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REGIONAL COMPETITION FOR DOMESTIC AND FOREIGN INVESTMENT: EVIDENCE FROM STATE DEVELOPMENT EXPENDITURES

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ABSTRACT

We develop a model in which state governments spend funds on attracting capital with the intent of maximizing the domestic wage bill. Our results suggest that states are likely to spend more on industrial development as the share of manufacturing in the state labor force increases, and spend less on economic development as the state wage level increases. Empirical tests using state expenditure data confirm the predictions of the model.

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1. INTRODUCTION

State and local governments in the United States are engaged in aggressive competition with each other as well with foreign locations for investment. The magnitudes of these expenditures are enormous. For example, Indiana recently packaged a $300 million deal to attract a United Airlines maintenance facility expected to create 6,300 jobs, or $48,000 per job created, while Kentucky issued $140 million in potential tax credits to attract 400 steel jobs, or $350,000 per job created.[1] States have also aggressively used incentives to attract foreign direct investment. A well-known example is Kentucky's $125 million expenditure to lure a Toyota plant away from Missouri [Hoyt and Black (1989)]. These programs are by no means limited to U.S. localities. Development programs of foreign countries also include large investment incentives [Bond and Samuelson (1986)].

The desirability of spending by states to attract investment is controversial. Hoyt and Black (1989) argue that the expenditures are desirable because they reduce the distortion created by average-cost pricing of public goods. Bond and Samuelson (1986) suggest that front-loaded tax holidays act as a signal which allows high productivity nations to distinguish themselves. In contrast, many public policy analysts feel that state development expenditures represent beggar-thy-neighbor policies: interstate competition causes tax revenue to be spent but no new capital is created at the aggregate level. In addition, the literature is uncertain that the programs are successful. Most states use tax abatements to attract and retain investment, and Newman and Sullivan (1988) cite recent evidence that tax rates are important in determining where investment locates. In contrast, O'hUAllachain and

Satterthwaite (1992) show that tax rates have little effect on the location of high-technology manufacturing or most services; similar findings are discussed by Due (1961) and Oakland (1978).

Regardless of the merits of these state and local programs, their existence and large magnitudes is well established. However, the determinants of state expenditure levels have been largely ignored. In this paper, we model the state government development expenditure decision in the context of a Ricardo-Viner model with a manufacturing sector and an alternative sector. The state spends to attract manufacturing capital, which increases the wage and decreases the return earned on existing capital. The state is presumed to spend to gain manufacturing capital in order to maximize the local (net) wage bill, because all labor income is earned by state residents whereas most capital income earned in the state is owned by individuals who live out-of-state.

Our structural model indicates that the state development expenditure, measured per worker, is determined by two variables: state expenditure is likely to be a positive function of the share of the state's labor force employed in the manufacturing sector, and a negative function of the state wage level. The former relationship arises because an increase in manufacturing capital is accompanied by a movement of labor from the alternate sector to the manufacturing sector; the consequent adjustment in the wage is favorable for the attraction of new manufacturing capital if the manufacturing sector is large. The latter relationship arises because high-wage states are capital intensive, and hence less sensitive to additional capital inflows. These relationships are strongly supported by our estimation. Consequently, despite the suggestion in the literature that state development expenditure may be relatively ineffective, our results support the view that states determine their expenditure in a manner conducive to maximizing the local (net) wage bill.

Our proxies for state expenditure on development are taken from the *1992 State Economic Development Expenditure Survey*, published by the National Association of State Development Agencies. Our expenditure data reflects general development expenditure on day-to-day expenses such as maintaining offices, visiting firms, and printing brochures. It does not include deals made for specific plants (like the Kentucky Toyota plant deal discussed earlier), of which a major component is tax abatements. The advantage of concentrating on day-to-day expenditure is that a consistent set of expenditure data is available across all states. If states substitute "blockbuster" deals for day-to-day expenditures, our proxies measure state development expenditure with error. However, in this case, we would expect our errors to be independent across states.

In addition to total state expenditure, our data includes expenditure on the disaggregated categories of spending to attract foreign capital, and of spending to attract and retain domestic capital. Our results for the attraction of foreign capital are consistent with our results for total state spending, but they also suggest that manufacturing labor share is more important for this capital type. We believe this is because, on average, foreign capital provides positive spillovers, perhaps because it embodies more advanced technology.

Our model of state expenditure is carefully constructed so that predicted expenditure per worker is unaffected by the size of the state. If there are economies of scale, state size is an important determinant of expenditure. We check for the robustness of our results by including total state employment as an explanatory variable. The results provide weak evidence of economies of scale but, more importantly, the importance of the relative size of the manufacturing sector is maintained.

The remainder of this paper is organized into three sections. Section 2 introduces the theoretical model of state expenditure on development and derives a linearized specification of the model. Section 3 tests this specification for three measures of state expenditure: the broad aggregate of state development expenditure and the two sub-aggregates, of expenditure on attracting foreign investment and of expenditure on the attraction and retention of domestic capital. Section 4 summarizes the main conclusions.

