Foreign Direct Investment, Product Sophistication and the Demand for Skilled and Unskilled Labor in Chilean Manufacturing*

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Abstract

This paper uses plant-level data from the manufacturing sector of Chile for the period 1995-2007 to analyze the existence of spillovers effects from FDI, and the role of product sophistication, on the demand for skilled and unskilled labor. We find that the presence of multinational corporations increases the demand for highly skilled labor while it decreases the demand for unskilled labor on firms located in the same industry and region and also on firms located in the same region but operating in different industries. The effect is more substantial for firms producing less sophisticated products, suggesting that, at least for Chile, lower levels of sophistication can make it easier for local firms to learn from multinational corporations. We also find that the spillover effects are more important for plants that are small and for those that do not participate in international markets as either exporters or importers. This paper contributes to the literature by showing that product sophistication can have a significant effect on the magnitude of FDI spillovers on the demand for both skilled and unskilled labor.

Keywords: *foreign direct investment, product sophistication, demand for labor*

JEL Codes: F14, F16, F66

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1. Introduction

The importance of multinational corporations (MNCs) in the world economy has increased dramatically over the last decades. In 2016, the amount of foreign direct investment in the world reached $2,397.6 billion compared to only $196.3 billion in 1990.[1] This is important because MNCs activities can have positive effects on both home and host countries. For the case of host countries, there is a vast literature examining spillover effects from MNCs on productivity and wages using data at various levels of disaggregation, including industry, firm, and plant or establishment.

In the literature, lots of work has been done studying the effects from MNCs on productivity and wages. However, there are only a few papers analyzing the impacts of FDI on employment. The purpose of this paper is to contribute to and complement the literature on spillover effects from MNCs. This study uses plant-level data from Chilean manufacturing to examine the spillover effects from FDI on the demand for skilled and unskilled labor. The analysis focuses on regional, industrial and regional-industrial spillover effects and explicitly takes the role of product sophistication into account. As far as we know, this is the first paper to consider the role of product sophistication on spillover effects from FDI.

Chile is an interesting case to analyze. It is one of the countries in South America that is most open to FDI and has received relatively more FDI than other Latin American countries of similar size and level of development. According to the World Bank's World Development Indicators, between 2000 and 2017, the net inflows of FDI as a percent of GDP in Chile averaged 7.0%, compared to 3.3% for Brazil, 2.0% for Argentina, 2.7% for Mexico, and 3.8% for Colombia. For

[1] Data source: World Bank.

the entire Latin American and the Caribbean region, the net inflows of FDI averaged 3.2% of the region's GDP.

In the case of Chile, there has been a significant shift in the relative demand for skilled labor. Figure 1 presents the evolution of the shares of both skilled and unskilled labor in the Chilean manufacturing sector. The graph shows an increasing trend in the share of skilled labor, which rises from 26.5% in 1995 to 38.7% in 2007.

There is also an increase in the importance of FDI in Chilean manufacturing during the period 1995-2007. Figure 2 shows a clear and robust increasing trend for the share of foreign-owned plants on total employment in the entire manufacturing sector. While the shares of foreign-owned plants on the sector level of value added and exports have fluctuated, in general, there are growing trends for those variables during the sample period. Figure 2 also reveals that while foreign-owned plants represent a small fraction of all plants in the manufacturing sector, they account for a large fraction of employment (17.5%), value added (24%), and exports (39%) in 2007.

The main result of this paper is that the presence of multinational corporations increases the demand for highly skilled labor while it decreases the demand for unskilled labor on firms located in the same industry and region, as well as firms in the same region but operating in different industries, and the effect is more substantial for firms producing less sophisticated products, suggesting that lower levels of sophistication can make it easier for local firms to learn from multinational corporations. The paper also finds that the effects are more important for plants that are small and for those establishments that don't participate in international markets either as exporters or importers.

The paper is organized as follows. Section 2 reviews the existing literature. Section 3 describes the econometric approach and the data used. Section 4 presents and analyzes the regression results. Section 5 presents the results of extensions to the basic analysis and robustness checks. Finally, Section 6 presents the conclusions and the implications of this study.

2. Literature Review

With regard to effects from MNCs on productivity, it is commonly argued that the presence of MNCs may increase the productivity of domestic firms through at least three channels (see, for example, Görg and Strobl, 2001, and Görg and Greenaway, 2004): Labor turnover, demonstration effects, and competition effects. Labor turnover refers to the transfer of knowledge about technologies, product designs, and managerial practices from foreign to domestic firms due to the movement of labor (mostly skilled workers) from MNCs to domestic firms.

Demonstration effects occur when domestic firms observe what foreign companies do, and copy their technologies, or product designs. Competition effects refer to the possibility that the increase in the level of competition in the domestic market, due to the entry of MNCs, may force domestic firms to become more productive in order to survive. Note, however, that it is possible that the entry of MNCs may have a negative effect on domestic firms' productivity if these firms are forced to reduced their production levels.

Empirically, the literature finds mix evidence of spillovers, with the results depending on the country under consideration, the type of data used (industry vs. firm- or plant-level; cross section

vs. panel), how the presence of MNC is measured, whether the study examines intra-industry or inter-industry spillovers and/or regional spillovers.

Early studies on productivity spillovers from MNCs, such as Caves (1974) for Australia, Globerman (1979) for Canada, Blomström (1986) and Kokko (1994, 1996) for Mexico, and Driffield (2001) for the UK, examined a cross section of data aggregated at the industry level, and found a positive effect of MNCs' presence on the productivity of domestic firms. Since these studies use a cross section of data, these studies cannot disentangle the causal relationship between FDI and productivity. The positive correlation between FDI and productivity may simply reflect that MNCs tend to locate in high-productivity sectors.

Access to disaggregated data at the firm-level allowed scholars to investigate productivity spillovers using panel data estimation techniques on a large number of observations. This has the advantage that it is possible to establish a causal relationship between FDI and domestic productivity. The first group of studies in this group either find no relationship between FDI or that FDI has a negative effect on domestic firms' productivity. Haddad and Harrison (1993), for example, find a negative although statistically insignificant effect of FDI the productivity of Moroccan firms for the period 1985-1989. Other papers find not only a negative but also significant effect of FDI on productivity of local firms. Examples include Aitken and Harrison (1999), which finds a negative and significant spillover effect of FDI on productivity in Venezuela for the period 1976-1989, Djankov and Hoekman (2000), which finds negative productivity spillovers in the Czech Republic during 1993-1996, and Kathuria (2000), which finds a negative spillover effect using firm-level data from India for 1976-1989.

Javorcik (2004, p. 606) argues that "since multinationals have an incentive to prevent information leakage that would enhance the performance of their local competitors, but at the

same time may benefit from transferring knowledge to their local suppliers, spillovers from FDI are more likely to be vertical than horizontal in nature." This means that productivity spillovers from FDI are more likely to be inter-industry (from MNCs to their suppliers) rather than intra-industry or horizontal (from MNCs to their competitors). Using firm-level data from Lithuania, Javorick (2004) finds strong evidence of positive productivity spillover effects from FDI on input suppliers and no evidence of horizontal spillovers. Using firm-level data in China's manufacturing sectors between 1998 and 2001, Wei and Liu (2006) find positive intra- and inter-industry productivity spillovers from FDI within regions. Alvarez and López (2008) find a similar result for Chile using plant-level data from the manufacturing sector.

In regards to wage spillovers, Feenstra and Hanson (1997) find that FDI increased the relative wage of skilled labor in Mexico during 1975-1988, a period characterized by an increase in outsourcing by U.S. firms. For the United States, Fligio and Blonigen (2000) use county-level data for South Carolina from 1980 through 1995 and find that foreign investment raises local real wages. A study for the United Kingdom, Girma, Greenaway and Wakelin (2001), uses firm-level panel data for the manufacturing between 1991 and 1996 and find no evidence of either wage or productivity spillovers of FDI on domestic firms. A paper by Driffield and Girma (2003), however, finds positive spillovers of FDI on wages of skilled workers, but not on wages of unskilled workers, in domestic firms in the UK electronics sector, and that the effect is highly localized. Using data from Indonesian manufacturing industries, Lipsey and Sjöholm (2004) show that the presence of FDI increases the average wages in domestically owned plants.

