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ABSTRACT

Using tax abatements, financial incentives, and public investments to attract (or retain) firms is the primary economic development tool for many local governments. Often local job creation policies focus on increasing capital through grants, low-interest financing, and other economic development incentives. Theory predicts that capital subsidies induce firm behaviors that limit their job creation effects. This paper employs the Incentives Environment Index, constructed from state constitutional provisions that limit and structure the ability of state and local governmental entities to aid private enterprises, and five-year county panels to test theoretical predictions on county capital expenditure and input mixes as well as industry establishment shares. The results indicate the act of increasing capital subsidy tools is associated with capital-labor substitution, decreased employment density, and changes in local industry mix. Results are robust to alternative empirical specifications and measures of capital subsidy availability.

JEL Classification Codes: R32, H25, R11

Key Words: economic development incentives, capital subsidies, capital-labor substitution

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1 INTRODUCTION

Responsibility for policies supporting local economic growth and jobs increasingly lies with state and local policymakers. As political polarization and limited federal resources hamper federal responses to the sluggish labor market, demands for state and local officials "to do something about jobs" will likely increase (Bartik 2012). Often local job creation policies focus on increasing business retention and recruitment through grants, low-interest financing, and other nontax economic development incentives. These nontax incentives effectively subsidize capital rather than labor; yet they are touted as job creation policies.

Despite being featured prominently in public debate on economic development incentives, there are few studies of nontax incentives (cash and near-cash grants, low-interest financing, free land and buildings, and so on). In part, this is due to lack of data on state and local nontax capital subsidies. The few existing studies rely on spending measures, which lump capital subsidies with other types of economic development programming and miss a portion of nontax incentives, or program measures. Studies employing economic development spending tend to find positive effects, while studies using program measures generally find negative or insignificant effects. Both spending and program measures present challenges to identifying the causal effect of capital subsidy incentives. In a "stellar illustration of pertinent, path-breaking research on state incentives" (Woodward 2012, p. 11), Patrick (2014a) develops the Incentive Environment Index (IEI) to investigate the effects of nontax capital subsidies on jobs. Patrick finds that increasing the ability of governments to aid private enterprise has a negative medium-term effect on rural county employment levels and no significant effect otherwise. Her results

are consistent with program measure-based findings that incentives don't support local job creation.

The research herein investigates the potential mechanisms underlying these findings for incentives aimed at subsidizing capital. Theory outlined in this paper predicts that capital subsidies will have two effects. The first effect is capital-labor substitution, whereby firms that can substitute capital for labor adjust their input mix in favor of capital. The theory also predicts that subsidy-induced changes in total costs allow relatively capital-intensive firms to outbid relatively labor-intensive firms for land, causing changes in locations' industry mix. Taken together, these two effects lead to no change or decreases in local employment levels—even if subsidies induce firm location on the margin.

The present paper employs the IEI and five year county panels to test theoretical predictions on county manufacturing capital expenditure and input mixes as well as industry establishment shares. A rich set of control variables and first-differencing helps to isolate the effect of capital subsidy availability. Previous research also suggests rural and urban areas respond differently to job creation stimuli. The paper therefore analyzes rural and urban counties separately. A subset of urban counties located in multi-state MSAs is also examined. The results indicate increasing capital subsidy availability is associated with both capital-labor substitution and changes in local industry mix, limiting the job creation effects of these policies. Consistent with previous findings, urban and rural counties respond differently to an increase in the IEI, and pooling counties masks heterogeneity in the effects for rural and urban counties. This suggests that incentive effects may vary with the level of agglomeration. Capital subsidies appear most effective at inducing capital expenditure in urban areas. Capital expenditure per employee increases with capital subsidies, and employment density declines. As predicted by theory,

relatively capital-intensive industries increase their establishment shares at the expense of relatively labor-intensive industries, with which they compete for land.

The results are robust to an alternative border fixed-effects random trend specification. The sample is limited to counties that share a state border, and the first-differenced equation is estimated with a border-specific fixed effect. This method has the advantage of focusing on within-border-area variation induced by differences in capital subsidy availability. The results are also robust to alternative measures constructed from state constitutional provisions governing public aid to private enterprises.

The paper proceeds in Section 2 by discussing key findings in the literature. Section 3 sketches a simple theoretical model of equilibrium changes under a capital subsidy regime. The data and empirical strategy are described in Section 4. Section 5 discusses the estimation results, and Section 6 explores robustness. Some concluding remarks are provided in Section 7.

2 BACKGROUND ON NONTAX CAPITAL SUBSIDIES AND JOB CREATION

Despite decades of research on economic development incentives, there is relatively little research on the effects of nontax incentives. Yet these types of incentives (cash and near-cash grants, low-interest financing, free land and buildings, etc.) feature prominently in the public debate because this type of incentive most closely resembles the legalized bribery of companies and because it often makes up the bulk of incentives packages (Bartik 2012; Patrick 2014a). Consider, for example, the state and local incentives in Google's recent selection of North Carolina. Morgan (2009) estimates the tax incentive portions of the package (credits, exemptions, and refunds) totaled $91.6 million, compared to the $170 million grant portion of the package. Although comprehensive data on state and local economic development incentives

are not available, some evidence suggests these incentives may account for as much as three-quarters of state and local resources devoted to economic development (Bartik, Erickcek, and Eisinger 2003). One survey of state economic development programs reports that "the percentage of businesses receiving more than $50,000 through nontax programs significantly exceeded that percentage for tax programs" (Council for Community and Economic Research 2013, p.19). Patrick (2014a) analyzes the incentive packages contained in the Good Jobs First megadeals subsidy database from 1985–2000 and finds that the reported value of the nontax portion was 1.7 times greater than the value of the tax incentives.[1]

The few studies of nontax incentives yield mixed results, in part because of differences in measures of incentives and methodologies. This line of research generally relies upon state measures of economic development expenditures or programs. These measures pose challenges for identifying the causal effect of nontax incentives (that effectively subsidize capital) on jobs. For example, de Bartoleme and Spiegel (1997) and Goss and Phillips (1997) find a positive relationship between state economic development spending and job growth. However, it is difficult to interpret these results as the causal effect of nontax incentives on job creation, for a variety of reasons. Critically, state economic development spending does not capture local resources. These data are not generally available, but research suggests local spending is at least as much as state spending in some places, and much greater in others.[2] State economic development spending is likely endogenous to state economic conditions. Furthermore, economic development spending confounds the effects of different types of incentive programs

[1] Details are available in the online appendix of Patrick (2014a). The total value of nontax incentives was $2,925,800,000, compared to $1,750,120,000 for tax incentives, based upon the author's calculations. These values are exclusive of worker training incentives when possible. Another $95,000,000 was classified as "other." Incentives classified as "other" were unspecified in the source data. Analysis is available upon request from the author.

[2] For example, Thomas (2011) reports the local/state subsidy ratio for Missouri—one of the few states for which he determined reliable data could be obtained—was 7:1. Thomas estimates total state and local spending by extrapolation and the assumption that most local subsidies equal state subsidies.

and nonincentive activities. It is reasonable to expect that economic development activities such as marketing, technical assistance, and workforce training will have different effects from cash, grants, loans, site development, and low-interest financing. Economic development spending bundles all these activities together, and even detailed budget data doesn't readily allow for separation.[3]

Rather than spending, other researchers employ program measures. Ó hUallacháin and Satterthwaite (1992) use tax rate measures, industrial revenue bond (IDB) financing, and program dummy variables. They find only the dummy variables for enterprise zones and university research parks have a positive statistical relationship with employment growth. Recognizing the limitations of their empirical approach, Ó hUallacháin and Satterthwaite are careful not to claim causation. Goetz et al. (2011) create measures of the share of all possible programs available in states and characterize programs in terms of "race to the top" (RTT) and "race to the bottom" (RTB) policies. They find tax incentive and financial assistance programs may harm growth rather than help. However, even their classification does not distinguish between the effects of capital subsidization and other policies. For example, RTT policies include capital subsidy programs targeted at innovative firms. RTB policies include capital subsidy programs aimed at traditional industries.

Like spending, program variables may also be endogenous to economic conditions. In fact, the policy literature indicates economic development policy does react and evolve based

[3] For example, the Council for Community and Economic Research's State Economic Development Expenditures Database contains totals for U.S. states' economic development expenditures by functional category. These categories do not differentiate between different types of incentives and other economic development activities. For example, marketing activities are included in International Trade and Investment, Domestic Recruitment, Tourism and Film, and Program Support. Multiple categories also include expenditures for capital subsidies (e.g., cash, loans, grants, site development), which makes determining total expenditure on these programs unfeasible even at the state level. Capital subsidies for private enterprises are included in the following functional categories: Business Finance, Strategic Business Attraction Fund, Domestic Recruitment, Technology Transfer, Entrepreneurial Development, Minority Business Development, and Community Assistance.

upon economic conditions (Greenbaum, Russell, and Petras 2010). Empirical evidence is inconclusive with regard to the direction of bias, though. Both distressed and growing locations have been found to be more likely to use economic development incentives and create programs in response to local economic conditions.

Incentive offers reflect local economic conditions, incentive packages offered by competing localities, and the "rules of the game" as dictated by federal and state constitutions. Patrick (2014a) overcomes some of the aforementioned challenges by creating the Incentives Environment Index (IEI) from state constitution provisions governing state and local government aid to private enterprise. These state constitution provisions originated in the mid-to-late nineteenth century in response to state and local government financial crises caused by participation in economic development projects (via railroads, canals, ferries, etc.). The types of programs available in locations across the United States are a direct reflection of the limits placed by these constitutional provisions. As detailed below, the IEI measures the ability of government to use public monies, credit, and property in the aid of private enterprise. It is not a measure of other types of economic development programming, such as human capital investments, amenities, tax breaks, or direct jobs programs. However, the availability of programs like industrial revenue bonds, venture capital funds, loan guarantee programs, etc., is directly governed by these constitutional provisions.

