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DETERMINANTS OF FOREIGN PLANT START-UPS IN THE UNITED STATES: LESSONS FOR POLICYMAKERS IN THE SOUTHEAST

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I. INTRODUCTION

State governments recently have begun to compete actively for the growing volume of direct foreign investment (DFI) in the

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United States.[1] While only ten states devoted any resources to attracting DFI before 1969, forty-seven states had invested $8.5 million[2] in DFI programs by 1979. This growth in state DFI programs appears to stem from the general belief of policymakers that DFI creates local employment opportunities, enhances local spending, and broadens state and local tax bases.[3]

State investment in DFI programs has continued to grow despite the fact that little is known about the effectiveness of DFI promotion. That effectiveness can be measured as an elasticity, defined as the ratio of the percent change in DFI to the percent increase in DFI promotion. The greater the percentage increase in DFI that results from a one percent increase in DFI promotion, the greater the elasticity. Thus, state expenditure of public funds on DFI promotion is justified only where the elasticity of DFI promotion to DFI is relatively high.

This article examines the elasticity of DFI in relation to these promotional activities. It also analyzes the effect that agglomeration economies, urbanization economies, and labor market conditions have on DFI. Its specific focus is upon the effect that those four determinants had on new plant start-ups in three separate industries: drug manufacturing, industrial machinery, and motor vehicle production over the 1979-1983 period. (Those industries have been given standard industrial classification (SIC) numbers of 283, 355 + 356, and 371, respectively, by the U.S. Department of Commerce.) The industries are considered separately in order to test the hypothesis that the importance of the four determinants varies according to specific business needs. Other recent contributions to the industrial location literature also consider three-digit industries separately for the same reason.[4] The study

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1. DFI in the United States grew twice as fast as outward investment. Between 1970 and 1983 the real average annual growth rate in inward DFI was 12.1 percent.

2. J. KLINE, STATE GOVERNMENT INFLUENCE IN UNITED STATES INTERNATIONAL ECONOMIC POLICY 58, 62 (1983) [hereinafter cited as J. KLINE]. This figure does not include state government investments in general business promotion programs.

3. *See* U.S. General Accounting Office, *Impact of Foreign Direct Investments: Case Studies in North and South Carolina, Report to the Congress by the Comptroller General*, April 26, 1976.

4. *See, e.g.*, Carlton, *The Location and Employment Choices of New Firms*, 65 REV. OF ECON. & STATISTICS 440 (1983); R. Schmenner, J. Huber, and R. Cook, Geographic Difference and the Location of New Manufacturing Facilities (1984)

uses state-level data and employs a multinomial logit procedure.

The article is divided into six further sections. Section II discusses the magnitude and variance of states' efforts to attract foreign businesses. Section III reviews industrial location theory, particularly as it pertains to foreign firms in the United States. Section IV presents an empirical model. Section V discusses the data used in the estimation. Section VI details the estimation results. Section VII concludes the article by highlighting certain implications for public policy and noting some limitations of the empirical work.

II. THE STATES AND INDUSTRIAL RECRUITMENT

Numerous studies document the extensive and growing efforts of states to attract new business investment. Although many of those studies observe that political pressures typically cause different states to offer the same incentives to foreign and domestic firms, at least one analyst (Kline, 1983) has identified some notable exceptions. In general, state recruitment efforts can be divided into two categories: (1) outreach, which is also known as "booze and brochures,"[5] and (2) direct and indirect financial incentives, which encompass both job training and research and development assistance, land and building subsidies, grants, loans, loan guarantees, and tax breaks.[6]

A. Outreach

A 1981 National Governors' Association survey identifies three types of foreign outreach programs: investment information (44 states), investment missions (35 states), and advertising (35 states). Kline, who has chronicled the growth of outreach programs since the Great Depression, calculates that states invested $8.5 million on these programs in 1980. Table 1 uses per capita statewide outreach expenditures to divide the fifty states into high (H), medium (M), and low (L) effort categories.

When domestic outreach is included, outreach expenditures in 1980 significantly exceeded $8.5 million. Another analyst, Luger, presents two arguments that support the inclusion of domestic outreach in the calculation of aggregate state expenditure on out-

(unpublished manuscript at the Fuqua School of Business, Duke University).

