

# THE EFFECTS OF BUSINESS PROPERTY TAX INCENTIVES\*

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**B**USINESS PROPERTY TAX ABATEMENT IS ONE of the more widely used tools of local economic development policy. Proponents argue that property tax abatements are granted to encourage businesses to locate or expand in a particular jurisdiction, while opponents argue that they are not effective and amount to corporate welfare. Over the past two decades local governments have increased their use of property tax abatement in an attempt to increase the number of firm locations and expansions and thereby the level of employment in local areas. Property tax abatements reduce the price of capital for industrial and commercial firms by exempting new investment from property taxes for a period of time. Through tax abatement, local governments attempt to increase new construction and capital investment and create economic opportunities for residents.

In Indiana, property tax abatement is granted for new construction or improvements to real property in an economic revitalization area<sup>1</sup> (ERA), enterprise zone (EZ), or newly installed personal property in an ERA or EZ. For each of these forms of abatement, assessed value is reduced by the amount of the abatement.<sup>2</sup> The value of the abatement is the tax rate times the reduction in assessed value. Property tax abatements shift the property tax burden onto other property owners. This may include other businesses or residents. In Indiana, business property tax abatements are approved by local city and/or county councils for a maximum of 10 years for real property and personal property in ERAs and up to four years in an EZ. Abatement that is granted for multiple years is reduced each year according to a sliding scale. Businesses in manufacturing and research and development industries are eligible to apply for abatement in an ERA.

Businesses applying for abatement must file a statement of benefits form and a compliance form for each year that abatement is received. The statement of benefits (application) form includes information on employees and salaries resulting from the project, estimates of the cost and assessed

value of proposed property improvements, and estimates of solid and hazardous waste conversion. In practice it is rare for an abatement application not to be approved. Annual compliance forms include information on actual employment, salaries, project costs, assessed values, and waste conversions. The actual amounts are compared with the estimates that were provided in the original application. Once granted, it is rare for a local government to adjust or revoke abatement even if there are discrepancies between the promised benefits initially stated in the application and the actual benefits shown on the annual compliance form.

The remainder of the paper provides: (1) a brief review of the literature on the determinants and effectiveness of local property tax incentives, and (2) an analysis of the effects of property tax abatement on employment and business establishments using data for Indiana counties.

## LITERATURE

In their work on industrial incentives, Fisher and Peters (1998) state that two of the most crucial issues for economic development policy are “(1) measuring the worth *to the firm* of incentives offered and (2) identifying the spatial pattern of incentives....” (p. 2). By “identifying the spatial pattern of incentives” Fisher and Peters mean determining if poorer, more distressed locations offer larger incentives than wealthier, less distressed places. This is important because, if economic development policy is effective, it should promote the employment in areas of high economic distress. For this to occur, economic development efforts should be more active in poorer, economically troubled places. A competing effect is that designating an area as blighted may repel businesses. As Bartik (1991) points out, areas with high levels of unemployment will benefit more from the creation of an additional job than areas with low levels of unemployment. Assuming that the various property tax incentives do lead to the creation of jobs that would not have been created in their absence, areas with high unemployment would benefit more from property tax incentives than areas with low levels of unemployment.

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Previous empirical studies of property tax abatement focus on two issues: the determinants of abatement and the effects of abatement. Each of these is addressed below.

### Determinants of Property Tax Abatements

There is some evidence that distressed locations offer more generous property tax abatement. Byrnes, Marvel, and Sridhar (1999) examine the determinants of the generosity of tax abatements to businesses in Ohio's enterprise zones based on location characteristics and firm characteristics. Property tax abatement (both real and personal) is the primary incentive offered to businesses. They examine 859 EZ abatement contracts in 230 school districts in 1993 and 1994. They find that school districts that enter into more abatement contracts are more generous, districts with lower house values offer more generous abatements, and districts with higher business millage rates offer more generous abatement. Firms that offered more new jobs receive more generous abatement offers than firms offering to retain jobs. The authors conclude "...cities do seem 'rational' in their negotiations with business, offering more favorable tax abatement packages to 'better' firms. ...it appears that Ohio cities that must overcome negative location characteristics offered higher abatements" (p. 817).