Similar to Ó hUallacháin and Satterthwaite (1992) and Goetz et al. (2011), Patrick (2014a) finds little evidence that increasing the availability of these types of incentives supports local jobs. In particular, she finds that increasing the ability of governments to aid private enterprise has a significant negative medium-term effect on rural county employment levels, and no significant effect otherwise. Patrick (2014a) postulates two potential reasons for the negative

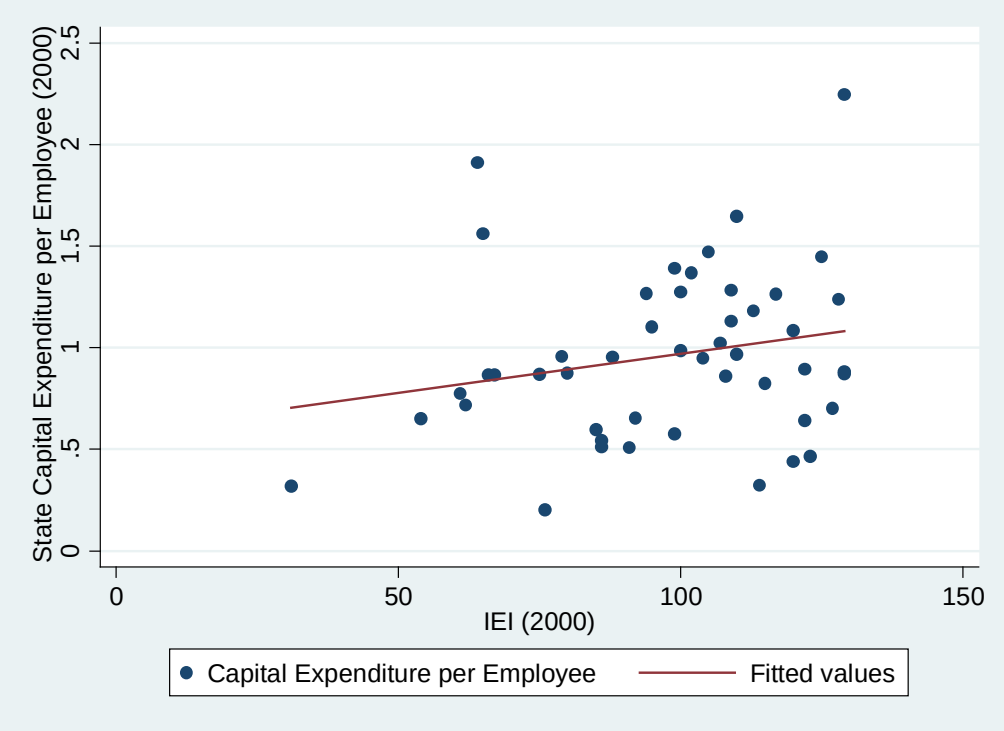
and insignificant direct effects: either increasing the availability of incentives in an area does not result in a net capital increase, or the net new capital does not result in new jobs (perhaps because of capital-labor substitution).

Figures 1 and 2 present the relationship of states' 2000 IEI score to capital stock per employee (Figure 1) and to capital expenditure per employee (Figure 2), respectively. The figures indicate that states with higher IEI scores, meaning more available capital subsidy tools, also have higher capital stocks and expenditures per employee. Although these figures do not represent a causal relationship, they do suggest that negative and insignificant job effects might not be driven by incentives' failure to induce net new capital. Instead, they suggest that the new capital may not increase jobs.

Figure 1 State Capital Stock per Employee and IEI (2000)

NOTE: Capital stock measured in thousands of 2000 US$.
SOURCE: Chirinko and Wilson (2009); Patrick (2014a).

Figure 2 State Capital Expenditure per Employee and IEI (2000)



NOTE: Capital expenditure measured in thousands of 2000 US$.
SOURCE: Chirinko and Wilson (2009); Patrick (2014a).

If capital subsidies induce additional capital without associated increases in jobs, then a number of underlying mechanisms may be at work. Induced capital could be redirecting capital from productive activities into overcapacity. As suggested by Gabe and Kraybill (2002), managers may engage in additional rent-seeking as a result of increased incentive availability and make inefficient production decisions. Managers may also adjust to public aid by substituting capital or public inputs for labor. Hanson and Rohlin (2011) find that wage subsidies induce changes in locations' industry mix consistent with labor-capital substitution. The results from Harger and Ross (2013) regarding the industry effects of new-market tax credits are also consistent with subsidy-induced capital-labor substitution. The next section sketches a simple theoretical model to illustrate the effects of capital subsidies.

3 EQUILIBRIUM CHANGES WITH SUBSIDIES

Consider the effect of a capital subsidy on a firm's optimal choice of capital and labor. Capital consists of equipment as well as the structure and land used in production. As discussed by McDonald and McMillen (2011), one can think of firm output as a function of equipment, labor, and real estate, which includes both land and structure capital. It is also useful to impose Cobb-Douglas production technology, so that $Q = AR^{\alpha}E^{\beta}N^{1-\alpha-\beta}$, where $Q$is a given level of output, $E$is equipment, $N$is labor, and $R$is real estate produced by structures S and land L, according to the Cobb-Douglas production function $R = BS^{\mu}L^{1-\mu}$. The parameters α and β govern substitutability of real estate, equipment, and labor in the production of output; while the parameter μ governs the substitutability of land and structure in the production of real estate. Assume the prevailing wage rate is w, the price of equipment capital is q, the price of structure construction is r, and the price of land is v. Now consider the optimal levels of labor and capital under a capital subsidy regime. Let τ be a capital subsidy that affects the price of equipment, structure, and land capital, such as low-interest financing, capital grants, loan guarantees, cash, etc. A profit-maximizing firm sets the ratio of the marginal products of inputs equal to their price ratio. Solving for optimal input levels given a target level of output, a profit-maximizing firm chooses inputs so that

(1) $N^{*} = \frac{(1-\alpha-\beta)(1-\tau)^{\alpha+\beta}CQ}{w}$,

(2) $E^{*} = \frac{\beta CQ}{q(1-\tau)^{1-\alpha-\beta}}$,

(3) $S^{*} = \frac{\alpha\mu CQ}{r(1-\tau)^{1-\alpha-\beta}}$, and

(4) $L^{*} = \frac{\alpha(1-\mu)CQ}{v(1-\tau)^{1-\alpha-\beta}}$,

where $C = \frac{1}{AB^{\alpha}\alpha^{\alpha}}\left(\frac{r}{\mu}\right)^{\alpha\mu}\left(\frac{v}{1-\mu}\right)^{\alpha(1-\mu)}\left(\frac{q}{\beta}\right)^{\beta}\left(\frac{w}{1-\alpha-\beta}\right)^{1-\alpha-\beta}$ and the price of output is normalized to one. Equations (1) – (4) indicate that optimal input choices depend upon capital intensity, the α and β parameters, as well as the amount of the subsidy τ. The amount of labor for a given output N^* is decreasing in capital subsidies and capital intensity; while equipment, structure, and land capital are increasing in the subsidy. The act of increasing capital subsidies therefore causes firms to substitute capital for labor; the degree of substitution depends upon the type-specific capital production parameters. This yields the first empirically testable prediction of the model: *all else being equal, capital expenditure should be higher in places with more capital subsidies*.

It is also interesting to note that the ratio of labor to equipment, given by $\frac{N}{E} = \frac{(1-\alpha-\beta)(1-\tau)q}{w\beta}$, depends upon the substitution parameters α and β and the amount of the subsidy τ. The optimal amount of labor per unit of equipment decreases as the subsidy increases, $\frac{\partial\frac{N}{E}}{\partial\tau} < 0$, and decreases at a faster rate for those firms that can easily substitute real estate or equipment for labor (higher values of α and β, respectively). Similarly, $\frac{\partial\frac{N}{S}}{\partial\tau} < 0$ and $\frac{\partial\frac{N}{L}}{\partial\tau} < 0$, indicating that employment density declines as the subsidy increases and that it declines at a faster rate for relatively capital-intensive firms. As noted below, the capital expenditure data does not differentiate between equipment, structure, and land capital. Given these constraints, the model predicts *capital expenditure per employee will increase with capital subsidies, and employment density will decrease.*

It is easy to see that the optimal ratios of structure to land, equipment to structure, and equipment to land are unaffected by a subsidy of that applies equally to all types of capital. Subsidies do not alter the capital input mix from the optimal without subsidies. However, capital

subsidies that apply differentially to equipment, structures, and land will also induce changes in the optimal capital input ratios. Consider, for example, gifts of real estate and real estate leaseback agreements that subsidize land and building capital only (albeit at different rates). According to this model, such incentives induce firms to decrease labor and equipment to real estate ratios while leaving the labor-equipment ratio unchanged. Real estate capital subsidies could therefore be associated with decreasing employment densities. On the other hand, a subsidy for only equipment capital induces equipment-labor substitution but leaves employment density unchanged.

The above discussion assumes that the price of land v behaves like other capital prices. Urban theory suggests that land markets differ substantially from equipment and construction markets. Within the context of a basic urban model, where land goes to the highest bidder and bids are determined by the amount left over after costs, those firms experiencing the largest cost reductions should win the bids for land. Setting the firm's willingness to pay for land (or the maximum amount the firm may pay for land and achieve zero economic profits) equal to $\bar{v} = \frac{Q - wN - (1-\tau)qE - (1-\tau)rS}{(1-\tau)L}$ and substituting gives

$$(5) \qquad \bar{v} = (1-\mu)(\alpha B)^{\frac{1}{1-\mu}} \left[\frac{A}{(1-\tau)^{\alpha+\beta}} \left(\frac{\mu}{r}\right)^{\alpha\mu} \left(\frac{\beta}{q}\right)^{\beta} \left(\frac{1-\alpha-\beta}{w}\right)^{1-\alpha-\beta} \right]^{\frac{1}{\alpha(1-\mu)}} .$$

Equation (5) demonstrates how the effect of the subsidy regime varies by firms' ability to substitute capital for labor. Equation (5) increases in the value of the subsidy τ, and it increases faster for relatively capital-intensive firms (higher values of α and β). Relatively capital intensive firms' WTP responds more because total costs decrease more for firms that have less ability to substitute away from capital or firms that are more capital-intensive. Capital subsidies are therefore most valuable to firms that have little ability to substitute away from capital, and

those firms experiencing the largest cost reductions should win the bids for land. As τ increases, firms with higher values of $(\alpha + \beta)$ will outbid firms with lower values, with which they compete for land. Thus, *as τ increases, the share of firms in relatively capital-intensive industries will increase.*[4]

Hanson and Rohlin (2011) approximate $(\alpha + \beta)_i = \frac{K_i}{K_i + N_i}$, where K_i and N_i are capital costs and labor costs, respectively, from Bureau of Economic Analysis (BEA) national income and product accounts (NIPA), and *i* denotes industry. Table 1 presents their approximations.

