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Exporters or competitors: behavior of foreign-based multinational firms in the United States

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Abstract. This study examines two issues: first, do foreign-based multinational firms (FBMNF) operating in the U.S. act mainly as exporters or as competitors with domestic firms? Second, which country's firms are likely to be exporters? Data consist of 1992 state-level data. Two equations are estimated; state manufacturing exports and state personal income, the respective dependent variables, are regressed (via OLS) on variables reflecting FBMNF employment and other state-level variables. The results support the argument that FBMNFs are primarily acting as exporters. A third equation regresses state manufacturing exports on employment in FBMNF broken down by country of ownership. The results support the argument that Japanese-based multinationals (and possibly European and Canadian multinationals) act chiefly as exporters. Policy recommendations for state governments include focusing on local taxation levels and providing education and training, as well as attracting FBMNFs.

1. Introduction

Interest in foreign-based multinational firms (FBMNFs) operating in the United States has been pervasive, especially with the increase in inward investment in the U.S. in the 1980s and 1990s. In turn, states and localities often have seen FBMNFs as sources of employment and regional economic growth (Young *et al.* 1994; Smith 1988) that add to the regional economic base. Because some economic development experts argue that increasing a region's economic base (export sector) is the most effective economic development strategy (Blakely 1994), attracting FBMNFs seems at first glance a rational policy.

As FBMNFs become more active regionally, however, do these firms act as exporters or as competitors against other existing firms? A recent article in the German news weekly *Die Zeit* (Tenbrock 1997) for instance, reported that over half of the vehicles produced at the new Mercedes plant in Alabama would be sold in the U.S. In the second (competitor) case, attracting foreign-based multinationals may not

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lead to a net increase in employment or income, especially if other competitors lose market share or disappear.

This study looks at two interrelated questions. First, as the presence of foreign-based multinational firms increases in a state, do state exports increase or decrease? If they tend to decrease, this may be a sign that FBMNFs are acting as competitors to domestic firms in state (domestic) markets rather than as exporters. Second, which country's multinational firms (MNFs) are most likely to be exporters rather than competitors? This analysis may help local and state economic development specialists focus on the most locally beneficial candidate firms.

2. Theory and prior work

There are a number of different theories concerning why multinational firms (MNFs) behave in the ways they do (see Caves (1996)). One set of explanations has been dubbed *ownership-location-internalization (OLI) theory* (Markusen 1995). The locational dimension to the OLI argument states that FBMNFs enter a new country or region to gain access to abundant resources or to be close to large markets. In the former case, one could argue that FBMNFs are more likely to be exporters; in the latter case such firms are more likely to be competitors with other firms operating in those same markets.

One recently published study by Leichenko and Erickson (1997) tries to answer this question by looking at a pooled (time series/cross-sectional) state-level data set for the years 1980 to 1991. Leichenko and Erickson conclude that as direct foreign investment increases in a state, so do its exports. To this author's knowledge, the Leichenko and Erickson work is the only (recent) study that has addressed the issue.

Most of the empirical research known to this author has examined the locational aspects of MNF behavior. The results of various studies are summarized in Caves and discussed in Ondrich and Wasylenko (1993). Agglomeration economies, infrastructure, and market size are variables that seem to make states attractive to FBMNF investment. On the other hand, wages and other labor-related variables (e.g., unionization levels and right-to-work status) do not always have the expected signs (Jelavich 1997). Ondrich and Wasylenko note that this may be due to the fact that these studies do not measure labor productivity. An alternative view, as noted by Markusen, is that FBMNFs may be seeking highly skilled (and thus expensive high wage) labor.

Another area where results across studies have been mixed is taxation. Ondrich and Wasylenko discuss the complexity of tax codes among nations and the individual U.S. states. This tax complexity makes analysis difficult, especially if a MNF can deduct taxes paid to one country from its taxable income in another nation. Recently, however, Hines (1996) has shown that FBMNFs tend to avoid U.S. states with high corporate income tax rates.

