FOREIGN DIRECT INVESTMENT, PRODUCTIVITY, DEMAND FOR SKILLED LABOUR AND WAGE INEQUALITY: AN ANALYSIS FOR URUGUAY

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Adriana Peluffo*

Resumen

Este trabajo analiza el impacto de la inversión extranjera directa (IED) sobre la productividad, la demanda de trabajo calificado y la inequidad salarial, para un panel de empresas manufactureras uruguayas en el período 1997-2005.

En primer lugar se estiman los efectos de la IED sobre la productividad, el empleo y los salarios y la brecha salarial entre trabajadores calificados y no calificados a través de técnicas de Mínimos Cuadrados Ordinarios. Además, se estiman regresiones cuantílicas, las que revelan que consistentemente con la heterogeneidad empresarial, la respuesta a la IED no es homogénea, sino que varia sobre la distribución condicional de las diferentes variables analizadas.

Sin embargo, dado que no podemos atribuir causalidad de las asociaciones anteriores, utilizamos técnicas de evaluación de impacto.

Los resultados nos indican que la IED está asociada a mayor productividad y demanda de trabajo calificado. Además, aunque los salarios promedios son mayores en las empresas multinacionales, la brecha salarial entre los trabajadores calificados y los no calificados es mayor en estas empresas. Por lo tanto, la promoción de la IED aumentaría la productividad. Por otra parte, dado la mayor demanda de trabajo calificado, las políticas tendientes a promover la capacitación de los trabajadores conducirían a mayores incrementos en la productividad, en tanto que otras políticas sociales podrían ayudar a mitigar los efectos sobre la inequidad salarial.

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FOREIGN DIRECT INVESTMENT, PRODUCTIVITY, DEMAND FOR SKILLED LABOUR AND WAGE INEQUALITY: AN ANALYSIS FOR URUGUAY

Abstract

This work analyses the impact of foreign direct investment (FDI) on productivity, the demand for skilled labour and wage inequality of the Uruguayan Manufacturing firms for the period 1997-2005.

Firstly, we estimate the effects of FDI on productivity, relative wages and relative employment of skilled workers, through conventional pooled OLS. Then, we estimate quantile regressions, which reveal that consistently with firm heterogeneity, the response to foreign ownership is not homogenous, but varies over the conditional distribution of each dependent variable.

Nevertheless, since we cannot attribute causality from the previous correlations we use discrete treatment effect techniques for analyzing causality. Our preliminary results seem to indicate that FDI is associated with higher productivity and an increased demand for skilled labour. Furthermore, though average wages are higher in foreign owned firms, the wage gap between skilled and unskilled workers is higher in foreign owned firms than in domestic ones. Then, it follows that promoting foreign investment enhances productivity. On the other hand, due to the higher demand for skilled workers policies such as training of workers would be conductive to further productivity improvements, while other social policies could help to mitigate wage inequality effects.

JEL: F23, J23, J24, J31, O39

Keyword: fdi, productivity, labour markets.

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1. Introduction

Foreign ownership or foreign direct investment (FDI) is an important component of the increasing globalization, also considered an important channel of technology transfer, both directly and indirectly through spillovers to domestic firms. When analysing the impact of the increasing importance of foreign direct investment (FDI) for host countries, most research has focused on the effects on productivity and economic growth at either the macro or the micro level.

It is now almost accepted as a stylised fact that foreign multinational enterprises perform better than domestic firms in several indicators. In particular, recent analyses using micro level data usually find that MNEs are not only more productive† than domestic firms, but have also more educated workforce and pay higher wages than domestic ones even after controlling for worker quality, at a given moment in time (Almeida 2007; Girma & Görg 2007; Feliciano & Lipsey 2006; Girma et al. 1999; Lipsey & Sjoholm 2004a). Thus while FDI may bring direct or indirect benefits to the host/receiving economy, it is less clear the impacts on wages and inequality. In this regard FDI can lead to increases in productivity and to the diffusion of skill-biased technologies affecting not only productivity but also increasing the demand for skilled labour and wages.

The rise in income and wage inequality has been discussed in the recent economic literature. There is evidence, for both developed and developing countries, of the increase in inequality between skilled and unskilled workers, as well as in the skill premia for workers with higher education (Goldberg & Pavcnik 2007; Acemoglu 2003; Gottschalk & Smeeding 1997). Three main explanations have been put forward to explain this phenomenon: trade, technological change and labour market institutions. Regarding to trade and technological change the works by Feenstra & Hanson (1997); Krugman (2000); Chennells & Van Reenen (1999), review and summarise this evidence. Domestic institutions‡ such as job security regulations are also argued to affect productivity and employment during economic liberalization processes (Aghion et al. 2003; 2005) since domestic regulation could restrict the ability to adjust the skill mix at the firm level in response to trade openness. Aghion et al. (2003) point out that restrictive domestic regulation could have adverse distributional consequences by constraining the adjustment

† This is not only the case in developing countries but also in developed economies. Several studies using firm level data find that foreign-owned firms are more productive than domestic ones. Looking at foreign-owned manufacturing firms in Sweden, Karpaty (2004; 2007) estimates that the productivity advantage of foreign-owned firms over domestic ones amounts to 2% to 7%; while Arndt & Mattes (2008; 2010) find a productivity advantage of foreign-owned multinationals of about 6% over domestic multinationals in Germany. Using US data, Doms & Jensen (1998) find that controlling for capital, age, industry and region, productivity in foreign owned plants is on average 11 to 13 % higher than domestic plants. Griffith et al. (2001) using UK data find an advantage of 9%. This premium is traditionally alleged to technology spillovers from the investing multinational enterprise (MNE) to its affiliate, to the value of the brand name, or to benefits of economies of scale within the MNE (Dunning 1981).

‡ Domestic institutions refer to all those legal provisions that could increase the cost of workforce adjustment by retrenchment of workers.

response of firms to competitive conditions. In this regard firms could have an incentive to set up a dual structure by employing unskilled-contract workers instead of unskilled –regular workers. Evidence of this dual structure has been observed for India (Ramaswamy 2008) and Morocco (Currie & Harrison 1997).

Relatively few papers analyse the role of FDI on labour markets for developing countries, and most of them are cross country comparisons. Nevertheless, cross-country studies do not take into account the different characteristics of countries such as the productive structure, policies and institutional settings that can affect the outcomes and may vary over time. In this regard, the country specific focus solves the shortcomings of cross-country comparison empirical works, analysing two key issues for development from a developing country perspective: productivity, the demand for skilled labour and inequality.

Thus, this work addresses some questions that have been analysed for other economies: are MNEs more productive than their domestic counterparts? Which are their effects on the demand for skilled labour and wage inequality? Are their effects evenly distributed on skilled and unskilled workers?

In this work we analyze the impact of FDI -which may act as possible international technology transfer channel- at the firm level for a developing country analyzing the impact on productivity, on employment of skilled workers and on wages paid to skilled labour force for the period 1997-2005. Further, we analyse the wage gap between skilled and unskilled labour, allowing us to have an insight on the effects on wage in/equality. To this aim we use various methodologies to test the results. Firstly, we assess performance premia, then, we estimate quantile regressions and finally we apply treatment effect techniques to examine the causal effect of FDI directly on productivity, skilled employment and wages of skilled workers.

Uruguay provides an interesting setting to analyse the impacts of FDI. Since the early 90s the country recovered macroeconomic stability and its commitment to trade and financial liberalisation, which translated into the return to a modest growth path up to the 2002 crisis, which a rapid and higher economic growth rate in 2004 and 2005, which reached the figure of 11.8 % and 6.6 % respectively. a medium income developing country Uruguay, that underwent significant structural reforms since the early 90s. One of them was the commitment to trade liberalization, along with the creation of the Mercosur. Further the country return to a moderate growth path and macroeconomic stability was achieved in the country and in the region. In this context an important inflow of FDI to the country was verified by the mid 90s up to date, accounting for an important share of the total investment in the country and of the GDP. The inflow of FDI into the country reached up to an average of 1.300 millions in 2004 and 2005, representing approximately 5 % of the GDP, a third of total investment. Furthermore, this important inflow of foreign capital into the country helped to mitigate the 2002 economic crisis (Bittencourt et al. 2009)

Relatively few papers analyse the role played by FDI in emerging economies at the micro level. This work contributes to the existing literature in several dimensions. Firstly, it studies a medium income developing country Uruguay-,that underwent significant structural reforms since the early 90s. One of them was the commitment to trade liberalization, along with the creation of the Mercosur. Further the country return to a moderate growth path and macroeconomic stability was achieved in the country and in the region. In this context an important inflow of FDI to the country was verified by the mid 90s up to date, accounting for an important share of the total investment in the country and of the GDP. Further, we apply several methodologies to analyse associations as well as causality by means of impact evaluation techniques which shed lights on causality. Finally, it integrates the analysis of productivity and labour market impacts, focusing not only on productivity but also on labour demand of skilled wages but also on another important issue that is labour inequality. From a developing country perspective both issues are pretty relevant to achieve inclusive growth.

The remainder of this work structures as follows: after this introduction in section 2 we comment some previous literature, in section 3 we describe the empirical strategy followed, while section 4 we present the results and the finally some concluding remarks.

2. Literature Review

Most of the studies on foreign ownership fall into two broad areas: those studies that examine the link between FDI and productivity and studies which focus on the implications on the labour market, namely on wages and inequality. Few studies attempt to analyse both issues in a same work, which would allow a more comprehensive picture of the impact of FDI.

Regarding to productivity, it is usually argue that foreign direct investment (FDI) can generate several benefits for the host country. For instance, it can finance the expansion of industries in which the domestic country enjoys comparative advantage. Moreover, it can lead to the transfer of knowledge from foreign to local firms and it can provide local ones with the critical know-how to enter into foreign markets. If foreign entrants possess a better technology, they can promote productivity improvements in the domestic industry either directly, by raising the productivity of the resources used in production, and indirectly through knowledge spillovers to local firms. In this regard, local firms can learn from foreign firms either by simply observing them, or through turnover of labour, as employees move from foreign to local ones.

