

# **Bidding for Firms: Subsidy Competition in the U.S.**

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National Tax Association  
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The New York Times

*Amazon Plans Second Headquarters,  
Opening a Bidding War Among Cities*

Sept. 7, 2017

# Amazon's HQ2 Spectacle Isn't Just Shameful—It Should Be Illegal

Each year, local governments spend nearly \$100 billion to move headquarters and factories between states. It's a wasteful exercise that requires a national solution.

NOV 12, 2018

- Transfer rents from state to firms, no national gain
- Tax competition literature emphasizes race to the bottom
  - Underprovision of public goods (Oates 1972, Wilson 1986)

## Subsidy competition has potential to improve allocation of firms

Subsidy competition maximizes firm profit + state “value” for firm

- State compensates firm for locating where they create more value
- Can increase welfare in presence of heterogeneous externalities, labor market frictions (Black & Hoyt 1989, Bartik 1991, Garcia-Milá & McGuire 2001, Glaeser 2001)
- Depends on how states value firms, and extent of heterogeneity

## What are the welfare implications of subsidy competition?

### 1. How do state governments value firms?

- How much are they “worth” to the state, and;
- Which factors affect that valuation (e.g. jobs v. economy v. politics)?

### 2. How important are subsidies to firm locations?

- How would locations change without subsidies?

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*Why don't we already know?*

- Sparse data on incentive spending and subsidy-deals
- Subsidy is an equilibrium outcome

## What I do

1. Hand-collect new data on state incentive spending and subsidy deals
  - 511 subsidy deals, average \$160M, 1,500 jobs (2002-2017)
2. Develop and estimate a model of states competing for firms
  - Allows for welfare gain: states have heterogeneous, private values
  - Firms choose location based on subsidy *and* state characteristics
  - Recover primitives of interest, e.g. distribution of states' value for firms
3. Use model to evaluate counterfactual subsidy regime
  - Counterfactual Subsidy Ban: No subsidies or incentive spending

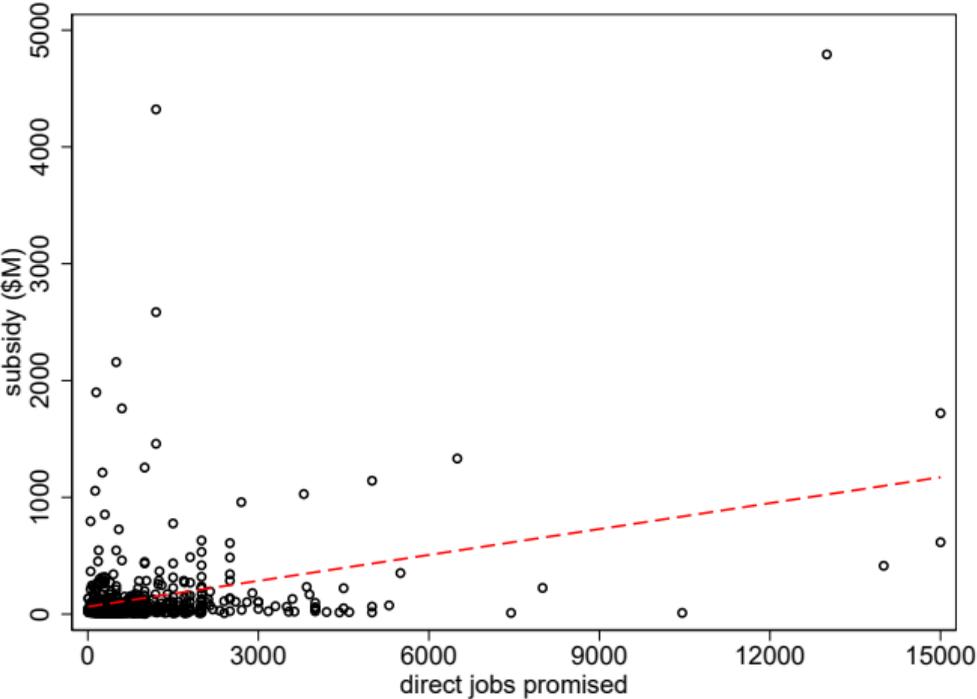
**A very quick look at the data**

## Job creation is stated objective of subsidy-giving

*Whether in Baltimore City, Prince Georges County or Montgomery County, we need to make it happen. **Its jobs, jobs, jobs and more jobs.*** – MD State Senator