Examining the timing of abatement offers, Anderson and Wassmer (1995) focus on *when* various local economic development incentives are first utilized by local governments after the incentives are approved in statute at the state level. Using a hazard model and 1974-1992 data for 112 municipalities in metropolitan Detroit, they find that the median household income and the property tax price of local public services (median house value/total property tax base) are the primary determinants of the timing of abatement offers (length of the non-abatement spell) and that first-time abatement is offered in response to offers in other jurisdictions (emulation effect). Jurisdictions with higher median household income and higher property tax price wait longer to grant abatements, which suggests that distressed areas are more likely to offer abatement.

In contrast, in her study of Michigan cities with populations greater than 10,000, Reese (1991) examines whether prosperous cities are more likely to grant abatement and the political factors that

influence abatements. Using data from the 1970s and early 1980s, she finds that cities with larger or growing populations, higher income levels, and more new development grant more abatement which suggests that growing rather than distressed areas may offer more abatement.

### Effects of Property Tax Abatements

Research examining the effects of property tax incentives on investment and employment is inconclusive. Focusing on investment, Coffin (1982) examines whether tax abatement offered in Indianapolis has led to an increase in new investment or altered the location of investment to areas that qualify for tax abatements. He estimates that property tax abatement reduces the investment costs on structures by 1.88 to 7.85 percent depending on use but draws no firm conclusions about the impact of tax abatement.

Wassmer (1994) examines the effects of five types of incentives -- industrial property tax abatement, commercial property tax abatement, Downtown Development Authority (DDA), Tax Increment Financing (TIF), and industrial development bonds -- for 112 cities in the Detroit metropolitan area using data at 5-year intervals from the mid-1900s through the 1980s. He finds that the effect of incentives depends on how development is measured and the type of incentive used. Industrial property tax abatements "can induce an elastic response in real manufacturing value added" if local conditions that "repel industrial firms are large enough" (p. 11) suggesting that distressed areas are more likely to offer abatement to compensate for negative local characteristics and that abatement increases manufacturing value added.

Another issue is the proposition that local governments offer abatement as a result of competitive pressure from other local governments. Wassmer and Anderson (2001) examine the effect of various economic development incentives on manufacturing property value, commercial property value, the residential employment rate, and the poverty rate using panel data (1977, 1982, 1987, 1992) for 112 cities in the Detroit metropolitan area. They find that "local offer of manufacturing property tax abatements exerted a positive influence on manufacturing property value only in 1977" -- the first year examined -- and explain this finding as less copycat behavior in the early years of the program.

### DATA AND MODELING STRATEGY

The analysis that follows examines the effects of property tax abatement offered by local governments in Indiana. Dalehite, Mikesell, and Zorn (2005) provide an overview of property tax abatement programs in the United States. In the current study the unit of analysis is the county. I aggregate property tax abatement in local jurisdictions in the state of Indiana from 1998 to 2001 to the county level. County was chosen as the unit of analysis because if tax abatement is effective, it will affect a larger geographic area than the local jurisdiction offering the abatement. These data are augmented with other county-level data to construct a panel (time-series, cross-section) dataset. The 1998-2001 time period is used because the change in coding of industries from Standard Industrial Codes (SIC) to the North American Industry Classification System (NAICS) makes it difficult to compare industry data prior to 1998, and a few variables used in the model are not readily available after 2001.

Manufacturing job losses have been particularly problematic in the Midwest. In Indiana, for example, the number of manufacturing jobs peaked at over 764,000 in the early 1970s and declined to just under 586,000 in 2003 according to estimates by the Bureau of Economic Analysis (BEA). In contrast, the number of manufacturing establishments increased from 6,920 in 1967 to 9,223 in 2002 according to the U.S. Census Bureau's Census of Manufacturers. Business property tax abatements have increased from \$6.98 million in 1984, the first year for which data is available, to approximately \$237.5 million in 2003, not adjusted for inflation.

