

Wage Differentials and Wage Spillovers of Foreign Firms: Evidence from Different Estimators^{*}

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Abstract:

We evaluate the impact of Foreign Direct Investment on the Portuguese labour market using a matched employer-employee panel covering the manufacturing sector between 1991-99. Wage differentials are found to be negligible when considering methods such as propensity score matching and difference-in-differences. Using OLS, the multinational premium also falls substantially when firm and/or worker characteristics are added and does not vary monotonically with foreign control. Spillover effects (from foreign presence to wages paid by domestic firms) are significantly positive, even when one accounts for unobserved heterogeneity, endogeneity and the domestic industry size. Foreign-presence elasticities of domestic wages range between 2% and 3%.

JEL codes: C23, F23, J31.

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Introduction

Large foreign direct investment (FDI) inflows have become an important feature of the Portuguese economy following EU accession.¹ These flows were not however without a cost, as expensive government policies were developed in order to attract multinationals to Portugal.² Moreover, this attraction process will probably become more expensive, as globalisation (and EU enlargement in particular) implies that multinationals have increasingly more geographical alternatives for their investments.

This empirical paper contributes to the evaluation of the usefulness of inward FDI for the Portuguese economy. Such an evaluation is particularly important given the current debate about the direction of the economy and the subsequent optimal design of public policies. We thus contribute for an answer to the question: *To what extent should taxpayers' money be used for attracting multinationals?*

Using data from about five million employees over the 1991-1999 period, the perspective adopted here is to examine the impacts of foreign multinationals in the Portuguese labour market and, in particular, in the wages paid to workers. This is pursued via considering two types of impacts. The first impact is about the differences in pay between workers in foreign firms and those in domestic firms. The second impact concerns the spillovers upon pay of workers of domestic firms that are related to the presence of multinationals in the relevant industry.³

The structure of the paper (and a short summary of the results) is as follows. Section 2 briefly surveys some of the key contributions in the literature on FDI and labour markets. One stylised fact from this literature is that workers in foreign firms are typically better paid than their counterparts in domestic firms. However, most of the evidence on spillovers suggests that, at best, these latter indirect benefits of FDI are negligible.

Section 3 presents the data set used, a large matched employer-employee panel, and some descriptive statistics. It is found that, while workers in foreign firms are indeed better paid, they also present some characteristics that are typically associated with higher productivity (e.g. higher schooling attainment). Foreign firms are also found to have some very different characteristics (e.g. bigger size) from their domestic counterparts.

Section 4 presents the results on the wage differentials: as in other studies and countries, foreign firms are found, in a first analysis, to pay higher wages. However, this premium falls by almost two thirds, from 30% to 11%, when taking into account worker and firm characteristics. This pay gap is found to fall even further and

¹ See Ministério das Finanças (2003) for a recent and detailed analysis of inward and outward FDI in Portugal and other countries, covering the period 1996-2001.

² A recent example (2001) is an investment of €37 million in the car components industry made by a French multinational in north-eastern Portugal, in which the Portuguese government awarded benefits with a present value of about €4 million or about 11% of the amount invested (author's calculations based on the investment contract and information from Ministério das Finanças, 2003, p. 105).

³ Work in progress, not included in this paper, includes the analysis of a third impact, that related to the mobility of workers from foreign to domestic firms and its implications on wages.

eventually to become insignificant when we use more sophisticated methods, that control for compositional effects and unobserved heterogeneity, such as differences-in-differences and propensity score matching.

Section 5 is about the wage spillovers related to foreign presence. Unlike before, here more sophisticated methods produce a positive impact. The elasticity of wages paid by domestic firms with respect to the employment of foreign firms is found to range between 1.9% and 2.7%. This is important evidence supporting the case for the attraction of FDI.

Finally, section 6 summarises the key findings, concludes and provides some policy-oriented comments.

1. Literature

There is a large literature, both theoretical and empirical, on the impact of FDI on host economies. From the theoretical contributions, this impact is ambiguous, as it depends on different factors of opposite effects. Such factors include the size of wage and/or productivity differentials, spillovers and market-stealing effects and, on the cost side, the level of transfers from the host countries to multinationals.

With respect to wage differentials, this line of research typically finds that workers of multinationals are paid more than their observably similar counterparts in domestic firms. Some examples are Aitken, Harrison and Lipsey (1996) for Mexico, Venezuela and the USA, Feliciano and Lipsey (1999) for the USA, and Lipsey and Sjöholm (2001) for Indonesia. (Other papers that examine this issue by drawing on the acquisition of domestic firms are reviewed in Section 4.4.)

The first paper finds evidence of higher wages in foreign firms in the three countries covered using establishment cross-sections. Feliciano and Lipsey (1999) focus on the US case using industry-state-ownership cells and again find evidence of a positive wage differential. Lipsey and Sjöholm (2001) finds a premium of 12% for blue-collar workers and 22% for white-collar workers, drawing on a 1996 cross-section of plants and regressing average wages on plant characteristics, including its domestic or foreign ownership.

Given these results, it is important to ask why is it that foreign firms apparently pay higher wages. A first explanation is that foreign firms, as they enter the domestic country, may increase the demand of labour and thus wages for the marginal workers hired by the multinational. However, under a competitive model of the labour market, these differentials would not be sustained for long. Indeed, in this case the rents of workers in foreign firms would be competed away via worker mobility from domestic firms.⁴

A second explanation is that multinationals may pay a wage premium to dissuade workers from moving to other firms. This is consistent with the Ownership-Location-Internalisation model of Dunning (1977), in particular with the internalisation

⁴ A competitive model is however unlikely to apply in the Portuguese case, given the many constraints to flexibility. See Martins (2003b), for instance, for evidence of substantial levels of rent sharing in the Portuguese labour market. Blanchard and Portugal (2001) highlight the large burden to economic efficiency brought by restrictive firing regulations.

motive.⁵ Under this model, foreign firms own special assets (e.g. new products or technologies) that are more profitably exploited abroad via FDI than, say, via exporting. Foreign firms would then pay higher wages in order to prevent the costly turnover which would occur when quitters provided insights about the multinationals' new methods and/or products to competing firms.

Another explanation is about compensating differentials: multinationals may provide less interesting job amenities than domestic firms. The little evidence available suggests the opposite however, including Sutherland (2002) and Brown et al (2003) for developed and developing countries, respectively.

Finally, foreign firms may select more skilled workers in dimensions unobservable to the researcher. For instance, given their larger size, multinationals may benefit from scale economies in setting up sophisticated human resource departments. This would allow these firms to screen and hire the best applicants for their vacancies, also along dimensions of skill not observable by the researcher. Under this case, the wage differential attributed to multinationals would be spurious as no causal impact of foreign ownership upon wages could be inferred. This also means that evidence of wage differentials should not necessarily support the case for government intervention.

As to productivity spillovers, they have been categorised into three types: demonstration, competition, and labour mobility effects – see Blomstrom and Kokko (1998) for a survey. Demonstration effects occur when national firms learn new practices and technologies from observing multinationals. Competition effects result from national firms being forced to become more efficient by the presence of foreign firms in their markets. Finally, labour mobility effects are present when workers acquire new skills in foreign firms that may then benefit domestic firms when workers leave the multinationals.

While the theoretical results are ambiguous, the empirical evidence on spillovers is clearer. Gorg and Strobl (2001), in a meta-analysis of the empirical literature of FDI spillovers, find that most recent studies, in particular those that use panel data, fail to detect any improvements in domestic productivity arising from foreign direct investment.

One influential example is the study of Aitken and Harrison (1999), that documents negative spillovers. The authors look at a panel of Venezuelan firms and regress plant output on the share of foreign ownership at the industry (weighted by employment) and on a number of controls, including time, industry and region dummies. The results differ between foreign and domestic firms: for the former, a small positive impact of foreign presence in the industry is found; for the latter, a negative effect is uncovered. This finding is consistent with their theoretical model, which predicts an ambiguous result, depending on whether positive spillovers or market-stealing effects dominate: the former shift the average cost curve downward whereas the latter increase average cost, due to lower output.⁶

⁵ Other prominent models of FDI, such as the vertical, horizontal and capital-knowledge models, are more difficult to be used in the context of models of pay determination.

⁶ Haddad and Harrison (1993) also find negative spillovers in the productivity growth of domestic firms in Morocco. However, while a recent study focusing on the UK, using panel data, Haskel et al (2002), finds positive spillovers, Harris and

The stylised result of no positive spillovers from FDI is of great importance, as it weakens the main economic argument for governments to spend resources in attracting FDI. If there is no gap between the private benefits of investment (from the point of view of the multinational) and the social benefits of that investment in the host country, then there are no economic reasons for the large hand-outs of public money observed in many years and in many countries.

However, one of the few papers we know of that looks at wage spillovers of FDI, Aitken et al. (1996), finds evidence supporting their existence. (The same applies to Driffield and Girma, 2003). In Aitken et al., The authors use plant data aggregated at the 4-digit industry level and regress the logarithm of average wages on several control and the share of FDI at each cell, defined by industry, region and skill level, either for all firms or for the subset of domestic firms. Using panel data for Mexico and Venezuela and cross-section data for the USA, the authors find that higher levels of foreign ownership are associated with higher wages across all countries, although this magnitude is smaller for the USA.

With respect to the specific case of Portugal, studies find evidence of FDI spillovers in terms of productivity, unlike in most of the literature summarised above. This result for Portugal holds either for the full set of domestic firms (Mata and Farinha, 1996) or for a subset of firms which present intermediate technological gaps with respect to their foreign counterparts (Flôres et al., 2000 and Proença et al., 2002).⁷

However, these studies do not examine the wage implications of FDI. (The only exception we know of is Almeida, 2003, which is discussed in Section 3.4.) They also draw on data at the firm or industry level only, thus disregarding individual-level compositional changes that may be involved in FDI. This study fills in these gaps, providing at the same time a more encompassing analysis of the range of implications that FDI may have upon the Portuguese labour market.

2. Data

Our empirical analysis draws on a large matched employer-employee panel data set, “Quadros de Pessoal”. This is a survey that has covered the Portuguese universe of employees since at least 1982 and in which all firms with at least one employee are required to fill in a survey about some of their characteristics and those of their workforce. The former characteristics include variables such as geographical location, industry, sales and, crucially from the point of view of this paper, the share of the firm’s equity owned by foreign parties. The set of worker characteristics includes variables such as gender, highest level of education attainment, tenure, wages, hours worked, etc.

The sub-sample considered here is that of an 80% representative sample of manufacturing sector firms, for each year between 1991 and 1999. This amounts to an annual average of about 678,000 workers per year and 29,481 firms (and a total of 71,240 different firms) – the yearly data are available on Tables 2 (workers) and

Robinson (2003), using the same data, finds negative effects. See also Girma et al (2001).

⁷ Other papers that look at different aspects of FDI in Portugal include Cabral (1996), Barry (1999), Guimarães et al. (2000), Mata and Portugal (2000, 2002 and 2004), Nogueira Leite et al (2001), and Barbosa and Louri (2002).

