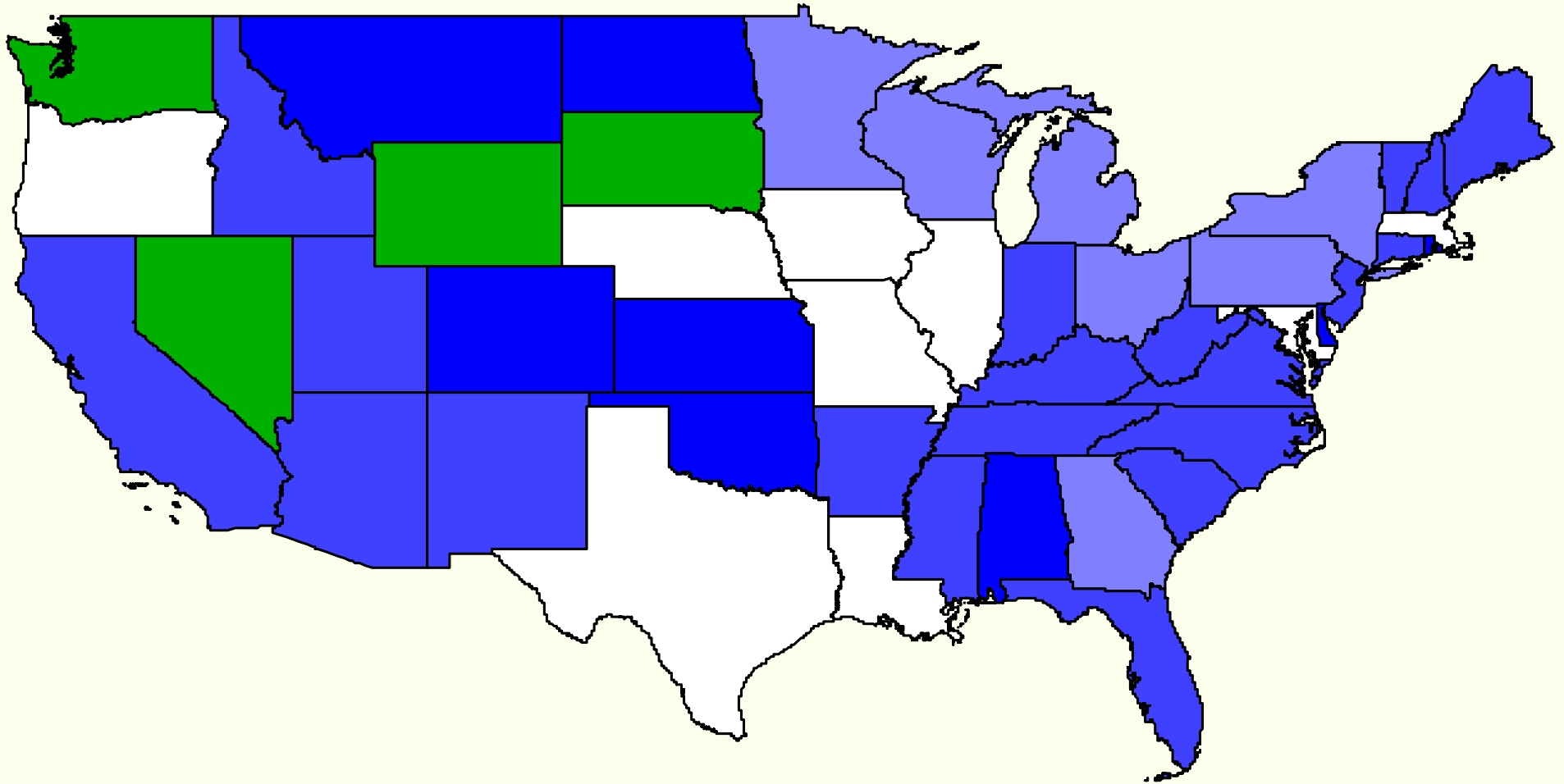


# Corp. Income Tax Rates (2006)





# Capital Apportionment Wgt. (2006)



# Previous Empirical Studies

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## *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?

