# BIDDING FOR BUSINESS:
# TAX DISCRIMINATION AS LOCAL INDUSTRIAL POLICY

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**Abstract**

Local and state governments routinely compete for economic activity by offering firms tax breaks and subsidies. While we have empirical evidence to show that large industrial plants produce significant local benefits, we know little about the type of firm that local governments most seek to attract. To further our understanding of local tax discrimination, we conduct a randomized field experiment across 312 communities in the United States. We observe how each of the governments in our sample adjusts its property tax in response to variation in firm characteristics and local economic conditions. We find that our towns pursue a systematic local industrial policy whose goal is to attract manufacturing jobs and work for unskilled labor. Surprisingly, we find no evidence that towns seek to generate rents targeted at the current local population. Local tax policy also appears to disregard agglomeration effects and concerns over industrial diversification.

## I. Introduction

There is intense competition for firms among jurisdictions in the United States. Elected officials routinely offer a wide variety of incentives and benefits to attract firms. The structure of these deals is often quite complicated, using many forms of incentives at once. For example, when Google was considering a new location for its server farm, a $600MM investment, North Carolina offered approximately $212MM in tax abatements and grants and forgiveness of 100% of Google's business property taxes and 80% of its real estate taxes for the next three decades. Similarly, when Motorola Mobility was considering moving its headquarters from Libertyville, the state of Illinois offered a whole basket of incentives valued at $100MM to keep the company (Mercer, 2011). While larger location incentives deals are more easily tracked and studied, many businesses, including many small companies, are taking advantage of tax incentives. In perhaps the most exhaustive analysis of tax discrimination at the state and local levels, Fisher and Peters (1998) document that fourteen of twenty states and a large number of cities engage in tax discrimination to attract firms of all sizes.

While tax competition is an important feature of U.S. federalism (Oates, 1972; Pigou, 1947; Zodrow & Mieszkowski, 1986), little is known about the determinants of location incentives. There are several reasons for this dearth of empirical evidence. First, we only observe the incentive packages of the victorious states and towns, creating a selection bias in research that compares benefit packages across jurisdictions. Second, firms do not consider a random set of locales as future sites; the choice of location is endogenous. Third, as our examples illustrate, the promised incentives come in many different forms, making it difficult to compare and evaluate them (Wolman and Spitzley, 1996). Finally, we lack systematic data about local incentives. Information is sometimes available for large firms and particularly generous incentives, but less is known about the benefits that smaller firms can expect to receive.

To study local tax discrimination among small firms, we conducted a field experiment with four firms and 312 randomly chosen municipalities. Our goal was to see how incentives change with plant and host community characteristics. To collect our data, we assisted four foreign firms in eliciting location bids

from local governments. The firms were evaluating a number of possible locations to enter the U.S. market. To make the bids for the four plants comparable, we asked the prospective host communities to offer incentives in the form of property tax abatements. We infer variation in the value of the firms to different places by studying how tax burdens vary by industry – two of our firms are manufacturers and two are in the software industry – firm size, and the local economic environment.

We find that locations offer a reduction in statutory taxes in 496 of our 1,248 cases. The average incentive is close to $100,000, a 13% discount. Not all jobs are taxed equally. A new job in manufacturing reduces the tax burden by $20,000; a job in the software industry generates a discount of $12,000. We find no evidence that patterns of tax discrimination reflect agglomeration economies or concerns over industrial diversification. Instead, municipalities appear to pursue a straightforward industrial policy that favors manufacturing.

Our paper adds to the literature that seeks to explain why local governments engage in economic development activities. Reviewing the available empirical evidence, Glaeser (2001) concluded that "economists do not yet know why these incentives occur and whether they are in fact desirable." More recent work did shed light on the welfare question. For large industrial facilities, so-called multi-million dollar plants, Greenstone and Moretti (2004) document local wage increases and a lift in property values, suggesting the net effect of incentive packages can be positive. By contrast, there has been less progress in our understanding of the reasons for tax discrimination. One prominent school argues that local jurisdictions are primarily interested in the fiscal consequences of firm location decisions (Pagano and Bowman 1995, Schneider 1989, Jones and Bachelor 1993). Others claim that job creation is the key concern (Blair, Fichtenbaum, and Swaney 1984; Furdell 1994; Bowman 1987.) Much of the evidence supporting these views comes from surveys of public officials, making it difficult to determine the extent to which public statements correspond to actual policy.