3 (firms). From this initial sample, missing observations and observations with inconsistent information in key variables were dropped. Also only firms based in the continent are considered. This gave rise to a data set with an annual average of about 496,000 workers and 16,935 firms (and a total of 39,783 different firms).

As mentioned before, the foreign/domestic ownership of the firms is derived from the share of equity held by foreign nationals. In particular, we define as foreign firms those for which at least 50% of equity is owned by foreign parties, although below we also consider the 10% threshold. According to this criterion, we find an annual average of 16,557 domestic and of 378 foreign firms. These correspond to about 434,000 workers in domestic firms and about 62,000 workers in foreign firms, which implies that, over the 1990's, an average of about 13% of employees worked in foreign-owned firms. This share also follows an increasing trend, consistently with the net inflows of FDI and the increasing share of services (to the detriment of manufacturing) in the Portuguese economy.

The descriptive statistics reveal some important differences between foreign and domestic firms. For instance, in all measures of earnings (monthly or hourly), workers in foreign firms earn more than their counterparts. In 1991, for example, the average worker in a foreign firm earned €691 per month (2000 prices, values gross of taxes), whilst the average worker in a domestic firm earned €528, which implies a pay premium of 30.9%. In the end of the decade, the corresponding values were €863 and €628 (and a pay premium of 37.4%).

These differences in earnings can be partly explained by differences in schooling attainment: workers in foreign firms are found to have an average of 6.9 years of schooling across the nine years covered, whereas the same figure for workers in domestic firms is only 5.8. Affecting the results in the opposite direction, workers in domestic firms are found to be more experienced. This is partly due to their lower schooling, as we measure experience here as (age–education–6). Tenure (a proxy for firm-specific skills) is also found to be slightly higher for workers in domestic firms, which would again go against an explanation of higher wages for workers in foreign firms due to human capital differences. Similarly, there is a larger share of women working for foreign firms.

As to the distribution of workers by industries, there are again clear differences between domestic and foreign firms. A particularly striking contrast is the over-representation of foreign firms in the metallic and transport industry (43% against 19% of workers). In an opposite direction stands the textiles, clothing and leather industry (29% of foreign workers against 38% of domestic workers) and the wood and cork industry (1% against 8%). These differences have also a geographical dimension, as workers of foreign firm are relatively more prevalent in the Lisbon region (40% versus 23%) and less prevalent in the North region (40% versus 52%).

A complementary way to establish the contrast between domestic and foreign ownership can be pursued by looking at firm (rather than worker) statistics. This amounts at looking at the same data as that of Table 2, but without weighting firm characteristics by firm size (number of workers). Instead, here we average firm characteristics and then look at simple averages of such firm averages. This exercise – see Table 3 – reveals even stronger pay differences between foreign and domestic firms. For instance, in 1999, the average multinational paid an average of €889 to an average worker, whereas the average domestic firm paid €502 to an average worker. This amount to a pay premium of 77.1%, more than twice the one documented for same year in Table 2.

An important explanation for this difference between the results for firms and workers lies on the fact that foreign firms are, on average, much larger (in terms of number of workers) than domestic firms. The former have an average of 190 workers whereas the latter have an average of only 32. This helps in understanding the very large pay difference as it is well known from the labour economics literature that smaller firms pay lower wages (see Brown and Medoff, 1989, and Oi and Idson, 1999). No other sizeable differences are found in terms of the industry or geographical distributions of domestic and foreign firms with respect to the previous table.

For the benefit of robustness and comparability, we also consider a threshold of 10% for the definition of foreign firms. This is also the criterion adopted by the IMF to distinguish between portfolio and direct investments. We have opted for the 50% level because we focus on firm ownership (and not investments in firms). However, one should be aware that this level is neither a sufficient nor a necessary condition for foreign firm ownership, given the information that we have available. For instance, a foreign investor with only 25% of equity may control a firm if the remaining equity is spread over a large number of stakeholders. But we may also be before a case in which two separate foreign investors with 30% each do not control a firm if, for instance, a third, domestic party holds 40%.

In the appendix we present descriptive statistics for workers over the nine-year period covered under the 10% classification. We find a relatively small increase in the percentage of workers in foreign firms (from 13% to 16%), indicating that most firms with a positive level of foreign ownership are above the 50% threshold, a result which is consistent with Barbosa and Louri (2002). From the comparison of domestic and foreign firms in this case, few differences are found with respect to the previous classification.

3. Wage Differentials

This section examines the robustness of the substantial pay premia for workers in foreign firms documented in the descriptive statistics examined above. A first step, producing benchmark results, involves an OLS estimator, allowing for like-for-like comparisons, considering progressively more extended sets of control variables. In fact, it could be the case that the pay premium is fully explained away by the characteristics of the workers (e.g. education) and/or their firms (e.g. size).

Secondly, we study whether the pay premia depend on the level of control of the foreign party, as measured by the share of equity held by the latter. The motivation for this is to examine whether the impact of foreign ownership upon wages underpins some causal process, which would probably imply that a greater level of control of the firm would be translated into higher wages.

Thirdly, the propensity score method is used. Under this approach, national- and foreign-firm workers are matched according to their many observable characteristics. From these comparisons, a measure of the wage difference between strictly comparable groups of workers is obtained.

It is also of great interest to know the wage impacts of acquisitions of domestic firms by foreign parties. The motivation for this is that foreign firms may hire workers that are more skilled along unobservable dimensions. This possibility –

unobserved heterogeneity – would explain the premium documented via the OLS estimator. However, one can circumvent this problem by using a differences-in-differences estimator. In this case, this amounts to comparing wage differences (i.e. wage growth) for workers whose domestic firms are acquired by foreign parties and wage differences for workers whose domestic firms remain domestic.

Finally, the differences-in-differences estimator and the propensity score method are combined. Some research, namely Heckman et al (1997), has suggested that this approach may be the most appropriate for evaluation studies. The intuition behind this result is that one can simultaneously difference out the unobserved heterogeneity variables and still tackle the problems of lack of common support and different distribution of characteristics allowed for by the propensity score matching method.

3.1 OLS

In this section, different versions of the following wage equation are considered, separately for each year:

$$y_i = X_i' \beta_1 + F_{j(i)}' \beta_2 + \beta_3 \text{Foreign}_{j(i)} + \varepsilon_i, \quad (1)$$

where y_i denotes the logarithm of real hourly wages. X_i denotes a set of human capital characteristics (six dummies for educational attainment, a quartic in experience, a quadratic in tenure – measured in months, and a female dummy). $F_{j(i)}$ denotes a set of characteristics of the firm of worker i (four regional dummies, log number of workers, a dummy for public firms and eight industry dummies⁸). $\text{Foreign}_{j(i)}$ is a dummy variable taking value one if the firm of worker i is a foreign multinational and value zero otherwise. Our attention in the first part of the paper is focused on the β_3 coefficient.⁹ ε_i is an error term following the standard assumptions.

The first version of equation (1) includes only the foreign dummy. In this case, the wage premium for workers in foreign firms is found to average 32% and range between 27% and 37%, depending on the year – see Table 4. However, as suggested before, these wage differences may be attributed to different levels of human capital. Indeed, it is found that, when one controls for these variables, the average premium falls to 27% (ranging between 23% and 32%). The adjusted R^2 statistic also increases markedly, from about 3% to about 45%.

Finally, when firm characteristics are also considered, the premium falls further and more substantially than when human capital variables were added. The average premium is now only 11%, ranging between 8% and 13% across the different years. The adjusted R^2 statistic now increases more modestly, to about 53%.

⁸ The industry coding was changed in 1995. We adopt the code used until that year (“CAE-Rev.1”) in the entire period. Given that some firms are not available in our sample in the period 1991-1994, their industry code was obtained from extrapolating from the changes observed in such codes for firms present in both periods (1991-94 and 1995-99).

⁹ This coefficient is discussed in terms of percentage differences in wages, after taking into account the logarithmic transformation of the dependent variable.

As to time trends, there is some evidence, in the first and second specifications, of increasing foreign multinational wage premia between 1991 and 1995, when they peak, and then declining premia from then until 1999.¹⁰ This pattern is however not present in specification that includes both human capital and firm controls.

Overall, these results suggest that about two thirds of the average difference in pay between domestic and foreign firms is determined by the different human capital of their workers and, more importantly, by the different characteristics of foreign and domestic firms. However, at 11%, the pay gap between domestic and foreign firms is still economically significant and may suggest an important direct effect of multinationals in the labour market. Similar findings are obtained when the 10% threshold is considered (see Table A2), except that the foreign premium is slightly bigger in all specifications and years.

These results assume a constant foreign pay premium for different industries. However, there are many reasons for one to expect such wage differentials to depend on the industry examined. For instance, and given the theoretical considerations before, in skill-intensive industries multinationals may have to pay large premia so to prevent the dissemination of their new methods to competitors via workers' mobility. Conversely, in low-skill industries, multinationals may be just happy to pay standard market wages, especially if these are much lower than in their own domestic labour markets.¹¹

We therefore allow the multinational premium to depend on the industry. Table 5 presents the results: the first eight main rows denote the average industry premia, the following row refers to the average foreign firm premium and the last eight rows denote the industry-specific premium. The comparison group (dropped dummy) is the Clothing, Textiles and Leather industry, the biggest one in our data and also one of the industries that pays the lowest premia.¹² In contrast, the four industries that exhibit higher average premia are Wood, Paper, Chemicals, Non-Metallic Minerals and Metallurgic sectors.

As to the differences in the multinational premium, the industries where this is larger are Food, Wood, Paper and Chemicals, where the average additional premia range between 26% (food) and 17% (chemicals). In the remaining industries, Clothing, Non-Metallic Minerals, Metallurgic, Metallic and Others, the average additional premia range between 8% (Non-Metallic Minerals) and 0% (the dropped industry, Clothing).

These findings may represent some support to the hypothesis described above about different incentives across different industries to pay above-market wage rates. For instance, Chemicals pay higher foreign premia and are probably a good example of an industry where patents and other inputs that generate rents are prevalent. On the other hand, Clothing, which pays the lowest wages, may again be an example of an industry that largely uses standard technical processes. These results may, however, be affected by the impact of wage spillovers. For

¹⁰ A similar pattern is found for returns to education – see Pereira and Martins (2002).

¹¹ There is also a large literature on inter-industry wage differentials, documenting in general substantial differences in pay across industries. See Vieira et al (2000) for evidence for Portugal.

¹² See Martins (2003a) for a study of wage determination in this industry.

instance, it may be no coincidence that the foreign differential is lower in industries that exhibit an important foreign presence, such as Textiles and Metallic products.

3.2 Different levels of control

In this section, we allow the wage impact of foreign firms to differ depending on the degree of control of the firm by the multinational, as implicit in the share of the firm's equity held by the latter. This is done by creating different dummy variables for firms with different share of foreign control: 1%-9%, 10-19%, ..., 90%-99% and 100%. Within the group of firms which are considered as foreign-owned, the most prevalent category is that of full foreign control (which accounts for 60% of workers) and then that of 90%-99% (20% of workers). Within the group of firms that have less than 50% foreign shares, they correspond to between .5% and 2% of the workers in domestic firms.