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- **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

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- **Theoretical Model**
  - Concise Strategic Tax Competition model with ambiguous reaction function slope
- **Econometric Techniques**
  - Control for aggregate effects and delayed response
- **Panel Data**
  - 48 contiguous U.S. states from 1965 – 2006
  - 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

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## 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

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## 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



# Outline

- Motivation and background
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# Empirical Model

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- 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

# Outline

- Motivation and background
- Key results of strategic tax competition model
- Empirical model
- **Empirical results**
- Conclusion

# Empirical Results

$\tau$  = Investment Tax Credit Rate

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

	# of Lags of $\tau_{i,t}^{\#}$ included:				
	0	1	2	3	4
Common Correlated Effects Pooled (CCEP)	<b>1.301</b> (0.059)	<b>-0.577</b> (0.146)	<b>-0.686</b> (0.159)	<b>-0.588</b> (0.170)	<b>-0.596</b> (0.175)
Time Fixed Effects (TFE)	<b>7.534</b> (2.770)	<b>-1.425</b> (0.312)	<b>-1.516</b> (0.370)	<b>-1.584</b> (0.375)	<b>-1.749</b> (0.436)
No Time Fixed Effects	<b>1.670</b> (0.180)	<b>0.308</b> (0.115)	<b>0.297</b> (0.120)	<b>0.285</b> (0.128)	<b>0.272</b> (0.139)