Our paper builds on this earlier literature, bringing to bear the advantage of an experimental approach. We observe within-community variation of a specific tax for a set of randomly chosen towns and exogenous variation in firm characteristics, providing stronger identification and an improved understanding of the forces that drive tax discrimination. The paper is organized as follows. In section 2, we describe the motivations for tax discrimination. In section 3, we explain the experiment. Section 4 describes our empirical approach. In section 5, we present our findings. Section 6 offers concluding remarks.

## II. Heterogeneity in Taxes

Location-based incentives packages tend to be designed on a firm-by-firm basis. We follow Glaser's review (2001) in thinking about why taxes might vary from one company to another. A first consideration is the cost of public inputs that can differ greatly between firms, leading to different rates of taxation in equilibrium (Oates 1972; Pigou 1947). Building a small stand-alone office requires fewer resources from local governments than the construction and operation of a large industrial chemical manufacturing facility.

Local rents are a second concern. Firms whose presence increases local property values and wages may be able to capture some of these rents when locales compete for economic activity (Black and Hoyt 1989; King, McAfee, and Welling 1993; Figlio and Blonigen 2000; Greenstone and Moretti 2003).

Third, towns have an incentive to subsidize the presence of firms that produce local agglomeration externalities (Marshall 1890; Glaeser, Scheinkman, and Shleifer 1995; Garcia-Mila et al. 2002). For example, Greenstone, Hornbeck and Moretti (2010) document that the presence of a large industrial plant significantly increases the total factor productivity of firms that share similar labor and technology pools. As a result, towns have incentives to subsidize early entrants into an industry with significant agglomeration externalities in the hopes of charging late arrivals higher taxes (Rauch, 1993).

Fourth, by locating in a particular area, a firm might contribute to the future growth and stability of the area by diversifying its industrial base (Glaeser, Scheinkman, and Shleifer 1995). Rather than being overly concentrated in one particular industry, it is beneficial to have a wide variety of industries and job types in any given locality. A more diverse industrial structure can adapt more readily to future structural changes (Jacobs 1969).

## III. The Experiment

To collect data on tax discrimination across industries and towns, we served as location consultants on behalf of four foreign firms looking to make their first entry into the United States. It is customary for foreign firms to seek the assistance of location consultants. These services are typically provided by the tax departments of large consulting companies and by smaller, highly specialized location consultants. We assisted two software development firms and two manufacturers during two separate time periods, first in 2005 and subsequently in 2012-13. In each period, we provided assistance for a single software and manufacturing firm. Prior to the start of our engagement with these firms, they had developed business plans for their U.S. operations. We relied on these plans to provide towns with information about the expected operations.

In order to determine potential locations, managers at each of the firms identified suitable states.[1] The firms gave us permission to contact 312 randomly chosen communities in these states. The communities varied in size from smaller towns to larger cities. The average population size in each location was about 59,000, but some communities were as small as 1,500 and others were as large as 1.4 million.

We asked each of our firms to develop an 'expected' and an 'optimistic' investment scenario. The manufacturers planned to create 55 and 35 jobs under the expected and 80 and 60 jobs under the optimistic plans (in the first and second waves respectively). The software firms promised to hire 28 and

[1] The states were Georgia, Massachusetts, Michigan, Ohio, South Carolina, and Texas.

50 people under the expected and 40 and 70 people under the optimistic plans. The firms' optimistic plans also required a physically larger plant and more office space. The investment plans provided information about the number of skilled and unskilled jobs for each of the two scenarios. Each town received two letters, one from each firm, in each of the two time periods. We randomly allocated expected and optimistic scenarios to the locations in our study.

We followed a uniform procedure to solicit tax abatements from our towns. First, we mailed two letters, one for each firm, to each of the 312 chosen communities. Each letter described the firm's investment plan and the number of jobs created. We asked the recipient community to indicate its willingness to lower property taxes. We focus on property tax abatement for several reasons. Our firms were family owned and planned to finance the new investment out of retained earnings. Debt financing incentives, while common in the United States, were of little interest to them. Property tax discounts have the further advantage that they are a standard component of location packages, fairly simple to compare across towns, and they represent an important source of revenue for local communities, representing close to 50% of total revenue from own sources (Annual Survey of State & Local Government Finances, various years).

In order to ensure that all communities had the opportunity to respond to the solicitation, we contacted towns at least two times, first via letter and subsequently via email message or phone call. We reached the complete sample of towns in both waves. Towns typically responded with an offer to reduce taxes for a specific period of time. For example, a community might offer 50% abatement for 7 years.