5. *See* J. KLINE, *supra* note 2, at 65-67.

6. *See id.*

reach programs. First, state outreach budgets may not be composed of separate domestic and foreign components. Second, outreach efforts often have multiple targets. Table 2 adjusts the state rankings for outreach effort by accounting for domestic outreach expenditures. Tables 1 and 2 demonstrate that states' efforts vary considerably, regardless of whether or not the calculation of outreach effort includes domestic outreach.

B. Financial Incentives

Table 3 ranks the forty-eight contiguous states according to their total per capita effort in seven categories of direct and indirect financial assistance to both domestic and foreign firms.[7] The categories are: land and building subsidies, debt and equity programs, tax incentives, general postsecondary education, job training, general business climate, and research and development assistance. The value of that financial assistance was estimated at more than one billion dollars in 1980, far exceeding the value of outreach expenditures. The table indicates that fourteen states have relatively high levels of per capita effort on nonrecruiting programs, fifteen states have medium levels of per capita effort, and nineteen states have relatively little per capita effort.[8] The relative investment in each of the seven categories of financial assistance also varies widely among the states. Note that the rankings in Tables 2 and 3 are different, indicating that some states substitute financial incentives for recruiting, and *vice versa.*

III. Industrial Recruitment and Industrial Location

This article examines whether state investment in DFI promotion, as summarized in Tables 2 and 3, is the most influential factor in the distribution of DFI in the United States. The distribution of DFI among the forty-eight contiguous states is listed in Table 4. In the four sample years, the seventy-six new plant start-ups in SICs 283, 355 + 356, and 371, were concentrated in just half of the states, with sixty-seven of the start-ups (88.2 percent)

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7. For a full description of these programs, see M. Luger, *The States and Industrial Development: Program Mix and Policy Effectiveness,* in Quigley, J.M. (ed.), PERSPECTIVES ON LOCAL PUBLIC FINANCE AND PUBLIC POLICY, VOL. 3, Greenwich, CT: JAI Press, forthcoming.

8. The rankings probably would change if Kline's data were incorporated, but not by much since he considered programs that were relatively small in size.

located in one-third of the states, and fifty of the start-ups (65.8 percent) located in one-fifth of the states.

Past studies on industrial location have identified five types of interstate location determinants:[9] agglomeration economies, urbanization economies, labor market conditions, other cost differentials, and public policy. Agglomeration economies help states attract new firms for at least three reasons. First, locations with a concentration of similar firms typically have the business services necessary for the new firms' operation. Second, the proximity of agglomeration allows competitors to monitor each other easily. Third, agglomeration often develops in markets where businesses can exploit consumer demand for their products, thereby lessening the impact of high output transportation costs. Agglomeration economies have been measured in different ways. For example, Moses and Williamson measure it as the number of plants of a particular industry (SIC) type.[10] Carlton measures it as the number of production manhours in a particular industry.[11] Both the methods measure absolute size, rather than the relative importance of the industry, within a given economic base.

Urbanization economies help states attract new firms because highly urbanized areas offer large consumer markets and large diversified pools of labor. Like agglomeration economies, urbanization economies have been measured in different ways. Schmenner, Huber, and Cook use population density as a proxy for urbanization, while other scholars use the ratio of metropolitan-to-nonmetropolitan population.[12]

Labor market conditions affect business location in at least three ways. First, businesses clearly gravitate toward areas where they can expect low wage costs. Second, businesses have displayed a similar preference toward the states with the fewest unions, particularly those states with right-to-work laws, since business success depends upon labor cooperation as much as it does upon labor compensation. Third, the location choice of many businesses is limited to areas that offer a labor pool with skills that are sufficiently specialized to meet the business' employment

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9. There is also a large literature on intrametropolitan location determinants.