Haddad & Harrison (1993), Aitken & Harrison (1994), and Harrison (1996) use plant-level panel data to analyze the impact of joint ventures and foreign subsidiaries on local firms' productivity in developing countries. These studies ask two related questions, namely, whether foreign firms' exhibit higher

productivity levels than local firms and whether knowledge spillovers from foreign to local firms raise the latter's productivity level. Data comes from three developing countries, Côte d'Ivoire (1978-87), Morocco (1985-89) and Venezuela (1983-88).[§] Haddad & Harrison (1993) use data for Moroccan manufacturing industries. They perform several specifications finding mostly insignificant results on the spillover coefficients. As far as the performance of foreign relative to local firms is concerned, these studies find that foreign firms generally exhibit higher total factor productivity, pay higher wages and have much higher import and export propensities. Nevertheless, the evidence on total factor productivity growth is mixed. In particular, only in the case of Venezuela TFP growth is higher for foreign firms. The converse is true for Morocco, and the difference is insignificant for Côte d'Ivoire.

Yasar & Morrison (2007) evaluate the relationship between productivity and FDI, exports, import and licensing for Turkish manufacturing plants in the apparel, textile and motor vehicle industries. They find that productivity is mostly related to foreign ownership, especially for large plants and in combinations with other forms of technology transfer, followed by exporting and then licensing.

There is a group of studies that analyses the wage premium of foreign firms, though usually the focus is on the effect of foreign acquisitions on wages (Lipsey & Sjöholm 2004b).[**]

Feenstra & Hanson (1997) use level data for Mexico, while Figini & Görg (1999) for Ireland and Taylor & Driffield (2005) for UK, finding a link between relative wages and FDI. Girma & Görg (2007) find that foreign owned multinationals in the UK pay higher wages than comparable domestic firms, and that the magnitude of these wage premia differs between skilled and unskilled workers, hence impacting on wage inequality. Furthermore Figini & Görg (2011) find that for developing countries this effect is not linear, i.e. inward FDI increases wage inequality at a decreasing rate over time. For developed countries, wage inequality decreases with FDI and there is no robust evidence to show that this effect is non-linear.

The higher productivity and wages paid by multinationals may be a consequence of firm specific assets such as superior technology, know-how and managerial practices. This firm specific asset implies that multinationals use "superior" levels of technology and hence would explain their higher productivity levels. Further, as noted by Girma & Görg (2007), if one assumes that the efficient use of this specific asset requires more productive workers, then a MNE would also pay higher wages. While a superior technology is a straightforward explanation for higher productivity several alternative explanations have been put forward to explain higher wages. One explanation is that MNEs pay higher wages than their domestic counterparts in order to reduce workers turnover, preventing so the leakage of the firm specific asset –technological knowledge and know-how acquired during the working processes-. Thus, higher wages would provide an incentive not to quit.

[§] Foreign firms are defined as all firms with foreign equity that exceed 5 per cent of assets while in our work we define as foreign if the firm has more than 10 per cent of foreign assets. Nevertheless, we should note that for the years that we have the share of foreign assets we find that more than 95 percent of the MNCs have more than 50 % of foreign capital.

[**] Lee et al. (2006) analyse the impacts of globalization, FDI and inequality.

Lipsey & Sjöholm (2004a) and Lipsey (2004) provides several other reasons for why MNEs pay higher wages, such as workers preferences to work for domestic firms and therefore need to be compensated, or that multinationals due to lack of knowledge of the local labour market must pay higher wages to attract good workers.

Further, other alternative explanations have been posed by Carmichael (1992) and Conyon et al. (2002). These authors argue that higher wages would avoid industrial relation disputes and ease the introduction of new practices peacefully in the workplace. On the other hand Budd et al. (2005) provide evidence that MNEs share rents with workers across borders, this is, the wage level in the foreign affiliate is linked to profits in the parent company.[††]

Aitken, Harrison and Lipsey (1996) working for Mexico, Venezuela and US, find that higher levels of foreign investment is associated to higher wages, nevertheless there is no evidence of wage spillovers for Mexico and Venezuela.

On the other hand the analyses that focus on causal relationships instead of on associations are less and show mixed results. Furthermore, most analyses are for developed countries. Among the studies that analyse causal effects Conyon et al. (2002) finds positive effects on productivity while Girma & Görg (2007) and Harris & Robinson (2003) finds not significant effects. These three works were conducted for the UK. For developing countries analyses of causal effects are very scarce. One of this is the work by Djankov & Hoekman (2000) for the Czech Republic who find that foreign ownership contributes to better performance.

The works that analyse the casual effects of foreign ownership on wages also fails to produce consistent empirical evidence. Almeida (2007) find small effects of FDI on the average wages of recipient firms for Portugal, while Girma & Görg (2007) for the food and electronic industry in UK, find significant effects on skilled and unskilled wages. For developing countries the work by Lipsey & Sjöholm (2004b) using instrumental variable estimation find that foreign owned establishments pay higher wages. In ppt Istambul there is the motivation more straightforward.

Summing up, while the empirical evidence regarding productivity seems to point out higher productivity of foreign owned firms, the studies of causal relations between foreign ownership, productivity and wages are not clear cut, thus, these mixed results call for further specific country studies on this issue.

[††] The country of origin of FDI also can have different effects on wages and spillovers effects but due to lack of data we do not test this issue in this work.

In this work we will analyse associations as well as causal relationships between FDI, productivity and labour market outcomes for a small developing country.

3. Empirical Strategy

3.1. Performance Premia

Firstly, we analyse the relationships between FDI and measures of productivity (TFP and labour productivity), employment and wages of skilled workers. In particular we estimate the proportional differences in performance characteristics (P_{it}) of firms with foreign ownership (FDI), where i indexes firms and t stands for time. To this aim we estimate the following equation:

$$\ln P_{it} = \beta_o + \beta_1 FDI_{it} + \beta_2 Size_{it} + \delta_j + \lambda_t + \varepsilon_{it} \quad (1)$$

The performance measures P_{it} include measures of productivity, employment and wages paid to skilled employees and capital-labour ratios, expressed in natural logarithms, defined as we explain below. FDI stands for foreign owned firms and, δj are sectoral dummies, λt are time dummies.

The parameter β_1 indicates the average differences in performance ($\ln P_{it}$), i.e. the percentage premia in terms of performance characteristics between foreign and domestic firms, conditional on industry, year and size.

Furthermore we use impact evaluation techniques to allow for endogeneity of FDI since foreign capital could be attracted to more productive firms, which in turn pay higher wages.[‡‡] In the presence of endogeneity OLS may result in biased and inconsistent estimates of the true parameters.

The measures of productivity considered are Total Factor Productivity (TFP) estimated assuming a Cobb-Douglas functional form and using the Levinsohn & Petrin (2003) methodology. Also we include a measure of labour productivity defined as value added over total number of workers.

We define as skilled labour those workers in non-production activities – usually referred as white collars- and split this category in professionals and technicians and other white collar employees. Professionals and technicians could be considered to be more skilled than other white collars who usually undertake administrative work.

The measures of employment include total employment; number of white collars–i.e. non-production workers- which can be discriminated into the number of professional and technicians per firm and other white collars. Also the number and share of skilled labour in total employment were analysed.

[‡‡] Mortensen (2009) demonstrates that a crucial factor in the theoretical treatment of wage dispersion is firm heterogeneity, and that there is a robust positive correlation between firm productivity and wages.

As measures of wages we considered average wages and wages of skilled workers per firm. We analyse also the share of skilled wages over variable costs of the firm. Finally, we analyse the wage gap between skilled and unskilled workers, i.e. between white and blue collars, which gives us a flavour of wage inequality impacts of firms with foreign capital.

We control for firm size using two different definitions: as the natural logarithm of total employment and dummy variables equal to one for those firms with 49-99 workers (medium firms) and a dummy equal to one for firms more than 100 workers (big firms). This variable captures differences in production technologies of firms with different size. This is omitted when the performance measure (ln P_{it}) measure is based on overall employment.

Time dummies (λ_t) capture macroeconomic shocks and changes in the institutional environment.[§§]

Finally, industry dummies (δ_t) control for sectoral differences that remain invariant during the period.

3.2. Quantile regressions

Quantile regressions allow examining the performance effect of FDI at different points of the conditional distribution of the dependent variables (productivity, skilled labour and wages paid to skilled workers, share of skilled employment and of skilled wages per firm).

When Ordinary Least Squares (OLS) is used to estimate (1) and there is unobserved heterogeneity, then the estimated coefficients are not representative of the entire conditional distribution (Dimelis & Louri (2002).

To account for some of the heterogeneity in the sample, observed firm level characteristics (such as firm size and industry) are explicitly included in the regression equation. Nevertheless, in the case of firm level data, usually there is heterogeneity which is quite difficult to observe, such as managerial capability.

Unobserved heterogeneity may cause that the dependent variables in (1) and the error term to be independently but not identically distributed across firms. If the error terms are not identically distributed then OLS will be inefficient. Moreover, if there are long tails, extreme observations will have significant influence on the estimated coefficient. In this regard quantile regression estimates place less weight on outliers and are robust to departures from normality.

In contrast to the OLS estimator, which provides information only about the effect of regressors at the conditional mean of the dependent variable, the results of quantile regressions give parameter estimates at different quantiles. Thus, this technique provides information regarding to the variation in the effect of the regressors on the dependent variable at different points of the distribution.

[§§] Time dummies also help us to control for the 2002 economic crisis in the country.

3.3. Treatment Effects Analysis

We use a matching and difference-in-differences methodology which allows studying the causal effect of FDI (the treatment) on firms (the treated) relative to domestic firms (the control group). Thus, our aim is to evaluate the causal effect of FDI on Y, where Y represents productivity, number and shares of skilled workers and the level and shares of wages paid to skilled workers. Y is referred to as the "outcome" in the evaluation literature.[***] Thus, let Y_{it} be the outcome for plant *i* at time *t*.

