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7 Comparing Wages, Skills, and Productivity between Domestically and Foreign-Owned Manufacturing Establishments in the United States

Mark E. Doms and J. Bradford Jensen

Over the past 20 years, there has been a several-fold increase in the foreign ownership of U.S. assets. This increase has generated interest, sometimes concern, over the effects of foreign direct investment (FDI) on the economy (see Graham and Krugman 1989; Froot and Stein 1991; McCulloch 1993). The interest has focused on the nature of employment opportunities provided by foreign-owned plants and their contribution to productivity. How do foreign plants compare to domestically owned plants in terms of wages and productivity? If foreign companies can overcome the costs of entering the U.S. market, this might signal that these companies have specific advantages, such as superior product design, greater production efficiency, and advanced marketing skill, relative to their domestically owned competitors. As a result, these foreign companies might outperform domestically owned plants in a number of respects, including productivity and wages. Alternatively, foreign firms might keep most of their high value-added operations in their home countries, with their U.S. operations consisting primarily of lower value-added assembly operations. In this case, foreign-owned establishments in the United States would have relatively low skilled workers, and hence relatively low wages, and not necessarily high productivity. Whichever case predominates, these arguments suggest that establishments owned by multinational corporations, regardless of

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country of ownership, might differ from establishments owned by companies with only domestic operations.

We compare the operating characteristics of foreign-owned and domestically owned plants using detailed data from a large number of U.S. manufacturing establishments. We present evidence on how foreign-owned plants compare to domestically owned plants in terms of employment, wages, productivity, capital intensity, and technology. Previously, researchers have identified differences between foreign-owned plants and domestically owned plants using more aggregated data. Using industry-level data, Howenstine and Zeile (1992) suggest that foreign-owned plants pay higher wages than domestically owned establishments. Further, foreign-owned plants account for a larger share of employment in industries that are capital intensive and skilled labor intensive. This research uses industry-level data, which might hide considerable plant-level heterogeneity within the class of foreign- and domestically owned plants.

The heterogeneity across establishments within industries is substantial. In fact, within-industry variance in wages and productivity exceeds the interindustry variance (for wages, see Davis and Haltiwanger 1991; and for productivity, see Baily, Hulten, and Campbell 1992). Thus, using plant-level data to examine differences across plants within an industry offers advantages over industry-level data. Howenstine and Zeile (1994) use plant- and subindustry-level data from the Annual Survey of Manufactures for 1989 and 1990 and find that foreign-owned plants are larger, more capital intensive, and more productive and pay higher wages than domestically owned plants. Globerman, Ries, and Vertinsky (1994) use Canadian plant-level data and examine the economic performance of foreign affiliates in Canada. They find that foreign affiliate plants are more productive than Canadian-owned plants but that when other plant characteristics (size, capital intensity, share of nonproduction workers, and share of male workers) are controlled for, these differences disappear. Further, Globerman et al. do not find statistically significant differences in performance between foreign-owned Canadian plants by country of ownership.

In this paper, we make use of newly available manufacturing plant-level data for 1987 (approximately 115,000 observations) that allow us to control for industry, size, age, and location and more rigorously test for differences between the operating characteristics of foreign- and domestically owned plants than previous research. Our initial results suggest that even controlling for four-digit industry, state, plant age, and plant size, foreign-owned plants are more productive, rely relatively more on capital than labor, and pay higher wages than domestically owned plants.

To investigate the sources of the observed differences between foreign- and domestically owned plants, we suggest a more useful categorization of ownership. We classify plants based on the nationality of ownership, firm size, and whether U.S.-owned plants belong to firms that have significant assets outside

the United States. This allows us to compare plants of foreign multinationals to plants of U.S. multinationals, plants of large domestically oriented firms, and plants of small U.S. firms. When we compare across these four categories, we find different results. As a group, the U.S. multinationals are the most productive, biggest, and most capital intensive and pay the highest wages. The foreign multinationals follow closely in terms of pay and productivity, followed by large domestically oriented plants.

These results suggest that multinational firms, whether foreign or domestic, have the most productive, most capital intensive, highest paying plants. Thus, comparing foreign-owned plants to all domestic plants is in some ways comparing apples and oranges. Plants owned by multinationals tend to be much bigger than the average plant in the United States and have the characteristics associated with size. Thus, it is true that foreign-owned plants have desirable characteristics relative to the whole of U.S. manufacturing. However, when compared to plants owned by U.S. multinationals, foreign-owned plants do not compare as favorably. Further, the results are consistent with the theory that firm-specific advantages, like productivity, enable firms, whether U.S. or foreign, to overcome the barriers to direct foreign investment.

The rest of the paper is organized as follows. In the next section we describe the 1987 Foreign Direct Investment Survey–Census of Manufactures link and our four firm classifications. Section 7.2 focuses on regression results comparing foreign- and domestically owned establishments for basic operating characteristics of establishments—wages, worker mix, productivity. Section 7.3 extends the analysis of section 7.2 by segregating domestic firms into three categories. Sections 7.4 and 7.5 examine the differences by country of ownership and the use of advanced manufacturing technologies in foreign-owned plants. Section 7.6 concludes.

7.1 Data Description

This section describes the data used in the subsequent analysis. The data set used in this paper is a combination of several establishment-level data sets: the 1987 Census of Manufactures (CM), 1987 Central Administrative Offices and Auxiliary Establishment Survey, 1988 Survey of Manufacturing Technology (SMT), and the 1987 Bureau of Economic Analysis (BEA) Foreign Direct Investment Survey. Through a joint project between BEA and the Bureau of the Census, the 1987 FDI Survey was linked to the 1987 Standard Statistical Establishment List, of which the 1987 CM, 1988 SMT, and Auxiliary Reports are subsets.[1] The CM provides information on shipments, value added, capital, production workers, nonproduction workers, wages, and other types of production information. The CM has this data for approximately 200,000 establish-

1. For more information on the Census-BEA link, see U.S. Department of Commerce (1992).

ments. The SMT provides information on the use of 17 advanced manufacturing technologies for a sample of approximately 10,000 manufacturing establishments.