10. Moses and Williamson, *The Location of Economic Activity in Cities*, 57 AM. ECON. REV. 211 (1967).

11. Carlton (1983), *supra* note 4.

12. R. Schmenner, J. Huber and R. Cook, *supra* note 4.

needs. All three measures of labor market conditions have been used as explanatory variables in models of location choice. For instance, Carlton measures labor market conditions according to a given location's wage rates, unemployment rates, and supply of engineers.[13] Glickman and Woodward include a variable that measures the percentage of the labor force that is unionized.[14] Schmenner, Huber, and Cook consider the percentage unionized variable along with variables accounting for the presence of right-to-work laws, the education level, and the wage rate.[15] Arpan and Ricks employ a labor attitude index, while Erickson and Wasylenko, and Moriarty include skills indices.[16]

Some studies have recognized other regional cost differences that also affect a business' choice of location. Depending upon the author, the study may include estimates of energy costs[17] and/or transportation costs.[18] Daniels' model of foreign investment in the United States measures intrafirm communication costs by the distance to the business' country of origin and includes regional differences in the cost of nonlabor inputs.[19]

Finally, public policy can affect business location. Most models include the statutory or effective corporate tax rate as a location determinant, with the likelihood of location decreasing as the tax rates increase. For example, Glickman and Woodward (1984) use a 0,1 tax exemption dummy as a measure of potential policy impact. A few studies also consider the benefits as well — areas with more spending on business programs being assumed to be more

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13. Carlton (1983), *supra* note 4.

14. N. Glickman and D. Woodward, Direct Foreign Investment and Regional Development: Some Empirical Findings (1984) (unpublished manuscript at the University of Texas, Austin).

15. R. Schmenner, J. Huber and R. Cook, *supra* note 4.

16. *See* J. ARPAN AND D. RICKS, DIRECTORY OF FOREIGN MANUFACTURERS IN THE UNITED STATES (1975); Erickson and Wasylenko, *Firm Relocation and Site Selection in Suburban Municipalities*, 8 J. URBAN ECON. 69 (1980); B. Moriarty, Regional Industrial Policy (1983) (unpublished manuscript at the University of North Carolina, Chapel Hill).

17. *See, e.g.*, Carlton (1983), *supra* note 4; N. Glickman and D. Woodward, *supra* note 15.

18. *See, e.g.*, S. MANDELL AND C. KILLIAN, AN ANALYSIS OF FOREIGN INVESTMENT IN SELECTED AREAS OF THE UNITED STATES (1974); J. ARPAN AND D. RICKS, *supra* note 17; B. Moriarty, *supra* note 17; N. Glickman and D. Woodward, *supra* note 15.

19. J. DANIELS, RECENT FOREIGN INVESTMENT IN THE UNITED STATES (1970).

attractive to businesses, all else equal.[20]

Perhaps the only two points common to all of the foregoing studies are that (1) agglomeration economies are an important determinant of location, and (2) location behavior of foreign and domestic firms is becoming increasingly similar. The effect of urbanization economies, labor market conditions, nonlabor cost differences, and public policy remains subject to considerable disagreement. The disagreement stems from conflicting study results, which arise from the use of different industries, variables, and model specifications.

IV. A Model of Foreign Branch Plant Locations

This article uses Department of Commerce data on new industrial plants in the United States, in 1979, 1981, 1982, and 1983, to analyze the factors that affect the location decisions of foreign firms.[21] It models foreign branch plant location as a discrete choice problem facing profit maximizing firms. Specifically, it assumes that individual firms choose among forty-eight alternative states, based on those state's characteristics.[22] It employs the conditional multinomial logit framework pioneered by McFadden.[23] That formulation allows one to analyze the spatial distribution of a given number of new branch plants.[24]

Let the profit of any plant in a given industry locating in the i^{th} state be π_i. It is hypothesized that π_i is made up of two components, one nonstochastic and the other random, i.e.,

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20. *See, e.g.*, S. Mandell and C. Killian, *supra* note 19; M. Luger, *supra* note 7.

21. *See* Int'l Trade Ad., U.S. Dept. of Commerce, Foreign Direct Investment in the U.S., 1979, 1981, 1982, 1983.

22. Our formulation assumes that all firms have the same choice set, the forty-eight contiguous states. Hawaii and Alaska are not considered due to insufficient data.