#### Empirical Specification

Since the level of tax abatement and employment (or establishment) growth may be simultaneously determined if tax abatement is effective, a system of simultaneous equations are estimated using the econometric method of two-stage least squares. This approach takes into account the interrelationships between abatement and employment (or establishment) growth.

The model is specified as:

$$(1) \quad A_{it} = \alpha_0 + \alpha_1 E\Delta_{it} + \alpha_2 G_{it} + \alpha_3 W_{it} + \alpha_4 L_{it} + \gamma_{it} + \varepsilon_{it}$$

$$(2) \quad E\Delta_{it} = \beta_0 + \beta_1 A_{it} + \beta_2 G_{it} + \beta_3 W_{it} + \beta_4 L_{it} + \beta_5 I_{it-5} + \gamma_{it} + \varepsilon_{2it}$$

where  $A_{it}$  is the dollar value of business property tax abatement in county  $i$  and time period  $t$ . Depending on the model,  $E\Delta_{it}$  is the growth in manufacturing employment, growth in the number of manufacturing establishments, or growth in nonfarm employment in county  $i$  over a 5-year period<sup>3</sup> ending with time period  $t$ . Employment (establishment) growth rather than the level of employment was chosen as the dependent variable because policy makers are primarily interested in job growth. In both equations,  $G_{it}$  is a vector of local government characteristics;  $W_{it}$  are workforce characteristics in county  $i$  and period  $t$ ; and  $L_{it}$  is a vector of local characteristics in county  $i$  and time period  $t$ . In equation 2,  $I_{it-5}$  is initial employment conditions five years earlier in county  $i$ . Random disturbance terms for each equation are the vectors  $\varepsilon_{1it}$  and  $\varepsilon_{2it}$ , and  $\gamma_{it}$  are fixed effects. Endogenous variables are noted with bold italics in the equations above.

Descriptive statistics for the variables used in the model are shown in Table 1. See Appendix A for variable descriptions and sources.

For counties during the 1998 through 2001 time period, the average (5-year) growth in nonfarm employment was just over 3000 jobs and ranged from -3,645 to over 63,000 jobs. Average (5-year) growth in manufacturing employment was just over 29 jobs and ranged from -7,264 to 5,777. The average change (over five years) in the number of manufacturing establishments was -3.03. The average business property tax abatement (adjusted for inflation) offered in a county during this time period was just over \$1.8 million and ranged from \$0 to over \$46 million.

In the employment (establishment) growth equation (equation 2 above), if tax abatement has the desired effect, it should increase employment (establishment) growth so the expected sign on the coefficient is positive. Government variables, such as local income tax revenues, sales tax revenues, and assessed value of property, are proxies for government spending and are expected to be positively related to employment growth. Road expenditures are included to reflect the quality of transportation infrastructure in a county. The quality of transportation infrastructure is expected to be positively related to employment growth.

Factors such as manufacturing labor costs, the unemployment rate, and the education level of workers influence a firm's decision to expand employment in a particular location. Local characteristics such as higher labor costs are generally