In this paper we examine how labor productivity, the mix of production workers and nonproduction workers, and the wages of production and nonproduction workers vary according to whether establishments are domestically or foreign owned. Some of these variables require accurate measures of nonproduction workers. One problem that arises is that nonproduction workers involved in production might not be physically located at manufacturing establishments. Instead, some nonproduction workers might be located at manufacturing auxiliary establishments. Manufacturing auxiliaries are those establishments that do not manufacture goods but are the locations for such things as R&D labs, headquarters, and data-processing centers. The measurement problem that arises is that in some firms these auxiliary functions are performed at manufacturing sites while in other firms these functions are performed at auxiliary establishments. If the nonproduction workers located at auxiliaries are excluded, then labor productivity will be biased upward, and nonproduction worker wages will most likely be biased downward since auxiliaries tend to pay above average wages. One reason why the issue of nonproduction workers is of particular interest in this paper is that the mix of workers in manufacturing operations gives some indication of the activities being performed in the country.

We present results with and without adjustments for auxiliary employment.[2] We use data from the 1987 Central Administrative Offices and Auxiliary Establishment Survey to make the auxiliary adjustments. First, for each firm we compute the total number of nonproduction workers and their salaries (each firm might have more than one manufacturing auxiliary) located in manufacturing auxiliaries. Second, we distribute these auxiliary workers and their wages across all manufacturing establishments of the firm. The proportion of auxiliary workers and auxiliary wage bill that an establishment receives depends on the share of the firm's nonproduction workers that establishment has. For instance, if an establishment has 30 percent of the firm's nonproduction workers who are employed at manufacturing establishments, we allocate to that plant 30 percent of the firm's auxiliary workers.

The FDI data that we currently have access to provide the country of ultimate beneficial ownership for the enterprise to which each establishment belongs. In the FDI Survey, "a U.S. affiliate is a U.S. business enterprise that is owned 10 percent or more, directly or indirectly, by a foreign person." Unfortunately, we do not have degree of foreign ownership. Therefore, in the analysis that follows, we treat all foreign-owned establishments equally.

In our analysis, there is significant sample attrition in terms of the number

2. This assuages, to some extent, a criticism of work that uses U.S. establishment-level manufacturing data, namely, that nonproduction workers are being undercounted in multiplant firms.

of establishments and, to a much lesser degree, in terms of manufacturing employment. The 1987 population of manufacturing establishments in the United States was approximately 350,000. About 200,000 of these establishments were mailed a 1987 Census of Manufactures form that requested information on shipments, labor, wages, and capital. The production data for the other 150,000 records, known as administrative records, are imputed and therefore cannot be used in our analysis. Administrative records almost always have fewer than five employees. The next largest source of attrition is the dropping of records with impute flags. An impute flag is set if any one of the following four variables was not reported by the establishment: employment, salaries and wages, materials, and total value of shipments. We dropped all records with impute flags. These records tend to be below average in terms of size. Table 7.1 reports the number of establishments, employment, average employment, and average earnings for the 1987 CM and some basic statistics for our final sample.

We also make use of the 1987 Large Company Survey (ES9100). The ES9100 is mailed to all enterprises with more than 500 employees. We use the ES9100 to identify whether domestically owned firms have significant foreign assets. Firms are asked to report "all assets in foreign countries, and U.S. possessions, regardless of type." Unfortunately, we do not know the nature of these assets. We divide foreign assets by total assets, and if the ratio of foreign to total assets is greater than 10 percent, we classify the firm as having foreign exposure (or as a U.S. multinational, for short).[3] If the ratio is less than 10 percent, we classify the firm as being a large U.S. firm without foreign exposure (or a large domestic firm). Unfortunately, the ES9100 is only mailed to firms with more than 500 employees, so there is a significant number of establishments for which we do not have foreign asset information. We classify firms with fewer than 500 employees as small U.S. firms. Table 7.1 also presents the breakdown of establishments by domestic ownership type.

7.2 U.S.-Owned Establishments Compared to Foreign-Owned Establishments

We begin by comparing the plant characteristics of U.S.-owned establishments to foreign-owned establishments. The discussion of foreign ownership of manufacturing facilities has typically focused on the nature of employment opportunities. Some suggest that foreign-owned plants undertake a set of activities different from that pursued by domestic plants and therefore use a different class of workers, pay lower wages, and are less productive than domestically owned plants. Other theories of FDI suggest that foreign-owned plants

3. Note that this definition differs from BEA's definition of a "parent" multinational. BEA defines a parent as any U.S. enterprise that owns 10 percent or more of a foreign entity. We do not observe the nature of the foreign assets in the ES9100. For more analysis of the sensitivity of this definition of U.S. "multinational" see Doms and Jensen (1997).

Table 7.1 **Basic Sample Statistics: Comparison between Samples and Populations**

Sample or Population	Number of Establishments	Total Employment	Average Employment per Establishment	Average Annual Earnings[a]
1987 CM manufacturing population	358,941	17,716,649	49.4	19.08
Total sample	115,139	12,420,340	107.9	21.44
Foreign population	7,077	1,180,686	168.8	26.55
Foreign sample	4,463	853,338	191.2	24.95
Domestic population	351,864	16,535,963	47.0	18.92
Domestic sample	110,676	11,567,002	104.5	21.30
Small domestic	87,030	3,902,625	44.8	20.78
Large domestic	15,920	4,229,001	265.6	21.87
U.S. multinational	7,726	3,435,376	444.6	25.90

[a]In thousands of dollars per employee.

belong to firms that have specific advantages that enable them to invest in new markets. These advantages include superior product design, greater production efficiency, and advanced marketing skill. We investigate these claims by comparing measures of average annual wages, skill mix, capital-labor ratios, and productivity between foreign-owned establishments and domestically owned establishments. Table 7.2 provides more precise definitions of the operating characteristics that we use in our comparisons.

In table 7.1 we saw that foreign-owned plants are larger than domestically owned plants. Table 7.3 reports plant means and standard deviations for the operating characteristics of each class of plant. We see that foreign-owned plants do differ from domestically owned plants. Foreign-owned plants pay higher wages to both production workers and nonproduction workers. Production workers in domestic plants average about $18,760 in earnings in 1987, while production workers in foreign plants average about $22,290 in 1987.

The difference in earnings of nonproduction workers is not as large. Without taking auxiliary employment into account, foreign plants pay nonproduction workers about $32,100 a year and domestically owned plants pay about $30,370. When we adjust for nonproduction worker employment at auxiliary establishments, the difference between domestically owned and foreign-owned establishments declines. What is the source of these earnings differentials?