23. *See* McFadden, *Conditional Logit Analysis of Qualitative Choice Behavior*, in P. Zarembka, ed., Frontiers in Econometrics (1974). This approach in estimating the model is similar to the one used in Carlton, *Why New Firms Locate Where They Do: An Econometric Model*, in W. Wheaton, ed., Interregional Movements and Regional Growth (1979), which studies the plant location decisions of domestic firms using Dun and Bradstreet data at the level of SMSAs rather than states. *See, e.g.*, S. Mandell and C. Killian, *supra* note 19; M. Luger, *supra* note 7.

24. The determinants of the total flow of foreign direct investment into the U.S. in any period are more complex than those affecting the location decisions of new plants in the U.S. Those factors are not studied in this paper.

$$\pi_i = F(Z_i) + U_i$$

The nonrandom part, $F(Z_i)$, is assumed to depend solely on a vector Z_i, which consists of the economic characteristics of location 'i' that influence a new plant's profitability in the given industry. The vector Z_i consists of the state and industry specific variables that enter into the profit functions of individual plants but are exogenous to the firms. Thus, the expression in (1) is a reduced form equation. The random variable u_i is assumed to have a Weibull distribution independent of all $u_j (i \neq j)$.[25]

The actual estimation results are discussed in section V. They are based on a multiplicative specification of the profit function, so that the deterministic component is

$$F(Z_i) = \Sigma \ln(Z_{ij}) B_j$$

where, Z_{ij} is the j^{th} element (characteristic) of the vector Z_i that corresponds to the i^{th} alternative (state).

With this model, the probability of location in state 'i' is,

$$P(i) = \frac{\exp F(Z_i)}{\sum_{i \epsilon I} \exp F(Z_i)}$$

I represents the set of all 48 states (alternatives), provided plant location is guided by profit maximization.

The model described above is estimated with an XLOGIT algorithm that uses maximum likelihood methods.[26] As previously noted, the location data of new plants are from Department of Commerce publications for the years 1979 and 1981-1983.[27] The

25. This independence restriction on the random variables u_i, $i = 1, \ldots I$ implies that the multinomial logit model satisfies the axiom of independence of irrelevant alternatives. According to this axiom, the unobserved characteristics (which affect profitability) of the 48 alternatives (states) from which firms make location choices, are independent. This property of the multinomial logit formulation could be restrictive for studying location decisions among states since the unobservable attributes of a given state may be correlated with the characteristics of those that are situated close to it. However, for the purposes of this study we retain multinomial logit in the interests of computational ease. Discrete choice models such as nested logit that relax the independence axiom are extremely cumbersome to estimate.

26. D. McFadden, and H. Wills, XLOGIT (1974), Quail Consultant Travel Demand Forecasting Project, University of California, Berkeley.

27. *See supra* note 22. 1980 data were excluded because of the large number of missing observations for that year.

Commerce Department's annual figures identify each new plant established by a foreign firm according to the plant's primary SIC code and its state of location. That information is sufficient for estimating a firm's actual location choice where, as here, the model approaches a firm's location decision as a discrete choice problem. Finally, the model assumes that the forty-eight contiguous states in the continental United States comprise the complete set of alternatives for all firms.[28]

There are not enough observations for any one four digit industry in the four year data set to use that level of industrial disaggregation. This study, therefore, focuses on the location behavior of three-digit manufacturing industries for which a sufficient number of new plant locations are available to make an estimation of the location choices of new plants meaningful. Accordingly, this article estimates the model for SIC codes 283, 355 + 356, and 371, that correspond respectively to drug manufacturing, general and special industrial machinery, and motor vehicle production.

V. Data Used for the Estimation

The sources of the state and industry specific data appear in the appendix. Where the necessary information was available annually, the average value of the variables over the relevant period was used in the estimation. For variables where averaging was infeasible, a single annual value was used.