Table 1 Capital-Labor Substitution Parameter Approximations by SIC Major Division

SIC Major Division	$\alpha + \beta$
Retail	0.255
Services	0.275
Construction	0.293
Wholesale	0.409
FIRE	0.477
Manufacturing	0.532
Transportation	0.656

SOURCE: Approximations from Hanson and Rohlin (2011).

Table 1 suggests that the share of establishments in FIRE, manufacturing, and transportation will increase at the expense of the relatively labor-intensive industries which compete for land with these sectors, such as wholesale trade, construction, and retail. The next section discusses the strategy and data employed to test these predictions.

[4] It should be noted that if cost savings are fully capitalized into land values, then subsidies induce changes in the industry mix without capital-labor substitution. The results herein suggest the cost savings are not fully capitalized.

4 EMPIRICAL IMPLEMENTATION

Empirical tests of the theory employ five-year county panels and the IEI to estimate the effect of increasing capital subsidy availability on manufacturing capital expenditure and input ratios as well as industry establishment shares. Allowing for unobserved heterogeneity and macroeconomic industry-time effects and first-differencing yields the following reduced-form estimation model: $\Delta Y_{ijt} = \Delta X'_{j,t-1}\beta + \mu_{it} + \Delta\varepsilon_{ijt}$, where *i*, *j*, and *t* index industry, county, and time, respectively. Y_{ijt} is the outcome of interest. Manufacturing capital expenditure tests the capital prediction; manufacturing capital expenditure per employee and employment density test the input ratio predictions; and industry *i* share of total establishments in county *j* at time *t* test the industry mix prediction. Lagged independent variables reduce the potential for endogeneity and allow decision-makers time to adjust to changes in the county. As discussed in more detail below, $X'_{j,t-1}$ includes the IEI as well as demographic, earnings, industrial structure, and state and local tax and expenditure control variables.

First-differencing removes time-invariant county and state unobservables and IEI levels are used to measure capital subsidy incentives. Hammond and Tosun (2010) assert employment factors have different effects in rural and urban areas. Partridge, Rickman, and Li (2009) and Patrick (2014a) also suggest that rural and urban areas respond differently to job creation stimuli. Thus, the paper analyzes rural and urban counties separately as well as counties in multistate MSAs.

Section 6 contains several robustness checks. First, panels are limited to counties that share a state border, and $\Delta Y_{ijt} = \Delta X'_{j,t-1}\beta + a_{jk} + \mu_{it} + \Delta\varepsilon_{ijt}$ is estimated. The vector a_{jk} is a vector of border fixed effects for every shared state border in the sample. For example, Georgia shares borders with Florida, Alabama, North Carolina, South Carolina, and Tennessee. A border

fixed effect is included for each of these. The specification therefore compares counties on either side of the borders, and identification comes from differences in policy within the border areas. Border fixed effects combined with first-differencing effectively make this specification a border fixed effects random trend specification, where time-invariant unobservables are removed and each border area is allowed to have its own growth rate.

Alternative measures constructed from state constitutional provisions are employed to check robustness of results to the implicit assumptions associated with using the IEI. The IEI sums individual clause scores to reflect substitution between covered incentives. Summing implicitly assumes incentive types have equal marginal effects, which may be a strong assumption. The sensitivity of results to this assumption is explored with estimates using a weighted IEI, where weights are determined using principal component factor analysis. Principal component factor analysis assumes that each of the clause scores reflects an underlying latent variable. In this case, the underlying latent variable could be broadly interpreted as the ability to aid private enterprises with public capital subsidies. Using the variation in the data, the exercise weights each clause score according to its contribution to the underlying latent variable.[5]

The empirical strategy assumes that the effects of increasing capital subsidies are linear. It is, however, possible that there are diminishing returns to the effects of capital subsidies. It is also possible that providing too many capital subsidies sends a negative business climate signal or raises concerns over state and local government subsidy–induced revenue shortfalls. If any of these are true, then the effects will be nonlinear. An alternative specification employing a set of indicator variables for relative position in the IEI distribution allows for this possibility. Percentile indicators also alleviate concerns that firms might not be able to differentiate between

[5] Results presented herein use the state variation to construct the factor weighted IEI. Results using the county variation were similar and available from the author upon request. Using the county variation implicitly weights each state's score by the number of counties in the state. Thus, the state variation is preferred.

small changes in capital subsidies by allowing behavior to vary according to relative position in the distribution of capital subsidy packages.

4.1 Data

The panel data for counties in the lower 48 states was obtained from the U.S. Census Bureau and the BEA. Data availability and consistency determined the periods of analysis. The five-year panel includes data from 1972 to 1997.

The Census of Manufactures provides data on aggregate county manufacturing capital expenditure. Results for manufacturing capital expenditure and manufacturing capital expenditure per employee utilize the 1982–1997 Census of Manufactures for the dependent variable. Unfortunately, publicly available Census of Manufactures data from earlier years does not include information on capital expenditures. Census Bureau county business patterns from 1977 to 1997 supply data on industry shares of establishments and employment by Standard Industrial Classification (SIC) major division.[6] Industry is defined by two-digit SIC codes.

Control variables for wages and industrial structure are constructed from BEA data. Wage and salary employment per square mile of land measures employment density. Wage and salary earnings per employed person measure wages. Finance, insurance, and real estate (FIRE); manufacturing; farm; service; and military sector shares are calculated by dividing the total number of employees in each SIC division by total county employment in the BEA data. Only the manufacturing capital expenditure and manufacturing capital expenditure per employee specifications use these employment shares as control variables.

[6] The county business patterns data suppress employment in some two-digit SIC industries. Suppressed employment data were imputed using the employment size classes of establishments in the county, as well as national average employment by establishment size class in the two-digit SIC industry.

Local government taxes and services are clearly important in the theoretical context of spatial equilibrium with incentives. In practice, the tax rates and services in a location are determined by state government policy as well as local government policy. Thus, state and local measures for the tax and service variables combine state and local data. State variables are calculated from the Census Bureau's state tax collections and state government finance data, as well as BEA's state gross domestic product estimates. Local measures are calculated using data from the Census Bureau's Census of Governments (CG). The CG data covers all governmental units in the United States. Local measures aggregate all government units within a county in the 1972–1997 CG data. In addition to tax and expenditure measures, state and local outstanding debt is also included. The rich set of state and local government finance variables control for other types of economic development programming not captured by the IEI, as well as fiscal capacity constraints.

Tables A.1 and A.2 provide a summary of the variables across panels.

The package of incentives offered in a particular location reflects local economic conditions, local taxes, the incentive packages offered by competing communities, and the "rules of the game" as dictated by federal and state constitutions. Including detail controls for the former two determinants allows isolation of the nontax incentive effects. Using the IEI as the measure for capital subsidy availability captures both available programs and the limits of jurisdictional response to competing offers.

Patrick (2014a) creates the IEI from state constitutional provisions on aid to private entities. Specifically, IEI is the sum of the state and local scores for three constitutional clauses governing public aid to private enterprises—typically referred to as the credit, current appropriations, and stock clauses. These state constitutional provisions on aid to private entities

provide a structural constraint on the ability of state and local governments to provide incentives. The provisions limit and structure the types of incentives a jurisdiction in the state may provide, as well as bounding jurisdictional ability to match and innovate in response to economic circumstances and competing offers. The provisions originated in the nineteenth century from public participation in failed economic development projects. The resulting fiscal consequences of public investment in risky private ventures included long-term debt obligations, default, and bankruptcy.[7] In response, states throughout the United States enacted constitutional reforms that constrained legislative promotion of economic development and created barriers to prevent abuses (Patrick 2014b; Tarr 1998). Because of differences in the instigating events, constraints are remarkably heterogeneous. State constitutional provisions enacted in response to historic events are relevant to today's competitive environment. As shown in Patrick (2014a), the types of programs available in locations across the United States are a direct reflection of the limits placed by these constitutional provisions.

To illustrate the relationship between constitutional provisions and available capital subsidies, consider Tables 2 and 3. Table 2 details the score for each component of the IEI as well as the summary score in five states that often compete for economic development projects: Alabama, Georgia, North Carolina, South Carolina, and Tennessee. A higher score means more freedom to use the incentives covered by that clause. There are separate scores for state governmental entities and local governmental entities, reflecting differential limitations within a state at these levels of government. The current appropriations provisions govern donations as

[7] In states with few constitutional restrictions, these types of fiscal consequences remain a risk for state and local governments (Patrick 2014b). Consider, for example, Rhode Island, which has one of the least restrictive constitutions. Competing with Massachusetts for Curt Schilling's now defunct Studio 38 video game company, Rhode Island provided a rich incentive package that included $75 million in state guaranteed financing. The state must continue to repay the debt for the failed venture, which has led to significant public debate on incentive practices in the state (Bray 2012; Cohan 2012).

well as loans financed through general fund revenue. The ability to use incentive programs financed through credit obligations and the lending of public credit for private purposes are constrained by credit clauses. Stock clauses govern equity incentives, such as public-private partnerships and public venture capital funds, that imbue the public with a form of ownership in private companies. The constitutional provisions govern both the source and the use of funds for economic development incentives; the IEI distinguishes the way in which the program is financed as well as the program type (Patrick 2015).

Table 2 State Constitutional Incentive Environment Index Scores

	AL	GA	NC	SC	TN
State credit	20	12	13	19	13
State current appropriations	15	14	23	23	23
State stock	5	8	17	8	9
Local credit	22	11	22	21	20
Local current appropriations	24	0	25	25	25
Local stock	19	20	20	6	19
Incentives environment index	105	50	120	102	109

SOURCE: Patrick (2015).