The effect of foreign ownership of capital is the estimated difference-in-difference of the outcome variable (productivity, share of skilled employment and wages and wage gap between skilled and unskilled workers) between the treated and the control groups.

Let foreign ownership of capital (FDI) where $FDI_{it} \in \{0,1\}$ denotes an indicator (dummy variable) of whether firm *i* has started to have foreign investments (FDI) and $Y_{i,t+s}^{1}$ is the outcome at t+s, after starting this activity. Also denote by $Y_{i,t+s}^{0}$ the outcome of firm *i* had it not have foreign capital. The causal effect of the FDI for firm *i* at period (t+s) is defined as: $Y_{i,t+s}^{1} - Y_{i,t+s}^{0}$.

The fundamental problem of causal inference is that the quantity $Y_{i,t+s}^{0}$, referred as the counterfactual, is unobservable. Causal inference relies on the construction of the counterfactual, which is the outcome the firms would have experienced on average had they not been exposed to FDI. The counterfactual is estimated by the corresponding average value of firms that do not have FDI, i.e. domestic firms. An important issue in the construction of the counterfactual is the selection of a valid control group and to this end me make use of matching techniques.

The basic idea of matching is to select from the group of firms belonging to the control group those firms in which the distribution of the variables X_{it} affecting the outcome is as similar as possible to the distribution of the firms belonging to the treated group. The matching procedure consists on linking each treated individual with the same values of the X_{it}. We adopt the "propensity score matching" method. To this end, we first identify the probability of being a firm with foreign capital ownership (the "propensity score") for all firms, irrespective if they belong to treated or control group by means of a logit model. A firm *k* belonging to the control industries, which is "closest" in terms of its "propensity score" to a firm belonging to the tradable industries, is then selected as a match for the former. There are several matching techniques, and in this work we use the "kernel" matching method that penalises distant observations, and bootstrapped standard errors.

[***] Blundell & Costa Dias (2000) present a review of the microeconomic evaluation literature.

A matching procedure is preferable to randomly or arbitrarily choosing the comparison group because it is less likely to suffer from selection bias by picking firms with markedly different characteristics.

As Blundell et al. (2004) point out, a combination of matching and difference-in-difference is likely to improve the quality of non-experimental evaluation studies. The difference-in-difference approach is a two step procedure. Firstly, the difference between the average outcome variable before and after having foreign capital is estimated for firms belonging to the treated group, conditional on a set of covariates (X_{it}). However, this difference cannot be attributed only to the FDI since after the firm started to have foreign capital the outcome variables might be affected by other macroeconomic factors, such as policies aimed to stabilization of the economy. To deal with this the difference obtained at the first stage is further differenced with respect to the before and after difference for the control group of non-tradable plants. The difference-in-difference estimator therefore removes effects of common shocks and provides a more accurate description of the impact of FDI.[†††]

3.4. Data sources

The data sources for the panel of firms are from the Industrial Census for 1997 and the Annual Surveys from 1998 until 2005,[‡‡‡] carried out by the "Instituto Nacional de Estadísticas del Uruguay" (INE).[§§§]

In 1997 an Economic Census was carried out and changes in the sample as well as in the methodology with respect to previous years were introduced in the following Annual Surveys.

Before 1997 the INE discriminated firms according to units of activities (Unidades de clase de Actividad also named UCAs) since the same firm can undertake activities in several different sectors. Thus, a firm could have several records in the Survey according to its different activities. Moreover, the Industrial Surveys gathered the data exclusively for manufacturing activities. This methodology changed since the 1997 Economic Census while the INE instead of recording data by activities started to register data globally at the firm level in the so called Surveys of Economic Activities. Hence, since 1997 if a firm has activities in several sectors (which can be manufacturing as well as commerce and services) the data will be at the firm level in just one record making difficult to discriminate the different activities. The firms are classified by the INE according to its main activity.

For this reason the data will take into account the whole activity of the firm and do not allow isolating the manufacturing activity from commerce and services, neither the different manufacturing sectors. Thus,

[†††] In future work we will address the categorical treatment effect since it is likely to have a different response at different shares of foreign capital, though we have some data limitation since in some years this variable is recorded as a binary variable, and for some years we have 3 or 4 categories and in others the share of foreign assets.

[‡‡‡] The panel ends in 2005 because this was the last year available when we conducted this work. Furthermore in 2006 there were important changes in the wage setting since wage councils (consejos de salaries) were introduced, where the government,firms and workers negotiated/agree on the wage setting.

[§§§] Our panel ends in 2005 since when we undertake this work this was the information available to us at the Institute of Economics.

the data on the firm give us an approximation to the value of production and the resources used but in some cases could be overestimated.[****]

The data provided by the INE includes gross output, value added, sales, exports, intermediate consumption discriminated in various items, number of workers, capital, imported and domestic intermediates.

One important variable is capital which is defined as the value of lands, buildings and constructions, machinery and equipment, intangible assets and other capital goods used by the firm, which is directly asked to the firm by the Instituto Nacional de Estadisticas del Uruguay.

In order to approximate the flow services of capital we use the stock under the assumption that flow services are proportional to the stock of capital. Nevertheless we should keep in mind that the stock of capital does not adjust quickly to changes in business cycles. Hence, total factor productivity estimated using data on capital stock will fluctuate pro-cyclically in relation to the rate of capital utilization. Nevertheless, since there is no data available to estimate flow services of capital and most of the empirical works use the stock of capital, in this study we use stock the capital in the estimation of the production functions and total factor productivity.

The variable foreign ownership of capital was recorded/provided in different ways during the period, while the INE actually asked the share of foreign assets, and we do have this information for some years, in other years they provide the variable in two or three categories: firms without foreign assets, firms with foreign assets, firms with up to 49 % of foreign assets, firms with more than 50 % of foreign assets. For the years that we have the share of foreign assets in total capital we find that 93 % of foreign owned firms have more than 50 % of foreign assets.

Gross output, value added, intermediates, capital and wages were deflated by specific industry price deflators that were constructed at the 4 ISIC digit level, with base year 1997.

We have to keep in mind that the Uruguayan economy was also affected by the Brazilian devaluation in the 1998 and since this year entered in a phase of recession that end up with the economic crisis in 2002 and the beginning of the recovery in 2004.

3.5. Variable definition

The dependent –or outcome- variables are defined as follows and expressed in natural logarithms.

As measures of productivity we estimate Total Factor Productivity (TFP) and Labour Productivity (LP).

[****] According to the INE the percentage of firms that has activities in several sectors (manufacturing and/or commerce and/or services) accounts for the 25 % of the whole firms surveyed in the period 1997-2005.

Total Factor Productivity was estimated assuming a Cobb-Douglas functional form and using the Levinshon and Petrin (2003) methodology which allows correcting for endogeneity in inputs (Ln TFP) while the attrition bias was tackled using an unbalanced panel of firms.
Labour Productivity was defined as value added over total employment (Ln LP).

The measures of skilled employment we considered are the following: (i) number of white collars per firm (ln_nwc1), which is further discriminated in number of professionals and technicians (ln_npyt) and other white collars; (ii) share of white collars in total employment at the firm level (lnshn_wc1); (iii) share of professionals and technicians in total employment defined as the number of professionals and technicians in total workforce of the firm (lnsh_pyt);[††††] (iv) finally we consider the ratio of the number of white collars to blue collars (ln_nwc_bc).

Regarding to wages we analysed the following variables: (i) averages wages per firm (ln_avgw);
(ii) share of wages of white collars in total wages per firm (lnshw_wc1); (iii) share of wages of professionals and technicians in total wages per firm (lnshw_pyt); (iv) share of wages of white collars in total variable costs (lnshwc_ci);[‡‡‡‡] (v) average wage of white collars per worker in relation to average wage of blue collars, named wage gap (lngap2), which proxies wage inequality between skilled and unskilled workers.

As additional variables we considered the following: capital intensity defined as the capital to labour ratio, i.e. stock of capital over total number of workers at the firm level (Ln K_L).
Size of the firm defined in terms of the number of workers and as dummy variables that takes the value of one for firms with 49- 99 workers (medium) and a dummy for firms with more than 100 workers (big firms). We control also with time and industry dummies as we comment above.

The explanatory variable we analyse is foreign ownership defined as a dummy variable equal to one when some share of the assets of the firm are foreign and zero otherwise. We named this variable FDI.

4. Results

4.1. Descriptive statistics

In Table 1 we present some descriptive statistics indicating the percentage of firms with foreign ownership of capital, exporting firms, firms that use imported intermediates and the share of big firms in the sample. We should note that our sample considers firms with 19 or more employees, since firms with

[††††] In this work we do not take into account consultancy services or sub-contracting of professionals, i.e. non-permanent workers.
[‡‡‡‡] Fajnzylber & Fernandes (2009) analysing the demand for skilled labour for Brazil and China use a similar definition of skilled wages over variable costs and skilled labour over total labour.

less than 19 employees present missing data problems. The shortcoming of this could be to bias the results towards bigger firms, and under-estimating so the results for foreign owned firms.

We find that in the period analysed 13 % are foreign firms, 51 % undertake exporting activities and 55 % use imported intermediates and 14 % of the firms carry out R&D activities. Multinationals enterprises are mostly exporting firms (70.52 %), further 77 % use imported intermediates, have a higher export propensity (38.66 % of their total sales), while the share of imported inputs is of 48.59 %, and 38.66 % undertake formal R&D activities (see Table 1.2).

Regarding to employment the average number of total workers per firms in the period is of 99 workers in the sample, while 25.5 % of the firms have more than 100 workers. The average number of white collars is of 27 employees per firm, while the average number of professional and technicians is just of 3 per firm. On the other hand the average number of blue collar per firm is of 62 workers (see Table 1.3).

With respect to wages, the average wage of white collars in the period is of 145,799 constant pesos while the average wage of professionals and technicians rise to 294,983 and average wage for blue collars is of 72,820 constant pesos per worker in each category in the period.