2. A SIMPLE MODEL OF STATE DEVELOPMENT EXPENDITURE

2.1 Determinants of state expenditure for an economic area.

To avoid model-driven impacts of state size in the determination of the state expenditure level, we consider a state to be composed of homogeneous groups of "economic areas," where each area has $\bar{L}$ workers. This section determines the expenditure on development by a representative economic area.

We use the two-sector Ricardo-Viner model with area-specific capital. Within each area there are two sectors. One sector is the manufacturing sector, notated by subscript m; the other sector is the non-manufacturing or alternate sector, notated by subscript a. The labor employed in manufacturing is L_m, and in the alternate sector is L_a. Similarly, the capital employed in the manufacturing sector is K_m and in the alternate sector is K_a. K_m and K_a are assumed to be area and sector specific.[2]

Production of output by a firm in the manufacturing sector shows constant returns to scale. Capital is sector specific but mobile within the sector, so that within each sector each firm has the same capital/labor ratio. Summing over all manufacturing firms, the total output of the manufacturing sector in the area is written using the intensive production function as:

$$Y_m = L_m \, f(\frac{K_m}{L_m}) \, , \tag{1}$$

with $f' > 0$ and $f'' \leq 0$.

The output produced by a firm in the alternate sector similarly shows constant returns to scale. Alternative output produced in the area is:

$$Y_a = L_a \, g(\frac{K_a}{L_a}) \, ,$$

with $g' > 0$ and $g'' \leq 0$.

Firms are assumed to be price takers, with prices determined by world prices. The price of a unit of manufacturing output is q_m, and the price of a unit of the alternative output is q_a. The labor market in the area is competitive, and workers are mobile between sectors. Manufacturing firms demand labor until:

$$w = q_m \frac{\partial Y_m}{\partial L_m} = q_m [f(\frac{K_m}{L_m}) - \frac{K_m}{L_m} f'(\frac{K_m}{L_m})] . \tag{2}$$

Similarly, firms in the alternative sector demand labor until:

$$w = q_a \frac{\partial Y_a}{\partial L_a} = q_a [f(\frac{K_a}{L_a}) - \frac{K_a}{L_a} f'(\frac{K_a}{L_a})]. \quad (3)$$

All labor is employed, or:

$$L_m + L_a = \bar{L}. \quad (4)$$

Given K_m and K_a, equations (2), (3) and (4) imply the equilibrium values of w, L_m and L_a in the area.

Owners of capital are assumed to be diversified - owners of capital resident in an area own capital in all areas. The capital income of residents is therefore relatively insensitive to the area's development policies. In contrast, all labor income is earned from employment within the area. We assume that area's development program seeks to increase the wage by increasing the manufacturing capital in the area. Because there is free labor mobility between the sectors, an increase in manufacturing capital ΔK_m increases the wage of *all* workers in an area by Δw,

$$\Delta w \sim \frac{dw}{dK_m} \Delta K_m.$$

Note that the wage increase is accompanied by a reduction in the return to capital: by increasing the capital stock, the area effects a shift of income from the owners of the area's capital, who are mainly located outside the area, to workers located in the area.

We assume that the returns to spending in order to attract firms to locate in the area are stochastic. Each area considers there to be N potentially migrant manufacturing firms, each with capital ΔK_m. The area must spend $c^i - \epsilon$ to locate and work with a migrant firm i. The component c^i reflects cost factors specific to the firm i and ϵ reflects cost factors specific to the area, where ϵ is assumed to be a state-specific random disturbance. Some firms are easier to locate and work with than others: c^i has a distribution function $\phi(c)$ and N is considered sufficiently large that $\phi(c)$ is approximated to be continuous. If the cost $c^i - \epsilon$ is incurred, the area is placed by firm i on a short-list; being on the short-list gives the area a probability p of "winning" the firm and gaining manufacturing capital ΔK_m. We assume that the area spends on all potentially mobile firms for which the cost per worker is less than the expected benefit per worker, or for all i for which:

$$\frac{c^i - \epsilon}{\bar{L}} \leq p \frac{dw}{dK_m} \Delta K_m,$$

The pre-existing capital stock K_m is considered sufficiently large relative to the capital attracted that dw/dK_m is evaluated at the status-quo capital stock K_m and is considered constant. Therefore total development spending in the area, e_a, is equal to:

$$e_a = \int_0^{p \bar{L} \frac{dw}{dK_m} \Delta K_m + \epsilon} Nc\phi(c)\, dc. \tag{5}$$

To obtain $\bar{L}(dw/dK_m)$, we write the variables in intensive form, $k_m \equiv K_m/L_m$, $k_a \equiv K_a/L_a$ and $\ell_m = L_m/\bar{L}$, and totally differentiate equations (2), (3) and (4), to give:

$$\bar{L}\frac{dw}{dK_m} = \frac{q_m\left(-\frac{k_m}{\ell_m}f''\right)}{1 + \frac{q_m}{q_a}\frac{1-\ell_m}{(-k_a^2 g'')}\frac{(-k_m^2 f'')}{\ell_m}} . \qquad (6)$$

Note that the right-hand side of equation (6) is independent of the area labor force $\bar{L}$ or, using equation (5), that the level of development spending by the area is independent of the area size. This occurs because, if an additional unit of capital is attracted to the area, the wage gain and the cost per worker both decrease equally as the area labor force increases.

