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Bringing the Firms into Globalization Research: The Effects of Foreign Investment and Exports on Wages in Mexican Manufacturing Firms

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Abstract

Researchers specializing in organizations and labor markets have paid insufficient attention to the effects that foreign ownership of a firm and its orientation towards export production may have on the wages it pays to its workers. Using information from a nationally-representative sample of manufacturing firms in Mexico, a paradigmatic case of a developing country that is highly integrated into world markets, we find that foreign-owned and export-oriented firms pay considerably more than nationally-owned firms engaged in the production of goods for sale in the domestic market. Second, beyond paying higher wages to their workers, foreign-owned firms also raise the wages paid by domestic firms operating in the same regional labor markets. The wage premium in foreign and export-oriented firms cannot be explained by their size, industry, geographical location, productivity, use of advanced technology, or the sociodemographic composition of their workforce. We find evidence that wages in foreign-owned companies in Mexico are dependent on the country of origin of the capital investment. A greater difference between the industry-specific wages paid in the country of ownership and Mexico is associated with a higher wage premium in Mexican affiliates. Future work should strive to link information from foreign-owned affiliates with their parent companies abroad.

Keywords

foreign investment; export production; wages; Mexico

A rich tradition of sociological research has shown how workers' earnings are greatly influenced by the types of organizations they work for (Baron and Bielby, 1980; Kalleberg, Wallace and Althausen 1981; Baron, 1984; Sørensen, 1994; le Grand, Szulkin, and Tåhlin, 1995; Kalleberg and Van Buren, 1996). Researchers have, for example, demonstrated that workers in large firms receive significantly higher wages even once other firm and worker characteristics are taken into account. (Stolzenberg, 1978; Brown, Hamilton, and Medoff 1990; Hollister, 2004). Larger firms also pay more fringe benefits and provide workers greater opportunities for promotion (Kalleberg and Van Buren 1996). Other firm-level research has examined how the demographic composition of business organizations affects wages (Reskin, McBrier, and Kmec 1999). However, researchers in this tradition have so far

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failed to examine the effect that foreign ownership and export production have on workers' wages. Do foreign and export-oriented firms pay workers more than comparable nationally-owned firms producing goods for sale in the domestic market, and if so, why? Second, what broader effects do these kinds of firms have on wages? In particular, do foreign and export firms raise average wage levels in the local labor markets in which they operate, and do they increase income inequality? This paper seeks to answer these questions using a nationally-representative survey of manufacturing firms in Mexico, a paradigmatic case of a developing country that is highly integrated into world markets.

Whether multinational companies operating in developing countries pay higher wages than domestic firms and whether they help raise wages more generally is particularly important given the dramatic increase in foreign capital flows and international trade worldwide. Our objective is therefore to "bring the firms in" to globalization research. The labor market approach we propose has the advantage of empirically grounding the globalization debate which has often been carried out in very broad, generalized terms. At the same time, our analysis also seeks to inform labor market research by demonstrating how foreign ownership of a firm and its focus on export production are important predictors of wages.

While sociologists have been slow to recognize the importance of factors such as foreign investment on firm-level outcomes, a strand of economic research has found that workers employed in foreign-owned firms receive higher wages, not only in developing countries such as Mexico, but in developed ones as well (Buckley and Enderwick, 1983; Wilmore, 1986; Aitken, Harrison, and Lipsey, 1996; Lipsey and Sjöholm, 2001). Yet this difference in wages between foreign and domestic firms has not been adequately explained by traditional economic approaches which attribute the higher wages in foreign firms to higher productivity. One reason economists are preoccupied with the higher wages paid by foreign and export-oriented firms is that they appear to challenge standard economic theories. If markets are indeed the driving force behind wages there is no obvious reason why the nationality of ownership or the destination of sales should matter. Why should a multinational firm moving its operations abroad pay above-market wages in its new country of operation? As we will demonstrate below, factors commonly used by economists to explain higher wages such as a firm's productivity level, are insufficient to explain the wage premium in foreign and export firms. This wage premium therefore presents an opportunity for sociologists specializing in organizations and labor markets to make a significant contribution.

A disparity in wages between foreign and nationally-owned firms and between those that are engaged in export and non-export production might also suggest one way in which economic globalization increases inequality in developing countries, especially if the relative payoffs to employment in the foreign and export sectors are greater for higher occupational groups. In the analysis below we will therefore examine the wage premium paid by foreign-owned and export firms to workers in different occupational levels. Finally, if the presence of foreign firms increases the wages paid by other companies operating in the same regional labor markets, then foreign investment may also contribute to a disparity in income between regions receiving large amounts of foreign investment, such as Mexico's northern border, and other parts of the country. In the final part of our paper we will therefore test whether foreign firms have a positive spillover effect on the wages paid by other companies.

Because of the remarkable economic transformation that Mexico has undergone over the past two decades from a relatively protected economy to one open to external trade and foreign investment, Mexico constitutes an important case to investigate the effects of economic globalization on workers' wages. Indeed, few developing countries have become

so thoroughly integrated into the world economy. As of 2003, Mexico had signed eleven free trade agreements with thirty-two countries in addition to being a founding member of the World Trade Organization (López-Córdova, 2003). The country experienced a particularly dramatic increase in international trade following the enactment of the North American Free Trade Agreement (NAFTA) in 1994. The agreement reduced tariffs on trade with the United States and Canada, forming the second largest trading bloc in the world. Fueled in part by NAFTA as well as by government policies lifting restrictions on foreign participation in the economy, foreign investment in the Mexican manufacturing sector rose considerably during the 1980s and 1990s, especially in the in-bond industries known as *maquiladoras*.¹

Why Foreign Ownership May Affect Wages

Sociologists have often been critical of the effects of foreign investment and international trade on income inequality in developing countries (Bornschiefer and Chase-Dunn, 1985; Dixon and Boswell, 1996; Alderson and Nielsen, 1999). Various studies have demonstrated a positive association between foreign investment and higher levels of income inequality. By contrast, much less attention has been placed on the higher wages paid by foreign and export-oriented firms. One important obstacle to the analysis of the wage premium in foreign and export firms is the scarcity of firm-level information that can allow researchers to control for other firm-specific factors that might account for the wage premium. Researchers have often had to rely on employment surveys which typically contain information from a sample of workers employed in different establishments and rarely include important information about the firms they work for such as their size, level of productivity, work organization, or use of advanced technology. Our access to firm-level data for a representative sample of manufacturing firms in Mexico allows us to more rigorously test alternative explanations for why foreign and export firms pay higher wages. In this section we propose six hypotheses for the wage premium in foreign firms derived from previous findings in labor market research. To simplify the presentation, the hypotheses are formulated in terms of the foreign ownership of firms, but they extend to export firms as well.

First, one of the most consistent findings in labor market research is that larger firms pay higher wages (Stolzenberg, 1978; Kalleberg and Van Buren, 1996; Hollister, 2004). Since foreign-owned manufacturing firms are considerably larger on average than domestic firms in developing countries, we may expect the wages of foreign firms to be higher simply as a function of their size. Part of the association between firm size and wages is itself explained by other variables that are correlated with larger firms such as having workers with greater human capital, having greater capital intensity, having more unionized workers, or having greater market power (Brown, Hamilton, and Medoff, 1990). However, these and other variables do not completely account for the firm size effect (Kalleberg and Van Buren, 1996; Idson and Oi, 1999). Our first hypothesis is therefore the following:

Hypothesis 1:

Foreign-owned firms pay higher wages because they are larger.