While there is abundant evidence of the effects of FDI on productivity and wages, there is little research on the impacts of FDI on employment (Waldkirch, 2015). One exception is

Driffield and Taylor (2000), who use sector-level data in UK to show that FDI tends to increase the demand of skilled labor in the manufacturing industries.

Previous studies find positive effects of FDI on employment, but the effects are usually small. Waldkich et al. (2009), for example, find that FDI had a positive and significant effect on employment of both blue and white collar workers using industry-level data for Mexico, but the magnitude of the impact is, however, relatively small. A related strand of literature shows that, since the late 1970s, within most industries, the relative demand for skilled labor keeps growing (Blonigen and Slaughter, 2001), although there is no conclusive evidence on the source of this skill upgrading. Feenstra and Hanson (1995, 1996) explain that one of the main forces that lead to the upgrading is outsourcing. Krueger (1998), however, argues that the effect of outsourcing is not robust in multisector models. Based on Robbins (1996) skill-enhancing trade hypothesis, one argument is that firms benefit from import activities by getting access to new technology, and the process is skill-biased, which means there should be skill-biased upgrading for importers.

Taking the role of firms' characteristics into consideration, Harrison and Hanson (1999) demonstrate that exporters are likely to have a more significant share of skilled workers than non-exporters. Using firm-level data from U.K. manufacturing industries, Girma, Görg, and Pisu (2008) finds that export-oriented multinationals have positive horizontal spillovers on productivity, and domestic-market-oriented multinationals have positive productivity spillovers on both exporters and non-exporters. Sinani and Meyer (2004) show that small non-exporting firms benefit more from technology transfer from FDI compared with other types of domestic firms using firm-level data in Estonia. For wages, Barry, Görg, and Strobl (2005) find that for domestic firms in Ireland, the presence of FDI has no significant effect on wages in non-exporters in the same sector, but it has a negative effect on domestic exporting firms.

The relationship between product sophistication and economic growth has been explored in previous studies. Xu and Lu (2009) examine the export level sophistication variations in China's manufacturing industries. Similarly, Jarreau and Poncet (2012) find that there is significant variation in export sophistication at the province level in China, which turns out to have an important effect for growth.

There are also a few studies using Chilean data to investigate the relationship between foreign technology and skilled labor demand. Using data for Chilean manufacturing plants from 1979 to 1986 Pavcnik (2003) shows that there's no robust causality between foreign technical assistance and increased demand for skilled workers. Gallego (2015) uses sectoral level data to prove that technology transfers from developed countries to developing countries are critical for skill upgrading.

3. Data Description and Econometric Approach

The paper uses plant-level data from the Chilean manufacturing sector for the period 1995-2007. The data come from the Annual National Industrial Survey, which is carried out by the National Institute Statistics of Chile. The dataset has detailed information for all manufacturing plants with 10 or more workers, including sales value, value added, ownership type (domestic or foreign-owned), imports, exports, and other plant characteristics. This rich dataset also employment at a disaggregate level, including the number of managers, technicians, administrators, direct workers, indirect workers, and service workers for each plant.

Table 1 shows the number of plants for each ownership type, domestic and foreign owned, for each year in the sample period. In this paper, we define a plant as foreign owned if the share

of foreign ownership of the plant is greater than zero.[2] On average, the data set has around 5,100 plants each year, with about 6% of them being foreign owned. According to the statistical summary in Table 1, there are on average, 860 exporters, 3,930 non-exporters, 930 importers, 3,860 non-importers, 3,600 small plants (10-49 employees), 810 medium plants (50-149 employees) and 400 large plants (150 and more employees) each year.

Table 1 also shows the distribution of domestic plants, i.e., plants with zero amount of foreign ownership, by export and import status, and size. As seen in the table, most domestic plants in Chile do not export or import, and they tend to be small (less than 50 employees) or medium size (between 50 and 149 workers).

The empirical analysis starts by estimating the following equation:

$$\ln(s_{ijrt}) = \alpha + \beta_1 FDI_{jrt} + \beta_2 FDI_{j-rt} + \beta_3 FDI_{-jrt} + \Theta Z_{ijrt} + \delta_i + \delta_t + \epsilon_{ijrt}, \quad (1)$$

where s_{ijrt} is the share of skilled (or unskilled) labor in plant *i* from industry *j* located in region *r* at time *t*, FDI_{jrt}, FDI_{j-rt} and FDI_{-jrt} are measures of foreign direct investment in the same industry and region, same industry but different regions, and same region but different industries, respectively, while Z_{ijrt} is a vector of plant characteristics, which includes size (total employment), age (the number of years the plant has been in operation since the start of the sample period), the capital-labor ratio, total factor productivity (TFP), the average wage for each plant, a dummy variable equal to one for plants that export, a dummy for plants that import, and a dummy for plants that use foreign technology licenses. The regression also includes plant fixed effects (δ_i) to control for unobserved and time-invariant heterogeneity at the plant level, and year

[2] Using alternative definitions of foreign ownership based on at least 10% or 15% of foreign ownership, does not change the results of this study.

fixed effects (δ_t) to control for aggregate shocks such as changes in government policies or business cycles.

TFP is measured as the residual of a regression that estimates a Cobb-Douglas production function for each three-digit level ISIC industry using the method proposed by Olley and Pakes (1996) and later modified by Levinsohn and Petrin (2003), which corrects for the simultaneity bias associated with the fact that productivity is not observed by the econometrician, but it may be observed by the firm. In some cases, the production functions were estimated at the two-digit level owing to the relative small number of observations available for some industries at the three-digit level of disaggregation. The average wage is calculated by dividing the total wage paid by the total number of workers.

We use the share of value added to measure the levels of FDI presence in each industry and region, which are calculated as follows:

$$FDI_{jrt} = \frac{\sum_{i \in jr}\left(D_{ijrt} v_{ijrt}\right) - D_{ijrt} v_{ijrt}}{\sum_{i \in jr} v_{ijrt}},$$

$$FDI_{j-rt} = \frac{\sum_{i \in j}\left(D_{ijrt} v_{ijrt}\right) - \sum_{i \in jr}\left(D_{ijrt} v_{ijrt}\right)}{\sum_{i \in j} v_{ijrt} - \sum_{i \in jr} v_{ijrt}},$$

$$FDI_{-jrt} = \frac{\sum_{i \in r}\left(D_{ijrt} v_{ijrt}\right) - \sum_{i \in jr}\left(D_{ijrt} v_{ijrt}\right)}{\sum_{i \in r} v_{ijrt} - \sum_{i \in jr} v_{ijrt}},$$

where D_{ijrt} is a dummy variable equal to 1 if plant *i* has any amount of foreign ownership at time t, and v_{ijrt} is the value added of plant *i* from industry *j* located in region *r* at time *t*. When we calculate FDI_{jrt}, we exclude the plant under consideration if it is foreign owned because it can not generate spillovers to itself.

We examine the role of product sophistication by using an index introduced by Hausmann et al. (2007) called $PRODY_{jt}$, which is defined as a weighted average of the GDP per capita for all countries exporting a certain product, where the weights reflect the revealed comparative advantage of each country producing that product:

$$PRODY_{jt} = \sum_{c} \frac{\left(\frac{x_{cjt}}{X_{ct}}\right)}{\sum_{c} \frac{x_{cjt}}{X_{ct}}} Y_{ct},$$

where x_{cjt} is country *c*'s exports of product *j* at year *t*, X_{ct} is total exports of country *c* at year *t*, and Y_{ct} is the GDP per capita of country *c* at year *t*. Exports (3-digit level) and GDP per capita data come from the WITS data set. Intuitively, the index represents the relative quality of a country's total export. By constructing the sophistication index in this way, we can connect the sophistication level of a particular good with the income level of all the countries exporting that good. We assume that goods exported by a country are expected to be at the country's production frontier. Thus, a good exported more intensively by relatively high-income countries should be more sophisticated. Similarly, a good exported more intensively by relatively low-income countries should be less sophisticated. According to Haussmann et al. (2007), using the revealed comparative advantage as weights helps eliminate the possibility that country size might affect the ranking of product sophistication.

