

# Foreign ownership wage premia in emerging economies

## *Evidence from the Czech Republic*<sup>1</sup>

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### Abstract

In this article we examine the relationship between wages, labour productivity and ownership using a linked employer–employee dataset covering a large fraction of the Czech labour market in 2006. We distinguish between different origins of ownership and study wage and productivity differences. The raw wage differential between foreign and domestically-owned firms is about 23 percent. The empirical analysis is carried out on both firm- and individual-level data. A key finding is that industry, region and notably human capital explain only a small part of the foreign–domestic ownership wage differential. Both white and blue collar workers as well as skilled and unskilled employees obtain a foreign ownership wage premium. Foreign ownership premia are more prevalent in older and less technologically advanced firms. Joint estimation of productivity and wage equations show that, controlling for human capital, the difference in productivity is about twice as

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large as the wage differential. Overall, results indicate that the international firms share their rents with their employees.

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## 1. Introduction

In recent years a relatively large literature has built up comparing wage and productivity levels of domestic and foreign-owned firms and attempting to explain the observed differences. All studies, using firm- as well as worker-level data, show that the foreign-owned firms outperform the domestic ones with respect to pay levels.<sup>2</sup> The literature can be divided into two categories: studies comparing domestic and foreign-owned firms (see, e.g. Conyon *et al.*, 2002; Girma *et al.*, 2001; Lipsey and Sjöholm, 2004; Martins, 2004) and investigations focussing on the wage consequences of changes in ownership (Earle and Telegdy, 2008; Heyman *et al.*, 2006, 2007; Huttunen, 2007; Martins and Esteves, 2008). The former examine the importance of differences in observable characteristics of the firms as well as of their employees, whereas the latter exploit panel data and use fixed effects or difference-in-difference methods to control for unobservables.<sup>3</sup>

Summarizing briefly the key findings of earlier studies, they are: (i) the foreign ownership premium is considerably larger in less developed countries; (ii) the premium estimates from estimations on firm-level data are as a rule higher than those estimated on individual data; (iii) inclusion of firm and/or worker traits significantly reduces the foreign-domestic differential; and (iv) accounting for unobservables reduces the premium estimate further towards close to zero. Firm characteristics that turn out to be especially important are company size and industry affiliation.<sup>4</sup> Corresponding employee traits are human capital variables (education, training and experience).<sup>5</sup> Data in these studies come from both advanced economies (United States, United Kingdom, Germany and the Nordic countries) and less developed countries like Indonesia, Ghana and Mexico.

As noted before, the findings differ considerably between developed and less developed countries. It is not obvious that the results obtained either for mature,

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<sup>2</sup> For a comprehensive survey describing the design and the key results of 18 studies, see Andrews *et al.* (2009).

<sup>3</sup> These studies do not include greenfield births which make up a non-negligible portion of foreign-owned firms (also in the CEE countries) and are likely to differ from the acquired companies.

<sup>4</sup> These results are interpreted as evidence of multinational firms entering industries with higher profits.

<sup>5</sup> This is considered as evidence of a sufficiently large pool of specialists in the local labour market playing an important role in international investors' location decisions. Thus, employees in general do not necessarily enjoy a wage premium for working in a foreign-owned firm.

advanced market economies or less developed countries also hold for the new market economies in Central and Eastern Europe. In these countries there is lively debate on the pros and cons of foreign direct investments (FDIs), which are often encouraged by the local governments (for Czech Republic see, e.g. Kohout, 2005; Hospodářské Noviny, 2009, 2010). A common notion is that the locations of foreign-owned firms in these countries are driven by the search for lower costs of production, and labour costs in particular, and that foreign investors are operating 'sweatshops' in CEE countries. Another motivation for locating there is the closeness to new expanding markets (Konings and Murphy, 2006). In neither case is it obvious that the foreign-owned firms would pay their employees more. On the other hand, in post-transition economies where skills learned in successful multinational companies are a particularly scarce resource, foreign firms may, to retain their employees and not lose the investments made in them, pay their workers a wage premium. Thus, one aim of this article is to provide evidence on this matter from the Czech Republic, a country with one of the highest FDI inflows among the CEE countries, and to inform the ongoing discussion about the pros and cons of attracting foreign investors. To the best of our knowledge, only one earlier study has dealt with foreign ownership wage premiums in a CEE country context, namely Earle and Telegdy (2008), who compare wages in public, private and foreign-owned firms in Hungary.<sup>6</sup>