Second, labor market research has found persistent wage differences across industries even after factors such as worker and job characteristics, and the level of unionization are taken

¹Maquiladora plants in Mexico assemble goods for export to foreign countries using materials that are imported temporarily for this purpose. Special legislation allows maquiladoras to import materials and machinery duty free so long as the assembled products are exported. Initially, maquiladoras were only allowed within twenty kilometers of the U.S. border under conditions similar to Export Processing Zones (EPZ) elsewhere in the world. Current legislation allows the establishment of maquiladoras in other parts of Mexico (INEGI, n.d.)

into account (Hodson, 1983; Krueger and Summers, 1987; Katz and Summers, 1989). While the ultimate source of industrial wage differentials remains debatable, they have been found to be correlated throughout the twentieth century in the United States, and across countries (Krueger and Summers, 1987). After controlling for human capital and other individual-level characteristics, manufacturing industries that pay higher wages include petroleum, chemical, paper, printing, rubber, and most durable manufacturing industries (Hodson, 1983; Krueger and Summers, 1987). Foreign-owned firms may be disproportionately located in these types of high-paying industries, which might explain their higher wages. A second hypothesis may therefore be stated as follows:

Hypothesis 2:

Foreign-owned firms pay higher wages because they are in industries that pay more.

Third, regional differences in wages have been observed in various countries even once basic worker characteristics are controlled. Research on China for instance, has demonstrated persistent and even increasing income disparities across regions, and particularly between the more developed coastal regions and inland provinces (Wang and Hu, 1999; Zhang and Zhang, 2003). Regional wage differentials may arise due to differences in infrastructure, agglomeration, or the human capital of the local labor force (Aitken, Harrison, and Lipsey, 1996, p. 349). Geographic differentials may be particularly severe if restrictions to worker migration exist (as in China), but may also be expected whenever there are costs associated with migration. In Mexico, foreign-owned firms are much more likely to be located in border states, which generally have higher wages. Foreign-owned firms may therefore have higher wages because of their geographical location, which leads to our third hypothesis:

Hypothesis 3:

Foreign-owned firms pay higher wages because they are located in regions that have higher wages.

One of the fundamental tenets of microeconomic theory is that workers' wages are tied to their level of productivity (Pindyck and Rubinfeld, 2003). As productivity levels rise, employers have an incentive to pay higher wages to their employees. Although economists have been criticized for overstating the relation between productivity and wages (Thurow, 1975; Sørensen, 1994), a high correlation nevertheless exists between measures of worker productivity and income both at the industry and national levels (Firebaugh and Beck, 1994). Economic research has consistently found higher productivity levels in foreign-owned firms, even those operating in advanced industrialized countries such as the U.S. (Bellak, 2004). The higher productivity of foreign firms may be due to their use of new technologies or management styles. The higher productivity levels may also be the result of foreign firms' larger scales of operation (i.e., firm size). In other words, the effect of productivity on wages may be mediated by some of the other factors described in the remaining hypotheses. Nevertheless, there may be productivity differences between foreign and domestic firms not accounted for by the other variables introduced in the analysis. The direct effect of productivity on wages will therefore be tested as a separate hypothesis:

Hypothesis 4:

Foreign-owned firms pay higher wages because they have higher productivity levels.

Our fifth hypothesis has to do with the type of technology used in the manufacturing process. Foreign firms often introduce advanced production technologies not previously available in host countries (Bellak, 2004). In fact, the transfer of technologies to domestic firms is one of the principal mechanisms through which productivity spillovers are thought to occur according to the economics literature (Blomström and Persson, 1983; Blomström

and Kokko, 1998). The more advanced production technologies used by foreign firms may also result in higher wages for workers. The introduction of advanced technologies may require a greater capital investment and capital intensity has been linked to higher wages (Hodson, 1983; Lawrence and Lawrence, 1985). Advanced technologies may also involve the use of computers or other sophisticated machinery that lead to increased wages especially among more highly skilled workers (Krueger, 1993). The effect that advanced production technologies may have on wages in foreign-owned firms is captured by our fifth hypothesis:

Hypothesis 5:

Foreign-owned firms pay higher wages because they use more advanced production technologies.

Finally, foreign firms may pay higher wages because of the types of workers they employ. For example, a more educated workforce will generally command higher wages. If foreign employers prefer to hire workers with more education than domestic firms they may have to pay them more. A more educated workforce may in part be necessary if more advanced management and production techniques are used by foreign firms. But workers' education may have an independent effect. The gender composition of a firm's workforce may also affect wages. Not only are women often paid less than men in similar occupations, but research has also shown that workers in predominantly female occupations and workplaces receive lower wages regardless of their own gender (Reskin, 1988; Kilbourne et al., 1994; Petersen and Morgan, 1995). Other characteristics of a firm's workforce such as the average years of work experience, the percentage of workers under temporary contracts, and the extent of unionization, may also affect wages. Our sixth hypothesis captures the effect that such compositional differences may have on the wages paid by foreign and domestic firms:

Hypothesis 6:

Foreign-owned firms pay higher wages because of the sociodemographic composition of their workforce.

Data and Measurements

Our analysis of the wages paid by foreign and domestic manufacturing firms in Mexico is based on data from the National Surveys of Employment, Wages, Technology and Training in the Manufacturing Sector (*Encuestas Nacionales de Empleo, Salarios, Tecnología y Capacitación en el Sector Manufacturero, ENESTYC*). The ENESTYC surveys were conducted in 1992, 1995, 1999 and 2001 by the Mexican National Institute for Statistics, Geography and Informatics (INEGI), the same governmental institution in charge of the population censuses (INEGI, 2001).² Our detailed analysis of wages in the Mexican manufacturing sector relies primarily on the 2001 survey because it is the most recent and largest of the four. However, data from the 1992 and 1999 ENESTYC surveys are used to further confirm our findings and examine the effect of changes in the level of foreign investment on wages at the state level. The 1995 survey is omitted from our analysis because it does not include important information such as the breakdown of workers by gender, their education level or tenure in the firm.

The 2001 ENESTYC survey contains information from a nationally representative sample of manufacturing firms. It is also representative at the industry level for 54 industries, and for

²The ENESTYC surveys contain sensitive information regarding firms' finances and personnel. For this reason, the Mexican National Institute for Statistics, Geography and Informatics (INEGI) strictly enforces confidentiality standards and does not release the data from the surveys publicly. It was therefore necessary to obtain approval for our research project and carry out our analyses at the INEGI headquarters in Mexico.

firms of four different sizes. Separate surveys were conducted for traditional manufacturing firms and the maquiladoras or in-bond industries. Data from both types of industries were merged into a single dataset in the analysis below.³ It is particularly important to include the maquiladoras because they are more likely to be foreign owned, and their entire output is destined for export to foreign markets. All three ENESTYC surveys include detailed information about firms' finances and operations such as the amount and national origin of capital investment, the total value and national destination of sales, the use of technology and quality control procedures and the industrial sector of which they are a part. Aggregate information is also available for workers in each firm based on four occupational categories and according to gender, including the number of workers in each category, their average wages, educational level, and years of tenure in the firm. All the information is provided by managers in each firm who are familiar with company finances and personnel records. The survey questions will typically require managers to consult company records.