When we calculate the index for each 3-digit level industry, for consistency, we only use data from countries having continuous export activities of that industry during the entire sample period. After adjusting the GDP per capita data to the 2005 price level index, we take the average of $PRODY_{jt}$ for the whole sample period to get an averaged product sophistication index $PRODY_j$ for each product *j*. Then, we construct a dummy variable HS_j for product *j* to indicate whether

the sophistication index of product *j* is above the median sophistication level for all the goods produced in Chile. We include this measure in equation (1) interacted with the measures of FDI and estimate:

$$\ln(s_{ijrt}) = \alpha + \beta_1 FDI_{jrt} + \beta_2 FDI_{j-rt} + \beta_3 FDI_{-jrt} + \gamma_1 FDI_{jrt} \times HS_j + \gamma_2 FDI_{j-rt} \times HS_j + \gamma_3 FDI_{-jrt} \times HS_j + \Theta Z_{ijrt} + \delta_i + \delta_t + \epsilon_{ijrt}. \quad (2)$$

Table 2 presents descriptive statistics for all variables used in the empirical analysis, including the three measures of FDI, for all the manufacturing plants in the data set as well as for the sample of domestic plants. Since the majority of plants in the data set are domestically-owned, the summary statistics for these two groups are very similar. Among all the observations, there are plants that change the ownership type during the sample period. The number of unique plants that ever change from foreign owned to domestic is 399, and the number of unique plants that change from domestic to foreign owned is 614.

For the rich dataset we use in this paper, we have detailed information on both skilled and unskilled labor. In addition to the share of total skilled labor, we also use three other measures of skilled labor at a more disaggregate level, which are the share of managers, the share of technicians and the share of administrative workers on total employment. In this dataset, technicians include highly educated workers, such as engineers, that work in the plant's production facilities, while administrative workers include all employees who work in the establishment's office, including data analysts and accountants.

Similarly, we use additional measures of unskilled labor, including the share of total unskilled labor, the share of direct workers, the share of indirect works and the share of services workers on total employment. Direct workers include all unskilled workers that are directly involved in the

production process. Indirect workers are those unskilled workers who are not directly involved in the production process, such as workers in charge of the maintenance of machines and equipment. Services workers provide services such as transportation, cleaning, and food services.

4. Basic Results

We begin our analysis by estimating equations (1) and (2) for the share of skilled labor, using all the plants in the data set for the entire period. The results are presented in columns (1) and (2) of Table 3. We can see that the estimated coefficient of FDI in the same region but different industries is positive and statistically significant for the skilled labor share. Since the share of unskilled labor is simply one minus the share of skilled labor, the estimated coefficient for the unskilled labor share is the same as the one for the share of skilled labor but with opposite sign. In other words, FDI in the same region but different industries has a positive effect on the share of skilled labor but a negative effect on the unskilled labor share. We also observe that FDI in the same industry and region seems to have a positive effect on the share of skilled labor but a negative effect on the unskilled labor share. The estimate for the FDI variable in the same industry but different regions is not statistically significant.

In terms of the interaction terms between the FDI variables and the measure of sophistication, we see that the ones for FDI in the same region and industry has the opposite sign as the estimates for the FDI variables. This means that the effect of FDI on the demand for labor is lower, the higher the sophistication level of the sector is. The same picture arises when looking at the interaction terms between the sophistication measure and FDI in the same region but different industries. Finally, the interaction terms for the sophistication measure and FDI in the same industry but different regions are not statistically significant.

The previous results use data for all the plants, domestic and foreign-owned, in the dataset. To better understand the effect of FDI spillovers on domestic plants, we now restrict the sample to domestic plants. Columns (3) and (4) of Table 3 show the results for domestic plants. Since the majority of the plants in the data are domestically owned, the estimates are similar than the ones using all plants.

Table 4, Panel A, shows the spillover effects of FDI distinguishing across different categories of skilled labor. Here, we divide all skilled workers into three categories: managers, technicians and administrative workers. First, we observe that FDI in the same region and industry increases the demand for technicians. FDI in the same industry but different regions increases the demand for technicians but decreases the demand for managers and administrative workers. Finally, FDI in the same region but different industries increases the demand for technicians. The estimates for these variables interacted with the sophistication dummy are generally of the opposite sign, suggesting once again that the effect of FDI is smaller in more sophisticated products.

Table 4, Panel B, shows the results for unskilled labor. We have three categories of unskilled workers, they are direct workers, indirect workers, and services workers. We see that FDI in the same region and industry reduces the demand for indirect workers, while FDI in the same industry but different regions decreases the demand for indirect workers but increases the demand for services workers. Finally, FDI in the same region but different industries reduces the demand for indirect workers. Again, the interactions with the sophistication variables show that the effect of FDI is lower for more sophisticated products.

Next, we divide the domestic plants' sample into different sub-samples according to export status, import status or plant size. According to the results in Table 5A and 5B, we find that FDI

has a more significant effect on non-exporters than exporters.[3] Table 5A shows the spillover effects of FDI distinguishing across different categories of skilled labor for both domestic exporters and domestic non-exporters. For non-exporters, we see that FDI in the same region and industry increases the demand for technicians. FDI in the same industry but different regions increases the demand for technicians but decreases the demand for managers and administrative workers. Finally, FDI in the same region but different industries increases the demand for technicians. For exporters, FDI in the same industry but different regions reduces the demand for managers. While FDI in the same region but different industries increases the demand for managers. The estimates for these variables interacted with the sophistication dummy are generally of the opposite sign, suggesting that the effect of FDI is larger in less sophisticated products.

Table 5B shows the result of unskilled labor. For non-exporters, we see that FDI in the same region and industry reduces the demand for indirect workers. However, FDI in the same industry but different regions decreases the demand for indirect workers but increases the demand for services workers. Finally, FDI in the same region but different industries reduces the demand for indirect workers. Again, the interactions with the sophistication variables show that the effect of FDI is lower for more sophisticated products. For exporters, FDI in the same industry but different regions reduces the demand for indirect workers. Same as before, the interaction with the sophistication variables show that the effect of FDI is smaller for more sophisticated products.

[3] According to Crespo and Fontoura (2007), FDI spillovers would be more evident for non-exporting domestic firms rather than domestic exporters.

Next, we test how the effects differ between importers and non-importers. Generally, non-importers benefit more from FDI than importers. Table 6A shows the spillover effects of FDI distinguishing across different categories of skilled labor for both domestic importers and domestic non-importers. For non-importers, we see that FDI in the same region and industry increases the demand for technicians. FDI in the same industry but different regions increases the demand for technicians but decreases the demand for managers and administrative workers. Finally, FDI in the same region but different industries increases the demand for technicians. For importers, FDI in the same industry and region increases the demand for both managers and administrative workers. FDI in the same industry but different regions reduces the demand for managers. However, FDI in the same region but different industries decreases the demand for technicians. The estimates for these variables interacted with the sophistication dummy are generally of the opposite sign, suggesting once again that the effect of FDI is smaller in more sophisticated products.

Table 6B shows the result of unskilled labor. For non-importers, we see that FDI in the same region and industry reduces the demand for indirect workers. Also, FDI in the same industry but different regions decreases the demand for indirect workers but increases the demand for services workers. Finally, FDI in the same region but different industries reduces the demand for indirect workers. For importers, FDI in the same industry and region decreases the demand for indirect workers. And FDI in the same industry but different regions has a slightly significant effect on the demand for service workers. Same as before, the interaction with the sophistication variables show that the effect of FDI is smaller for more sophisticated products.