In Table 1.4 we present the percentage of foreign firms by year while in Table 1.5 we present the percentage of foreign owned firms by industry for the whole period. We can observe that multinational enterprises in absolute number concentrates mostly in manufactures of food product and beverage (243 firms out of 1,843 firms in the sample), a sector in which the country enjoys comparative advantage.
In what follows we present our results.

4.2. Premia

In Table 2 we present the estimated performance premia associated to foreign ownership of capital. We find that the coefficients for labour productivity, TFP, total employment and average wages are positive and significant indicating that firms with foreign ownership perform better in terms of labour productivity, total factor productivity, employment, and wages per worker. While labour productivity shows a coefficient 70 % higher than for domestic firms, TFP is 65 % higher, employment 44 % and average wages per worker are 46 % higher than for domestic firms. Further capital intensity show a coefficient of 0.72, i.e. foreign owned firms shows higher capital intensity than domestic firms. These results are consistent but higher than for developed countries, in line with findings for developing ones (for instance Yasar et al. 2007 for Turkey).

Regarding to skilled labour, we find that the number of white collars per firm and professionals and technicians show a positive association with foreign ownership of capital with coefficients of 0.32 and 0.56 respectively –i.e. a change in 32 % and 56 % -, pointing out that the absolute number of skilled labour is higher in foreign owned firms than in their domestic counterparts. Furthermore the share of white to blue collars –in number of workers- is also positive and significant, 36 % higher than for domestic firms.

On the other hand, the share of skilled workers in total employment show a positive and significant association (0.29) and the share of professionals and technicians shows a coefficient even higher (0.555).

The wage bill share of skilled workers in total wages show a positive association with FDI, with an average an estimated coefficient of 0.41, but the bill wage share of skilled workers in variable costs is not significant. Also the wage bill share of professionals and technicians is higher in foreign owned firms, with an average premia of 54.5 %.

Thus, wages of skilled workers seem to be higher for firms with foreign ownership of capital. Finally, the wage gap –defined as average wages of white collars to average wage of blue collars per worker- between white and blue collars is also positive and significant, with a coefficient of 0.177, i.e. 17.7 % higher than for domestic firms.

Thus, we find a positive association of foreign direct investment with productivity, number and wages of skilled workers per firm in total and relative terms, with the exception of the wage bill share of white collars in variable cost, which turn out to be not significant.

Finally, it is worth noting that the coefficient for wages are higher than those for employment which would indicate that the demand operates more through the price of skilled labour than through the number of skilled workers.

4.3. Quantile regressions

The tests of the normality[§§§§] of the dependent variable indicate that the dependent variables depart from normality which justifies the use of quantile regressions.

[§§§§] We perform the sktest in Stata 11, which provides the skewness and kurtosis tests of normality. In all cases we reject normality. The Kolmogorov-Smirnov tests (ksmirnor in Stata) also confirm non-normality.

In Table 3 we present the results for OLS and of the quantile regressions at 0.10, 0.25, 0.50, 0.75 and 0.90 quantiles of the distribution of the dependent variables. The coefficients can be interpreted as the partial derivative of the conditional quantile of Y with particular regressors, i.e. the marginal change in Y at the conditional quantile due to the marginal change in a particular regressor, in our case FDI.

For both measures of productivity, labour productivity and total factor productivity, the coefficients associated with FDI vary significantly, in a positive increasing way as we move from the lowest to the highest quantile. This provides evidence that there is a positive effect of FDI on productivity across the entire conditional output distribution.[*****] Thus, firms with higher productivity levels are more responsive to foreign ownership. In Chart 1 and 2 we depict the estimated coefficients for the different quantiles for labour productivity and TFP respectively.

Regarding to the number of white collars per firm they increase from the 0.1 quantile up to the 0.5 and then decrease. Thus, firms are more responsive around the median showing a U-inverted association (see Chart 3). In turn, the number of professional and technicians per firm shows a sharp increase from the 0.10 quantile to the 0.25 and then it remains relatively stable (Chart 4).

The share of white collars in total employment for foreign ownership is not significant at the lowest quantile but positive over the rest of the distribution with a maximum around the median (Chart 5). The effect of FDI on the share of professionals shows an increasing effect over the distribution with a stronger effect at the highest quantiles (Chart 6).

Finally the ratio of the number of white collars to blue collars is not significant at the lowest tail and positive and increasing from the 0.25 quantile reaching the maximum at the upper tail (Chart 7).
Regarding to wages, average wages are positive and significant and relatively stable over the 0.10 up to the 0.75 quantile and reaches the maximum at the 0.90 quantile (Chart 8).
While the wage bill share of white collars in total wages per firm shows a declining trend over quantiles, so the conditional effect is highest at the lower tail of the distribution.
The wages of white collars over variable costs shows that FDI is not significant except for the 0.75 quantile with a coefficient of 0.406. On the other hand the wage bill share of professionals and technicians over total wages shows a positive and relatively stable trend over the 0.10 to the 0.75 quantile reaching its maximum at the upper tail.
Finally the wage gap measure as the ratio of wages per white collar to wages of white collars (lngap2) show a positive significant effect decreasing around the 0.25 and 0.50 quantile and increasing afterwards, i.e. showing an U-shaped association.

[*****] The positive shift of all quantiles means that foreign ownership productivity distribution first order stochastic dominates the non-foreign (domestic) productivity distribution.

The number of professionals and technicians over total employment shows an increasing response with a maximum at the 0.75 percentile. Further, the wages of professionals and technicians shows also a positive and increasing response over the whole distribution.

Thus, these results confirms that the effect of FDI have varies over the distribution of the dependent variable.

To sum up, productivity is more responsive to FDI as we move from the low to the upper tail of the distribution, so firms with higher productivity levels are more responsive to foreign ownership. The number of white collars is more responsive around the middle of the distribution showing a U-inverted shaped relationship, while the ratio of white collars to blue collars shows an increasing trend over the entire distribution reaching a maximum at the upper tail. For the share of white collars in total employment we find a similar behaviour than for the number of white collars with a higher response to FDI around the median.

Regarding to wages, we find that foreign owned firms pay higher average wages to skilled workers, though the wage bill share of skilled workers over total wages shows a declining trend over quantiles, so that the average effect is highest at lower tail of the distribution. This could be due to a higher wage of white collars or a lower total wage, and hence smaller firms.[†††††] While the share of wages in variable costs turns out to be not significant and there is evidence of a higher wage gap between skilled and unskilled workers from the lowest to the upper tail of the distribution.

The whole picture that emerges is that the response to the variables differs over the conditional distribution of each variable, confirming that the response or premia is not homogeneous. Since firms are heterogeneous, the premium in terms of productivities, skilled labour and wages for foreign ownership of capital vary along the distribution of the various dependent variables considered to analyse productivity, the demand of skilled labour and wage inequality. Thus, firm heterogeneity translates into different responses that are better captured using quantile regressions than with the standard OLS regressions.

4.4. Discrete Treatment Effect Analysis

We use treatment effect techniques which allow analysing the causal effects of foreign ownership (the treatment) on firms with foreign capital participation (the treated) relative to firms that do not (the control group). Our treatment variable is foreign ownership (FDI). We performed regressions in double differences without matching, matching and double differences (MDID) without bootstrapped standard errors and matching and double differences with bootstrapped standard errors. Due to space constraints

[†††††] The correlation between total number of workers per firm and total wages is of 0.84.

we will comment the results for MDID with kernel matching techniques[‡‡‡‡‡] and bootstrapped standard errors which are reported in Table 4.1. The advantage of bootstrapping is that it is not assumed a specific distribution of the variable under analysis. Additionally, in Table 4.2 we report the results of MDID without bootstrapping.

As covariates we included size defined as a dummy that takes the value of one for firms with more than 100 workers and zero otherwise, a dummy that takes the value of one for firms with value added higher than the median for the whole sample and zero otherwise, and a dummy equal one for those firms with gross output higher than the median and zero otherwise, as well as time and industry dummies.
In all the cases we check that the balancing tests were satisfied.[§§§§§]

For labour and total factor productivity, the number of white collars and the number of professionals and technicians we find a positive and significant impact of foreign ownership. Moreover, foreign ownership of capital has a positive and significant effect on the ratio of white to blue collars. While labour productivity is 51.3 % higher in foreign owned firms, total factor productivity is 47.5 % higher, the number of white collar 22 % and the number of professionals and technicians 48.5 % higher than for domestically owned firms.

Further, FDI has a positive significant impact on the share of white collars in total employment (22.9 %), as well in the share of professionals and technicians (51.3 %) pointing out that the demand of skilled labour is higher for foreign owned firms than for domestic firms. For the share of professionals in total employment we obtain a positive and significant effect for foreign ownership, with a response of 51.3% . The ratio of the number of white collar to blue collars is also 32.5 % higher in foreign owned firms.

Regarding to wages, the effect of foreign ownership has a positive effect on average wages per firms, which turns to be 35 % higher than in domestic firms, which is partly driven mainly by the share of white collars in total employment.

The wage bill share of white collars in total wages shows a positive effect of foreign capital, with an elasticity of 33 %. Nevertheless the share of wages of white collars in variable costs turns out to be not significant. Further, foreign owned investment has a positive causal effect on the share of professionals and technicians in total wages, which is 54.5 % higher, being this effect stronger than for total white collars.

[‡‡‡‡‡] The kernel technique penalises distant observations.
[§§§§§] We use three different commands to estimate results in Stata 11: pscore followed by the attk command with the bootstrap option; the bs: psmatch2 command for MDID and bootstrapping and psmatch2 without the bootstrap option. Results are available upon request.

Finally foreign direct investment has a positive effect on the wage gap between skilled and unskilled workers. In this regard, the ratio of average wage of white collar to average blue collar wages is of 22 %. In Table 5 we present a summary of the results for the treatment effect analysis.

5. Concluding Remarks

Regarding to the OLS estimations, we find that the coefficients for labour productivity, total factor productivity, employment and wages are positive and significant indicating that firms with foreign ownership of capital perform better in terms of labour productivity, total factor productivity and employment, capital intensity and wages per worker paid. Results for skilled labour in number of workers seem to show that foreign owned firms tend to employ more skilled workers and to pay higher wages. Nevertheless, the wage gap between skilled and skilled workers is positive and significant pointing out to a greater inequality between these two types of workers in foreign owned firms.