In this article we examine the relationship between wages, labour productivity and foreign vs. domestic ownership for the Czech labour market using a linked employer–employee dataset covering a large fraction of the Czech private sector labour market. We distinguish between different origins of owners and study wage and productivity differences. In our individual-level analyses we distinguish between employee categories (type of work, skill levels) and in the firm-level analysis between young and old firms and technologically advanced and less advanced firms.

The remainder of the article is structured as follows. The next section briefly summarizes earlier research on the topic. Section 3 describes the data used and Section 4 contains the results of the empirical analysis. In Section 5, we discuss the results and offer some conclusions.

## 2. Previous research and hypotheses development

It is by now considered as a stylized fact that foreign-owned firms have higher productivity and pay higher average wages than domestically-owned firms. Does this

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<sup>6</sup> More precisely, other studies, notably Münich *et al.* (2005, 2006), have also included type of ownership as control variables in estimation of earnings equations, but they do not distinguish between foreign and domestic ownership, but privatized, state-owned enterprises and public administration and *de novo* private ownership.

imply that wages will rise in a domestic firm after it has been acquired by a foreign investor? Does the existence of a foreign ownership wage premium mean that foreign greenfield births pay higher wages than similar domestic firms? The answers to these questions depend on what gives rise to the foreign–domestic wage differential. Although there is no lack of suggestions for explanations and despite a growing empirical literature testing them, consensus concerning the main drivers of these differences has not yet been arrived at. One obvious fact is that foreign-owned firms are typically located in certain industries and regions. In advanced industrialized countries you often find them in high wage sectors and/or regions where sufficiently large pools of specialists are located. However, a number of studies that control for firm characteristics also find foreign ownership wage premia within industries or regions.

A number of hypotheses have been put forward to explain the ownership premium. One is that foreign-owned firms employ workers who possess higher qualifications and are rewarded accordingly. The reason that multinational firms employ workers with more human capital is that the success of firms in international markets is due to having higher quality capital, tangible as well as intangible, and hence, they need more skilled labour to work with it. This implies that it is not only employees working in foreign-owned firms who receive a premium but also those employed in domestically-owned multinational firms. Heyman *et al.* (2006, 2007) provide evidence from Sweden that there is no premium associated with foreign ownership *per se*.

In many countries, local as well as national governments seek to attract foreign investors hoping that in addition to a direct impact on employment there will also be positive (technological, skills and knowledge) spillovers from the foreign firms to the local companies.<sup>7</sup> If these spillover effects are significant, this would imply that, at least in the medium or longer term, the foreign–domestic wage differential would be smaller. On the other hand, multinational firms are likely to be aware of these spillovers and therefore attempt to prevent them by means of paying higher wages to reduce labour turnover (see Fosfuri *et al.* (2001) for an analysis).

A growing number of studies have tried to find empirical evidence of spillover effects and their magnitude. A study making use of panel data on UK firms (Haskel *et al.*, 2007; see also Fu, 2009), finds positive spillover effects, whereas some studies using similar data from transition economies, Konings (2001) for Bulgaria and Romania, Javorcik (2004) for Lithuania and Djankov and Hoekman (2000) and Sabirianova Peter *et al.* (2005) for the Czech Republic, find no or only limited evidence of their existence; Ayyagari and Kosová (2010) and Kosová (2010) on the Czech Republic reach a different conclusion. Some recent studies have focussed on knowledge spillovers by considering what happens to the wages of employees working

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<sup>7</sup> FDI is often actively encouraged by local governments by measures including tax holidays, preferential loans, preparation of greenfields. This has certainly been the case in the Czech Republic, too.