## IV. Empirical Specification

To see how firm and town characteristics influence the value placed on economic activity, we estimate models of the general form

$$B_{ic}(S_i) = X_c\beta + \nu_i + \gamma + \varepsilon_{ic} \qquad (1)$$

where $X_c$ is a vector of characteristics of firm *c*, $\nu_i$ is a place fixed effect indicating town *i*, and $\gamma$ is a year fixed effect. Our dependent variable, $B_{ic}(S_i)$, is the cumulative property tax burden imposed by place *i* on firm *c*. The cumulative tax burden is a function of the statutory tax burden, $S_i$, and any abatement offered. To construct the measure, we use the discounted present value of property taxes calculated over the maximum period of time for which there was an offer of tax abatement, taking into account the abatement offered:

$$B_{ic} = \sum_{k=1}^{n} \frac{TaxBurden_{ick}}{(1+r_i)^k} \qquad (2)$$

The maximum amount of time for which any local government was willing to forgo taxes was 20 years, so we calculate the above expression over a 20 year period. The $TaxBurden_{ick}$ is the dollar value of expected taxes to be paid for location in community *i*, by firm *c* in time period *k*. We discount the annual tax burdens using the inflation-adjusted municipal bond rate $r_i$ gathered from the *Mergent's Municipal and Government Manual*. Appendix A provides detail for calculations and data sources.

$X_c$ is a vector of firm characteristics including its industry, the size of the facility, and the number and types of jobs created. Our model includes place fixed effects, $\nu_i$, which control for time-invariant unobservables such as the town's geographic location and (fixed) state-level policies that affect firm entry decisions. By performing the experiment across two time periods, we account for a general change in the business climate.

The previous literature suggests four reasons for tax discrimination: the cost of serving the firm, local rents, agglomeration economies, and concerns over industrial diversification. We think of the size of an establishment as a proxy for the public cost of hosting the firm. We seek to identify the remaining factors by pursuing a difference-in-difference approach. The broad idea is that the value of attracting a firm

depends on a town's own (time-variable) economic environment. For example, a town might be particularly eager to attract job-creating companies at a time when unemployment is unusually high.

Following this approach, we test the idea that *local rents* motivate tax discrimination by including three interactions in model (1): the number of jobs created by our firms and the rate of unemployment, the number of unskilled positions and the fraction of the workforce that is without a high school degree, and the number of skilled positions and the fraction of college graduates. In each of these cases, we expect greater local rents to lower the tax burden.

In the presence of agglomeration externalities, towns have an incentive to lower taxes for companies that produce this type of benefit. We assume that the externalities increase with increases in employment in the industry, but they do so at a decreasing rate (for empirical evidence, see Rauch 1993). As a result, we expect the tax burden to increase in employment. We will test for agglomeration externalities separately for each industry to account for differences in their relative importance. In order to capture employment information, we use Census data aggregated through ESRI Business Analyst at the 2-digit NAICS level and aggregate by zip code and city boundaries.

Finally, the theory of tax discrimination based on industrial diversification argues that towns are better off with a more diverse industrial structure. Accordingly, local jurisdictions will impose lower taxes on firms whose presence would increase industrial diversity and higher taxes on firms whose presence has the opposite effect. To capture this idea, we calculate the change in the Shannon index of industrial diversity that is due to adding one of our experimental firms to a location *i*'s industrial base:

$$D_i = \sum_{j=1}^{J} p_j' \ln(p_j') - \sum_{j=1}^{J} p_j \ln(p_j) \qquad (3)$$

where $p_j$ represents the proportion of employment in a given place for industry *j*. There are *J* total industries in a given location *i*. $p_j'$ is the fraction of employment if our experimental firm moved to town *i*. In our empirical implementation, we create an indicator variable that identifies cases in which the

experimental firm would decrease industrial diversity. For these cases, we expect a higher tax burden if industrial diversity is a concern. As a robustness check, we also calculated Shannon indices using NAICS and two types of SIC classifications. The details of these categorizations can be found in Appendix B.

A summary of the predicted effects of these three prominent theories of tax discrimination can be found in Table 1.

## V. Results

We present summary statistics for our sample in Table 2. There is wide variation in tax burdens. The statistics highlight the difficulty of using statutory tax rates as indications of expected tax burdens. Of the 1,248 possible opportunities to provide tax abatement, locations offer discounts in 496 cases. The present value of the mean statutory tax burden is $720,000 versus an average offered tax burden of $624,000.

