Evaluating State and Local Business Tax Incentives*

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Income and opportunity vary substantially across regions. After decades of skepticism (Glaeser and Gottlieb, 2008), there is now growing enthusiasm among many policymakers and academics for using place-based policies to address these regional disparities (Austin, Glaeser and Summers, 2018; Bartik, 2019*b*; Kline and Moretti, 2014). Summers (2019), for example, discusses the widely uneven incidence of distress, the inability of natural economic forces and migration to address these disparities, and the political ramifications of growing disaffection of non-cosmopolitans. Others emphasize that place-based policies can have unique targeting benefits that transfer resources to distressed regions and can create substantial welfare gains (Gaubert, Kline and Yagan, 2019).

The primary place-based policy in the United States is state and local business tax incentives. Bartik (2019*b*) estimates that these incentives amount to approximately $46B out of $60B of local economic development spending and have tripled since the 1990s. Despite the growing enthusiasm for place-based policies in general, many question the effectiveness of these business incentives and whether the mounting costs are justified. Unlike many other federal place-based policies that focus on infrastructure improvements, hiring subsidies, or place-specific tax credits, these business tax incentives are controlled and implemented at the state and local level. This autonomy has led some policymakers to propose banning these incentives out of concerns over the race to the bottom and beggar-thy-neighbor behavior.

This essay describes and evaluates state and local business tax incentives in the United States. We consider three types of tax incentives—state corporate taxes, state tax credits, and firm-specific incentives—and the tradeoffs involved with using them to achieve local and national objectives. Across types of incentives, the key tradeoff is between targeting versus discretion. Firm-specific incentives can attract marginal firms at lower cost than a corporate tax cut for all firms, but local discretion reduces transparency and its effectiveness relies on politicians picking winners based on economic rather than political reasons. Across levels of government, local discretion can align with local preferences, technologies, and economic conditions (Oates, 1972), but can also

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result in excessive subsidies, misallocated funds, and negative externalities on other locations (Gordon, 1983). Across locations, the key tension is between productive efficiency versus equity.

We use new datasets from Slattery (2019) to characterize these incentive policies, to describe the selection process that determines which places and firms give and receive incentives, and then to evaluate the economic consequences. In 2014, states spent between $5 and $216 per capita on incentives for firms in the form of firm-specific subsidies and general tax credits, which mostly target investment, job creation, and research and development. Collectively, these incentives amounted to nearly 40% of state corporate tax revenues for the typical state, but some states' incentive spending exceeded their corporate tax revenues. States with higher per capita incentives tend to have higher state corporate tax rates. Recipients of firm-specific incentives are usually large establishments in manufacturing, technology, and high-skilled service industries, and the average discretionary subsidy is $178M for 1,500 promised jobs. Firms tend to accept subsidy deals from places that are richer, larger, and more urban than the average county, and poor places provide larger incentives and spend more per job.

While we find some evidence of direct employment gains from attracting a firm, we do not find strong evidence that firm-specific tax incentives increase broader economic growth at the state and local level. Although these incentives are often intended to attract and retain high-spillover firms, the evidence on spillovers and productivity effects of incentives appears mixed. As subsidy-giving has become more prevalent, subsidies are no longer as closely tied to firm investment. If subsidy deals do not lead to high spillovers, justifying these incentives requires substantial equity gains, which are also unclear empirically.

The lack of clear spillovers and equity benefits suggest potentially large gains from reforms that direct resources to where efficiency and equity gains are largest. We discuss some of these reforms in the conclusion. Overall, much more work is needed to evaluate the efficiency and distributional consequences of these policies and to design reforms that better address regional disparities and improve the well-being of the unemployed and working class.

1 Conceptual Framework

1.1 Stated Goals of Business Incentive Programs

The stated goal of most state and local business incentives is to stimulate local economic activity, create jobs, and boost wages. For example, the legislation enacting North Carolina's Job Development Investment Grant (JDIG) program states:

> The purpose is to stimulate economic activity and to create new jobs for the citizens of the State by encouraging and promoting the expansion of existing business and industry within the State and by recruiting and attracting new business and industry to the State.

The goals are similar for business incentives that do not explicitly target firm entry and job creation. A report on California's R&D tax credit reads (Hall and Wosinska, 1999):

> California is perceived as a high-tax business environment by firms contemplating setting up business or expanding...An R&D-related tax measure targets the particular types of firms that California desires to attract in spite of its relatively high position in the "tax league" tables.

In this section, we provide a framework to consider how state and local governments use different business incentive policies to achieve their objectives of stimulating local economic activity, creating jobs, and boosting wages.

1.2 State and Local Objective Function

Consider how business incentives affect local workers, capital owners, and politicians. All else equal, workers benefit from employment opportunities, higher wages, lower local prices, lower taxes, high-quality government services, and other amenities. Capital owners, who include local firm owners and landowners, benefit from higher after-tax-and-incentive profits and rents. Profits depend on intermediate input costs, worker wages, borrowing costs, rental rates of capital, product demand, and productivity, which may be related to government spending on roads and schools. Politicians value improvements in their re-election odds, campaign contributions, pork provision opportunities, and other aspects of their political success. The weights that states and local governments place on the wellbeing of these different groups may vary across places and over time, and may also vary within groups. For example, the weight on the wellbeing of low- and high-earning residents may differ.

1.2.1 State and Local Use of Business Tax Instruments

State and local policymakers have several policy instruments, within and outside the tax system, with which to maximize this objective function. We focus on three instruments within the tax system: lowering corporate tax rates, narrowing the corporate tax base, and offering firm-specific tax incentives. Table 1 shows that the average state in 2014 has a corporate tax rate of 6.5%, spends $57 per capita on business tax incentives in general, and offered 14 firm-specific tax incentives between 2002-2017. On average, the general and firm-specific incentives amount to 38% of state corporate tax revenue.

There is significant heterogeneity in business taxes and incentives across states. For example, Iowa and Pennsylvania have corporate income tax rates of roughly 10%, whereas Nevada and Washington have no corporate tax. State corporate tax apportionment rules and other base provisions vary widely across states as well. Indeed Suárez Serrato and Zidar (2018) show that state tax base and credit rules explain more of the variation in state tax revenues than state corporate rates do.

Figure 1 shows that states with high corporate tax rates tend to have narrower tax bases (measured as business tax expenditures per capita). States with higher statutory corporate tax rates are able to offer "larger" tax incentives because the tax incentive serves to reduce the effective corporate tax rate. However, a large tax incentive with a high tax rate may still be less attractive than a state with a much lower corporate tax (and no tax incentive), all else equal.

Table 1 highlights the policy differences across eight states. West Virginia has a corporate tax rate of 6.5% and corporate tax revenue of $118 per capita, but spends $177 per capita on business tax incentives, all through state budget programs. Meanwhile, California has a corporate tax rate of 8.8% and double the per capita tax revenue, and only offers $62 per capita in business tax incentives, mainly through tax credits. West Virginia only gave four large firm-specific subsidies between 2002-2017, at a cost of $34,000 per job, while California gave 13 subsidies, but at a much lower price of $5,000 per job.[1] What are the costs and benefits of these different approaches and why might governments adopt different policies?

1.3 Local Costs and Benefits of Each Policy Instrument

1.3.1 Firm-Specific Tax Incentives

State and local governments can provide firm-specific incentives in exchange for a firm's commitment to certain levels of investment and employment. Consider the welfare of local workers if the government gives a firm-specific tax incentive to a firm that promises 1,000 jobs at $60,000 a year. While some of these jobs go to migrants, local residents who get these jobs will enjoy welfare gains that depend on their prior wages and employment status.The benefits for local workers may extend beyond the directly employed group of 1,000 workers—this new firm may increase local labor demand and therefore local wages (Moretti, 2010). However, this entry can also have negative effects. Entry can create congestion and increase land prices. If the tax revenue generated from additional employment and economic activity falls short of paying for the incentive, it will need to be financed through higher taxes or lower public service provision, reducing the welfare of local workers.

The owners of the firm receiving the incentive benefit directly. The owners of other local firms may benefit from productivity and demand spillovers, but might face higher wages, local prices, and taxes. Local landowners will gain to the extent that land prices increase, but may be worse off if their property tax bills increase to finance the incentive. Local politicians may benefit from publicity of salient plant arrival, increased economic activity, goodwill from recipient firm, and other political considerations.

1.3.2 Lower Corporate Tax Rates

Instead of lowering the tax bill of a single firm, state governments can lower corporate taxes across the board. Lowering the corporate tax rate mechanically benefits all C-corporations in the state by decreasing their tax bill. It also encourages the entry of new firms and the expansion of existing firms (Giroud and Rauh, 2019). Like in the case of the firm-specific tax incentives, this new activity increases the demand for labor and other inputs, which can increase local wages and prices (Suárez Serrato and Zidar, 2016). To the extent that lower corporate taxes are financed by reduced public services, a corporate tax cut may have adverse effects on productivity.

[1] There is also within-state variation over time in how states finance these incentives. For example, in 2013 Michigan decreased per capita corporate tax expenditures from $117 to $13. However, the per capita economic development budget rose by about $90, leaving total per capita corporate incentive spending almost unchanged. The number of subsidies and cost per job are for a sample of large firm-specific deals, which we describe in the data measurement section. There are likely more modest subsidy deals with lower cost per job numbers, for which we do not have data because they are not covered by the media.

In Kansas, for example, dramatic business income tax cuts reduced state revenues by $700 million, leading to underfunding of public schools, increases in sales taxes, and decreases in infrastructure spending (Leachman, 2017).

For workers, the effects of a corporate tax cut depend on real wages and fiscal conditions. If labor demand increases lead to higher wages and less unemployment, then workers will enjoy some benefit. But if wages and employment don't increase substantially, then they may be worse off due to higher taxes or lower public service provision. Similarly, the effects on landowners depend on local prices and property taxes.

1.3.3 Narrow Corporate Tax Base

An intermediate policy intervention often involves narrowing the corporate tax base by lowering the tax bill for a set of firms based on their activity or industry. For instance, state investment tax credits and accelerate depreciation allowances reduce the tax bill for firms that do a lot of investment (e.g., Chirinko and Wilson (2008), Ohrn (2018)) and R&D tax credits reduce the tax bill for research-intensive firms (e.g.,Wilson (2009)). This approach has direct effects on recipient firms that are similar to lowering the corporate tax rate, and indirect effects on other firms that resemble those due to firm-specific incentives.[2]

1.4 Tradeoffs Among Policy Instruments

What are the tradeoffs among these policy instruments? Consider a typical state that both provides business incentives and taxes corporate income. If providing an additional firm-specific incentive attracts a "high-benefit" firm, the firm's arrival will lead to higher productivity, more prosperity, and higher tax revenue both from other firms and from higher incomes (Bartik, 1991; Glaeser, 2001; Garcia-Mila and McGuire, 2002; Henderson, 2003; Greenstone and Moretti, 2003; Greenstone, Hornbeck and Moretti, 2010). Offering a firm-specific tax incentive also enables states to contract with firms regarding specific investment and hiring outcomes, which they cannot do with a corporate tax cut.

Firm-specific subsidies can also be used to target mobile firms. If some firms are more responsive to state corporate taxes, then providing tax relief for these firms can allow governments to price discriminate, increase economic activity, and raise revenues more efficiently (Ramsey, 1927).[3] Lastly, firm-specific incentives also help attract or retain firms without lowering revenue collected from all firms in the state. A firm that attracts skilled workers, that broadens the industrial mix of an area, or that has hard-to-build relationship-specific capital with local suppliers may be especially valuable (Glaeser, Scheinkman and Shleifer, 1995; Moretti and Wilson, 2014;

[2]State policymakers also use base provisions to tax different sources of revenue. Through the apportionment system, state policy makers can allocate taxes based on where goods are sold (destination), where goods are produced (source), and where the firm owners live (residence). These options can lead to different effects on local workers, capital owners, and politicians, depending on the structure of production and the responsiveness of multi-state firms to tax provisions. In addition, state personal tax taxes can also be an important policy instrument. The rise of pass-through businesses has made state personal income tax rules an increasingly relevant business tax instrument as many private firms (including S-corporations and partnerships) face personal income taxation rather than traditional corporate taxation (**?**). Moreover, if workers care about after-tax pay, low personal tax rates may also enable firms to pay workers less, thus attracting firms to low personal tax rate places.

[3]Black and Hoyt (1989) make a related argument about the net fiscal contribution of new firms. If the marginal cost of providing public goods is less than tax revenues generated by the firm, then the government may want to offer the firm subsidies. For a discussion of related considerations regarding international taxation, see Keen (2001); Dharmapala (2008).

