THE EFFECTS OF LOCAL TAXES AND SPENDING ON BUSINESS STARTUPS

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1. INTRODUCTION

This paper examines the determinants of new business startups in 128 Maine cities and 67 industries between 1993 and 1994. Of particular interest are the effects of local taxes, education spending and total local government spending on new business activity. Information on the effects of local taxes and spending is important to local policymakers given the claims made by businesses that taxes are too high and the recent trend of the federal government delegating more responsibility to state and local governments (Deller, 1998).

The effects of state and local taxes on business location decisions and other aspects of local economic growth and development have been examined extensively (Due, 1961; Wasylenko, 1981; Newman and Sullivan, 1988; Bartik, 1991, 1992). A review of the literature prior to 1960 suggests that taxes have very little effect on business location decisions (Due, 1961). A more recent survey of the literature found that 40 of 57 reviewed studies have at least one tax variable with a negative effect on economic activity (Bartik, 1992).

Although the estimated effects of taxes on business activity vary widely, many studies suggest that taxes have a greater negative impact on business activity at the intraregional level than at the interregional level (Wasylenko, 1981). Based on the results from 48 studies, the average elasticity of economic activity with respect to state and local taxes is –0.25 (Bartik, 1992). This suggests that a 10-percent increase in taxes is associated with a 2.5-percent decrease in business activity. Furthermore, Bartik (1991) found that the elasticity of business activity with respect to taxes is between –0.1 to –0.6 for interregional location decisions and –1.0 to -3.0 for location decisions within a particular metropolitan area.

Carlton (1983), Bartik (1985) and Walker and Greenstreet (1991) examined the effects of taxes on business location. Walker and Greenstreet (1991) found that property taxes have a negative and generally significant effect on the location of manufacturing plants in the Appalachian region, whereas Bartik (1985) found that state property taxes have a negative but insignificant effect on the location of new branch plants of Fortune 500 companies. Carlton (1983) found that local property tax rates do not affect firm location decisions in the fabricated plastic products, communication transmitting equipment and electronic components industries. One explanation offered for why taxes are not a significant determinant of new plant location is that taxes are used to finance public services that may benefit businesses (Carlton, 1983).

A failure to account for the benefits of public services financed by taxes may lead to an inaccurate estimate of the (negative) impacts of taxes on business activity (Fisher, 1997). Wasylenko (1997) suggests that firms and policymakers consider tax policy as well as the benefits from public goods and services as key determinants of site selection. Furthermore, Bartik (1991) found that econometric studies with variables controlling for state and local public services were more likely to uncover a negative impact of taxes on economic activity than studies that did not control for state and local public services.

A recent survey of the literature found that education spending has a positive effect on business activity in 12 of 19 reviewed studies and a positive and significant effect in 6 of 19 studies (Fisher, 1997). Likewise, spending on public safety has a positive effect on business activity in 5 of 9 studies and a positive and significant effect in 4 of 9 studies. Much of this work (14 of the 19 studies on education spending and 8 of the 9 studies on public safety spending) examines the impact of spending at the state level and does consider spending by local governments, which is the focus of this paper.

2. FACTORS AFFECTING NEW BUSINESS STARTUPS

A new business will enter a competitive industry in a given city if

(1) $\Pi_{i,t}(\gamma_{i,t}, \omega_{i,t}) > F_i$

where $\Pi_{i,t}(.)$ is the value of a new establishment i in time period t and F_i is the cost of entering the industry. The variable $\gamma_{i,t}$ represents current and expected future demand and cost conditions associated with operating a business in the city-industry, where $\partial \Pi / \partial \gamma > 0$, and $\omega_{i,t}$ represents the number and characteristics of establishments in the city-industry after entry and exit decisions are made between periods t-1 and t, where $\partial \Pi / \partial \omega < 0$.

Starting from a situation in which the value of a new establishment equals the cost of entering the industry, favorable changes in actual or expected demand and cost conditions between periods t-1 and t, $\gamma_{i,t} - \gamma_{i,t-1} > 0$, result in establishment values that exceed the entry costs. In competitive industries, this may induce new businesses to enter the city-industry, $\omega_{i,t} - \omega_{i,t-1} > 0$, until

(2) $\Pi_{i,t}(\gamma_{i,t}, \omega_{i,t}) = F_i$

Other things being equal, city-industries with high demand, low operating costs and favorable changes in actual or expected demand and cost conditions will have more startups than city-industries with low demand, high operating costs and unfavorable changes in demand and cost conditions. Likewise, industries with low entry costs will have more new entrants than industries characterized by high costs of entry.[1]

We used Covered Employment and Wages (ES-202) data from the Maine Department of Labor to identify new business startups between 1993 and 1994 in 128 Maine cities and 67 2-digit SIC industries.[2] Table 1 presents descriptive statistics on these 8,576 city-industries. To be counted as a business startup, the establishment must have an initial liability year of 1993 or 1994, it must have employed one of more workers when it opened, and it must have remained in operation until at least 1996.[3] Based on this definition, city-industries in our sample had an average of 0.437 startups between 1993 and 1994. There were zero startups during these years in 6,792 of the city-industries.