The model includes four of the five types of location determinants discussed in section III. Agglomeration economies are summarized by a single variable that measures the level of activity, in total manhours, in each three digit industry. When agglomeration was measured in a different way in earlier work, as the ratio of a given industry's manhours to total manhours in the state, the re-

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28. This single stage process that we assume for the plant location decision is in contrast to the model presented in R. Schmenner, J. Huber and R. Cook, *supra* note 4. In that work, the location decision is analyzed in two stages with a different set of state and industry characteristics being considered by firms in each stage. While such hierarchical decisionmaking probably captures the complexity of location choice better than the single stage process used here, it requires more detailed information about firms' choices at each stage of the decision. Since this information is obviously not available from the Commerce Department data to which we have access, the single stage model of decisionmaking is retained here.

sults were essentially the same as those reported in section VI. Labor market conditions are measured by wage rates and skill levels in each of the industries. The unemployment rate was included in preliminary regressions, but because its coefficient was not significantly different from zero for any of the industries, it was dropped from the regressions reported in section VI.[29] Urbanization economies are measured as population density.[30] The model also includes two kinds of policy variables: (1) an index that represents the level of effort expended by state governments on various schemes to attract new businesses, and (2) a weighted average of corporate and personal state tax rates. The model does not include a nonlabor cost differential variable, such as variations in the cost of energy and transportation, due to data constraints at the time this article was prepared.

A. Agglomeration Economies

The agglomeration variable presumes that the states with greater absolute activity in an industry have a higher probability of attracting new investment in that industry, due to the resultant external scale economies. The agglomeration measure used in the estimation is the total number of annual manhours in a specific industry. Three digit SIC data on production manhours are available only for 1977.

B. Labor Market Conditions

The model includes wage rate and skill level variable as measures of labor market conditions. It includes a wage variable because wage costs comprise a significant percentage of total costs in most industries. The sign of the wage coefficient is presumed to

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29. The poor performance of the unemployment variable may reflect its countervailing effects on location probability. As a proxy for local demand side influences, the unemployment rate should have a negative effect, because the model assumes that the unemployment rate is inversely related to consumer demand, profitability, and hence, the probability of location. The unemployment rate also affects the supply side, however. To the extent that a high unemployment rate reduces recruitment costs for firms in a given location, particularly for workers in low-skill jobs, it may be associated with greater profitability, and hence, a higher location probability.

30. The inclusion of an urbanization variable may create multicollinearity in the model because the demand side influences that population density is intended to capture may already be picked up by the agglomeration and unemployment variables.

be negative, since the probability of location should decrease as the state wage rate in the particular industry increases. The wage estimates in 1977, as reported in the *Censuses of Manufactures*, are computed as the ratio of workers' annual earnings to total annual production manhours. The 1977 data on wage rates were the latest available and seem appropriate for modeling location decisions during the 1979-1983 period because state rankings by wage rate did not change significantly between 1977 and 1982.[31]

The skill composition of each state's labor force is included because the availability of skilled labor is expected to encourage business location, particularly for technologically sophisticated industries, such as SIC 371. There is no single measure of the skill level of a state's labor force. This study uses the percentage of the state's employment that is classified as white collar. While this figure only roughly approximates the supply of skilled labor, it should be noted that the costs of hiring managerial and technical personnel decreases and profitability increases, in states that have large proportions of white collar employees.

C. Urbanization Economies

The results reported in section VI are based on the population per square mile in 1980 as the measure of states' urbanization economies. Presumably, more densely populated states are more desirable locations, especially for plants that produce locally-consumable commodities. For those plants, the greater density reduces the costs of transporting goods to market. When other measures of urbanization, including gross population and the ratio of metropolitan to nonmetropolitan population, were used in regressions not reported in this article, the estimated coefficients were not significantly different from those shown in Table 5.