We find – see Table 6a – positive premia for all workers whose firms have some positive share of equity held by foreign parties, regardless of the size of that share. For instance, firms with a share of equity of between 1% and 9% pay their workers, on average across the decade, 12% more than similar workers in firms without any share of equity held by foreigners.

Although average premia are higher in the 50%-100% range than in the 1%-49% range, there is no clear evidence of a monotonic relationship between premia and the share of foreign ownership. This result weakens the case for a strong causal relationship between the degree of control and the wage differential. However, one must bear in mind the relatively low number of workers in firms that exhibit low but positive levels of foreign ownership. This may explain the considerable volatility in the estimates for lower levels of foreign ownership as different years are considered.

As a further check on this link between the degree of foreign control and the wage premium, we also investigated the wage difference between domestic and foreign firms when the latter are defined at different thresholds. Here we consider ownership starting alternatively at the 10%, 20%, 30%, 40% and 50% levels and compute the premia accordingly. Taking into account the hypothesis described above that greater control translates into higher premia, we expect that the greater the ownership threshold, the higher will the premium be.

The results – see Table 6b – indicate that, not only is there no monotonically positive relationship between the premium and the level of control, as in most years the premium is found to fall at higher levels of control. These results are further evidence against the existence of a causal link between foreign ownership and wages.

3.3 Propensity score matching

One concern with standard OLS estimators is that their “like-for-like” comparisons disregard the possibility of a different support (i.e. range of values of the regressors) between observations with and without some characteristic whose impact is of interest. Moreover, the distribution of characteristics over that region of common support may also be very different between the two groups.

Propensity score matching is a non-parametric method that allows one to tackle these issues directly, by restricting the estimation of the impact of interest over the region of common support only and making such estimation take into account the distribution of the variables. Heckman et al (1997) suggest that these two biases (non-overlapping support and different distributions of covariates within groups) are more important than that related to selection on unobservables, which has received much more attention in the literature on programme evaluation. In their words, “the simple balancing of observables goes a long way towards effective evaluation” (p. 607).

The relevance of this method in this paper stems from the large differences documented in terms of the observable characteristics of the two types of workers. These differences are particularly pronounced on the educational attainment of workers, and on firm size and industry distribution. Failure to take this into account may thus have biased our results.

The new findings are obtained using the same annual data sets described before. The variables considered for the estimation of the propensity score are: six education dummies, experience, tenure, gender, log firm size, three region dummies (north, centre and Lisbon) and four industry dummies (textiles, wood, chemicals and metallic). It is this propensity score that is used to match workers in foreign firms (the “treatment group”) to those in domestic firms. Observations from both groups are then paired via one-to-one matching. Standard errors are obtained with bootstrapping (50 repetitions).

The first nine rows of Table 7 present the results. The estimates of the foreign firm premium range between -5% (1994) and 6% (1999), averaging 1.06% over the nine years studied. Some coefficients are significant while others are not. Overall, the small magnitude of the coefficients and their insignificance (in some cases) stands in clear contrast with the initial OLS findings in this paper and in the literature on the impacts of foreign ownership on wages. However, this is not at odds with the finding in section 3.1 that a more detailed comparison of workers in domestic and foreign firms reduces the estimates of the foreign-firm wage premium and the finding in section 3.2 of no monotonic relationship between the extent of ownership and the size of the premium.

3.4 Acquisitions – difference-in-differences

The method followed in this subsection involves contrasting the change in a variable of interest in a group of observations that have undergone some treatment with the change in the same variable in a similar group of observations but which have not undergone treatment. The advantage of this approach is that one is able to control indirectly for variables that may influence the parameter of interest but which are not available, provided that such variables are time-invariant and the assignment to treatment is random. Here, we apply this method for the case of domestic firms that are acquired by multinationals: this acquisition is the treatment whose impacts are studied vis-à-vis the control group of domestic firms that are not acquired over the period considered.

A similar approach is used in Conyon et al (2002) and in Almeida (2003).¹³ The first paper uses UK firm level panel data and focus on productivity and wage impacts of acquisition, contrasting the case of acquisitions originated by foreign multinationals and other domestic firms. The authors find evidence of higher wage growth when domestic firms are acquired by multinationals than when domestic firms are not acquired by any firm. However, those domestic firms that are acquired already exhibit higher levels of wage growth before acquisition than those firms that are not acquired, suggesting some role for “cherry picking”. In any case, the authors find that, after controlling for productivity, the wage differential is eliminated.¹⁴

Almeida (2003) also studies the wage impacts of foreign acquisition using the “Quadros de Pessoal” data set. However, some important differences in relation to what is done in this subsection are that Almeida (2003) considers both the manufacturing and non-manufacturing sector, data aggregated at the firm level and foreign ownership or acquisition are defined at the 10% share of equity threshold. As to the results, and focusing on the case of manufacturing firms, the estimates of the foreign firm wage premium are found to fall from 0.16 in the OLS cross-section estimator to an insignificant coefficient of 0.02 in the differences-in-differences results. As with Conyon et al (2002), important observational differences between acquired and always-domestic firms are also documented, even before acquisition.

Our contribution to this literature is twofold. Firstly, we take the analysis to worker-level data, in order to minimise the aggregation bias implicit in firm-level information. Secondly, we focus on the same workers before and after acquisition. This should substantially decrease the scope of unobserved heterogeneity to bias our estimates of the foreign ownership effect. Moreover, this approach also means that we do not suffer from the biases that may occur when, upon acquisition, firms change their workforces, particularly when such changes occur along unobserved dimensions.

We construct the data set used as follows. The control group includes all firms which are never foreign owned over the years in which they are available in our sample. Only two years are considered for our analysis: the “before” year is randomly selected in the 1991-1998 range, while the “after” year is the subsequent year available in the sample for that firm. (This is not necessarily the “before” year plus one as the panel is unbalanced.) A total of 23,991 firms (and about 250,000 workers) were found with this method.

The treatment group (domestic firms acquired by foreign parties) was defined as the set of firms whose ownership is initially domestic (i.e. share of equity owned by foreign parties below 50%) and which in some subsequent year become foreign-owned. Firms following this criterion but in which the foreign acquisition process is

¹³ Other papers include Girma and Gorg (2003) for the UK and Lipsey and Sjöholm (2003) for Indonesia, both drawing on firm-level data. Both papers document higher wage growth for acquired firms, although the first finds that this result applies only to some industries and when the acquirers are of specific nationalities. A third paper, Harris and Robinson (2002), finds decreased productivity in acquired firms in the UK.

¹⁴ Similar results are obtained when the acquisition dummy is instrumented. However, it is not clear whether the instruments used in the paper pass the validity tests, i.e. whether they can be excluded from the main equation and whether they contribute to the explanatory power of the auxiliary regression.

reversed at a later stage were dropped. A total of 231 firms (and about 18,000 workers) were found.

For the benefit of robustness, a further treatment group was obtained: the subset of firms in the former target group that exhibit a positive level of foreign ownership before acquisition: 26 firms (and 2,578 workers) satisfy this condition. The motivation is to control further for the possible selectivity involved in the process of foreign acquisition. In particular, foreign firms may target domestic firms whose workers have unobservable characteristics that make them different from the control group of not-acquired domestic firms. To the extent that this subset of firms has already been targeted by foreign firms, we may be more likely to pick up with our differences-in-difference estimator only the acquisition effect, rather than a combination between the selection and the acquisition effects.

These three groups were found to be very different, as far as their observable characteristics are concerned – see Table 8a. Focusing on the larger treatment group, the treatment workers are more educated than their control group counterparts. The former are also over-represented in bigger firms and in the metallic industry while they are under-represented in the clothing industry, for instance. The distribution of acquisitions per year, in terms of workers, is also less balanced as that of the control group, particularly in 1992 (25% vs 12%) and in 1995 (6% vs 13%). Importantly, there is also a sizeable difference in wage growth for each group of workers: the treatment group has an average wage growth of .6% whereas for the control group that figure is 5.1%.¹⁵

These differences in wage growth may however be due to the different characteristics of each type of workers, not to the acquisition effect. The impact of the treatment was therefore obtained from running a regression in which the dependent variable is wage growth between the “before” and “after” period, i.e. differences of the log hourly wage, as in the equation below:

$$\Delta y_{it,t-1} = X_{it-1}'\beta_1 + F_{j(i),t-1}'\beta_2 + \beta_3 \text{Foreign}_{j(i),t} + \beta_4 \Delta t_{it} + \varepsilon_{it} \quad (2)$$

The regressors are the characteristics of the workers and their firms in the “before” period (t-1) and on a dummy variable (Foreign) taking value one for workers in firms that become foreign-owned and value zero for workers in firms that are still domestically-owned in the second period. A control for the difference in years between the two periods is also included.

The results indicate that, after controlling for the differences in worker characteristics, the impact of foreign acquisition on wages is significantly negative (–3.1 p.p.) for the larger treatment group. However, the coefficient becomes significantly positive (2 p.p.) for the subset of firms with a positive level of foreign ownership in the first period.¹⁶

We also find that the first result is due to the fact that the domestic firms that are subject to an acquisition (in particular those whose equity is entirely owned by

¹⁵ Another concern is that the subset of treated firms that have some foreign ownership in the before period present even more different characteristics than the entire group of treated firms with respect to the control group.

¹⁶ Similar results were obtained when one disregards the panel nature of the data (i.e. if one runs a pooled cross-section regression and focuses on the interaction between the before/after and the foreign dummies).

domestic agents) are paying wages much above the market rates (conditional of firm and worker characteristics) than their counterparts that will not be subject to an acquisition. Taking the latter group as the benchmark, pooled cross-section OLS results (not reported) find that the domestic firms that will be acquired are paying 11.7% more. After acquisition, the acquired firms are paying a 7.1% premium while those firms that remain domestically owned are paying 0.8% more.

As a further check on the robustness of these results, we considered a different control group: those firms that are always foreign-owned. The motivation for this choice is that the latter firms (and their workers) are, from the observable point of view, more similar to the treatment group under study, particularly the larger one. To that extent they stand as a better control group. It turns out, however, that wage growth is still lower for acquired firms than for always-foreign-owned firms, controlling or not for worker and firm characteristics. From the regression results – see Table 8b –, the coefficient on the treatment dummy is -0.042 (-4.1 p.p.).

The findings of negative or small positive wage premia are surprising, given the opposite stylised fact in the literature. However, this result is not unexpected from the point of view of the literature on takeovers. Here, it has been hypothesised that a key motivation for the acquisition of firms is for new employers to renege on implicit contracts and to appropriate a larger portion of the surplus produced by employees (Schleifer and Summers, 1988). Other authors claim that mergers and acquisitions stem from a process of improved matches between firms and managers, whereby firms that are being badly run are more likely to be taken over (Lichtenberg and Siegel, 1990).