While many of the published studies of FBMNF behavior in the USA have focused on the manufacturing sector, recent studies have examined direct foreign investment in the nonmanufacturing sectors (Jelavich 1993). OhUallachain (1996)

has documented the rapid increase in service sector investment by FBMNFs in the United States.

In summary, prior studies can be used to buttress either argument (that FBMNFs operate in the United States acting as exporters or that they operate as competitors). While low taxes, infrastructure, and agglomeration economies may point toward the export argument, the desirability of being in or near large markets argues for the competitive view.

3. Model specification: exporter versus competitor

This study uses a 1992 cross-sectional database of the 50 U.S. states to examine FBMNF behavior. The first equation specifies state manufacturing exports (SMEXP) as a linear function of the following:

$$SMEXP = F(TDFEMP, DFIEMP, MWAGE, RTW, STAX, LTAX, CT, MX, CD, GL) \quad (1)$$

where:

SMEXP	=	State manufacturing exports, in billions of dollars;
TDFEMP	=	State employment (in thousands of workers) in establishments classified as foreign-owned by the U.S. Department of Commerce;
DFIEMP	=	Ratio of TDFEMP to total state employment;
MWAGE	=	June 1992 average manufacturing wage in a state;
RTW	=	1 if the state is a right-to-work state and 0 otherwise;
STAX	=	Ratio of total state government taxes (in millions of dollars) divided by state total personal income (SINC, in billions of dollars);
LTAX	=	Local government taxes in each state (in millions of dollars) divided by SINC;
CT	=	1 if the state is a coastal state and 0 otherwise;
MX	=	1 if the state borders Mexico and 0 otherwise;
CD	=	1 if the state borders Canada and 0 otherwise; and
GL	=	If the state borders a Great Lake and 0 otherwise.

Data sources are discussed in the appendix. Table 1 gives means and ranges for each variable.

It is hypothesized that as TDFEMP increases, so will exports. The coefficient of WMAGE should be negative, while RTW's coefficient should be positive; both reflect costs of labor. The coefficients of STAX and LTAX are presumed to be negative. The coefficients for CT, MX, CD, and GL are assumed to be positive—being at or near port facilities (measured by CT and GL) or near a border should be attractive to FBMNF investment.

The coefficient of DFIEMP, the ratio of employment in foreign-owned facilities to total state employment helps test whether FBMNFs are exporters or competitors. If the coefficient is positive, then state exports will increase as FBMNFs expand their presence in a state. If the coefficient is negative, however, the interpretation is that

Table 1. Means and ranges of variables

Variable	Mean	Range
SINC	$ 102.4 (bill)	8.8000 to 667.3
SMEXP	$ 4.9771 (bill)	0.0170 to 30.5560
TDFEMP	93.2140 (thousand)	5.3000 to 521.8
DFIEMP	0.0410	0.0170 to 0.1041
MWAGE	$ 11.2746	8.71 to 14.95
RTW	0.42	0 to 1
STAX	66.8020	5.2207 to 121.4
LTAX	39.5740	18.9726 to 77.5109
CT	0.4800	0 to 1
MX	0.0800	0 to 1
CD	0.2200	0 to 1
GL	0.1400	0 to 1
JPEMP	14.7460 (thousand)	0.1000 to 147.9
EUEMP	57.1760 (thousand)	1.2000 to 268.3
CDEMP	11.6000 (thousand)	0.5000 to 42.0

See text for variable definitions and data sources

FBMNFs expand their operations to produce for the domestic (U.S.) market, not for international markets.

TDFEMP includes employment both inside and outside manufacturing. It could be argued for consistency's sake with state manufacturing exports (SMEXP) that the relevant variable should be employment in foreign-owned manufacturing facilities only. This approach, however, might exclude employment in nonmanufacturing support sectors such as warehousing and distribution.