Glaeser, Kallal, Scheinkman and Shleifer, 1992; Acemoglu, Autor, Dorn, Hanson and Price, 2016). Base rules share some of these benefits, such as targeting more responsive activity and linking tax benefits to desired outcomes like investment, employment, and innovation (Suárez Serrato and Zidar, 2018).

However, implementing firm-specific incentives presents many challenges. The economic rationale for targeting particular firms hinges on the the assumption that state and local governments are able to pick winners effectively. Identifying "high-benefit" firms and forecasting a firm's effect on the local economy—including potential agglomeration economies—is a difficult problem for policymakers and academics alike. Moreover, assessing whether the firm would locate elsewhere without the incentive is also hard; firm location decisions are multi-dimensional and idiosyncratic. There is mixed evidence on what share of firms receiving targeted benefits are inframarginal, and thus not influenced by the tax benefit: for example, Bartik (2019*a*) argues that most deals involve inframarginal firms (Bartik, 2018), while, using revealed preference approaches, Slattery (2019) finds that deals affect location choice among the largest establishments and Mast (Forthcoming) finds limited effects for tax exemptions for mobile firms within New York State. Firm-specific incentives have clear fiscal costs and unclear benefits. In short, targeting specific firms may not be as effective in practice.

Using firm-specific incentives has additional costs. The lack of transparency in subsidy-giving leaves it more exposed to political capture and non-economic allocation of funds. An investigation of the Economic Development Agency in New Jersey, for example, found that lobbying and corruption led to inflated subsidy deals (Corasaniti and Haag, 2019).

More broadly, providing generous corporate tax incentives requires raising revenue from other taxes. Figure 1 shows high-incentive states have higher tax rates on average. The social cost of higher taxes grows quickly with the size of the tax and the benefits of incentives diminish with the size of incentives. Thus, providing additional incentives may not always lead to higher welfare in the state, especially at high levels of incentives. In addition, the most distressed places, where the equity gains may be largest, may not be able to afford to compete for firms with local incentives.

In the following section, we examine a tax incentive Volkswagen received in Tennessee to make these considerations more concrete. Then we will move from anecdote to more comprehensive data to measure and evaluate how these incentive policies work in practice.

2 A firm-specific incentive for Volkswagen

In 2008, Volkswagen and the state of Tennessee came to an agreement. Volkswagen (VW) would locate their new assembly plant in Chattanooga, hire 2,000 employees and spend almost $1 billion. In exchange, VW would receive a discretionary subsidy worth over $500 million.

Many officials championed the deal for not only the 2,000 promised jobs and $1B investment, but also for the expected indirect job creation and revenue effects. "The Volkswagen investment in this community is going to have a tremendous economic gain for the entire region. I'm confident we're going to have a very reasonable incentive package when you look at the initial costs of what is being offered compared with a much bigger long-

term return," stated Matt Kisber, the TN commissioner for Economic and Community Development (ECD). He added "I think Gov. Bredesen and the mayors here are right to treat an assembly plant as worth a large taxpayer investment. There's nothing quite like the automobile industry to bring in money, raise family incomes and bring in jobs." Kisber and the ECD projected that in a few years VW would have an annual payroll of more than $100M, help create 14,000 total jobs, and have a total economic benefit of over $600M per year (Chattanooga Times, July 2008).

Business Incentives for Volkswagen

Tennessee used a mix of instruments to attract VW. The $558 million incentive package consisted of state-level tax credits and grants, as well as discretionary tax abatements and in-kind contributions from the state and local government. Specifically, the deal consisted of property given to VW ($81M), worker training ($30M), highway and road construction ($43M), rail line upgrades ($3.5M), "enhanced" state job and investment tax credits over 20 years ($200M), and local property tax abatements over 30 years ($200M). Moreover, the state promised specialized tax credits for any suppliers that locate immediately around the VW plant (Chattanooga Times, July 2008).

Some of these incentives are available to any qualifying firm in the state. For example, a Tennessee company with at least 10 new employees and $1 million of investment qualifies for a $4,500 per job credit for *one year*. These credits become more generous for larger employment and investment levels. Based on their projected plans, VW qualified for Tennessee's "enhanced" Jobs Credit, at $5,000 per job over *20 years*. Facing a state corporate tax rate of 6.5%, VW would be able to use these credits to reduce their tax bill.

The VW subsidy package also included state funds for worker training. More specifically, the state promised at least $12,000 per employee to train each of the 2,000 workers, and to pay for the construction of a technical training center. Some of this money came from Tennessee's "Fast Track" program, which typically provides grants of $4,000 per employee for worker training.[4]

In short, any manufacturing firm entering Tennessee in 2008 would receive incentives from at least three programs: tax relief from the Jobs Credit and Industrial Machinery Credit, as well as grants for job training from the Fast Track program. The size of their investment and the number of jobs at the plant determine the generosity of these incentives.

Of course, the average manufacturing firm is less likely to receive discretionary incentives such as property, infrastructure, and property tax abatements. These discretionary components of a subsidy deal are usually funded through the state budget. Tennessee has an "Economic Development Fund" that can provide additional grant support to companies expanding or locating in the state, but "only used in exceptional cases where the impact of the company on a given community is significant." Lastly, there are capital grants available to "significant projects." Since 2011, this has only included 9 companies, including VW, Amazon, GM, and Nissan. According to the Tennessee state budget, in 2008 the Department of Economic and Community Development

[4]According to the state budget documents (Tennessee State Legislature, 2011-2012), Tennessee spent over $53M on the Fast Track program in 2008, and allocated $71M for the program in 2009, likely increasing the available funds because of the arrival of VW. Like the tax credits, the size of the Fast Track grant is determined by the company investment, number of new jobs, and wages of new jobs, as well as the types of skills needed, and the location of the project. Since 2011, there have been 874 projects in the "Fast Track" program, and firms received about $4,000 per new job.

spent $109M on business attraction and recruitment. Tennessee's level of incentives is about average across states; in 2014, the state spent $16 per capita on tax credits and $35 per capita on economic development programs, while the national average was $19 per capita on tax credits and $34 per capita on economic development (Table 1). However, incentive spending as a percent of corporate tax revenues in Tennessee was only 26%, while the national average was 38%.

Volkswagen's Location Decision

One reason that Tennessee put together a subsidy package for Volkswagen was that the automobile manufacturer was considering many other sites for their new assembly plant. VW's head of overseas manufacturing described the site selection process as follows: "We took 400 Metropolitan Statistical Areas (MSAs) into account. They were narrowed down by different principal criteria to 12 MSAs in seven states. Then the sites that matched our criteria in terms of size and basic infrastructure were researched in detail and analyzed" (AreaDevelopment.com, 2011). VW hired a consulting firm, The Staubach Company, to assist with the site selection process. A team of 25 consultants were employed full time, analyzing hundreds of potential sites and soliciting proposals from the dozen locations that they short-listed. According to the director of industry-government relations at VW, this location decision was the result of "truly a very close competition," with Chattanooga narrowly beating out a site in Huntsville, Alabama. The Alabama subsidy offer was at least $386 million (Bruns, September 2008; Bennett, July 2008).

The overall attractiveness of each state depends on more factors than just tax incentives; many non-tax considerations matter for VW's location decision. In this case, the two finalists are fairly similar. Both states have right-to-work laws, state corporate tax rates of 6.5%, similar apportionment weights, and are in the same region of the country – the drive from Chattanooga, Tennessee to Huntsville, Alabama takes under two hours. Wages in the sector were slightly higher in Huntsville, and unemployment was slightly lower there as well.[5] Other harder-to-quantify factors, such as the quality of the infrastructure, readiness for a large new assembly plant, and time to build, also influenced VW's decision process.

The Effect of Volkswagen on the Local Economy

We can evaluate this particular subsidy by comparing outcomes in Chattanooga, the winning city in Tennessee, to outcomes in Huntsville, the runner-up in Alabama. Figure 2 plots how employment in Transportation Equipment Manufacturing (NAICS 336, which includes motor vehicle manufacturing as NAICS 3361) evolved from 2000 to 2017 in Hamilton County, TN and Huntsville, AL. The "winning" city Chattanooga is in Hamilton County, and the runner-up city of Huntsville is in Madison County. Huntsville initially had roughly 10,000 employees in transportation equipment manufacturing before the VW deal in 2008, which was substantially more than the roughly 750 employees in Hamilton county. After the VW deal in 2008, Hamilton saw a sharp increase in employment to nearly 3,500 employees. The runner-up Huntsville experienced a short-term decline of approximately 3,500 workers, likely due to the Great Recession, and eventual recovery back to around 9,000 workers. Thus, the difference in differences amounted to approximately 4,000 workers in transportation manu-

[5] Transportation manufacturing wages were about $50,000 in Hamilton County, and $87,000 in Huntsville. Unemployment was higher in Hamilton, at 5.7% to Huntsville's 4.3%. Hamilton county had a population of about 320,000 whereas Huntsville had a population of roughly 400,000. Both locales had per-capita income of roughly $40,000. Tennessee had a sales tax rate of 7% and no income tax, while Alabama had a sales tax rate of 4% and income tax rate of 3.3%.

facturing following the VW deal. If we are concerned that some of this estimate reflects double counting (due to business stealing affecting both the treatment and comparison group), we can use the raw difference of post versus pre of approximately 2,750 additional jobs in Hamilton.

Recall that the TN commissioner of local economic development projected that VW's promised 2,000-job plant and $1B investment would increase local payroll by $100M, create 14,000 jobs, and have a total economic benefit of $600M per year. While it is plausible that VW's plant increased auto employment by a few thousand jobs, it is hard to detect effects on total employment.[6] In terms of payroll, the direct estimates were quite reasonable since 2000 direct jobs at an average annual salary in 2008 of $50K amounts to $100M of payroll. The indirect spillover benefits and "trickle down" of equity impacts are harder to detect.

3 Data on State and Local Business Incentives

3.1 Measurement Challenges

The VW deal is a single case study. We need comprehensive data to evaluate these incentives in general. Assembling such data requires addressing some key measurement challenges.

There is substantial complexity and heterogeneity within and across the three broad policies that we consider: reducing the corporate tax rate, narrowing the corporate tax base, and offering firm-specific incentives. Discretionary tax incentives can come with many parts; the subsidy deal for VW was a function of property tax abatements, specialized tax credits, free land, job training, and more. Also, a given firm may qualify for different levels of non-discretionary tax credits based on its exact industry, investment, and employment, as well as its location within a state and the allocation of activity and sales across states, which affects how multi-state firms apportion profits for tax purposes.

An additional measurement challenge is that states and local governments do not usually report the exact amount of tax credits and incentives each establishment in their jurisdiction receives, but instead report tax rates, total tax expenditures, incentive program rules, and incentive program budgets. Because there are many different tax credits and incentive programs, and because the individual tax bill of a firm is unobserved, it is hard to measure and compare incentives across firms and states.

3.2 Three Approaches for Measuring Business Incentives

In this subsection we describe three approaches for measuring state and local business incentives: rules-based, expenditure-based, and a narrative approach

The first approach is "rules-based," which involves collecting data on the rules of each tax, tax credit, and incentive program offered in a locality, and predicting the incentives for a firm, given their activity and the rules. Bartik (2017) applies this approach in the "Panel Database on Incentives and Taxes." This database tracks marginal tax rates and business incentives for 45 industries in 47 cities and 33 states, from 1990 to 2015.

[6] For example, a simple difference-in-differences specification run on 3 digit employment just in these two counties has a treatment effect of 2,679 jobs, but the estimate for total employment is -8,782.

The focus is incentives for new and expanding businesses. Using the rules of each tax rate, tax credit, and grant in the database, Bartik (2017) uses a simulation model to predict the level of tax incentives a firm would receive in a certain city, given the firm's balance sheet.

In terms of state corporate tax rates and tax base provisions, Suárez Serrato and Zidar (2018) also use a rules-based approach. They analyze how rule changes affected state corporate tax revenue over time and across locations, but they are only able to analyze total revenue rather than more granular micro-data at the firm or tax-rule level.

The second approach is "expenditure-based," which measures the outlays for each program.[7] Slattery (2019) collects data on state-level business incentives expenditures from state tax expenditure reports and budget documents by reading each document and identifying tax credits and budget items targeted at new and expanding businesses. The state economic development spending collected from state budgets can include grants, job training, loans, and discretionary subsidies, among other types of incentives. The final product tracks the budget for each program (like job training grants) and expenditure on each tax incentive (e.g., investment tax credit) by state and year, from 2007-2014.