# Empirical Results

$\tau$  = Corporate Income Tax Rate

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

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

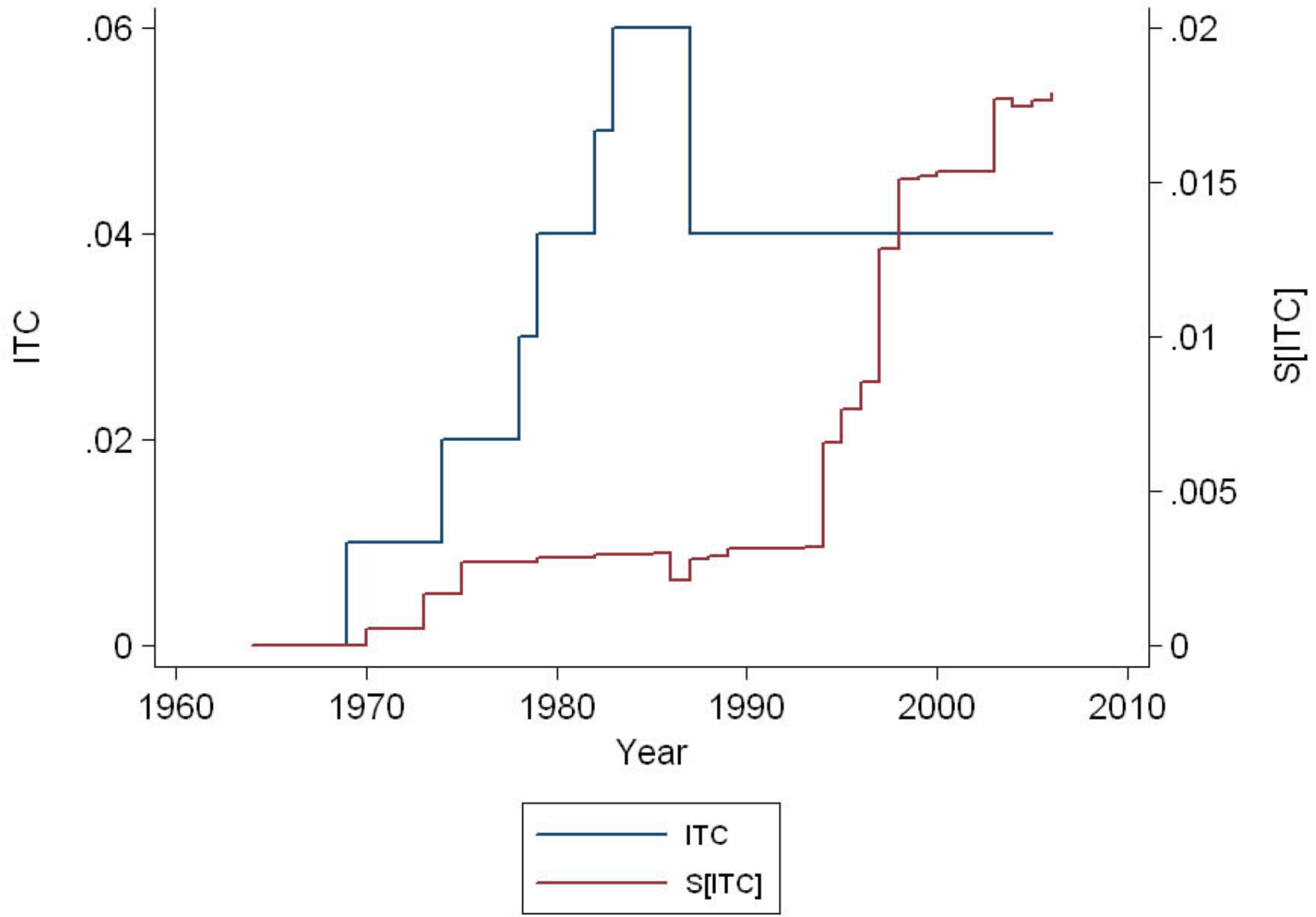
# Empirical Results

## Extension: Capital Apportionment Weight

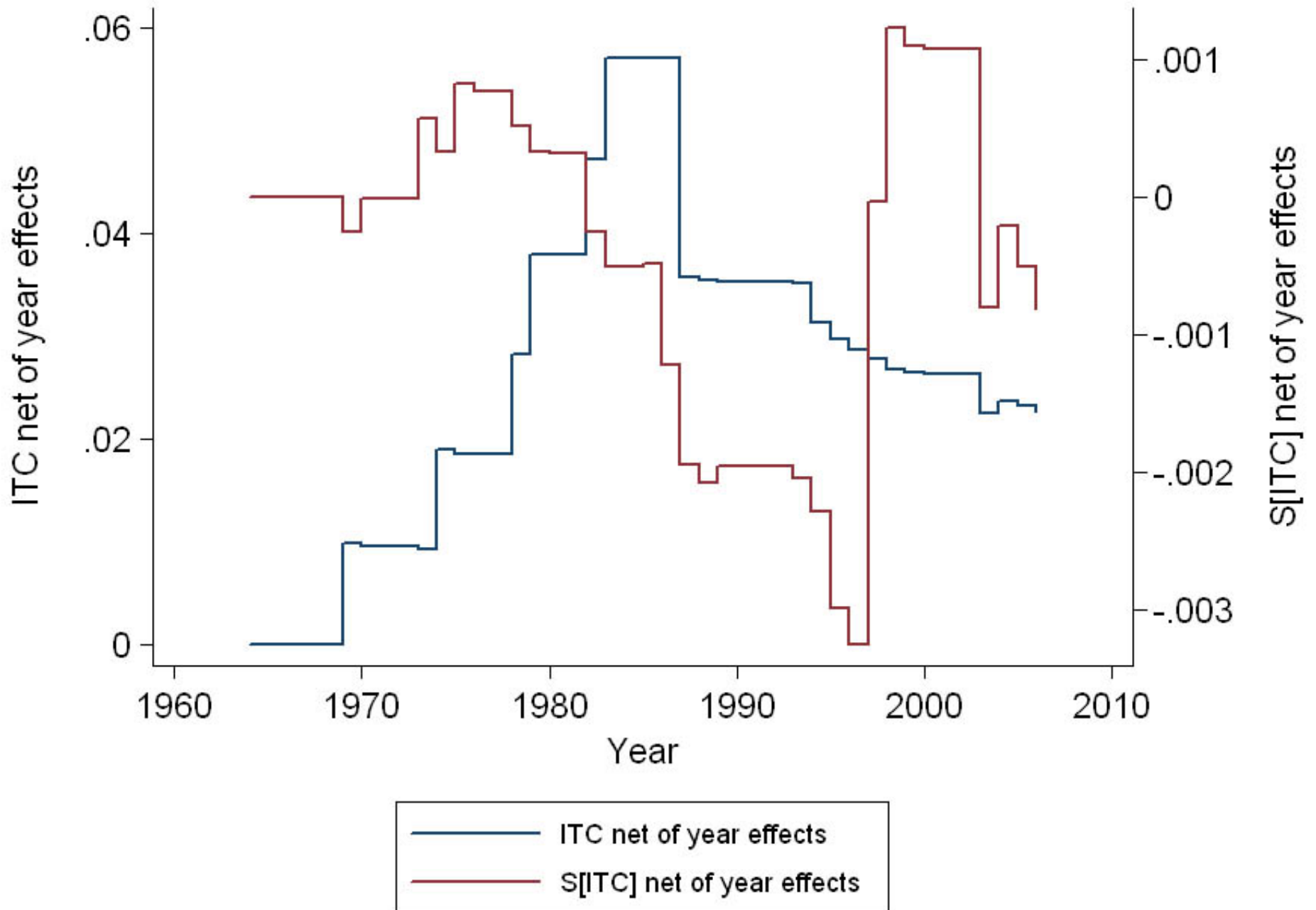
$\tau$  = weight on capital (property) in state's formula for apportioning a company's national income to the state

	# of Lags of $\tau_{i,t}^{\#}$ included				
	0	1	2	3	4
Common Correlated Effects Pooled (CCEP)	<b>1.904</b> (0.075)	<b>-2.045</b> (0.064)	<b>-2.126</b> (0.067)	<b>-2.209</b> (0.064)	<b>-2.333</b> (0.063)
Time Fixed Effects (TFE)	<b>2.089</b> (1.239)	<b>-3.718</b> (0.250)	<b>-3.825</b> (0.263)	<b>-3.955</b> (0.294)	<b>-4.131</b> (0.282)
No Time Fixed Effects	<b>0.942</b> (0.209)	<b>0.297</b> (0.077)	<b>0.317</b> (0.077)	<b>0.337</b> (0.074)	<b>0.359</b> (0.071)

# Example: New York



# Example: New York





# Conclusion

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- 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)