D. Public Policy

The model includes two public policy variables: an "efforts index" and a tax rate measure. The efforts index is used to summarize the variety of programs that states use to encourage the location of foreign plants. That index is based on seven indicators of

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31. The alternative of using the two digit SIC wages that appear annually in the *Annual Surveys of Manufacturers*, was rejected because of the considerable variance among the hourly wages of the three digit industries within SICs 28, 35, and 37.

state policy, four of which are measured as per capita state expenditures for the appropriate part of the population. They are: (1) subsidized job training, (2) debt and equity capital for industrial development, (3) contributions to general postsecondary education revenues and (4) expenditures on investment attraction and retention. Indicators five and six are 0, 1 dummies that measure the presence or absence of significant state activity in the provision of (5) land and building subsidies and (6) research and development assistance. Finally, the policy index includes a business climate indicator for each state, computed as a weighted sum of a dummy for right to work legislation and an index of the state's unemployment compensation regulations. After the forty-eight states were ranked according to their effort in each of the seven program areas, the scores were aggregated to yield an unweighted total score, which is used here as a measure of each state's efforts in industrial development policy.[32]

State tax policy may also affect a new plant's location decision. This study employs a weighted sum of state corporate and personal tax rates, using a 0.67 coefficient for corporate and a 0.33 coefficient for personal. This index includes personal tax rates for two reasons. First, corporate managers presumably care about the extent to which their compensation is diminished by state taxes. Second, owners of noncorporate businesses pay business taxes at the personal tax rate. In each case, the tax rates refer to the marginal tax rate for the state's median business or median individual. The latest published figures for state and local business tax rates are for 1977.

VI. Estimation Results

In the preceding section, the article outlined the expectations regarding the direction of the effects of each explanatory variable on the probability of location. The expected effect of industrial agglomeration is positive. Wage rates in each industry are expected to be inversely related to location probability, while the skill level of the labor force is expected to be directly related. Population density is expected to have a positive coefficient for industries that produce for local (state) consumption. And, of the two policy variables, the probability of location most likely increases with the effort index, but decreases with the level of taxes.

32. For the precise definition of this index, see M. Luger, *supra* note 7.

As described in the previous section, the multinomial logit model describes the location behavior of individual firms. The implication of this formulation is that the probability of a new plant locating in a given state (represented by 'i') is,

$$P(i) = \frac{\exp F(Z_i)}{\sum_{i \in I} \exp F(Z_i)}$$

where $F(Z_i)$ is the logarithm of the expected profitability of locating a new plant in the i*th state, which has attributes shown by the components of Z_i. Also as assumed above,

$$F(Z_i) = \Sigma_k (1nZ_{ik})B_k$$

where Z_{ik} is the k^{th} attribute in location 'i'.

Using data on new foreign plant locations for the four years, 1979 and 1981-1983, the model is estimated separately for each three-digit industry. The estimation was carried out with XLOGIT, which uses a maximum likelihood procedure, given the actual location choices and the formulation outlined above. Table 5 shows the results for each industry.

While the results should be interpreted with caution, due to the small sample sizes, they nevertheless correspond with economic intuition. For several variables, however, the small size implies large standard errors, and therefore, a lack of precision in the coefficient estimates. The coefficient of each explanatory variable in this study is proportional to the change in location probability due to a one percent change in the value of that variable. The relative effects of different variables on location probability, therefore, can be inferred by comparing the estimated values of their coefficients.

The first variable in Table 5 is manhours (MH), the agglomeration measure. Its coefficient has a positive and relatively large effect on the probability of location in each of the sample industries, indicating that agglomeration economies are an important influence on the location of new branch plants. The coefficient is different from zero at a 1 percent level of significance in all three industries.

The next two variables in the table measure labor market effects on the location probability. The first of those variables is the industry-specific wage rate (W). Its coefficients have negative signs that are relatively large in magnitude and statistically different from zero at the 2, 10 and 1 percent levels of significance, for SICs 283, 355 + 356, and 371, respectively. This negative effect conforms with prior expectations about the influence of high wage rates on the location propensity. The second labor market variable is the industry-specific skill level (SK). Its coefficient does not differ significantly from zero for SICs 283 and 355 + 356. For SIC 371, the coefficient is positive at a 3 percent level of significance, as expected, and is relatively large in magnitude.

The fourth variable in the table, population density (DEN), measures urbanization economies. Its coefficients are statistically indistinguishable from zero for each of the sample industries.