The third approach is "narrative-based" (named after the approach for studying national and state tax changes in Romer and Romer (2010) and Giroud and Rauh (2019), respectively). Because systematic reporting on firm-level incentives does not exist, Slattery (2019) uses a variety of sources to assemble a data set on these firm-level deals. She starts with all subsidy deals worth over $5M, as reported by the *Good Jobs First* "Subsidy Tracker."[8] Next, she removes any entry that does not mention expansion, relocation, or a discretionary incentive. Finally, she adds any firm locations reported by *Site Selection* Magazine's "Incentives Deal of the Month" columns and annual "Top Deals" reports, arriving at a sample of 543 establishments receiving discretionary subsidies over the period 2002-2017.

Given this list of 543 subsidy deals, Slattery (2019) uses press releases and news articles to fill in details on the number of jobs promised, investment promised, runner-up location, and specific terms of the deal. Each of these subsidy deals combine a range of various incentives, as we saw with VW. The deals often combine state-level tax credits and grants that the state would offer to any company of a certain size, as well as discretionary tax abatements and in-kind contributions from the state and local government. Therefore, in some cases where the news or press release only reports the discretionary component (e.g., a discretionary tax credit from the "California Competes" program), she uses the state-level spending data to determine what non-discretionary incentives are available to the firm (e.g., California's R&D tax credit), and thus to estimate the tax credit for

[7] This approach combines the size of incentives and the level of activity. For example, two states with the same investment tax credit rates could have different investment tax credit expenditures if one state happens to have a lot more (inframarginal) investment.

[8] The mission statement of *Good Jobs First* is "Tracking Subsidies, Promoting Accountability in Economic Development." To this end, they publish a "Subsidy Tracker" which lists all the firm-level incentives they come across. The sources of these incentives include state and local government reports, newspaper articles, press releases, and the results of FOIA requests to state governments. There is a lot of selection in the set of subsidies observed in the data, due to difference in reporting across states or even within states but across programs. For the largest subsidy deals, where there is press available, *Good Jobs First* has much better coverage. Another note is that there are often duplicates in the data, due to subsidies being reported in press releases and tax expenditures being reported annually for states that report tax expenditures at the firm level. The total value of tax incentives may also be under-reported for states like California, where the "Subsidy Tracker" has entries for the "California Competes" discretionary tax credit program, but does not report how much firms receive from California's generous R&D tax credit.

the subsidy deal.[9]

3.3 The Magnitude of State and Local Business Tax Incentives

Using a rule-based approach, Bartik (2017) estimates that state and local governments spent $45B on incentives in 2015, of which $13.5B is attributed to local property tax abatements, which together with other local incentives make the total state incentive expenditure less than $30B. Using an expenditure-based approach, Slattery (2019) estimates that state governments spent about $20B on incentives in 2014. Assuming the same relative contribution from local governments as the Bartik (2017) estimates would imply that total state plus local incentives amount to $30B in 2014.

Differing approaches and data coverage explain some of the gap between these estimates. Bartik (2017) assumes each firm receives all of the incentives it is qualified for, and calculates the level using a simulation model, whereas Slattery (2019) records the state reported budget for each incentive program and expenditure for each tax credit from the annual budget documents and tax expenditure reports. The state-level dataset of Slattery (2019) does not include local incentives, which are included in Bartik (2017), and is based on reported spending instead of simulated spending, given rules and activity. Therefore, the state-level data from Slattery (2019) that we present is a lower bound for total state and local business incentives.

Previous efforts to collect data on firm-specific incentives using a narrative-based approach have found estimates of business incentive spending that are almost twice as high. A main source for these estimates is the non-profit *Good Jobs First* (Mattera and Tarczynska, 2019), and journalists at the *New York Times* (Storey, Fehr and Watkins, 2012). The *New York Times* sourced data from *Good Jobs First*'s "Subsidy Tracker," consultants, state agencies, and government reporting to create their "United States of Subsidies" interactive database on business incentives. The resulting database reported total business incentive spending of $80B in 2012. One reason for this difference from (Bartik, 2017) and Slattery (2019) is double counting. Firm-specific subsidies can be recorded twice, both as the individual subsidy deal and as part of the total state spending on an incentive program. Also, Bartik (2017) and Slattery (2019) explicitly focus on incentives for new and expanding business, whereas the *New York Times* data include other components such as sales tax exemptions that could apply to individuals and existing companies.

In the Slattery (2019) firm-level incentive data that we use, we take the size of the subsidy as given, even though there may be differences in reporting across localities and even industries in how much a given package of incentives is "worth" to a firm. Furthermore, the subsidy size is normalized to 2017 dollars and a 10-year contract. The modal subsidy deal is paid out over 10 years, but some have longer horizons, such as the 20 years of state tax credits for VW.

With 543 firm-specific subsidies over the period of 2002-2017, the total amount of discretionary incentives

[9]Over 30% of the subsidy deals in our sample mention contributions to the subsidy package from local governments, e.g., the county and city governments. This estimate is likely a lower bound on deals that involve local government spending. We do not have a comprehensive data set on spending at the more local level. We suspect that the local contribution is reported in news articles and press releases when it is a significant portion of the total deal. Like in the VW case, local governments usually add to the subsidy deal by offering property tax abatements, which can be very large in localities with high property taxes. Larger cities may have economic development offices and economic development teams of their own, who will work with the state to develop a subsidy offer for a given firm.

promised was $96 billion, or about $6.4 c billion a year. Subsidy-giving fluctuates over time, but generally increased from 2002 to 2014, with a minimum of 14 discretionary incentives offered in 2003, and a maximum of 53 discretionary incentives offered in 2012.

We use per capita incentive spending—the sum of economic development and tax expenditures—as a measure of the generosity of a state's incentives. Top per capita spenders include Michigan, West Virginia, New York, Vermont, and New Hampshire. Their per capita incentive spending in 2014 amounts to 56 percent of public safety expenditures, 40 percent of spending on health and hospitals, 30 percent of transportation, and 12 percent of education. For the full sample of states, it is 23 percent of public safety, 13 percent of health and hospitals, 11 percent of transportation, and less than 5 percent of education. Compared to state corporate tax revenues, incentive spending is about 40 percent of corporate tax revenues on average across states in 2014. There are five states—Nevada, South Dakota, Texas, Washington, and Wyoming—which have zero corporate income tax revenue, but spend about $44 per capita on incentives for firms. One measure of generosity of these incentives is the ratio of subsidy to promised jobs or "cost per job." Interpreting this cost per job measure requires care, because the subsidy is a flow over a period of ten years, so cost per job *per year* is lower than these estimates. Complications with discount rates and job churn complicate estimates of cost per effective-annual-full-time employees, but dividing by 10 provides a crude, optimistic estimate of cost per job per year. We find that average cost per job has increased over the same period. This finding is consistent with Bartik (2017), which shows that incentives have increased over a longer time-period—incentive spending as a percentage of gross taxes increased from 10% in 1990 to 30% in 2015.

At the time, the VW location deal was the largest subsidy offer made by Tennessee—$558M in 2008 dollars for a 2,000-job automobile plant, with a cost of about $279,000 per job promised. However, in terms of discretionary subsidies offered to large firms, it is not an extreme outlier. Over the entire sample of discretionary incentives, firms receive $178.4M on average and promise about 1,500 jobs at the establishment. The effective cost per job is $120,000 at the mean but varies a lot over deals—from $13,300 at the 10th percentile to $1M at the 90th percentile. In the next section we explore how differences across industries and locations help explain variation in observed subsidy size.

3.4 The Allocation of State and Local Business Tax Incentives

This subsection uses the Slattery (2019) data to assess how well the allocation of incentives aligns with the efficiency, equity, and political goals of policymakers. We first consider how well the allocation of incentives aligns with employment, growth, and spillover goals, and then consider how the allocation of incentives aligns with equity and political goals.

Large, profitable firms are more likely to receive firm-specific subsidies. Comparing subsidy receipt by establishment size to the universe of establishment entry in the Census Business Dynamics Statistics reveals that more than 30 percent of all establishments with over 1,000 employees receive discretionary subsidies, while the percentage is less than 0.2 percent for establishments with under 250 employees.[10] The firms that receive

[10]We compare the size of establishments in the subsidy data with the size distribution of establishments entering the U.S.,

discretionary subsidies not only have larger establishments, but they are also larger than the average public company in terms of employment, profits, revenue, and capital stock. The differences are striking. Firms that receive discretionary subsidies from states have eight times as many employees as the average firm in Compustat (60 times more at the median). The gross profit of the average firm in Compustat from 2001-2014 is just over $1B. The average gross profit for the subsample of firms that ever received a discretionary subsidy in that period is $14B, and it is even higher in the year of the subsidy deal ($21B).

The fact that larger establishments, which are part of large, profitable, firms, are most likely to receive discretionary subsidies is consistent with the following hypotheses on subsidy-giving: state and local jurisdictions try to attract large productive establishments that will have generate surplus and spillovers, affect the location decisions of other establishments, and increase demand for both labor and services. However, the fact that only the largest firms receive large discretionary subsidies may facilitate increasing industry concentration, a topic of much interest and concern (See, for example, De Loecker and Eeckhout (2017)).

The prevalence of firm-specific subsidies in manufacturing, technology, and high-skilled services also appears consistent with stated objectives. These industries represent nearly half (47%) of our sample of deals. Table 2 shows mean deal characteristics for five industries.[11] Automobile manufacturing firms are the most "popular" industry, with 56 subsidies, or 10 percent of the total sample. The average automobile manufacturer promises to create almost 3,000 jobs, and receives over $290M, at over $100,000 per job. The Economic Policy Institute estimates that the auto industry has the largest jobs multiplier, with 14 jobs created in the local economy for every 1 job created at an automobile manufacturing plant (Bivens, 2019). Therefore, the prevalence of auto subsidies is consistent with the hypothesis that policymakers target firms with large agglomeration effects.

Other industries get large subsidies, but do not promise as many jobs. For example, basic chemical manufacturing subsidies amount to over $950,000 per job. Establishments in this industry, however, often make large capital investments, have high fixed costs to entry, reduce local energy costs for other firms, and become settled future taxpayers. They may also lobby aggressively. In Louisiana, for example, where many chemical manufacturers are located, a proposal to restrict the discretionary tax exemption program in the state was met with a rush of activity from the chemical industry, and the publication of industry-backed studies on the positive impact that they have in the state (The Advocate, 2018, 2016). An open question is how subsidy receipt depends on the product and labor market characteristics of firms as well as the number and type of workers it attracts.

At the state level, we find similar patterns for non-discretionary incentives. The most popular tax credits (in terms of both the number of credits available and total spending) target job creation, investment, and research activity. Those three types of credits make up 75 percent of total per capita tax expenditures.

Distressed places may enjoy larger welfare gains from increasing local economic activity. Consistent with this observation, we find that within the sample of winning counties, poorer counties are more likely to give

from the Census Business Dynamics Statistics (Appendix Table A.1). We match the firms in our sample of subsidized firms to firms in the Compustat database (Appendix Table A.2). Our subsidy data set is selected on subsidies that are at least $5 million, so smaller firms are likely also receiving smaller discretionary subsidies. However, when we use *all* establishment level tax credit and grant receipts from the state of Indiana—a state that provides more comprehensive data—we find a very similar pattern on establishment size.

[11] See Appendix Table A.3 for the mean and median characteristics for the top 10 industries, by subsidy-receipt.

larger subsidies. Figure 3 illustrates this phenomenon with a binned scatterplot, with subsidy per job plotted against average wages in the county. It shows that counties with an average wage of less than $40,000 pay over $400,000 per job in the mean subsidy deal. Meanwhile, counties with average wages over $100,000 pay less than $100,000 per job in a given subsidy. This pattern may also be driven by differences in profitability — distressed places may need to provide larger incentives to attract firms. There is little evidence on who benefits from these policies across the income distribution and whether those experiencing wage gains were mostly prior residents, unemployed, or working-class individuals. These are open and important questions.

However, the most distressed locations are rarely able to attract firms with subsidies. Winning and runner-up counties have higher per-capita income and higher average wages than the average county.[12] The personal income per capita of the average county is $34,000, which is $7,000 lower than winning counties and more than $10,000 lower than the runner-ups. Facing tight budgets, the most distressed places where equity gains may be largest are not well-served by locally-financed incentive policies.