Two other objections should be taken into account. The first is that one may not extrapolate from the wage impact of foreign acquisitions to the wage differences between “standard” multinationals and domestic firms. Possibly a better control group would be domestic firms acquired by different domestic owners but, unfortunately, there is not information about this in the data set. This criticism is, however, attenuated by the stylised fact that most of the current levels of FDI in developing countries are derived from firm acquisitions and not greenfield investment.¹⁷ Another objection, probably more important, is that “cherry picking” may affect the comparison between acquired and non-acquired domestic firms. This is examined in the next section.

3.5 Acquisitions – difference-in-differences and propensity score matching

In this section, we combine the methods of the two previous sections. As mentioned before, this is motivated by Heckman et al (1997) that found that a difference-in-differences extension of the method of matching is particularly effective in eliminating bias, especially that due to time-invariant unobserved variables. In this case, that of domestic firms acquired by multinationals, there may be an important dimension of “cherry picking” over both observed and unobserved variables. However, the direction of the bias is not clear, as some authors argue that the asymmetry of information inherent in the acquisition of firms may be

¹⁷ In Portugal, over the period 1996-2001, acquisitions (and equity increases) took 39% of net inward FDI, while greenfield investment (establishment of new firms) represented only 2% (Ministério das Finanças (2003, p. 17). The remaining share concerns credits and reinvested profits.

particularly acute for foreign firms, leading them to pick “lemons” rather than “cherries” (see Gioia and Thomsen, 2003).

To the extent that the unobserved variables are time-invariant, the combined method used here will provide unbiased estimates of the impact of foreign ownership upon wages. To the more likely extent that some of those variables are not time-invariant but are picked up by the observable variables used here, our approach will reduce the amount of bias.

For the benefit of robustness, we consider as before the same two control groups (always-domestic and always-foreign firms) and two treatment groups (domestic firms that become foreign-owned and the subset of firms in which foreign parties have a positive level of ownership in the first period).

In the first two cases, with the wider treatment group, we find negative estimates (see Table 9): -1.5 p.p. and -7.8 p.p. for the always domestic and the always foreign control groups, respectively. We find, however, a positive estimate of 3.9 p.p. in the third case, with the restricted treatment group and the control group of always-domestic firms but we do not attach too much relevance to this result given the small and particularly unrepresentative sample used

Overall, we conclude that the wage premium of foreign multinationals is, in the case of Portugal, most likely due to compositional effects and other biases. After one takes these into account, the premium is of a negligible magnitude and, in some cases, even negative. Our evidence goes against the case that there is a causal link between foreign ownership and wages.

In current work (Martins, 2003c and 2004), we examine this causal link from additional approaches – rent sharing and instrumental variables – and still find similar, i.e. insignificant, results. In particular, we do not find any differences in the extent of rent sharing between domestic and foreign firms. Moreover, when instrumenting the foreign-ownership dummy in a wage equation (using agglomeration effects), we also find that the foreign-firm wage premium becomes insignificant with respect to the OLS case.

4. Wage Spillovers

In this section, we examine the importance of wage externalities that may be exerted upon domestic firms by the presence of foreign firms. In practical terms, we first aggregate the wage equations described in Section 4.1 into the firm level and restrict the analysis to domestic firms. Finally, these wage equations are augmented with the employment levels of foreign and domestic firms in the three- or four-digit industry of each domestic firm. The coefficient of the variable measuring the size of foreign firms can then be interpreted as capturing the level of the externality associated with foreign firms.

One important problem, neglected in some of the literature, is that the distribution of multinational presence across industries may be influenced by unobserved factors that also influence overall pay determination, i.e. multinational presence may be endogenous. Many examples would be consistent with this hypothesis. For instance, foreign firms may prefer industries where host-country firms already pay higher wages because, for instance, such industries are undergoing a period of expansion and face upward-sloped labour supply curves. Such industries may also

draw disproportionately more on workers that are more skilled along unobservable dimensions and which demand higher premia to be attracted away from their previous employers. The industries targeted by foreign multinationals may also benefit from rents (due to economies of scale, for instance). If rent-sharing is a common practice in the labour market, then those industries will also pay higher wages even without foreign presence.

In all these cases, the externality coefficient would be spuriously inflated should one not control for endogeneity. However, the direction of the bias is unclear: foreign investment may also target sectors that pay lower wages because, for instance, they are undergoing difficult economic conditions and offer good opportunity for acquisitions. This would generate a negative correlation between the foreign participation variable and the error term that would bias downward the spillover effect.

This matter is looked at, in a first instance, through the inclusion of fixed effects for firms. In this way, the role of foreign presence is estimated from the relationship between changes in foreign presence and changes in wages. This method allows one to control for unobserved time-invariant factors that may simultaneously influence wage determination and foreign presence. Given the previous examples, such factors would be whether an industry is expanding or not, the unobservable skills of the work force or the existence of rents, respectively.

As a further control for this endogeneity problem, current foreign presence in a given industry cell is also instrumented. Indeed, as suggested before, changes in foreign presence may be related to changes in unobservables that drive wages. The instruments used here are the (first) lagged values of current foreign shares. The motivation for this choice is that one may argue that while lagged foreign shares are correlated with current foreign shares, lagged shares should not enter directly the wage equation as current shares are the ones that matter as far as wage determination is concerned. Under this view, lagged shares satisfy the requirements of a valid instrument.

4.1 Methodology

Unlike in Section 3, here we use worker data aggregated at the firm level. This is due to the larger size of the data set, which is now examined as a panel, and to the inherent computational constraints. This new data set amounts to more than 140,000 domestic firms-year. Moreover, we compute industry-year cells with the level of employment of the foreign firms available in the data set and also with the domestic level of employment in each industry-year combination. Two definitions of industries are also taken into account, at a level of aggregation of three- and four-digits, both of which are based on the same two-digit, nine-industry classification as before.

The wage equation considered corresponds to the one presented in (1), but now aggregated at the firm level and augmented with controls for industry employment. The equation is as follows:

$$y_{it} = X_{it}'\beta_1 + F_{it}'\beta_2 + \beta_3\text{DomesticEmpl}_{\text{ind}(i)} + \beta_4\text{ForeignEmpl}_{\text{ind}(i)} + \lambda_i + \sigma_t + \varepsilon_{it}, \quad (3)$$

where y_{it} denotes the logarithm of the average hourly wage paid by firm i in year t , X_{it} denotes the average characteristics of the workforce of firm i in year t , F_{it}

denotes the average characteristics of the firm i itself in year t , $\text{DomesticEmpl}_{\text{ind}(i)}$ denotes the logarithm of the domestic employment level of the industry of firm i (defined at either the three- or four-digit level), $\text{ForeignEmpl}_{\text{ind}(i)}$ denotes the logarithm of the foreign employment level of the industry of firm i , λ_i is a firm fixed effect, σ_t are the year fixed effects and ε_{it} is the standard random error term.

Our motivation for controlling simultaneously for domestic and foreign employment in a given industry is based on Castellani and Zanfei (2002, 2003). From the perspective of the productivity spillovers literature, these authors show that it may be too restrictive to impose no impact from the growth of a given industry and only from the *share* of foreign employment in total employment, the variable typically used in previous research.

Special attention is placed on the β_4 coefficient, which measures the foreign firm spillover on the wages of workers of domestic firms. For reasons explained above, this equation is estimated with firm fixed effects, first disregarding the endogeneity of the foreign employment variable and then instrumenting it, using foreign employment lagged values.

Another issue is that because we draw on a sample of 80% of all firms, there is probably extra variability in the industry size variables that is not related to the normal entry and exit of firms to each industry. The measurement error problem that this will bring (which is compounded with panel data – see Griliches and Hausman, 1986) may attenuate the estimates of the spillover effects. We try to correct this using new measures of the domestic and foreign employment per industry, obtained by interpolating the employment level of firms that are not sampled in intermediate years. For instance, if a firm is available in our data set in 1993 and 1995, but not in 1994, then we assign to the latter year the average employment level of 1993 and 1995.

4.2 Results

The first four columns of Table 10 present the first set of results, in which firm fixed effects are considered but the possible endogeneity of foreign presence is ignored. The first two columns consider three-digit industries, and the not-adjusted and adjusted industry size cells, respectively. The foreign-employment spillover coefficients are insignificant if foreign employment is not adjusted but become significant (marginally at the 10% and at the 5% levels, respectively) at the 3- and 4-digit level of aggregation, when foreign employment is adjusted for measurement error. However, even in the last two cases, the point estimates are very low, at .4% or .2%.

As mentioned before, we attach greater importance to the estimation method that instruments for foreign shares, as this allows one to draw on exogenous variation to identify the spillover effect. In this case, presented in the last four columns of Table 10, we find a more consistent picture, in which all foreign-share coefficients are positive and highly significant, ranging between 1.9% and 2.7%, or about 10 to 30 times bigger than those without instrumentation.¹⁸ Finally, we also find higher

¹⁸ This increase after instrumentation is consistent with measurement error and/or the case in which foreign firms locate in specific industries that, because of their own unobserved characteristics, pay lower wages.

elasticities for more disaggregated industries. This suggests that the impact of foreign presence fades away as we consider a progressively broader set of firms.¹⁹

Taking these estimates at face value, one can work out back-of-the-envelope monetary impacts of the spillovers. These figures may have some policy relevance as they can be regarded as a benchmark for how much public authorities may spend in attracting multinationals. Considering the case of three-digit industries, not-adjusted measurement, and an average gross monthly wage of €628 for workers in domestic firms, we obtain a wage increase of €12 per worker per month. We then multiply this figure by 14 months and by the average number of domestic workers per industry (19,459) and divide it by the average number of workers in foreign firms per industry (4,443). This results in a spillover of €728 per new job created by a foreign multinational. Considering the case of four-digit industries, the same spillover per job is of €1,002. (There is an average of 6,882 workers in domestic firms and 1,492 workers in foreign firms in each sector defined at this level of aggregation.) In the case of adjusted measurement, we obtain benchmark values of €832 and €1,073, respectively.

5. Summary and Conclusions

Large foreign direct investment (FDI) inflows have become an important feature of the Portuguese economy, representing up to 23% of GDP in 2000. These massive flows were not however without a cost, as expensive government policies were developed in order to attract multinationals to Portugal. In a global context in which the attraction of such flows is likely to become even more difficult, and in a national context in which the future direction of the Portuguese economy is under debate, it is important to assess the benefits to the Portuguese economy of FDI.

This paper provides some evidence on this topic from the perspective of the Portuguese labour market and of wages in particular. This approach contrasts with that taken in most related research, which focuses on productivity. Our motivation for this alternative method lies on the importance of wages to people's welfare. In fact, if, for some reason, FDI-related increases in productivity do not trickle down to a large share of the population via higher wages, one can argue, at least on equity grounds, that the contribution of FDI to a country's economy is not that important.

To this extent, we consider that the role of foreign firms is more relevant if 1) workers of such firms are better paid than their equivalent counterparts in domestic firms and/or 2) workers of domestic firms are better paid as a consequence of foreign presence in their industry. These are the two specific impacts of foreign firms on the Portuguese labour market that are examined in this paper.