SMEXP is state manufacturing exports to other countries. SMEXP does not include interregional exports to other U.S. states. Using SMEXP controls for (eliminates) FBMNF production in one state destined for sale in another part of the United States. Limiting exports to the manufacturing sector is a crude method of identifying the economic base (Nishiyama 1997) and is in line with the focus of Leichenko and Erickson's work.

The U.S. Commerce Department definition of a foreign-owned facility (and thus of TDFEMP) is that the facility must be at least 10 percent foreign-owned. Thus, many of these establishments may be majority U.S.-owned.

Along with equation (1), SINC (total state personal income) is regressed against the same variables as the SMEXP equation:

$$\text{SINC} = G(\text{TDFEMP, DFIEMP, MWAGE, RTW, STAX, LTAX, CT, MX, CD, GL}) \qquad (2)$$

In this specification, the signs are assumed to be the same as in equation (1). The coefficient of DFIEMP can be interpreted in a similar manner. If the coefficient is positive, FBMNFs add to exports and (by reasoning of economic base theory) should increase state income.

Equations (1) and (2) are both estimated using ordinary least squares (OLS) using SAS. The regressions are presented in Table 2. The F-statistics are significant at 5 percent for both equations. In both equations the coefficient of TDFEMP is signifi-

Table 2. OLS estimates of export and income equations

Dependent variables:	SMEXP (Equation 1)	SINC (Equation 2)
Parameters		
Constant	-6.89038	-51.54035
	(-1.142)	(-1.087)
TDFEMP	0.04979	1.19610
	(8.860)**	(27.076)**
DFIEMP	-79.89440	-1264.38386
	(-2.679)**	(-5.394)**
MWAGE	1.40490	5.52090
	(3.330)**	(1.664)*
RTW	0.31464	-10.47352
	(0.283)	(-1.199)
STAX	-0.02015	0.39555
	(-0.677)	(1.690)*
LTAX	-0.14027	0.25165
	(-2.941)**	(0.671)
CT	1.81956	7.17170
	(1.734)*	(0.869)
MX	1.16991	3.84108
	(0.679)	(0.284)
CD	2.22164	-1.70939
	(1.992)**	(-0.195)
GL	-0.17755	-23.41610
	(-0.121)	(-2.037)**
R^2	0.8362	0.9749
F	19.910	151.657

t-ratios in parentheses
*Significant at 10 percent
**Significant at 5 percent

cantly positive. In the SMEXP equation both the LTAX and STAX coefficients have negative signs, but only LTAX's value is significantly different from zero. The LTAX and STAX coefficients are oddly positive in the SINC equation. In both equations, MWAGE is significantly positive; this perverse outcome may be explained by the issues addressed above. RTW is insignificant in both equations. The correlation between MWAGE and RTW is high (-0.600), a possible source of multicollinearity. On the other hand, the correlation between TDFEMP and DFIEMP is low (0.247). The CT (coastal) and CD (Canadian border) coefficients are significantly positive in the SMEXP equation; MX and GL are insignificant. In the SINC equation CT, MX, and CD are insignificant, whereas GL is strangely significantly negative (possibly reflecting lingering Rust Belt problems in 1992).

Most interesting are the coefficients of DFIEMP. In both equations the coefficients are significantly negative, suggesting that FBMNFs tend to be more like domestic competitors than like exporters as they increase their presence (employment) in a state. Because the numerator (TDFEMP) includes both manufacturing and nonmanufacturing (e.g., service) employment in foreign-owned facilities, this may reflect the phenomenon noted by OhUallachain (1996) of growing direct foreign investment in the U.S. service sector. As OhUallachain argues, these products by their nature are not usually exportable.