for a foreign employer when they move to domestically-owned firms. Three studies – Andrews *et al.* (2009) for Germany; Balsvik (2011) for Norway; and Pesola (2007) for Finland – find evidence of foreign-to-domestic firm moves having a positive impact on the employee's wage, while the studies by Martins (2004) and Martins and Esteves (2008) using Portuguese and Brazilian data, respectively, find the opposite: movers from foreign to domestic firms take wage cuts. From this rather mixed bag of results, one may conjecture that spillovers are more likely to materialize in advanced economies with a relatively high proportion of skilled workers in the labour force.<sup>8</sup> A distinguishing feature often attributed to foreign firms is that they exhibit different patterns of labour demand. In particular, it is claimed, and standard models of trade support this notion (Fabbri *et al.*, 2003), that multinational firms have a more elastic demand for labour than domestic firms (except for domestically-owned multinationals). If this is the case, it is conceivable that employees in foreign firms are paid more to compensate for the higher insecurity in employment.

The empirical evidence on the matter is quite mixed, however. Barba Navaretti *et al.* (2003) and Balsvik and Hammer (2010) find that the multinationals' labour demand is in fact less elastic than that of domestic firms because of the higher skill levels of their workforces. On the other hand, Görg *et al.* (2009) find a considerably higher elasticity in international companies operating in Ireland, while Hakkala *et al.* (2010), who compare domestic firms with foreign-owned and domestically-owned multinationals in Sweden, do not find any differences in labour demand elasticity between the three ownership types. Still another explanation for the observed wage differential is rent sharing within multinational companies. More specifically, within foreign-owned firms profits may be shared with workers across borders. As discussed in Budd *et al.* (2006), rent sharing in multinational firms is predicted by several theoretical frameworks: implicit contract models with risk-averse firms and employees (which predict that parent as well as affiliate wages are positively correlated with profits), insider–outsider models (where insiders at an affiliate can extract parent as well as affiliate rents), models of fairness and models of corporate strategy (emphasizing positive goodwill to prevent government interventions). Budd *et al.* (2006) make use of data from a panel of European firms to provide evidence that this occurs in practice. In a recent paper, Martins and Yang (2010) give additional evidence that multinational firms are sharing rents across borders on the basis of an analysis of a dataset covering 47 countries.

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<sup>8</sup> This would be consistent with the country pattern of the results. Also Pesola's (2007) finding, that it is only employees with higher education who obtain wage gains when moving from foreign to domestic firms, is consistent with it. However, it does not appear consistent with the finding that foreign ownership wages are significantly larger in less developed countries. As the analyses have used data from different countries and at different levels (worker, firm, industry), one should not draw strong conclusions from these two groups of studies.

### 3. Data description

We use a linked employer–employee dataset that includes all workers from 3,050 companies in year 2006. This has been provided to us by a private consulting company Trexima, which produces wage and wage costs statistics for the Czech Ministry of Labor and Social Affairs. The sampling strategy used by the consultancy firm is to survey all firms with more than 250 employees every year, while a rotating random sample is adopted for smaller firms (15 percent of all firms between 50 and 249 employees, and 4.5 percent of firms between 10 and 49 employees). Consequently, large and medium-sized firms are over-represented in the dataset. The dataset contains information about individual workers in each firm, their age, gender, education, occupation, workers firm tenure, hourly wage, annual working hours, total annual compensation as well as its wage and bonus components. The hourly wage information is of very high quality as it is calculated by the employer to estimate the employee's vacation and absence pay. Thus, by using the hourly wage reported by the employers we avoid measurement errors arising from division of aggregate income by the number of standard working hours.

The dataset also provides some information about firm characteristics, such as industry (we make use of 15 two-digit NACE code industries), the region of the firm's operations (of which there are 14), and most importantly for the current article, type and country of origin of ownership.<sup>9</sup> A firm is defined as foreign-owned when at least 50 percent of the equity is in foreign hands. In addition, we have received firm-level financial information collected from firms' balance sheets and income statements by Creditinfo Czech Republic and from these data we have retrieved information about firms' sales, profits, fixed assets, materials, value added and information on technological development of firm such as expenditure on R&D, software, licenses, patents and other forms of know-how. We merged these data with our linked employee–employer data.