With respect to the first aspect, that of the wage differentials between foreign and domestic firms, we conclude that they are difficult to reconcile with a causal relationship. When using standard methods (OLS), we find, in line with most of the international literature, that foreign firms pay more – an average premium of about 32%. However, even when considering this simple method, the addition of further control variables – those related to worker characteristics and, in particular, firm

¹⁹ In the models that deal with endogeneity, we also find negative elasticities of wages with respect to domestic employment in the industry. This is consistent with a process of rent sharing, whereby as the industry expands and becomes more competitive, rents decrease, forcing wages to decrease (or to grow by less).

characteristics – substantially decreases the pay premium to an average of about 11%. Moreover, no evidence is found of a positive relationship between the degree of foreign control of a firm and the wage premium of such firm. However, should foreign control have a positive causal effect upon pay, a positive relationship between such control and pay would be expected.

Further evidence on this was obtained with the Propensity Score Matching (PSM) method. This is a non-parametric estimator that assumes no selection on unobservables and which works by performing a detailed matching of observations from the two groups being compared: workers in domestic and foreign firms, in our case. Although the assumption on unobservables is probably too strong, PSM improves on OLS by allowing for better like-for-like comparisons. This possibility is especially important in our data, since they provide a rich set of matching variables, both at the worker and at the firm level, and many observable differences between domestic and foreign firms are documented. Using PSM we find, on average, a foreign wage premium of only 1%.

Another complementary approach used is a difference-in-differences (DID) estimator based on the foreign acquisition of domestic firms. This allows one to control for unobservable effects that may vary between workers in domestic and foreign firms and which would therefore undermine a causal interpretation of the wage differentials reported before. Under this approach, the wage differential becomes in some specifications even negative, at -4 and -3 percentage points (p.p.), with an upper bound of 2 p.p. in the less reliable case. An explanation for these differences is that domestic firms that undergo this “treatment” may be very different from domestic firms that are not subject to a foreign acquisition. This matter was looked at by combining DID and PSM, thus allowing for a better comparison of treated and not treated firms. However, we still find negative figures in the main cases, which overall range between -8 p.p. and 4 p.p.

The second major aspect examined in this paper concerns the size of spillovers from foreign to domestic firms in terms of the wages paid to workers of the latter group. In fixed effects specifications, in which the impact of foreign presence on domestic firms’ wages is derived from the time differences of the variables, combined with the instrumentation of foreign presence, one finds statistically significant and economically large elasticities.

These elasticities range between 1.9% and 2.7%, increasing as we narrow the definition of industries, which suggests that foreign presence has a greater impact in domestic firms that produce similar goods. Moreover, these estimates allow for back-of-the-envelope calculations of the monetary impacts of these spillovers, which may be taken into account by policy-makers as benchmarks when deciding on how much to spend when attracting multinationals. These estimates range between €730 and €1,070 per new job created by a foreign multinational.

Overall, our best evidence on wage differentials and on wage spillovers of foreign firms suggests that while differentials are explainable by the different characteristics of foreign firms, spillovers are of a significant magnitude. In the first case, the lack of a wage premium when domestic and foreign firms are better matched suggests that other firm characteristics than “foreignness” drive the differential. In other words, workers would benefit from more firms with the characteristics of multinationals, regardless of their nationality. In the second case, the significant wage spillovers suggest that workers in domestic firms would benefit from a larger presence of foreign firms in their industries.

In terms of policy implications, the findings presented in this paper provide encouraging support for the role that foreign direct investment can play in the development of the Portuguese economy and in the welfare of its citizens. However, and as emphasised before, one should underline that the impacts of FDI are multi-dimensional, while in this analysis only the wage aspect was addressed. Further studies can complement the one presented here. In any case, the results in this paper do mean that the case for FDI as a mechanism for economic development in Portugal can draw on supporting empirical evidence.

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Table 2a - Descriptive Statistics, Workers in Foreign and Domestic Firms, 1991-1999

Variable	1991		1992		1993		1994		1995	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Foreign Firms										
Monthly Earnings	690.672	565.65	730.441	610.22	801.833	707.12	767.412	676.25	801.801	710.91
Hourly Earnings	4.057	4.40	4.410	10.53	4.655	4.93	4.564	4.75	4.731	5.01
Log Hourly Earnings	1.194	0.57	1.263	0.58	1.307	0.61	1.294	0.59	1.342	0.58
Schooling Years	6.206	3.10	6.350	3.19	6.417	3.29	6.779	3.18	6.958	3.19
Experience	21.713	11.77	21.628	12.05	22.450	11.66	20.537	11.43	20.725	11.31
Tenure (Months)	115.027	104.89	115.957	108.70	121.226	106.47	99.074	100.01	103.560	101.68
Female	0.561		0.550		0.538		0.576		0.568	
Food, Beverages	0.061		0.044		0.068		0.111		0.093	
Textiles, Clothing, Leather	0.351		0.331		0.354		0.291		0.268	
Wood, Cork	0.013		0.012		0.022		0.016		0.008	
Paper, Graphical Arts, Edition	0.038		0.035		0.032		0.022		0.024	
Chemicals	0.152		0.157		0.130		0.111		0.082	
Non-Metalic Minerals	0.020		0.040		0.035		0.032		0.042	
Metalurgic	0.009		0.009		0.007		0.008		0.012	
Metalic, Transport	0.347		0.369		0.351		0.407		0.469	
Others	0.008		0.003		0.002		0.002		0.002	
North	0.447		0.507		0.472		0.350		0.364	
Centre	0.100		0.096		0.109		0.241		0.193	
Lisboa and T. V.	0.434		0.390		0.416		0.404		0.438	
Observations	52,485		41,671		53,432		57,843		73,795	
Domestic Firms										
Monthly Earnings	528.463	419.95	566.039	495.42	582.574	537.62	575.465	1322.57	562.403	477.85
Hourly Earnings	3.118	4.12	3.309	4.50	3.399	4.42	3.438	11.71	3.342	4.30
Log Hourly Earnings	0.954	0.52	1.005	0.53	1.023	0.54	1.024	0.54	1.026	0.52
Schooling Years	5.260	2.67	5.353	2.71	5.481	2.76	5.735	2.78	5.758	2.74
Experience	23.510	12.78	23.467	12.81	23.901	12.72	23.235	12.46	23.496	12.38
Tenure (Months)	116.348	108.02	116.343	107.76	120.108	108.50	110.819	104.92	114.901	108.29
Female	0.423		0.430		0.417		0.431		0.434	
Food, Beverages	0.102		0.105		0.109		0.113		0.107	
Textiles, Clothing, Leather	0.401		0.399		0.375		0.384		0.391	
Wood, Cork	0.073		0.076		0.080		0.084		0.082	
Paper, Graphical Arts, Edition	0.053		0.055		0.060		0.060		0.056	
Chemicals	0.070		0.057		0.065		0.063		0.059	
Non-Metalic Minerals	0.087		0.080		0.080		0.077		0.083	
Metalurgic	0.028		0.025		0.025		0.016		0.016	
Metalic, Transport	0.175		0.193		0.197		0.192		0.196	
Others	0.010		0.009		0.010		0.010		0.010	
North	0.511		0.513		0.499		0.513		0.540	
Centre	0.215		0.207		0.224		0.227		0.223	
Lisboa and T. V.	0.253		0.257		0.254		0.232		0.211	
Observations	471,745		475,336		441,029		404,563		427,461	

Notes:

Monetary values are in real terms (2000 prices) and in euros.

Alentejo and Algarve regional dummies are omitted (their share ranges between .0% and 3.8%).

Table 2b - Descriptive Statistics, Workers in Foreign and Domestic Firms, 1991-1999

	Variable	1996		1997		1998		1999		Annual Average
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Foreign Firms	Monthly Earnings	806.128	763.80	841.352	721.85	841.777	713.32	863.091	756.85	793.8
	Hourly Earnings	4.728	7.80	4.837	4.42	5.001	4.58	5.147	5.56	4.7
	Log Hourly Earnings	1.340	0.57	1.386	0.55	1.426	0.54	1.446	0.55	1.3
	Schooling Years	7.196	3.31	7.255	3.32	7.221	3.27	7.367	3.36	6.9
	Experience	20.486	11.51	20.635	11.45	21.348	11.62	21.290	11.58	21.2
	Tenure (Months)	105.067	102.62	106.347	103.00	111.682	104.88	106.749	105.78	109.4
	Female	0.534		0.516		0.548		0.552		0.55
	Food, Beverages	0.105		0.075		0.077		0.066		0.08
	Textiles, Clothing, Leather	0.258		0.262		0.267		0.234		0.29
	Wood, Cork	0.006		0.008		0.016		0.023		0.01
	Paper, Graphical Arts, Edition	0.021		0.011		0.024		0.024		0.03
	Chemicals	0.070		0.073		0.116		0.085		0.11
	Non-Metalic Minerals	0.045		0.036		0.039		0.036		0.04
	Metalurgic	0.016		0.023		0.018		0.011		0.01
	Metalic, Transport	0.476		0.510		0.441		0.521		0.43
	Others	0.002		0.002		0.002		0.001		0.00
	North	0.360		0.325		0.382		0.398		0.40
	Centre	0.209		0.229		0.254		0.264		0.19
	Lisboa and T. V.	0.423		0.434		0.324		0.296		0.40
	Observations	72,561		74,804		67,971		68,837		62,600
Domestic Firms	Monthly Earnings	603.105	526.74	593.721	509.92	610.191	506.39	627.803	520.11	583.3
	Hourly Earnings	3.519	4.96	3.536	5.00	3.708	3.78	3.854	4.13	3.5
	Log Hourly Earnings	1.066	0.53	1.091	0.50	1.150	0.49	1.188	0.49	1.1
	Schooling Years	5.922	2.87	5.958	2.84	6.124	2.95	6.206	2.98	5.8
	Experience	23.936	12.34	23.884	12.39	24.328	12.45	24.528	12.39	23.8
	Tenure (Months)	120.348	110.83	116.409	110.41	117.825	112.59	118.600	113.08	116.9
	Female	0.435		0.449		0.436		0.442		0.43
	Food, Beverages	0.112		0.101		0.106		0.110		0.11
	Textiles, Clothing, Leather	0.391		0.389		0.363		0.362		0.38
	Wood, Cork	0.075		0.092		0.089		0.088		0.08
	Paper, Graphical Arts, Edition	0.061		0.066		0.063		0.062		0.06
	Chemicals	0.064		0.055		0.062		0.065		0.06
	Non-Metalic Minerals	0.082		0.082		0.090		0.085		0.08
	Metalurgic	0.017		0.018		0.016		0.017		0.02
	Metalic, Transport	0.188		0.186		0.202		0.203		0.19
	Others	0.010		0.010		0.009		0.008		0.01
	North	0.537		0.548		0.524		0.533		0.52
	Centre	0.222		0.225		0.236		0.225		0.22
	Lisboa and T. V.	0.214		0.201		0.211		0.216		0.23
	Observations	412,961		428,839		409,721		434,319		433,997

Notes:

Monetary values are in real terms (2000 prices) and in euros.
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 Alentejo and Algarve regional dummies are omitted (their share ranges between .0% and 3.8%).