2.2 Expenditure at the state level.

The level of analysis now moves to the state. Capital intensities and manufacturing labor shares are assumed to be the same for all areas within a state, so that each area chooses the same expenditure level on development. State development spending per worker, e, is therefore:

$$e = \frac{1}{\bar{L}} \int_0^{p\,\bar{L}\frac{dw}{dK_m}\Delta K_m+\epsilon} Nc\phi(c)\,dc, \qquad (7)$$

where $\bar{L}\,dw/dK_m$ is defined in equation (6) and ℓ_m, k_m and k_a now refer to the manufacturing share of employment in the state, and to the capital intensity in the two sectors in the state .

2.3 Empirical specification.

To empirically estimate equation (7), we linearize the model by expanding around base variable values ℓ_m^0, k_m^0, k_a^0 and ϵ^0, and normalize

$\epsilon^0 = 0$. Equations (2) and (3) become:

$$w = w^0 + [q_m(-k_m f'')]_0 \, (k_m - k_m^0), \tag{8}$$

$$w = w^0 + [q_a(-k_a g'')]_0 \, (k_a - k_a^0), \tag{9}$$

where $[\cdot]_0$ implies that the term is to be evaluated at the base variable values and $w^0 = [f - k_m f']_0$.

Similarly,

$$e = e^0 + [\frac{N}{\bar{L}} c^0 \phi^0 p \Delta K_m \frac{\partial}{\partial \ell_m}(\bar{L}\frac{dw}{dK_m})]_0 (\ell_m - \ell_m^0) + [\frac{N}{\bar{L}} c^0 \phi^0 p \Delta K_m \frac{\partial}{\partial k_m}(\bar{L}\frac{dw}{dK_m})]_0 (k_m - k_m^0)$$

$$+ [\frac{N}{\bar{L}} c^0 \phi^0 p \Delta K_m \frac{\partial}{\partial k_a}(\bar{L}\frac{dw}{dK_m})]_0 (k_a - k_a^0) + [\frac{N}{\bar{L}} c^0 \phi^0]_0 \epsilon \ . \tag{10}$$

where

$$c^0 = [p\bar{L}(dw/dK_m)\Delta K_m]_0,$$

$$e^0 = \int_0^{c^0} N c \phi(c) dc,$$

and $\phi^0 = \phi(c^0)$.

Using equations (8) and (9) to substitute for $(k_m - k_m^0)$ and $(k_a - k_a^0)$ in equation (10), the state expenditure per worker is:

$$e = a_0 + a_\ell \, \ell_m + a_w \, w + u, \tag{11}$$

where
$$a_\ell = [\frac{N}{\bar{L}} c \phi p \Delta K_m]_0 [\frac{\partial}{\partial \ell_m}(\bar{L}\frac{dw}{dK_m})]_0 \ ,$$

$$a_w = [\frac{N}{\bar{L}} c \phi p \Delta K_m]_0 [\frac{1}{q_m(-k_m f'')} \frac{\partial}{\partial k_m}(\bar{L}\frac{dw}{dK_m}) + \frac{1}{q_a(-k_a g'')} \frac{\partial}{\partial k_a}(\bar{L}\frac{dw}{dK_m})]_0 .$$

and $$u = [\frac{N}{L}c\phi]_0\,\epsilon .$$

Equation (11) is the equation to be estimated.

We consider first the predicted sign of a_ℓ. Taking the appropriate derivatives gives:

$$a_\ell = [\frac{N}{L}c^0\phi^0 p\Delta K_m q_m]_0\,[-\frac{1}{D}\frac{(-k_m f'')}{\ell_m^2} + \frac{1}{D^2}\frac{(-k_m f'')}{\ell_m}\frac{q_m}{q_a}\frac{(-k_m^2 f'')}{(-k_a^2 g'')}\frac{1}{\ell_m^2}]_0, \qquad (12)$$

where

$$D \equiv 1 + \frac{q_m}{q_a}\frac{1-\ell_m}{(-k_a^2 g'')}\frac{(-k_m^2 f'')}{\ell_m} .$$

To understand this result, consider two states which differ in the size of their manufacturing sectors but which have equal wages. Equations (2) and (3) imply that the states have the same capital-labor ratio in each sector: the state with the larger share of employment in manufacturing has more manufacturing capital and less alternate capital than the other state. Equation (12) shows that there are two effects associated with a unit increase in manufacturing capital. First, holding L_m constant, a unit increase in manufacturing capital increases the wage in the manufacturing sector by less if the state has a large manufacturing sector; this happens because the increased capital is shared over more workers. Second, labor moves from the alternate sector to the manufacturing sector to equalize the wage in the two sectors. For the state with the large manufacturing sector, a given labor movement into the manufacturing sector causes a small fall in the capital/labor ratio in the manufacturing sector and a large increase in the capital/labor ratio in the alternate sector. In consequence, for the state with the larger share of employment in manufacturing, the wage is equalized less by lowering the manufacturing wage and more by raising the alternate wage. This second effect favors the state with the larger share of employment in manufacturing. The two effects therefore work in different directions.