In the last step, we compare the difference between small plants and medium to large plants. Table 7A shows the result for skilled labor. For small plants, we see that FDI in the same region

and industry increases the demand for technicians. FDI in the same industry but different regions increases the demand for technicians but decreases the demand for managers and administrative workers. Finally, FDI in the same region but different industries increases the demand for technicians. For medium to large plants, both FDI in the same region and industry and FDI in the same region but different industries increases the demand for managers. Again, the interactions with the sophistication variables show that the effect of FDI is lower for more sophisticated products.

Table 7B shows the spillover effects of FDI distinguishing across different categories of unskilled labor. For small plants, we see that FDI in the same region and industry reduces the demand for indirect workers. FDI in the same industry but different regions decreases the demand for indirect workers but increases the demand for services workers. Similarly, FDI in the same region but different industries decreases the demand for indirect workers but increases the demand for services workers. For medium to large plants, FDI doesn't have any significant effect on the demand for unskilled labor. The estimates for these variables interacted with the sophistication dummy are generally of the opposite sign, suggesting once again that the effect of FDI is larger in less sophisticated products.

5. Extensions and Robustness Checks

As pointed out in previous literature, exported goods are always more sophisticated than products only sold in domestic markets. In that sense, exports might demand more skilled labor than non-exported goods. It could be possible that export intensity is one of the driven factors for the change in demand for both skilled and unskilled labor. To test this hypothesis, we add three

additional control variables to equation (2) to capture the effects of export intensity (XS) on labor demand. We define those variables as exports over sales ratio, and we construct those variables in similar ways as the FDI variables,

$$XS_{jrt} = \frac{\sum_{i \in jr}(X_{ijrt})}{\sum_{i \in jr} S_{ijrt}},$$

$$XS_{j-rt} = \frac{\sum_{i \in j}(X_{ijrt}) - \sum_{i \in jr}(X_{ijrt})}{\sum_{i \in j} S_{ijrt} - \sum_{i \in jr} S_{ijrt}},$$

$$XS_{-jrt} = \frac{\sum_{i \in r}(X_{ijrt}) - \sum_{i \in jr}(X_{ijrt})}{\sum_{i \in r} S_{ijrt} - \sum_{i \in jr} S_{ijrt}},$$

where X_{ijrt} is the exports value of plant *i* from industry *j* located in region *r* at time *t*, and S_{ijrt} is sales value of plant *i* from industry *j* located in region *r* at time *t*. We use domestic plants data to do robustness check for the demand for both skilled and unskilled labor. Tables A1 and A2 in the Appendix present the results for this robustness check.

Table A1 shows the results for skilled labor after adding these new control variables. The table shows that the estimates for export activity in the industry and/or region are, in general, not statistically significant. Only the estimate for exports in the same industry and different regions is significant for the case of administrative workers. With respect to the FDI variables, we see that the results are almost identical in magnitude and statistical significance than the results in table 4A that do not include the controls for exports. Table A2 presents the results for unskilled labor. The estimates for the export variables in general not significant. The inclusion of these variables does not affect the magnitude and significance of the FDI variables and the interactions with the sophistication variables. This rules out the possibility that export intensity is one of the driven factors for the change in demand for both skilled and unskilled labor, instead of FDI

spillovers. The results from robustness check confirm that our previous findings in section 3 are quite robust.

A final robustness check uses the firm-level variables lagged one period to minimize potential endogeneity problems. The results, not presented here, are similar to the basic results with contemporaneous levels of the control variables.

6. Conclusions

This paper used plant-level data from Chile to study the spillover effects from FDI on the demand for skilled and unskilled labor. Unlike previous papers, this study considered the role of product sophistication. The paper found that FDI increases the demand for skilled labor while it decreases the demand for unskilled labor on firms located in the same industry and region and also on firms in the same region but operating in different industries. The effect is more substantial for firms producing less sophisticated products, suggesting that lower levels of sophistication can make it easier for local firms to learn from multinational corporations. The paper also found that the effects are more important for plants that are small and don't participate in international markets as exporters or importers. This paper contributes to the literature by showing that product sophistication has a significant effect on the demand for both skilled and unskilled labor.

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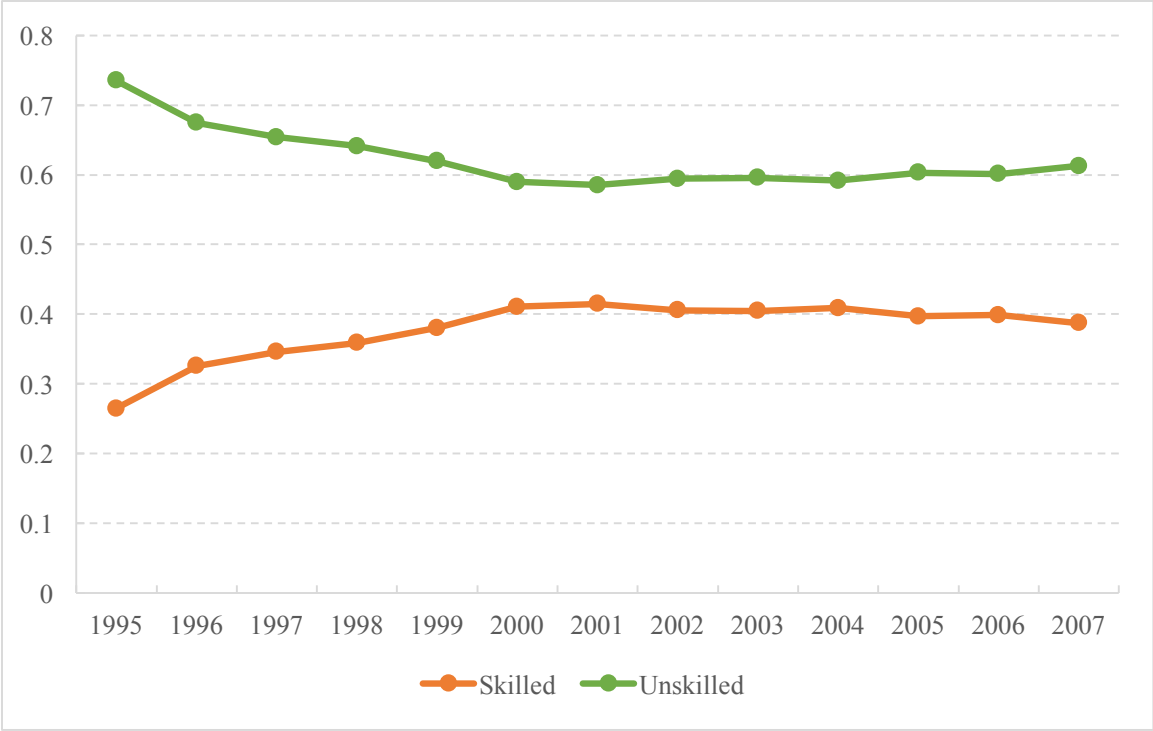