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## Establishment characteristics do not explain subsidy size

	Outcome : Subsidy Size (\$ M)					
New Jobs Promised (1,000)	59.16*** (15.29)	71.34 (58.45)	72.79*** (24.33)	57.47*** (17.73)	2.03 (81.75)	-16.82 (56.87)
Med. Industry Wage (\$1,000)		0.95 (1.84)			-1.22 (2.38)	-1.91 (1.66)
Jobs Promise $\times$ Wage		-0.20 (0.89)			1.33 (1.37)	1.90** (0.94)
Jobs Multiplier			12.81 (7.79)		8.93 (9.08)	17.81*** (6.26)
Jobs Promise $\times$ Multiplier			-2.81 (4.24)		-6.02 (4.97)	-7.14** (3.53)
Investment Planned (\$ B)				68.10*** (12.34)	68.31*** (12.56)	47.74*** (9.27)
Observations	511	511	511	423	423	418
R-squared	0.02	0.02	0.02	0.09	0.09	0.65
Year FE	X	X	X	X	X	X
State FE						X

# A model of subsidy competition

# How to model the competition?

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1. Firm cares about state characteristics and subsidy offer

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By [THE ASSOCIATED PRESS](#) August 1, 2017

Scoring

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### **General Electric Company (“GE”)**

Nine states including North Carolina were considered for the project. South Carolina’s incentive package was valued at \$14.8 million while Virginia’s totaled \$11 million.

Additionally, South Carolina had several local incentive packages worth over \$30 million over a 10-year period.

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*Calendar Year 2013 Legislative Report*

17

4. Information structure: Many firm characteristics public

- One states’ anticipated indirect jobs does not change  $v$  of others

Private Value

## Auction Example: Two States Bid for Firm A

**State 1**

$$v_{1A} = 3, \pi_{A1} = 10$$

**State 2**

$$v_{2A} = 7, \pi_{A2} = 7$$

## Auction Example: Two States Bid for Firm A

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$W_0=13$ ,  $W_c=14$ : Competition *increases* total welfare

- However, state payoffs higher without competition
- If  $v_2$  were higher  $\rightarrow$  both state and firms experience gain
- If  $v_2$  were lower  $\rightarrow$  zero-sum game
- Welfare results depend on variance of  $v$

## Model $\Rightarrow$ Identification and Estimation

**Model:** Winning state gives payoff of runner-up

$$\pi_{\text{winner}} + b_{\text{winner}} = \pi_{\text{runner-up}} + v_{\text{runner-up}}$$

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**Identification Step 1:** Recover parameters of firm profit function,  $\pi_i$

- $b_{i,\text{winner}} = (\pi_i(x_{\text{runner-up}}) - \pi_i(x_{\text{winner}})) + v_{\text{runner-up}}(x_{\text{runner-up}}, z_i)$

**Identification Step 2:** Identify distribution of firm payoffs,  $F(w|\cdot)$

- Calculate runner-up payoffs, use as 2nd order statistic

**Identification Step 3:** Invert payoffs to recover  $H(v|\cdot)$

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# State valuations and subsidy ban

## How do states value firms?

Economic and political variables affect valuation ( $v$ )

	$\Delta v$	
remove term-limit: 1 $\rightarrow$ 0	\$14M	12%
increase jobs: 500 $\rightarrow$ 1,000	\$16M	13%
lose manufacturing: 5% $\uparrow$ to 5% $\downarrow$	\$31M	38%

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Multiplier  $\times$  Unemployment has largest effect

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	1	2.5
unemployment: original	\$2M	\$20M
unemployment: 4%	\$1.5M	\$6M
unemployment: 8%	\$3M	\$62M

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*Can't contract on spillover jobs*