We compare the relative importance of determinants of incentive provision at the state level and find a strong role for political factors. In particular, we follow Slattery (2019) by estimating a linear probability model in which the dependent variable equals 1 if the state increased per capita incentive spending by at least 20 percent. The explanatory variables of interest include whether it was an election year, state GDP per capita in the previous year, state employment rate in the previous year, and whether the governor of the state could run as an incumbent. This specification includes state and year fixed effects. Table 3 presents the results. We find that a 20 percent increase in state per capita incentive spending is less likely when previous-year employment is higher. When a state loses jobs, the fiscal externality of creating a new job is higher. While these economic determinants are important, political factors are especially important. The interaction between an incumbent governor and an election year is highly correlated with increases in incentive spending, suggesting a strong role for political determinants of incentive provision. In the raw data, per capita incentive spending increases by more than 20% in half of the cases in which it is an election year and the Governor is up for re-election versus one-fifth of the cases otherwise. This result is consistent with Jensen and Malesky (2018), who find that offering incentives increases the re-election odds of governors.

4 Effects of State and Local Business Incentives

What is the effect of these business tax policies on firm location, economic activity, and fiscal outcomes? Answering this question is difficult. One approach is to measure how outcomes change after a business tax policy change, but this approach is problematic because state and local governments may be more likely to enact policies or give more generous incentives when economic conditions are deteriorating or are expected to deteriorate. Indeed, in terms of generosity, Figure 3 shows that poorer places give larger subsidies per worker. Alternatively, places may be more likely to enact policies when economic conditions give them more slack in

[12] In 2000, the winning counties had a mean population of 407,000 and an average wage of $45,500, while the runner-up counties had a mean population of 610,000 and an average wage of $48,600. Counties with at least 100,000 residents have a similar profile to the winners: a mean population of 400,000 and an average wage bill of $44,400. Meanwhile, the average county had a population of 91,000 and an average wage of $34,800. See Appendix Table A.4 for more detail.

the budget. Thus, comparing outcomes before and after may reflect how the place was trending, rather than the effect of the policy itself. An alternative comparison group, such as runner-up locations or states that will adopt similar policies a few years later, can help difference out common trends and identify the effects of policy changes.

4.1 Evidence on Discretionary Subsidies

This subsection investigates the effects of firm-specific tax incentives by comparing outcomes in "winning" locations to runner-up locations as in Greenstone and Moretti (2003) and Greenstone, Hornbeck and Moretti (2010). We examine effects on employment within the targeted industry (i.e., at the NAICS 3-digit level), spillovers to other labor market outcomes, and overall effects on house prices. We use county-level data to look at these outcomes and state-level data to look at effects on government expenditures and revenues. We then compare these results with prior results in the literature.

Figure 4A shows how employment within the 3-digit industry of the targeted firm differs between "winning" and "runner-up" counties in the years before and after the incentive. It shows that differences in the years before the policy are fairly stable but then increase after the discretionary incentive to be approximately 1,500 jobs higher in the winner versus the runner-up location. This result suggests that we can detect the direct effects of these policies on local employment within the sector of the deal.

Table 4 shows difference-in-differences estimates for a broader set of local outcomes. The results are more mixed and weaker for effects on employment outside the 3-digit industry as well as on county-wide outcomes. For example, we don't see strong evidence of effects on other 2-digit, 1-digit, or county-wide employment outcomes outside the directly affected 3-digit sector. Patterns are similar at a broader geographic (CONSPUMA) level. While it is hard to measure distributional outcomes using publicly available data at the county level, Column 7 also finds little impact on the employment-to-population ratio, which is one of the ways to measure equity impacts.

Figure 4B shows the effects on county-level house prices. In the years prior to the discretionary subsidy, winning counties had slightly higher house prices but the differences are minor. However, after the subsidy, house prices seem to decline to about 4% relative to the runner-up locations, but the effect is marginally significant statistically. This apparent decline in house prices, which may reflect a negative pre-trend rather than real effects, provides some weakly suggestive evidence that the welfare effects of these deals might be negative on average.

Prior studies have examined the effects of firm-specific incentives using the same approach and found somewhat different results. Greenstone and Moretti (2003) found employment effects at the 1-digit level and small increases of 1.1-1.7% in property values in a sample of 82 primarily manufacturing deals in the 1980s and early 1990s.[13] Greenstone, Hornbeck and Moretti (2010) use data on productivity of other manufacturing plants and find quite substantial total factor productivity spillovers in winning areas. Patrick (2016) finds

[13]Note, however, that their property value measure differs from the house price index and in their Data Appendix, they note a .54 correlation between their measure and a repeat sale house price index from OFHEO.

that the specific estimates in Greenstone, Hornbeck and Moretti (2010) are somewhat sensitive to specification choices such as the inclusion of trends and the selection of runner-ups, and that attracting a new large plant leads to modest increases in economic activity. Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten and Van Reenen (2019) expand the million-dollar plant data set and find spillovers using establishment level data for their sample in the 2000s.

The difference in results across these studies is likely due to differences in the question being asked and how the analysis samples are constructed. Asking what happens in places that had large investments is different than asking what happens in places that gave large subsidies. Large investments may lead to spillovers, whereas large subsidies may not.[14] The Greenstone and Moretti (2003); Greenstone, Hornbeck and Moretti (2010) and Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten and Van Reenen (2019) sample is selected on the size of firm investment, while our data is selected on the size of the subsidy. As subsidy-giving has become more prevalent in the 2000s, it is not always for large investment projects.[15]

Overall, our assessment of the current evidence is that the spillover effects of subsidies is mixed. While the million-dollar plant papers find evidence of spillovers, large firms that often get large subsides may not generate large spillovers on average in our data and in some other recent work. Criscuolo, Martin, Overman and Van Reenen (2019), for example, examine a related policy in the UK, where firms apply for a discretionary grant. They find employment and wage effects, but don't see any effects on total factor productivity. Their effects are concentrated for the smallest firms, as larger firms are able to receive incentives without changing their behavior.

4.2 Evidence on Corporate Tax Rate and Base Changes

There is also a large literature on the effect of state corporate tax policies on firm location, economic activity, and fiscal outcomes. A number of recent papers such as show that U.S. state corporate taxes affect firm location and FDI.[16] In terms of distributional effect, most of the gains from state corporate tax cuts go to firm and landowners (Suárez Serrato and Zidar, 2016); while there are also some wage gains for workers on average, it is not yet well-established which workers benefit and how much these benefits "trickle down" to low wage and unemployed residents.

Some of the more important corporate tax base provisions are those related to innovation and investment. Wilson (2009), Moretti and Wilson (2014), Moretti and Wilson (2017), and Akcigit, Grigsby, Nicholas and Stantcheva (2018) study the effects of state tax policies related to research and development on innovation.

[14] In a recent working paper using Census micro data, Patrick and Partridge (2019) find evidence of small spillovers on incumbent plans in the million-dollar plant sample, and smaller to no spillovers in a larger sample of subsidized plants. The larger sample of subsidized firms is the million-dollar plant sample plus the *Site Selection* sample without runners-up plus the Good Jobs first sample. More generally, one potential issue with the runner-up design is that some firms may use implausible runner up locations to game the bidding process, in which case effects may be overstated.

[15] To confirm that our specification choices were not causing the differences, we estimated them using the set of plants from Greenstone and Moretti (2003); Greenstone, Hornbeck and Moretti (2010) and Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten and Van Reenen (2019) and confirmed that our approach delivers results that are consistent with this earlier work in that we see spillovers beyond the 3-digit industry at the county level. We report these results in the appendix.

[16] Readers interested in this literature might begin with papers from the last few years like Ljungqvist and Smolyansky (2016); Suárez Serrato and Zidar (2016); Fuest, Peichl and Siegloch (2018); Fajgelbaum, Morales, Suárez Serrato and Zidar (2018); Curtis and Decker (2018); Giroud and Rauh (2019); Mast (Forthcoming). For foreign direct investment and state taxes, Hines (1996) is a central reference.

Ohrn (2018) shows the effects of accelerated depreciation policies on investment at the state level, and Chirinko and Wilson (2008) study state investment tax credits. Garrett, Ohrn and Suárez Serrato (Forthcoming) show that these investment effects also affect state employment. A full assessment of this literature is beyond the scope of this paper, but we mention this research to highlight some of the current evidence on numerous levers policymakers use to attract firms and increase economic activity in their jurisdictions.

5 National Welfare and Additional Considerations

In practice firm-specific incentives represent the large majority of local and economic development spending in the United States (Bartik, 2019*b*). From a national perspective, we need to consider not only the effects on the agents in the location providing incentives, but also on the agents in all other locations. Much of the literature on tax competition (for a survey, see Agrawal, Hoyt and Wilson (2019)) highlights the possibility of a race to the bottom and over-subsidization of firms. A prisoner's dilemma perspective in which every location acting in their own self-interest, leading to a sub-optimal equilibrium for all helps reveal why some policymakers have called for subsidy bans in the United States (Markell, 2017) and has led to bans on such subsidies within the European Union. In this section, we discuss the conditions under which allowing state and local business incentives may or may not be in the national interest.

As a baseline, consider the simplest frictionless benchmark with no externalities and the optimal level of government service provision. In this case, business incentives likely reduce aggregate welfare. Moving a firm to a location to which it would not go in the absence of incentives misallocates resources (Gaubert, 2018; Fajgelbaum, Morales, Suárez Serrato and Zidar, 2018) and has fiscal costs that either raise taxes, which increase dead weight loss, or lowers government spending below optimal levels.

Considering fiscal externalities and productivity spillovers can change this assessment. If firms do not internalize the externalities they provide, allowing local areas to align tax incentives and social benefits may increase allocative efficiency (Glaeser, 2001; Ossa, 2015). For example, moving a technology firm from San Francisco, California, to Columbus, Ohio, may lead to more service employment, wage growth, and local fiscal benefits in Ohio. In terms of externalities across locations, reallocating activity may affect fiscal conditions in other locations (Gordon, 1983) and can also increase overall economic activity in some circumstances. For example, overall US innovative activity may be higher if the technology firm remains in San Francisco (Moretti, 2019; Glaeser and Hausman, 2019; Sollaci, 2019) due to gains from concentrating scientists in knowledge hubs. It is not clear, however, if concentrating firms and workers would increase aggregate activity in most industries or in other settings.[17]

Equity considerations are the basis for some of the most compelling arguments for placed-based incentives. Income and opportunity vary substantially across regions, and place-based policies can provide unique targeting benefits for addressing these disparities (Gaubert, Kline and Yagan, 2019). Gaubert, Kline and Yagan (2019)

[17] Kline and Moretti (2013) find that the elasticity of local productivity with respect to population density is constant, suggesting that at least in the context of the Tennessee Valley Authority, the gains in one location are roughly offset by losses in the other. Some recent work on firm-specific incentives in the UK finds effects on employment and investment, but little gains in TFP (Criscuolo, Martin, Overman and Van Reenen, 2019).

characterize these conditions, which relate to sorting, productivity differences across locations, worker mobility, and other features affecting the equity and efficiency of the optimal income tax system.

Moreover, these regional disparities may reflect labor market frictions or other distortions from the tax system (Albouy, 2009; Fajgelbaum, Morales, Suárez Serrato and Zidar, 2018), transfers (Baicker, Clemens and Singhal, 2012), and other state and local policies and regulations (Hsieh and Moretti, 2019). For example, search frictions can lead to large gains from incentivizing firms to move to high unemployment areas (Bilal, 2019). The underlying idea is that the shadow value of a job or resources in general is likely highly unequal across regions. In principle, the theory of second-best suggests that incentive policies may be able to improve welfare, because we are not starting from an undistorted frictionless benchmark. But it also not clear how effective these policies are in increasing income and opportunity for non-employed and low-wage workers who play a key role in these equity arguments.

The equity gains from local business tax incentives may be limited if the most distressed places, which may benefit most from attracting a firm, lack sufficient revenue to offer incentives to attract that firm. Other prominent place-based policies—like the Tennessee Valley Authority discussed by Kline and Moretti (2013) and Empowerment Zones discussed by Busso, Gregory and Kline (2013*b*)—avoid these limitations by using federal funding.

6 Conclusion

State and local governments are devoting substantial resources towards attracting firms and corporate capital. This article has discussed three different incentive policies state and local governments currently use, the tradeoffs between these policies, and the evidence we have on the effects on local economic activity.

We provide descriptive evidence that industries with larger multiplier effects are more likely to receive subsidies, and receive more subsidy dollars per job. We also find that poorer places spend more per job. In terms of local economic effects, we find limited evidence that these subsidized firms have employment spillovers in the local economy. In that case, the argument for this place-based policy rests more heavily on equity considerations.