For example, consider Cobb-Douglas production functions of $f(k_m)=k_m^{\alpha_m}$ and $g(k_a)=k_a^{\alpha_a}$. In this case,

$$a_\ell = [\frac{N}{L}c\phi p\Delta K_m q_m]_0 [\frac{1}{D^2} (\frac{\alpha_m(1-\alpha_m)k_m^{\alpha_m-1}}{\ell_m^2})(\frac{q_m\alpha_m(1-\alpha_m)k^{\alpha_m}}{q_a\alpha_a(1-\alpha_a)k^{\alpha_a}} - 1)]_0. \quad (13)$$

Using the Cobb-Douglas production function, Equations (2) and (3) become $w = q_m(1-\alpha_m)k^{\alpha_m} = q_a(1-\alpha_a)k^{\alpha_a}$. Inserting into equation (13) gives

$$a_\ell > 0 \quad \text{if} \quad \alpha_a < \alpha_m.$$

Since α_m and α_a measure the share of value-added attributed to capital, the inter-sectoral labor movement effect dominates and a_ℓ is positive if manufacturing is the capital-intensive sector - a condition which seems likely to be met in practice.

We next consider the predicted sign on a_w. Taking the appropriate derivatives,

$$a_w = [\frac{N}{L}c\phi p\Delta K_m]_0 [\frac{1}{D} \frac{-f''-k_m f'''}{(-k_m f'')\ell_m} \quad (14)$$

$$- \frac{1}{D^2} (\frac{-k_m f''}{\ell_m})\frac{q_m(1-\ell_m)}{q_a(-k_a^2 g'')\ell_m}\left(\frac{-2k_m f''-k_m^2 f'''}{(-k_m f'')} - \frac{q_m(-k_m^2 f'')(-2k_a g''-k_a^2 g''')}{q_a(-k_a g'')(-k_a^2 g'')}\right)]_0.$$

To understand this equation, consider two states which have the same share of manufacturing employment, but differ in the wage. The state with the higher wage has a higher capital/labor ratio in both sectors. As before, there are two effects. First, if a unit of manufacturing capital is introduced into both states, with no labor movement the wage in the manufacturing sector is likely to increase more in the state with less capital or with the lower wage; i.e., we expect that $-f''-k_m f'''<0$. This is captured in the first term of equation (14) which would then be negative. Second, labor moves between the sectors to equalize the wage. This also is unfavorable to the high-wage state if the increased capital intensity causes labor demand to become relatively inelastic in the manufacturing sector. In this case, a_w is unambiguously negative. More generally, a_w is negative provided the first effect dominates, which seems likely.

In the case of Cobb-Douglas production functions, $f(k_m)=k_m^{\alpha_m}$ and $g(k_a)=k_a^{\alpha_a}$,the labor demand elasticities are equally affected, there is zero second effect and the sign of a_w is unambiguously negative:

$$a_w = [\frac{N}{L} c\phi p\Delta K_m]_0 [\frac{1}{D} \frac{-(1-\alpha_m)}{k_m \ell_m}]_0 < 0.$$

3. EMPIRICAL EVIDENCE

3.1 Data.

The National Association of State Development Agencies provides data on the expenditure made by each state's development agency. The data includes expenditure in various categories - manpower training, research, local development, tourism, film promotion and (if applicable) natural resources - and also the spending which is financed by state funds and by federal aid. We consider state spending on development to be spending on manpower training, research and local development, and we use the information provided to construct a measure of state spending on development.[3] We exclude Alaska and Hawaii from the sample since they are essentially resource-intensive economies.[4]

The same source provides data on expenditure to attract foreign investment, and on expenditure to attract and retain domestic investment. These categories reflect direct efforts to increase the state capital stock. However, the share of such spending which is federally financed is not reported. Expenditure to attract foreign investment is mostly state funded; therefore expenditure to attract foreign investment is a good proxy for state expenditure in this category. However, a significant share of expenditure to attract and retain domestic investment is funded by federal programs. Consequently, using expenditure to attract and retain domestic capital as a proxy for state expenditure in this area has greater error.

Table 1 ranks states by total state expenditure on development per worker, by expenditure per worker on attracting foreign capital and by expenditure per worker on attracting or retaining domestic capital.[5] Some surprising results emerge. Some states which are not typically considered to be interventionist, such as Iowa, Montana, and Utah, are quite active in total expenditure per worker on development. In contrast, other states, such as New York and California, which are normally considered to be active spenders, spend relatively little. The disaggregated measures of expenditure targeted at foreign and domestic capital are both positively correlated with the total state expenditure measure. However, there are some interesting distinctions. Arizona, Florida, and South Carolina are noticeably more active in spending to attract foreign investment than they are in total expenditures. In contrast, Illinois and Ohio spend relatively more on general activities than on activities which are targeted at foreign investment.

Similar variations appear in the expenditure targeted at domestic capital. Kentucky and Wisconsin are active in total spending to encourage development, but relatively less involved in attracting and retaining domestic investment. On the other hand, the industrial states of Pennsylvania and Louisiana are much more active in promoting domestic investment. Moreover, these states tend to favor spending aimed at the retention of existing plants rather than the attraction of new capital.[6] However, one should be careful in interpreting the data for spending on domestic capital too literally because, as noted earlier, they are likely to include a significant amount of federally-funded spending, so that the state share of these expenditures are unclear.