The firm-level information contained in the ENESTYC surveys is ideal for our purposes because it allows us to control for differences among foreign and domestic firms which might explain their wage disparity. However, the surveys have the limitation that they do not include information about individual workers. Instead, the average characteristics of all employees, such as their wages and educational level, are available for each of the four occupational categories identified in the survey, and within each occupational category for both genders. The four occupational categories distinguished in the ENESTYC surveys are: 1) unskilled blue-collar workers defined as those with "minimum experience and training regarding their work"; 2) skilled blue-collar workers who "master a trade or position... as well as the instruments of their work"; 3) non-managerial white-collar workers, which include "all personnel that are not directly involved with the production process" such as clerical workers, engineers, accountants and other administrative staff; and 4) managers, defined as "personnel that make decisions associated with planning, directing, formulating production policies, finance, marketing, and organization within the firm..." (INEGI, 1999, our translation). Only full-time workers are included in the analysis. Full-time workers consist of all permanent employees as well as those temporarily hired by the firm during the time of the survey. Part-time and subcontracted workers are excluded, in part because their wage information is not available.⁴

We array the data from the ENESTYC survey so that each case represents the average worker in each occupational and gender category in each firm (8 categories in all). That is, the dependent variable in our regression models refers to the mean wage for a particular occupational category (i.e., unskilled blue-collar, skilled blue-collar, non-managerial white-collar, or managerial) for a particular gender (male or female) for a particular firm. We arrange the data in this way in order to make maximum use of the information provided by the ENESTYC survey which lacks information for any particular worker at the individual level. However, because workers who belong to the same firm share all firm-level characteristics and their wages are determined by the same employer, they do not constitute independent cases. For this reason we use the Huber/White estimation technique with clustering to compute standard errors for the regression coefficients. This technique produces correct standard error estimates even when cases included within clusters (in this case, firms) are not independent, so long as they are independent across clusters (StataCorp,

³The surveys conducted in 1992 and 1999 are also representative at the national level, using the economic censuses as a reference. However, the 1999 ENESTYC survey contains representative samples of only 53 industries, while the 1992 is only representative at the national level. Separate surveys were carried out for maquiladora and non-maquiladora firms in 1999, while the 1992 survey included both types of firms together.

⁴Although a detailed breakdown by occupational level is not available, results from the 2001 ENESTYC survey indicate that subcontracted workers account for less than 2% of all workers employed by the average firm in our sample. The average percentage of workers who are employed part time (0.8%), by the hour (0.2%), and by honorarium (0.3%) are similarly low.

2005a, p. 275–280). Because foreign investment is heavily concentrated in medium and large size firms we selected only firms in these two categories based on INEGI's classification system, that is, those with more than 100 employees. Since larger firms generally have higher wages, our comparison of only medium and large firms constitutes a stricter test of the higher wages paid by foreign firms compared to those that are domestically owned.⁵ Were we to include smaller firms that are overwhelmingly nationally-owned and pay lower wages, the wage gap between foreign and domestic firms would be even larger.

The dependent variable used in the regression models below is the logged average monthly compensation paid to workers in each occupational and gender category. The total compensation includes wages, overtime pay, benefits, mandatory contributions by employers to the national social security system, and any other payments made during the month of reference (June 2001). For simplicity, in the remainder of the paper we will refer to the sum of all these direct and indirect payments to workers as “wages”. This measure of total compensation is preferable to one based solely on monetary wages because it more accurately reflects the total income received by employees for their service to the firm and the living standard they can afford (Jencks, Perman, and Rainwater, 1988). However, the main findings regarding the total compensation to workers in foreign and domestic firms described below were replicated using wages alone.

Firm-level Predictors

Following our theoretical discussion, the main predictors used in the regression analysis are those that have to do with the national origin of the capital invested in the firm and the destination of the manufactured goods sold. We use both continuous and dichotomized measures of foreign investment and export production. The continuous measures are simply the proportion of the capital investment that is foreign and the proportion of the total sales that is destined for foreign markets respectively. The exact proportion of foreign investment and export sales are reported in the survey.⁶ We dichotomize these measures by classifying all firms in which 50% or more of the total investment is not Mexican as foreign-owned, and all firms with 50% or more of their sales destined for foreign markets as export-oriented. Because 100% of their output is sold abroad, all maquiladoras are classified as export-oriented firms. However, because maquiladoras have special features that distinguish them from traditional exporting companies, we also use a separate dummy variable to specifically identify them in our statistical analysis. When maquiladoras are included 27.9% of firms in our sample are foreign-owned and 38.6% are export-oriented according to our definitions (based on weighted sample). Finally, in order to test the interaction effects between foreign ownership and export orientation we use the dichotomous variables to construct dummy variables identifying four mutually exclusive categories of firms: foreign-owned export firms (21.9%), foreign-owned non-export firms (6.0%), domestic export firms (16.7%), and domestic non-export firms (55.4%).

Our first explanation for the wage disparity between foreign and domestic firms described in the previous section pertains to the differences in their overall size. We test this hypothesis using two different indicators. First, we include the average number of workers in the firm during the most recent year as a predictor of wages. Second, workers may not only benefit from the size of the particular establishment in which they work, but also from being part of

⁵According to the 2001 ENESTYC survey 96.1% of workers in foreign-owned firms are employed in firms with more than 100 employees.

⁶Our measure of exports only includes products that are directly sold by a firm to foreign buyers. It does not include products sold to other domestic firms that will be further processed and eventually sold abroad. In this sense, our study may underestimate the full impact of export production.

larger corporate group. Foreign and export-oriented firms in particular are likely to belong to larger conglomerates with headquarters and affiliates abroad. We therefore also include a dummy variable indicating whether a firm is part of a larger conglomerate as a predictor of wages in the analysis below.

To test our second hypothesis regarding the industrial sectors to which foreign and domestic firms belong, we include as predictors 8 dummy variables corresponding to the major categories in the Mexican industrial classification system (see the tables below for the specific name of each industry). We expect foreign and export-oriented firms to be concentrated in higher paying industries (such as the metal products and chemical industries), therefore accounting at least in part for their higher wages. To test our third hypothesis regarding the geographical location of foreign firms we include dummy variables in the regression models indicating whether a firm is located in a border state or the Mexico City area (defined as the Federal District and the neighboring state of Mexico).

Our fourth explanation for the disparity in wages between foreign and domestic firms was based on the economic literature which suggests that foreign firms pay higher wages because they have higher levels of productivity. We computed the overall productivity of a firm as the total price of the goods produced in 2000 divided by the number of workers. Our fifth hypothesis had to do with the use of advanced technology by foreign-owned firms. We test this hypothesis using three different indicators: 1) the use of automated equipment (including numerical control machinery and robots) based on their value relative to the total cost of the machinery used in the production process; 2) a dummy variable indicating whether research and development activities are carried out in the plant; 3) a dummy variable indicating whether the firm has some form of quality control certification (such as ISO-9000). We expect the difference in wages between foreign and domestic firms to be at least partly explained by the greater use of more advanced technology among foreign firms. Similarly, the total capital investment in a firm may be associated with the use of advanced technologies, and is therefore included as a predictor. Finally, economists have also suggested that newer firms have higher labor productivity which may in turn affect wages (Aitken, Harrison, and Lipsey, 1996, p. 354; Bellak, 2004, p. 493). Thus, we also include the years of operation of the firm as a predictor of workers' wages.

Worker Characteristics

Our sixth hypothesis suggested that the wage differential between foreign and domestic firms is explained by the types of workers they hire. We therefore include a set of variables measuring workers' characteristics as predictors of their wages in the regression models below. Because each case in our sample represents the average employee in each of the 8 occupational/gender categories these variables are expressed as averages and proportions of workers in each category who have a certain level of human capital or share some other demographic characteristic. We also include dummy variables indicating the particular occupational category and gender represented by each case in our sample.