We introduce a first set of specifications in Table 3. The models relate the observed tax burden to the type of firm, the number of jobs the firm would create, and the physical size of the proposed investment. We find that an additional job decreases the present value of property taxes by about $13,100 once we account for the size of the investment (specification 3). However, the marginal decrease in taxes depends on the industry. The tax on a software job is $7,800 higher than the tax on a manufacturing job (specification 5). This finding provides evidence of a local industrial policy that systematically favors manufacturing. A similar effect is visible in specification (4) where we distinguish skilled and unskilled positions. The latter receive a significantly more favorable treatment. A final result is that, perhaps unsurprisingly, governments increase taxes for physically larger plants, presumably because the size of a plant proxies for the cost of the required public inputs.

In Table 4, we study the local rent hypothesis, the idea that towns' economic characteristics guide its tax policy. We begin by looking at the influence of unemployment (specification (1)) and find that towns

with high unemployment provide significantly larger tax breaks. A one standard deviation increase in unemployment decreases taxes by almost 8% of the mean.

The theory of local rents predicts that towns with higher unemployment rates should be particularly eager to attract jobs. In fact, we observe the opposite. In specification (2), the coefficient on the interaction of the level of unemployment and the number of jobs offered is positive and statistically significant. Our estimates imply that a town with an average unemployment rate responds to a one standard deviation increase in software jobs with a decrease in taxes that is 30% larger than a town whose unemployment rate is one standard deviation above the mean. The difference for manufacturing jobs is about half as large.

One intuition for this result might be that towns with high unemployment rates cannot afford to be generous. While plausible, this mechanism is unlikely to drive our result. Note that our specification includes controls for a town's per capita income, its population size, and an indicator for municipalities with high discount rates which might signal financial distress. The latter is positively correlated with tax burdens, suggesting that fiscal challenges do influence tax policy. However, controlling for such fiscal pressure, towns with higher unemployment are less eager to attract jobs by lowering taxes.

We test for alternative evidence supporting the local rents hypothesis by examining how the level of education influences taxes. In specification (3), we document that towns with a less educated population offer lower taxes. The interaction of unemployment and unskilled job creation is negative but statistically insignificant (specification 4). Interestingly, places with higher unemployment tax skilled job creation higher. Finally, in specification (5), we test whether municipalities match education and job types. We find no evidence that locations with more non-high school graduates target unskilled jobs nor that locations with more college graduates target high skilled jobs.

Taken together, Table 4 indicates that tax policy varies with the economic circumstances of municipalities. Jurisdictions with higher unemployment, a more poorly educated workforce, and fewer

financial pressures offer lower taxes. However, there is little evidence to suggest that towns seek to generate local rents by matching firm attributes to local conditions.

We test for evidence of the influence of agglomeration effects and concerns over industrial diversity in Table 5. We include in our models employment in manufacturing and the information sector using a 2-digit NAICS classification.[2] These employment measures provide a more accurate indicator of agglomeration than using the number of firms since the latter does not distinguish among firms of varying size. Rather than including a single continuous concentration variable for each sector, we divide the employment values into terciles and include the higher two levels as indicator variables in our regression (see Specification (2)). Levels of employment appear to be correlated with tax levels but there is no easily discernible pattern. In models with interactions (specfications 3-6), we do not find evidence of a policy promoting agglomeration in either software or manufacturing. In conclusion, there is little evidence of industry and / or job creation specific tax abatement to target the capture of agglomeration externalities.

Lastly, we use test for a policy targeting increased industrial diversity in the final specifications in the table. In Specification (7), we include the Shannon Index variable calculated for each location prior to the proposed addition of the new firm. We find that places that are more diversified offer lower tax burdens. A one standard deviation increase in the Shannon Index results in a $62,000 lower tax burden. In order to test for a targeted policy to promote industrial diversity, we investigate whether tax policy differs by the direction in which the Shannon Index would move if our experimental firm was located in the jurisdiction (model (8)). We find no such effect.

[2] For manufacturing, we use code 31 and for the software company, we use the information sector, code 51.

## Conclusion

In this paper, we add to our understanding of local tax policy and tax discrimination by acting as location consultants for four firms in two separate industries. In our experiment, we are able to observe the full set of local bids made in response to exogenous variation in firm attributes. The paper provides some of the first evidence for patterns of tax discrimination among small businesses.

Theory suggests that municipalities target firms that are inexpensive to serve, and we find evidence supportive of this notion. Larger facilities are taxed more highly. On the benefit side, existing work leads us to expect that towns are particularly eager to attract companies that generate local rents, agglomeration benefits and advantages associated with industrial diversification. Overall, we find little evidence that supports this view. Instead, we document that our towns and cities seek to attract manufacturing jobs and work for unskilled labor irrespective of the current composition of industry and the quality of their labor pool.