Data on 1990 state characteristics, including the share of manufacturing labor in the total state labor force, wages and total employment (L_s) are obtained from *1990 Employment and Wages*.[7] The mean variable values and the covariance matrix is shown in Table 2.

3.2 Evidence from state development expenditure.

Equation (11) is our specification for state expenditure on development. As discussed above, the predicted sign on the share of manufacturing labor in the state labor force is ambiguous, depending on relative magnitudes of the negative impact of the additional capital being shared over more workers, and the positive impact of the labor movement between the two sectors to equalize the wage.

(FIGURE 1 HERE)

Figure 1 shows the univariate relationship between state expenditure per worker on development and the share of the labor force in manufacturing. There is a strong positive relationship between the two, indicating the dominance of the labor movement effect. Nevertheless, there are notable outliers, including some small Western states such as Montana, which spend a large amount per head on development despite their lack of manufacturing, and North Carolina, which spends relatively little per head despite the fact that it has one of the highest manufacturing labor shares in the sample.

In general, many of the outliers are small states. This may reflect the "lumpiness" of some components of development expenditure. Since our data only observes one year of state spending, the presence or absence of a single project in a small state can have a large impact on its total spending that year. To accommodate this possibility, we include weighted-least squares estimation results, with weighting done by the size of the state labor force, in addition to OLS and White's heteroskedasticity-corrected regression estimates.

(FIGURE 2 HERE)

Given plausible parameter restrictions, our model suggests that the coefficient on the state wage is likely to be negative. Figure 2 shows the univariate relationship between total state development expenditure per head and the state wage level, confirming a negative relationship.

Regression results for total state expenditure per worker are reported in Table 3.1. It can be seen that state expenditure per head is increasing in the share of labor in the manufacturing sector, consistently at or close to a 5% confidence level. This result is robust to all three forms of estimation. The positive estimated sign is consistent with dominance of the labor movement effect. The wage data enter with the expected negative sign, although not significantly when estimation was performed using weighted least squares. The model passes the F-test for significance at a 5% confidence level in all three estimations.

3.3 Evidence from expenditure targeted at foreign capital.

As noted earlier, our data contains disaggregated expenditure by the state to attract foreign capital. Note that our sample is smaller than the 48 state sample above since data on expenditure on attracting foreign investment is only available for 34 states (see Table 1). The regression results using this as the dependent variable are reported in Table 3.2. As in the case of total state expenditures, the share of manufacturing labor enters positively in all three specifications, and is significant at a 1% confidence level in both of the unweighted regressions. In the case of the WLS regression, Florida is a large positive outlier since it spends a large amount on attracting foreign investment despite its lack of manufacturing. This may be due to the unique foreign influence in Florida. If Florida is omitted from the sample, the share of manufacturing labor also enters significantly in the WLS regressions. In all three regressions, state expenditure per worker is negatively and significantly related to the state wage level, consistent with the model. Again, the specifications passed the F-test for significance at a 5% confidence level.

In addition, the model presented in Section 2 implies that the difference between total expenditure on all capital attraction and on foreign capital lies in the values of N, p and the function $\phi(\cdot)$. Hence the ratio a_ℓ/a_w should be the same whether the dependent variable is total expenditure or expenditure targeted to attract foreign firms. These numbers are similar in orders of magnitude and inspection of the standard errors of the estimates shows that this null hypothesis is not rejected by the data.

However, note that the relationship between the share of manufacturing in the labor force and expenditure per head on attracting foreign investment is particularly strong. The manufacturing share of labor has a correlation coefficient 0.58 with expenditure per worker on attracting foreign direct investment, but correlation coefficient 0.26 with total state expenditure per worker.

The high value of a_ℓ and the correlation coefficient may indicate that foreign investment is particularly desirable to states with large manufacturing sectors. The model of section 2 treats all capital as homogeneous. However there is reason to believe that foreign investment may embody more advanced technology. A large literature[8] suggests that foreign direct investments suffer from disadvantages relative to portfolio investments. Consequently, investors choosing foreign direct investment over portfolio investment heavily represent activities for which countervailing advantages exist. These advantages are likely to include the better use of sophisticated technology in production which is not conducive to arms length transactions. The presence of capital embodying advanced technology is likely to provide beneficial spillovers to other manufacturing firms in the state.[9]

If K_m is the total capital in the manufacturing sector, and K_f is the capital which is foreign owned, with spillovers from foreign investment equation (1) would be respecified as:

$$Y_m = A\left(\frac{K_f}{K_m}\right) L_m f\left(\frac{K_m}{L_m}\right).$$

Because the direct benefit is gained by all firms in the manufacturing sector, the benefit of attracting foreign direct investment is likely to be greatest in states with large manufacturing sectors. In this case, the share of labor employed in the manufacturing sector is predicted to be more strongly related to expenditure targeted at foreign direct investment than to total expenditures.