An alternative view of equation (1) is found by taking the partial derivative of SMEXP (the dependent variable) with respect to TDFEMP:

0.04979 - 79.89440/(total state employment),

recalling that DFIEMP is the ratio of TDFEMP to total state employment. Thus, for some states (in terms of employment), the effect of FBMNFs on state exports is positive. In particular, states with employment exceeding 1,604,000 workers should see exports rise with FBMNF employment. Because the average state in this data set had total employment of 2,166,000 workers, in most states FBMNF activity will lead to greater exports.

Given that the database used in this model is cross-sectional, there is a possibility of heteroskedasticity in equations (1) and (2). This possible heteroskedasticity means that while the regression coefficients are unbiased, the standard errors and t-ratios are biased. To test for this problem, the Breusch-Pagan test is used to test for heteroskedasticity (Maddala 1988). The squared errors from each equation are regressed on the independent variables (as listed in Table 2), and then we examine the resulting regression sum of squares (RSS). For each equation, the test statistic becomes:

$\lambda = RSS/(2*\sigma**4)$,

where σ is the standard deviation of the error terms. For equation (1)'s error term, RSS is 17597.92 and σ is 18.95. For equation (2)'s error term, RSS is 24,032,864.35 and σ is 700.33. λ has a χ^2 distribution with degrees of freedom equal to the number of independent variables. At 5 percent significance the critical value is 3.94; as λ is less than that for both equations, the assumption of homoskedasticity cannot be rejected.

4. Specification and estimation of origin country influence

The other issue addressed at the beginning of this paper concerns which countries' multinationals are most likely to be export-oriented. SMEXP is specified to be a linear function of the following variables:

SMEXP=H(JPEMP,EUEMP,CDEMP,MWAGE,LTAX,STAX,RTW,CT,MX,CD,GL) (3)

where:

JPEMP = State employment in Japanese-owned facilities;
EUEMP = State employment in European-owned facilities; and
CDEMP = State employment in Canadian-owned facilities.

JPEMP, EUEMP, and CDEMP (termed here *origin-country* variables) are all measured in thousands of employees (see the appendix for the data source). All of the other variables are the same as in equations (1) and (2).

The coefficients on JPEMP, EUEMP, and CDEMP are all assumed to be positive (that is, increasing employment by each country's (region's) MNFs should raise state exports). All of the other signs should be as specified for equations (1) and (2).

Equation (3) is estimated by OLS, and the results are presented in Table 3. The equation is significant based on the F-test at 5 percent. Of the three origin-country variables, only the Japanese employment variable is significant (although all three are positive). This may reflect a preference by Japanese MNFs for *green field* (newly built) investments (Caves 1993) and manufacturing facilities (Atwong *et al.* 1995).The two tax variables have the expected negative signs, although only the local tax (LTAX) coefficient is significant. The MWAGE coefficient is significantly positive, and all five binary variables are positive (as expected), with CT and CD being significantly positive. The significant Canadian-location variable (CD) may reflect the impact of the 1988 U.S.-Canadian free trade agreement. The DFIEMP coefficient is significantly negative, as in the previous two equations. A Breusch-Pagan test of equation (3), done by regressing the squared errors on the independent variables in Table 3, shows that the hypothesis of homoskedasticity cannot be rejected (RSS = 17944.9; σ =19.137).

One problem with equation (3)'s estimation is that there is a high correlation between CDEMP and EUEMP (0.920), thus creating multicollinearity. A new variable, CDEUEMP, equal to the sum of EUEMP and CDEMP, is created, and equation (3) is reestimated. The results are presented as equation (3a) in Table 3. CDEUEMP is significantly positive, implying that attracting European or Canadian MNFs should increase state exports. This seems to confirm the conclusion that FBMNFs boost state exports. There is little change in the respective coefficients in equations (3) and (3a).

5. Implications for state economic development policy

The results of this study suggest that as foreign-based multinational firms increase their presence in a state, such firms are likely to be exporters rather than competitors with other established enterprises. This conclusion is similar to the work of Leichenko and Erickson. The implication for OLI theory is that FBMNFs appear to locate near resources rather than markets. Thus, encouraging foreign-based multinational manufacturers to locate in a state should lead to a net increase in state economic activity.