One possibility is differences in human capital. Beyond paying higher wages, foreign-owned establishments are more nonproduction worker intensive than domestic plants, whether auxiliary employment is included or not. Foreign-owned plants use a higher share of nonproduction, or skilled, workers. This in itself would not explain the wage differential for the different categories of workers. But if, in addition to using more nonproduction workers,

Table 7.2 Variable Definitions

Variable Name	Definition
	A. Dependent Variables
Production worker wages	Annual salaries (thousand $) for production workers/ number of production workers
Nonproduction worker wages (1)	Annual salaries (thousand $) for nonproduction workers/ number of nonproduction workers
Nonproduction worker wages (2)	Same as Nonproduction worker wages (1) except with an adjustment made for employment and payroll in auxiliaries
Production workers/Total employment (1)	Number of production workers/total employment
Production workers/Total employment (2)	Number of production workers/total employment, where total employment is adjusted for auxiliary employment
Capital/Employment (1)	Book value of machinery and building assets (thousand $)/total employment
Capital/Employment (2)	Book value of machinery and building assets (thousand $)/total employment, where total employment is adjusted for auxiliary employment
Value added/Employment (1)	Value added (thousand $)/total employment
Value added/Employment (2)	Value added (thousand $)/total employment, where total employment is adjusted for auxiliary employment
TFP-R	Natural logarithm of total factor productivity calculated from using the residual from a value-added Cobb-Douglas production function[a]
TFP-FS	Natural logarithm of total factor productivity calculated using a factor share method[b]
	B. Independent Variables
Plant size	Categorical variable band on total plant employment (TE): Size class 1: $1 \leq TE < 50$ Size class 2: $50 \leq TE < 100$ Size class 3: $100 \leq TE < 250$ Size class 4: $250 \leq TE < 500$ Size class 5: $500 \leq TE < 1{,}000$ Size class 6: $1{,}000 \leq TE < 2{,}500$ Size class 7: $2{,}500 \leq TE$ (omitted category)
Plant age	Categorical variable based on year of first CM appearance: Age class 63: First appearance in census is 1963 Age class 67: First appearance in census is 1967 Age class 72: First appearance in census is 1972 Age class 77: First appearance in census is 1977 Age class 82: First appearance in census is 1982 Age class 87: First appearance in census is 1987 (omitted category)
Plant industry	Dummy variables representing four-digit industry

(continued)

Table 7.2 (continued)

Variable Name	Definition
	B. Independent Variables
Plant location	Dummy variable representing state in which plant is located

[a]The residual measure is calculated using a Cobb-Douglas specification with capital, labor, and materials (including parts, fuels, and services) included as inputs. The regression coefficients are from four-digit industry regressions.

[b]The factor share method is calculated using the median factor shares of capital, labor, and materials (including parts, fuels, and services) from the four-digit industry. This method is similar to that used in Baily et al. (1992).

Table 7.3 **Variable Means by Foreign and Domestic Ownership**

Variable	Domestic	Foreign
Production worker wages (thousand $)	18.76	22.29
	(8.13)	(8.57)
Nonproduction worker wages (1) (thousand $)	30.37	32.10
	(15.74)	(12.44)
Nonproduction worker wages (2) (thousand $)	32.49	32.94
	(11.06)	(10.58)
Production workers/Total employment (1)	0.73	0.68
	(0.19)	(0.21)
Production workers/Total employment (2)	0.72	0.63
	(0.20)	(0.22)
Capital/Employment (1) (thousand $)	39.34	103.10
	(91.1)	(218.40)
Capital/Employment (2) (thousand $)	36.84	91.83
	(75.9)	(193.49)
Value added/Employment (1) (thousand $)	56.50	109.48
	(77.9)	(160.35)
Value added/Employment (2) (thousand $)	53.75	96.55
	(66.73)	(137.77)
TRP-R	.02	.06
	(.29)	(.28)
TFP-FS	.04	.06
	(.36)	(.36)

Note: See table 7.2 for variable definitions. Numbers in parentheses are standard deviations.

foreign-owned plants also used more skilled or more educated workers within a category, this might explain the observed higher wages within categories. Supporting this claim is Troske (1994), who finds that worker characteristics account for a significant portion of observed cross-plant wage differentials in a sample of plants from the 1987 CM. Unfortunately, we do not have any additional information on the workers in our establishments. Another possibility is

that foreign-owned plants pay a wage premium to deter unionization. Although we cannot test this hypothesis, we include controls for state and industry.

Foreign-owned plants are more capital intensive and more productive. Foreign-owned plants average approximately $103,000 in capital assets per employee (without adjusting for auxiliary employment), while domestic plants average about $40,000 in capital assets per employee. After adjusting for auxiliary employment, the differential is still quite large, though reduced. Foreign-owned plants have higher labor productivity (which might be due to the higher capital-labor ratio at foreign plants) and higher total factor productivity (TFP), which takes into account the higher capital-labor ratio.

These results suggest that foreign plants differ significantly from domestic plants. However, other studies, such as Howenstine and Zeile (1992, 1994), show that foreign-owned plants are concentrated in industries that are more capital intensive, pay higher wages, and are more productive. Thus, the observed differences described above could be due to industry composition effects. Column (1) of table 7.4 presents regression results comparing foreign-owned plants to domestically owned plants without industry, location, age, or size controls.[4] The regression coefficients in column (1) of table 7.4 tell the same story as the means reported in table 7.3. Foreign-owned plants are significantly more capital intensive, are more productive, and pay higher wages, but this may be due to composition effects. To control for possible composition effects, we include controls for plant size, industry, plant age, and plant location.[5] In column (2), we present regression results that control for these other plant characteristics. When we include controls for plant size, industry (four-digit), plant age, and plant location (state), the observed differences between foreign-owned and domestically owned plants decrease but persist.

The equations controlling for size, age, industry, and location still show that foreign-owned plants pay about 7 percent more to production workers and 1 to 2 percent more to nonproduction workers. Foreign-owned plants are about 30 percent more capital intensive and have about 20 percent higher labor productivity than domestically owned plants of the same age and size, in the same location and industry. In terms of TFP, foreign-owned plants are about 2 to 4 percent more productive. Further, foreign-owned plants use fewer production workers than domestically owned plants.

4. The regression coefficients reported in col. (1) of table 7.4 are from a regression of the dependent variable on an intercept term and a dummy variable that is one if the establishment is foreign owned. These results represent the mean differences between foreign-owned plants and domestically owned plants. See the appendix for a more detailed description of the specification.