3.4 Expenditure on attraction and retention of domestic investment.

The regression results for expenditure on the attraction and retention of domestic investment are shown in Table 3.3. It can be seen that the regressions for domestic investment are not as successful as either for total expenditure or for expenditure to attract foreign investment. We attribute this to the fact that our data are less reliable because this category includes a large amount of federally-sponsored programs.

The share of manufacturing labor enters insignificantly and with the incorrect sign in the unweighted regressions, and these specifications fail to pass the F-test for significance at a 5% confidence level. However, under weighted least squares the coefficient on the manufacturing share of labor is significantly positive, consistent with our earlier results. Moreover, this specification does pass the F-test for model significance. The wage levels enter with the expected negative sign in all three regressions, but are insignificant.

3.5 Economies of scale in development programs.

New York and California are noteworthy as states which spend less per worker on development than is predicted by the model, indicating that state size may play a role in determining state expenditure levels. To check the robustness of our results, we include the size of the state labor force as an explanatory variable, and associate it with possible fixed costs of state development programs.[10] If a state incurs a fixed cost F independent of the number of economic areas in the state, Equation (7) becomes,

$$e = \frac{F}{L_s} + \frac{1}{L_s}\int_0^{p\bar{L}\frac{dw}{dK_m}\Delta K_m+\epsilon} Nc\phi(c)\,dc,$$

where L_s is the total number of workers in the state. If fixed costs are important, expenditure per worker is predicted to be decreasing in the size of the state labor force.

The specifications with the size of the labor force added are reported in Table 4. The size of the labor force consistently enters negatively, but only significantly at a 1% confidence level in the WLS regressions for overall expenditure and for expenditure on attraction of foreign capital. The importance of state size in determining expenditure per worker is therefore only marginally supported by the data. More importantly, the share of the labor force in manufacturing appears to be quite robust to the inclusion of a state size variable. However, the significance of the state wage level is now diminished. This is attributed to the relatively strong positive correlation between state size and state wage level of 0.57.

4. CONCLUSION

Despite the mixed evidence in the literature concerning the effectiveness of state development expenditure in attracting investment, our results suggest that the states' expenditure is consistent with a model in which state governments choose expenditures to maximize the wage bill. Our empirical results strongly support two stylistic facts concerning state expenditure: state expenditure per head is increasing in the share of the state labor force in manufacturing and decreasing in the state wage level.

An interesting empirical finding in the state expenditure data was that there are two main patterns of spending by states: some states are actively involved in attracting, and in particular retaining, capital, such as the large industrial states of the Midwest. There are other states, such as Arizona and Washington, which are not very active overall in development expenditure, but are relatively active in expenditure directly aimed at attracting foreign investment. This pattern may reflect the fact that when large levels of development expenditure are needed merely to hold on to the capital that a state has, its ability to expend resources to attract new firms is hindered. In contrast, states which are unhindered by the need to spend to retain domestic capital, may selectively target their expenditures to attract foreign direct investment because it is relatively "high-tech" and has beneficial spillovers. This is a promising area for further research.

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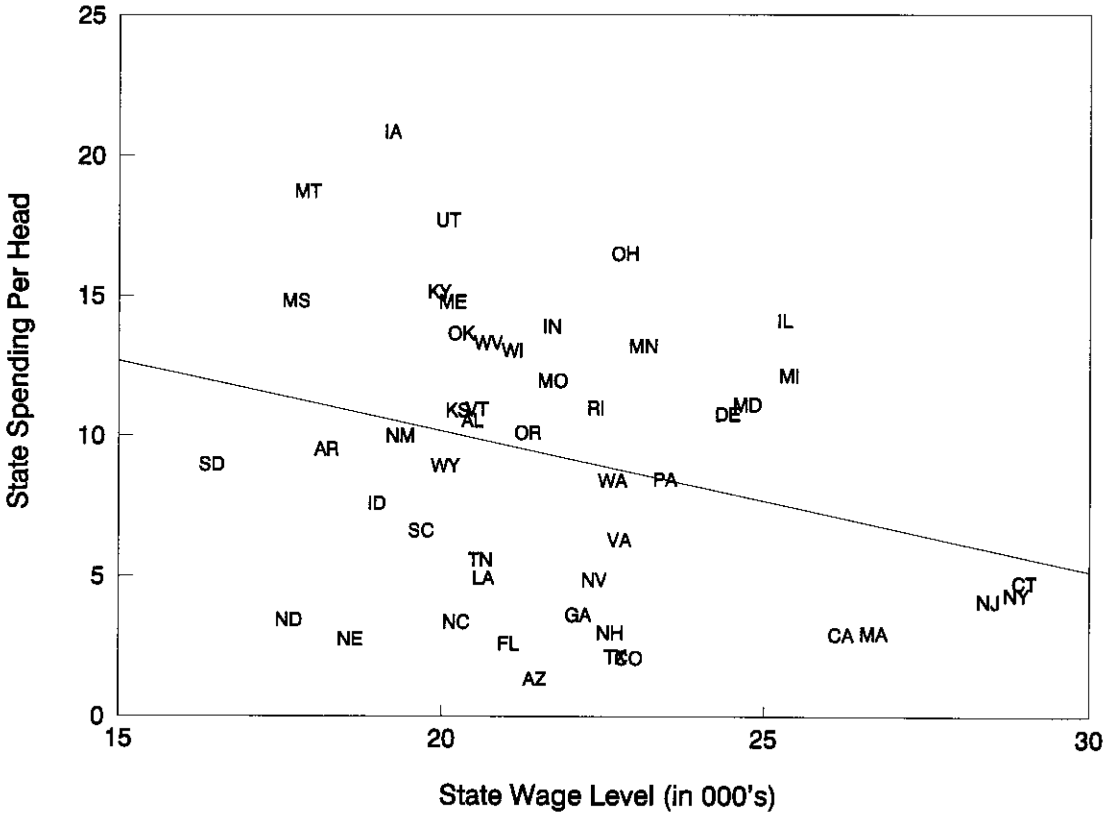