The quantile estimations reveal that the response to the variables differ over the conditional distribution of each variable, confirming that the response or premia is not homogeneous. Since firms are heterogeneous, the premium in terms of productivities, skilled labour and wages for foreign ownership of capital vary along the distribution of the various dependent variables considered to analyse productivity and the demand for skilled labour. Thus, firm heterogeneity is better capture using quantile regressions than with the standard OLS regressions.

The treatment effect analysis reveals a positive causal effect of foreign ownership on productivity, skilled labour and wages. When we take skilled labour wages as share of total wages, we find that -except for the share of white collar wages in variable costs which turns out to be not significant-, foreign ownership shows a positive effect. In short, it seems to be a causal association of foreign direct investment with the absolute and relative number of skilled workers and wages of skilled workers, as well as also a greater wage inequality between skilled and unskilled workers.

The whole picture that emerges is that knowledge from abroad helps to increase productivity, in line with the predictions of endogenous growth models in open economies. Furthermore, there is evidence that foreign direct investment tends to increase the demand for skilled labour, which would in turn increase income inequality. Thus, the policy recommendation should be to promote foreign direct investment as well as to implement complementary domestic policies such as training of workers in order to take advantage of the globalised environment and other social policies to mitigate wage inequality.

References

Acemoglu, D., 2003. Cross-country Inequality Trends*. *The Economic Journal*, 113(485), p.F121–F149.

Aghion, P. et al., 2005. Entry liberalization and inequality in industrial performance. *Journal of the European Economic Association*, 3(2-3), pp.291–302.

Aghion, P. et al., 2003. The unequal effects of liberalization: theory and evidence from India. *Harvard University, unpublished paper, October*.

Aitken, B., Harrison, A. & Lipsey, R.E., 1996. Wages and foreign ownership A comparative study of Mexico, Venezuela, and the United States. *Journal of International Economics*, 40(3-4), pp.345–371.

Aitken, B.J. & Harrison, A.E., 1994. *Do domestic firms benefit from foreign direct investment: evidence from panel data*, World Bank Publications.

Almeida, R., 2007. The labor market effects of foreign owned firms. *Journal of International Economics*, 72(1), pp.75–96.

Arndt, C. & Mattes, A., 2010. Cross-Border Mergers and Acquisitions of Multinational Firms. New Firm-Level Evidence. *IAW Discussion Papers*.

Arndt, C. & Mattes, A., 2008. The impact of inward FDI and foreign ownership on the performance of German multinational firms. *mimeo Institute for Applied Economic Research*.

G Bittencourt, G Carracelas, A Doneschi, N Reig. 2009. Tendencias recientes de la inversión extranjera directa en Uruguay. Documento de Trabajo 27/09, Departamento de Economia, Facultad de Ciencias Sociales, UdelaR.

Blundell, R., Dias, M.C., Meghir, C. & Reenen, J., 2004. Evaluating the employment impact of a mandatory job search program. *Journal of the European Economic Association*, 2(4), pp.569–606.

Blundell, R. & Costa Dias, M., 2000. Evaluation methods for non-experimental data. *Fiscal studies*, 21(4), pp.427–468.

Budd, J.W., Konings, J. & Slaughter, M.J., 2005. Wages and international rent sharing in multinational firms. *Review of Economics and Statistics*, 87(1), pp.73–84.

Carmichael, F., 1992. Multinational enterprise and strikes: theory and evidence. *Scottish Journal of Political Economy*, 39(1), pp.52–68.

Chennells, L. & Van Reenen, J., 1999. Has technology hurt less skilled workers. *An econometric*.

Conyon, M.J. et al., 2002. The productivity and wage effects of foreign acquisition in the United Kingdom. *The Journal of Industrial Economics*, 50(1), pp.85–102.

Currie, J. & Harrison, A., 1997. Sharing the costs: the impact of trade reform on capital and labor in Morocco. *Journal of Labor Economics*, 15, pp.44–71.

Dimelis, S. & Louri, H., 2002. Foreign ownership and production efficiency: a quantile regression analysis. *Oxford Economic Papers*, 54(3), pp.449–469.

Djankov, S. & Hoekman, B., 2000. Foreign investment and productivity growth in Czech enterprises. *The World Bank Economic Review*, 14(1), pp.49–64.

Doms, M.E. & Jensen, J.B., 1998. *Comparing wages, skills, and productivity between domestically and foreign-owned manufacturing establishments in the United States*, University of Chicago Press.

Dunning, J.H., 1981. *International production and the multinational enterprise*, Allen & Unwin London.

Fajnzylber, P. & Fernandes, A.M., 2009. International economic activities and skilled labour demand: evidence from Brazil and China. *Applied Economics*, 41(5), pp.563–577.

Feenstra, R.C. & Hanson, G.H., 1997. Foreign direct investment and relative wages: Evidence from Mexico's maquiladoras. *Journal of international economics*, 42(3-4), pp.371–393.

Feliciano, Z.M. & Lipsey, R.E., 2006. Foreign ownership, wages, and wage changes in US industries, 1987–92. *Contemporary Economic Policy*, 24(1), pp.74–91.

Figini, P. & Görg, H., 1999. Multinational companies and wage inequality in the host country: the case of Ireland. *Review of world economics*, 135(4), pp.594–612.

Figini, Paolo & Gorg, Holger, 2011. Does Foreign Direct Investment Affect Wage Inequality? An Empirical Investigation. *The World Economy*, 34(9), pp.1455–1475.

Girma, S. et al., 1999. *Wages, productivity and foreign ownership in UK manufacturing*, University of Nottingham.

Girma, S. & Gorg, H., 2007. Evaluating the foreign ownership wage premium using a difference-in-differences matching approach. *Journal of International Economics*, 72(1), pp.97–112.

Girma, S. & Görg, H., 2007. MULTINATIONALS'PRODUCTIVITY ADVANTAGE: SCALE OR TECHNOLOGY? *Economic Inquiry*, 45(2), pp.350–362.

Goldberg, P.K. & Pavcnik, N., 2007. *Distributional effects of globalization in developing countries*, National bureau of economic research.

Gottschalk, P. & Smeeding, T.M., 1997. Cross-national comparisons of earnings and income inequality. *Journal of economic literature*, 35(2), pp.633–687.

Griffith, R., Simpson, H. & Windmeijer, F., 2001. Understanding productivity differences between foreign and domestic firms. *Institute for Fiscal Studies*.

Haddad, M. & Harrison, A., 1993. Are there positive spillovers from direct foreign investment?* 1:: Evidence from panel data for Morocco. *Journal of development Economics*, 42(1), pp.51–74.

Harris, R. & Robinson, C., 2003. Foreign ownership and productivity in the United Kingdom estimates for UK manufacturing using the ARD. *Review of Industrial Organization*, 22(3), pp.207–223.

Harrison, A., 1996. Openness and growth: A time-series, cross-country analysis for developing countries. *Journal of Development Economics*, 48(2), pp.419–447.

Helpman, E., Melitz, M.J. & Yeaple, S.R., 2004. Export versus FDI with heterogeneous firms. *The American Economic Review*, 94(1), pp.300–316.

Karpaty, P., 2004. Are foreign owned&firms more productive? Evidence from Swedish firm data. *Working Papers*.

Karpaty, P., 2007. Productivity effects of foreign acquisitions in Swedish manufacturing: The FDI productivity issue revisited. *International Journal of the Economics of Business*, 14(2), pp.241–260.

Krugman, P.R., 2000. Technology, trade and factor prices. *Journal of International Economics*, 50(1), pp.51–71.

Lee, E., and M. Vivarelli. 2006. The Social Impact of Globalisation in Developing Countries. IZA Discussion Paper no. 1925.

Levinsohn, J. & Petrin, A., 2003. Estimating Production Functions Using Inputs to Control for Unobservables. *Review of Economic Studies*, 70(3), pp.317–341.

Lipsey, R.E., 2004. *Home-and host-country effects of foreign direct investment*, University of Chicago Press.

Lipsey, R.E. & Sjoholm, F., 2004a. Foreign direct investment, education and wages in Indonesian manufacturing. *Journal of Development Economics*, 73(1), pp.415–422.

Lipsey, R.E. & Sjoholm, F., 2004b. Foreign direct investment, education and wages in Indonesian manufacturing. *Journal of Development Economics*, 73(1), pp.415–422.

Ramaswamy, K., 2008. Wage Inequality in Indian Manufacturing: Is it trade, technology or labour regulations? *Indira Gandhi Institute of Development Research, Mumbai Working Papers*.

Taylor, K. & Driffield, N., 2005. Wage inequality and the role of multinationals: Evidence from UK panel data. *Labour Economics*, 12(2), pp.223–249.

Yasar, M. & Morrison Paul, C.J., 2007. International linkages and productivity at the plant level: Foreign direct investment, exports, imports and licensing. *Journal of International Economics*, 71(2), pp.373–388.

Table 1.1: Descriptive statistics for the period 1997-2005

Variable	Obs	Mean	Std. Dev.	Min	Max
Foreign Ownership	3636	0.128	0.335	0	1
Exporters	5035	0.506	0.500	0	1
Imported Intermediates	4955	0.554	0.497	0	1
Undertake R&D	5161	0.141	0.348	0	1
Employment	5684	99.670	156.379	19	2,438
Big firms	5684	0.255	0.436	0	1

Source: Own elaboration based on data from the Instituto Nacional de Estadisticas.

Table 1.2: Multinational vs. Domestic Firms

	Multinational Firms	Domestic Firms

Variable	No. Obs.	Mean	Std. Dev	No. Obs.	Mean	Std. Dev
Exporting firms	458	0.705	0.456	3001	0.479	0.499
Importing intermediates	454	0.773	0.419	2973	0.533	0.499
Share of imported intermediates	454	0.486	0.389	2973	0.282	0.351
Export propensity	458	0.387	0.401	3001	0.194	0.32
R&D activities	458	0.338	0.474	3105	0.107	0.309

Source: Own elaboration based on data from the Instituto Nacional de Estadisticas.