Many questions remain unanswered. How much do these policies improve the well-being of underemployed and low-income workers? Are the most distressed places able to attract firms with tax incentives? How effective are these approaches relative to other policies? Does targeting subsidies at the largest firms have anticompetitive effects in the product market? At the local level, is the newly-attracted firm stimulating hiring of local residents that were previously unemployed and working in low-wage jobs? Or as was argued in the case of Amazon's proposal for putting a headquarters in New York City, are all the good jobs going to people moving in from other locations, while leaving locals with more congestion and higher prices?

Policymakers can design incentives with these considerations in mind and evaluate the extent to which these policies actually "trickle down." Bartik (2019*a*) calls for targeting tax incentives to hard-hit regions, and to employers who promise to hire local residents. He also notes that targeting marginal investments and job

creation in tradable industries with high multipliers, instead of individual firms, could reduce political influence. More evidence on the conditions under which these policies are effective and for whom would help improve policy recommendations.

To the extent that well-targeted and effective policy is not feasible, recent harmonization efforts at the state and local level also hold promise. New York state lawmakers have proposed the "End Corporate Welfare Act" to outlaw firm-specific state tax incentives, and have urged other states to do the same. Of course, an incentives truce is much more attractive to a state like New York than it is to states with distressed regions that are struggling to attract firms and grow their local economies.

Given disparate impacts of a universal ban on firm-specific incentives and regional heterogeneity, another promising avenue is harmonization at a regional level. Fajgelbaum, Morales, Suárez Serrato and Zidar (2018) find that regional tax harmonization can achieve most of the gains of a national tax harmonization. In 2019, Kansas and Missouri came to a truce: they would not offer tax incentives for firms moving from the other side of the border in Kansas City. However, both states rushed to finalize large incentive deals right before the truce was enacted.

Avoiding these dynamics and directing funds to the most distressed regions may require a larger federal role. However, implementation details are key. Lenient eligibility requirements for the new federal opportunity zone program, for example, may not be as effective at targeting distressed regions as past programs with similar goals and stricter criteria like empowerment zones, which funded places with poverty rates above 40% and unemployment rates above 15% (Busso, Gregory and Kline, 2013*a*). Other countries have adopted more centralized approaches. For example, the EU restricts state aid to reduce concerns about tax competition. Instead, they implement EU structural funds at the super-federal level and use incentives to reduce regional disparities by encouraging investment, capital deepening, and economic development in distressed areas.

Given the scale and scope of state and local business tax incentives in the United States, much more work needs to be done by academics and policymakers to analyze how these programs affect the welfare of local areas and the nation. While there have been recent efforts to increase transparency (Governmental Accounting Standards Board Statement 77), the new reporting requirements still give too much discretion to governments in terms of what to report and how to report it (Governmental Accounting Standards Board, 2015). The data are not yet uniform, comprehensive, or high-quality. Even with these new accounting rules, roughly half of municipalities have not disclosed any revenue lost to tax incentives in their annual financial reports (Farmer, 2018). Meanwhile, at the state level, Michigan, Kansas, and Montana recently enacted laws requiring evaluation of business tax incentives, but many other states still do not have them.

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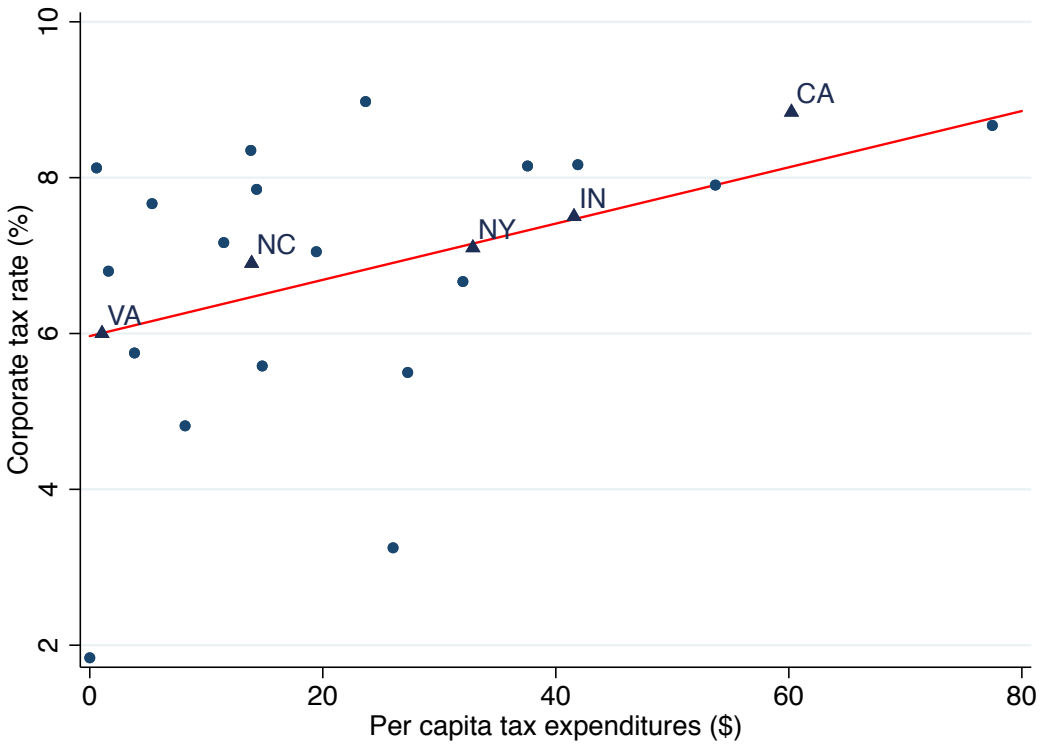
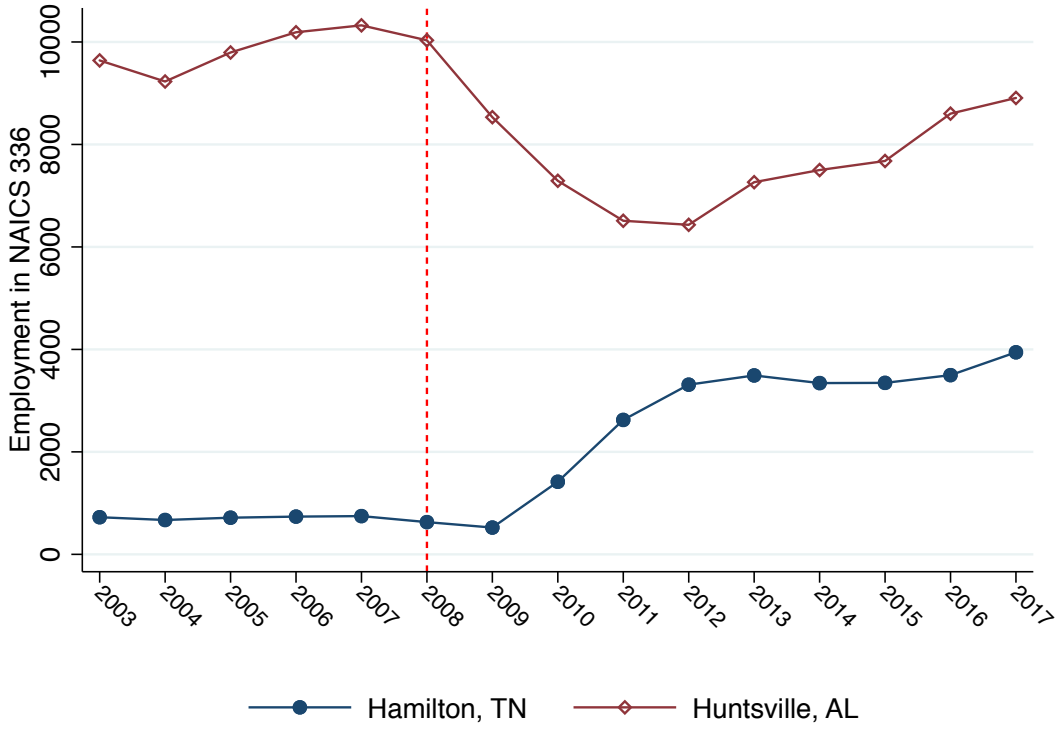
Figure 1: Corporate Tax Rates and Tax Expenditures are Positively Correlated



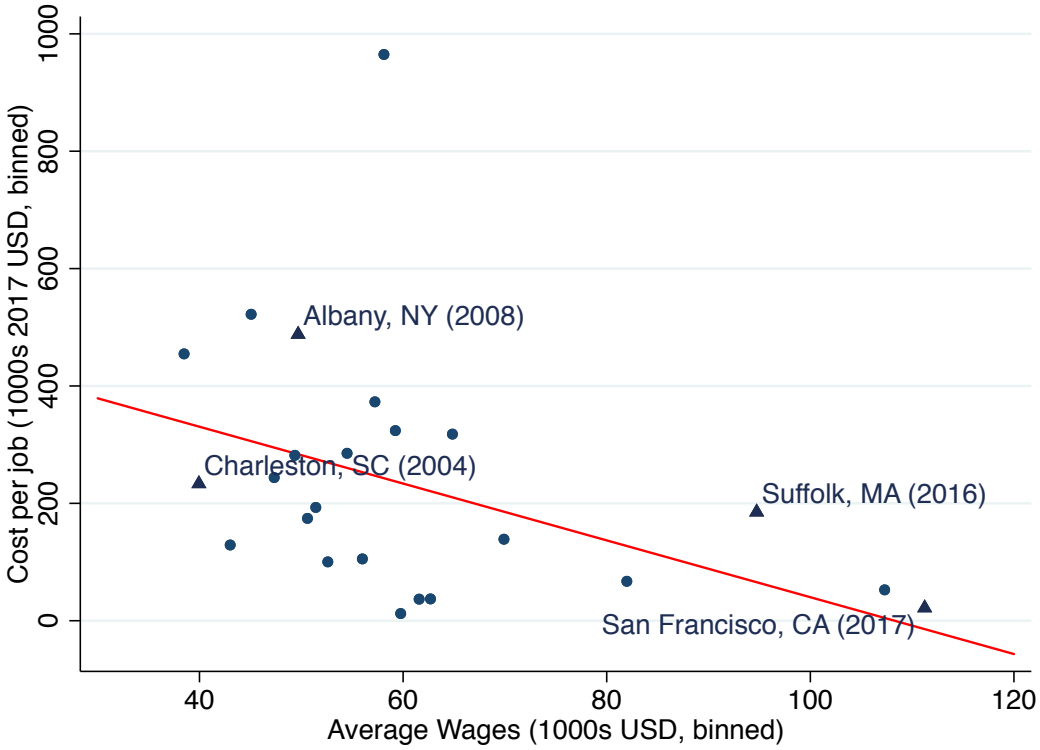
Notes: This figure plots state corporate income tax rates and per capita state business tax expenditures in 2014. The per capita tax expenditure is the total amount of tax expenditures for new and expanding businesses in a state, divided by the state population. The source of the tax expenditure data are the state tax expenditure reports compiled by Slattery (2019). Data on corporate tax rates comes from Suárez Serrato and Zidar (2018), and population data comes from the US Census. Triangles in the plot are specific states; circles are binned data. Best fit line estimates are from a population-weighted linear regression of corporate tax rates on per capita tax expenditures. The figure shows that per capita business tax expenditures tend to be higher in states with higher corporate tax rates.

Figure 2: Auto Employment in Winning and Runner-up County of 2008 VW Deal



Notes: This figure plots total employment in transportation manufacturing (NAICS 336) in Hamilton County, TN (the county Volkswagen chose) and Huntsville, AL (the runner-up location). The red dashed line indicates the year of the deal, 2008. Data on industry-specific employment comes from the Quarterly Census of Employment and Wages (QCEW, 1990-2017).