TABLE 1: 1992 development expenditure per worker by state

State	Total	State	Foreign	State	Domestic
Iowa	20.824	Wyoming	0.1567	Utah	18.086
Montana	18.721	Wisconsin	0.5855	Montana	17.791
Utah	17.696	Mississippi	1.5029	Pennsylvania	9.389
Ohio	16.506	Delaware	0.8433	Delaware	8.433
Kentucky	15.136	South Carolina	0.7692	Kansas	7.207
Mississippi	14.823	Arkansas	0.7511	Oklahoma	5.442
Maine	14.783	Oklahoma	0.7273	Louisiana	4.872
Illinois	14.120	Kansas	0.6508	Maryland	4.495
Indiana	13.906	Iowa	0.6131	Iowa	4.387
Oklahoma	13.661	Kentucky	0.5624	New Mexico	4.344
West Virginia	13.313	Tennessee	0.5585	North Dakota	3.890
Minnesota	13.212	Florida	0.5084	Maine	3.846
Wisconsin	13.053	Louisiana	0.4882	Indiana	3.623
Michigan	12.158	Washington	0.4655	Idaho	3.389
Missouri	11.970	New Mexico	0.3937	Illinois	3.104
Maryland	11.109	Missouri	0.3910	Minnesota	2.688
Rhode Island	10.994	West Virginia	0.3627	Oregon	2.418
Vermont	10.947	Idaho	0.3419	Wyoming	2.381
Kansas	10.910	Arizona	0.2950	Ohio	2.338
Delaware	10.769	Illinois	0.2910	Virginia	2.282
Alabama	10.555	Georgia	0.2553	New Hampshire	2.076
Oregon	10.112	Ohio	0.2029	West Virginia	2.072
New Mexico	10.010	Connecticut	0.1961	Missouri	1.826
Arkansas	9.529	Massachusetts	0.1764	North Carolina	1.761
South Dakota	9.003	Pennsylvania	0.1717	Alabama	1.644
Wyoming	8.956	New Jersey	0.1575	Washington	1.403
Pennsylvania	8.453	Montana	0.1355	Mississippi	1.317
Washington	8.418	North Dakota	0.1288	Georgia	1.219
Idaho	7.609	New York	0.1204	Nebraska	1.211
South Carolina	6.617	Nebraska	0.1149	South Dakota	1.129
Virginia	6.294	Texas	0.0866	Colorado	0.926
Tennessee	5.577	New Hampshire	0.0559	Arkansas	0.886
Louisiana	4.937	California	0.0089	Kentucky	0.852
Nevada	4.874	South Dakota	0	New Jersey	0.781
Connecticut	4.768	Virginia	NA	South Carolina	0.667
New York	4.330	Vermont	NA	Arizona	0.526
New Jersey	4.096	Utah	NA	Vermont	0.466
Georgia	3.642	Rhode Island	NA	New York	0.401
North Dakota	3.444	Oregon	NA	Wisconsin	0.230
North Carolina	3.383	North Carolina	NA	Florida	0.177
New Hampshire	3.008	Nevada	NA	Connecticut	0.142
Massachusetts	2.976	Minnesota	NA	Texas	0.113
California	2.926	Michigan	NA	Tennessee	NA
Nebraska	2.778	Maryland	NA	Rhode Island	NA
Florida	2.620	Maine	NA	Nevada	NA
Texas	2.151	Indiana	NA	Michigan	NA
Colorado	2.104	Colorado	NA	Massachusetts	NA
Arizona	1.351	Alabama	NA	California	NA
Mean	9.024		0.3844		3.243
Std. Dev.	5.044		0.3054		3.929
Maximum	20.824		1.5029		18.086
Minimum	1.351		0		0.113

Table 2

Summary Statistics

	Mean	S.D.	Maximum	Minimum
e	9.024	5.044	20.824	1.351
ℓ_m	0.210	0.069	0.036	0.048
w	21768.167	2899.080	28995.000	16430.000
L_s	1868352.000	20541636.400	11173340.000	125997.000

Covariance Matrix

	e	ℓ_m	w	L_s
e	24.915			
	(1.000)			
ℓ_m	0.087	0.005		
	(0.255)	(1.000)		
w	-4214.4	2.751	8229566	
	(0.294)	(0.014)	(1.000)	
L_s	-291653	5938.2	3.335E+09	4.12E+12
	(0.288)	(0.043)	(0.573)	(1.000)