The educational level of workers is controlled using four categories corresponding to the proportion of workers in each occupational and gender group with: less than middle school education, middle school education (*secundaria*), high school education (*preparatoria* or equivalent), and college or more, as reported in the ENESTYC surveys. Based on standard human capital theory we expect workers with higher education to earn more even when all other firm-level characteristics are included in the analysis. Second, the years of workers' tenure in the firm is controlled using six categories corresponding to the proportion of workers with: less than 1, 1 to 3, 3 to 5, 5 to 10, 10 to 20, and more than 20 years of work in the firm. We expect that workers' wages will increase with the greater number of years of service to the company.⁷ Third, permanent workers will generally receive a higher income

compared to those employed temporarily, especially because benefits are included in our measure of income and temporary workers are less likely to receive them. We therefore include the proportion of workers in each occupational and gender category who are permanent employees. Finally, as previously noted, gender segregation may have an important effect on wages. Workers in predominantly female occupations and workplaces tend to receive lower wages even once workers' own gender is taken into account (Reskin, 1988; Kilbourne et al., 1994; Petersen and Morgan, 1995). Thus, in order to account for the effect that gender segregation in the workplace may have on wages in Mexican manufacturing firms, we control for the proportion of workers in each occupational category within a firm who are female.

Results

Table 1 shows the results of the regression models using logged average wages as a dependent variable. The first two models test the effect of foreign ownership and export production as continuous variables, while the third compares wages in the maquiladora sector relative to all other firms. The remaining three models use interaction terms to form mutually exclusive groups corresponding to: foreign-owned export firms, foreign-owned non-export firms, and domestic export firms, using domestic non-export firms as the baseline category. The results strongly confirm our expectation that foreign-owned firms, and to a lesser extent maquiladoras and export-oriented firms pay higher wages. This holds true even when all other firm and worker characteristics are controlled. The wage disparity is indeed quite large. According to the most complete model (Model 6), foreign-owned non-export firms pay wages that are 25.9% higher than domestic non-export firms (i.e., $\exp(.230) - 1$), while foreign-owned export and domestic export firms pay 22.8% and 10.2% more, respectively.⁸

With regards to our first six hypotheses for why foreign-owned and export-oriented firms pay higher wages, none of them seem to fully account for the wage disparity, although the corresponding coefficients are generally significant. First, firm size is an important predictor of wages in the manufacturing sector. Consistent with previous findings in labor market research, larger firms pay significantly higher wages. One standard deviation increase in the size of the firm is associated with a 3.0% increase in wages even once other firm-level predictors are taken into account. Similarly, workers employed in firms that belong to larger industrial conglomerates pay 10.7% higher wages according to the most complete model in Table 1. Second, as hypothesized, heavy industries such as the metal products and chemical industries where foreign investment tends to be concentrated pay significantly higher wages even once other firm-level characteristics are taken into account. Third, neither of our geographical indicators was significant, suggesting that manufacturing firms located near the border and in the Mexico City area do not pay higher wages once all other firm and worker characteristics are controlled. Fourth, as predicted by economic theory, productivity is a significant predictor of wages within firms. Yet differences in productivity between foreign and domestic firms and between export and non-export firms fail to fully explain the wage disparities observed. Fifth, firms with more automated machinery, those that conduct research and development, and those with some type of quality control certification pay significantly higher wages.

⁷The years of tenure are only available for permanent workers. However, the regression models also control for the proportion of permanent (i.e., non-temporary) workers in each occupational category and gender.

⁸As indicated in Table 1, the coefficients for all three types of firms are statistically significant when compared to the baseline category of domestic non-export firms according to Model 6. The difference between the wages paid by domestic export firms and both foreign-owned export and non-export firms are also statistically significant. However, the difference between foreign export and foreign non-export firms is not statistically significant at the .05 level. In other words, export orientation appears to have no additional effect on wages for foreign-owned firms once all other relevant factors are controlled.

The characteristics of workers are also significant predictors of the wages paid by manufacturing firms in Mexico. First, the aggregate educational level of workers in each occupational and gender category was positively associated with wages. Interestingly, the importance of education declined once all firm-level characteristics, including the type of industry were controlled (the coefficient for all higher educational groups decline and the coefficient for middle school education becomes non-significant when firm characteristics are added in Model 6 compared to Model 4 in Table 1). This suggests that a considerable part of the effect that education has on wages may be due to the sorting of individuals with varying educational levels into different industries and firms. The amount of years of tenure of workers in each occupational and gender category is also associated with wages in the expected direction. However, the effect of tenure is also lower once all firm-level characteristics are included in the models. Third, as expected, workers in higher occupational categories earn much higher wages even when their average educational level and years of tenure are taken into account.

Female workers generally earn lower wages compared to men. Moreover, a higher *proportion* of women employed in each occupational category in a firm severely reduces the wages received by all workers in that category, regardless of their gender. Further analysis not presented here showed that the penalty paid by workers in a particular occupational category in a firm with a higher proportion of female workers was the same for men and women. Consistent with prior research on gender segregation in the U.S. as well as other countries (Kilbourne et al., 1994; Sørensen and Trappe, 1995; Petersen et al., 1997), the feminization of workplaces in Mexican manufacturing firms has a strong negative effect on wages. Once again, the effect that feminized workplaces have on wages is considerably reduced once all firm-level characteristics are included in the regression models (judging from the 46.6% reduction in the coefficient for the proportion female between Models 4 and 6).

Differences across Occupational Groups

In order to investigate whether the difference in wages between foreign and nationally-owned firms and between export and non-export firms vary for workers of different occupational levels we tested separate regression models for each of the four occupational groups. These additional regression models included the same predictors in the full model in Table 1 (Model 6). While the complete results are not presented in order to conserve space, the regression coefficients corresponding to the interaction terms between foreign ownership and export production are shown in Figure 1. The regression coefficients represent the wage premiums for workers in the different types of firms once all other firm and worker characteristics are controlled. Overall, the graph indicates that foreign ownership disproportionately benefits workers in higher occupational categories, while export production appears to benefit the intermediate occupational categories more. More specifically, the premium for workers in foreign-owned non-export firms increases almost monotonically for higher occupational groups, while the premium in foreign-owned export firms is higher for workers in the three highest groups and statistically non-significant for the lowest group.⁹ By contrast, the pattern for nationally-owned export firms is curvilinear: the wage premium paid by such firms is highest for the two intermediate occupational categories (i.e., skilled blue-collar and non-managerial white collar workers) and non-significant for the lowest and highest groups. These differences in the wages paid by foreign

⁹The high wage premiums for managers in foreign-owned firms may be in part due to the fact that some of these firms bring managers from their countries of origin who are almost certainly paid higher wages. Unfortunately, we do not have information regarding the national origin of workers in the sample of firms. However, since non-managerial workers are rarely brought in from other countries, their national origin is unlikely to affect the wage premiums for workers of lower occupational categories. The nationality of workers should also have no effect on the wage premiums for workers employed in nationally-owned export firms.

and export firms are important because they suggest that foreign investment and export production increase income inequality in Mexico even while they may be helping to raise the average wage level. The findings are therefore consistent with those of dependency theorists who find a positive effect of foreign investment on inequality using cross-national datasets.

The Effect of Home Country on Wages in Foreign-owned Firms

In the previous section of the paper we tested six different explanations for the wage premium paid by foreign firms operating in Mexico. The hypotheses were derived from well-established findings in labor market research. However, these explanations failed to fully account for the wage premium. Factors such as the size of foreign firms, their location, industry, productivity and use of advanced technologies did not fully explain why they pay higher wages. In this section we consider how the characteristics of the country of origin of the capital investment may affect the wages paid by multinational firms operating in Mexico. In particular, we consider whether the higher wages paid by foreign firms are tied to the difference between the wages paid by foreign firms to workers in their home countries and those paid to Mexican workers.