**TABLE 1**

Main Theories of Tax Discrimination

| **Theory** | **Prediction** |
|---|---|
| local rent generation | Greater opportunity for local rent generation due to matches in community and company profiles will result in lower aggregate tax burdens. |
| agglomeration externalities | Higher levels of existing employment in the respective industry of entry will result in smaller tax abatement |
| diversification externalities | Higher tax abatement will be provided for companies whose new presence in a location increases industrial diversity. |

**TABLE 2**

Summary Statistics

| Variable | Description | Observations | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|---|
| taxburden | Total discounted tax offering | 1248 | 623.82 | 457.90 | 0 | 4959.754 |
| stattax | Statutory tax offering | 1248 | 720.39 | 534.02 | 77.15688 | 7192.23 |
| jobs | # of total jobs | 1248 | 52.37 | 16.54 | 28 | 80 |
| skilled | # of skilled jobs | 1248 | 35.84 | 9.50 | 21 | 50 |
| unskilled | # of unskilled jobs | 1248 | 16.53 | 7.63 | 7 | 30 |
| size | size of proposed office / mfg space | 1248 | 23,516.83 | 13,349.37 | 10,000 | 50,000 |
| hi_discrate | = 1 if location's discount rate is > average of all discount rates | 1248 | 0.60 | 0.49 | 0 | 1 |
| pcincome | per capita income | 1248 | 26,966.73 | 9,650.44 | 9,304 | 104,920 |
| pop | population | 1248 | 59,167 | 127,189 | 1,459 | 1,359,291 |
| nonhsgrad | fraction of non high school graduates | 1248 | 0.14 | 0.09 | 0.009 | 0.541 |
| bsgrad | fraction of college graduates | 1248 | 0.30 | 0.15 | 0.015 | 0.8095902 |
| unemployment | fraction of unemployment | 1248 | 0.08 | 0.04 | 0.008 | 0.2844997 |
| Employment - 31 | employment in manuracturing industry | 1248 | 380.82 | 1,124.69 | 0 | 14649 |
| Employment - 51 | employment in information (software) industry | 1248 | 689.89 | 2,521.18 | 0 | 30143 |

**TABLE 3**

Firm Characteristics

| | (1) taxburden | (2) taxburden | (3) taxburden | (4) taxburden | (5) taxburden |
|---|---|---|---|---|---|
| software | -225.388*** | -181.100*** | 281.347*** | 178.966*** | -39.852 |
| | (19.882) | (20.738) | (39.808) | (43.066) | (104.936) |
| jobs | | 4.151*** | -13.120*** | | -19.858*** |
| | | (0.664) | (1.441) | | (2.492) |
| size | | | 0.040*** | 0.021*** | 0.047*** |
| | | | (0.003) | (0.004) | (0.004) |
| skilled | | | | 16.146*** | |
| | | | | (5.321) | |
| unskilled | | | | -28.209*** | |
| | | | | (3.000) | |
| software*jobs | | | | | 7.784*** |
| | | | | | (2.355) |
| Obs. | 1248 | 1248 | 1248 | 1248 | 1248 |
| R-squared | 0.152 | 0.186 | 0.315 | 0.338 | 0.323 |
| Fixed Effects: | Place Year | Place Year | Place Year | Place Year | Place Year |

***Notes:*** Dependent variable is the present value of the proposed tax burden for the next 20 years. All columns estimated with a model of fixed effects at the place (municipality) level. The *software* variable is an indicator equal to 1 for the software companies and 0 otherwise. The *skilled* and *unskilled* job counts were provided to the places in their solicitation for tax abatement. *** denotes 1% significance, ** denotes 5% significance, and * denotes 10% significance.