Table 3: Determinants of State Development Expenditure[1]

Estimation Method	OLS	OLS White's Heteroskedasticity Consistent Covariance	WLS Weighted by Size of State Labor Force
1. Dependent Variable: Total State Expenditure per Worker			
Const	16.332	16.332	-0.273
	(5.617)	(5.451)	(0.966)
ℓ_m	18.969*	18.969*	56.460***
	(10.027)	(10.139)	(12.040)
w	-0.0005**	-0.0005**	-0.0002
	(0.0002)	(0.0002)	(0.0002)
Obs	48	48	48
F-Stat	4.093	4.093	27.013
2. Dependent Variable: Expenditure to Attract Foreign Capital per Worker			
Const	0.577	0.577	1.237
	(0.287)	(0.263)	(0.299)
ℓ_m	2.845***	2.845***	0.169
	(0.609)	(0.759)	(0.671)
w	-3.588E-05***	-3.588E-05***	-4.449E-05***
	(1.227E-05)	(1.158E-05)	(9.802E-06)
Obs	34	34	34
F-Stat	14.196	14.196	3.419
3. Dependent Variable: Expenditure to Attract and Retain Domestic Capital per Worker			
Const	11.396	11.396	0.387
	(4.990)	(5.972)	(0.924)
ℓ_m	-12.994	-12.994	16.701**
	(9.123)	(9.069)	(7.750)
w	-0.0003	-0.0002	-7.317E-05
	(0.0002)	(0.0002)	(0.001)
Obs	42	42	42
F-Stat	1.738	1.738	5.851

[1]Standard errors in parentheses. *Significant at 10% confidence level. **Significant at 5% confidence level. ***Significant at 1% confidence level.

Table 4: Determinants of State Development Expenditure (cont.)[1]

Estimation Method	OLS	OLS White's Heteroskedasticity Consistent Covariance	WLS Weighted by Size of State Labor Force
1. Dependent Variable: Total State Expenditure per Worker			
Const	12.964	12.964	-3.860
	(6.323)	(5.936)	(5.888)
ℓ_m	19.456*	19.456*	47.663***
	(10.001)	(9.917)	(11.251)
w	-0.0003	-0.0003	0.0001
	(0.0003)	(0.0002)	(0.0002)
L_s	-4.702E-07	-4.702E-07*	-5.285E-07***
	(4.102E-07)	(2.650E-07)	(1.618E-07)
Obs	48	48	48
F-Stat	3.186	3.186	25.432
2. Dependent Variable: Expenditure to Attract Foreign Capital per Worker			
Const	0.426	0.426	1.063
	(0.322)	(0.333)	(0.225)
ℓ_m	2.808***	2.808***	-0.388
	(0.609)	(0.783)	(0.510)
w	-2.649E-05*	-2.649E-05*	-2.432E-05***
	(1.529E-05)	(1.597E-05)	(8.289E-06)
L_s	-2.196E-08	-2.196E-08	-3.172E-08***
	(2.135E-08)	(1.849E-08)	(6.211E-09)
Obs	34	34	34
F-Stat	9.834	9.834	12.817
3. Dependent Variable: Expenditure to Attract and Retain Domestic Capital per Worker			
Const	8.914	8.914	0.284
	(5.675)	(6.156)	(4.062)
ℓ_m	-12.562	-12.562	14.668*
	(9.152)	(9.025)	(8.538)
w	-0.0001	-0.0001	-1.934E-05
	(0.0002)	(0.0002)	(0.0002)
L_s	-4.428E-07	-4.428E-07	-1.812E-07
	(4.790E-07)	(4.211E-07)	(3.064E-07)
Obs	42	42	42
F-Stat	1.439	1.439	3.952

[1]Standard errors in parentheses. *Significant at 10% confidence level. **Significant at 5% confidence level. ***Significant at 1% confidence level.

FOOTNOTES

[1] Wall Street Journal, July 6, 1993.

[2] For example, the capital in an automobile plant is physically located in an area and is specific to manufacturing cars. However, the plant may change owners and be used with various numbers of workers; it is therefore mobile within the manufacturing sector.

[3] Our proxy for total state development expenditure was formed by taking development expenditures net of expenditure on tourism, film promotion and (where applicable) natural resource extraction, and multiplying by the share of state funded expenditure in total expenditure. For many states, the survey contains additional information on programs which were federally funded. In these cases, these expenditures were removed before apportioning the state's share of the remaining amount of expenditure.

[4] In addition, the data for Hawaii is not consistent with the rest of the sample because the Hawaii development expenditure figures include large amounts of private funding [see NASDA (1992)].

[5] Total expenditure exceeds spending to attract foreign capital and to attract and retain domestic capital. This is because total expenditure includes many general categories.

[6] See *1992 State Economic Development Expenditure Survery*, National Association of State Development Agencies: Washington, DC.

[7] Bureau of Labor Statistics: Washington, DC.

[8] See Caves (1982) for an extensive review.

[9] E.g., by making existing firms aware of technology improvements, by demanding intermediate goods with higher performance and by improving labor force skills.

[10] E.g., the cost of maintaining a foreign office may be relatively unaffected by state size.