Even with the higher wages they pay relative to other firms in Mexico, the wage differential between what foreign firms would otherwise pay workers in their home countries and what they pay workers in Mexico is large. For example, the average compensation for Mexican manufacturing firms (including wages, benefits and other expenses paid by employers) was approximately one eighth that of U.S. workers in 2000. This wage differential, of course, reflects many differences between production operations in the U.S. and Mexico, including differences in worker productivity. Yet the lower wages are to some extent also tied to the profit margins for U.S. companies operating in Mexico, and indeed provide the primary motivation for moving their operations abroad.

A large literature in sociology and economics has shown that higher profits are associated with higher wages both at the firm and industry levels (Katz and Summers, 1989; Hildred and Oswald, 1997; Arai, 2003). In the case of multinational firms the effect of profits on wages is particularly difficult to estimate because workers in foreign affiliates may benefit not only from higher profits in their particular establishments, but also from the profits of their parent companies abroad. Financial information from parent companies in other countries is typically not available in national surveys. Nevertheless, in a unique study conducted by Budd, Konings and Slaughter (2005), the authors use an unusual dataset containing information from a sample of European firms and their foreign affiliates located in other European countries. They show that a greater profitability of parent companies indeed raises wages in foreign affiliates. They conclude that profits are being shared across borders within European multinational firms. Budd and Slaughter (2004) also present evidence of profit sharing with workers across borders for affiliates of U.S. companies operating in Canada.

Unfortunately, the survey of Mexican establishments we use in this study does not contain information about the parent companies abroad. We are therefore unable to directly test the hypothesis that the profitability of parent companies increases the wages paid to workers in Mexican affiliates. Instead we use information about the industry-specific wage differential between the country of origin of the capital investment and Mexico as a proxy for the greater profits accrued by multinational companies as a result of moving their operations to Mexico. As stated earlier, this wage differential is an imperfect measure of the profits obtained by multinational companies. Other factors such as differences in productivity between manufacturing establishments in Mexico and the countries of origin will affect the

profit margins for multinational companies. For example, if productivity in a Mexican affiliate of a U.S.-based company is lower than in the United States that will reduce the profits for the parent company. Greater costs of transportation, energy and other factors of production may also reduce the profits obtained by multinational companies as a result of moving their operations to Mexico. Wage differentials are therefore at best an upper bound for increased profits.

To test the effect of relative labor costs on workers' wages in foreign-owned firms we introduce as a predictor in our wage models the difference in the cost of labor in each country of ownership in a particular industry relative to the average labor costs in that industry in Mexico. The average labor cost for each industry in the various countries was obtained from statistics compiled by the U.S. Labor Department.¹⁰ The eight industries corresponding to the major industrial categories identified by the ENESTYC survey were matched as close as possible with the industries for which the U.S. Labor Department statistics are available. The ENESTYC survey identified 11 foreign countries of ownership as well as four categories for other countries in America, Europe, Asia, and all other regions. Labor costs for these other categories were computed as the average of all countries in the corresponding region available in the U.S. Labor Department statistics.¹¹

The results of this additional regression model in which the difference in labor costs is used as a predictor are shown in Table 2. The industry-specific wage differential is a positive and significant predictor of wages. More importantly, once the difference in labor costs is taken into account in Model 2, the proportion of foreign capital investment in a firm has no significant effect on wages in Mexican manufacturing firms.¹² This means that the wage premium in foreign firms operating in Mexico is proportional to the relative labor costs between the country of origin of the capital investment and Mexico. To the extent that this difference in wages may be considered a proxy for greater profits this finding may be taken as an indication of profit-sharing by multinational firms with their employees abroad. Our findings are therefore consistent with those of earlier studies by Budd, Konings and Slaughter (2005) and Budd and Slaughter (2004).

Of course, this finding begs the question of why foreign employers would share the wage differential with workers in host countries such as Mexico. Paying wages that are above market rates in developing countries may be a convenient way of securing the most dedicated workers and preventing labor unrest for employers that receive large profits from their operations abroad. Foreign employers may have other incentives to share some of their profits with workers. Large multinationals operating in developing countries such as Mexico are particularly susceptible to charges of exploitation and mistreatment of workers both by political leaders in host countries and labor rights activists at home. Corporate managers

¹⁰The Labor Department estimates include wages as well as other expenditures such as social security contributions and taxes paid by employers, and are therefore preferable to measures based solely on average wages that may be obtained from other sources. See U.S. Department of Labor, Bureau of Labor Statistics, "Hourly Compensation Costs for Production Workers in Manufacturing, 32 Countries or Areas, 22 Manufacturing Industries, 1992–2004" (<http://www.bls.gov/fls/flshcindaics.htm>). Details regarding the matching of Mexican industries to those available in the Labor Department report are available upon request.

¹¹The ENESTYC survey does not code the specific country to which products are exported, but only the percentage of exports destined to five broad regions of the world. A similar variable measuring differences in labor costs between Mexico and the country of destination of exports cannot therefore be constructed.

¹²Despite the seemingly close relation between our measures of foreign investment and the wage differential, including both predictors in the same regression model does not result in multicollinearity. The maximum Variance Inflation Factor (VIF) for the full model (Model 2) is 6.33 and the average VIF for all variables is 2.02. While there is no formal test for the value of the VIF that can signal problems in our estimates of the standard errors for the coefficients in our models, these values fall within an acceptable range. Several authors suggest that researchers should be concerned with VIF values exceeding 10.0 as a rule of thumb (Kutner, Nachtsheim and Neter [2004]; StataCorp [2005b:90]; Chatterjee and Hadi [2006:236]; Kleinbaum, Kupper, Nizam and Muller [2008:315]). In order to further examine the possibility that our results may be affected by multicollinearity we tested a simplified model removing many of the firm-level predictors. This additional model included the same control variables as Model 4 in Table 1. The maximum VIF in that regression model was 5.33 and the results were consistent with those reported in Table 2.

may therefore choose to pay workers in host countries higher wages than other local firms to pre-empt criticism and public boycotts (United Nations Economic and Social Council, 1994, pp. 32–33). The evidence for profit sharing is only suggestive since we do not have direct measures of the profits of parent companies in other countries. Many other factors including differences in worker productivity between countries may affect the profits of multinational companies as a result of moving their operations abroad. More research is required into the finances and operations of multinational companies across borders in order to corroborate that savings on labor costs are indeed passed on to workers in foreign affiliates. However, the results of our analysis of the wage differentials across countries is important because they clearly demonstrate the need to consider factors beyond the country of operation in order to understand the wages paid by foreign-owned firms. In an increasingly globalized world it is no longer sufficient to examine the characteristics of local establishments such as their size, industry and location, to account for workers' wages. We also need to look at the conditions in parent companies located abroad.

Regional Effects of Foreign Investment

In the previous sections of the paper we have shown that foreign and export-oriented manufacturing firms in Mexico pay higher wages than nationally-owned firms producing goods for sale in the domestic market. In this sense, there is little doubt that workers in these firms benefit from greater foreign investment and a general shift in the national economic strategy towards the promotion of exports. But what about the other workers? Do foreign investment and export production have any benefits beyond directly increasing the wages of the workers employed in such firms? This is a particularly important question if our aim is to assess the broader impact that Mexico's greater participation in the world economy has had on the lives of its citizens. It is also important to investigate the effects of foreign investment and export production at the regional level because, as research on China and elsewhere has shown, the insertion of developing countries into world markets does not have uniform consequences, but may in fact exacerbate regional disparities (Wang and Hu, 1999; Zhang and Zhang, 2003).