**TABLE 4**

Community Characteristics - The Local Rent Hypothesis

| | (1) taxburden | (2) taxburden | (3) taxburden | (4) taxburden | (5) taxburden |
|---|---|---|---|---|---|
| software | -26.293 | -63.891 | -78.607 | -108.761 | 176.516*** |
| | (104.726) | (104.097) | (103.966) | (121.855) | (42.846) |
| jobs | -19.506*** | -23.557*** | -18.934*** | | |
| | (2.486) | (2.656) | (3.876) | | |
| software*jobs | 7.409*** | 7.180*** | 6.966*** | | |
| | (2.351) | (2.331) | (2.327) | | |
| unemployment | -1226.874* | -4599.481*** | -5394.495*** | -4605.959*** | -1132.779* |
| | (639.392) | (1130.721) | (1194.668) | (1566.707) | (663.927) |
| unemployment*jobs | | 62.982*** | 77.543*** | | |
| | | (16.296) | (17.702) | | |
| nonhsgrad*jobs | | | -23.907** | | |
| | | | (9.649) | | |
| bsgrad*jobs | | | -5.935 | | |
| | | | (5.659) | | |
| skilled | | | | -10.615 | 18.296*** |
| | | | | (10.598) | (5.871) |
| unskilled | | | | -16.155** | -27.425*** |
| | | | | (6.718) | (4.084) |
| software*skilled | | | | 10.089** | |
| | | | | (4.074) | |
| unemployment*unskilled | | | | -104.383 | |
| | | | | (66.403) | |
| unemployment*skilled | | | | 141.012** | |
| | | | | (57.571) | |
| nonhsgrad*unskilled | | | | | -8.005 |
| | | | | | (18.296) |
| bsgrad*skilled | | | | | -6.402 |
| | | | | | (8.728) |
| nonhsgrad | | -786.649* | 397.019 | -823.884* | -736.151 |
| | | (426.700) | (644.079) | (423.624) | (512.659) |
| bsgrad | | 223.814 | 511.015 | 197.951 | 422.778 |
| | | (434.421) | (530.858) | (430.923) | (542.913) |
| pcincome | | -0.007 | -0.007 | -0.006 | -0.006 |
| | | (0.004) | (0.004) | (0.004) | (0.004) |
| pop | | 0.002 | 0.002* | 0.002* | 0.002* |
| | | (0.001) | (0.001) | (0.001) | (0.001) |
| hi_discrate | 68.600** | 51.987* | 54.052* | 53.072* | 54.916* |
| | (30.031) | (30.803) | (30.732) | (30.611) | (30.700) |
| size | 0.046*** | 0.046*** | 0.045*** | 0.031*** | 0.025*** |
| | (0.004) | (0.004) | (0.004) | (0.006) | (0.005) |
| Obs. | 1248 | 1248 | 1248 | 1248 | 1248 |
| R-squared | 0.329 | 0.347 | 0.352 | 0.359 | 0.355 |
| Fixed Effects: | Place Year | Place Year | Place Year | Place Year | Place Year |

***Notes:*** Dependent variable is the present value of the proposed tax burden for the next 20 years. All columns estimated with a model of fixed effects at the place (municipality) level. All interaction variables are indicated by the format *VariableName1* * V*ariableName2*. *** denotes 1%