Table 3 summarizes the available types of nontax economic development incentive programs operated by state (not local) governments in these states. Comparing the types of programs reveals some variation in source and use of funds; however, it is important to note that it does not capture all the variation in the IEI. The effects of constitutional variations in Table 2 can be readily gleaned from Table 3. Georgia has the lowest IEI score in Table 2. It also offers the fewest types of programs in Table 3.

Consider, for example, cash and property inducements. The Table 2 current appropriations score reflects the fact that the Georgia state constitution prohibits gifts to private enterprises. Table 3 indicates that Georgia does not operate any direct grant economic development incentive programs. Such inducements are permitted by the North Carolina, South Carolina, and Tennessee constitutions, and Table 3 indicates that all three states operate direct

Table 3 State Economic Development Incentive Program Types

State economic development incentive program type	Alabama	Georgia	North Carolina	South Carolina	Tennessee
Grants or donations to private entities			X	X	X
Grants or donations to public and quasi−public entities	X	X	X	X	X
Loans to private	X		X	X	X
Loans to public and quasi−public		X	X		X
Private loan guarantees and participation	X				
Private loan guarantees and participation through public or quasi−public conduit		X	X	X	
Other preferential rate financing through public or quasi−public conduit	X	X	X	X	X
Private equity			X		
Private equity via public or quasi−public conduit	X			X	X

NOTE: The classification of economic development incentive type presented here does not distinguish the funding source for the program. Programs financed through public debt and current appropriations are grouped together. The incentives environment index further distinguishes between program types by considering both the source and the use of funds. In other words, the IEI distinguishes both the way in which the program is financed as well as the program type. The inventory does not include local programs, nor does it distinguish between programs by subrecipient end use. Program inventory excludes federal funds programs such as Community Development Block Grants, Appalachian Regional Commission programs, the Tennessee Valley Authority, the U.S. State Small Business Credit Initiative (SSBCI) program, Small Business Administration programs, etc. The inventory also excludes customized worker training programs administered through public institutions, such as Georgia QuickStart and North Carolina's Customized Training Program.
SOURCE: Patrick (2015).

grant programs. Table 3 reports that all states operate public grant programs for economic development. The local current appropriations scores in Table 2 also reveal variation in the way in which local governments may use state grants to aid private enterprises. For example, both the OneGeorgia EDGE Fund and the Tennessee FastTrack Economic Development Fund provide funds to local governments and development authorities to finance the purchase of equipment in aid of a private company. Georgia constitutional restrictions on local development authorities require that the authority retain ownership of the equipment financed by OneGeorgia and lease it to the company. On the other hand, a local authority receiving FastTrack funds may either reimburse the company for its purchase of the equipment or donate the equipment to the firm.

The IEI provides both a measure of available programming and the limits of response. A measure of incentives created from constitutional provisions avoids the aforementioned endogeneity problems and exploits the dynamics of incentives competition. The constraints in state constitutional provisions are binding, prompting attempts to amend or revise them.

Constitutional amendment and revision generally requires several steps, often culminating in voter referendums. Results of recent votes on amendments reveal that voters are not always supportive of increasing available nontax incentives. For example, many state constitutions prohibit public issuance of general obligation bonds whose proceeds benefit private organizations. Three states amended their constitutions in 2010 to allow public entities to use general obligation bonds to finance economic development incentives; however, Texas voters rejected a proposed amendment to expand county government issuance of general obligation bonds for economic development in 2011 (Dinan 2011, 2012; Patrick 2014b).

More than one-third of the states changed their constitutions at least once during the study period, with approximately 30 percent changing multiple times (Patrick 2014). Amendments tend to result from political movements focused on the role of government, political pressures associated with so-called corporate welfare, and competitive pressures to provide the new relevant baseline incentives (Patrick 2014a; Tarr 1998). State constitutional amendments of this nature are not as obviously endogenous to local economic conditions as other potential measures, particularly considering that it is unlikely any single county's economic conditions will exert enough influence to induce state constitutional amendment. The empirical strategy employs county-level data and differences out state and local unobservables, which alleviate any remaining identification concerns.

5 RESULTS

5.1 Manufacturing Capital and Input Ratios

Table 4 reports the estimated medium-term change in manufacturing capital expenditure from a one-point increase in the IEI, which is a very small change in policy tools. Standardized

beta coefficients are shown in brackets to ease comparison. Columns correspond to separate regressions for each subsample of counties, with column 1 presenting results for the pooled county sample, columns 2 and 3 containing estimates for the samples of rural and urban counties, respectively, and column 4 corresponding to the sample of counties in multistate MSAs. The estimated sign and magnitudes for control variables are reasonable. More expensive labor is associated with the largest increase in county manufacturing capital expenditure, while the effective corporate tax rate is associated with the largest decrease. Increasing capital subsidies increases manufacturing capital expenditure, as predicted by theory. However, the effect varies across samples.

Table 4, column 1, indicates that a one-point increase in the IEI is associated with an imprecisely measured manufacturing capital expenditure increase of $39,590. Columns 2–4 reveal that the pooled border county panel masks heterogeneity in the effects for rural and urban counties and splitting the samples increases precision. Table 4, column 2, indicates that rural county manufacturing increases by $17,750 with a one-point increase in the IEI. A one-standard-deviation increase in the IEI increases rural county manufacturing capital expenditure by $424,468, or 4.62 percent of the average rural expenditure.

The urban border county results in Table 4 indicate that a one-point increase in the IEI is associated with a manufacturing capital expenditure increase of $183,800. A one-standard-deviation increase in the IEI therefore increases manufacturing capital expenditure by $3,462,757 in urban counties, or 3.1 percent of average urban county manufacturing capital expenditure and 12 percent of the average change. The last column of Table 4 presents the estimated effect when the sample is restricted to counties in multistate MSAs. The point estimates more than double the point estimates from the urban county sample. The increase is

Table 4 Changes in Counties' Manufacturing Capital Expenditure Associated with Additional Capital Subsidies

	(1) All	(2) Rural	(3) Urban	(4) MSA
IEI	39.59	17.75**	183.8*	371.2***
	[0.0140]	[0.0237]**	[0.0344]*	[0.102]***
	(30.18)	(9.006)	(102.3)	(116.2)
Working-age share	−135,291	29,181	−377,904	−583,980
	[−0.0151]	[0.0123]	[−0.0221]	[−0.0530]
	(95,301)	(30,998)	(365,113)	(378,769)
Minority share	555,394***	9,504	882,291**	234,816
	[0.0781]***	[0.00441]	[0.0805]**	[0.0363]
	(150,208)	(17,947)	(350,820)	(185,535)
Earnings per employee	6,413***	729.4**	9,900***	10,081***
	[0.141]***	[0.0581]**	[0.110]***	[0.205]***
	(1,291)	(360.9)	(3,729)	(2,510)
Effective corp. tax rate	−421,731***	−141,305***	−1.438e+06***	−558,189
	[−0.0590]***	[−0.0776]***	[−0.0952]***	[−0.0509]
	(100,946)	(49,767)	(487,148)	(389,537)
Property tax rate	289,178***	19,664	1.553e+06***	−52,045
	[0.0365]***	[0.0101]	[0.0790]***	[−0.00411]
	(83,503)	(31,781)	(572,103)	(538,601)
Sales tax rate	489,642**	219,066**	1.294e+06	−1.343e+06
	[0.0264]**	[0.0467]**	[0.0325]	[−0.0563]
	(247,264)	(102,034)	(1.118e+06)	(1.077e+06)
Indiv. income tax rate	−875,215***	−24,954	−3.362e+06***	129,119
	[−0.0368]***	[−0.00398]	[−0.0744]***	[0.00396]
	(328,732)	(83,405)	(1.182e+06)	(1.109e+06)
K–12 expenditure	−45,163	16,008	−329,005	60,133
	[−0.00856]	[0.0123]	[−0.0254]	[0.00790]
	(40,058)	(16,744)	(308,436)	(264,388)
Public safety expend.	202,890	−88,831	1.743e+06	−1.520e+06
	[0.0163]	[−0.0270]	[0.0745]	[−0.104]
	(269,345)	(95,611)	(1.094e+06)	(1.125e+06)
Highway expenditure	−118,302	−5,897	−393,247	617,665
	[−0.00936]	[−0.00195]	[−0.0101]	[0.0281]
	(123,420)	(35,222)	(1.061e+06)	(521,268)
Outstanding debt	1,483	880.2	7,052	1,055
	[0.00381]	[0.00952]	[0.00555]	[0.00267]
	(1,799)	(1,072)	(16,879)	(3,805)
County industry shares	Y	Y	Y	Y
Time fixed effects	Y	Y	Y	Y
N	7,514	5,712	1,802	793

NOTE: The table reports results from four separate regressions. Column headings correspond to the sample, with column (1) presenting results for the pooled county sample, columns (2) and (3) containing estimates for the samples of rural and urban counties, respectively, and column (4) corresponding to the sample of counties in multistate MSAs. The dependent variable is county manufacturing capital expenditure, measured in $000s. State and local tax and expenditures are measured relative to personal income, with the exception of the state effective corporate tax rate, which is measured relative to gross state product. Standardized beta coefficients are shown in brackets. Standard errors clustered at the county level are shown in parentheses. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

substantial: one standard deviation is associated with over $8.3 million in additional manufacturing capital expenditure (approximately 11 percent of sample county manufacturing

capital expenditure and 38 percent of the average change in the sample). Capital subsidies appear most effective at inducing capital expenditure across state borders in the same urban area.

Table 5 reports the change in manufacturing capital expenditure per employee and employment density for the same samples of counties. An increase in the IEI is associated with increased manufacturing capital expenditure per employee and decreased employment density, which is consistent with theoretical predictions about subsidy-induced capital-labor substitution. Table 5 also suggests that the effects vary substantially between rural and urban areas, with the largest effects occurring in urban areas. The last column of Panel A in Table 5 indicates that a one-standard-deviation increase in capital subsidy availability increases capital expenditure per employee by $247, or 6 percent of mean multistate MSA county expenditure per employee and 16 percent of the average change. Panel B, column 3, indicates five fewer employees per square mile of land with a one-standard-deviation increase in the IEI in urban counties.