5. The regression coefficients reported in col. (2) of table 7.4 are the coefficients from a dummy variable representing whether a plant is foreign owned. The specification also includes controls for plant size, plant age, plant industry, and plant location. We include as controls seven plant-size dummy variables based on employment at the plant. We choose this form of controls as it allows more flexibility than imposing a linear restriction by including a continuous measure of plant employment. We control for plant age by including a categorical variable representing the first CM in which the plant appears. We also include dummy variables for four-digit industry and state. See the appendix for a more detailed description of the specification.

Table 7.4 **Differences between Domestically and Foreign-Owned Establishments**

Dependent Variable	Foreign Owned No Controls (1)	Foreign Owned With Controls (2)	Foreign Owned Controls + K/L[a] (3)
log Production worker wages	.190	.073	.038
	(.007)	(.006)	(.006)
log Nonproduction worker wages (1)	.104	.012	−.020
	(.008)	(.008)	(.008)
log Nonproduction worker wages (2)	.130	.026	−.005
	(.008)	(.008)	(.008)
Production workers/Total employment (1)	−.052	−.020	−.018
	(.003)	(.003)	(.003)
Production workers/Total employment (2)	−.084	−.031	−.029
	(.003)	(.003)	(.003)
log Capital/Employment (1)	.941	.332	
	(.018)	(.015)	
log Capital/Employment (2)	.877	.308	
	(.017)	(.014)	
log Value added/Employment (1)	.537	.211	.134
	(.010)	(.009)	(.008)
log Value added/Employment (2)	.473	.186	.118
	(.010)	(.009)	(.008)
TFP-R	.041	.037	
	(.004)	(.005)	
TFP-FS	.024	.023	
	(.006)	(.006)	

Note: The numbers are regression coefficients from linear models that do and do not control for establishment size, four-digit industry, plant age, and state. The omitted group is domestically owned establishments. Number of observations is approximately 115,000. Numbers in parentheses are standard errors.

[a]K/L = capital-labor ratio (capital intensity).

Following Globerman et al. (1994), we also include the capital-labor ratio as a control variable. Globerman et al. find that when they include size, capital intensity, and percentage of males in the plant,[6] the observable labor productivity difference between Canadian and foreign-owned plants becomes statistically insignificant. We report the results of including capital intensity among the controls in column (3) of table 7.4.[7] The differences are reduced, but the differential for productivity is still positive and statistically significant. Including the capital-labor ratio also reduces the observed wage premium to produc-

6. We cannot replicate the percentage of males in the plant as we do not know the composition of workers by gender in the plant.

7. We do not include the capital-labor ratio in the TFP regressions as the capital and labor inputs are already controlled for in a less restrictive manner.

tion workers, but it is still positive and statistically significant at about 3.8 percent.

These results suggest that the differences between foreign- and domestically owned plants are partially the result of industry, size, age, and location effects. Including controls for these effects reduces the observed differences between domestically and foreign-owned plants. However, the differences do not disappear. Even after controlling for these effects, foreign-owned plants still have superior operating characteristics relative to domestic plants.

The results suggest that some of the fears expressed over FDI are unwarranted. Foreign-owned plants are more capital intensive, are more productive, pay higher wages, and use a higher proportion of nonproduction workers than the average U.S.-owned plant. Further, although some of the differences between foreign-owned and domestically owned plants are the result of industry composition effects, foreign-owned plants still have superior operating characteristics compared to domestically owned plants controlling for industry, state, age, and size. While these results are suggestive of the impact of foreign-owned plants on the domestic economy, the results do not speak to the potential sources of the different operating characteristics. In section 7.3 we further decompose the plants by ownership type to investigate potential sources of the differences in operating characteristics.

7.3 Foreign-Owned Establishments Compared to U.S. Multinational Establishments

In section 7.2 we compared foreign-owned plants to all domestically owned plants. For some purposes, this is the relevant comparison. However, in trying to uncover the sources of these differences, a more detailed comparison might prove fruitful. According to theories of multinational investment, firms that engage in FDI have some firm-specific advantages that allow them to overcome the hurdles of FDI. Thus, we might expect that plants owned by foreign multinational corporations would be more productive than the average domestically owned plant. However, if this theory of FDI is correct, we would expect to find that plants owned by U.S. multinational corporations would also have these superior characteristics. To investigate this possibility, we further divide our sample and compare plants owned by U.S. multinationals to foreign-owned plants.

We divide plants into four categories: (1) plants owned by foreign companies, (2) plants owned by U.S. firms with fewer than 500 employees, (3) plants owned by U.S. firms with more than 500 employees without significant foreign assets, and (4) plants owned by U.S. firms with more than 500 employees and foreign assets comprising more than 10 percent of total assets. For ease of exposition, we call the first group "foreign-owned plants," the second group "small U.S. firm plants," the third group "large domestic firm plants," and the fourth group "U.S. multinationals."

Table 7.5 **Differences between Foreign-Owned Establishments and Domestic Establishments by Domestic Plant Type**

	Plant Type		
Dependent Variable	Foreign Owned	Large Domestic Firm	Small U.S. Firm
log Production worker wages	−.029	−.069	−.152
	(.007)	(.005)	(.005)
log Nonproduction worker wages (1)	−.004	−.025	−.020
	(.010)	(.007)	(.007)
log Nonproduction worker wages (2)	−.039	−.050	−.095
	(.010)	(.007)	(.007)
Production workers/Total employment (1)	−.021	.008	−.006
	(.003)	(.002)	(.002)
Production workers/Total employment (2)	.009	.036	.056
	(.003)	(.003)	(.002)
log Capital/Employment (1)	−.062	−.212	−.605
	(.017)	(.013)	(.012)
log Capital/Employment (2)	−.006	−.156	−.488
	(.017)	(.013)	(.012)
log Value added/Employment (1)	−.082	−.166	−.446
	(.010)	(.008)	(.007)
log Value added/Employment (2)	−.026	−.110	−.329
	(.010)	(.007)	(.007)
TFP-R	−.036	−.042	−.111
	(.006)	(.004)	(.004)
TFP-FS	−.024	−.024	−.073
	(.007)	(.005)	(.005)

Note: All numbers are regression coefficients from linear models that control for establishment size, four-digit industry, plant age, and state. Number of observations is approximately 115,000. Omitted plant type is U.S. multinational. Numbers in parentheses are standard errors.