Figure 3: Low-Wage Locations Provide More Generous Subsidies

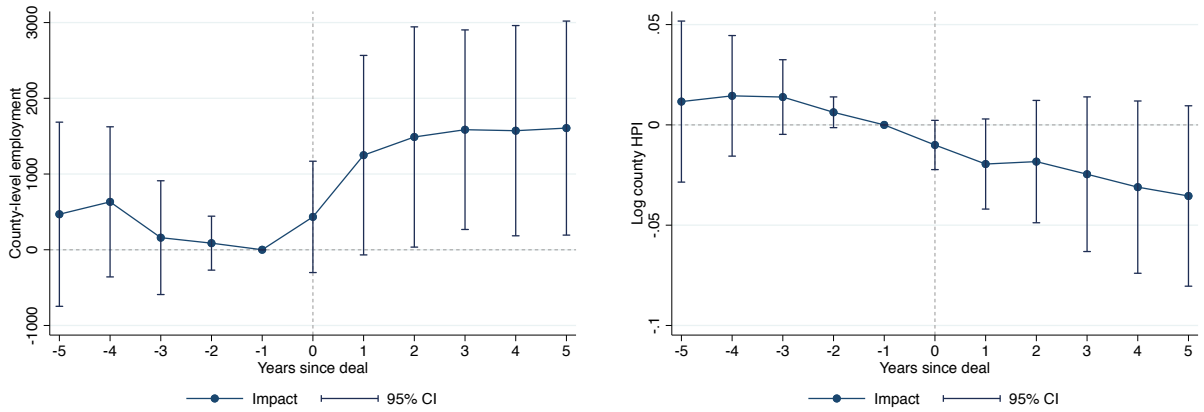


Notes: This figure shows the relationship between local average earnings and the generosity of firm-specific incentives subsidies. The sample is firm-specific incentive deal winners 2002-2017. We calculate the cost per job for each subsidy in the firm-specific deal data (Slattery, 2019). Cost per job is the total subsidy size divided by the number of jobs promised in the subsidy deal. Average wages are sourced from the Quarterly Census of Employment and Wages (QCEW, 1990-2017). The figure plots total subsidies for each deal relative to average wages in the winning county. Triangles in the plot are individual data points; circles are binned data. Best fit line estimates are taken from a population-weighted linear regression of subsidy cost per job on average county wages. The figure shows that lower wage counties offer larger subsidies per job.

Figure 4: The Effect of Winning a Firm on County-level Outcomes

(a) Employment within 3-Digit Industry

(b) Log House Price Index



Notes: This figure shows the event study estimates of the effect of winning a firm-specific deal on county level employment within the NAICS 3-digit industry of deal in Panel (a) and on county level house prices in Panel (b). The sample is a balanced panel of firm-specific deals taking place between 2002 and 2012 taken from Slattery (2019). The sample is restricted to deals for which we observe employment, population, and average wages ten years before the year of deal and five years after. The outcome data thus span 1997 to 2017, and the control for log employment, population, and average wages 10 years in advance of the deal year are measured in 1992 or later. Housing price index data is taken from the Federal Housing Finance Agency (2014), and employment data is taken from the Quarterly Census of Employment and Wages (QCEW, 1990-2017). The figure shows that winning a deal increases employment in the 3-digit industry of the deal, but property values decrease.

Table 1: Business Tax Policy Instruments Across States in 2014

	Average	AL	CA	NV	NY	PA	SC	TN	WV
Instrument 1:									
Corporate Tax Rate (%)	6.5	6.5	8.8	0	7.1	10	5	6.5	6.5
Corporate Tax Revenue per capita (2017 USD)	162	90	246	0	264	193	81	193	118
Instrument 2:									
Tax Credits per capita (2017 USD)	19	11	60	0	33	15	32	16	0
Econ Development per capita (2017 USD)	34	15	2	5	142	25	8	35	177
Instrument 3:									
Number of subsidies	14	15	13	4	20	3	16	12	4
Cost per job (2017 USD)	45,785	12,466	4,997	42,339	11,712	93,406	6,433	11,805	34,345
Incentives as a percent of Corp Tax Revenues (%)	38	29	25	N/A	66	20	49	26	150

Notes: This table shows differences in business tax policy instruments across states in 2014. Corporate income tax revenue is sourced from the US Survey of State and Local Government Finance, via the Tax Policy Center (Urban-Brookings Tax Policy Center, 1977-2016). Population data comes from the US Census and data on corporate tax rates comes from CSG Book of the State (1950-2018). The data on tax expenditures, economic development spending, number of subsidies, and cost per job are from Slattery (2019). The number of subsidies and cost per job statistics are available for subsidies that exceed 5 million dollars, as described in the data section. State tax credits per capita are expenditures on tax credits for businesses divided by population, and state economic development per capita is any spending in the state budget for new and expanding businesses, divided by population. The number of subsidies and the average cost per job (Instrument 3) are for the entire sample (2002-2017), not just for 2014.

Table 2: Select Industries Receiving Firm-Specific Incentives

	# of Deals	Subsidy (2017 M USD)	Jobs Promised	Cost Per Job (2017 USD)	Investment Promise (2017 M USD)
Full sample	543	178.4	1,487	119,972	757.5
Automobile manuf. (3361)	56	293.6	2,768	106,057	854.8
Aerospace manuf. (3364)	31	585.8	2,734	214,237	534.5
Financial activities (5239)	25	92.3	2,652	34,809	286.8
Scientific R&D svc (5417)	22	113.7	518	219,259	185.0
Basic chemical manuf. (3251)	18	187.4	196	956,701	779.0

Notes: This table shows descriptive statistics for firm-specific incentives at the industry level, for select industries mentioned in the text. It is tabulated using firm-level subsidy data from Slattery (2019); the sample is firm-specific incentive deals from 2002-2017. This sample focuses on *large* subsidy deals that exceed 5 million dollars, as described in the data section. The table reports the number of deals for each industry, and the mean subsidy size, jobs promised, cost per job, and investment promised. See Appendix Table A.3 for more industries and for industry averages.

Table 3: When Do States Increase Incentive Spending?

	Per Capita Incentives Increase by 20%					
Governor can run as incumbent	0.05				-0.02	-0.02
	(0.06)				(0.06)	(0.06)
Election year		0.11*			-0.08	-0.07
		(0.06)			(0.10)	(0.10)
GDP per capita ($1000) in $t-1$			0.00			0.02*
			(0.01)			(0.01)
% of population employed in $t-1$				-0.05		-0.09**
				(0.03)		(0.04)
Gov can run as incumbent × Election year					0.27**	0.25**
					(0.11)	(0.11)
Observations	336	336	336	336	336	336
R-squared	0.17	0.18	0.17	0.18	0.20	0.21

Notes: This table shows the relationship between state characteristics and increases in state per capita incentive spending. The sample is states between years 2007 and 2014. State per capita incentive spending includes both state tax expenditures on tax credits for businesses, and state economic development programs for businesses. The dependent variable is an indicator for whether per capita incentive spending increased by more than 20%. States increased per-capita spending by over 20% 63 times, or 19% of the sample of state-years. GDP is sourced from the US Bureau of Economic Analysis (U.S. Bureau of Economic Analysis, 1967-2017). Population is sourced from the US Census, while employment is sourced from the Census County Business Patterns (County Business Patterns, 1997-2017). Data on whether the governor can run as an incumbent, or if the state is in an election year is sourced from Follow the Money (2000-2016). State and Year Fixed Effects are included in each specification. Standard errors reported in parentheses. *** p < 0.01, ** p < 0.05, *p < 0.1

Table 4: The Effect of Winning a Firm-Specific Deal on County-Level Outcomes

	3-D Ind. Employment (1)	Res. 2-D Ind. Employment (2)	Res. 1-D Ind. Employment (3)	Res. County-wide Employment (4)	Personal inc. (5)	log HPI (6)	Emp/pop (7)
Panel A. Levels Estimates							
Winner × Post	1108.287**	780.238	53.154	-1920.430	-1090.989	N/A	-0.001
	(539.686)	(1096.283)	(1928.740)	(5301.175)	(716.305)	N/A	(0.002)
Mean of outcome	9326.605	15763.784	49393.076	2.80e+05	49826.006	N/A	0.470
Panel B. Log Estimates							
Winner × Post	0.149**	0.026	0.030	0.003	-0.005	-0.040*	-0.002
	(0.068)	(0.027)	(0.019)	(0.013)	(0.012)	(0.021)	(0.004)
Mean of outcome	7.965	9.037	9.922	12.006	16.667	4.858	-0.759

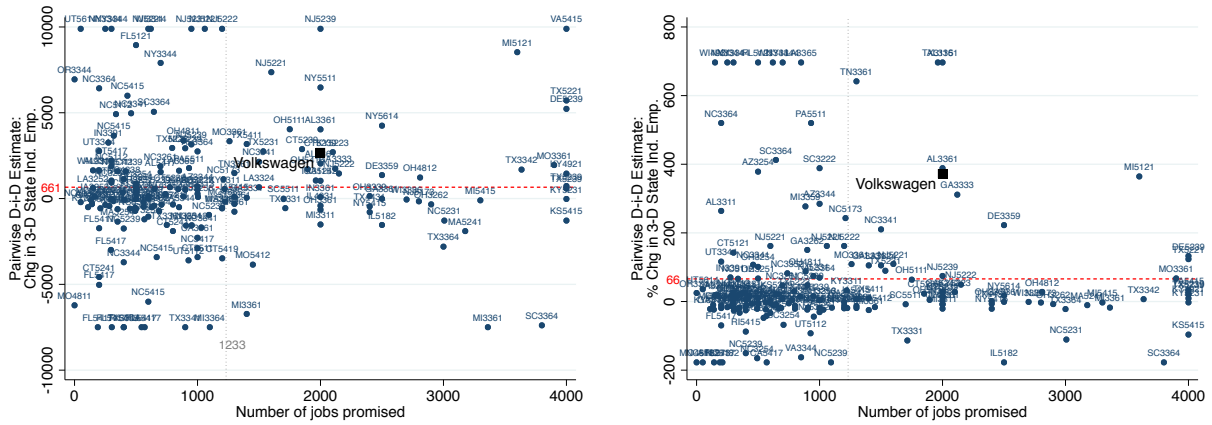
Notes: This table shows difference-in-differences estimates of the effects of winning a firm-specific deal on a variety of county-level outcomes. Employment data are from the Quarterly Census of Employment and Workers (QCEW, 1990-2017), HPI data are from the (Federal Housing Finance Agency, 2014), and employment-to-population figures are computed using BLS data for the numerator and BEA data for the denominator. Standard errors reported in parentheses and are clustered at the state level. *** p < 0.01, ** p < 0.05, *p < 0.1

A Appendix

Figure A.1: Pairwise Difference-in-Differences Estimates of Firm-Specific Subsidies