## What if there was a subsidy ban/truce?

Policy in the EU, truce in Kansas City, “End Corporate Welfare Act” in NY State

Set subsidies to zero, let firms choose highest profit place

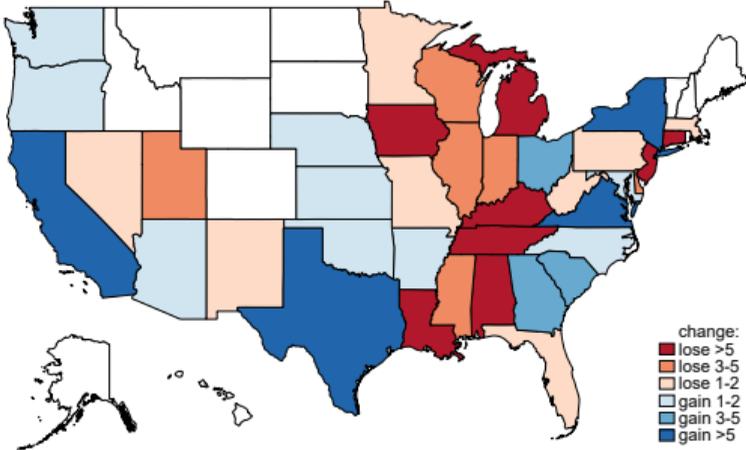
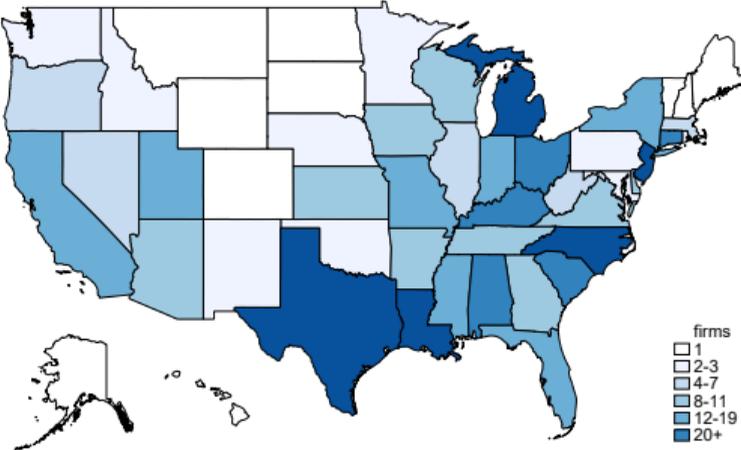
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\$B	state value	firm profit
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Optimistic valuations: State  $v = (1 + \mu) \times v_{\text{true}}$

$\mu = 0.10$ : 46% of locations overpay, lose  $\sim$  \$6B

## Conclusion and Future Work

Subsidy competition has **potential** to improve allocative efficiency

- Competition allocates firms to highest value states
- Valuation reflects, in part, labor market conditions in locality
- Politics also affects willingness to pay ... State welfare  $\neq$  Governor's valuation

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Much more to learn/many papers to write:

- Political concerns: Beyond the re-election effect
- Distributional concerns:
  - jobs for residents v migrants, welfare of real estate developers v residents
- Dynamic concerns: short termism of governors, agglomeration
- Practical concerns: contracting of deal, renegotiation

**Thank you!**

## What's in a Subsidy Deal: VW and Tennessee (2008) [Back](#)

“There’s nothing quite like the automobile industry to bring in money, raise family incomes and bring in jobs” – TN Dept of Economic Development

- VW chooses Chattanooga for new assembly plant, promising 2,000 emp and \$1B investment
- TN grants VW a subsidy worth **\$558 million**
  - Local property tax abatements over 30 years (\$200M)
  - Enhanced state job and investment tax credits over 20 years (\$200M)
  - Property given to VW (\$81M)
  - Worker training (\$30M)
  - Highway and road construction (\$43M) + Rail line upgrades (\$3.5M)
- TN promises specialized tax credits for any neighboring suppliers
- TN projected VW would have \$100M in annual payroll, help create 14,000 total jobs, and have a total economic benefit of \$600M per year

Location decision was “truly a very close competition”

- Runner-up in Huntsville, AL, subsidy offer at least **\$386 million**

*Site Selection Magazine* reports:

*A team of 25 people with Staubach worked on the project, helping VW consider an initial pool of more than 100 candidate sites, all located in the central or eastern U.S. because of time-zone proximity to Germany.*

*“What you look for is mostly problems sites have – readiness, labor, logistics infrastructure,” says Greg Lubar, project leader and senior vice president at Staubach. VW said it short-listed 25 sites. “It was then a dozen or so we were in discussions with until the three finalists,” says Lubar.*

## Observed Subsidy is an Equilibrium Outcome [Back](#)

Observe VW locating in Chattanooga for \$558M, result of:

- VW location decision: total payoff function of subsidy, productivity
- TN willingness to pay (value) for VW
- # of competitors, and the payoffs they provide

Do not know VW location in no-subsidy counterfactual

- Does VW create more “value” in TN than in counterfactual choice?