In this section we examine whether the presence of foreign firms has a spillover effect on the wages paid by other firms operating in the same regional market. Why might foreign firms have a positive spillover effect on wages? Economists have argued that foreign firms may raise the wages paid by domestic firms through the spread of "productive knowledge" (Aitken, Harrison, and Lipsey, 1996). Foreign-owned firms may also raise wages by increasing the overall demand for workers in the labor markets in which they operate. The existence of spillover effects from foreign investment is an unsettled issue in the economic literature since the empirical evidence has been mixed (Blomström and Persson, 1983; Aitken, Harrison, and Lipsey, 1996; Aitken and Harrison, 1999).

We examine the spillover effect of foreign investment in two ways. First, we use multilevel models where the same firm-level variables used in our previous analysis are included as predictors of wages at level 1, and the proportion of workers employed in foreign firms at the state level during the previous ENESTYC survey are used as predictors at level 2. Cross-level interaction terms between foreign investment at the state and firm levels allow us to distinguish whether foreign investment has a positive effect on wages in foreign and domestic firms. Second, in order to examine the effect that changes in level of foreign investment at the regional level have on workers' wages we aggregate information from the ENESTYC surveys to construct a three-wave panel of Mexican states and test a fixed effects model.

Multilevel Models

The regression model used to test the spillover effect of foreign investment is of the form:

$$y = \beta_1 \cdot \text{foreignfirm} + \beta_2 \cdot \text{domesticfirm} + \sum_{j=3}^k \beta_j X_j + \varepsilon$$

where y is the log average income for workers in each occupational and gender category for a given firm. The dummy variables *foreignfirm* and *domesticfirm* indicate whether the firm is foreign- or domestically-owned. Since these two dummy variables are complementary, the intercept is removed from the equation in order to avoid perfect multicollinearity. The random coefficients β_1 and β_2 are modeled as linear functions of the proportion of workers in a state employed in foreign firms according to the preceding ENESTYC survey, *PFOR*. We use information from the preceding survey (the 1992 survey in the models for 1999 and the 1999 survey in the models for 2001) because we expect the effect of greater foreign investment on the wages of workers in other firms to be lagged.¹³ Once we substitute β_1 and β_2 with the level-2 equations, the model for wages becomes:

$$y = (\gamma_{10} + \gamma_{11} \cdot \text{PFOR} + u_1) \cdot \text{foreignfirm} + (\gamma_{20} + \gamma_{21} \cdot \text{PFOR} + u_2) \cdot \text{domesticfirm} + \sum_{j=3}^k \beta_j X_j + \varepsilon$$

In these models γ_{11} and γ_{21} measure the effect of a greater presence of foreign investment at the state level on wages in foreign and domestic firms respectively. Finally, X_j are the remaining firm-level predictors centered around their state means such that the random intercepts may be interpreted as the income received by the average worker in the average firm in the state. We use reduced form models in which non-significant firm-level predictors in the full model in Table 1 are excluded.

The results of our multilevel models for 1999 and 2001 shown in Table 3 indicate a consistent spillover effect from foreign to domestic firms: a higher proportion of manufacturing workers employed in foreign-owned firms significantly increases the wages paid by domestic firms in both years. Interestingly, a greater presence of foreign firms does not increase wages in foreign-owned enterprises suggesting that the spillover effect is primarily from foreign to domestic firms rather than between foreign firms within a state. The remaining variables in the models for all three years are generally consistent with our previous findings.

Fixed Effects Models

The multilevel regression models presented in Table 3 take full advantage of the firm-level information available in the ENESTYC surveys. Lagging our state-level measure of foreign investment also helps ensure that the spillover effect is not contemporaneous. However, these models do not test how changes in the level of foreign investment may affect changes in wages paid to workers within a given state. They also do not control for other time-invariant state-level characteristics that may affect the wages paid to manufacturing workers. To accomplish these tasks we tested a fixed effects model using a dataset constructed by aggregating our firm-level measures by state for every year in which the ENESTYC surveys were available. This new dataset consists of a panel of 32 states with repeated measures for three years: 1992, 1999 and 2001. Our dependent variable in the regression models is the

¹³In models not presented here we tested the effect of foreign investment in the same year and found similar results.

state-level average wages in manufacturing firms (logged). The proportion of workers in each state employed in foreign-owned firms is entered as a predictor of the average wages. Other control variables are also created using the data from the ENESTYC surveys. These variables include basic determinants of wages such as the average education level of workers in the state, their average tenure, and the proportion of female workers. Finally, we control for differences in the level of economic development in each state by introducing the state-level GDP per capita as a predictor of wages (INEGI 2000, 2003).¹⁴ Although this is a limited set of predictors, fixed effects models have the advantage of automatically controlling for any remaining time-invariant state-level characteristics.

Table 4 shows the results of our fixed effects model for average manufacturing wages in Mexican states. The results indicate that an increase in foreign investment at the state level (measured by the proportion of manufacturing workers employed in foreign firms in the state) results in an increase in average wages. The results strongly suggest that foreign investment has indeed benefited workers in manufacturing firms in Mexico by raising their average wages. Given the disproportionate allocation of foreign investment in some Mexican states (such as those along the U.S. border), as opposed to others (such as those in Southern Mexico), the results of the fixed effects model also suggest that foreign investment may have exacerbated the income inequality across Mexico's regions.

Discussion and Conclusions

Our analysis has demonstrated that foreign investment and export production have a positive effect on wages in Mexico: Not only do foreign and export-oriented firms pay workers significantly more than other firms even after controlling for other relevant firm and worker characteristics, but they also appear to raise regional wage levels.¹⁵ It might at first seem difficult to reconcile these positive effects of foreign and export firms on workers' wages in Mexico with the harmful effects of foreign investment and export production found by researchers using cross-national research methods. Over the past two decades, researchers in the dependency theory tradition and many others have found foreign direct investment and export production to be associated with increasing levels of inequality at the national level (Bornschieer and Chase-Dunn, 1985; Alderson and Nielsen, 1999). However, the results of our statistical analysis are actually consistent with those of researchers using cross-national research methods. As we noted earlier, foreign firms may increase income inequality even while they raise wages. They may increase inequality in three different ways: First, by paying higher wages, foreign firms create a gap between workers employed in the foreign and domestic sectors. Second, our analysis further revealed higher wage premiums for workers in higher occupational groups. By raising the wages of white-collar workers and managers more than those of blue-collar workers, foreign firms may therefore be worsening an already unequal income distribution. Finally, the results of our spillover models suggest that workers in regions of the country with a greater presence of foreign investment receive higher wages. Since foreign firms are more likely to operate in certain states such as those located near the U.S. border, foreign investment flows may also be increasing inequality across regions. All these findings are highly suggestive of a positive association between

¹⁴The state-level measure of GDP was not available for 1992. We therefore used the 1993 values for that year instead.

¹⁵Wages are an important indicator of the effect of foreign investment and export production, but they are not the only one. Multinational companies may have other harmful effects including damage to the environment, the suppression of labor unions, and a distortion of host countries' political systems. Our analysis should therefore not be interpreted as a wholesale defense of multinational corporations in the developing world. Similarly, the ENESTYC surveys do not contain questions that would allow us to assess whether multinational companies are more likely to engage in sweatshop practices. For example, we are unable to determine whether foreign and export-oriented firms provide unsafe or unsanitary conditions for their workers. However, a comparison of the average number of hours worked per week revealed that skilled and unskilled blue-collar workers work fewer hours in foreign and export-oriented firms.

foreign investment and income inequality in Mexico. However, a proper test of the effect that foreign firms have on the income distribution requires more detailed information than currently available in our surveys. Our study does, however, demonstrate that foreign investment may simultaneously raise average wage levels and increase inequality, thereby reconciling findings from previous studies.