Local fiscal policy may affect the current or expected future costs of operating a business in a given city. High taxes that increase an establishment's annual operating costs may repel new business activity, whereas spending that extends or improves the quality of public services may decrease an establishment's costs, which would attract new business activity. Aside from the possibility that local spending may correlate with the quality of the workforce or infrastructure used by a new business, entrepreneurs may locate in high-spending cities because they (or their family) benefit directly from the public services. The local fiscal variables used in the paper are the city's personal property tax rate, the amount of education spending per pupil, and the amount of total local government spending per resident.[4]

Data on the personal property tax rate and the total amount of local government spending are from the 1993 Municipal Valuation Return Statistical Summary, published by the Property Tax Division of Maine Revenue Services. The local government-spending variable represents a city's total spending commitment that is financed by local sources. This includes spending on municipal services and locally-financed spending on education. We divide total government spending by the city's population to arrive at a per-capita level of local government spending.

Education spending figures are from the Maine Department of Education. The education-spending variable represents the total general fund costs included in the administrative unit's annual financial report with the exception of major capital outlays, debt service and transportation outlays. This amount includes education spending financed by local, state and federal sources. We divide local education spending by the number of students in the administrative unit, based on the average enrollment figures during the weeks of October 1 and April 1, to arrive at a per-pupil level of education spending.

The size and growth of the local population and the local cost of labor may affect the value of all businesses in a city. City population represents the size of the market for retail trade and service establishments, and population also controls for urbanization economies (e.g., availability of infrastructure and specialized business services, internal economies of scale) that may affect costs in all industries. City and county population growth may increase demand in retail and services industries and may increase the supply of labor used by all industries. Establishment values may increase with city population size and growth in the local populations and, therefore, we expect a positive relationship between the number of startups and these population variables. The average annual wages earned by workers in the county may directly affect an establishment's operating costs and decrease the value of all businesses in high-wage areas. Thus, we expect a negative relationship between the number of startups and local labor costs.

The size of a city-industry and the industry location quotient represent the economic climate for businesses in a specific city-industry. Other things being equal, city-industries with a large number of incumbent establishments and areas with a high industry concentration may have conditions that are favorable to businesses in the city-industry. For instance, a high concentration of industry in an area may provide cost savings to new businesses in the form of localization economies such as a pool of qualified workers, information spillovers and the ability to share specialized inputs (Krugman, 1991). We expect the number of businesses in the city-industry and the industry location quotient to have a positive effect on the number of startups.

Industry growth at the national level may affect the value of all establishments in the industry regardless of their location. Increases in gross industry output may reflect favorable changes in demand conditions that could induce new business entry. Thus, we expect a positive relationship between new business startups and the change in gross industry output at the national level.

Finally, the cost of industry entry may affect the number of new business startups that occur in response to favorable changes in costs or demand in the city-industry. Entry costs are represented in the paper by the non-labor costs of operating an average-sized establishment in the industry. This variable is calculated as

(3) $F_i = [1 / (1 - \alpha)] \, x \, \text{EMP} \, x \, \text{WAGE}$

where α is the ratio of employee compensation by industry to gross industry output, EMP is the average number of employees per establishment in the industry and WAGE is the average annual wages paid per worker in the industry.[5] The expression $[1/(1 - \alpha)]$ represents the value of gross industry output that is dedicated to non-labor factors per dollar of employee compensation. Other things being equal, entry costs are high in non-labor intensive (i.e. low value of α) industries, high-wage industries, and industries with a large average establishment size.

3. EMPIRICAL MODEL AND FINDINGS

This section presents empirical evidence on the effects of the local personal property tax rate, local education spending, total local government spending and other regional and industry characteristics on business startups. The empirical model used in the analysis is the zero-inflated Poisson (ZIP) regression model (Lambert, 1992; Greene, 1998, 2000). This estimator is appropriate given the discrete nature of new business startups and the large percentage of city-industries in our sample that had zero startups in 1993 and 1994.