Table 1.3: Employment variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Employment	5684	99.670	156	19	2438
No. of White Collars	5161	26.577	49.183	0	954
No. of Blue Collars	5684	61.597	112.026	0	2163
Professionals and Technicians	5684	2.556	9.302	0	230

Source: Own elaboration based on data from the Instituto Nacional de Estadisticas.

Table 1.4: Percentage of foreign firms by year

Year	MNCs
1997	10%
1998	14%
1999	15%
2000	15%
2001	12%
2002	12%
2003	13%
2004	10%
2005	11%
Total	13%

MNCs: foreign owned firms.
Source: Own elaboration based on data from the Instituto Nacional de Estadisticas.

Table 1.5: Distribution of foreign firms by industry, period 1997-2005

ISIC rev 3	Industry description	ETs	No. of firms
15	Manufacture of food products and beverages	13%	1,843
16	Manufacture of tobacco products	43%	26
17	Manufacture of textiles	7%	476
18	Manufacture of wearing apparel, dressing and dyeing of fur	4%	438
19	Tanning and dressing of leather, manufacture of luggage, handbags, saddlery, harness and footwear	11%	183
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plainting materials	0%	125
21	Manufacture of paper and paper products	28%	88

22	Publishing, printing and reproduction of recorded media	12%	330
23	Manufacture of coke, refined petroleum products and nuclear fuel	0%	12
24	Manufacture of chemicals and chemical products	26%	672
25	Manufacture of rubber and plastics products	9%	308
26	Manufacture of other non-metallic mineral products	14%	196
27	Manufacture of basic metals	20%	68
28	Manufacture of fabricated metal products, except machinery and equipment	6%	248
29	Manufacture of machinery and equipment n.e.c.	15%	133
30	Manufacture of office, accounting and computing machinery	0%	5
31	Manufacture of electrical machinery and apparatus n.e.c.	23%	125
32	Manufacture of radio, television and communication equipment apparatus	60%	10
33	Manufacture of medical, precision and optical instruments, watches and clocks	18%	88
34	Manufacture of motor vehicles, trailers and semi-trailers	28%	103
35	Manufacture of transport equipment	12%	55
36	Manufacture of furniture; manufacture n.e.c.	6%	150
37	Recycling	0%	2
Total		13%	5684

Source: Own elaboration based on data from the Instituto Nacional de Estadisticas.

Table 2: Performance Premia

VARIABLES	Ln(Labour Productivity) (Lnlp)	Ln(TFP) (lntfp)	Ln(Total Employ-ment)[a] (lnpo)	Ln(K_L) (lnkl)	Ln(average wages) (ln_avgw)	Ln(number of White Collars) (ln_nwc)	Ln(number of P&T) (ln_npyt)	Ln(No. WC/No. BC) (ln_nwc_b)	Ln (No. WC/Total EMP.) (lnsh_wc1)	Ln(Wages WC/Total Wages) (lnshw_w1)	Ln(Wages WC/Var. Costs) (lnshwc_c)
FDI	0.706***	0.653***	0.439***	0.718***	0.455***	0.321***	0.560***	0.365***	0.285***	0.410***	0.321
	(0.0491)	(0.0473)	(0.0435)	(0.0597)	(0.0269)	(0.0409)	(0.0497)	(0.0563)	(0.0404)	(0.0340)	(0.198)
Medium	0.170***	0.239***		0.272***	0.164***	0.626***	0.413***	-0.117***	-0.088**	-0.0193	0.684***
	(0.0324)	(0.0312)		(0.0534)	(0.0213)	(0.0317)	(0.0332)	(0.0446)	(0.0322)	(0.0326)	(0.194)
Big	0.296***	0.493***		0.683***	0.271***	1.613***	1.207***	-0.247***	-0.183***	-0.0156	1.550***
	(0.0376)	(0.0353)		(0.5025)	(0.0232)	(0.0359)	(0.0391)	(0.0443)	(0.0339)	(0.0326)	(0.182)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	11.47***	10.53***	4.090***	10.936***	10.641***	1.938***	0.548***	-1.118***	-1.693***	-1.378***	-2.259***
	(0.0355)	(0.0342)	(0.0353)	(0.0546)	(0.0250)	(0.0359)	(0.0360)	(0.0494)	(0.0372)	(0.0363)	(0.190)
Observations	3,570	3,400	3,636	3,458	3,562	3,521	3,120	3,406	3,445	3,261	813
R-squared	0.233	0.254	0.092	0.184	0.355	0.446	0.376	0.105	0.093	0.089	0.113

Ln LP: labour productivity ; lnTFP: Total factor Productivity; lnpo: total number of workers; lnkl: ratio capital-labour; ln_avgw: average wages per worker and firm; ln_nwc: number of white collars; Ln_nyp: number of professionals and technicians; ln_nwc_bc: ratio of the number of white collars to blue collars; ln sh_wc1: number of white collars over total number of workers; lnshw_wc1: white collar wages over total wages; lnshwc_ci: wages white collar wages over variable costs; lngap2: white collar wages per capita/blue collar wages per capita; lnshw_pyt: wages P&T/total Wages.

WC: white collars, i.e. non production workers including professionals and technicians and other white collars; BC: Blue collars, i.e. workers in productive activities; P&T: Professionals and technicians. Ln stands for natural logarithms. FDI: dummy equal one if the firm has foreign capital.

Robust standard errors between brackets. *significant at the 10 %; ** significant at the 5 %; *** significant at the 1 % .

(a) without control for size.

Table 2: Performance Premia (cont.)

VARIABLES	Ln(WagesP&T/Total Wages) (lnshw_pyt)	Ln(Wages WC/Var. Costs) (lnshwc_c)	Ln Wage Gap (lngap2)
FDI	0.545***	0.321	0.177***
	(0.0618)	(0.198)	(0.0628)
Medium	0.413***	0.684***	-0.894***
	(0.0332)	(0.194)	(0.0500)
Big	1.207***	1.550***	-2.110***
	(0.0391)	(0.182)	(0.0543)
Time Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
Constant	-1.677***	-2.259***	-15.17***
	(0.0362)	(0.190)	(0.0582)
Observations		813	3,125
R-squared	0.366	0.113	0.373

Ln LP: labour productivity ; lnTFP: Total factor Productivity; lnpo: total number of workers; lnkl: ratio capital-labour; ln_avgw: average wages per worker and firm; ln_nwc: number of white collars; Ln_nyp: number of professionals and technicians; ln_nwc_bc): ratio of the number of white collars to blue collars; ln sh_wc1: number of white collars over total number of workers; lnshw_wc1: white collar wages over total wages; lnshwc_ci: wages white collar wages over variable costs; lngap2: white collar wages per capita/blue collar wages per capita; lnshw_pyt: wages P&T/total Wages; WC: white collars, i.e. non production workers including professionals and technicians and other white collars; BC: Blue collars, i.e. workers in productive activities; P&T: Professionals and technicians.
Ln stands for natural logarithms. (a) without control for size. FDI: dummy equal one if the firm has more than 10 % of foreign capital. Robust standard errors between brackets. *significant at the 10 % level; ** significant at the 5 % level; *** significant at the 1 % level..

Table 3: Quantile regressions

		Quantile Regressions				
Dependent	OLS	0.1	0.25	0.5	0.75	0.9
Ln Labour Productivity	0.706***	0.447***	0.565***	0.612***	0.811***	1.046***
(lnlp)	(0.0491)	(0.0740)	(0.0469)	(0.0439)	(0.0457)	(0.0689)
Ln Total Factor Productivity (TFP)	0.653***	0.392***	0.510***	0.587***	0.704***	0.933***
(lntfp)	(0.0473)	(0.0694)	(0.0492)	(0.0472)	(0.0407)	(0.0681)
Ln Number of White Collars	0.321***	0.288***	0.351***	0.449***	0.400***	0.180***
(ln_nwc)	(0.0409)	(0.0642)	(0.0670)	(0.0417)	(0.0593)	(0.0633)
Ln Number of Professionals and Technicians	0.560***	0.187***	0.677***	0.693***	0.679***	0.693***
(ln_npyt)	(0.0497)	(7.13e-09)	(0.00336)	(0.0119)	(0.0298)	(0.0662)
Ln (Number of WC/Total Employment)	0.285***	0.0877	0.308***	0.329***	0.299***	0.268***
(lnsh_wc1)	(0.0404)	(0.0794)	(0.0555)	(0.0549)	(0.0426)	(0.0379)
Ln(Number of WC/Number of BC)	0.365***	0.0794	0.272***	0.361***	0.471***	0.554***
(ln_nwc_bc)	(0.0563)	(0.0914)	(0.0707)	(0.0565)	(0.0671)	(0.0817)
Ln Average Wages	0.455***	0.432***	0.410***	0.413***	0.397***	0.514***
(ln_avgw)	(0.0269)	(0.0505)	(0.0366)	(0.0297)	(0.0293)	(0.0305)
Ln(WC Wages/Total Wages)	0.410***	0.642***	0.471***	0.392***	0.292***	0.163***
lnshw_wc1	(0.0340)	(0.0941)	(0.0624)	(0.0444)	(0.0336)	(0.0239)
Ln (Wages WC/Variable Costs)	0.321	0.154	0.310	0.431	0.406*	0.0526
(lnshwc_ci)	(0.198)	(0.286)	(0.282)	(0.262)	(0.214)	(0.282)
Ln(Wages WC/Wages BC)	0.699***	0.726***	0.601***	0.625***	0.611***	0.814***
(lngap)	(0.0646)	(0.0971)	(0.0865)	(0.0755)	(0.0797)	(0.116)
Ln(Wages per capita WC/Wages per capita BC)	0.177***	0.257**	0.192**	0.109*	0.209***	0.245**
(lngap2)	(0.0628)	(0.107)	(0.0752)	(0.0639)	(0.0771)	(0.0951)

Lnlp: Ln Labour Productivity; lntfp: Ln Total Factor Productivity; ln_nwc: Ln Number of White Collars; ln_npyt: Ln Number of Professionals and Technicians; lnsh_wc1: Ln (Number of WC/Total Employment); ln_nwc_bc: Ln(Number of White Collars/Number of Blue Collars); ln_avgw: Ln (Average Wages); lnshw_wc1: Ln(White Collar Wages/Total Wages); lnshwc_ci: Ln (Wages White Collars/Variable Costs); lngap: Ln(Wages White Collar/Wages Blue Collars); lngap2: Ln(Wages per capita WC/Wages per capita BC); lnshn_pyt: Ln(No. Prof&Tec/total employment); lnshw_pyt: Ln(Wages P&T/total Wages); WC: white collars, i.e. non production workers including professionals and technicians and other white collars; BC: Blue collars, i.e. workers in productive activities; P&T: Professionals and technicians.
Robust standard errors in parenthesis. *significant at the 10 % level; ** significant at the 5 % level; *** significant at the 1 % level..