At a theoretical level, our paper has attempted to show how sociological research on labor markets can be brought to bear on the debate about the effects of globalization, and how globalization research can in turn inform labor market theory. The labor market approach we are proposing has the advantage of empirically grounding the globalization debate which has often been carried out in very broad, generalized terms. Labor market theory allows us to specify the micro-level mechanisms through which foreign investment and export production may affect workers' lives. Our analysis may therefore be seen as an attempt to "bring the firms in" to globalization research. Globalization research in turn has the potential to advance labor market theory by highlighting the importance of international factors in the determination of wages. Specialists on labor markets and organizations have so far mostly ignored the effect that foreign ownership of a firm and its focus on export production may have on workers' wages. Yet our analysis has shown that they have a strong, independent effect. Future work should strive to better understand why that is.

Many of the hypotheses derived from well-established labor market theories failed to explain the higher wages paid by foreign and export-oriented firms. Factors such as the size of firms, their location, industry, productivity and use of advanced technologies did not fully account for the wage premium. Instead, our analysis suggests that wages in foreign-owned affiliates are tied to the conditions in the parent companies abroad. Data limitations prevented us from properly testing the effect of profit sharing between parent companies in other countries and workers in Mexican affiliates. However, our finding that the wage premium in foreign-owned manufacturing firms is proportional to the industry-specific wage differential between the country of origin of the capital investment and Mexico is consistent with findings from studies by Budd, Konings and Slaughter (2005) and Budd and Slaughter (2004), that find more direct evidence of profit sharing across borders. Of course, the evidence for profit sharing is only suggestive. More research is required into the finances and operations of multinational companies in order to corroborate that savings on labor costs are indeed passed on to workers in foreign affiliates. In particular, financial information from both parent companies and foreign affiliates would be required to further test this hypothesis and rule out competing explanations. As firms' operations increasingly span more than one country it is essential that sociological analysis of firms do the same.

So far, economists have taken the lead in analyzing the effects of foreign investment and export production at the firm level. Economic research has made important contributions to our knowledge of the wages paid by multinational firms. However, economists have focused on a limited set of explanatory factors. In particular, they have emphasized the importance of productivity differences in explaining the wage premium paid by foreign and export-oriented firms. Our analysis has shown that productivity differences are insufficient to explain the wage disparity. Instead, the higher wages paid by foreign and export-oriented firms involve processes that are beyond standard economic theory, and for which sociological research is especially well-suited. A rich tradition of sociological work has already shown how workers' earnings are greatly influenced by the types of organizations they work for. By applying and extending the insights from these earlier works sociologists may disentangle how global phenomena such as international investment and trade flows affect the lives of workers worldwide.

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Figure 1.
Regression Coefficients from Full Models Predicting Log Average Wages for Workers in
Four Occupational Groups, 2001*

* n.s. indicates coefficient is not statistically significant at .05 level.

Table 1

Regression Models of Log Average Wages on Firm and Worker Characteristics, 2001

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<u>Firm Characteristics</u>						
Proportion Foreign Investment	0.221** (0.041)					
Proportion Export Sales		0.128** (0.033)				
Maquiladora			0.079* (0.035)			
Foreign-owned export firm			0.180** (0.045)	0.187** (0.037)	0.205** (0.038)	
Foreign-owned non-export firm			0.362** (0.025)	0.243** (0.024)	0.230** (0.030)	
Domestic export firm			0.073* (0.035)	0.075 (0.039)	0.097* (0.041)	
Firm size (/10,000)				0.395** (0.144)	0.286* (0.128)	
Total capital investment				0.002 (0.008)	0.009 (0.009)	
Part of a large conglomerate				0.099** (0.025)	0.101** (0.025)	
Years of operation of firm				0.002** (0.000)	0.002** (0.001)	
Proportion unionized				0.027 (0.034)	0.033 (0.034)	
Productivity				0.048** (0.010)	0.048** (0.013)	
Percent automated equipment				0.137** (0.030)	0.113** (0.031)	

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Research and development					0.068 ^{**} (0.021)	0.053 [*] (0.024)
Quality control certification					0.066 [*] (0.028)	0.053 (0.028)
<u>Industries</u>						
Food, beverages and tobacco						0.026 (0.035)
Wood and wood products						-0.021 (0.049)
Paper products and printing						0.131 [*] (0.052)
Chemical industries, various						0.106 ^{**} (0.037)
Mineral products non-metal						0.116 (0.068)
Basic metal industries						0.110 [*] (0.052)
Metal prods., machinery, eqmt.						0.103 ^{**} (0.036)
Other industries						-0.325 ^{**} (0.102)
<u>Regions</u>						
Border						0.026 (0.031)
Mexico City area						0.032 (0.028)
<u>Worker Characteristics</u>						
Skilled blue collar	0.299 ^{**} (0.025)	0.293 ^{**} (0.023)	0.295 ^{**} (0.023)	0.299 ^{**} (0.023)	0.324 ^{**} (0.024)	0.347 ^{**} (0.024)
White collar	0.595 ^{**}	0.575 ^{**}	0.571 ^{**}	0.594 ^{**}	0.623 ^{**}	0.636 ^{**}

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Managers	(0.037) 1.628** (0.060)	(0.034) 1.594** (0.059)	(0.034) 1.591** (0.060)	(0.036) 1.628** (0.059)	(0.039) 1.704** (0.058)	(0.035) 1.738** (0.055)
Female	(0.009) -0.058** (0.009)	(0.009) -0.053** (0.009)	(0.009) -0.054** (0.009)	(0.009) -0.057** (0.009)	(0.009) -0.070** (0.009)	(0.009) -0.066** (0.009)
Proportion female	(0.047) -0.423** (0.063)	(0.043) -0.449** (0.059)	(0.042) -0.433** (0.058)	(0.044) -0.425** (0.062)	(0.042) -0.282** (0.056)	(0.044) -0.227** (0.052)
Proportion permanent	0.077 (0.063)	0.075 (0.059)	0.089 (0.058)	0.082 (0.062)	0.119* (0.056)	0.161** (0.052)
<u>Education Level</u>						
Proportion middle school	(0.040) 0.108** (0.040)	(0.037) 0.123** (0.037)	(0.037) 0.118** (0.037)	(0.038) 0.108** (0.038)	(0.039) 0.095* (0.039)	(0.040) 0.066 (0.040)
Proportion high school	(0.055) 0.203** (0.055)	(0.051) 0.231** (0.051)	(0.051) 0.232** (0.051)	(0.053) 0.206** (0.053)	(0.056) 0.168** (0.056)	(0.051) 0.151** (0.051)
Proportion college or more	(0.071) 0.484** (0.071)	(0.069) 0.526** (0.069)	(0.070) 0.533** (0.070)	(0.070) 0.479** (0.070)	(0.072) 0.436** (0.072)	(0.066) 0.379** (0.066)
<u>Tenure</u>						
Proportion 1 to 3 years	(0.052) 0.096 (0.052)	(0.049) 0.100* (0.049)	(0.049) 0.100* (0.049)	(0.050) 0.093 (0.050)	(0.053) 0.113* (0.053)	(0.038) 0.075* (0.038)
Proportion 3 to 5 years	(0.061) 0.164** (0.061)	(0.057) 0.176** (0.057)	(0.056) 0.175** (0.056)	(0.059) 0.165** (0.059)	(0.050) 0.103* (0.050)	(0.038) 0.076* (0.038)
Proportion 5 to 10 years	(0.065) 0.240** (0.065)	(0.062) 0.255** (0.062)	(0.060) 0.246** (0.060)	(0.062) 0.235** (0.062)	(0.059) 0.182** (0.059)	(0.051) 0.135** (0.051)
Proportion 10 to 20 years	(0.065) 0.345** (0.065)	(0.065) 0.352** (0.065)	(0.063) 0.344** (0.063)	(0.064) 0.347** (0.064)	(0.064) 0.259** (0.064)	(0.059) 0.246** (0.059)
Proportion more than 20 years	(0.067) 0.571** (0.067)	(0.065) 0.577** (0.065)	(0.064) 0.557** (0.064)	(0.064) 0.570** (0.064)	(0.063) 0.420** (0.063)	(0.061) 0.373** (0.061)
Constant	(0.071) 1.069** (0.071)	(0.068) 1.071** (0.068)	(0.067) 1.086** (0.067)	(0.070) 1.055** (0.070)	(0.073) 0.752** (0.073)	(0.069) 0.673** (0.069)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
R-squared	0.7048	0.6980	0.6961	0.7060	0.7256	0.7349
number of firms (clusters)	4296	4296	4296	4296	4195	3357