The ZIP model used in the paper is $Y_i = 0$ with probability q_i and $Y_i \sim$ Poisson with probability $1 - q_i$, so that

(4) $\text{Prob}(Y_i = 0) = q_i + (1 - q_i)e^{-\lambda i}$

and

(5) $\text{Prob}(Y_i = j > 0) = (1 - q_i)e^{-\lambda i}\lambda_i^j/j!$

where $\lambda_i = e^{\beta' Xi}$, $q_i \sim \text{Normal}(v_i)$ and $v_i = \tau\beta' X_i$ (Lambert, 1992; Greene, 1998). The variable Y_i represents the number of business startups, X_i is a vector of regional and industry characteristics that affect the number of startups, β is a vector of regressors and τ is the ZIP(τ) parameter estimated in the model.

Table 2 reports maximum-likelihood estimates from a ZIP model examining the number of business startups in Maine city-industries between 1993 and 1994.[6] Explanatory variables used in the model are the local fiscal variables and other regional and industry factors expected to affect the operating costs and demand associated with operating a business in a given city-industry, and the cost of entering the industry. The model also includes a set of dummy variables that control for the industry's major SIC category.

Effects of local fiscal variables on business startups

Our empirical findings reveal that local taxes have a negative effect on new business startups, whereas spending on education and total local government spending have a positive effect on startups. The local tax rate, education spending, the tax rate divided by education spending, and the tax rate divided by total local government spending all have a significant effect on the number of new business startups.[7] Furthermore, a joint-hypothesis (Wald) test of the fiscal variables indicates that the taxing and spending decisions of local governments have a significant effect on the number of new business startups [Chi-squared = 44.05; significance level = 0.000].

Since the ZIP estimates are not interpreted as marginal effects and since the model includes various interaction terms, we calculated the effects of the explanatory variables for each city-industry. The expected number of new business startups in a city-industry is

$$(6) \qquad E(Y_i) = [1 - \text{Normal}(\tau\beta' X_i)]\exp^{\beta' X_i}$$

where Y_i is the number of startups, X_i is a vector of explanatory variables, β is a vector of estimated coefficients and τ is the ZIP(τ) parameter estimated in the model. The marginal effects reported in the paper are calculated as the expected number of startups after increasing the variable by 10 percent minus the expected number of startups at the variable's actual value, while the other variables are held at the sample mean.

The average effect of a 10-percent increase in the local personal property tax rate is a 0.0017 decrease in the number of business startups per city-industry.[8] Furthermore, increasing the tax rate by 10 percent has a negative effect on the number of startups in all 128 cities included in the sample. Other things being equal, 10-percent increases in education spending and total government spending are associated with an average of 0.0096 and 0.0123 additional startups per city-industry, respectively. The increase in education spending has a positive effect on the number of startups in 73 of 128 cities, and the increase in total government spending has a positive effect on business startups in 87 of 128 cities.

Effects of other local and industry characteristics on business startups

The empirical findings indicate that a city's population size and the initial size of the city-industry have a positive effect on the number of business startups. These variables are individually significant and a joint-hypothesis test indicates that city population size, the initial number of establishments per city-industry and the interaction between population and city-industry size have a significant effect on the number of new business startups [Chi-squared = 437.70; significance level = 0.000].[9]

Other things being equal, a 10-percent increase in city population is associated with an average of 0.0016 additional business startups per city-industry. This increase in population has a positive effect on the number of startups in 125 of 128 cities. A 10-percent increase in the initial size of the city-industry is associated with an average of 0.000395 additional startups. This figure is based on the 3,492 city-industries that had one of more establishments in 1992. The increase in city-industry size has a positive effect on the number of startups in 3,258 (93 percent) of these 3,492 city-industries.

The empirical results reveal a positive relationship between business startups and city population growth, but do not provide evidence of a positive link between startups and county population growth. City population growth and the interaction between city and county population growth have a significant effect on the number of new business startups.[10] Furthermore, a joint-hypothesis test indicates that city population growth, county population growth and the interaction between city and county population growth have a significant effect on the number of startups [Chi-squared = 46.11; significance level = 0.000].

Other things being equal, a 10-percent increase in city population growth is associated with an average of 0.00047 additional startups per city-industry. This average is based on 126 cities in which the population change between 1992 and 1995 was not equal to zero. The 10-percent increase in the city population growth has a positive effect on startups in all of these cities. A 10-percent increase in county population growth is associated with an average of 0.02907 fewer startups per city-industry. The 10-percent increase in county population change has a positive effect on startups in only 51 of the 128 cities included in the sample.