Table 3a - Descriptive Statistics, Foreign and Domestic Firms, 1991-1999

		1991		1992		1993		1994		1995		
Variable		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Foreign Firms	Monthly Earnings	684.276	422.88	736.970	373.94	776.020	457.39	807.893	474.84	837.143	512.65	
	Hourly Earnings	4.046	2.58	4.374	2.36	4.573	2.75	4.801	2.96	4.922	3.08	
	Log Hourly Earnings	1.167	0.45	1.246	0.46	1.262	0.48	1.312	0.47	1.337	0.48	
	Number of Workers	181.324	305.52	180.021	304.82	181.115	341.77	169.094	397.01	200.867	450.71	
	Food, Beverages	0.080		0.088		0.089		0.101		0.111		
	Textiles, Clothing, Leather	0.291		0.271		0.268		0.251		0.259		
	Wood, Cork	0.050		0.039		0.061		0.054		0.047		
	Paper, Graphical Arts, Edition	0.050		0.046		0.042		0.054		0.049		
	Chemicals	0.180		0.180		0.182		0.170		0.143		
	Non-Metalic Minerals	0.047		0.063		0.059		0.049		0.057		
	Metalurgic	0.017		0.018		0.020		0.022		0.022		
	Metalic, Transport	0.269		0.282		0.268		0.288		0.301		
	Others	0.017		0.014		0.011		0.010		0.010		
	North	0.374		0.377		0.369		0.367		0.383		
	Centre	0.161		0.165		0.193		0.200		0.193		
	Lisboa and T. V.	0.438		0.426		0.425		0.411		0.402		
	Observations	361		284		358		406		405		
	Domestic Firms	Monthly Earnings	413.133	177.60	438.727	201.13	453.590	229.04	454.539	241.90	453.567	207.19
		Hourly Earnings	2.424	1.48	2.558	1.40	2.633	1.49	2.717	2.28	2.715	1.58
Log Hourly Earnings		0.763	0.31	0.808	0.32	0.827	0.33	0.852	0.34	0.869	0.33	
Number of Workers		39.999	118.25	39.516	116.94	35.779	103.97	31.582	85.73	30.235	77.01	
Food, Beverages		0.100		0.099		0.101		0.107		0.112		
Textiles, Clothing, Leather		0.282		0.280		0.270		0.265		0.264		
Wood, Cork		0.148		0.147		0.144		0.147		0.146		
Paper, Graphical Arts, Edition		0.078		0.080		0.080		0.085		0.083		
Chemicals		0.055		0.053		0.054		0.052		0.051		
Non-Metalic Minerals		0.079		0.083		0.081		0.079		0.081		
Metalurgic		0.014		0.014		0.015		0.013		0.012		
Metalic, Transport		0.224		0.224		0.235		0.233		0.231		
Others		0.021		0.020		0.020		0.020		0.021		
North		0.487		0.482		0.477		0.489		0.496		
Centre		0.220		0.222		0.227		0.226		0.222		
Lisboa and T. V.		0.253		0.255		0.256		0.244		0.240		
Observations		15,095		15,278		15,351		16,171		16,757		

Notes:

Monetary values are in real terms (2000 prices) and in euros.

*Descriptive statistics on foreign and domestic firms are reported in the appendix. The share ranges between .0% and 3.8%.

Table 3b - Descriptive Statistics, Foreign and Domestic Firms, 1991-1999

	Variable	1996		1997		1998		1999		Annual Average
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Foreign Firms	Monthly Earnings	809.742	406.47	831.480	410.10	874.334	446.85	888.790	481.54	805.2
	Hourly Earnings	4.745	2.55	4.863	2.38	5.203	2.66	5.428	3.07	4.8
	Log Hourly Earnings	1.319	0.45	1.364	0.43	1.437	0.44	1.466	0.44	1.3
	Number of Workers	200.333	487.64	201.334	556.08	196.372	461.98	195.316	456.67	189.5
	Food, Beverages	0.119		0.104		0.112		0.093		0.10
	Textiles, Clothing, Leather	0.258		0.255		0.242		0.225		0.26
	Wood, Cork	0.028		0.045		0.045		0.061		0.05
	Paper, Graphical Arts, Edition	0.051		0.037		0.045		0.037		0.05
	Chemicals	0.157		0.139		0.162		0.154		0.16
	Non-Metalic Minerals	0.063		0.064		0.061		0.054		0.06
	Metalurgic	0.018		0.025		0.021		0.017		0.02
	Metalic, Transport	0.298		0.322		0.303		0.346		0.30
	Others	0.010		0.010		0.008		0.012		0.01
	North	0.389		0.356		0.364		0.380		0.37
	Centre	0.192		0.230		0.237		0.228		0.20
	Lisboa and T. V.	0.391		0.381		0.370		0.353		0.40
	Observations	396		404		376		408		378
Domestic Firms	Monthly Earnings	476.766	234.64	479.462	226.46	493.402	221.24	502.278	221.16	462.8
	Hourly Earnings	2.814	1.66	2.881	1.77	3.031	1.41	3.138	2.45	2.8
	Log Hourly Earnings	0.898	0.33	0.934	0.32	1.004	0.30	1.039	0.30	0.9
	Number of Workers	30.397	84.98	28.035	70.78	27.200	69.77	27.582	82.47	32.3
	Food, Beverages	0.114		0.116		0.118		0.114		0.11
	Textiles, Clothing, Leather	0.263		0.260		0.247		0.251		0.26
	Wood, Cork	0.139		0.151		0.149		0.152		0.15
	Paper, Graphical Arts, Edition	0.085		0.083		0.087		0.084		0.08
	Chemicals	0.051		0.048		0.048		0.048		0.05
	Non-Metalic Minerals	0.084		0.081		0.086		0.084		0.08
	Metalurgic	0.011		0.013		0.011		0.013		0.01
	Metalic, Transport	0.232		0.229		0.236		0.234		0.23
	Others	0.020		0.019		0.019		0.019		0.02
	North	0.484		0.497		0.478		0.497		0.49
	Centre	0.236		0.231		0.240		0.231		0.23
	Lisboa and T. V.	0.237		0.226		0.233		0.227		0.24
	Observations	16,093		17,853		17,596		18,819		16,557

Notes:

Monetary values are in real terms (2000 prices) and in euros.

*North and Algarve regional dummies are omitted (their share ranges between .0% and 3.8%).

Table 4 - Wage Premia of Foreign Firms, 1991-1999.

Specifications - Controls	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg.	Max.	Min.
No Controls	27.1%	29.4%	32.8%	31.0%	37.2%	31.5%	34.3%	31.8%	29.4%	31.6%	37.2%	27.1%
St. Errors	[0.002]**	[0.003]**	[0.003]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**
Adjusted R-squared	0.019	0.017	0.025	0.026	0.043	0.032	0.041	0.036	0.031			
Human Capital (HC)	23.1%	24.5%	26.6%	28.4%	32.3%	26.5%	26.9%	27.9%	25.7%	26.9%	32.3%	23.1%
St. Errors	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**
Adjusted R-squared	0.451	0.436	0.45	0.438	0.453	0.453	0.445	0.477	0.477			
HC and Firm Characteristics	11.6%	9.6%	11.3%	10.5%	12.2%	9.0%	8.0%	12.6%	13.0%	10.9%	13.0%	8.0%
St. Errors	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**
Adjusted R-squared	0.544	0.536	0.542	0.524	0.534	0.534	0.516	0.549	0.546			
Observations	524,230	517,007	494,461	462,406	501,256	485,522	503,643	477,692	503,156			

Notes:

Standard errors in brackets (* significant at 5%; ** significant at 1%).

Human Capital controls are: six dummies for educational degrees, a quartic in experience, a quadratic in tenure (in months), and a female dummy.

Firm Characteristics are: four regional dummies, log number of workers, a dummy for public firms and eight industry dummies.

Table 5 - Wage Premia of Foreign Firms in Different Industries, 1991-1999.

Specifications	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg.	Max.	Min.
Food, Beverages	6.5%	8.4%	9.2%	10.1%	10.1%	9.7%	6.9%	9.7%	8.5%	8.8%	10.1%	6.5%
	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**			
Wood, Cork	-2.7%	-0.6%	-2.2%	1.4%	2.6%	4.8%	1.7%	2.3%	1.5%	1.0%	4.8%	-2.7%
	[0.002]**	[0.002]*	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**			
Paper, Graphical Arts	28.7%	21.0%	24.4%	26.5%	29.8%	29.8%	25.7%	23.7%	25.2%	26.1%	29.8%	21.0%
	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.002]**	[0.002]**			
Chemicals	29.0%	26.7%	29.7%	28.0%	28.9%	27.4%	23.1%	26.1%	24.5%	27.1%	29.7%	23.1%
	[0.002]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.002]**	[0.002]**			
Non-Metalic Minerals	19.8%	26.4%	22.5%	23.9%	26.5%	29.6%	20.4%	20.1%	19.8%	23.2%	29.6%	19.8%
	[0.002]**	[0.002]**	[0.002]**	[0.003]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**			
Metalurgic	3.5%	14.7%	13.0%	22.9%	23.5%	29.3%	19.0%	22.9%	22.9%	19.1%	29.3%	3.5%
	[0.003]**	[0.004]**	[0.004]**	[0.005]**	[0.005]**	[0.005]**	[0.004]**	[0.004]**	[0.004]**			
Metalic, Transport	13.1%	15.5%	15.7%	21.3%	20.6%	21.8%	17.0%	15.7%	13.8%	17.2%	21.8%	13.1%
	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**			
Others	7.5%	12.1%	10.7%	12.3%	12.6%	10.0%	6.1%	6.2%	7.4%	9.4%	12.6%	6.1%
	[0.005]**	[0.006]**	[0.006]**	[0.006]**	[0.006]**	[0.006]**	[0.006]**	[0.006]**	[0.006]**			
Foreign Firm	5.4%	7.8%	4.8%	3.5%	5.9%	3.9%	1.9%	4.8%	3.9%	4.6%	7.8%	1.9%
	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**	[0.003]**			
(Food, Beverages)*For.	42.5%	11.4%	22.6%	15.0%	22.6%	25.0%	32.3%	28.4%	30.3%	25.6%	42.5%	11.4%
	[0.007]**	[0.009]**	[0.007]**	[0.006]**	[0.006]**	[0.005]**	[0.006]**	[0.006]**	[0.006]**			
(Wood, Cork)*For.	28.0%	22.5%	7.0%	24.7%	15.0%	18.3%	19.6%	16.5%	14.8%	18.5%	28.0%	7.0%
	[0.014]**	[0.017]**	[0.012]**	[0.013]**	[0.016]**	[0.018]**	[0.015]**	[0.011]**	[0.009]**			
(Paper, Graphical Arts)*For.	6.9%	14.3%	16.6%	27.4%	29.4%	18.8%	8.5%	14.7%	26.6%	18.1%	29.4%	6.9%
	[0.009]**	[0.010]**	[0.010]**	[0.011]**	[0.009]**	[0.010]**	[0.013]**	[0.009]**	[0.009]**			
Chemicals*For.	11.0%	16.5%	18.8%	19.8%	11.2%	17.5%	24.0%	16.3%	21.9%	17.4%	24.0%	11.0%
	[0.005]**	[0.006]**	[0.006]**	[0.006]**	[0.006]**	[0.006]**	[0.006]**	[0.005]**	[0.006]**			
(Non-Metalic Minerals)*For	8.8%	2.6%	0.0%	10.8%	5.4%	8.1%	13.8%	9.0%	12.2%	7.9%	13.8%	0.0%
	[0.011]**	[0.010]**	[0.009]	[0.010]**	[0.007]**	[0.007]**	[0.008]**	[0.007]**	[0.008]**			
Metalurgic*For.	31.5%	-11.6%	13.4%	-2.3%	-7.8%	-8.4%	4.0%	-0.9%	16.0%	3.8%	31.5%	-11.6%
	[0.017]**	[0.020]**	[0.021]**	[0.018]	[0.013]**	[0.012]**	[0.010]**	[0.011]	[0.013]**			
(Metalic, Transport)*For.	1.9%	-5.2%	4.9%	3.9%	4.0%	-0.4%	0.2%	5.8%	6.3%	2.4%	6.3%	-5.2%
	[0.004]**	[0.005]**	[0.004]**	[0.004]**	[0.004]**	[0.004]	[0.004]	[0.004]**	[0.004]**			
Others*For.	5.3%	-8.2%	4.7%	5.2%	4.7%	14.6%	9.1%	14.1%	14.8%	7.1%	14.8%	-8.2%
	[0.019]**	[0.031]**	[0.033]	[0.035]	[0.033]	[0.034]**	[0.032]**	[0.028]**	[0.037]**			
Adjusted R-squared	0.546	0.538	0.543	0.525	0.536	0.537	0.519	0.551	0.548			
Observations	524,230	517,007	494,461	462,406	501,256	485,522	503,643	477,692	503,156			