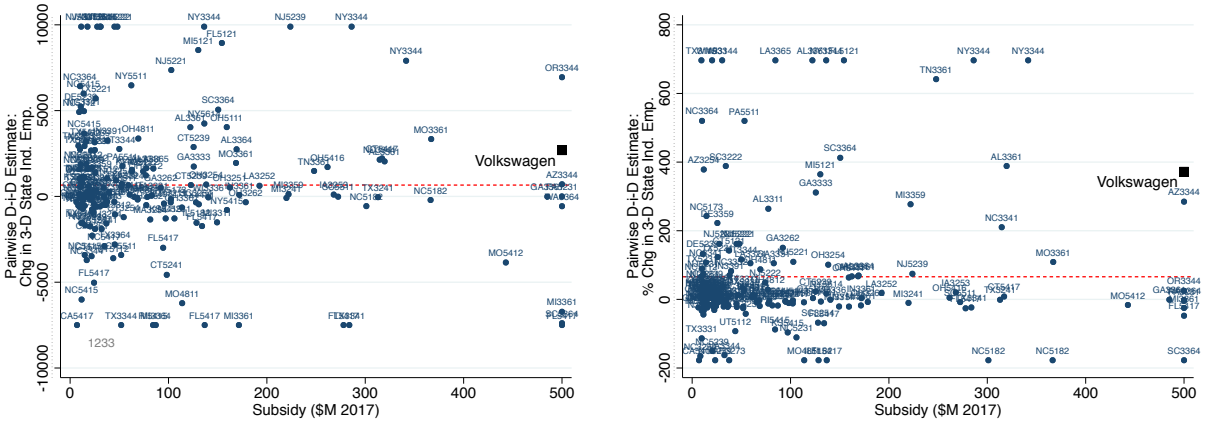
(a) Number of Jobs Promised, Level

(b) Number of Jobs Promised, Percent



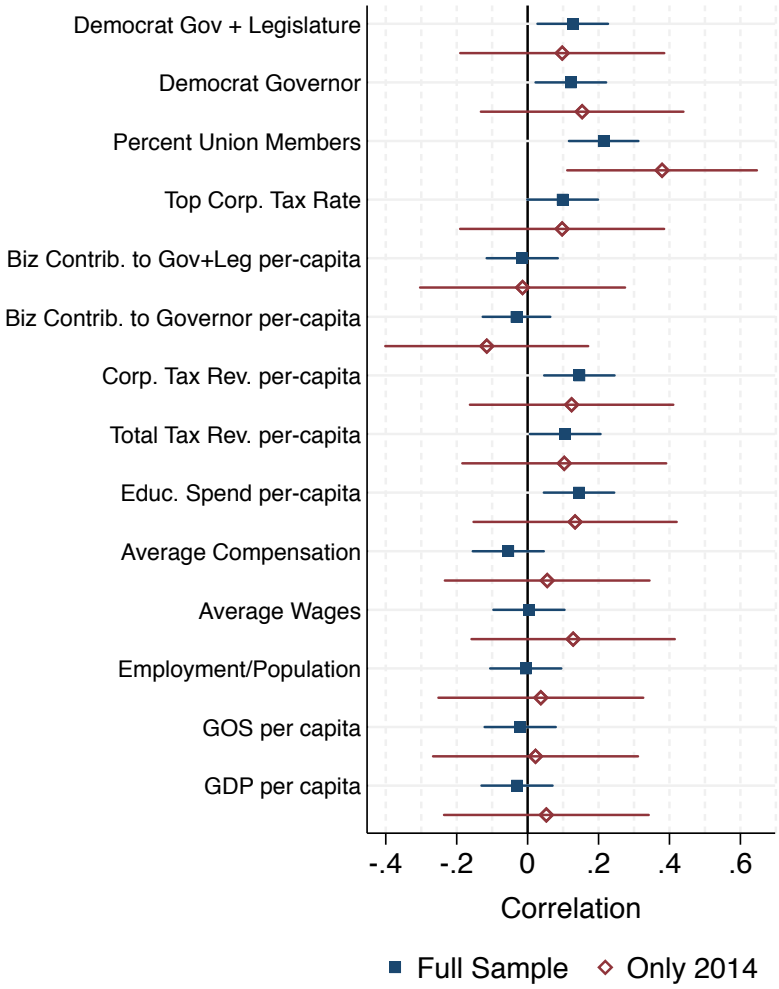
(c) Size of Subsidy, Level

(d) Size of Subsidy, Percent



Notes: This figure plots pairwise difference-in-difference estimates for the deals in our sample whose "winner and "runner-up counties have positive pre-deal employment. Pre-deal employment is the average for the three years prior to the deal. Post-deal employment is the three-year average of employment 4, 5 and 6 years after the deal. The sample is winner-runner-up pairs whose year of deal is between 2002 and 2012. Panels A and B compares the level and percent change in employment to the number of jobs promised. Panels C and D replicate Panels A and B, but plot the estimates relative to the size of the subsidy package. Estimates are winzorized at the 5% level. The dotted light gray line denotes the average number jobs promised and the size of the average subsidy package. The dashed red line denotes the mean difference-in-differences estimate. We censor number of jobs promised at 4,000 and subsidy amount to $500M for visualizations sake. Four deals promise over 4,000 jobs, and 5 subsidies are over $500M.

Figure A.2: State Characteristics and Per Capita Incentive Spending

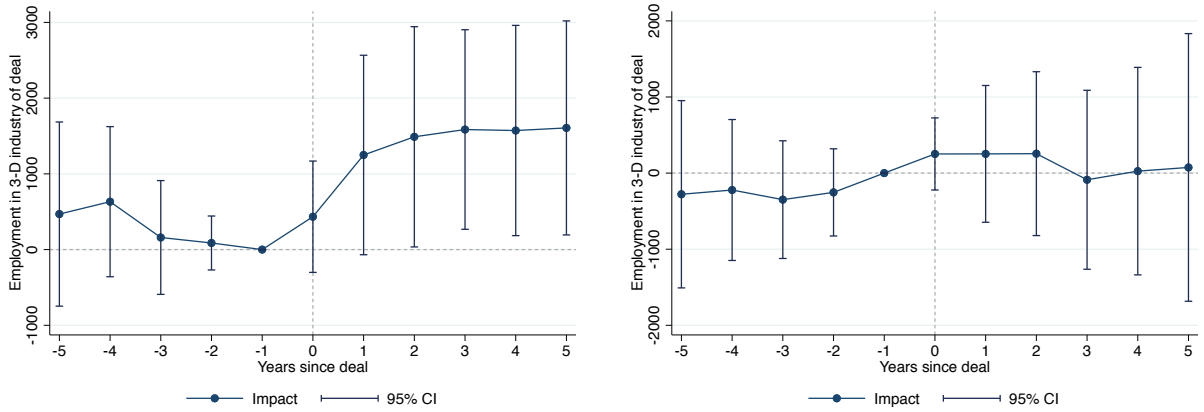


Notes: This figure plots correlations between state per capita business tax incentive spending and state characteristics. The correlation coefficient and the 95% confidence interval are reported. The navy squares report the relationship over the full sample (2007- 2014), while the maroon hollow diamonds report the results for 2014. State per capita incentive spending is from Slattery (2019). GDP, GOS, and compensation are sourced from the U.S. Bureau of Economic Analysis (1967-2017). Corporate income tax revenue, total tax revenue, and education expenditures are drawn from the US Survey of State and Local Government Finance, via the Tax Policy Center. Top corporate income rates from the CSG Book of the State (1950-2018). Population comes from the US Census. Wages and employment are sourced from the Census County Business Patterns (1997-2017). Data on state union shares come from the work of Hirsch, Barry and Macpherson, David and Vroman, Wayne (1964-2018), while campaign contributions come from Chirinko and Wilson (2010). Lastly, data on the party of governors and state legislatures is from Follow the Money (2000-2016).

Figure A.3: Event Studies: Within-Industry Employment Effects of Winning a Subsidy Deal

(a) Our Deals Dataset

(b) Million-Dollar Plants Deals Dataset

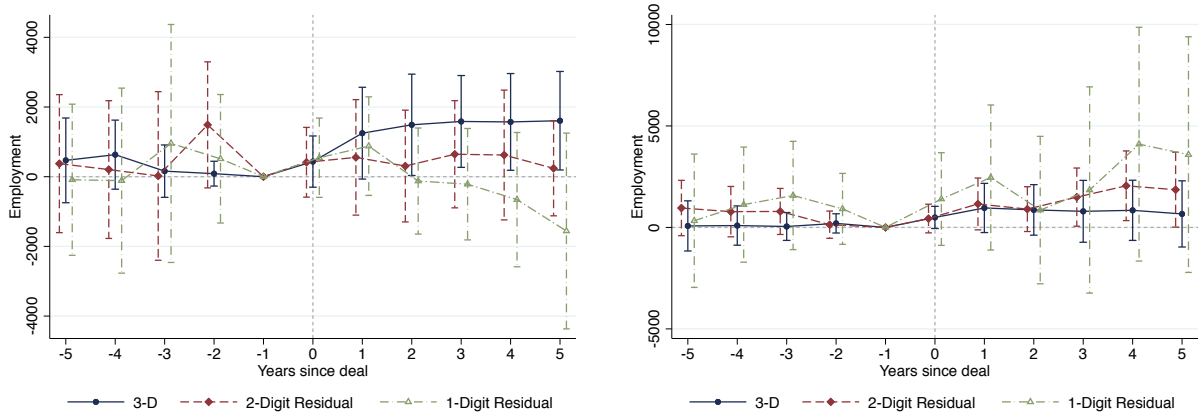


Notes: This figure plots event study estimates of the effect of winning a firm-specific deal on employment in NAICS 3-digit industry of deal, with employment data taken from Quarterly Census of Employment and Wages (QCEW, 1990-2017). We use the same specification as Figure 4. Panel (a) shows event study coefficients estimated using firm-specific subsidy deals from Slattery (2019), and Panel (b) shows more modest and less precise effects as measured using Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten and Van Reenen (2019) deals dataset.

Figure A.4: Event Studies: Employment Effects of Winning a Subsidy Deal

(a) Our Deals Dataset

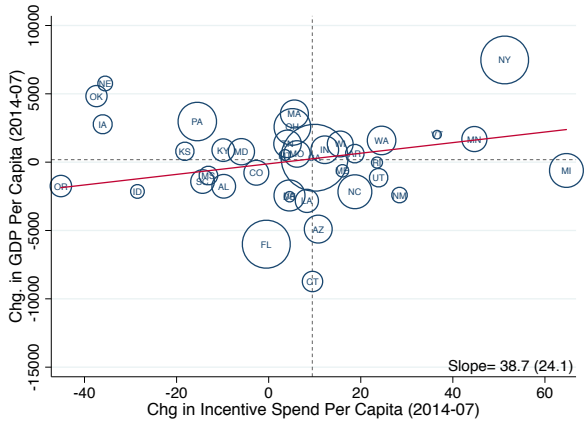
(b) Million-Dollar Plants Deals Dataset



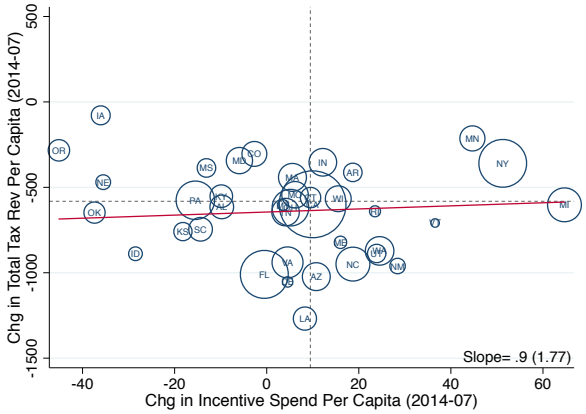
Notes: This figure shows event study estimates of the effect of winning a firm-specific deal on three outcomes: employment in 3-digit industry of deal, 2-digit residual employment, and 1-digit residual employment. We use the same specification as Figure 4. Panel (a) plots event study coefficients using firm-specific subsidy deals from Slattery (2019), showing little evidence for positive employment spillovers associated with winning a firm-specific deal. Panel (b) plots event study coefficient using Bloom, Brynjolfsson, Foster, Jarmin, Patnaik, Saporta-Eksten and Van Reenen (2019) deals dataset which covers deals in roughly the same period. While estimates in panel (b) are imprecise, they show a rosier picture for potential spillover effects. In both panels, employment figures are taken from the Quarterly Census of Employment and Wages (QCEW, 1990-2017).

Figure A.5: Changes in State Incentive Spending, Economic Activity, and Fiscal Policy

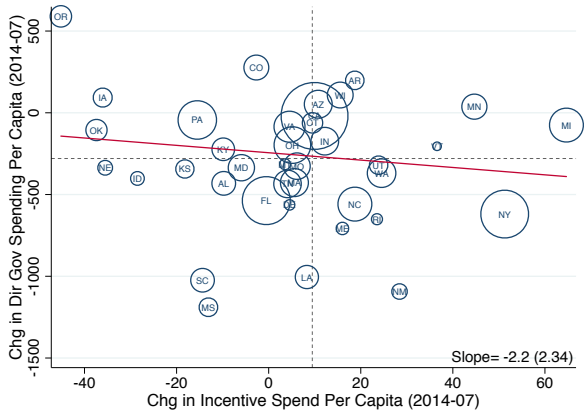
(a) GDP Per Capita



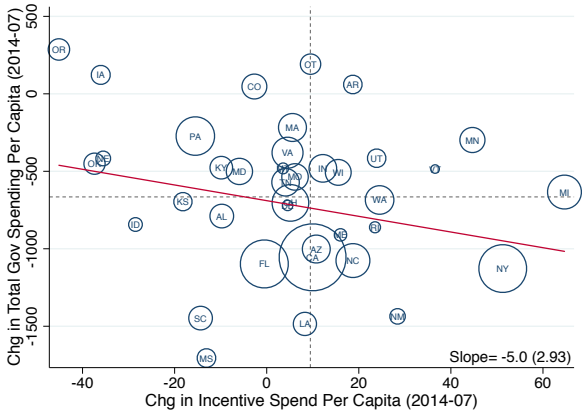
(b) Total Tax Revenue Per Capita



(c) Direct Spending Per Capita



(d) Total Expenditures Per Capita



Notes: This figure plots the change in per capita outcomes of each state from 2007 to 2014 versus the change in per capita incentive spending over the same period. Per capita incentive spending includes both state tax expenditures on tax credits for businesses, and state economic development programs for businesses. The incentive spending data is collected by the author from state tax expenditure reports and state budget documents (Slattery, 2019). The source of the state outcome data (GDP, tax revenues, direct spending, and total expenditures) is the Census of Governments.

Table A.1: The Size Distribution of Establishments Receiving Firm-Specific Incentives

Employment	# of Firm-Specific Incentives	Total Establishment Entry	% Coverage
1 - 99	39	8,971,339	0.00
100 - 249	47	26,126	0.18
250 - 499	80	4,251	1.88
500 - 999	141	1,419	9.94
1000+	236	639	36.93

Notes: This table reports the number and percentage of establishments that receive firm-specific incentives, by employment size. The set of 543 firm-level subsidy deals is from Slattery (2019). The rows correspond to the employment level of the establishment. For the subsidy deals, this is the number of jobs promised at the establishment. For the total establishment entry, it is the actual employment at the establishment. The first column is the number of establishments of that size that received discretionary subsidies over the period 2002-2016. The second column is the total number of establishments entering the U.S. over the same period (sourced from the Census Business Dynamics Statistics). The third column is the % of total entrants that receive firm-specific incentives (number of firm-specific incentives divided by total entry).