Table 5 Changes in Counties' Input Ratios Associated with Additional Capital Subsidies

	(1) All	(2) Rural	(3) Urban	(4) MSA
Panel A: Manufacturing capital expenditure per employee				
IEI	0.00650***	0.00455**	0.0112***	0.0110**
	[0.0313]***	[0.0240]**	[0.0457]***	[0.0581]**
	(0.00192)	(0.00215)	(0.00415)	(0.00522)
Panel B: Employment density				
IEI	−0.0782***	−0.0106***	−0.199**	−0.137
	[−0.0415]***	[−0.0602]***	[−0.0525]**	[−0.0254]
	(0.0205)	(0.00382)	(0.0815)	(0.159)

NOTE: The table reports results from eight separate regressions. Column headings correspond to the sample, with column (1) presenting results for the pooled county sample, columns (2) and (3) containing estimates for the samples of rural and urban counties, respectively, and column (4) corresponding to the sample of counties in multi−state MSAs. The Panel A dependent variable is county manufacturing capital expenditure (measured in $000s) per manufacturing employee. The dependent variable in Panel B is total wage and salary employment per square mile of land area. Controls include variables for county demographics, average earnings, and industrial structure as well as measures for state and local government tax rates, expenditures, and outstanding debt. Standardized beta coefficients are shown in brackets. Standard errors clustered at the county level are shown in parentheses. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

5.2 County Two-Digit SIC Establishment Shares by Major Division

The results in Section 5.1 indicate significant differences in the effects for rural and urban counties. This section therefore presents results separately for rural and urban samples. Estimates for pooled samples are available in Appendix A.2. Table 6, Panels A, B, and C, present the estimated change in industry shares of establishments by SIC major division for rural, urban, and multistate MSA counties, respectively. The unit of analysis is industry share, where industry is defined by two-digit SIC codes. Sample sizes vary by SIC major division because the number of two-digit SIC codes varies between divisions.

5.2.1 Rural counties

Table 6, Panel A, presents the estimated change in rural county industry establishment shares by SIC industry major division. Table 6, Panel A, indicates that a significant increase in the IEI is associated with an increase in manufacturing, transportation, FIRE, and service establishment shares at the expense of wholesale trade and construction. Manufacturing, transportation, and FIRE are relatively capital-intensive compared to relatively labor-intensive wholesale trade and construction industries. The results in Table 6, Panel A, are consistent with the prediction that capital-intensive firms will outbid labor-intensive firms for land.

Zoning regulations and differential site requirements mean that firms compete for land with other firms in a subset of industry major divisions (as opposed to all firms). For example, manufacturing firms likely compete with other manufacturing firms as well as wholesale trade firms for land. It is unlikely, however, that manufacturing firms compete with retail firms for the same land. Table 6, Panel A, therefore indicates that the share of relatively capital-intensive manufacturing establishments increases at the expense of relatively labor-intensive wholesale trade firms. The average rural county experienced a decrease in manufacturing establishment

shares over the period, making the estimated increase associated with capital subsidies particularly important.

The increase in service establishment shares is not entirely consistent with theoretical predictions. The service SIC major division contains a wide variety of two-digit industries. It is therefore plausible that relatively capital-intensive two-digit industries drive the increase in service establishment shares. Alternatively, service firms may experience unmodeled cost decreases from positive externalities generated by capital-intensive industries. It also seems plausible that service establishments don't compete with manufacturing and transportation firms for land because of zoning regulations and differential site requirements.

In results not shown, estimates suggest rural employment shares increased for manufacturing, transportation, and FIRE, while wholesale trade and retail employment shares decreased. These results are consistent with the establishment share findings in that relatively capital-intensive industries increased employment shares at the expense of relatively labor-intensive industries. Estimates of manufacturing employment per establishment also indicate that capital-labor substitution decreases employment per manufacturing establishment.[8] This suggests that relatively capital-intensive firms are crowding out firms in labor-intensive sectors, which increases their share of employment. Consistent with previous studies' findings that incentives do not support local job growth, replacing labor-intensive firms with capital-intensive firms would result in lower levels of overall employment in rural counties.

[8] Results are available in earlier versions of the paper or upon request from the author.

Table 6 Effect of Increasing the IEI on Counties' Two−Digit SIC Shares of Establishments by Major Division

	(1) Construction	(2) Manufacturing	(3) Transportation	(4) Wholesale Trade	(5) Retail	(6) FIRE	(7) Services
				Panel A: Rural counties			
IEI	−0.0005*	0.0007***	0.0003**	−0.0018***	0.0001	0.0003***	0.0004***
	[−0.0086]*	[0.0290]***	[0.0097]**	[−0.0320]***	[0.0012]	[0.0115]***	[0.0101]***
	(0.0003)	(0.0001)	(0.0002)	(0.0004)	(0.0002)	(0.0001)	(0.0001)
N	26,474	69,972	37,921	27,921	64,280	46,501	102,615
R−squared	0.1463	0.0348	0.0421	0.0522	0.0627	0.1175	0.2289
				Panel B: Urban counties			
IEI	0.0005	0.0001**	−0.0000	−0.0014***	0.0005**	−0.0001	0.0002*
	[0.0127]	[0.0179]**	[−0.0001]	[−0.0620]***	[0.0174]**	[−0.0081]	[0.0068]*
	(0.0004)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
N	7,451	36,599	14,869	7,467	17,413	16,672	32,437
R−squared	0.3726	0.0533	0.0669	0.1276	0.1840	0.2203	0.4941
				Panel C: Multistate MSA counties			
IEI	0.0021**	0.0004***	−0.0001	−0.0017***	0.0005	−0.0005	−0.0001
	[0.0375]**	[0.0303]***	[−0.0056]	[−0.0486]***	[0.0124]	[−0.0181]	[−0.0034]
	(0.0009)	(0.0001)	(0.0002)	(0.0005)	(0.0004)	(0.0003)	(0.0002)
N	3,356	14,083	6,146	3,428	7,954	7,015	14,114
R−squared	0.3361	0.0332	0.0483	0.1216	0.1197	0.1487	0.3691

NOTE: The table reports the results of 21 separate regressions. Panels correspond to the sample of counties. Column headings correspond to SIC major division. The unit of analysis is the two-digit SIC industry share of total county establishments. Control variables include measures for county demographics and average earnings as well as measures for state and local government tax rates, expenditures, and outstanding debt. Standardized beta coefficients are shown in brackets. Standard errors clustered at the county level are shown in parentheses. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

5.2.2 Urban and multistate MSA counties

As expected, increasing capital subsidy availability has somewhat different effects in urban counties as opposed to rural counties. Table 6, Panel B, presents the change in establishment and employment shares associated with an increase in the IEI for the sample of urban counties that share a border with another state, while Table 6, Panel C, reports results for the sample of counties located in multistate MSAs. The effects of increasing capital subsidy availability are very similar for the two samples of urban counties.

In the full sample, urban counties experienced an increase in manufacturing, retail, and service establishment shares and a decrease in wholesale trade shares. The manufacturing and wholesale trade results are consistent with the theory that manufacturing establishments compete with wholesale trade establishments for the same land and that subsidy-induced cost savings allow manufacturing to outbid wholesale trade. The increase in retail trade and service establishment shares is unexpected given the theory, but it may suggest some positive spillovers between manufacturing and these sectors in urban areas. The service sector results may also be driven by relatively capital-intensive two-digit industries. Recall that the rural county results indicated potential positive spillovers between the services sector and manufacturing. Thus, these results also suggest that manufacturing may generate different externalities in rural and urban areas, perhaps because of different forward/backward linkages.

In results not shown, increasing the capital subsidy tools is associated with an increase in construction and retail employment shares in urban counties. This is consistent with the increase in construction and retail establishment shares in Panel B. Construction and retail cannot easily substitute capital for labor. Thus, an increase in their establishment shares associated with capital subsidies would be expected to increase their employment shares. There is not a significant

change in the other industries' employment shares. Although manufacturing establishment shares increased with capital subsidies, the establishment share increase is not associated with a significant increase in employment shares. This is consistent with the capital-labor substitution predicted by theory and the estimated changes in manufacturing capital expenditure. Manufacturing employment per establishment also decreases as urban counties' package of capital subsidies increases, further supporting subsidy-induced capital-labor substitution.

Table 6, Panel C, reports estimates for another set of urban counties, counties in multistate MSAs. Panel C confirms urban counties experience an increase in manufacturing establishment shares at the expense of wholesale trade establishment the IEI increases. This is also congruent with the theory that manufacturing and wholesale trade establishments compete for the same land and the cost decrease from capital subsidies allows manufacturing firms to outbid wholesale trade firms for land. The increase in construction establishments again suggests some positive spillovers between construction and manufacturing in urban areas, perhaps because of capital subsidy–induced investments in building capital.

The employment share results suggest that there were no significant changes in employment shares. Given the increase in manufacturing establishment shares associated with capital subsidies, lack of employment effects indicate subsidy-induced capital-labor substitution. Employment per establishment decreases in manufacturing firms. This is consistent with theoretical predictions about capital-labor substitution.

6 ALTERNATIVE EMPIRICAL SPECIFICATION AND IEI MEASURES

6.1 Border Random Trend Estimates

Table 7 reports the effect of increasing capital subsidy tools on manufacturing capital expenditure, manufacturing capital expenditure per employee, and employment density identified by differences between counties that share a state border. The results confirm the findings from Section 5. Table 7, Panel A, indicates a significant increase in capital expenditure associated with an increase in the IEI in the pooled border, urban border, and multistate MSA county samples. The largest effects are for urban border and multistate MSA counties, with an estimated increase of $10,101, 069 and $9,003,490, respectively, from a one-standard-deviation increase in the IEI. The rural effect from Section 5 disappears, bolstering the conclusion that capital subsidies are most effective at inducing new capital expenditure across state borders in urban counties. Consistent with theoretical predictions regarding input ratios, there is increased capital expenditure per employee (Panel B) and decreasing employment density (Panel C) in the counties on the side of state borders with higher capital subsidies.