* p<.05
 ** p<.01 (two-tailed tests)

Table 2

Regression Model including Relative Labor Costs as a Predictor, 2001

Variables	Model 1	Model 2
<u>Firm Characteristics</u>		
Proportion Foreign Investment	0.208** (0.031)	0.071 (0.053)
Relative Labor Costs		0.009** (0.003)
Firm size (/10,000)	0.296* (0.122)	0.295* (0.120)
Total capital investment	0.009 (0.009)	0.009 (0.009)
Part of a large conglomerate	0.090** (0.025)	0.089** (0.025)
Years of operation of firm	0.002** (0.001)	0.002** (0.001)
Proportion unionized	0.059 (0.035)	0.058 (0.035)
Productivity	0.048** (0.013)	0.047** (0.013)
Percent automated equipment	0.112** (0.031)	0.109** (0.031)
Research and development	0.055* (0.023)	0.054* (0.023)
Quality control certification	0.056* (0.027)	0.053* (0.027)
<u>Industries</u>		
Food, beverages and tobacco	0.004 (0.035)	0.000 (0.035)
Wood and wood products	-0.035 (0.051)	-0.038 (0.050)
Paper products and printing	0.110* (0.052)	0.098 (0.052)
Chemical industries, various	0.092* (0.036)	0.076* (0.037)
Mineral products non-metal	0.106 (0.063)	0.085 (0.062)
Basic metal industries	0.094 (0.051)	0.084 (0.051)
Metal prods., machinery, eqmt.	0.087* (0.037)	0.077* (0.037)

Variables	Model 1	Model 2
	(0.036)	(0.036)
Other industries	−0.346**	−0.369**
	(0.106)	(0.107)
<u>Regions</u>		
Border	0.027	0.031
	(0.028)	(0.028)
Mexico City area	0.017	0.018
	(0.031)	(0.031)
<u>Worker Characteristics</u>		
Skilled blue collar	0.350**	0.351**
	(0.024)	(0.024)
White collar	0.638**	0.640**
	(0.036)	(0.036)
Managers	1.743**	1.749**
	(0.055)	(0.055)
Female	−0.067**	−0.068**
	(0.010)	(0.010)
Proportion female	−0.214**	−0.208**
	(0.044)	(0.043)
Proportion permanent	0.162**	0.157**
	(0.053)	(0.053)
<u>Education Level</u>		
Proportion middle school	0.060	0.058
	(0.040)	(0.040)
Proportion high school	0.148**	0.147**
	(0.052)	(0.052)
Proportion college or more	0.378**	0.373**
	(0.067)	(0.067)
<u>Tenure</u>		
Proportion 1 to 3 years	0.073	0.074
	(0.039)	(0.039)
Proportion 3 to 5 years	0.067	0.066
	(0.039)	(0.039)
Proportion 5 to 10 years	0.128*	0.127*
	(0.051)	(0.050)
Proportion 10 to 20 years	0.237**	0.236**
	(0.059)	(0.058)
Proportion more than 20 years	0.359**	0.359**
	(0.061)	(0.061)
Constant	0.696**	0.703**

Variables	Model 1	Model 2
	(0.069)	(0.069)
R-squared	0.7346	0.7354
number of firms (clusters)	3357	3357

*
p<.05

**
p<.01 (two-tailed tests)

Table 3

Multilevel Regression Models Measuring the Spillover Effect of Foreign Investment at the Regional Level, 1999–2001

Variables	1999	2001
<u>Firm Characteristics</u>		
Foreign-owned firm		
Intercept	2.000 ** (0.033)	2.243 ** (0.034)
Proportion workers in foreign firms in state	0.154 (0.084)	−0.057 (0.100)
Domestic firm		
Intercept	1.766 ** (0.031)	2.002 ** (0.030)
Proportion workers in foreign firms in state	0.387 ** (0.078)	0.203 * (0.097)
Firm size	1.109 ** (0.250)	0.386 (0.199)
Part of a large conglomerate	0.107 ** (0.017)	0.111 ** (0.030)
Years of operation of firm	0.002 ** (0.001)	0.002 ** (0.000)
Productivity	0.051 (0.027)	0.049 ** (0.013)
Percent automated equipment	0.111 ** (0.029)	0.104 ** (0.024)
Research and development	0.029 (0.023)	0.045 * (0.020)
<u>Industries</u>		
Food, beverages and tobacco	0.092 (0.048)	0.015 (0.038)
Wood and wood products	0.163 (0.091)	−0.014 (0.035)
Paper products and printing	0.196 ** (0.047)	0.103 (0.066)
Chemical industries, various	0.199 ** (0.040)	0.097 ** (0.037)
Mineral products non-metal	0.154 ** (0.037)	0.077 (0.070)
Basic metal industries	0.253 ** (0.093)	0.098 (0.052)

Variables	1999	2001
Metal prods., machinery, eqmt.	0.190** (0.036)	0.103** (0.036)
Other industries	0.097 (0.095)	0.288** (0.098)
<u>Worker Characteristics</u>		
Skilled blue collar	0.270** (0.022)	0.352** (0.024)
White collar	0.616** (0.030)	0.644** (0.031)
Managers	1.588** (0.052)	1.756** (0.056)
Female	-0.084** (0.012)	-0.069** (0.012)
Proportion female	-0.188** (0.046)	-0.185** (0.031)
Proportion permanent	0.192** (0.048)	0.178** (0.048)
<u>Education Level</u>		
Average years of education	-0.085** (0.027)	-0.020 (0.031)
Average years of education squared	0.007** (0.001)	0.003 (0.001)
<u>Tenure</u>		
Average years of tenure	0.017** (0.002)	0.015** (0.002)
<u>Variance Components</u>		
Foreign-owned firm slope	0.1207**	0.1400**
Domestic firm slope	0.1600**	0.1514**
Level 1	0.6046	0.4843

*
p<.05

**
p<.01 (two-tailed tests)

Table 4

Fixed Effects Model of Log Average Manufacturing Wages in Mexican States, 1992–2001

	Model
Proportion workers in foreign-owned firms	0.486** (0.178)
Average years of education of workers	0.116** (0.037)
Average years of tenure of workers	0.048** (0.014)
Proportion female workers	−0.858* (0.357)
State-level GDP per capita	−0.009 (0.020)
Year 1999	0.052 (0.048)
Year 2001	0.111 (0.057)
Constant	−0.713 (0.459)
R-squared within	0.5432
R-squared between	0.3132
R-squared overall	0.4020