Table 1  
Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum	Observations
Nonfarm Employment Growth	3,063.06	7,149.12	-3,645	63,015	368
Manufacturing Employment Growth	29.33	1,290.53	-7,264	5,777	360
Manufacturing Establishment Growth	-3.03	22.65	-222	29	368
Real Business Property Tax Abatement* \$	1,810,136	4,220,984	0	46,169,845	368
Real Local Income Tax Revenues* \$	9,203,964	15,871,781	0	1,18E+08	368
Real Sales Tax Revenues* \$	23,913,375	69,120,319	0	6,88E+08	368
Real Assessed Value of Property* \$ (10,000)	104,044.8	213,845.2	4,458.55	1,970,548	368
Road Expenditures	3,425,674	5,613,151	208,651	53,379,942	368
Initial Nonfarm Employment	35,418,58	75,520.59	913	662,474	368
Unemployment Rate %	7,377,473	11,996.34	17	84,365	368
High School Drop-Out Rate %	3.48	1.12	1.08	7.29	368
Real Average Annual Pay* \$	1.88	0.87	0	6.04	368
Real Average Annual Manufacturing Pay* \$	27,629.64	4,700.4	17,188.06	47,164.5	368
Manufacturing as a Share of Total Employment %	35,503.89	11,387.36	0	77,244.1	368
Health and Social Services as a Share of Total Employment %	31.04	13.58	0.49	61.99	368
Wholesale as a Share of Total Employment %	11.74	3.82	2.71	24.72	368
Retail as a Share of Total Employment %	3.79	2,523	0.44	16.39	368
Finance and Insurance as a Share of Total Employment %	14.43	3.57	5.63	27.13	368
Real Median Household Income \$	3.19	1.85	0.49	14.53	368
Center County Dummy	44,254.14	7,045.58	33,299.74	81,874.33	368
Poverty Rate %	0.09	0.29	0	1	368
	8.67	2.19	3.22	15.69	368

Note: \* Adjusted for inflation. Endogenous variables are italicized.

expected to be negatively related to employment (establishment) growth. However, higher average pay may also signal higher productivity, so the sign is indeterminate. A less educated workforce is expected to be a deterrent to business location and expansion, while a high unemployment rate may signal available labor.

Agglomeration economies suggest that counties with high industry concentrations will have higher employment (establishment) growth, so employment shares for various industries are expected to be positively related to employment growth. In addition, counties with higher levels of initial employment are expected to have higher employment growth. Factors such as low-median household income, central county (county containing the primary city in a metropolitan area), and a high poverty rate are indicators of economic distress.

### Regression Method and Results

This paper examines the relationship between employment growth and the level of property tax abatement. Table 2 shows the regression estimates for three models: growth in manufacturing employment, growth in manufacturing establishments, and growth in nonfarm employment. The simultaneous equation model was estimated using two-stage least squares with fixed effects. Fixed effects capture differences in local amenities, geographic location, etc. among the counties. The results of the second stage of the regression are shown in Table 2.<sup>4</sup> Variables used in the first stage of the regression are shown in Appendix A.

### Abatement

The level of property tax abatement is a significant determinant of manufacturing and nonfarm employment growth and changes in the number of manufacturing establishments. The coefficients can be interpreted as follows. A \$10,000 increase in abatement is associated with a loss of 2.7 manufacturing jobs, while a \$1 million increase in abatement is associated with an increase of 5 manufacturing establishments. This suggests that property tax abatement is not sufficient to “turn the tide” on overall manufacturing job losses but that it can encourage startups. Finally, a \$10,000 increase in abatement is associated with an increase of 11 jobs in the nonfarm sector. Property tax abatement in Indiana targets manufacturing and research and development firms. Employment growth in each of

these sectors is expected to have multiplier effects increasing employment in other sectors.

### Government Tax and Spending Policies

Research has shown that local tax policies and public services influence job creation. Wasylenko (1997) and Fisher (1997) provide an overview of studies addressing these issues. Variables controlling for local income tax revenues and sales tax revenues are included as a proxy for spending.<sup>5</sup> The assessed value of property (the property tax base) serves as a measure of wealth and local revenue capacity. Local income tax revenue is significant in each of the three models although the direction of the effect differs. A \$100,000 increase in local income tax revenue is associated with a decrease of five manufacturing jobs, while a \$10,000 increase in local income tax revenue is associated with an increase of four jobs in the nonfarm sector. A \$1 million increase in local income tax revenue is associated with an increase of one manufacturing establishment. In Indiana local income taxes were established to fund local “economic development” projects, reduce reliance on property taxes, and reduce property tax burdens.<sup>6</sup> Perhaps it is the “use” of these funds that is driving the increase in nonfarm employment and manufacturing establishments.