Border random trend estimates for rural, urban, and multistate MSA counties' change in industry establishment shares are presented in Table 8, Panels A–C, respectively. The results largely corroborate the findings in Section 5. As capital subsidy packages increase, relatively capital-intensive manufacturing shares increase at the expense of wholesale trade shares. The positive effects on urban retail industry shares from Table 6 are also found in Table 8, Panels B and C. Rural border-county retail shares, however, decrease with capital subsidies as predicted by theory. Table 8 also reports increases in construction industry shares associated with an increase in the IEI, perhaps suggesting subsidy-induced increases in demand for building capital, as predicted by theory.

Table 8 Border Random Trend Estimates of the Effect of IEI on Counties' Two−Digit SIC Share of Establishments by Major Division

	(1) Construction	(2) Manufacturing	(3) Transportation	(4) Wholesale trade	(5) Retail	(6) FIRE	(7) Services
Panel A: Rural border counties							
IEI	0.0012*	0.0005*	0.0004	−0.0002	−0.0007**	0.0002	0.0004**
	(0.0007)	(0.0003)	(0.0003)	(0.0006)	(0.0003)	(0.0002)	(0.0002)
Observations	11,464	30,602	16,749	12,153	27,909	20,338	44,970
R−squared	0.1723	0.0400	0.0402	0.0864	0.0699	0.1352	0.2366
Panel B: Urban border counties							
IEI	0.0020*	0.0000	−0.0000	−0.0014***	0.0009*	−0.0002	0.0001
	(0.0010)	(0.0001)	(0.0002)	(0.0005)	(0.0005)	(0.0004)	(0.0002)
Observations	3,184	15,645	6,448	3,212	7,524	7,138	13,900
R−squared	0.4426	0.0642	0.0885	0.1447	0.1750	0.1765	0.4873
Panel C: Multistate MSA counties							
IEI	0.0026**	0.0001	−0.0003	−0.0010	0.0010*	−0.0006	0.0001
	(0.0011)	(0.0002)	(0.0003)	(0.0007)	(0.0005)	(0.0004)	(0.0003)
Observations	3,356	14,083	6,146	3,428	7,954	7,015	14,114
R−squared	0.3489	0.0388	0.0572	0.1316	0.1234	0.1538	0.3703

NOTE: The table reports the results of 21 separate regressions. Panels correspond to the sample of border counties. Column headings correspond to SIC major division. The unit of analysis is the two−digit SIC industry share of total county establishments. Control variables include measures for county demographics and average earnings as well as measures for state and local government tax rates, expenditures, and outstanding debt. Standardized beta coefficients are shown in brackets. Standard errors clustered at the county level are shown in parentheses. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

6.2 Factor-Weighted IEI

This section explores the sensitivity of results to the assumption that the types of incentives covered under each clause have equal marginal effects. Estimates employ a weighted IEI, where weights are determined using principal component factor analysis. For the IEI, the scoring coefficients for Factor 1 weight the local current appropriations clause most heavily, followed by the local credit clause, local stock clause, and the state current appropriations clause. Current appropriations activities include cash, grants, site development, and other aid from the general fund. For example, a location with a low current appropriations clause score is constitutionally prohibited from buying land to give to a company; while a location with a high current appropriations clause score could. The heavy weights given to the local credit clause and local stock clause suggests that low-cost financing through local government is an important capital subsidy as well, although less so than local government current appropriations. Thus, the IEI Factor 1 considers current appropriations and local financial partnerships as the most important capital subsidies. The state credit and stock clauses receive large weights in Factor 2. Factor 2 could therefore be interpreted as capturing financial partnerships with the state. Tables 9 and 10 present results using the IEI factors.

Table 9 contains the results for manufacturing capital expenditure (Panel A), manufacturing capital expenditure per employee (Panel B), and employment density (Panel C). An increase in the IEI Factor 1—the current appropriation and local financial partnership factor—is associated with an increase in manufacturing capital expenditure and capital expenditure per employee in all samples. This is consistent with theoretical predictions and the results from Tables 4 and 5, above. Again, pooling urban and rural counties averages much stronger urban effects and weaker rural effects. The multistate MSA column of Table 9, Panel A,

Table 9 Changes in Counties' Manufacturing Capital Associated with Additional Factor-Weighted Capital Subsidy Availability

	(1) All	(2) Rural	(3) Urban	(4) Multistate MSA
Panel A: Manufacturing capital				
IEI Factor 1	1,436**	471.2**	6,332**	9,040***
	(712.1)	(191.8)	(2,468)	(2,996)
IEI Factor 2	−871.5	−55.05	−2,687	1,590
	(645.3)	(217.6)	(2,515)	(2,440)
Panel B: Manufacturing capital expenditure per employee				
IEI Factor 1	0.176***	0.147***	0.237**	0.246**
	(0.0448)	(0.0476)	(0.0934)	(0.110)
IEI Factor 2	−0.00315	−0.0504	0.135	0.0857
	(0.0515)	(0.0572)	(0.113)	(0.145)
Panel C: Employment density				
IEI Factor 1	−1.189***	−0.206**	−2.118	−0.161
	(0.443)	(0.0808)	(1.869)	(3.247)
IEI Factor 2	−1.934***	−0.181**	−6.774***	−9.674*
	(0.622)	(0.0758)	(2.525)	(5.228)

NOTE: The table reports results from 12 separate regressions. Column headings correspond to the sample, with column (1) presenting results for the pooled county sample, columns (2) and (3) containing estimates for the samples of rural and urban counties, respectively, and column (4) corresponding to the sample of counties in multistate MSAs. The Panel A dependent variable is county manufacturing capital expenditure measured in $000s. Panel B presents results for manufacturing capital expenditure (measured in $000s) per employee. The dependent variable in Panel C is total wage and salary employment per square mile of land area. Controls include variables for county demographics, average earnings, and industrial structure as well as measures for state and local government tax rates, expenditure, and outstanding debt. Standardized beta coefficients are shown in brackets. Standard errors clustered at the county level are shown in parentheses. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

indicates that an increase in the IEI factor increases manufacturing capital expenditure by more than $9 million. Employment density decreases with an increase in both IEI factors (Table 9, Panel C), as predicted.

Table 10 reports the results for county industry establishment shares by major division for the rural, urban, and multistate MSA county samples in Panels A, B, and C, respectively. The results generally confirm the findings from Section 5. Table 10, Panel A, reveals that increasing capital subsidy availability is associated with increased manufacturing, transportation, FIRE, and service establishment shares at the expense of wholesale trade and construction in rural border counties. Urban counties experienced an increase in manufacturing establishment shares associated with an increase in both IEI factors (Table 10, Panels B and C). Like the earlier results, Table 10 indicates their increase comes at the expense of wholesale trade establishment shares. Again, this is consistent with manufacturing firms outbidding wholesale trade firms with whom they compete for land. There is also some indication of unmodeled positive externalities between manufacturing and the construction and retail industries in urban counties.

6.3 IEI Percentile Indicators

Tables 11 and 12 present results allowing for potential nonlinearities and concerns about small differences in the IEI. The variables of interest are indicator variables for the counties' position in the IEI distribution. The omitted category is the indicator variable for counties with IEI scores less than the twenty-fifth percentile score, representing the most restrictive capital subsidy environments in the distribution.

Table 11 presents the change in counties' manufacturing capital and input mixes associated with each IEI percentile category. The results indicate no significant changes in manufacturing capital expenditure or capital expenditure per employee associated with moving

Table 10 Changes in Counties' Establishment Shares Associated with Additional Factor-Weighted Capital Subsidy Availability

	(1) Construction	(2) Manufacturing	(3) Transportation	(4) Wholesale trade	(5) Retail	(6) FIRE	(7) Services
Panel A: Rural border counties							
IEI Factor 1	0.0072	0.0136***	0.0028	−0.0239***	0.0006	0.0043**	0.0113***
	(0.0067)	(0.0025)	(0.0036)	(0.0056)	(0.0037)	(0.0022)	(0.0020)
IEI Factor 2	−0.0384***	0.0107***	0.0108***	−0.0410***	0.0020	0.0085***	0.0015
	(0.0073)	(0.0022)	(0.0038)	(0.0109)	(0.0042)	(0.0023)	(0.0020)
Panel B: Urban border counties							
IEI Factor 1	0.0074	0.0026*	−0.0027	−0.0281***	0.0161***	−0.0030	0.0030
	(0.0091)	(0.0014)	(0.0019)	(0.0051)	(0.0057)	(0.0024)	(0.0025)
IEI Factor 2	0.0112	0.0023	0.0053**	−0.0176***	−0.0034	−0.0006	0.0062***
	(0.0093)	(0.0014)	(0.0025)	(0.0054)	(0.0044)	(0.0028)	(0.0022)
Panel C: Multi−state MSA counties							
IEI Factor 1	0.0422**	0.0082***	−0.0030	−0.0307***	0.0159*	−0.0092	−0.0037
	(0.0186)	(0.0029)	(0.0048)	(0.0100)	(0.0081)	(0.0056)	(0.0042)
IEI Factor 2	0.0311	0.0021	0.0014	−0.0242**	−0.0113	−0.0009	0.0023
	(0.0193)	(0.0025)	(0.0052)	(0.0121)	(0.0089)	(0.0081)	(0.0045)

NOTE: The table reports the results of 21 separate regressions. Panels correspond to the sample of counties. Column headings correspond to SIC major division. The unit of analysis is the two−digit SIC industry share of total county establishments. Control variables include measures for county demographics and average earnings as well as measures for state and local government tax rates, expenditure, and outstanding debt. Standardized beta coefficients are shown in brackets. Standard errors clustered at the county level are shown in parentheses. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table 11 Changes in Counties' Manufacturing Capital Associated with Capital Subsidy Availability Percentile Indicators