Table 1 gives some basic descriptive statistics for the sample of firms for the year 2006. More precisely, it contains the number of firms, their average size as measured by number of employees and the average hourly wage for five groups of countries for four places of origin of the owners plus the Czech Republic. Most foreign-owned firms<sup>10</sup> are, not surprisingly, from the Western European countries<sup>11</sup> (in particular Germany, Netherlands, Austria, France and Switzerland) followed by other European countries (in particular the neighbouring CEE countries Slovakia and Poland) and the United States. Firms with owners from Asia account for a tiny proportion of foreign-owned firms. Note, however, that the Asian-owned firms are

<sup>9</sup> For more information about the dataset, see Eriksson and Pytlikova (2004) and Eriksson *et al.* (2009).

<sup>10</sup> We have excluded a handful of firms with owners from Cyprus and the Seychelles, as it is hard to determine their true ownership origin because of the 'tax-haven' status of these countries.

<sup>11</sup> Defined as the 'old' EU15 countries plus Norway, Iceland and Switzerland.

**Table 1. Sample firm characteristics**

Ownership by origin	Number of firms	Average size	Sum of workers employed	Average hourly pay (CZ Koruna)
Western Europe	527	696	366,728	151
Other Europe	23	395	9,079	144
Asia	12	929	11,149	114
United States	18	694	12,486	183
Czech Republic	2,184	376	820,842	118

larger than other firms and thus their relative share of total employment is about the same as that of the other European countries.

#### 4. Empirical analysis

Figures 1 and 2 show the log average hourly wage and total factor productivity distributions for domestic and foreign-owned firms, respectively, when computing from regressing log sales on log employment, capital and materials.

From these it clearly stands out that a significant part of the foreign firms' wage distribution lies to the right of that of the domestically-owned firms. The difference in average total factor productivity is even larger.<sup>12</sup> *F*-tests of equality of variances show that dispersion of wages is significantly larger among foreign-owned firms but does not differ with respect to labour productivity.

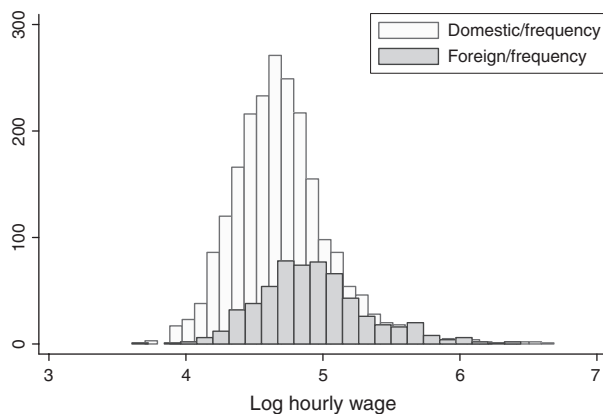
Table 2 provides some descriptive statistics for the sub-samples of foreign and domestically-owned companies. We may notice that employees in foreign-owned firms are on average younger and have a shorter tenure at their current employer. This is not surprising as foreign-owned firms in the Czech Republic for obvious reasons are younger. The differences in schooling levels of the firms' workforces are minor as are differences in the share of white collar employees. Foreign-owned firms have, not unexpectedly, an almost twice as large share of foreign employees and, perhaps somewhat surprisingly, a higher share of female employees. Foreign firms in the Czech Republic are predominantly operating in the manufacturing sector and are twice as often as domestic firms located in the capital area.

However, there are also differences between the foreign firms, depending on which region the owners come from. Firms from other CEE countries and the United States employ a higher proportion of university-educated people and (consequently) white-collar workers, whereas Asian-owned firms have the lowest

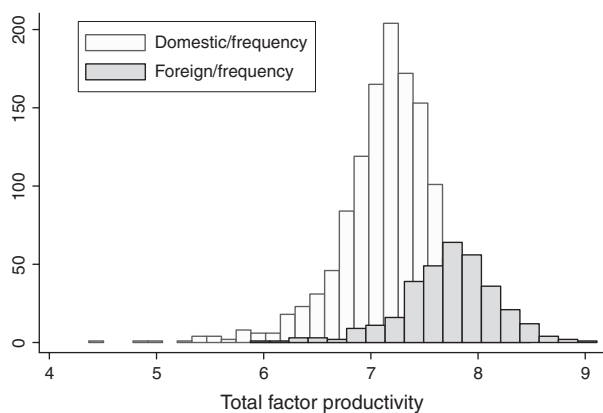
<sup>12</sup> Estrin *et al.* (2009) conclude from their survey of studies of the causal relationship between ownership and productivity in transition economies that there is indeed a strong positive effect of foreign ownership.