In table 7.5 we present regressions comparing plant characteristics for the four plant types (plants of U.S. multinationals is the omitted category). Plants of U.S. multinationals pay the highest wages to both production and nonproduction workers. Production workers are paid 2.9 percent less at foreign-owned plants, 6.9 percent less at large domestic firm plants, and 15.2 percent less at small U.S. firm plants relative to U.S. multinationals. Nonproduction workers at U.S. multinationals do not enjoy as large a pay premium as production workers; the differential ranges from 0.4 percent lower at foreign-owned plants to 2.0 percent lower at small U.S. firm plants (when auxiliary employment is not included), and 3.9 percent lower at foreign-owned plants to 9.5 percent lower for small U.S. firm plants (when auxiliary employment is included).[8]

8. The nonproduction wage differential increases when auxiliary employment is included because large firms tend to have more auxiliary employment and auxiliaries have above average wages.

Plants owned by U.S. multinationals are also the most capital intensive. The capital-labor ratio of foreign-owned plants is 6.2 percent lower than that of U.S. multinational plants. Plants of large domestic firms have a 21.2 percent lower capital-labor ratio, and plants of small U.S. firms have a 60.5 percent lower capital-labor ratio. When employment at auxiliary establishments is included in total employment, the results change. With auxiliary employment included, foreign-owned plants are not statistically different from plants of U.S. multinationals in terms of capital-labor ratios. Plants of large and small U.S. firms still have lower capital-labor ratios, although the differences have decreased to 15.6 percent lower and 48.8 percent lower, respectively. The addition of auxiliary employment increases employment for plants of U.S. multinationals the most. Thus, the capital-labor ratio at these plants decreases relative to the other plant classes when auxiliary employment is included.

In terms of labor productivity and TFP, plants of U.S. multinationals are the most productive. Labor productivity (without adjusting for auxiliary employment) is 8.2 percent lower at foreign-owned plants than at plants of U.S. multinationals. Labor productivity is even lower at plants of large domestic firms, 16.6 percent lower, and lower still at plants of small U.S. firms, 44.6 percent lower. When auxiliary employment is included, the differentials decrease but are still significant. For TFP, the story is much the same. Foreign-owned firms have 3.6 percent lower TFP than plants of U.S. multinationals. For plants of domestic firms, plants of large firms have 4.2 percent lower TFP and plants of small firms have 11.1 percent lower TFP. Again, when auxiliary employment is included, the productivity differentials decrease but are still significant.

These results, and the results from section 7.2, suggest that while foreign-owned plants do indeed have different, and in many ways superior, characteristics compared to the average U.S.-owned plant, there is considerable heterogeneity within the class of U.S.-owned plants. When we divide U.S.-owned plants and look at plants of U.S. multinationals, we see that they compare favorably with foreign-owned plants and with all other domestically owned plants. Further, the results suggest that the plants of multinationals, whether U.S. or foreign, are the most alike and possess superior operating characteristics. These results suggest that plants of multinational corporations are the most productive, are the most capital intensive, and pay the highest wages. This finding is consistent with the notion that multinationals possess firm-specific advantages, whether superior product design, greater production efficiency, or advanced marketing skill, that enable them to overcome the barriers to FDI.

7.4 Comparing Plant Characteristics Based on Country of Ownership

We also break out the plants by country of ownership. Vernon (1993) suggests that in the past researchers have found it useful to distinguish multinational enterprises according to their national bases. He further suggests that this dimension will become less useful in the future. We examine differences in the operating characteristics of foreign-owned plants by country of ownership.

Table 7.6 presents the wage, labor mix, capital-labor ratio, and productivity results. One interesting feature is that no country compares favorably with plants owned by U.S. multinationals. Further, plants owned by Japanese firms do not seem to perform as well as might be expected based on popular perceptions. Plants owned by Japanese firms have the lowest labor productivity of foreign-owned plants and the lowest and second lowest measured TFP.[9] These data are from 1987. Much of the Japanese investment in the United States was done in the early 1980s. While we control for plant age, using the year of the first CM that the plant appears in as a proxy for age, this might not adequately control for age effects.[10] Thus, it is possible that the low productivity numbers for Japan reflect start-up costs. In terms of labor market characteristics, Japan and Australia are again relatively poor performers. Both pay their production workers less than other foreign-owned plants. While plants owned by multinationals from these countries exhibit lower productivity and production worker wages relative to plants owned by other multinationals, they compare favorably to nonmultinational domestically owned plants.

7.5 Technology Use at Foreign- and Domestically Owned Plants

We examine the use of advanced technologies at foreign-owned and domestically owned plants. One potential advantage of FDI is technology transfer. If foreign plants are more technologically advanced than domestic plants, these plants might produce technological spillovers. We use data from the Survey of Manufacturing Technology to examine technology use in domestically and foreign-owned plants. The SMT provides information on the use of 17 advanced manufacturing technologies for a sample of approximately 10,000 manufacturing plants.[11] We use the number of technologies reported as present in a manufacturing plant as a measure of the technology intensity at that plant.

Table 7.7 presents results for regressions with the number of technologies as the dependent variable comparing domestically owned and foreign-owned establishments. On average, foreign plants do use more technologies than domestic plants. However, when we control for industry, location, plant size, and plant age, the difference is reduced and marginally significant. When we control for the capital-labor ratio at the plant, the difference is negligible. Table 7.8 presents results for the comparison with plants owned by U.S. multinationals. We see that plants owned by U.S. multinationals are the most technology-

9. The other country whose plants seem to perform relatively poorly is Australia.

10. We use the first census a plant appears in to proxy for the age of the plant. This identifies a plant birth to prior to one of six five-year censuses: birth prior to the 1963, 1967, 1972, 1977, 1982, or 1987 CM. A problem that arises with this definition is that it pertains to new facilities, commonly referred to as "greenfield" plants. The definition does not measure how long the facility has been operated by a particular firm. Unfortunately, we do not know how long a plant has been owned by a foreign firm.