Both sales tax revenue and assessed value of property are negatively related to growth in the number of manufacturing establishments. In Indiana half of state sales tax revenues are distributed to the property tax replacement fund, which local governments then use to reduce property taxes. The negative relationship between assessed value and growth in the number of manufacturing establishments suggests that manufacturing establishments are more likely to locate or expand in areas with lower assessed value. Nonfarm employment growth is positively related to sales tax revenues. Much of the growth in nonfarm employment has occurred in the retail sector which may explain this result.

Road expenditures include spending on construction, maintenance, and repair of local roads.<sup>7</sup> This variable is included to serve as a proxy for the quality of local roads in each county. Road expenditures are a significant determinant of nonfarm employment and manufacturing establishment growth, however the sign is unexpectedly negative. A \$1 million increase in local road expenditures is associated with a decrease of 2 manufacturing

*Table 2*  
**Employment growth or establishment growth equation,  
 Two-stage least squares regression results**

<i>Dependent Variable</i>	<i>Model 1: Growth in Manufacturing Employment – Coefficient [t value]</i>	<i>Model 2: Growth in Manufacturing Establishments – Coefficient [t value]</i>	<i>Model 3: Growth in Nonfarm Employment – Coefficient [t value]</i>
Real Business Property Tax Abatement \$	-0.00027* [4.364]	.000005* [9.344]	0.0011* [4.495]
Real Local Income Tax Revenues \$	-.00005* [2.633]	.000001* [5.046]	0.0004* [5.407]
Real Sales Tax Revenues \$	.0000004 [0.107]	-.000000096** [2.060]	0.00015* [6.359]
Real Assessed Value of Property	0.0032 [1.418]	-.000084* [3.253]	-0.0079 [1.101]
Road Expenditures	-.00005 [1.216]	-.000002* [5.215]	-0.00029** [2.145]
Initial Nonfarm Employment			-0.1257* [3.219]
Initial Manufacturing Employment	0.0683* [3.937]	-0.00077* [4.115]	
Unemployment Rate %	-231.97** [2.563]	-1.0037 [0.989]	-343.73 [1.188]
High School Drop-Out Rate %	114.49 [1.435]	0.7343 [0.82]	420.94*** [1.706]
Real Average Annual Pay			0.0337 [0.528]
Real Average Annual Manufacturing Pay	0.0026 [0.322]	.00002 [0.281]	
Manufacturing as a Share of Total Employment %			-12.04 [0.621]
Health and Social Services as a Share of Total Employment %	-39.74*** [1.957]	-0.2274 [0.998]	-153.86** [2.405]
Wholesale as a Share of Total Employment %	15.24 [0.507]	0.2324 [0.687]	147.57 [1.588]
Retail as a Share of Total Employment %	29.13 [1.29]	0.0671 [0.267]	184.09** [2.226]
Finance and Insurance as a Share of Total Employment %	37.63 [0.682]	-1.6515** [2.753]	-124.93 [0.721]
Real Median Household Income \$	0.0232 [0.887]	-0.00016 [0.564]	-0.0312 [0.317]
Center County Dummy	-81.41 [0.224]	-1.4868 [0.376]	-1400.96 [1.326]
Poverty Rate %	-13.23 [0.189]	-1.0499 [1.346]	-106.72 [0.469]
R square	0.5412	0.8039	0.8524
Number of Observations	360	368	368

\*Significant at the 99 percent confidence level in a two-tailed test.  
 \*\* Significant at the 95 percent confidence level in a two-tailed test.  
 \*\*\* Significant at the 90 percent confidence level in a two-tailed test.  
 County specific fixed effects were computed but are not reported here.

establishments. A \$10,000 decrease in local road expenditures is associated with a decrease of 2.9 nonfarm jobs. Dalenberg and Partridge (1995) suggest that spending on local roads is a response to deterioration and is thereby an effort to improve highway services. Alternatively, perhaps state and federal roads are more closely tied to economic growth so that spending on local roads is not an appropriate indicator to use.