**Figure 1. Log hourly wage distributions for domestic and foreign firms**



**Figure 2. Total factor productivity distributions for domestic and foreign firms**



share of university-educated and white-collar workers. Yet, firms from these two regions of origin also share some similarities as they employ a much larger share of foreign workers compared with the other foreign firms and domestic companies. There are also differences between the different regions of origin with respect to the industry and region in which the firms operate. Compared with domestic and other foreign firms, companies from other CEE countries are much more represented in retail and business services. US-owned firms are more present in hotel and transportation, banking and manufacturing industries. Half of the US-owned firms are located in Prague. All Asian-owned firms carry out their activities in manufacturing and mining industries, and are located in other regions than the capital. Averages of individual characteristics closely mirror firm averages.



Table 2. Descriptive statistics

	Domestic	Foreign, all	Western Europe	Other Europe	Asia	United States
<b>Firm-level characteristics</b>						
<i>Human capital</i>						
Average age (years)	42.2	37.5	37.6	39.2	34.1	37.0
Average tenure (years)	8.2	5.8	5.8	6.4	4.1	6.4
<i>Share of employees (%)</i>						
Vocational training	13.7	13.6	14.1	8.8	13.3	6.1
University-level education	10.0	11.1	10.6	17.4	6.5	18.8
Women	37.2	43.1	43.4	37.7	42.0	40.9
White-collar workers	44.4	43.1	42.3	55.7	27.0	57.2
Foreign employees	2.4	4.4	3.7	19.1	13.7	4.1
<i>Other (%)</i>						
Prague region	12.7	25.2	24.7	26.1	8.3	50.0
Mining, manufacturing	37.7	63.5	63.8	43.5	100	61.1
Retail	12.0	11.9	11.8	21.7	0	11.1
Hotels, transport	7.0	5.6	5.5	4.3	0	16.6
Banking	1.7	6.1	6.1	4.3	0	11.1
Business services	9.9	7.1	6.6	26.1	0	0
Education, health and culture	7.9	2.1	2.9	0	0	0
Number of firms	2,184	579	527	23	12	18
<b>Individual-level characteristics</b>						
<i>Human capital</i>						
Average age (years)	42.2	36.9	37.0	40.0	31.5	33.6
Average tenure (years)	10.8	6.4	6.3	11.6	3.1	4.4
<i>Share of employees (%)</i>						
Vocational training	14.1	15.7	4.3	14.7	11.5	8.6
University-level education	11.2	9.2	9.1	19.4	5.2	8.9
Women	39.8	44.7	44.9	24.9	33.8	52.6
White-collar workers	47.1	41.3	41.4	43.1	20.6	45.6
Foreign employees	3.0	4.7	4.2	17.1	14.5	3.9
<i>Other (%)</i>						
Prague region	15.4	18.0	17.6	15.1	2.4	38.5
Mining, manufacturing	39.5	66.2	65.5	72.9	100	63.8
Retail	6.1	12.0	12.7	1.3	0	4.2
Hotels, transport	22.0	5.6	5.6	0.7	0	20.9
Banking	0.9	6.0	4.2	0.7	0	11.2

**Table 2. (cont) Descriptive statistics**

	Domestic	Foreign, all	Western Europe	Other Europe	Asia	United States
Business services	5.6	7.3	6.8	24.3	0	0
Education, health and culture	11.9	2.4	2.8	0	0	0
Number of individuals	820,842	394,884	366,728	9,079	11,149	12,486

#### 4.1 Firm-level analyses

We begin with analyses of firm-level data, that is, regressions where the dependent variable is the log of the average firm hourly wage. As can be seen from the first column of Table 3, the raw difference in average wages between foreign and domestically-owned firms is 23.4 percent. When accounting for differences in the compositions in firms' workforces (as measured by firm means and standard deviations<sup>13</sup> of age and firm tenure, share of female employees and employees with foreign citizenship, and employees' educational qualifications), the difference changes by merely two percentage points (not shown). Note that, at the same time, the adjusted  $R^2$  jumps from 0.065 to 0.61, implying that a substantial fraction of the variation in firm wages is because of differences in workforce structures. Adding regions, industries and firm size to the regressors reduces the differential from 21 to 16 percent. Thus, about two-thirds of the raw foreign–domestic firm-wage differential remains after all the explanatory variables have been entered.