Notes:

Standard errors in brackets (* significant at 5%; ** significant at 1%).

Specifications are Food, Beverages, Wood, Cork, Paper, Graphical Arts, Chemicals, Non-Metalic Minerals, Metalurgic, Metalic, Transport, and Others, and firm characteristics (see previous tables for definitions).

Table 6a - Wage Premia of Foreign Firms for Different Degrees of Control, 1991-1999.

Specifications	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg.	Max.	Min.
1%-9%	13,8% [0.006]**	9,6% [0.006]**	9,5% [0.005]**	16,1% [0.006]**	13,9% [0.005]**	9,7% [0.006]**	9,6% [0.007]**	2,5% [0.010]*	20,7% [0.007]**	11,7%	20,7%	2,5%
10%-19%	17,2% [0.008]**	-2,2% [0.013]	-5,3% [0.010]**	22,9% [0.008]**	37,2% [0.007]**	28,1% [0.007]**	25,9% [0.008]**	15,6% [0.007]**	-3,4% [0.010]**	15,1%	37,2%	-5,3%
20%-29%	18,1% [0.004]**	6,4% [0.005]**	3,9% [0.006]**	4,6% [0.006]**	-1,8% [0.006]**	14,0% [0.006]**	3,6% [0.006]**	-4,3% [0.005]**	-2,2% [0.006]**	4,7%	18,1%	-4,3%
30%-39%	19,7% [0.007]**	-3,4% [0.008]**	-4,1% [0.008]**	18,9% [0.008]**	12,0% [0.008]**	0,0% [0.008]	9,2% [0.007]**	11,9% [0.007]**	13,9% [0.008]**	8,7%	19,7%	-4,1%
40%-49%	22,5% [0.006]**	27,5% [0.007]**	19,0% [0.007]**	7,9% [0.007]**	17,2% [0.007]**	11,4% [0.006]**	13,7% [0.005]**	14,0% [0.006]**	15,0% [0.005]**	16,5%	27,5%	7,9%
50%-59%	18,6% [0.006]**	6,5% [0.008]**	6,6% [0.006]**	11,3% [0.007]**	8,3% [0.007]**	8,5% [0.007]**	4,1% [0.008]**	-1,2% [0.007]	9,7% [0.006]**	8,1%	18,6%	-1,2%
60%-69%	2,3% [0.010]*	17,2% [0.007]**	16,6% [0.005]**	40,8% [0.006]**	36,3% [0.006]**	10,4% [0.008]**	36,5% [0.011]**	36,5% [0.009]**	24,6% [0.009]**	24,6%	40,8%	2,3%
70%-79%	2,1% [0.009]*	0,5% [0.011]	21,2% [0.009]**	38,3% [0.010]**	26,9% [0.007]**	25,0% [0.008]**	6,2% [0.009]**	23,6% [0.009]**	-5,4% [0.008]**	15,4%	38,3%	-5,4%
80%-89%	7,6% [0.005]**	10,5% [0.008]**	10,5% [0.010]**	12,9% [0.009]**	12,2% [0.008]**	10,5% [0.008]**	17,4% [0.006]**	14,6% [0.006]**	14,3% [0.007]**	12,3%	17,4%	7,6%
90%-99%	11,5% [0.004]**	8,0% [0.004]**	15,6% [0.004]**	10,6% [0.004]**	10,3% [0.003]**	15,5% [0.003]**	13,9% [0.003]**	10,8% [0.003]**	17,7% [0.004]**	12,7%	17,7%	8,0%
100%	15,8% [0.002]**	11,2% [0.003]**	10,4% [0.002]**	7,9% [0.002]**	12,6% [0.002]**	7,8% [0.002]**	6,7% [0.002]**	13,7% [0.002]**	13,3% [0.002]**	11,0%	15,8%	6,7%
Adjusted R²	0,548	0,538	0,543	0,528	0,538	0,537	0,518	0,551	0,548			
Observations	524.230	517.007	494.461	462.406	501.256	485.522	503.643	477.692	503.156			

Notes:

Standard errors in brackets (* significant at 5%; ** significant at 1%).

Specification used includes controls for human capital and firm characteristics (see previous tables for definitions).

Table 6b - Wage Premia for Foreign Firms, Different Definitions, 1991-1999

	1991		1992		1993		1994		1995		1996		1997		1998		1999	
	Premium	St. Error	Premium	St. Error	Premium	St. Error	Premium	St. Error	Premium	St. Error	Premium	St. Error	Premium	St. Error	Premium	St. Error	Premium	St. Error
>=10%	14,8%	(0.002)**	9,9%	(0.002)**	10,3%	(0.002)**	11,3%	(0.002)**	13,1%	(0.002)**	10,5%	(0.002)**	9,3%	(0.002)**	12,3%	(0.002)**	12,3%	(0.001)**
>=20%	14,7%	(0.002)**	10,1%	(0.002)**	10,7%	(0.002)**	10,5%	(0.002)**	11,7%	(0.002)**	9,4%	(0.002)**	8,4%	(0.002)**	12,0%	(0.002)**	12,7%	(0.002)**
>=30%	13,0%	(0.002)**	10,2%	(0.002)**	11,2%	(0.002)**	10,8%	(0.002)**	12,7%	(0.002)**	8,9%	(0.002)**	8,7%	(0.002)**	13,1%	(0.002)**	13,4%	(0.002)**
>=40%	12,5%	(0.002)**	11,0%	(0.002)**	12,0%	(0.002)**	10,4%	(0.002)**	12,6%	(0.002)**	9,2%	(0.002)**	8,5%	(0.002)**	13,0%	(0.002)**	13,3%	(0.002)**
>=50%	11,6%	(0.002)**	9,6%	(0.002)**	11,3%	(0.002)**	10,5%	(0.002)**	12,2%	(0.002)**	9,0%	(0.002)**	8,0%	(0.002)**	12,6%	(0.002)**	13,0%	(0.002)**
N. Obs.	524230		517007		494461		462406		501256		485522		503643		477692			

Notes:

Standard errors in parentheses: * significant at 5% level; ** significant at 1% level

The specification considered includes human capital and firm characteristics.

Table 7 - Propensity Score Matching estimates

Year/Method	Estimate	St. Error
1991	-0,34%	0,006
1992	-0,02%	0,004
1993	1,59%	0,006
1994	-5,49%	0,008
1995	1,49%	0,003
1996	2,36%	0,006
1997	2,17%	0,002
1998	2,03%	0,005
1999	5,75%	0,007
Average	1,06%	

Note:

Standard errors obtained via bootstrapping (50 repetitions)

Table 8a - Difference-in-differences Descriptive Statistics and Results, I

Control group: workers in firms that are always domestically-owned.

Variable	Treatment1	Treatment2	Control	DID - Treat. 1		DID - Treat. 2	
	Mean	Mean	Mean	Coeff.	St. Error	Coeff.	St. Error
Change in Log Hourly Wages	0,006	0,075	0,051				
1st Cycle	0,399	0,322	0,509	-0,014	0,003	-0,012	0,003
2nd Cycle	0,232	0,205	0,263	-0,009	0,003	-0,009	0,003
3rd Cycle	0,170	0,241	0,098	-0,014	0,004	-0,013	0,004
Secondary	0,107	0,150	0,063	-0,009	0,004	-0,013	0,004
"Bacharelato"	0,017	0,021	0,007	0,009	0,008	0,003	0,008
"Licenciatura"	0,040	0,033	0,014	0,001	0,006	-0,008	0,006
Experience	115,247	122,832	127,974	0,000	0,000	0,000	0,000
Tenure (Months)	22,570	22,907	24,350	-0,001	0,000	-0,001	0,000
Female	0,386	0,268	0,426	-0,012	0,001	-0,013	0,001
Log Firm Size	6,080	5,887	4,766	-0,008	0,000	-0,004	0,000
Difference in Years	1,410	1,634	1,332	0,030	0,001	0,023	0,001
Food, Beverages	0,088	0,126	0,109	0,013	0,002	0,011	0,002
Wood, Cork	0,039	0,064	0,081	-0,001	0,003	0,007	0,003
Paper, Graphical Arts, Edition	0,038	0,009	0,051	0,005	0,003	0,005	0,003
Chemicals	0,091	0,147	0,059	-0,026	0,003	-0,029	0,003
Non-Metalic Minerals	0,032	0,001	0,082	0,015	0,003	0,018	0,003
Metalurgic	0,017	0,000	0,015	0,015	0,005	0,008	0,005
Metalic, Transport	0,443	0,630	0,197	0,008	0,002	0,015	0,002
Others	0,001	0,000	0,008	-0,015	0,007	-0,006	0,007
Centre	0,211	0,293	0,229	-0,001	0,002	-0,002	0,002
Lisboa and T. V.	0,408	0,557	0,216	-0,020	0,002	-0,011	0,002
Alentejo	0,033	0,000	0,013	-0,008	0,005	0,000	0,006
Algarve	0,001	0,000	0,007	-0,032	0,007	-0,033	0,007
1991	0,165	0,337	0,148	0,008	0,003	0,005	0,003
1992	0,250	0,047	0,117	-0,059	0,003	-0,033	0,003
1993	0,108	0,200	0,114	-0,042	0,003	-0,039	0,003
1994	0,089	0,100	0,118	-0,024	0,003	-0,021	0,003
1995	0,063	0,000	0,131	-0,022	0,003	-0,018	0,003
1996	0,161	0,031	0,158	0,023	0,002	0,024	0,003
1997	0,069	0,069	0,116	0,001	0,003	0,005	0,003
Treatment				-0,031	0,003	0,020	0,006
Observations	18.269	2.578	250.031	268.300		252.609	
Adj. R squared				0,0165		0,0106	

Notes:

Treatment group 1: Workers in firms that are domestic in the first period and foreign in the second.