Figure 1: Share of Skilled and Unskilled Labor in Manufacturing Sector

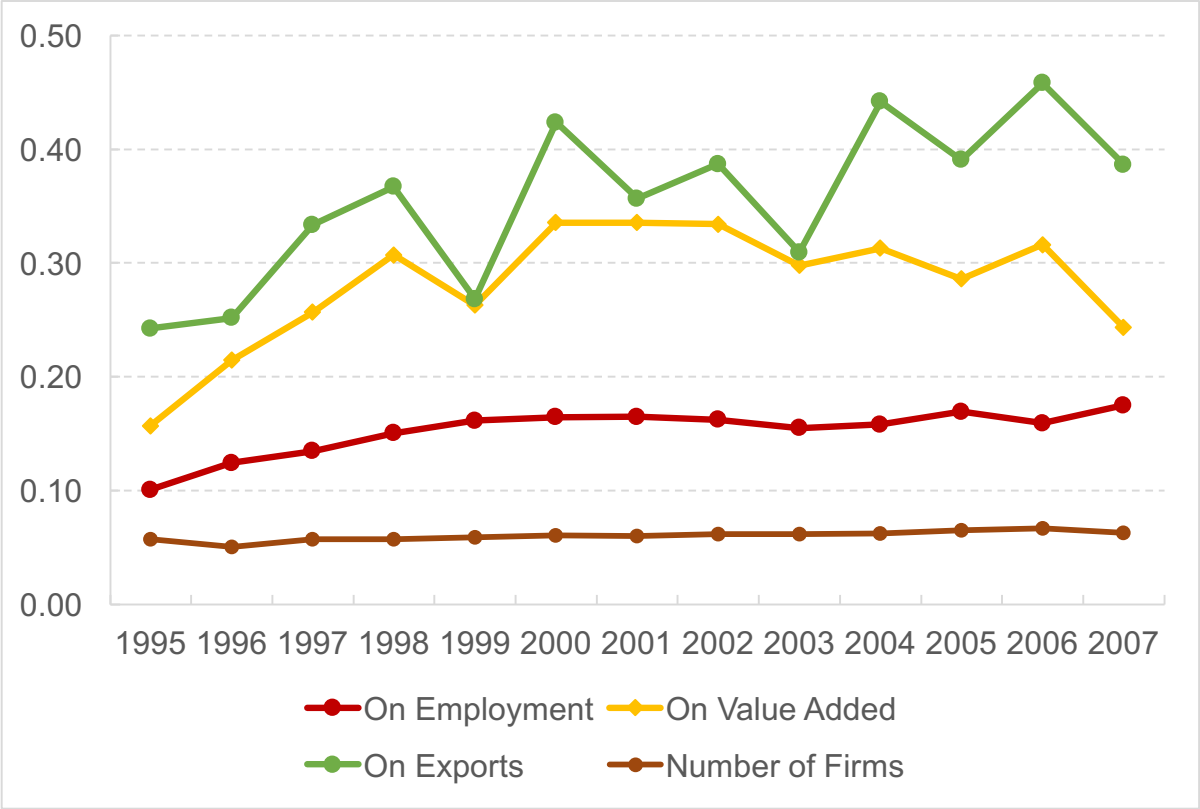

Figure 2: Share of foreign-owned plants on employment, value added, exports and number of firms

Table 1: Data Summary

	Total	Foreign-Owned	Domestic							
			Total	Exporters	Non-exporters	Importers	Non-importers	Small	Medium	Large
1995	5,326	305	5,021	985	4,036	1,108	3,913	3,399	1,052	570
1996	5,656	286	5,370	990	4,380	1,186	4,184	3,804	1,044	522
1997	5,398	309	5,089	942	4,147	1,120	3,969	3,622	965	502
1998	5,189	298	4,891	903	3,988	995	3,896	3,549	889	453
1999	4,989	293	4,696	807	3,889	816	3,880	3,513	792	391
2000	4,942	300	4,642	772	3,870	765	3,877	3,534	734	374
2001	4,828	291	4,537	754	3,783	824	3,713	3,555	662	320
2002	5,185	320	4,865	812	4,053	860	4,005	3,842	688	335
2003	5,128	316	4,812	851	3,961	913	3,899	3,774	710	328
2004	5,320	332	4,988	880	4,108	918	4,070	3,886	765	337
2005	5,057	330	4,727	866	3,861	892	3,835	3,599	772	356
2006	4,778	318	4,460	842	3,618	860	3,600	3,346	752	361
2007	4,488	283	4,205	806	3,399	817	3,388	3,087	724	394
Average 95-07	5,099	306	4,793	862	3,930	929	3,864	3,578	811	403

Note: Small: Less than 50 workers; Medium: Between 50 and 149 workers; Large: 150 or more workers.

Table 2: Descriptive Statistics

Variable	Observations	Mean	Std. Dev	Min	Max
	All Plants				
FDIDjrt	66,284	0.15	0.23	0	1
FDIDj_rt	66,284	0.14	0.20	0	1
FDID_jrt	66,284	0.26	0.14	0	0.94
Exporter Dummy	66,284	0.21	0.40	0	1
Ln(TFP)	66,284	6.22	1.44	-3.49	13.47
Foreign Ownership Dummy	66,284	0.06	0.23	0	1
Ln(Average Wage)	66,284	8.25	0.71	3.04	14.12
Importer Dummy	66,284	0.22	0.41	0	1
Foreign Technology Licenses Dummy	66,284	0.05	0.23	0	1
Ln(Employment)	66,284	3.33	1.17	0	8.2
Ln(Age)	66,284	1.39	0.80	0	2.6
Capital-Labor Ratio	66,284	24,361	441,195	0.03	50,000,000
	Domestic Plants				
FDIDjrt	62,303	0.14	0.22	0	1.00
FDIDj_rt	62,303	0.15	0.21	0	1
FDID_jrt	62,303	0.28	0.14	0	0.94
Exporter Dummy	62,303	0.18	0.38	0	1
Ln(TFP)	62,303	6.19	1.42	-3.49	13.47
Ln(Average Wage)	62,303	8.21	0.69	3.33	14.12
Importer Dummy	62,303	0.19	0.39	0	1
Foreign Technology Licenses Dummy	62,303	0.04	0.21	0	1
Ln(Employment)	62,303	3.27	1.13	0	8.14
Ln(Age)	62,303	1.39	0.80	0	2.57
Capital-Labor Ratio	62,303	21,330	447,170	0.03	50,000,000

Table 3: Basic Results for Skilled Labor

	All Plants		Domestic Plants	
	(1)	(2)	(3)	(4)
FDIDjrt	0.0243	0.0594**	0.0239	0.0599*
	(1.57)	(2.62)	(1.43)	(2.53)
FDIDj_rt	0.0058	0.0109	0.0036	0.0113
	(0.63)	(0.80)	(0.37)	(0.82)
FDID_jrt	0.0369**	0.0575**	0.0304*	0.0519**
	(2.98)	(3.37)	(2.35)	(2.97)
HS*FDIDjrt		-0.0771**		-0.0827**
		(-2.93)		(-3.01)
HS*FDIDj_rt		-0.0110		-0.0175
		(-0.69)		(-1.04)
HS*FDID_jrt		-0.0425+		-0.0471*
		(-1.91)		(-2.04)
Exporter Dummy	0.0061	0.0057	0.0058	0.0053
	(1.56)	(1.45)	(1.38)	(1.26)
Ln(TFP)	0.0037*	0.0037*	0.0044*	0.0045*
	(2.16)	(2.19)	(2.47)	(2.54)
Foreign Ownership Dummy	0.0223**	0.0222**		
	(2.77)	(2.76)		
Ln(Average Wage)	0.0468**	0.0469**	0.0007	0.0005
	(13.67)	(13.70)	(0.19)	(0.13)
Importer Dummy	0.0002	0.0000	-0.0024	-0.0023
	(0.06)	(0.00)	(-0.47)	(-0.44)
Foreign Technology Licenses Dummy	-0.0062	-0.0063	-0.0833**	-0.0830**
	(-1.26)	(-1.27)	(-23.83)	(-23.71)
Ln(Employment)	-0.0792**	-0.0789**	-0.0122*	-0.0125*
	(-23.78)	(-23.70)	(-2.34)	(-2.41)
Ln(Age)	-0.0096+	-0.0099*	0.0000	0.0000
	(-1.91)	(-1.97)	(0.37)	(0.49)
Capital-Labor Ratio	-0.0000	0.0000	0.0058	0.0053
	(-0.10)	(0.02)	(1.38)	(1.26)
Constant	0.2963**	0.2960**		
	(8.06)	(8.08)		
Observations	66,284	66,284	62,303	62,303
R-squared	0.078	0.078	0.080	0.080

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.