Table 3: Quantile regressions (cont.)

Dependent	OLS	0.1	0.25	0.5	0.75	0.9
Ln(No. P&T/Total Employment)	0.507***	0.212***	0.301***	0.462***	0.704***	0.609***
(lnshn_pyt)	(0.0622)	(0.0658)	(0.0611)	(0.0700)	(0.0651)	(0.101)
Ln(Wages P&T/Total Wages)	0.545***	0.528***	0.529***	0.540***	0.529***	0.616***
(lnshw_pyt)	(0.0618)	(0.112)	(0.105)	(0.0663)	(0.0617)	(0.101)

Chart 1: Quantile coefficients, dependant variable: Ln Labour Productivity

Chart 2: Quantile coefficients, dependant variable: Ln TFP

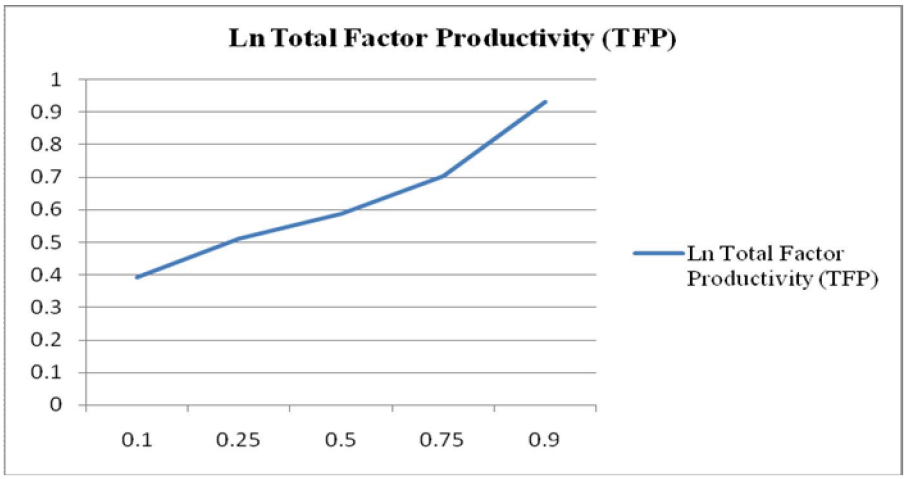


Chart 3: Quantile coefficients, dependant variable: Ln Number of White Collars

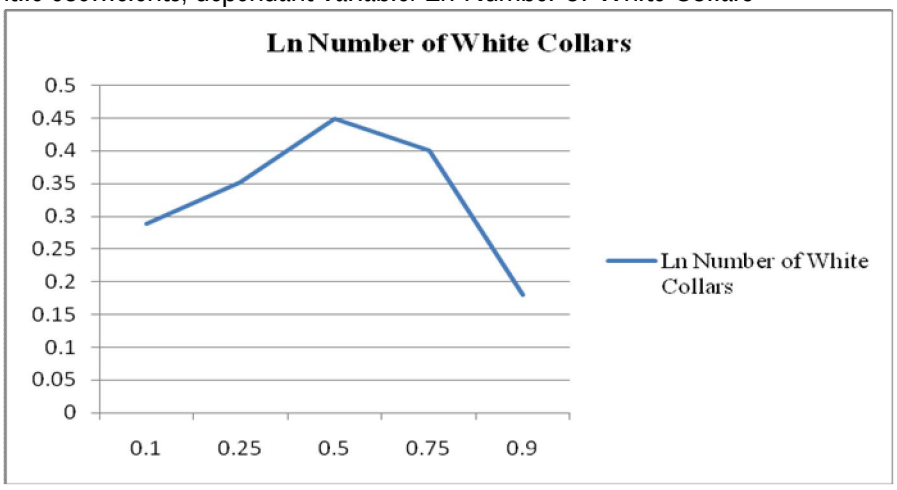


Chart 4: Quantile coefficients, dependant variable: Ln Number of Professionals and Technicians

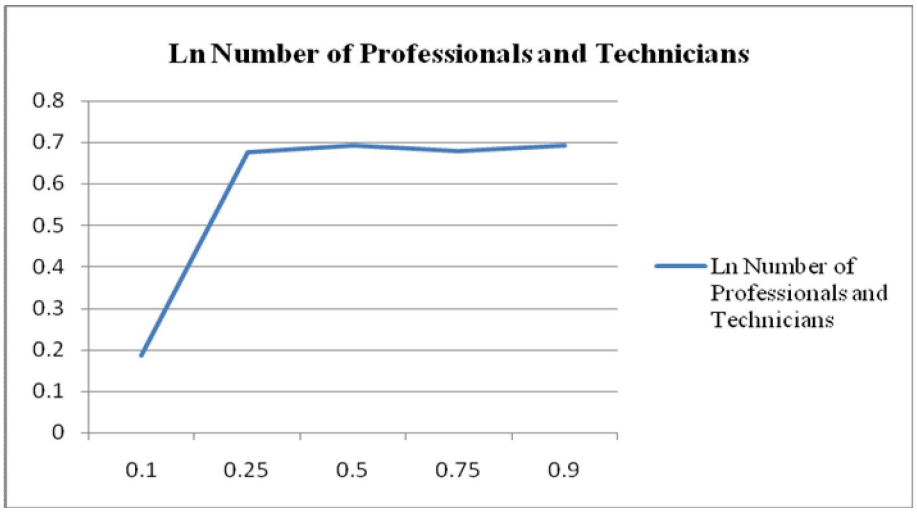


Chart 5: Quantile coefficients, dependant variable: Ln (Number of WC/Total Employment)

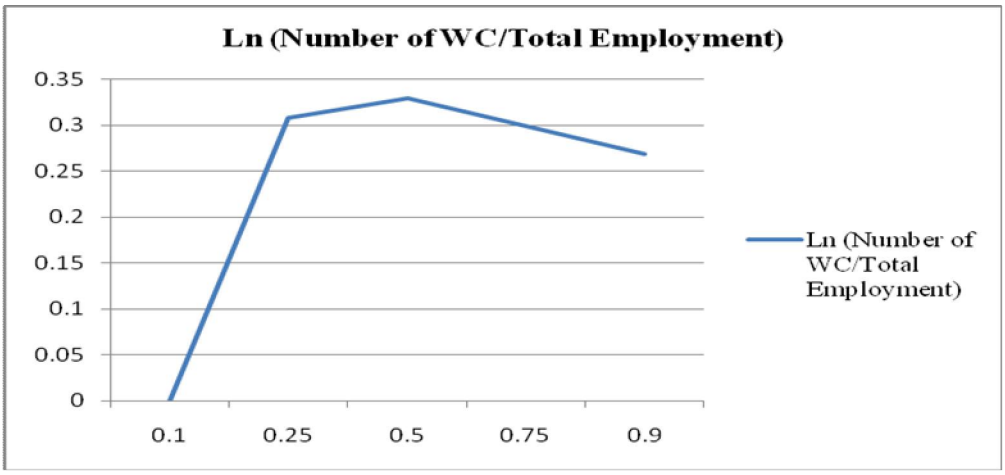
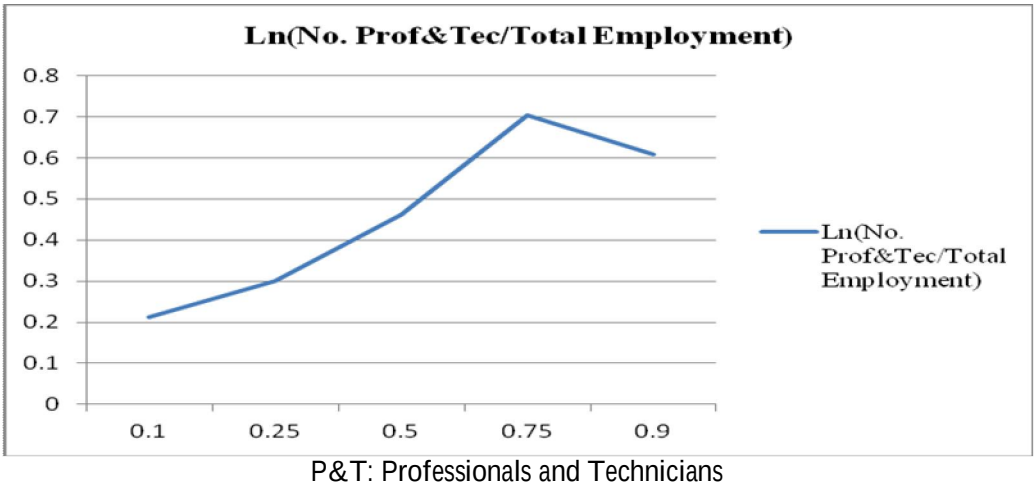


Chart 6: Quantile coefficients, dependant variable: Ln (Number of P&T/Total Employment)



P&T: Professionals and Technicians

Chart 7: Quantile coefficients, dependant variable: Ln (Number of WC/Number of BC)