11. For more information on the design and coverage of the SMT, see Dunne and Schmitz (1992).

Table 7.6 **Cross-Country Comparisons**

Establishment Ownership	log Production Worker Wages	log Non-production Worker Wages (1)	log Non-production Worker Wages (2)	Production Workers/ Total Employment (1)	Production Workers/ Total Employment (2)	log Capital/ Labor (1)	log Capital/ Labor (2)	log Value Added/ Employee (1)	log Value Added/ Employee (2)	TFP-R	TFP-FS
Australia	−.157	.094	.007	−.029	.013	.077	.164	−.192	−.106	−.068	−.095
	(.038)	(.053)	(.052)	(.018)	(.018)	(.095)	(.094)	(.056)	(.056)	(.030)	(.038)
Canada	−.036	−.025	−.067	−.027	.008	−.036	.033	−.059	.010	−.013	−.017
	(.015)	(.021)	(.020)	(.007)	(.007)	(.038)	(.037)	(.022)	(.022)	(.012)	(.015)
France	−.054	−.001	−.081	−.022	.020	−.219	−.136	−.121	−.037	−.015	.021
	(.020)	(.030)	(.029)	(.010)	(.010)	(.051)	(.051)	(.030)	(.030)	(.016)	(.020)
Germany	.011	.046	.006	−.026	−.004	.130	.173	−.015	.029	−.032	−.035
	(.018)	(.025)	(.025)	(.009)	(.009)	(.046)	(.046)	(.027)	(.027)	(.015)	(.018)
Japan	−.058	−.028	−.039	.018	.059	.001	.080	−.207	−.177	−.102	−.078
	(.019)	(.027)	(.026)	(.009)	(.009)	(.047)	(.047)	(.028)	(.028)	(.015)	(.019)
Netherlands	−.047	−.027	.032	.016	.002	.077	.051	.049	.024	−.020	−.019
	(.024)	(.033)	(.032)	(.011)	(.011)	(.059)	(.059)	(.035)	(.035)	(.019)	(.023)
Other	.016	.049	−.009	−.006	.035	−.056	.021	−.101	−.025	−.041	−.042
	(.015)	(.022)	(.021)	(.007)	(.007)	(.039)	(.039)	(.023)	(.023)	(.012)	(.015)
Sweden	.041	−.008	−.039	−.055	−.020	−.117	−.048	−.154	−.084	−.025	−.027
	(.030)	(.043)	(.042)	(.014)	(.015)	(.076)	(.076)	(.045)	(.045)	(.024)	(.030)
Switzerland	−.028	.003	.004	−.006	−.005	.058	.031	.064	.038	−.004	.016
	(.024)	(.033)	(.032)	(.011)	(.011)	(.059)	(.059)	(.035)	(.035)	(.019)	(.023)
United Kingdom	−.042	−.032	−.071	−.042	−.007	−.172	−.114	−.097	−.038	−.039	−.013
	(.011)	(.016)	(.015)	(.005)	(.005)	(.027)	(.027)	(.016)	(.016)	(.009)	(.011)
U.S. small firm	−.151	−.020	−.095	−.007	.056	−.607	−.489	−.447	−.329	−.112	−.073
	(.005)	(.007)	(.007)	(.002)	(.002)	(.012)	(.012)	(.007)	(.007)	(.004)	(.005)
U.S. large domestic firm	−.069	−.025	−.051	.008	.036	−.214	−.157	−.167	−.110	−.042	−.024
	(.005)	(.007)	(.007)	(.002)	(.002)	(.013)	(.013)	(.008)	(.008)	(.004)	(.005)

Note: All coefficients are relative to U.S. multinational firms. All numbers are regression coefficients from linear models that control for establishment size, four-digit industry, plant age, and state. Number of observations is approximately 15,000. Numbers in parentheses are standard errors.

Table 7.7 **Differences between Domestically and Foreign-Owned Establishments**

Dependent Variable	Foreign Owned No Controls	Foreign Owned With Controls	Foreign Owned Controls + K/L[a]
Number of technologies	.930	.268	.055
	(.189)	(.152)	(.149)

Note: The numbers are regression coefficients from linear models that do and do not control for establishment size, four-digit industry, plant age, and state. The omitted group is domestically owned establishments. Number of observations is approximately 6,800. Numbers in parentheses are standard errors.

[a]K/L = capital-labor ratio (capital intensity).

Table 7.8 **Differences between Foreign-Owned Establishments and Domestic Establishments by Domestic Plant Type**

	Plant Type		
Dependent Variable	Foreign Owned	Large Domestic Firm	Small U.S. Firm
Number of technologies	−.229	−.309	−1.03
	(.165)	(.106)	(.109)

Note: All numbers are regression coefficients from linear models that control for establishment size, four-digit industry, plant age, and state. Number of observations is approximately 6,800. Omitted plant type is U.S. multinational. Numbers in parentheses are standard errors.

intensive plants. Foreign-owned plants use fewer technologies than plants owned by U.S. multinationals. Plants owned by large domestic firms also use fewer technologies than plants of U.S. multinationals, and plants of small U.S. firms use even fewer technologies.

These results suggest that foreign-owned plants are more technology intensive than the average domestically owned plant and, thus, offer the possibility of more technology transfer than the average U.S. plant. The results are also consistent with the notion that multinationals, whether foreign or domestic, use the most technology-intensive means of production.[12]

7.6 Conclusions

The results presented in this paper show that foreign-owned manufacturing plants in the United States in 1987 have superior operating characteristics rela-

12. Using the SMT subsample, we reran all of the regressions reported in tables 7.4 and 7.5, both with and without the number of technologies as a control variable. The results do not change, in general, even with the inclusion of the technology control variable.

tive to the average U.S.-owned plant. Foreign-owned plants pay higher wages, are more capital intensive, are more technology intensive, and are more productive than the average U.S. plant. There do not appear to be large differences among foreign-owned plants based on country of ownership.

This being said, the results also suggest that it is not the fact that the plants are foreign owned that is important to plant operating characteristics, rather it is the fact that the plants are owned by multinational corporations that seems important. Plants owned by U.S. multinationals exhibit the best operating characteristics, followed by plants of foreign multinationals. The combined class of multinationals is significantly different from both plants owned by large domestically oriented U.S. firms and plants owned by small U.S. firms. These results are consistent with the notion that multinationals possess some firm-specific advantages that enable them to overcome the barriers of FDI.

Appendix

In this appendix we present a more detailed description of the specifications we estimate in table 7.4. We use the same general set of specifications throughout the paper. Below, we also present more of the coefficient estimates from the specifications in table 7.4.

For column (1)—no controls—in table 7.4, we estimate

$$Y_i = \alpha + \beta \text{ Foreign owned}_i + \varepsilon_i,$$

where Y_i is the dependent variable listed in the table. Table 7A.1 contains the full set of regression coefficients.

For column (2)—with controls—in table 7.4, we estimate

$$Y_i = \alpha + \beta \text{ Foreign owned}_i + \Gamma X_i + \varepsilon_i,$$

where X_i includes dummy variables for plant size, plant age, state, and industry (see panel B of table 7.2). Table 7A.2 contains an extended set of regression coefficients for this specification. (We suppress the industry and state results to conserve space and to avoid disclosure issues.)