Table A.2: Characteristics of Firms that Receive Firm-Specific Incentives

	All Compustat		Subsidized Firms		Subsidized Firms: Year of Deal	
	Mean	Median	Mean	Median	Mean	Median
Employees (1000s)	9.0	0.6	71.8	34.3	102.5	64.4
Capital Stock ($M)	1,513.3	28.2	12,221.9	3,074.5	18,473.7	8,026.0
Revenue ($M)	3,458.7	184.5	40,289.3	15,152.0	60,941.9	40,660.0
Gross Profit ($M)	1,138.8	67.5	13,128.6	4,049.4	20,846.0	9,255.8
Market Value ($M)	2,991.4	189.5	45,499.6	13,199.0	77,448.5	28,204.2
State Income Taxes ($M)	5.1	0.0	57.9	8.1	99.4	13.9
Total Income Taxes ($M)	99.8	1.0	1,226.2	276.8	1,792.3	639.3
Observations	107,214		2,422		303	

Notes: This table includes descriptive statistics for all firms included in Compustat, and the Compustat firms that received discretionary subsidies, from 2002 to 2014. Compustat is a database of financial, statistical and market information on global companies throughout the world. We merged the firm-level subsidy data (Slattery, 2019) to Compustat data on firm names. We found 56% of the firms in Compustat. In the first two columns we report statistics for the full sample of 107,218 active firm-years in Compustat. In columns 3 and 4 we report the same statistics for the sample of firms in Compustat that are observed receiving at least one firm-specific incentive in the firm-level subsidy data. Columns 5 and 6 report the statistics for the same subsample of firms, only for the year in which they receive the firm-specific incentive. Dollars are measured in 2017 dollars.

Table A.3: Top Industries Receiving Firm-Specific Incentives

Industry (NAICS)	Subsidy ($ M) Mean	Subsidy ($ M) Median	# Jobs Promised Mean	# Jobs Promised Median	Cost per Job ($) Mean	Cost per Job ($) Median	Investment($ M) Mean	Investment($ M) Median	# of Deals
Full sample	178.4	53.2	1,487	810	119,972	65,678	757.5	219.0	543
Analysis sample	163.3	53.8	1,229	868	132,884	62,045	765.0	236.4	196
Manufacturing analysis sample	214.1	57.2	1,071	738	199,907	77,532	1,004.4	389.3	101
Automobile manuf. (3361)	293.6	118.2	2,768	2,000	106,057	59,119	854.8	500.0	56
Aerospace manuf. (3364)	585.8	94.9	2,734	1,100	214,237	86,265	534.5	500.0	31
Semiconductor/electronic manuf. (3344)	188.1	58.2	730	500	257,623	116,450	2,145.0	351.5	27
Financial activities (5239)	92.3	24.9	2,652	1,691	34,809	14,749	286.8	84.1	25
Scientific R&D svc (5417)	113.7	51.7	518	302	219,259	171,440	185.0	42.2	22
Pharmaceutical/medicine manuf. (3254)	55.1	36.8	601	500	91,743	73,691	389.1	191.6	21
Basic chemical manuf. (3251)	187.4	93.2	196	126	956,701	736,516	779.0	699.8	18
Information Technology (5415)	143.6	29.3	2,325	800	61,756	36,648	459.8	21.5	18
Data processing, hosting/related svc (5182)	169.4	112.7	490	110	345,513	1,024,982	1,270.5	1,000.0	14
Rubber product manuf. (3262)	109.1	92.1	1,465	1,200	74,447	76,776	538.9	570.0	13
Petroleum/coal manuf. (3241)	141.5	84.9	605	218	233,995	390,463	3,525.0	662.0	12

Notes: This table reports descriptive statistics for subsidy deals in the top 10 industries, by number of deals, in the subsidy deal data set (Slattery, 2019). We report the mean and median size of the subsidy deal (2017 $M) for each industry, as well as the mean and median number of jobs promised in those deals. We also include descriptive statistics on the cost per job (subsidy over number of jobs promised), and investment promised. The top 10 industries in the table make up 47% of the sample in terms of number of deals, and 56% of the sample in terms of dollars spent.

Table A.4: Comparing Winner and Runner-up Counties

County:	Winner (Full)		Winner (Analysis)		Runner-up		Average		Pop > 100K	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Employment (1000s)	201.3	82.0	229.1	142.9	303.5	157.5	44.1	11.3	197.1	102.9
	(380.82)		(240.09)		(520.81)		(141.76)		(297.13)	
Population (1000s)	407.0	171.2	453.9	285.1	610.0	308.1	90.9	25.2	400.8	208.6
	(795.29)		(479.08)		(1,093.83)		(294.84)		(623.08)	
Wage bill (M)	10,969.5	3,403.9	12,789.2	6,751.4	17,477.6	7,689.0	2,086.8	376.7	10,059.3	4,207.9
	(23,012.67)		(15,973.19)		(31,657.84)		(8,236.70)		(17,826.63)	
Average wages (1000s)	45.5	42.8	48.6	45.0	48.6	45.0	34.8	33.1	44.4	42.1
	(11.99)		(13.24)		(14.84)		(8.96)		(10.89)	
Personal income (M)	19,640.2	6,592.2	23,161.7	11,790.5	31,131.8	14,512.0	3,968.0	792.9	18,809.3	8,473.0
	(38,879.81)		(29,274.20)		(53,499.94)		(14,449.31)		(30,781.22)	
Personal income per capita (1000s)	40.9	39.3	44.5	41.8	45.6	41.7	34.1	32.8	42.9	40.6
	(12.03)		(14.09)		(14.64)		(8.53)		(11.25)	
Population density	1,096.7	285.3	1,524.9	485.2	1,702.1	506.3	229.4	42.4	1,088.6	341.0
	(4,765.15)		(6,439.90)		(6,302.85)		(1,674.19)		(3,926.36)	
Unemployment rate (%)	4.0	3.7	3.7	3.4	3.8	3.5	4.4	4.1	3.9	3.6
	(1.28)		(1.05)		(1.17)		(1.69)		(1.52)	
% emp in mfg.	21.5	18.0	20.1	16.0	17.6	15.3	19.3	17.3	16.4	14.8
	(13.04)		(13.24)		(9.87)		(15.28)		(9.16)	
% emp info & prof svcs.	19.3	17.2	22.4	22.1	24.1	24.0	9.6	8.3	21.2	19.6
	(10.13)		(10.78)		(9.93)		(8.18)		(8.19)	
% urban	73.2	78.5	81.0	90.6	82.8	91.8	39.1	38.4	81.0	85.3
	(24.65)		(19.77)		(17.88)		(30.72)		(15.89)	
% Bachelor's or more	22.1	20.3	25.4	24.6	26.9	25.4	16.5	14.5	24.9	23.4
	(9.55)		(10.21)		(10.19)		(7.69)		(9.12)	
% white	78.1	81.1	77.4	79.2	75.7	77.8	84.5	91.3	79.4	82.9
	(15.55)		(13.73)		(15.05)		(16.53)		(14.90)	
% Hispanic	7.0	3.1	8.1	3.9	8.1	3.9	6.2	1.8	9.1	4.3
	(10.11)		(11.01)		(9.39)		(12.05)		(12.86)	
% foreign-born	6.2	3.5	7.7	4.7	8.5	5.5	3.5	1.7	7.7	5.3
	(7.34)		(7.95)		(8.38)		(4.85)		(7.43)	
log housing units	11.2	11.2	11.5	11.6	11.7	11.7	9.4	9.3	11.6	11.4
	(1.31)		(1.25)		(1.23)		(1.35)		(0.80)	
Observations	268		115		126		3,107		533	

Notes: This table summarizes employment, wage bill, average wages, personal income, population and personal income per capita for"winning" and "runner-up" counties in our sample, and compares them to the average U.S. county. All statistics reported are from the year 2000. "Winning" counties are the counties where firms locate after receiving a subsidy deal."Runner-up" counties are the second-place location in the subsidy competition. Data on the identity of runner-up counties is collected by the Slattery (2019) by reading news articles and press releases on each subsidy deal. At least one runner-up county is known for 278 of the subsidy deals, or about 51% of the sample of 543 deals. Wages and personal income are measured in 2017 dollars. Employment and unemployment data come from the Bureau of Labor Statistics (BLS, 1990-2017). Wage and industry employment data come from Quarterly Census of Employment and Wages (QCEW, 1990-2017). Race/ethnicity, educational attainment, percent urban, and housing units data come from the U.S. Census (U.S. Census Bureau, 2000). Personal income and population data come from the U.S. Bureau of Economic Analysis (1967-2017).

Table A.5: Comparing Winner and Runner-up Counties: Population-weighted Summary Statistics

County:	Winner (Full)		Winner (Analysis)		Runner-up		Average		Pop > 100K	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Employment (1000s)	940.9	452.0	479.0	442.2	1,228.4	511.5	502.1	200.9	656.2	333.9
	(1,233.41)		(301.60)		(1,384.42)		(877.23)		(959.11)	
Population (1000s)	1,955.3	884.4	955.2	858.4	2,555.8	1,003.4	1,046.7	407.8	1,367.6	661.8
	(2,652.71)		(620.82)		(2,986.69)		(1,874.95)		(2,055.47)	
Wage bill (M)	54,295.2	24,556.1	28,291.1	22,088.6	71,942.3	31,827.1	27,936.4	8,861.3	36,644.4	17,951.4
	(70,789.76)		(21,457.68)		(78,596.12)		(50,500.78)		(55,322.35)	
Average wages (1000s)	54.0	51.2	55.4	51.3	57.2	55.8	46.7	44.8	50.5	48.7
	(14.81)		(15.44)		(15.88)		(13.82)		(13.39)	
Personal income (M)	92,501.5	41,676.7	50,500.5	41,083.6	122,695.7	62,813.7	49,316.9	18,092.7	64,625.2	31,052.2
	(116473.85)		(39,115.76)		(129507.58)		(84,173.89)		(91,678.80)	
Personal income per capita (1000s)	48.3	43.8	51.0	46.0	51.0	48.2	43.6	41.5	46.9	43.8
	(14.88)		(17.97)		(16.05)		(13.44)		(13.46)	
Population density	3,051.8	1,306.1	3,597.3	1,213.9	3,540.2	1,657.9	2,129.2	480.3	2,783.4	971.0
	(8,672.56)		(11,359.34)		(9,540.73)		(6,634.85)		(7,513.94)	
Unemployment rate (%)	3.9	3.7	3.5	3.5	3.9	3.7	4.1	3.8	4.0	3.7
	(1.16)		(0.86)		(0.97)		(1.42)		(1.36)	
% emp in mfg.	15.0	14.5	14.3	13.8	14.1	13.6	16.4	14.5	14.2	13.4
	(8.00)		(7.26)		(6.31)		(10.29)		(7.41)	
% emp info & prof svcs.	27.6	28.6	29.0	28.6	30.1	30.0	21.8	21.4	25.5	26.3
	(8.66)		(9.07)		(7.28)		(10.20)		(8.35)	
% urban	92.4	97.1	93.5	96.6	95.0	98.0	78.9	91.1	90.5	95.8
	(12.68)		(9.77)		(8.82)		(25.85)		(12.29)	
% Bachelor's or more	27.6	25.9	29.5	27.0	29.6	27.4	24.4	24.5	27.1	25.9
	(8.71)		(9.39)		(7.99)		(9.48)		(8.62)	
% white	69.3	70.5	72.7	72.9	66.9	66.5	75.2	77.7	71.9	74.4
	(15.04)		(12.05)		(14.15)		(17.04)		(16.26)	
% Hispanic	16.7	10.5	13.7	7.8	18.2	15.6	12.6	5.7	15.0	8.8
	(15.89)		(15.14)		(14.38)		(15.07)		(15.57)	
% foreign-born	14.9	11.2	13.2	10.4	17.1	15.2	11.1	6.6	13.7	9.8
	(11.88)		(11.12)		(11.37)		(10.92)		(11.18)	
log housing units	12.8	12.8	12.6	12.7	13.1	13.0	11.8	12.0	12.5	12.5
	(1.23)		(0.85)		(1.18)		(1.58)		(1.11)	
Observations	268		115		126		3,103		533	

Notes: This table replicates Table A.4, with population weights.