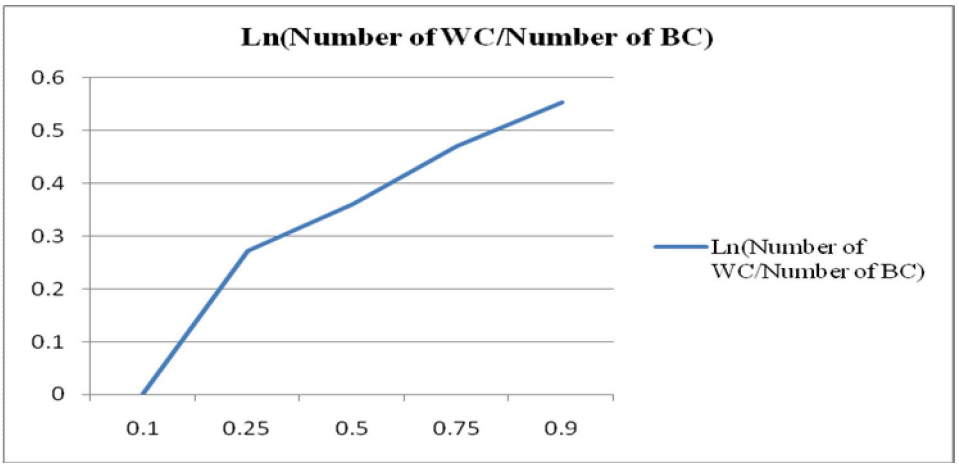


Chart 8: Quantile coefficients, dependant variable: Ln (Average Wages)

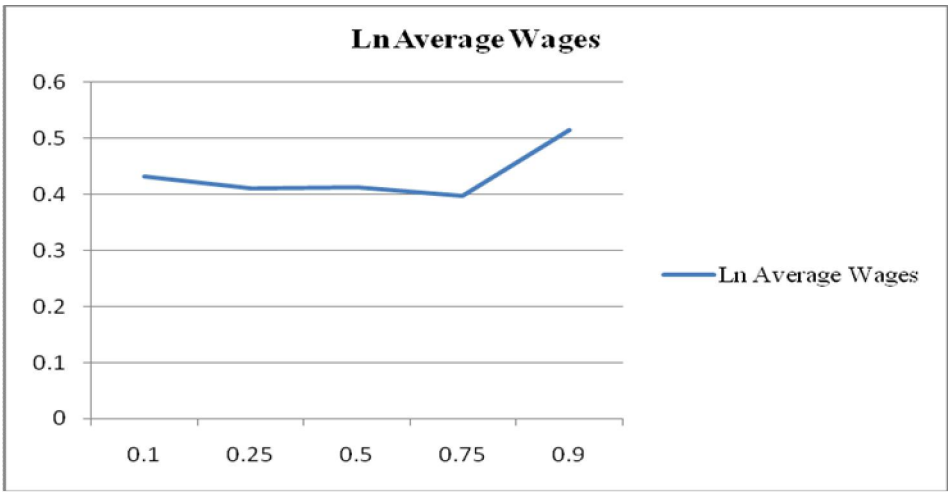


Chart 9: Quantile coefficients, dependant variable: Ln (White Collar Wages/Total Wages)

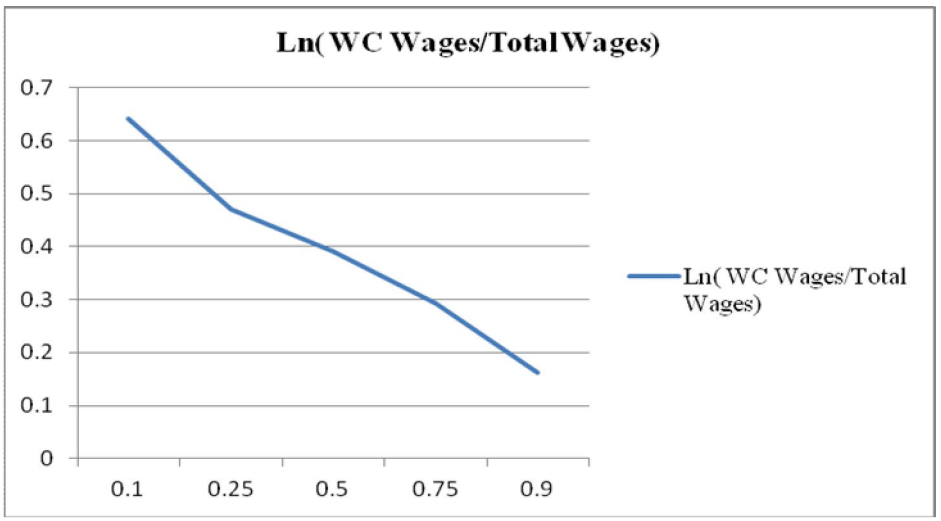


Table 4.1. Matching and Double Difference with bootstrapped standard errors

Output Variable	Ln LP (lnlp)	Ln TFP (lntfp)	Ln(No. of WC) (ln_nwc)	Ln(No. of P&T) (ln_npyt)	Ln(No. WC/No. BC) (ln_nwc_bc)	Ln(No. WC/EMP) (lnsh_wc1)
FDI	0.513	0.475	0.220	0.485	0.325	0.229
	(0.0466)***	(0.0372)***	(0.0488)***	(0.0450)***	(0.0623)***	(0.0449)***

Output Variable	Ln(No P&T/EMP) (lnshn_pyt)	Average Wages (ln_avgw)	Wages WC/Total Wages (lnshw_wc1)	Wages P&T/Total Wages (lnshw_pyt)	Avg Wages WC/Avg Wages BC (lngap2)	Wages WC/Var. Costs (lnshwc_ci)
FDI	0.513	0.351	0.331	0.544	0.220	0.181
	(0.0784)***	(0.0292)***	(0.0329)***	(0.0705)***	(0.0761)***	(0.1822)

Lntfp: Ln Labour Productivity; lntfp: Ln Total Factor Productivity; ln_nwc: Ln Number of White Collars; ln_npyt: Ln Number of Professionals and Technicians; lnsh_wc1: Ln (Number of White Collars/Total Employment); ln_nwc_bc: Ln(Number of White Collars/Number of Blue Collars); (ln_avgw): Ln Average Wages per firm; lnshw_wc1: Ln(White Collar Wages/Total Wages); lnshwc_c): Ln (Wages White Collars/Variable Costs); lngap: Ln(Wages White Collar/Wages Blue Collars); lngap2: Ln(Wages per capita WC/Wages per capita BC); lnshn_pyt: Ln(No. Prof&Tec/total employment); lnshw_pyt: Ln(Wages P&T/total Wages); WC: white collars, i.e. non production workers including professionals and technicians and other white collars; BC: Blue collars, i.e. workers in productive activities; P&T: Professionals and technicians. FDI: dummy equal one if the firm has foreign capital. Robust standard errors in parenthesis.

*significant at 10 %; ** significant at 5 %; *** significant at the 1 %.

Table 4.2: Matching and Double Difference without bootstrapped standard errors

Output Variable	Ln LP (lnlp)	Ln TFP (lntfp)	Ln(No. of WC) (ln_nwc)	Ln(No. of P&T) (ln_npyt)	Ln(No. WC/No. BC) (ln_nwc_bc)	Ln(No. WC/EMP.) (lnsh_wc1)
FDI	0.513	0.475	0.220	0.485	0.325	0.229
	(0.0507)***	(0.0487)***	(0.0536)***	(0.0592)***	(0.0625)***	(0.044)***

Output Variable	Ln(No P&T/EMP) (lnshn_pyt)	Average Wages (ln_avgw)	Wages WC/Total Wages (lnshw_wc1)	Wages P&T/Total Wages (lnshw_pyt)	Avg Wages WC/Avg Wages BC (lngap2)	Wages WC/Var. Costs (lnshwc_ci)
FDI	0.513	0.351	0.331	0.544	0.220	0.181
	(0.0668)***	(0.0305)***	(0.0375)***	(0.0655)***	(0.0849)***	(0.218)

Lntfp: Ln Labour Productivity; lntfp: Ln Total Factor Productivity; ln_nwc: Ln Number of White Collars; ln_npyt: Ln Number of Professionals and Technicians; lnsh_wc1: Ln (Number of White Collars/Total Employment); ln_nwc_bc: Ln(Number of White Collars/Number of Blue Collars); (ln_avgw): Ln Average Wages per firm; lnshw_wc1: Ln(White Collar Wages/Total Wages); lnshw_bc): Ln(Wages Blue Collars/Total Wages); (lnshwc_ci): Ln (Wages White Collars/Variable Costs); (lnshbc_ci): Ln (Wages Blue Collars/Variable Costs); (lngap): Ln(Wages White Collar/Wages Blue Collars); (lngap2): Ln(Wages per capita WC/Wages per capita BC); lnshn_pyt: Ln(No. Prof&Tec/total employment); lnshw_pyt: Ln(Wages P&T/total Wages); WC: white collars, i.e. non production workers including professionals and technicians and other white collars; BC: Blue collars, i.e. workers in productive activities; P&T: Professionals and technicians. FDI: dummy equal one if the firm has foreign capital. Standard error in parenthesis.
*significant at 10 %; ** significant at 5 %; *** significant at the 1 %.

Table 5: Summary results of the Matching and Double-Difference Estimations

Output Variable	FDI
Ln Labour Productivity	+
Ln Total Factor Productivity	+
Ln Number of White Collars	+
Ln Number of P&T	+
Ln (No. White Collars/No. Blue Collars)	+
Ln (No. White Collars/Total Employment)	+
Ln (No. P&T/Total Employment)	+
Ln (White Collar Wages/Total Wages)	+
Ln (P&T Wages/Total Wages)	+
Ln (White Collar Wages/Variable Costs)	ns
Ln (Average WC Wages/Average BC Wages)	+

WC: White Collars; BC: Blue Collars; P&T: Professionals and Technicians