Table 4: Basic Results for Domestic Plants

Panel A: Skilled Labor						
	Managers	Tech	Adm	Managers	Tech	Adm
	(1)	(2)	(3)	(4)	(5)	(6)
FDIDjrt	-0.0009	0.0264+	-0.0016	0.0027	0.0563*	0.0009
	(-0.47)	(1.69)	(-0.34)	(1.27)	(2.51)	(0.13)
FDIDj_rt	-0.0014	0.0114	-0.0064	-0.0051*	0.0274*	-0.0110+
	(-0.82)	(1.24)	(-1.52)	(-2.26)	(2.09)	(-1.75)
FDID_jrt	-0.0037	0.0285*	0.0057	-0.0003	0.0498**	0.0023
	(-1.49)	(2.25)	(1.06)	(-0.09)	(2.90)	(0.34)
HS*FDIDjrt				-0.0085*	-0.0683**	-0.0059
				(-2.37)	(-2.63)	(-0.69)
HS*FDIDj_rt				0.0085*	-0.0369*	0.0110
				(2.48)	(-2.27)	(1.42)
HS*FDID_jrt				-0.0074+	-0.0467*	0.0070
				(-1.82)	(-2.06)	(0.82)
Observations	62,303	62,303	62,303	62,303	62,303	62,303
R-squared	0.052	0.066	0.047	0.052	0.066	0.047
Panel B: Unskilled Labor						
	Direct	Indirect	Services	Direct	Indirect	Services
	(1)	(2)	(3)	(4)	(5)	(6)
FDIDjrt	0.0102	-0.0352*	0.0011	0.0021	-0.0607*	-0.0013
	(0.95)	(-2.09)	(0.49)	(0.13)	(-2.25)	(-0.41)
FDIDj_rt	0.0056	-0.0130+	0.0038*	0.0055	-0.0238*	0.0069**
	(0.67)	(-1.90)	(2.31)	(0.47)	(-2.25)	(2.97)
FDID_jrt	-0.0040	-0.0306**	0.0042+	0.0072	-0.0639**	0.0048
	(-0.28)	(-2.67)	(1.73)	(0.36)	(-3.78)	(1.43)
HS*FDIDjrt				0.0183	0.0589*	0.0055
				(0.88)	(2.18)	(1.32)
HS*FDIDj_rt				-0.0006	0.0256*	-0.0075*
				(-0.04)	(2.25)	(-2.46)
HS*FDID_jrt				-0.0233	0.0716**	-0.0013
				(-0.96)	(4.35)	(-0.31)
Observations	62,303	62,303	62,303	62,303	62,303	62,303
R-squared	0.045	0.143	0.047	0.045	0.145	0.047

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.

Table 5A: Results for Skilled Labor – Domestic Plants by Export Status

	Skilled	Managers	Tech	Adm	Skilled	Managers	Tech	Adm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Non-exporters				
FDIDjrt	0.0230	-0.0007	0.0255	-0.0018	0.0616*	0.0035	0.0587*	-0.0006
	(1.17)	(-0.28)	(1.44)	(-0.33)	(2.36)	(1.38)	(2.47)	(-0.08)
FDIDj_rt	0.0051	-0.0013	0.0145	-0.0081+	0.0158	-0.0050*	0.0355*	-0.0147*
	(0.45)	(-0.67)	(1.38)	(-1.74)	(1.00)	(-2.09)	(2.40)	(-2.13)
FDID_jrt	0.0319*	-0.0066*	0.0350*	0.0034	0.0552**	-0.0021	0.0537**	0.0035
	(2.18)	(-2.37)	(2.50)	(0.57)	(2.89)	(-0.71)	(2.91)	(0.48)
HS*FDIDjrt					-0.0950**	-0.0110**	-0.0804**	-0.0036
					(-3.13)	(-2.77)	(-2.88)	(-0.38)
HS*FDIDj_rt					-0.0231	0.0090*	-0.0478**	0.0157+
					(-1.21)	(2.34)	(-2.63)	(1.84)
HS*FDID_jrt					-0.0552*	-0.0104*	-0.0446+	-0.0001
					(-2.16)	(-2.31)	(-1.81)	(-0.01)
Observations	51,093	51,093	51,093	51,093	51,093	51,093	51,093	51,093
R-squared	0.078	0.045	0.070	0.041	0.079	0.045	0.071	0.041
				Exporters				
FDIDjrt	0.0032	-0.0017	0.0067	-0.0018	0.0230	0.0053	0.0108	0.0070
	(0.22)	(-0.49)	(0.49)	(-0.28)	(1.10)	(1.25)	(0.57)	(0.78)
FDIDj_rt	0.0005	-0.0024	0.0041	-0.0012	-0.0086	-0.0086+	0.0035	-0.0036
	(0.04)	(-0.69)	(0.33)	(-0.19)	(-0.56)	(-1.89)	(0.24)	(-0.44)
FDID_jrt	0.0043	0.0083*	-0.0214	0.0174+	-0.0044	0.0206**	-0.0278	0.0029
	(0.16)	(1.97)	(-0.85)	(1.90)	(-0.12)	(3.17)	(-0.81)	(0.17)
HS*FDIDjrt					-0.0365	-0.0127+	-0.0076	-0.0162
					(-1.26)	(-1.88)	(-0.28)	(-1.28)
HS*FDIDj_rt					0.0186	0.0127+	0.0011	0.0048
					(0.71)	(1.83)	(0.04)	(0.39)
HS*FDID_jrt					0.0119	-0.0182*	0.0092	0.0210
					(0.25)	(-2.37)	(0.21)	(1.14)
Observations	11,210	11,210	11,210	11,210	11,210	11,210	11,210	11,210
R-squared	0.103	0.097	0.044	0.102	0.104	0.099	0.045	0.103

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.

Table 5B: Results for Unskilled Labor – Domestic Plants by Export Status

	Direct	Indirect	Services	Direct	Indirect	Services
	(1)	(2)	(3)	(4)	(5)	(6)
			Non-exporters			
FDIDjrt	0.0226+	-0.0462*	0.0006	0.0148	-0.0755*	-0.0010
	(1.75)	(-2.19)	(0.21)	(0.79)	(-2.40)	(-0.29)
FDIDj_rt	0.0084	-0.0179*	0.0044*	0.0072	-0.0321*	0.0091**
	(0.84)	(-2.11)	(2.19)	(0.51)	(-2.49)	(3.17)
FDID_jrt	0.0019	-0.0371**	0.0034	0.0107	-0.0704**	0.0044
	(0.11)	(-2.77)	(1.22)	(0.49)	(-3.82)	(1.20)
HS*FDIDjrt				0.0188	0.0719*	0.0044
				(0.79)	(2.30)	(0.84)
HS*FDIDj_rt				0.0016	0.0331*	-0.0116**
				(0.09)	(2.40)	(-3.15)
HS*FDID_jrt				-0.0206	0.0783**	-0.0025
				(-0.77)	(4.39)	(-0.56)
Observations	51,093	51,093	51,093	51,093	51,093	51,093
R-squared	0.041	0.144	0.043	0.041	0.147	0.043
			Exporters			
FDIDjrt	-0.0084	0.0027	0.0025	-0.0221	-0.0006	-0.0003
	(-0.56)	(0.42)	(0.90)	(-0.95)	(-0.06)	(-0.06)
FDIDj_rt	-0.0017	0.0027	-0.0015	0.0108	0.0041	-0.0063*
	(-0.12)	(0.44)	(-0.68)	(0.62)	(0.49)	(-2.54)
FDID_jrt	-0.0174	0.0039	0.0092+	0.0138	-0.0108	0.0013
	(-0.61)	(0.39)	(1.92)	(0.36)	(-0.73)	(0.18)
HS*FDIDjrt				0.0246	0.0063	0.0056
				(0.79)	(0.48)	(0.98)
HS*FDIDj_rt				-0.0272	-0.0025	0.0111**
				(-0.97)	(-0.20)	(2.63)
HS*FDID_jrt				-0.0459	0.0219	0.0122
				(-0.91)	(1.18)	(1.48)
Observations	11,210	11,210	11,210	11,210	11,210	11,210
R-squared	0.083	0.150	0.079	0.083	0.150	0.079

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.