Our results show that local labor costs have a negative effect on business startups, whereas the local concentration of industry (county location quotient) has a positive effect on startups. Other things being equal, a 10-percent increase in the average annual wages earned per worker in the county is associated with an average of 0.00345 fewer startups per city-industry. This increase in labor costs has a negative effect on startups in all 128 cities included in the sample. A 10-percent increase in the industry location quotient is associated with an average of 0.00038 additional startups per city-industry. This figure is based on 7,485 city-industries that have county location quotients greater than zero. The 10-percent increase in industry concentration has a positive effect on startups in 100 percent of these city-industries.

The results indicate that industry growth at the national level has a positive effect on business startups, whereas the cost of entering the industry has a negative effect on startups. Other things being equal, a 10-percent increase in industry output growth is associated with an average of 0.00111 additional startups per city-industry. This increase in industry output has a positive effect on startups in all 67 industries included in the sample. A 10-percent increase in the costs of entering an industry is associated with an average of 0.001051 fewer business startups per city-industry. This increase in entry costs has a negative effect on startups in all 67 industries. Finally, the number of business startups is significantly related to the industry dummy variables individually and as a group [Chi-squared = 142.45; significance level = 0.000].

4. CONCLUSIONS

Many state and local governments use fiscal policy as a tool to stimulate business activity and economic growth. Whereas national industry demand conditions, industry-specific entry costs and patterns of industry concentration are largely outside the influence of local governments, local governments can readily alter their taxes and spending on public services.[11]

Our empirical results indicate that local property tax rates have a negative effect on the number of startups, whereas spending on education and total local government spending on public services have a positive effect on new business activity. Future research will examine the impacts of a decrease in local tax rates with and without corresponding decreases in education spending and total local government spending.

NOTES

[1] Previous studies have examined the effects of entry costs (especially "sunk" entry costs) on industry structure, entry decisions and business growth (Pindyck, 1982; Dixit, 1989; Cabral, 1995; Lambson and Jensen, 1998). In particular, Lambson and Jensen (1998) used a framework similar to the one employed in this paper to show that intra-industry firm value variability and intertemporal firm value variability are greater in industries with high sunk costs than in low sunk costs industries.

[2] The sample includes Maine cities and towns that had 2,500 or more people as of 1992.

[3] Business startups are a key source of new jobs in many areas and startups accounted for an average of 16 percent of annual job creation in the United States between 1973 and 1988 (Davis et al., 1996). Startups also benefit an area by generating innovative activity and acting as "agents of change" in the local economy (Audretsch, 1999).

[4] The relationship between education spending and local property taxes in Maine and many other states is based on a complex and controversial school funding formula (Murray et al., 1998; Mills, 1999). In Fiscal Year 2000, Maine towns received or collected a total of $1.5 billion from property taxes ($1.2 billion), vehicle excise taxes ($130 million), non-education revenue sharing from the state ($92 million) and Department of Transportation road assistance ($22 million). Towns spent $775 million on K-12 education and $700 million on other municipal services, and contributed $60

million to county governments in Fiscal Year 2000. From the state's $2.4 billion budget in Fiscal Year 2000, it provided $778 million to towns for K-12 education, $92 million to towns in general revenue sharing and $22 million to local governments in road assistance. Of the total $1.6 billion spent by Maine's public schools in Fiscal Year 2000, they received $778 million from the state government, $775 from local governments and the remainder from federal sources. (Mills, 1999)

[5] For example, the electronic industry (SIC 3600) had a total gross output of $107,683 million and spent $65,138 million on employee compensation in 1992, which gives an alpha of 0.605. The average size of establishments in the electronic industry was 84 workers and the average worker in the industry earned $31,199 in 1992. Using these values, the cost of entering the electronic industry is estimated at $6,636,420.

[6] The Vuong statistic of 46.23, much greater than the 5-percent critical value of 1.96, supports the ZIP model in favor of the standard Poisson model (Vuong, 1988; Greene, 1998, 2000).

[7] We included the tax rate divided by education spending and the tax rate divided by total local government spending as additional fiscal policy variables since businesses likely consider taxes together with local spending when making location decisions.

[8] Based on these estimates, the average elasticity of new business startups with respect to local taxes is –0.0719. This value falls just below Bartik's range (-0.1 to –0.6) for the elasticity of interregional location decisions with respect to taxes (Bartik, 1991).

[9] We included an interaction variable for city population size multiplied by the number of existing establishments in the city-industry because the city size variable may have a different effect on the number of startups depending on the number of establishments initially operating in the city-industry, and vice versa.

[10] We included an interaction variable for city population growth multiplied by county population growth because the effects of a change in the city population on the number of startups may differ depending on the population change occurring in the county, and vice versa.