For column (3)—with controls and capital-labor ratio—in table 7.4, we estimate

$$Y_i = \alpha + \beta \text{ Foreign owned}_i + \delta \text{ Capital/Labor}_i + \Gamma X_i + \varepsilon_i,$$

where X_i includes dummy variables for plant size, plant age, state, and industry (see panel B of table 7.2). Table 7A.3 contains an extended set of regression coefficients for this specification.

Table 7A.1 **Differences between Domestically and Foreign-Owned Establishments**

Independent Variables	log Production Worker Wages	log Non-production Worker Wages (1)	log Non-production Worker Wages (2)	Production Workers/ Total Employment (1)	Production Workers/ Total Employment (2)	log Capital/ Labor (1)	l Cap La (
R^2	.007	.001	.002	.003	.007	.024	.(
Intercept	2.843	3.290	3.306	.732	.718	3.009	2.9
	(.001)	(.002)	(.002)	(.001)	(.001)	(.004)	(.(
Foreign owned	.190	.104	.130	−.052	−.084	.941	.8
	(.007)	(.008)	(.008)	(.003)	(.003)	(.018)	(.(

Note: The numbers are regression coefficients from linear models that include an intercept and a foreign-owned dummy. Numbers of observations is a

Table 7A.2 **Differences between Domestically and Foreign-Owned Establishments**

Independent Variables	log Production Worker Wages	log Non-production Worker Wages (1)	log Non-production Worker Wages (2)	Production Workers/ Total Employment (1)	Production Workers/ Total Employment (2)	log Capital/ Labor (1)	Ca L
R^2	.317	.144	.150	.245	.260	.407	
Foreign owned	.073	.012	.026	−.020	−.031	.332	
	(.006)	(.008)	(.008)	(.003)	(.003)	(.015)	(
Size class 1 (1–49)	−.482	−.306	−.303	.040	.087	−.983	−
	(.021)	(.029)	(.028)	(.010)	(.010)	(.053)	(
Size class 2 (50–99)	−.472	−.188	−.180	.042	.083	−.841	−
	(.021)	(.029)	(.028)	(.010)	(.010)	(.053)	(
Size class 3 (100–249)	−.412	−.179	−.162	.042	.075	−.703	−
	(.021)	(.029)	(.028)	(.010)	(.010)	(.053)	(
Size class 4 (250–499)	−.348	−.160	−.134	.046	.066	−.587	−
	(.021)	(.029)	(.028)	(.010)	(.010)	(.054)	(
Size class 5 (500–999)	−.263	−.138	−.102	.045	.056	−.405	−
	(.021)	(.030)	(.029)	(.010)	(.011)	(.055)	(
Size class 6 (1,000–2,499)	−.162	−.061	−.044	.023	.029	−.274	−
	(.023)	(.032)	(.031)	(.010)	(.011)	(.058)	(
First census 63	.112	.128	.126	−.022	−.023	.184	
	(.003)	(.005)	(.005)	(.002)	(.002)	(.009)	(
First census 67	.093	.110	.113	−.012	−.014	.166	
	(.005)	(.007)	(.006)	(.002)	(.002)	(.012)	(
First census 72	.075	.105	.105	−.008	−.009	.135	
	(.004)	(.006)	(.006)	(.002)	(.001)	(.010)	(
First census 77	.049	.075	.072	−.005	−.005	.108	
	(.004)	(.005)	(.005)	(.002)	(.002)	(.009)	(
First census 82	.028	.038	.036	−.002	−.001	.066	
	(.003)	(.005)	(.005)	(.002)	(.002)	(.008)	(

Note: The numbers are regression coefficients from linear models that control for establishment size (size class 7 digit industry (results not reported), and state (results not reported). Numbers of observations is approximately 11

Table 7A.3 **Differences between Domestically and Foreign-Owned Establishments**

Independent Variables	log Production Worker Wages	log Non-production Worker Wages (1)	log Non-production Worker Wages (2)	Production Workers/ Total Employment (1)	Production Workers/ Total Employment (2)	log Value Added/ Employee (1)	log Value Added/ Employee (2)	TFP-R	TFP-FS
R^2	.367	.168	.177	.246	.261	.421	.391	.024	.178
Foreign owned	.038	−.020	−.005	−.018	−.029	.134	.118	.038	.074
	(.006)	(.008)	(.008)	(.003)	(.003)	(.008)	(.008)	(.005)	(.005)
log Capital/Labor (1)	.107	.094		−.009		.231		−.001	−.152
	(.001)	(.002)		(.001)		(.002)		(.001)	(.001)
log Capital/Labor (2)			.096		−.010		.223		
			(.001)		(.001)		(.002)		
Size class 1 (1–49)	−.377	−.213	−.217	.032	.079	−.280	−.225	−.089	−.242
	(.020)	(.028)	(.002)	(.010)	(.010)	(.029)	(.029)	(.017)	(.019)
Size class 2 (50–99)	−.382	−.109	−.107	.035	.076	−.261	−.212	−.081	−.215
	(.020)	(.028)	(.028)	(.010)	(.010)	(.029)	(.029)	(.017)	(.019)
Size class 3 (100–249)	−.337	−.113	−.100	.037	.069	−.218	−.182	−.064	−.179
	(.020)	(.028)	(.028)	(.010)	(.010)	(.029)	(.029)	(.017)	(.019)
Size class 4 (250–499)	−.285	−.105	−.081	.041	.060	−.153	−.132	−.038	−.123
	(.020)	(.029)	(.028)	(.010)	(.010)	(.029)	(.029)	(.017)	(.019)
Size class 5 (500–999)	−.220	−.100	−.065	.041	.052	−.088	−.080	−.017	−.079
	(.021)	(.030)	(.029)	(.010)	(.010)	(.030)	(.030)	(.017)	(.020)
Size class 6 (1,000–2,499)	−.133	−.036	−.019	.021	.027	−.044	−.043	−.001	−.049
	(.022)	(.031)	(.031)	(.011)	(.011)	(.032)	(.031)	(.018)	(.021)
First census 63	.093	.110	.108	−.021	−.021	−.018	−.016	−.012	−.018
	(.003)	(.005)	(.005)	(.002)	(.002)	(.005)	(.005)	(.003)	(.003)
First census 67	.075	.094	.098	−.011	−.012	.003	.003	.000	−.005
	(.004)	(.007)	(.006)	(.002)	(.002)	(.006)	(.006)	(.004)	(.004)
First census 72	.061	.093	.092	−.007	−.008	−.005	−.004	−.004	−.007
	(.004)	(.006)	(.006)	(.002)	(.002)	(.005)	(.005)	(.003)	(.004)
First census 77	.038	.065	.062	−.005	−.004	−.007	−.005	−.001	−.007
	(.004)	(.005)	(.005)	(.002)	(.002)	(.005)	(.005)	(.003)	(.003)
First census 82	.021	.032	.029	−.002	−.000	−.005	−.002	−.000	−.003
	(.003)	(.005)	(.004)	(.002)	(.002)	(.005)	(.005)	(.003)	(.003)