**TABLE 5**
Industry Characteristics

| | (1) taxburden | (2) taxburden | (3) taxburden | (4) taxburden | (5) taxburden | (6) taxburden | (7) taxburden | (8) taxburden |
|---|---|---|---|---|---|---|---|---|
| software | -29.803 | -27.594 | -38.978 | -199.356 | -0.264 | -138.140 | -20.190 | -30.967 |
| | (104.501) | (103.544) | (105.398) | (144.991) | (107.263) | (145.655) | (104.451) | (104.806) |
| jobs | -19.722*** | -20.120*** | -20.273*** | -21.164*** | -20.052*** | -21.329*** | -19.556*** | -19.722*** |
| | (2.483) | (2.461) | (2.461) | (2.750) | (2.466) | (2.756) | (2.480) | (2.486) |
| size | 0.047*** | 0.047*** | 0.048*** | 0.047*** | 0.047*** | 0.047*** | 0.047*** | 0.047*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| software*jobs | 7.529*** | 7.649*** | 7.634*** | 10.790*** | 7.588*** | 10.139*** | 7.306*** | 7.528*** |
| | (2.347) | (2.325) | (2.323) | (2.978) | (2.327) | (2.951) | (2.346) | (2.352) |
| Employment Information - 2nd tercile | | 107.702** | 73.909 | 17.691 | 107.617** | 100.703** | | |
| | | (45.830) | (50.568) | (137.495) | (45.853) | (46.212) | | |
| Employment Information - top tercile | | 36.371 | 47.891 | -100.059 | 36.172 | 34.166 | | |
| | | (73.532) | (76.499) | (147.412) | (73.569) | (73.929) | | |
| Employment Manufacturing - 2nd tercile | | -12.857 | -13.004 | -18.353 | -26.637 | 30.930 | | |
| | | (46.883) | (46.811) | (47.542) | (51.575) | (114.416) | | |
| Employment Manufacturing - top tercile | | -171.055*** | -171.336*** | -169.102*** | -193.239*** | -91.320 | | |
| | | (58.691) | (58.601) | (58.722) | (62.547) | (115.733) | | |
| software*employment information 2nd tercile | | | 67.699 | 215.813 | | | | |
| | | | (43.258) | (179.215) | | | | |
| software*employment information top tercile | | | -23.237 | 292.760* | | | | |
| | | | (43.210) | (169.816) | | | | |
| jobs*employment information 2nd tercile | | | | 0.728 | | | | |
| | | | | (2.234) | | | | |
| jobs*employment information top tercile | | | | 2.452 | | | | |
| | | | | (2.115) | | | | |
| software*jobs*information 2nd tercile | | | | -3.082 | | | | |
| | | | | (3.316) | | | | |
| software*jobs*information top tercile | | | | -6.247** | | | | |
| | | | | (3.152) | | | | |
| mftg*employment mftg 2nd tercile | | | | | 27.556 | -132.505 | | |
| | | | | | (43.007) | (177.893) | | |
| mftg*employment mftg top tercile | | | | | 44.328 | -203.611 | | |
| | | | | | (43.001) | (171.772) | | |
| jobs*employment mftg 2nd tercile | | | | | | -1.406 | | |
| | | | | | | (2.154) | | |
| jobs*employment mftg top tercile | | | | | | -2.393 | | |
| | | | | | | (2.183) | | |
| mftg*jobs*employment mftg 2nd tercile | | | | | | 3.015 | | |
| | | | | | | (3.252) | | |
| mftg*jobs*employment mftg top tercile | | | | | | 4.736 | | |
| | | | | | | (3.165) | | |
| shannon | | | | | | | -291.746** | |
| | | | | | | | (147.757) | |
| software*Neg. Shannon | | | | | | | | 14.715 |
| | | | | | | | | (126.074) |
| mftg*Neg. Shannon | | | | | | | | -16.984 |
| | | | | | | | | (66.760) |
| Obs. | 1248 | 1248 | 1248 | 1248 | 1248 | 1248 | 1248 | 1248 |
| R-squared | 0.336 | 0.351 | 0.355 | 0.358 | 0.352 | 0.354 | 0.339 | 0.336 |
| Fixed Effects: | Place Year | Place Year | Place Year | Place Year | Place Year | Place Year | Place Year | Place Year |
| **Controls** | | | | | | | | |
| hi_discrate | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| unemployment | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| pcincome | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| pop | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| nonhsgrad | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| bsgrad | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

***Notes:*** Dependent variable is the present value of the proposed tax burden for the next 20 years. All columns estimated with a model of fixed effects at the place (municipality) level. All interaction variables are indicated by the format VariableName1 * VariableName2. The industry concentration variables are indicators equal to 1 if the focal place is in the second ("_2") or third ("_3") tercile of the concentration distribution. The omitted tercile in each case is the first, or lowest, so all comparisons can be made relative to the lowest levels of industry concentration. The *software*Neg.Shannon* and *mftg*Neg.Shannon* variables are indicator variables equal to 1 if the proposed addition of the software or manufacturing firms, respectively, caused the industrial diversity in the focal place to decrease. *** denotes 1% significance, ** denotes 5% significance, and * denotes 10% significance.

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## Appendix A: Calculating Baseline Property Taxes for $TaxBurden_i$ Computations

In valuing taxes forgone by each place we first calculate the baseline amount of property taxes that the local government would have received had it not granted any abatement. Since both client firms intend to purchase property, we compute baseline property taxes using the tax formula levied on commercial or industrial property (usually similar for most states).

The first step is assessing property value: We calculate the project costs (land, building, construction and other such investments that could be classified as being part of taxable property value) for the different variations of project sizes as specified in our field experiment's business plans using the RSMeans cost calculator, a construction and project cost estimating service widely used in the construction and building industry (www.rsmeans.com). To this construction cost we add the cost of purchasing land, derived from place-specific assessed values of commercial and industrial properties as reported by state revenue offices and verified by local economic development officials.