Table 6A: Results for Skilled Labor – Domestic Plants by Import Status

	Skilled	Manag	Tech	Adm	Skilled	Manag	Tech	Adm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Non-importers				
FDIDjrt	0.0298	-0.0010	0.0350*	-0.0042	0.0630*	0.0028	0.0644**	-0.0042
	(1.59)	(-0.41)	(2.03)	(-0.80)	(2.52)	(1.02)	(2.77)	(-0.54)
FDIDj_rt	0.0073	-0.0020	0.0177+	-0.0084+	0.0171	-.0052+	0.0359*	-0.0136*
	(0.67)	(-0.93)	(1.69)	(-1.77)	(1.18)	(-1.95)	(2.54)	(-2.00)
FDID_jrt	0.0410**	-0.0020	0.0364**	0.0066	0.0629**	0.0015	0.0569**	0.0045
	(2.91)	(-0.74)	(2.66)	(1.13)	(3.30)	(0.49)	(3.07)	(0.61)
HS*FDIDjrt					-0.0836**	-0.0100*	-0.0731**	-0.0005
					(-2.77)	(-2.14)	(-2.61)	(-0.05)
HS*FDIDj_rt					-0.0236	0.0081*	-0.0449*	0.0131
					(-1.24)	(1.97)	(-2.43)	(1.48)
HS*FDID_jrt					-0.0496*	-0.0076+	-0.0467+	0.0048
					(-1.98)	(-1.69)	(-1.94)	(0.50)
Observations	50,229	50,229	50,229	50,229	50,229	50,229	50,229	50,229
R-squared	0.082	0.044	0.071	0.045	0.083	0.044	0.072	0.045
				Importers				
FDIDjrt	-0.0044	-0.0021	-0.0185	0.0162*	0.0192	0.0070*	-0.0148	0.0270**
	(-0.31)	(-0.69)	(-1.40)	(2.17)	(0.80)	(2.03)	(-0.74)	(2.80)
FDIDj_rt	-0.0205+	-0.0012	-0.0111	-0.0082	-0.0297+	-0.0083*	-0.0104	-0.0110
	(-1.79)	(-0.44)	(-1.09)	(-1.43)	(-1.77)	(-2.36)	(-0.80)	(-1.32)
FDID_jrt	-0.0493+	-0.0113+	-0.0596*	0.0216+	-0.0555+	-0.0076	-0.0567+	0.0087
	(-1.82)	(-1.85)	(-2.29)	(1.86)	(-1.74)	(-1.23)	(-1.94)	(0.61)
HS*FDIDjrt					-0.0419	-0.0160**	-0.0066	-0.0193
					(-1.45)	(-2.79)	(-0.25)	(-1.41)
HS*FDIDj_rt					0.0171	0.0133*	-0.0016	0.0054
					(0.74)	(2.46)	(-0.08)	(0.48)
HS*FDID_jrt					0.0102	-0.0074	-0.0058	0.0234
					(0.25)	(-0.86)	(-0.14)	(1.34)
Observations	12,074	12,074	12,074	12,074	12,074	12,074	12,074	12,074
R-squared	0.075	0.085	0.053	0.065	0.075	0.086	0.053	0.065

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.

Table 6B: Results for Unskilled Labor – Domestic Plants by Import Status

	Direct	Indirect	Services	Direct	Indirect	Services
	(1)	(2)	(3)	(4)	(5)	(6)
			Non-importers			
FDIDjrt	0.0163	-0.0475*	0.0014	0.0092	-0.0723*	0.0001
	(1.25)	(-2.28)	(0.50)	(0.49)	(-2.30)	(0.03)
FDIDj_rt	0.0077	-0.0184*	0.0034	0.0074	-0.0317*	0.0071*
	(0.74)	(-2.12)	(1.62)	(0.54)	(-2.45)	(2.44)
FDID_jrt	-0.0121	-0.0328*	0.0039	0.0010	-0.0684**	0.0044
	(-0.74)	(-2.58)	(1.45)	(0.05)	(-3.70)	(1.19)
HS*FDIDjrt				0.0172	0.0629*	0.0034
				(0.69)	(2.00)	(0.64)
HS*FDIDj_rt				-0.0007	0.0337*	-0.0094*
				(-0.04)	(2.43)	(-2.40)
HS*FDID_jrt				-0.0284	0.0793**	-0.0013
				(-1.06)	(4.40)	(-0.28)
Observations	50,229	50,229	50,229	50,229	50,229	50,229
R-squared	0.045	0.142	0.040	0.045	0.145	0.040
			Importers			
FDIDjrt	0.0157	-0.0121*	0.0008	0.0240	-0.0360**	-0.0072
	(1.13)	(-2.15)	(0.26)	(1.00)	(-4.17)	(-1.40)
FDIDj_rt	0.0081	0.0077+	0.0047+	0.0203	0.0032	0.0062+
	(0.70)	(1.67)	(1.88)	(1.23)	(0.59)	(1.75)
FDID_jrt	0.0245	0.0159	0.0090	0.0463	-0.0004	0.0096
	(0.88)	(1.08)	(1.45)	(1.47)	(-0.02)	(1.14)
HS*FDIDjrt				-0.0148	0.0426**	0.0141*
				(-0.52)	(4.07)	(2.20)
HS*FDIDj_rt				-0.0246	0.0101	-0.0026
				(-1.05)	(1.19)	(-0.51)
HS*FDID_jrt				-0.0424	0.0329+	-0.0006
				(-1.00)	(1.90)	(-0.07)
Observations	12,074	12,074	12,074	12,074	12,074	12,074
R-squared	0.053	0.166	0.088	0.054	0.167	0.088

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.

Table 7A: Results for Skilled Labor – Domestic Plants by Size Category

	Skilled	Managers	Tech	Adm	Skilled	Managers	Tech	Adm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Small Plants (Less than 50 Workers)				
FDIDjrt	0.0282	0.0002	0.0328+	-0.0048	0.0670*	0.0045	0.0685**	-0.0059
	(1.43)	(0.06)	(1.83)	(-0.82)	(2.48)	(1.44)	(2.78)	(-0.67)
FDIDj_rt	0.0052	-0.0019	0.0168	-0.0096+	0.0154	-0.0062*	0.0353*	-0.0137+
	(0.44)	(-0.92)	(1.53)	(-1.82)	(0.96)	(-2.29)	(2.36)	(-1.79)
FDID_jrt	0.0313*	-0.0067*	0.0321*	0.0060	0.0461*	-0.0015	0.0461*	0.0015
	(2.15)	(-2.35)	(2.27)	(0.91)	(2.33)	(-0.47)	(2.40)	(0.19)
HS*FDIDjrt					-0.0936**	-0.0111*	-0.0849**	0.0025
					(-2.94)	(-2.33)	(-2.93)	(0.23)
HS*FDIDj_rt					-0.0224	0.0104*	-0.0431*	0.0103
					(-1.11)	(2.54)	(-2.25)	(1.06)
HS*FDID_jrt					-0.0371	-0.0126*	-0.0355	0.0110
					(-1.41)	(-2.44)	(-1.40)	(1.03)
Observations	46,510	46,510	46,510	46,510	46,510	46,510	46,510	46,510
R-squared	0.078	0.043	0.071	0.042	0.079	0.043	0.071	0.042
				Medium and Large Plants (50 Workers or More)				
FDIDjrt	0.0023	-0.0003	-0.0017	0.0043	0.0054	0.0053*	-0.0089	0.0090
	(0.17)	(-0.13)	(-0.13)	(0.76)	(0.28)	(2.46)	(-0.51)	(1.08)
FDIDj_rt	-0.0142	0.0027	-0.0156	-0.0013	-0.0160	0.0014	-0.0125	-0.0049
	(-1.16)	(1.22)	(-1.31)	(-0.27)	(-1.01)	(0.55)	(-0.85)	(-0.69)
FDID_jrt	0.0364	0.0037	0.0221	0.0105	0.0503	0.0067+	0.0389	0.0048
	(1.54)	(1.07)	(0.95)	(1.42)	(1.56)	(1.79)	(1.24)	(0.42)
HS*FDIDjrt					-0.0058	-0.0110**	0.0148	-0.0095
					(-0.21)	(-2.65)	(0.58)	(-0.90)
HS*FDIDj_rt					0.0035	0.0025	-0.0061	0.0072
					(0.15)	(0.56)	(-0.26)	(0.75)
HS*FDID_jrt					-0.0212	-0.0047	-0.0252	0.0087
					(-0.56)	(-0.93)	(-0.69)	(0.68)
Observations	15,793	15,793	15,793	15,793	15,793	15,793	15,793	15,793
R-squared	0.055	0.059	0.058	0.030	0.055	0.060	0.058	0.030

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.