Note: The numbers are regression coefficients from linear models that control for establishment size (size class 7 omitted), plant age (census class 87 omitted), four-digit industry (results not reported), and state (results not reported). Number of observations is approximately 115,000. Numbers in parentheses are standard errors.

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Comment Keith Head

Doms and Jensen ask and answer the question, How do foreign plants compare to domestically owned plants in terms of wages and productivity? Their answer can be summarized as follows. Workers at foreign-owned manufacturing plants generate about 50 percent more value added and receive 20 percent higher wages than employees at the average domestically owned plant. However, most of the premiums in productivity and wages can be explained by observable

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differences in the attributes of the plants, rather than in the form of a pure "ownership" effect. Furthermore, the unexplained part of the premiums does not appear to derive from their "foreignness"; rather, it appears that plants owned by multinational corporations pay more and have higher productivity. In fact, employees at plants owned by large U.S.-owned multinationals receive the highest average wages. Doms and Jensen have provided a clear and convincing answer to the question they posed; however, they do not explore the policy implications of their work. In particular, do their results justify policies designed to attract foreign direct investment (FDI)?

In 1994 the state of Alabama helped convince Mercedes Benz to locate a plant there by offering an incentive package of approximately $230 million. This topped a previous record set by Kentucky when its $147 million package drew an auto plant from Toyota.[1] For initial employment levels of 1,500 and 3,000, respectively, these plants cost the host governments around $150,000 and $50,000 per job. What can Doms and Jensen's results tell us about the return on these outlays? To start, let us assume that the only benefit to the host economy is the higher incomes received by the workers employed at these plants. The present value, assuming a discount rate of 0.05, of a 20 percent wage premium over the sample average $25,000 annual earnings in manufacturing is $100,000. This suggests that the Kentucky bid might have been reasonable but Alabama overpaid.

The 20 percent wage premium is the raw increase to wages without any controls. After accounting for the industry, state, plant size and age, and capital intensity of foreign-owned plants, the wage premium falls to 4 percent, or a present value of $20,000. At this premium level, neither incentive package appears to make sense. Which number should the state governor use? It might be argued that the exact mechanisms underlying the wage premium do not matter—just the overall result. However, the governor could allocate the funds to alternative projects designed to improve the attributes of existing firms. For instance, some form of general investment subsidy could be used to increase their size and capital intensity. If such opportunities exist, then perhaps the governor should consider only the premium attributable to foreign multinational management.

The simple calculations above made two key assumptions that should now be critiqued. First, I assumed that the wage premium constituted a welfare gain for the host economy. Second, by focusing solely on the jobs at the particular investment, we omit the potential for external effects. Namely, the foreign plant may generate spillovers that benefit other local manufacturers. These spillovers might induce subsequent investment by the same firm or its suppliers. These factors could make us revise our estimates of the benefits of FDI upward if the wage premium does not represent a welfare improvement or downward if there are substantial positive spillovers.

1. More details on both incentive packages can be found in the *New York Times*, 4 October 1994.

What causes foreign-owned plants to pay higher average wages? To answer this question it is useful to consider some alternative hypotheses. First, suppose foreign-owned plants employ different, but technically equal, management methods. Then we would expect no difference in productivity and would interpret a wage premium as evidence of a compensating differential to induce domestic workers to accept foreign management. Alternatively, suppose workers are indifferent as to ownership but foreign firms really do possess superior techniques. Then we would expect a productivity premium, but wages would be determined by the alternative opportunity of working for a domestic firm. The finding of both wage and productivity premiums might argue for a superior technology that imposes costs on the workers for which they must be compensated.

The high wage premium paid by U.S. multinational-owned plants suggests that the compensation does *not* reflect aversion to foreign control per se. It could be that the higher wages paid by foreign and domestic multinationals reflect the outcome of a bargaining game in which workers share the extra rents generated by the superior technologies used by multinational-owned plants. An alternative interpretation consistent with high productivity and wages would be that multinational plants use production processes that require higher levels of effort from their employees. One reason might be that multinationals have a greater stake in maintaining a reputation for product quality. Alternatively, the multinational may use technologies that make intensive use of more highly skilled—and hence, better paid—workers.

If the wage premium represents compensation for higher effort or greater skills, individual workers may not benefit from employment at a multinational. In one case they have to work harder, in the other case they probably gave up high-paying jobs at other firms. Even if individual workers do not receive a net benefit from working at a multinational plant, the local government may value the increase in the income tax revenues it can obtain as a result of higher average wages. If the skill intensity story is correct, attracting a multinational-owned plant would tend to draw an inflow of skilled workers from other states that might be viewed as a desirable development in its own right.

Defenders of large incentive packages would probably argue that the most critical flaw in the calculations I made on the return to attracting foreign investors is the omission of "job creation" beyond the direct employment of the firm. They would probably point to complementary investments by supplier firms and to the likelihood of future expansion by Mercedes and Toyota. Indeed, Toyota is expected to increase its employment in Kentucky to 6,000, and there are already a couple dozen new Japanese-owned parts suppliers in the state.

In addition, superior technologies employed by multinational plants may spill over to domestic firms, causing additional productivity and wage increases beyond those at the assembly plants themselves. These externality issues could be addressed using the Doms and Jensen data set if it can be extended to include a time-series dimension. With better estimates of the

magnitudes of the indirect effects of multinational investments, we could obtain more precise measures of their value to host governments. Even with more precise quantifications of the potential benefits to host-country governments, competition between states may bid away most of the benefits after subtracting the cost of the incentive package. It seems likely that there will be a push for policy reforms designed to curb the tendency of local governments to overbid for investments. The results of Doms and Jensen provide a useful component in evaluating potential agreements on investment incentives.