The last two variables measure the effect of public policies on the probability of location. The policy index (PI) has coefficients that are positive for every industry, but relatively small in magnitude. For one industry, SIC 371, the coefficient is not statistically different from zero. For another, SIC 283, the significance level is only 8 percent. The second policy variable is the tax effort index (IT), which is the inverse of the weighted income tax rate. That variable has a statistically significant (at the 3 percent level) positive coefficient for SIC 283, a significant (at the 9 percent level) negative coefficient for SIC 371, and a coefficient that is not statistically different from zero for SIC 355 + 356. The result for SIC 371 is surprising since it indicates that higher tax rates are associated with higher location probabilities, all else equal. That result might be explained by the fact that automobile manufacturers place a particularly high premium on the services that high taxes pay for.

VII. Conclusions

This study has attempted to analyze the determinants of new plant location by foreign firms in the United States. Our particular interest has been in evaluating the efficacy of the efforts of state governments in attracting DFI in the form of new plants. The framework we have used for the estimation is particularly applicable to the problem of location choice. The model allows us to study the choice between different location alternatives at the level of the individual firms that make these decisions.

Our results, although preliminary, have several implications for policy. First, our work supplements the findings of earlier work on industrial location, which concludes that agglomeration economies and wage rates are the most important determinants of new plant location. In this respect, the behavior of foreign firms resembles that of domestic firms. Thus, state governments should concentrate on attracting new foreign firms belonging to those industries that are already present in the economic base.

Second, the results indicate that public policies do not have a uniform effect on industries. States that have expended relatively greater effort on industrial promotion are shown to have higher probabilities of foreign branch plant locations in SICs 283 and 355 + 356, but not in SIC 371. However, the magnitude of the policy index coefficient is not very large, indicating that the elasticity of new locations with respect to promotional expenditures is small. In order to justify these expenditures, such benefits much be compared to the additional costs that are incurred.

The estimated coefficients on the income tax variable are also instructive for policymakers. It is not at all clear that tax rate reductions will induce more foreign start-ups. In the past, lower tax rates did increase the location probability for plants in SIC 283, presumably because drug manufacturers are not that dependent on state government services. The results suggest that tax rate increases, accompanied by service level improvements, would foster *more* automobile plant start-ups. The general point that must be stressed is that general policy changes, either on the tax or benefits side, will induce new start-ups in some industries, but not in others. If policymakers use these general policy initiations, they will affect the composition, as well as the size, of their economic bases.

These conclusions are subject to a number of qualifications. First, they are based on a small sample of plants over a limited period of time. The authors plan to reestimate the logit model using a more extensive data set from the U.S. Department of Commerce, to confirm the results for SICs 283, 355 + 356, and 371, and to test the effect of promotion investment in other three digit industries. Second, the conclusions are based on a model that excludes key variables, most notably, energy costs. The authors plan to include that variable in their further estimation. Finally, the conclusions pertain to the distribution of a fixed number of foreign plants among the states, not to the size of the foreign investment pie. If *all* states increased their promotion effort and cut taxes, they would only realize more locations if the total number of foreign start-ups rose.

TABLE 1

Per Capita Effort on Foreign Outreach

High (H)	*Medium (M)*	*Low (L)*
Arkansas	Alabama	Arizona
Delaware	Connecticut	California
Georgia	Indiana	Colorado
Kentucky	Iowa	Florida
Maryland	Louisiana	Idaho
North Carolina	Massachusetts	Illinois
South Carolina	Michigan	Kansas
Vermont	Mississippi	Maine
Virginia	Missouri	Minnesota
	Montana	Nebraska
	New Hampshire	New Jersey
	New York	North Dakota
	Oklahoma	Oregon
	Rhode Island	Pennsylvania
	Tennessee	South Dakota
		Texas
		Utah
		Washington
		West Virginia
		Wisconsin

Source: Kline (1983)

States were grouped according to arbitrarily selected high and low cutoff values.