Table 7B: Results for Unskilled Labor – Domestic Plants by Size Category

	Direct	Indirect	Services	Direct	Indirect	Services
	(1)	(2)	(3)	(4)	(5)	(6)
	Small Plants (Less than 50 Workers)					
FDIDjrt	0.0181	-0.0452*	-0.0010	0.0125	-0.0758*	-0.0038
	(1.32)	(-2.27)	(-0.38)	(0.60)	(-2.51)	(-1.06)
FDIDj_rt	0.0101	-0.0209*	0.0056**	0.0107	-0.0354**	0.0093**
	(0.94)	(-2.39)	(2.58)	(0.73)	(-2.70)	(3.08)
FDID_jrt	0.0038	-0.0423**	0.0071*	0.0247	-0.0797**	0.0088*
	(0.22)	(-2.99)	(2.50)	(1.09)	(-4.18)	(2.32)
HS*FDIDjrt				0.0124	0.0742*	0.0069
				(0.49)	(2.46)	(1.32)
HS*FDIDj_rt				-0.0036	0.0356*	-0.0096*
				(-0.19)	(2.53)	(-2.47)
HS*FDID_jrt				-0.0502+	0.0913**	-0.0040
				(-1.83)	(4.86)	(-0.84)
Observations	46,510	46,510	46,510	46,510	46,510	46,510
R-squared	0.043	0.140	0.039	0.043	0.144	0.040
	Medium and Large Plants (50 Workers or More)					
FDIDjrt	-0.0028	-0.0069	0.0074**	0.0015	-0.0127	0.0058
	(-0.18)	(-0.79)	(2.65)	(0.07)	(-0.88)	(1.41)
FDIDj_rt	0.0089	0.0065	-0.0012	0.0102	0.0073	-0.0015
	(0.70)	(1.24)	(-0.64)	(0.66)	(0.95)	(-0.64)
FDID_jrt	-0.0420+	0.0070	-0.0014	-0.0301	-0.0112	-0.0090
	(-1.66)	(0.60)	(-0.33)	(-0.86)	(-0.61)	(-1.55)
HS*FDIDjrt				-0.0084	0.0113	0.0029
				(-0.28)	(0.69)	(0.53)
HS*FDIDj_rt				-0.0030	-0.0012	0.0006
				(-0.12)	(-0.12)	(0.16)
HS*FDID_jrt				-0.0183	0.0279	0.0116+
				(-0.45)	(1.54)	(1.79)
Observations	15,793	15,793	15,793	15,793	15,793	15,793
R-squared	0.035	0.147	0.074	0.035	0.147	0.074

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.

Table A1: Robustness Check for Skilled Labor – Domestic Plants

	Skilled	Manag	Tech	Adm	Skilled	Manag	Tech	Adm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FDIDjrt	0.0290+	-0.0011	0.0324*	-0.0024	0.0660**	0.0030	0.0621**	0.0008
	(1.69)	(-0.56)	(2.03)	(-0.50)	(2.81)	(1.48)	(2.78)	(0.12)
FDIDj_rt	0.0050	-0.0010	0.0143	-0.0083+	0.0109	-0.0051*	0.0285*	-0.0124*
	(0.50)	(-0.55)	(1.52)	(-1.96)	(0.79)	(-2.26)	(2.18)	(-2.03)
FDID_jrt	0.0254	-0.0018	0.0301*	-0.0029	0.0483*	0.0012	0.0531**	-0.0059
	(1.63)	(-0.59)	(1.99)	(-0.45)	(2.41)	(0.35)	(2.73)	(-0.75)
HS*FDIDjrt					-0.0890**	-0.0102**	-0.0710**	-0.0078
					(-3.22)	(-2.78)	(-2.71)	(-0.89)
HS*FDIDj_rt					-0.0141	0.0100**	-0.0344*	0.0103
					(-0.83)	(2.82)	(-2.08)	(1.32)
HS*FDID_jrt					-0.0480*	-0.0063	-0.0478*	0.0061
					(-2.03)	(-1.47)	(-2.07)	(0.69)
XSjrt	-0.0187	-0.0035	-0.0223+	0.0071	-0.0134	-0.0028	-0.0181	0.0076
	(-1.45)	(-1.27)	(-1.79)	(1.54)	(-1.07)	(-1.03)	(-1.49)	(1.64)
XSj_rt	0.0057	0.0015	-0.0123	0.0166**	0.0047	0.0015	-0.0130	0.0162**
	(0.44)	(0.50)	(-1.02)	(3.09)	(0.37)	(0.49)	(-1.09)	(3.06)
XS_jrt	0.0110	-0.0033	-0.0017	0.0161*	0.0078	-0.0035	-0.0052	0.0165*
	(0.68)	(-1.02)	(-0.11)	(2.38)	(0.48)	(-1.06)	(-0.32)	(2.42)
Observations	60,797	60,797	60,797	60,797	60,797	60,797	60,797	60,797
R-squared	0.080	0.052	0.066	0.047	0.081	0.052	0.067	0.047

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.

Table A2: Robustness Check for Unskilled Labor – Domestic Plants

	Direct	Indirect	Services	Direct	Indirect	Services
	(1)	(2)	(3)	(4)	(5)	(6)
FDIDjrt	0.0079	-0.0380*	0.0011	-0.0016	-0.0638*	-0.0007
	(0.72)	(-2.19)	(0.47)	(-0.10)	(-2.37)	(-0.23)
FDIDj_rt	0.0048	-0.0141*	0.0043*	0.0063	-0.0245*	0.0072**
	(0.56)	(-2.01)	(2.54)	(0.54)	(-2.33)	(3.03)
FDID_jrt	0.0076	-0.0370**	0.0040	0.0189	-0.0722**	0.0049
	(0.46)	(-3.00)	(1.47)	(0.88)	(-4.04)	(1.38)
HS*FDIDjrt				0.0223	0.0623*	0.0043
				(1.05)	(2.31)	(0.99)
HS*FDIDj_rt				-0.0048	0.0261*	-0.0072*
				(-0.31)	(2.30)	(-2.31)
HS*FDID_jrt				-0.0232	0.0731**	-0.0019
				(-0.93)	(4.31)	(-0.46)
XSjrt	0.0135	0.0062	-0.0011	0.0125	0.0023	-0.0014
	(1.02)	(0.90)	(-0.52)	(0.94)	(0.36)	(-0.64)
XSj_rt	-0.0167	0.0152+	-0.0042+	-0.0155	0.0149+	-0.0041+
	(-1.30)	(1.89)	(-1.94)	(-1.21)	(1.93)	(-1.86)
XS_jrt	-0.0217	0.0111	-0.0005	-0.0225	0.0154	-0.0007
	(-1.29)	(1.00)	(-0.20)	(-1.34)	(1.44)	(-0.27)
Observations	60,797	60,797	60,797	60,797	60,797	60,797
R-squared	0.044	0.145	0.047	0.044	0.148	0.047

Robust t stats in parentheses. Standard errors clustered at the industry-region-year level. ** significant at 1%, * significant at 5%, + significant at 10%.