### Initial Employment

Initial employment is measured as the level of employment five years earlier. Initial employment is a significant determinant of manufacturing employment and establishment growth and nonfarm employment growth, although the direction of the effect differs. An increase in initial manufacturing employment is associated with positive manufacturing job growth but negative establishment growth. This indicates that counties with higher initial manufacturing employment experience higher manufacturing employment growth – a one-job increase in initial employment is associated with a 0.068 increase in manufacturing job growth. The negative relationship between initial manufacturing employment and manufacturing establishment growth suggests that manufacturing growth is attributable to existing firms rather than start ups. The level of initial nonfarm employment is negatively associated with nonfarm employment growth, which suggests that counties with lower initial nonfarm employment experience more growth in nonfarm jobs.

### Workforce Characteristics

The unemployment rate is a proxy for available workers. A one percentage point increase in the unemployment rate is associated with a 231 job decrease in manufacturing employment. This variable is insignificant for the other models. The high school drop-out rate is used as a proxy for educational attainment since data on educational attainment is not available annually. It may also be a proxy for available workers. A one percentage point increase in the high school drop-out rate is associated with a 420 job increase in nonfarm employment. Employment in relatively low skill industry sectors such as retail may be driving this result. The drop-out rate is insignificant for the other models.

Worker pay is expected to be negatively associated with employment growth although higher pay may also signal higher productivity which is expected to increase employment growth. Neither of the labor cost variables is significant in any of the models. Additional work needs to be done to develop more precise measures of worker compensation. The descriptive statistics suggest that there is not a substantial amount of variation in annual pay among the counties which may explain the lack of significance of these variables.

### Other Local Characteristics

A higher share of health and social service employment is associated with decreases in nonfarm employment. A one percentage point increase in the share of health and social service employment is associated with a 153 job decrease in nonfarm employment and a 39 job decrease in manufacturing employment. In contrast, a one percentage point increase in the share of retail employment is associated with a 184 job increase in nonfarm employment. The positive relationship between the share of retail employment and growth in nonfarm employment provides support for agglomeration economies: counties with a higher portion of retail employment attract employment in other sectors. A higher share of finance and insurance employment is negatively associated with growth in the number of manufacturing establishments. Since employment in finance and insurance tends to be concentrated in urban cities, perhaps this result is reflecting the relocation of manufacturing firms to suburban and rural counties. Other local variables, median household income, the center county dummy, and the poverty rate are not significant determinants of employment growth in any of the models.

### CONCLUSIONS AND EXTENSIONS

After controlling for property tax abatement, do distressed counties have higher levels of employment growth? Do areas with high unemployment have higher levels of employment growth? Measures of economic distress included in the models are the unemployment rate, the high school drop-out rate, median household income, the center county dummy, and the poverty rate. Of these measures, only the unemployment rate and the high school drop-out rate were significant in one model

each. The coefficient on the unemployment rate was negative, which suggests that manufacturing employment decreases as the unemployment rate increases. The high school drop-out rate is positively related to growth in nonfarm employment. There is not sufficient evidence to conclude that distressed counties have higher levels of employment growth.

In sum, regression results from a simultaneous regression model suggest that fiscal variables including property tax abatement, road expenditures, and initial employment are the primary determinants of employment growth in Indiana counties during the 1998-2001 time period. Property tax abatement is positively related to growth in the number of manufacturing establishments and growth in nonfarm employment and negatively related to growth in manufacturing employment.

Planned extensions of this research include incorporating better measures of labor costs, including variables on local tax rates, and including a detailed analysis of the determinants of abatement.

## Notes

- <sup>1</sup> A rehabilitation deduction for residential property is also included in this classification. Only a small number of properties are granted this type of deduction.
- <sup>2</sup> Property tax abatement in Indiana is authorized under Indiana Code 6-1.1-12.1 for enterprise zones and economic revitalization areas.
- <sup>3</sup> For example, in 1998  $EA_{it}$  would measure employment (or establishment) growth between 1993 and 1998. In 1999  $EA_{it}$  would measure growth between 1994 and 1999, etc.
- <sup>4</sup> Appropriate tests for collinearity were conducted for all variables.
- <sup>5</sup> The author is in the process of obtaining data on tax rates.
- <sup>6</sup> There are three local option income taxes in Indiana: the County Adjusted Gross Income Tax (CAGIT), the County Option Income Tax (COIT), and the County Economic Development Income Tax (CEDIT).
- <sup>7</sup> Funding for these expenditures is from the Local Road and Street Account and the Motor Vehicle Highway Account, which are funded primarily through the state motor fuel tax (gasoline) and the special fuel tax (diesel).