	(1) All counties	(2) Rural	(3) Urban	(4) Multistate MSA
Panel A: Capital expenditure				
25th–50th percentile	−1,286	−348.7	−1,011	3,086
	(2,255)	(520.5)	(8,019)	(6,990)
50th–75th percentile	6,304**	1,547***	21,446**	28,872***
	(2,538)	(510.0)	(8,793)	(8,968)
IEI ≥ 75th percentile	314.4	870.7	446.7	13,696**
	(1,981)	(601.7)	(7,497)	(6,492)
Panel B: Capital expenditure per employee				
25th–50th percentile	0.213	0.112	0.425	0.353
	(0.137)	(0.144)	(0.312)	(0.403)
50th–75th percentile	0.605***	0.441***	0.936***	1.187***
	(0.119)	(0.123)	(0.290)	(0.366)
IEI ≥ 75th percentile	0.280**	0.176	0.513	0.462
	(0.139)	(0.142)	(0.349)	(0.336)
Panel C: Employment density				
25th–50th percentile	−2.487*	−0.966***	−1.160	20.32*
	(1.463)	(0.210)	(6.598)	(10.49)
50th–75th percentile	−2.926***	−0.657***	−5.322	5.903
	(0.979)	(0.209)	(4.378)	(7.414)
IEI ≥ 75th percentile	−3.458**	−0.319	−10.98	−2.529
	(1.394)	(0.220)	(6.762)	(9.281)

NOTE: The table reports results from eight separate regressions. Column headings correspond to the sample, with column (1) presenting results for the pooled border county sample, columns (2) and (3) containing estimates for the samples of rural and urban border counties, respectively, and column (4) corresponding to the sample of counties in multistate MSAs. The Panel A dependent variable is county manufacturing capital expenditure, measured in $000s. Panel B presents results for manufacturing capital expenditure (measured in $000s) per employee. The variables of interest are indicator variables for the counties' position in the IEI distribution. The omitted category is the indicator variable for counties with IEI scores less than the 25th percentile score, representing the most restrictive capital subsidy environments in the distribution. Controls include variables for county demographics, average earnings, and industrial structure as well as measures for state and local government tax rates, expenditures, and outstanding debt. Standard errors clustered at the county level are shown in parentheses. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table 12 Changes in Counties' Establishment Shares Associated with Capital Subsidy Availability Quartiles

	(1) Construction	(2) Manufacturing	(3) Transportation	(4) Wholesale trade	(5) Retail	(6) FIRE	(7) Services
Panel A: Rural border counties							
25th–50th percentile	−0.0729***	0.0205***	0.0103	−0.0611***	0.0290**	0.0089	0.0256***
	(0.0208)	(0.0072)	(0.0103)	(0.0182)	(0.0125)	(0.0066)	(0.0060)
50th–75th percentile	−0.0245	0.0389***	−0.0024	−0.0544***	0.0302***	0.0124**	0.0273***
	(0.0181)	(0.0062)	(0.0097)	(0.0145)	(0.0106)	(0.0060)	(0.0056)
IEI ≥ 75th percentile	−0.0483**	0.0306***	0.0176	−0.1352***	0.0187	0.0187***	0.0314***
	(0.0189)	(0.0064)	(0.0121)	(0.0298)	(0.0118)	(0.0064)	(0.0056)
Panel B: Urban border counties							
25th–50th percentile	−0.0400	0.0044	0.0010	−0.0512***	0.0502***	−0.0082	0.0054
	(0.0297)	(0.0046)	(0.0070)	(0.0155)	(0.0166)	(0.0086)	(0.0077)
50th–75th percentile	0.0318	0.0083**	0.0010	−0.0772***	0.0447***	−0.0019	0.0085
	(0.0247)	(0.0037)	(0.0054)	(0.0142)	(0.0151)	(0.0089)	(0.0070)
IEI ≥ 75th percentile	0.0365	0.0032	−0.0062	−0.0953***	0.0454***	−0.0136*	0.0124*
	(0.0264)	(0.0039)	(0.0058)	(0.0164)	(0.0140)	(0.0073)	(0.0070)
Panel C: Multistate MSA counties							
25th–50th percentile	0.0157	0.0184**	−0.0076	−0.0513*	0.0651***	−0.0351*	−0.0300**
	(0.0564)	(0.0085)	(0.0156)	(0.0304)	(0.0235)	(0.0185)	(0.0131)
50th–75th percentile	0.0799	0.0198**	−0.0079	−0.0610**	0.0576**	−0.0023	−0.0051
	(0.0504)	(0.0084)	(0.0144)	(0.0293)	(0.0234)	(0.0168)	(0.0118)
IEI ≥ 75th percentile	0.1135**	0.0209**	−0.0189	−0.0979***	0.0477**	−0.0426*	−0.0167
	(0.0547)	(0.0083)	(0.0150)	(0.0316)	(0.0241)	(0.0217)	(0.0129)

NOTE: The table reports the results of 21 separate regressions. Panels correspond to the sample of counties. Column headings correspond to SIC major division. The unit of analysis is the two-digit SIC industry share of total county establishments in Panel A and share of total employment in Panel B. The variables of interest are indicator variables for the counties' position in the IEI distribution. The omitted category is the indicator variable for counties with IEI scores less than the 25th percentile score, representing the most restrictive capital subsidy environments in the distribution. Control variables include measures for county demographics and average earnings as well as measures for state and local government tax rates, expenditures, and outstanding debt. Standard errors clustered at the county level are shown in parentheses. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

from the lowest positions in the distribution to the range between the twenty-fifth and fiftieth percentiles (Panels A and B, respectively). Relative to the baseline capital subsidies package, providing the capital subsidies in the range between the fiftieth and seventy-fifth percentiles significantly increases both capital expenditure and capital expenditure per employee. Estimates for the highest percentiles suggest either diminishing returns or negative signals associated with the most generous capital subsidy packages. The pooled county employment density results suggest employment density is linearly decreasing in capital subsidies (Panel C, column 1); however, these results appear to be driven by urban counties. Rural county employment densities are decreasing in capital subsidies, but the effect diminishes as counties move higher in the distribution.

Establishment-share changes associated IEI percentile indicators are reported in Table 12. Panel A confirms that manufacturing and service firms increase their share of establishments at the expense of construction and wholesale trade in rural counties. The results suggest some nonlinearity in the effect of increasing capital subsidies—either due to diminishing reductions in total costs or because potential revenue shortfalls associated with capital subsidies are negatively capitalized into land values. For example, Panel A, column 2 indicates that the biggest estimated increase in rural manufacturing shares occurs in counties in the range between the fiftieth and seventy-fifth percentiles of the distribution, rather than the seventy-fifth percentile (the null hypothesis of equality between the fiftieth-to-seventy-fifth percentile coefficient and the seventy-fifth-percentile-or-higher coefficient can be statistically rejected at the five percent level). While all percentile categories of capital subsidies are associated with increased service establishment shares relative to the baseline, equality cannot be rejected. Wholesale trade establishment shares decrease more as counties move to the next highest percentile category.

Equality cannot be rejected for the twenty-fifth-to-fiftieth and the fiftieth-to-seventy-fifth percentile indicators, but can for the seventy-fifth.

Table 12, Panels B and C, report the percentile category indicator results for urban border counties and multistate MSA counties, respectively. Panels B and C also suggest that manufacturing establishment shares increase at the expense of wholesale trade, with the biggest effects associated with the highest percentile category. Equality of effects, however, cannot be rejected at conventional levels. The categorical results also suggest positive spillovers for retail and construction in urban areas. Generally, the urban establishment share results also indicate a nonlinear relationship with capital subsidies.

7 CONCLUSION

Despite the lack of scholarly consensus on the effects of economic development incentives, they remain the primary economic development tool for many state and local governments. Nontax incentives make up a substantial portion of economic development incentive packages; however, they are also the type of incentive about which we know the least. Nontax incentives effectively subsidize capital as a job creation policy; however, the few studies examining nontax incentives suggest that these incentives do not support local job creation. The research herein investigates the mechanisms underlying these findings. Theory predicts that capital subsidies will have two effects. The first effect is capital-labor substitution, whereby firms adjust their input mix in favor of capital. Theory also predicts that subsidy-induced changes in total costs cause capital-intensive firms to outbid labor-intensive firms for land, resulting in changes in locations' industry mix.

The results presented herein indicate increasing capital subsidy availability is associated with both capital-labor substitution and changes in local industry mix. Consistent with previous findings, urban and rural counties respond differently to an increase in the IEI. Capital subsidies appear most effective at inducing new capital expenditure in urban areas. Employment densities decline with increases in available capital subsidies, consistent with theoretical predictions about capital-labor substitution. As predicted by theory, the industry employment share estimates also indicate that relatively capital-intensive industries increase their establishment shares at the expense of relatively labor-intensive industries with which they compete for land. The establishment-share results also suggest unmodeled spillovers between capital-intensive industries and labor-intensive industries, which vary between urban and rural areas. These findings suggest that further investigation of the interaction between capital subsidies and agglomeration externalities may be warranted. Taken together, the research presented herein suggests that subsidizing capital has consequences that may limit job creation effects. If capital-labor substitution and crowding out of labor-intensive industries by capital-intensive industries dominates any spillovers, then employment levels either decrease or remain unchanged, even when incentives change firm location behavior.

References

Bartik, Timothy. 2012. "The Future of State and Local Economic Development Policy: What Research Is Needed." *Growth and Change* 43(4): 545–562.

Bartik, Timothy J., George Erickcek, and Peter Eisinger. 2003. "Economic Development Policy in Michigan." In *Michigan at the Millennium*, Charles Ballard, Paul Courant, Doug Drake, Ron Fisher, and Elizabeth Gerber, eds. East Lansing, MI: Michigan State University Press, pp. 279–297.

Bray, Hiawatha. 2012. "R.I. Races to Save Curt Schilling's Company." *Boston Globe*, May 16. http://www.boston.com/business/technology/articles/2012/05/16/ri_races_to_save_curt_schillings_company/ (accessed September 21, 2015).

Chirinko, Robert S., and Daniel J. Wilson. 2009. "A State Level Database for the Manufacturing Sector: Construction and Sources." FRB Working Paper No. 2009-21. San Francisco: Federal Reserve Bank of San Francisco.

Cohan, Peter. 2012. "Who Does Curt Schilling Owe $151 Million?" *Forbes*, June 7. http://www.forbes.com/sites/petercohan/2012/06/07/who-does-curt-schilling-owe-151-million/ (accessed September 21, 2015).

Council for Community and Economic Research. 2013. *2012 State Economic Development Incentives Survey Report*. Arlington, VA: Council for Community and Economic Research.

de Bartolome, Charles A. M., and Mark M. Spiegel. 1997. "Does State Economic Development Spending Increase Manufacturing Employment?" *Journal of Urban Economics* 41(2): 153–175.