TABLE 2

Per Capita Effort on
Foreign and Domestic Outreach

High (H)	*Medium (M)*	*Low (L)*
Alabama	Illinois	Arizona
Delaware	Iowa	Arkansas
Idaho	Kansas	California
Maryland	Kentucky	Colorado
Mississippi	Maine	Connecticut
New Jersey	Massachusetts	Florida
North Dakota	Minnesota	Georgia
Rhode Island	Montana	Indiana
South Carolina	Nebraska	Louisiana
South Dakota	Nevada	Michigan
Vermont	New Mexico	Missouri
	North Carolina	New Hampshire
	Ohio	New York
	Oklahoma	Oregon
	Utah	Pennsylvania
	West Virginia	Tennessee
	Wyoming	Texas
		Virginia
		Washington
		Wisconsin

Source: Luger (1984), Table 2

TABLE 3

Per Capita Effort on
Direct and Indirect Financial Programs

High (H)	*Medium (M)*	*Low (L)*
Alabama	Delaware	California
Arizona	Florida	Colorado
Arkansas	Indiana	Connecticut
Georgia	Kansas	Illinois
Idaho	Maryland	Kentucky
Iowa	Nevada	Maine
Louisiana	New Jersey	Massachusetts
Mississippi	New Mexico	Michigan
Nebraska	Oklahoma	Minnesota
North Carolina	Rhode Island	Missouri
North Dakota	South Dakota	Montana
South Carolina	Texas	New Hampshire
Tennessee	Vermont	Ohio
Utah	Virginia	Oregon
	Wyoming	Pennsylvania
		Washington
		West Virginia
		Wisconsin

Source: Luger (1984), Table 2

TABLE 4

Number of New Start-ups, Three Sample Industries, 1979, 1981, 1982, 1983

State	*Number*	*State*	*Number*
Alabamá	0	Nebraska	0
Arizona	0	Nevada	0
Arkansas	0	New Hampshire	0
California	5	New Jersey	3
Colorado	0	New Mexico	0
Connecticut	4	New York	4
Delaware	1	North Carolina	8
Florida	3	North Dakota	0
Georgia	2	Ohio	4
Idaho	0	Oklahoma	0
Illinois	4	Oregon	0
Indiana	0	Pennsylvania	4
Iowa	0	Rhode Island	0
Kansas	0	South Carolina	3
Kentucky	1	South Dakota	0
Louisiana	0	Tennessee	8
Maine	1	Texas	5
Maryland	2	Utah	0
Massachusetts	3	Vermont	0
Michigan	4	Virginia	3
Minnesota	0	Washington	1
Mississippi	1	West Virginia	0
Missouri	1	Wisconsin	1
Montana	0	Wyoming	0

TABLE 5

Probability of New Plant Location[a]

Variable[b]	*283*	*SIC CODE* *355+356*	*371*
MH	0.938 (0.259)	0.909 (0.293)	1.492 (0.367)
W	−3.003 (1.478)	−1.76 (1.358)	−4.435 (1.653)
SK	−0.698 (1.236)	−0.233 (1.063)	3.01 (1.647)
DEN	0.024 (0.351)	0.17 (0.296)	0.474 (0.305)
PI	1.056 (0.73)	1.443 (0.622)	0.785 (0.888)
IT	1.93 (1.045)	−0.227 (1.022)	−1.131 (0.848)
LIKELIHOOD RATIO STATISTIC[c]	42.37	26.52	49.43
NO. OF NEW PLANTS	21	27	28

[a]Standard errors are in parentheses.
[b]See the appendix for variable definitions. All variables are measured in logs.
[c]This statistic enables one to test the null hypotheses that all coefficients taken together equal zero. For each industry, the likelihood ratio statistic is greater than the critical chi-square value at the one percent significance level, indicating rejection of that hypotheses.

APPENDIX

	Variable	*Source*
MH,	Annual production manhours in 3-digit SIC	*Census of Manufactures* (1977)
W,	Wage rate in 3-digit SICs	*Census of Manufactures* (1977)
SK,	Percent of white collar workers in labor force	*State and Metropolitan Area Data Book* (1982)
DEN,	Population density per square mile (1980), by state	*Statistical Abstract of the United States* (1982)
PI,	Effort index of state policies	See Luger (1986) for various sources
IT,	Inverse of weighted average of state business and personal tax rates, normalized to lie in 0,1 interval	Wheaton (1983) *Statistics of Income*; U.S. Internal Revenue Service (1982)

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