[11] For example, Barkley and Henry (1997) suggest that, for communities that do not already have an initial agglomeration of a particular industry, it is very costly to develop a local industry cluster.

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TABLE 1: Variable Definitions and Descriptive Statistics

Variable Name	Variable Definition	Mean	Standard Deviation
Business startups	Number of new business startups in city-industry between 1993 and 1994	0.437	1.561
Tax rate (TAX)	City personal property tax rate in 1993	0.017	0.006
Local government spending (SPEND)	Total per-capita local government spending financed by local sources in 1993 [$10,000]	0.792	0.452
Local education spending (EDUC)	Education spending per pupil in 1993-1994 [$1,000]	4.621	0.929
TAX/SPEND	Tax rate divided by local government spending	0.028	0.027
TAX/EDUC	Tax rate divided by education spending	0.004	0.001
City population (POP)	City population in 1992 [10,000] [a]	0.708	0.773
City population growth (ΔPOP)	Change in city population, 1992 to 1995 [1,000] [a]	-0.009	0.321
County population growth (ΔCPOP)	Change in county population, 1992 to 1995 [1,000] [a]	0.291	2.793
ΔPOP x ΔCPOP	Change in city population multiplied by change in county population	0.559	1.725
County wages	Average wages earned per worker in county in 1992 [$1,000] [b]	21.075	2.325
Existing establishments (EST)	Number of businesses in city-industry in 1992	1.818	6.008
POP x EST	City population multiplied by number of businesses in city-industry	3.520	28.109

Table is continued on following page.

TABLE 1: Variable Definitions and Descriptive Statistics, Continued

Location quotient	Percentage of county's businesses in 2-digit SIC category divided by percentage of businesses in the United States in the same category [b]	1.300	2.158
Industry growth	Change in gross industry output at the national level, 1992 to 1995 [$1,000,000,000] [c]	29.064	33.256
Entry costs	Non-labor costs of operating an average-sized establishment in the industry [$1,000,000]	3.188	5.262
AGMIN	1 if industry is in SIC category 700, 800, 900, 1300 or 1400; 0 otherwise	0.075	NA
CONS	1 if industry is in SIC category 1500, 1600 or 1700; 0 otherwise	0.045	NA
MANU	1 if industry is in SIC category 2000 or 2200 – 3900; 0 otherwise	0.284	NA
TRANS	1 if industry is in SIC category 4100, 4200, 4400 - 4900; 0 otherwise	0.119	NA
WHOLE	1 if industry is in SIC category 5000 or 5100, 0 otherwise	0.030	NA
RETAIL	1 if industry is in SIC category 5200 – 5900; 0 otherwise	0.119	NA
FIRE	1 if industry is in SIC category 6000, 6100, 6200, 6300, 6400, 6500 or 6700; 0 otherwise	0.104	NA
SERV	1 if industry is in SIC category 7000, 7200, 7300, 7500, 7600, 7800 – 8400, 8600, 8700 or 8900; 0 otherwise	0.224	NA

[a] City and county population figures are from Maine State Planning Office

[b] Computed from County Business Patterns data from the United States Bureau of the Census

[c] Industry output figures are from the United States Bureau of Economic Analysis

TABLE 2: ZIP Regression Results: Factors Affecting the Number of New Business Startups per City-Industry

Variable	Estimated Coefficient	t-statistic
Constant	-1.394	-6.065**
Tax rate	-41.414	-3.381**
Local government spending	0.013	0.326
Local education spending	0.175	3.506**
TAX/SPEND	-4.089	-4.312**
TAX/EDUC	210.184	3.650**
City population	0.263	23.179**
City population change	0.124	3.446**
County population change	0.003	0.555
ΔPOP x ΔCPOP	0.035	6.141**
County wages	-0.010	-2.496*
Existing establishments	0.049	117.207**
POP x EST	-0.005	-61.804**
Location quotient	0.018	4.230**
Industry growth	0.003	6.947**
Entry costs	-0.018	-9.165**
CONS	0.399	7.006**
MANU	0.116	2.721**

Table is continued on following page.

TABLE 2: ZIP Regression Results: Factors Affecting
the Number of New Business Startups per City-Industry, Continued

TRANS	0.207	4.490**
WHOLE	0.270	4.127**
RETAIL	0.352	6.161**
FIRE	0.305	6.322**
SERV	0.422	9.242**
ZIP(τ)	-2.378	-16.124**
Vuong Statistic	46.234	
Log-likelihood	-5,249.403	
Number of observations	8,576	

** Indicates variable is significant at 1-percent level, | t-statistic | > 2.576

* Indicates variable is significant at 5-percent level, | t-statistic | > 1.960