Treatment group 2: Workers in firms that are domestic in the first period, but with a positive level of foreign ownership, and foreign in the second.

The standard deviations of the change in log wages is 0,358, 0,371 and 0,31 for the first two treatment groups and for the control group respectively.

Table 8b - Difference-in-differences Descriptive Statistics and Results, II

Control group: workers in firms that are always foreign-owned.

Variable	Control	DID - Treat. 1	
	Mean	Coeff.	St. Error
Change in Log Hourly Wages	0,070		
1st Cycle	0,340	-0,038	0,010
2nd Cycle	0,307	-0,027	0,010
3rd Cycle	0,189	-0,031	0,010
Secondary	0,108	-0,019	0,011
"Bacharelato"	0,013	-0,003	0,016
"Licenciatura"	0,023	-0,011	0,013
Experience	111,62	0,000	0,000
Tenure (Months)	20,80	-0,003	0,000
Female	0,56	-0,021	0,003
Log Firm Size	6,38	-0,030	0,001
Difference in Years	1,53	0,074	0,002
Food, Beverages	0,064	-0,021	0,007
Wood, Cork	0,011	-0,108	0,011
Paper, Graphical Arts, Edition	0,013	0,029	0,011
Chemicals	0,128	-0,056	0,006
Non-Metalic Minerals	0,033	-0,044	0,009
Metalurgic	0,007	-0,188	0,011
Metalic, Transport	0,504	-0,034	0,005
Others	0,001	-0,103	0,039
Centre	0,238	0,038	0,005
Lisboa and T. V.	0,380	0,009	0,004
Alentejo	0,004	0,033	0,014
Algarve	0,000	0,289	0,067
1992	0,104	-0,125	0,006
1993	0,139	-0,004	0,006
1994	0,227	0,018	0,006
1995	0,211	0,000	0,006
1996	0,055	0,004	0,007
1997	0,098	-0,020	0,007
1998	0,068	0,002	0,007
Treatment		-0,042	0,003
Observations	27.229	46.476	
Adj. R-squared		0,0983	

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Notes:

See the definition of the treatment groups in the previous table.

The standard deviations of the change in log wages is 0,3 for the control group.

Table 9 - Propensity Score Matching estimates

Control	Treatment	Effect
Always domestic firms	All domestic firms	-1,54%
Always domestic firms	Subset of domestic firms	3,85%
Always foreign firms	All domestic firms	-7,83%

Notes: See main text.

Table 10 - Spillovers Effects

	Without Instruments				With Instruments			
	3-digit		4-digit		3-digit		4-digit	
	A	B	A	B	A	B	A	B
Log Domestic Size	0,0184	0,0135	0,0230	0,0116	-0,0464	-0,0479	-0,0460	-0,0473
	0,0067	0,0069	0,0047	0,0048	0,0023	0,0023	0,0020	0,0020
Log Foreign Size	-0,0005	0,0040	-0,0009	0,0023	0,0189	0,0216	0,0247	0,0265
	0,0016	0,0021	0,0011	0,0014	0,0017	0,0019	0,0015	0,0015
Observations	143.420	143.517	143.574	143.574	79.365	79.389	79.418	79.418
Adjusted R-squared	0,741	0,741	0,742	0,741				

Notes:

Standard errors reported below coefficients.

Other controls: Education Dummies, Experience, Tenure, Female Share, Firm Size, Public Ownership, and Year Dummies.

All specifications include firm fixed effects. Robust Standard Errors. Instruments are lagged foreign shares.

A - Foreign size measurement not corrected.

B - Foreign size measurement corrected.

Appendix

Table A1a - Descriptive Statistics, Workers in Foreign and Domestic Firms, 1991-1999 (10% foreign ownership definition).

Variable		1991		1992		1993		1994		1995	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Foreign Firms	Monthly Earnings	729,233	562,756	748,363	641,801	811,258	696,585	775,501	659,695	817,393	717,845
	Hourly Earnings	4,324	4,434	4,544	9,743	4,699	5,272	4,637	4,698	4,812	4,979
	Log Hourly Earnings	1,264	0,573	1,297	0,576	1,324	0,601	1,318	0,586	1,365	0,576
	Schooling Years	6,211	3,166	6,322	3,186	6,417	3,318	6,780	3,230	6,974	3,261
	Experience	23,153	12,043	22,357	12,151	23,237	11,873	21,370	11,730	21,573	11,700
	Tenure (Months)	126,584	107,267	122,124	111,070	128,755	109,286	105,798	103,571	112,586	107,298
	Female	0,490		0,507		0,493		0,543		0,536	
	North	0,424		0,470		0,453		0,334		0,368	
	Centre	0,113		0,100		0,116		0,227		0,192	
	Lisboa and T. V.	0,450		0,423		0,428		0,435		0,436	
	Observations	70.335		52.362		63.084		69.466		85.323	
Domestic Firms	Monthly Earnings	483,882	360,092	547,771	474,813	552,047	491,848	549,205	1231,43	539,510	448,419
	Hourly Earnings	2,829	3,910	3,188	4,303	3,221	4,131	3,262	11,558	3,193	4,154
	Log Hourly Earnings	0,889	0,465	0,977	0,517	0,984	0,519	0,987	0,513	0,994	0,493
	Schooling Years	5,135	2,525	5,297	2,650	5,387	2,658	5,643	2,668	5,676	2,645
	Experience	22,990	12,809	23,270	12,844	23,584	12,745	23,016	12,463	23,295	12,370
	Tenure (Months)	109,846	106,141	113,417	106,747	115,418	106,809	107,201	103,164	111,715	106,740
	Female	0,444		0,439		0,432		0,440		0,443	
	North	0,542		0,527		0,518		0,532		0,553	
	Centre	0,227		0,214		0,228		0,230		0,224	
	Lisboa and T. V.	0,208		0,235		0,229		0,209		0,196	
	Observations	423.346		446.567		409.669		378.135		403.845	

Notes:

Monetary values are in real terms (2000 prices) and in euros.

Alentejo and Algarve regional dummies are omitted (their share ranges between .0% and 3.8%).

Table A1b - Descriptive Statistics, Workers in Foreign and Domestic Firms, 1991-1999 (10% foreign ownership definition).

Variable		1996		1997		1998		1999		Annual Average
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Foreign Firms	Monthly Earnings	832,928	767,144	860,720	720,861	855,704	725,472	875,588	748,271	811,85
	Hourly Earnings	4,877	7,502	4,955	4,485	5,088	4,644	5,267	6,442	4,80
	Log Hourly Earnings	1,370	0,574	1,411	0,555	1,447	0,538	1,465	0,550	1,36
	Schooling Years	7,180	3,355	7,267	3,375	7,255	3,332	7,369	3,406	6,86
	Experience	21,365	11,859	21,470	11,844	22,107	11,964	22,016	11,854	22,07
	Tenure (Months)	113,653	107,760	114,099	108,326	120,692	111,406	114,733	111,051	117,67
	Female	0,502		0,487		0,512		0,516		0,51
	North	0,364		0,334		0,389		0,393		0,39
	Centre	0,206		0,228		0,253		0,256		0,19
	Lisboa and T. V.	0,423		0,428		0,323		0,314		0,41
	Observations	84.861		88.031		80.615		79.459		74.837
Domestic Firms	Monthly Earnings	571,277	484,371	568,369	487,239	580,210	464,515	602,491	488,942	554,97
	Hourly Earnings	3,329	4,797	3,384	4,802	3,528	3,579	3,690	3,605	3,29
	Log Hourly Earnings	1,029	0,503	1,059	0,482	1,116	0,464	1,159	0,468	1,02
	Schooling Years	5,822	2,762	5,874	2,757	6,009	2,842	6,119	2,899	5,66
	Experience	23,761	12,348	23,675	12,369	24,203	12,446	24,365	12,376	23,57
	Tenure (Months)	116,938	109,310	112,610	108,318	114,152	110,524	115,158	111,048	112,94
	Female	0,445		0,460		0,447		0,453		0,44
	North	0,554		0,561		0,535		0,548		0,54
	Centre	0,222		0,224		0,240		0,224		0,23
	Lisboa and T. V.	0,196		0,187		0,194		0,201		0,21
	Observations	388.000		402.799		384.213		411.037		404.572

Notes:

Monetary values are in real terms (2000 prices) and in euros.

Alentejo and Algarve regional dummies are omitted (their share ranges between .0% and 3.8%).

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Table A2 - Wage Premia of Foreign Firms, 1991-1999 (10% foreign ownership definition).

Specifications - Controls	1991	1992	1993	1994	1995	1996	1997	1998	1999	Avg.	Max.	Min.
No Controls	39,2%	35,3%	36,2%	35,9%	42,3%	37,6%	39,9%	36,3%	33,4%	37,4%	42,3%	33,4%
St. Errors	[0.002]**	[0.003]**	[0.003]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**		
Adjusted R-squared	0,046	0,029	0,035	0,039	0,061	0,049	0,06	0,053	0,044			
Human Capital (HC)	27,4%	26,5%	25,5%	29,2%	32,7%	28,1%	28,1%	28,0%	25,7%	27,9%	32,7%	25,5%
St. Errors	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**		
Adjusted R-squared	0,461	0,443	0,453	0,444	0,46	0,461	0,452	0,482	0,481			
HC and Firm Characteristics	15,0%	9,7%	10,4%	11,3%	13,0%	11,4%	9,2%	12,6%	12,9%	11,7%	15,0%	9,2%
St. Errors	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**	[0.002]**		
Adjusted R-squared	0,548	0,539	0,543	0,526	0,541	0,541	0,522	0,554	0,56			
Observations	524.230	517.007	494.461	462.406	501.256	485.522	503.643	477.692	503.156			

Notes:

Standard errors in brackets (* significant at 5%; ** significant at 1%).

Human Capital controls are: six dummies for educational degrees, a quartic in experience, a quadratic in tenure (in months), and a female dummy.

Firm Characteristics are: four regional dummies, log number of workers, a dummy for public firms and eight industry dummies.