Equation (3) shows that increased presence of Japanese firms in a state will increase exports from that state, *ceteris paribus*. This is consistent with earlier research showing that Japanese MNFs prefer green field investments in manufacturing. If an foreign-based MNF simply buys an existing U.S. manufacturing facility, such a purchase itself would not increase the respective state's exports (without a change in marketing strategy for the acquired plant's production). The results of equation (3a), on the other hand, suggest that Canadian and European MNFs add to state exports. Investments in nonmanufacturing (e.g., service and retail) facilities, however, do little to enhance a state's exports and may drive out domestically-owned competitors.

Table 3. OLS estimates of equation (3) and (3a)

	SMEXP	
Dependent variable	Equation (3)	Equation (3a)
Constant	-6.05815	-5.94081
	(-1.003)	(-0.997)
JPEMP	0.11168	0.10674
	(3.159)**	(3.448)**
EUEMP	0.03284	
	(1.352)	
CDEMP	0.07464	
	(0.634)	
CDEUEMP	0.03933	
	(3.533)**	
MWAGE	1.34448	1.35713
	(3.171)**	(3.256)**
LTAX	-0.12930	-0.13232
	(-2.637)**	(-2.790)**
STAX	-0.03416	-0.03639
	(-1.087)	(-1.205)
RTW	0.77828	0.75302
	(0.695)	(0.683)
CT	2.31018	2.27336
	(2.171)**	(2.177)**
MX	0.75974	0.92909
	(0.414)	(0.539)
CD	2.28345	2.46923
	(2.081)**	(2.253)**
GL	0.43945	0.40244
	(0.295)	(0.274)
DFIEMP	-77.90677	-74.97589
	(02.494)**	(-2.558)**
R^2	0.8472	0.8468
F	17.095	19.098

While other studies have shown that state and local taxes can influence FBMNF location decisions, this study does not show such taxes always to be significant. Table 3's estimations, however, show that local taxes have an impact on state exports. Thus, municipal and county tax policies can significantly help or hinder a state government's efforts to increase exports and income. Furthermore, right-to-work states may not have an obvious edge over other states, especially if foreign-based firms are seeking skilled and highly productive workers or are seeking (nonmanufacturing) investments in non-RTW states. The significantly positive wage coefficients in Table 3 suggest (following Markusen (1995)) that states with well-skilled (and thus well-paid) labor forces are in the best position to be exporters, and state policy should encourage appropriate education and training. While attracting Japanese (and maybe European and Canadian) multinationals is one export-enhancing strategy, influencing local taxation rates and providing (vocational-technical) education are complementary policies to such a strategy.

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Data appendix

The following are sources for the data used in this study.

TDFEMP, JPEMP, EUEMP, CDEMP	U.S. Department of Commerce (August 1994), *Foreign Direct Investment in the United States*, Washington D.C.: Bureau of Economic Analysis
Total state employment (to calculate DFIEMP)	U.S. Department of Commerce (September 1994), *Statistical Abstract of the United States*, 114th edition, Washington D.C.: U.S. Government Printing Office
SINC	U.S. Department of Commerce (1994), "State Personal Income, Revised Estimates for 1991-93," *Survey of Current Business*, 74, no. 8, pp. 64-79.
Total state government taxes and local government taxes (used to calculate STAX and LTAX)	U.S. Department of Commerce, *Statistical Abstract of the United States*, 114th edition.
MWAGE	U.S. Department of Labor (August 1993), *Employment and Earnings*, Washington D.C.: Bureau of Labor Statistics
SMEXP	U.S. Department of Commerce (1996), *Analytical Report Series, AR92-2*, "Selected Characteristics of Manufacturing and Wholesale Establishments that Export: 1992," Washington D.C.: Economics and Statistics Administration, Bureau of the Census
RTW	States identified based on information in Hogler (1995)