Dinan, John. 2011. "State Constitutional Developments in 2010." In *The Book of the States*, Council of State Governments, ed. Lexington, KY: Council of State Governments, pp.3–11.

———. 2012. "State Constitutional Developments in 2011." In *The Book of the States*, Council of State Governments, ed. Lexington, KY: Council of State Governments, pp.3–10.

Gabe, Todd M., and David S. Kraybill. 2002. "The Effect of State Economic Development Incentives on Employment Growth of Establishments." *Journal of Regional Science* 42(4): 703–730.

Goetz, Stephan J., Mark D. Partridge, Dan S. Rickman, and Shibalee Majumdar. 2011. "Sharing the Gains of Local Economic Growth: Race-to-the-Top versus Race–to-the-Bottom Economic Development." *Environment and Planning C: Government and Policy* 29(3): 428–456.

Goss, Ernest P., and Joseph M. Phillips. 1997. "The Effect of State Economic Development Agency Spending on State Income and Employment Growth." *Economic Development Quarterly* 11(1): 88–96.

Greenbaum, Robert T., Blair D. Russell, and Tricia L. Petras. 2010. "Measuring the Distribution of Economic Development Tax Incentive Intensity." *Economic Development Quarterly* 24(2): 154–168.

Hammond, George W., and Mehmet S. Tosun. 2010. "The Impact of Local Decentralization on Economic Growth: Evidence from U.S. Counties." *Journal of Regional Science* 51(1): 47–64.

Hanson, Andrew, and Shawn Rohlin. 2011. "The Effect of Location-Based Tax Incentives on Establishment Location and Employment across Industry Sectors." *Public Finance Review* 39(2): 195–225.

Harger, Kaitlyn, and Amanda Ross. 2013. "Do Capital Tax Incentives Attract New Businesses? Evidence across Industries from the New Markets Tax Credit." Working paper. Morgantown, WV: West Virginia University.

McDonald, John F., and Daniel P. McMillen. 2011. *Urban Economics and Real Estate: Theory and Policy,* 2nd ed. Hoboken, NJ: Wiley.

Morgan, Jonathan Q. 2009. "Using Economic Development Incentives: For Better or for Worse." *Popular Government* 2009(Winter): 16–29. http://sogpubs.unc.edu/electronicversions/pg/pgwin09/article3.pdf (accessed September 22, 2015).

Ó hUallacháin, Breandán, and Mark A. Satterthwaite. 1992. "Sectoral Growth Patterns at the Metropolitan Level: An Evaluation of Economic Development Incentives." *Journal of Urban Economics* 31(1): 25–58.

Partridge Mark D., Dan S. Rickman, and Hui Li. 2009. "Who Wins from Local Economic Development? A Supply Decomposition of U.S. County Employment Growth." *Economic Development Quarterly* 23(1): 13–27.

Patrick, Carlianne. 2014a. "Does Increasing Available Nontax Economic Development Incentives Result in More Jobs?" *National Tax Journal* 67(2): 351–386.

———. 2014b. "Constitutional Limits on State and Local Aid to Private Enterprise." *Center for State and Local Finance Policy Brief No.5.* Atlanta: Center for State and Local Finance.

———. 2015. *Assessing Georgia's Non-Tax Economic Development Incentives: A Comparison of Georgia to Neighboring States*. Center for State and Local Finance Report. Atlanta: Center for State and Local Finance.

Tarr, G. Alan. 1998. *Understanding State Constitutions*. Princeton, N.J.: Princeton University Press.

Thomas, Kenneth P. 2011. *Investment Incentives and the Global Competition for Capital*. New York: Palgrave Macmillan.

Woodward, Douglas P. 2012. "Industry Location, Economic Development Incentives, and Clusters." *Review of Regional Studies* 42(1): 5–23.

Appendix

Table A1 Summary Statistics for Manufacturing Capital Samples

Variables	(1) All counties	(2) Rural	(3) Urban	(4) Multistate MSA	(5) Border	(6) Rural border	(7) Urban border
Mfg. capital expenditure	31,949	9,191	112,088	109,229	28,689	9,260	97,337
	129,820	21,652	257,532	203,784	93,306	20,502	178,765
Mfg. capital expend. per empl.	3.744	3.224	5.309	4.742	3.558	3.045	5.114
	5.018	4.416	6.245	4.393	4.182	3.409	5.664
% population working age	0.372	0.364	0.401	0.405	0.372	0.366	0.399
	0.045	0.042	0.045	0.0446	0.043	0.041	0.041
% population minority	0.105	0.103	0.114	0.111	0.100	0.098	0.105
	0.151	0.158	0.118	0.122	0.152	0.161	0.111
Earnings per employee	14.010	13.310	16.710	17.31	14.140	13.400	17.030
	6.506	5.984	7.651	8.158	6.538	5.985	7.709
Manufacturing employment Share	0.204	0.203	0.206	0.209	0.207	0.202	0.226
	0.137	0.143	0.112	0.113	0.140	0.145	0.118
Farm employment share	0.203	0.239	0.061	0.0514	0.199	0.235	0.055
	0.222	0.231	0.094	0.0935	0.223	0.232	0.095
FIRE employment share	0.022	0.025	0.012	0.0786	0.020	0.022	0.010
	0.026	0.028	0.013	0.0293	0.021	0.023	0.009
Service employment share	0.069	0.066	0.081	0.279	0.067	0.065	0.074
	0.032	0.031	0.031	0.0791	0.029	0.029	0.028
Military employment share	0.261	0.256	0.279	0.0355	0.259	0.255	0.276
	0.084	0.084	0.080	0.0876	0.085	0.086	0.082
State effective corp. tax rate	0.024	0.023	0.029	0.0754	0.024	0.022	0.030
	0.045	0.040	0.060	0.0110	0.044	0.033	0.071
Indiv. income tax rate	0.076	0.076	0.077	0.0204	0.076	0.076	0.076
(state and local)	0.011	0.011	0.011	0.00961	0.012	0.011	0.012
Property tax rate	0.016	0.016	0.018	0.0305	0.017	0.017	0.018
(state and local)	0.010	0.010	0.011	0.0136	0.010	0.010	0.011
Sales tax rate	0.034	0.035	0.029	0.0206	0.034	0.035	0.028
(state and local)	0.026	0.028	0.013	0.00742	0.024	0.026	0.013
K–12 education expenditure	0.023	0.023	0.023	0.0836	0.023	0.023	0.022
(state and local)	0.008	0.008	0.008	0.0174	0.009	0.009	0.008
Public safety expenditure	0.098	0.101	0.085	0.0278	0.098	0.102	0.084
(state and local)	0.025	0.026	0.020	0.00907	0.025	0.025	0.017
Highway expenditure	0.026	0.025	0.028	0.0174	0.026	0.025	0.028
(state and local)	0.009	0.008	0.009	0.00681	0.009	0.008	0.009
Outstanding debt	0.023	0.025	0.017	0.156	0.024	0.026	0.017
(state and local)	0.011	0.012	0.006	0.0912	0.011	0.012	0.007
N	18426	14658	3768	1740	7962	6342	1620
n	3071	2443	628	290	1327	1057	270
T	6	6	6	6	6	6	6

NOTE: The table provides the mean (larger type size) and standard deviation (smaller type size) for the dependent and independent variables employed in the manufacturing capital regressions. Manufacturing capital expenditure is expressed in $000s. "(State and local)" means the expenditure/tax information from the line above uses both state and local expenditures. State and local tax and expenditure variables are measured relative to personal income, with the exception of state effective corporate tax rate.

Table A2 County Panel Establishment Average Industry Shares (%)

	All counties	Rural	Urban	Multistate MSA	Border	Rural border	Urban border
Construction	3.496	3.431	3.496	3.859	3.400	3.338	3.634
	2.759	2.667	2.759	3.163	2.682	2.602	2.951
FIRE	1.335	1.378	1.335	1.252	1.313	1.350	1.201
	1.184	1.205	1.184	1.142	1.145	1.148	1.129
Manufacturing	0.642	0.756	0.642	0.457	0.630	0.737	0.390
	1.199	1.382	1.199	0.658	1.160	1.344	0.481
Retail	4.152	4.273	4.152	3.823	4.166	4.264	3.796
	2.805	2.894	2.805	2.536	2.753	2.823	2.434
Service	2.257	2.257	2.257	2.271	2.266	2.263	2.276
	1.972	1.953	1.972	2.022	1.973	1.951	2.048
Transportation	1.106	1.271	1.106	0.815	1.110	1.267	0.669
	1.504	1.643	1.504	1.043	1.519	1.667	0.848
Wholesale Trade	3.248	3.352	3.248	2.932	3.266	3.388	2.801
	2.230	2.337	2.230	1.734	2.434	2.591	1.627

NOTE: The table provides summary statistics for the two-digit Standard Industrial Classification (SIC) industry employment shares by SIC major division used as the dependent variable in the employment share regressions. Summary statistics for the independent variables included in the regressions are available in Table A.1.

Table A3 Effect of IEI on Border Counties' 2-Digit SIC Shares of Establishments by Major Division

	(1) Construction	(2) Manufacturing	(3) Transportation	(4) Wholesale	(5) Retail	(6) FIRE	(7) Services
IEI	-0.0002	0.0005***	0.0002*	-0.0017***	0.0002	0.0002**	0.0003***
	[-0.0035]	[0.0268]***	[0.0075]*	[-0.0347]***	[0.0032]	[0.0073]**	[0.0090]***
	(0.0002)	(0.0001)	(0.0001)	(0.0003)	(0.0001)	(0.0001)	(0.0001)
Observations	33,925	106,571	52,790	35,388	81,693	63,173	135,052
R-squared	0.1684	0.0316	0.0405	0.0538	0.0698	0.1283	0.2573

NOTE: The table reports the results of fourteen separate regressions using the sample of border of their state with another state. Column headings correspond to SIC major division. The unit of analysis is the 2-digit SIC industry share of total county establishments in Panel A and share of total employment in Panel B. Control include variables for county demographics, and average earnings well as measures for state and local government tax rates, expenditure, and outstanding debt. Beta coefficients are shown in brackets and robust standard errors shown in parentheses.