## References

- Anderson, John E. and Robert W. Wassmer. The Decision to "Bid for Business": Municipal Behavior in Granting Property Tax Abatements. *Regional Science and Urban Economics* 25 (December 1995): 739-757.
- Bartik, Timothy. *Who Benefits from State and Local Economic Development Incentives?* Kalamazoo, MI: W.E. Upjohn Institute, 1991.
- Byrnes, Patricia, Mary K. Marvel, and Kala Sridhar. An Equilibrium Model of Tax Abatement City and Firm Characteristics as Determinants of Abatement Generosity. *Urban Affairs Review* 34 (July 1999): 805-819.
- Coffin, Donald A. Property Tax Abatement and Economic Development in Indianapolis. *Growth and Change* 13 (April 1982): 18-23.
- Dalehite, Esteban G., John L. Mikesell, and C. Kurt Zorn. Variation in Property Tax Abatement Programs Among States. *Economic Development Quarterly*, 19.2 (May 2005): 157-73.
- Dalenberg, Douglas R. and Mark D. Partridge. The Effects of Taxes, Expenditures, and Public Infrastructure on Metropolitan Area Employment. *Journal of Regional Science* 35 (November 1995): 617-640.
- Fisher, Peter S. and Alan H. Peters. *Industrial Incentives Competition Among American States and Cities*. Kalamazoo: W.E. Upjohn Institute for Employment Research, 1998.
- Fisher, Ronald C. The Effects of State and Local Public Services on Economic Development. *New England Economic Review* (March/April 1997): 53-71.
- Reese, Laura A. Municipal Fiscal Health and Tax Abatement Policy. *Economic Development Quarterly* 5 (February 1991): 23-32.
- U.S. Census Bureau. Census of Manufacturers. Geographic Area Series. Washington, D.C., 1967 and 2002.
- U.S. Department of Commerce. Bureau of Economic Analysis. Annual Earnings by Industry Estimates, Washington, D.C., various years.
- Employment and Earnings. Washington, D.C., various years.
- Wassmer, Robert W. Can Local Incentives Alter a Metropolitan City's Economic Development. *Urban Studies* 31 (October 1994): 151-159.
- Wassmer, Robert W. and John E. Anderson. Bidding for Business: New Evidence on the Effect of Locally Offered Economic Development Incentives in a Metropolitan Area. *Economic Development Quarterly* 15 (May 2001): 132-148.
- Wasylenko, Michael. Taxation and Economic Development: The State of the Economic Literature. *New England Economic Review* (March/April 1997): 37-52.

## APPENDIX A

*Table 1A*  
**Variable Names, Descriptions, and Sources, Employment/Establishment growth equations,  
the second stage of the regression model**