Upon this baseline computed property value we apply the rules specified by specific places in particular states as to how much property taxes our businesses would theoretically have to pay every year. Each place is governed by different tax rates and rules used to calculate assessment values; we document our sources below and confirmed our methodology for estimating tax rates with state and local officials where some rules seemed ambiguous:

1. For *Massachussetts*: Specific tax rates for each place for fiscal years 2003 and 2012. Tax rates are expressed as "dollars per thousand dollars of value." Confirmed computations with officials at the Division of Local Services of the Commonwealth of Massachusetts [online reference at http://www.mass.gov/dor/local-officials/municipal-data-and-financial-management/data-bank-reports/property-tax-information.html]
2. For *Michigan*: Specific tax rates computed from baseline "State Equalized Values" (SEV), which is approximately 50% of the property's market value, for years 2003 and 2012. Non-homestead millage rate applied to every $1,000 of SEV. [online reference at http://www.michigan.gov/taxes/0,1607,7-238-43535_43540---,00.html]
3. For *Ohio*: Obtained place-specific rates from the Ohio Department of Taxation for each place for tax calendar year 2002 and 2011. Assessment value at 35% of market value; millage rate applied as $1 per $1,000 of assessed value. [online reference at http://www.tax.ohio.gov/tax_analysis/tax_data_series/publications_tds_property.aspx]
4. For *Texas*: Obtained rates from the Texas Comptroller of Public Accounts, "Window on State Government"for tax years 2002 and 2012. Assessment value applied as tax rate per $100 of property market value. [online reference at http://www.window.state.tx.us/taxinfo/proptax/taxrates/]
5. For *Georgia:* Obtained 2002 and 2012 millage rates via Georgia Department of Revenue. Assessment value = 40% of fair market value; total millage rate applied to every $1,000 of this amount. [online reference at https://etax.dor.ga.gov/ptd/cds/csheets/millrate.aspx]
6. For *South Carolina*: South Carolina Property Tax Rates by County for 2002 and 2012 noted that commercial property assessed at 10.5% of its fair market value; millage rate applied to this. [online reference at http://www.sctax.org/Tax+Information/Property+Tax/PropertyTaxHomepage.htm]

We apply the proposed property tax abatements provided by each place that submitted a positive bid to this baseline amount and discount that value using place-specific inflation-adjusted municipal bond rate. To derive the bond rate, we used information from the most recent bonds issued by each place; information obtained from *Mergent's Municipal and Government Manual 2002* and *Mergent's Municipal and Government Manual 2013* editions.

## Appendix B: Alternative Shannon Index Calculations

As robustness checks to ensure the accuracy of our choice of the Shannon index using the proportion of employment in each two-digit NAICS code, we tested several other forms using NAICS and SIC classifications.

- **NAICS Alternative:**

  In addition to calculating the Shannon Index based on NAICS 2-digit codes, we also calculated it based on similarity in the main descriptions for each of the codes. In this instance, some of the 2-digit classifications became grouped as follows:

| Sector | Description |
|---|---|
| 11 | Agriculture, Forestry, Fishing and Hunting |
| 21 | Mining, Quarrying, and Oil and Gas Extraction |
| 22 | Utilities |
| 23 | Construction |
| 31-33 | Manufacturing |
| 42 | Wholesale Trade |
| 44-45 | Retail Trade |
| 48-49 | Transportation and Warehousing |
| 51 | Information |
| 52 | Finance and Insurance |
| 53 | Real Estate and Rental and Leasing |
| 54 | Professional, Scientific, and Technical Services |
| 55 | Management of Companies and Enterprises |
| 56 | Administrative and Support and Waste Management and Remediation Services |
| 61 | Educational Services |
| 62 | Health Care and Social Assistance |
| 71 | Arts, Entertainment, and Recreation |
| 72 | Accommodation and Food Services |
| 81 | Other Services (except Public Administration) |
| 92 | Public Administration |

- **SIC Divisions:**
  Alternatively, we also use the SIC major divisions to calculate industrial diversity and proposed changes in industrial diversity. The main divisions for the SIC classification are as follows:

| |
|---|
| Division A: Agriculture, Forestry, And Fishing |
| Division B: Mining |
| Division C: Construction |
| Division D: Manufacturing |
| Division E: Transportation, Communications, Electric, Gas, And Sanitary Services |
| Division F: Wholesale Trade |
| Division G: Retail Trade |
| Division H: Finance, Insurance, And Real Estate |
| Division I: Services |
| Division J: Public Administration |

- **SIC Divisions Further Subdivided by Wage:**
  Lastly, we divided up the SIC divisions into sub-divisions based on average national wages (according to the Census) for each of the 2-digit SIC codes. We grouped similar average wage values into our industry groups to calculate a Shannon index. This method had the advantage of not grouping all manufacturing together but rather grouping lower wage manufacturing industries separately from higher wage manufacturing industries.