<i>Variable</i>	<i>Description</i>	<i>Source</i>
Nonfarm Employment Growth	Increase or decrease in nonfarm employment over a 5-year period.	Bureau of Economic Analysis
Manufacturing Employment Growth	Increase or decrease in manufacturing employment over a 5-year period.	Bureau of Economic Analysis
Manufacturing Establishment Growth	Increase or decrease in the number of manufacturing establishments over a 5-year period.	County Business Patterns
Real Business Property Tax Abatement \$	Total property tax abatement offered to businesses.	Indiana Legislative Services Agency
Real Local Income Tax Revenues \$	Revenue from one of three local option income taxes adjusted for inflation.	Indiana Handbook of Taxes, Revenues, and Appropriations
Real States Tax Revenues <sup>a</sup> \$	Sales tax revenues adjusted for inflation.	Stats Indiana
Real Assessed Value of Property \$	Certified net assessed value of property adjusted for inflation.	Indiana Legislative Services Agency
Road Expenditures \$	Expenditures on construction, maintenance, and repair of local roads.	Local Technical Assistance Program (Purdue University)
Initial Nonfarm Employment	Nonfarm employment at the beginning of the 5-year periods considered in this analysis.	Bureau of Economic Analysis
Initial Manufacturing Employment	Number of manufacturing jobs in the county.	Bureau of Economic Analysis
Initial Number of Manufacturing Establishments	Number of manufacturing establishments in the county.	County Business Patterns
Unemployment Rate %	Percent of the county labor force who are unemployed.	Bureau of Labor Statistics
High School Drop-Out Rate %	Percentage of high school students who do not graduate.	Stats Indiana
Real Average Annual Pay (in thousands)	Total annual payroll divided by total employment	County Business Patterns
Real Average Annual Manufacturing Pay (in thousands)	Total manufacturing payroll in a county/manufacturing employment	County Business Patterns
Manufacturing as a Share of Total Employment %	Manufacturing employment as a share of total employment in each county	County Business Patterns
Health and Social Services as a Share of Total Employment %	Health and social services employment as a share of total employment in each county	County Business Patterns
Wholesale as a Share of Total Employment %	Wholesale employment as a share of total employment in each county.	County Business Patterns
Retail as a Share of Total Employment %	Retail employment as a share of total employment in each county	County Business Patterns
Finance and Insurance as a Share of Total Employment %	Finance and insurance employment as a share of total employment in each county	County Business Patterns
Real Median Household Income \$	Median household income adjusted for inflation	U.S. Bureau of the Census
Center County Dummy	=1 if county is the central county (containing the primary city) in a metropolitan area.	U.S. Bureau of the Census and author's designation
Poverty Rate %	=0 otherwise. Percent of people with incomes below the poverty threshold.	U.S. Bureau of the Census

a. Indiana Department of Revenue allows businesses that own business locations throughout the state to consolidate their sales tax on a return; therefore the total sales, sales tax due, and use tax for all of these businesses would get reported under one county. This, in effect, understates the total sales and sales tax for some counties and overstates the sales tax in other counties.

*Table 2A*  
**Variable Names, Descriptions, and Sources, Abatement equation,  
the first stage of the regression models**

<i>Variable</i>	<i>Description</i>	<i>Source</i>
Nonfarm Employment Growth	See Table 1A above.	See Table 1A above.
Manufacturing Employment Growth	See Table 1A above.	See Table 1A above.
Manufacturing Establishment Growth	See Table 1A above.	See Table 1A above.
Real Local Income Tax Revenues \$	See Table 1A above.	See Table 1A above.
Real States Tax Revenues \$	See Table 1A above.	See Table 1A above.
Real Assessed Value of Property	See Table 1A above.	See Table 1A above.
Unemployment Rate %	See Table 1A above.	See Table 1A above.
Poverty Rate %	See Table 1A above.	See Table 1A above.
Real Average Annual Pay \$	See Table 1A above.	See Table 1A above.
Real Average Annual Manufacturing Pay \$	See Table 1A above.	See Table 1A above.
Population	Residential population in each county	Stats Indiana
Real Total Cost of Building Permits \$	Value of single and multifamily residential housing listed on building permits, adjusted for inflation	U.S. Census Bureau
High School Drop-Out Rate %	See Table 1A above.	See Table 1A above.
Manufacturing as a Share of Total Employment %	See Table 1A above.	See Table 1A above.
Health and Social Services as a Share of Total Employment %	See Table 1A above.	See Table 1A above.
Wholesale as a Share of Total Employment %	See Table 1A above.	See Table 1A above.
Retail as a Share of Total Employment %	See Table 1A above.	See Table 1A above.
Finance and Insurance as a Share of Total Employment %	See Table 1A above.	See Table 1A above.
Real Median Household Income \$	See Table 1A above.	See Table 1A above.
Center County Dummy	See Table 1A above.	See Table 1A above.
Poverty Rate %	See Table 1A above.	See Table 1A above.