Foreign investors are likely to have different motives for their decision to locate in the Czech Republic. Western European and US-owned firms' location decisions can be influenced by both lower wage costs and closeness to new, growing markets, whereas the non-Western European (and to some extent also Asian)-owned firms are less interested in the lower wage costs. Consequently, it is possible that the foreign wage premia differ with respect to the country of origin. In the third and fourth columns of Table 3, we divide foreign-owned firms into four groups of countries of origin: the 15 old EU member states + countries belonging to the European Economic Area + Switzerland (henceforth called Western Europe), other European countries, Asia and the United States. The unconditional differences relative to domestic firms vary substantially: the difference is 24 percent for the Western European countries, 17 percent for other European countries and 41 percent for the US-owned companies. There is no pay difference between domestic firms and the Asian-owned firms. The average differential masks considerable heterogeneity across owner-country groups. Controlling for human capital, firm

<sup>13</sup> Standard deviations are included to capture the fact that age and tenure distributions are highly skewed and therefore characterizing them with means only can be misleading.

**Table 3. Firm-level wage regressions. Dependent variable:  
log firm average hourly wage**

<b>Firm-level variables</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Foreign	0.234*** [0.018]	0.161*** [0.014]	– –	– –
Western Europe	–	–	0.236*** [0.019]	0.170*** [0.015]
Other Europe	–	–	0.165 [0.098]	0.049 [0.057]
Asia	–	–	–0.003 [0.062]	0.035 [0.054]
United States	–	–	0.412*** [0.102]	0.159** [0.052]
Average age	–	–0.009*** [0.001]	–	–0.009*** [0.001]
SD age	–	–0.006 [0.004]	–	–0.006 [0.004]
Average tenure	–	0.013*** [0.002]	–	0.013*** [0.002]
SD tenure	–	–0.006* [0.002]	–	–0.006* [0.002]
Share females	–	–0.422*** [0.024]	–	–0.422*** [0.024]
Share foreigners	–	–0.296*** [0.058]	–	–0.270*** [0.059]
Share no or primary education	–	–0.051 [0.083]	–	–0.052 [0.084]
Share vocational training	–	–0.114*** [0.034]	–	–0.117*** [0.034]
Share university degree	–	1.499*** [0.063]	–	1.501*** [0.063]
Regions, industry, firm size	–	Yes	–	Yes
Number of observations	2,746	2,746	2,746	2,746
Adjusted R <sup>2</sup>	0.064	0.606	0.066	0.607

*Note:* Robust standard errors in brackets; \*\*\* $P < 0.001$ , \*\* $P < 0.01$ , \* $P < 0.05$ .

size, region and industry, the differential shrinks for the Western Europe group by a fourth, for American firms by more than half, and disappears for the other European countries group.

How can the pattern of observed differences across groups of 'countries of origin' be interpreted? Following the arguments in Budd *et al.* (2006),<sup>14</sup> we can expect there to be differences in the strength of rent sharing depending on the 'distance' between the parent company and its affiliate in the Czech Republic. Thus, if the parent company is located in a neighbouring (or otherwise nearby) country that shares the same level of economic development, such as Poland and the Slovak Republic and other countries in the group 'other European countries', we would expect the FDI to be of a primarily horizontal nature, and consequently, there is less need for rent-sharing mechanisms. On the other hand, parent companies from countries that differ in terms of economic development and technology, like EU15 and the United States, are more likely to have carried out vertical investments in the Czech Republic, and hence to have stronger incentives to engage in rent-sharing as their bargaining position *vis-à-vis* the affiliate's employees is weaker. Indeed, this is also what we find in Table 3: the foreign ownership premium is considerably higher in affiliates of which the parent company is either from the United States or Western Europe than in the 'other Europe' group, which is dominated by neighbouring countries (of which some, in addition to geographical proximity and being former planned economies, also have in common a language belonging to the Slavic language family). Thus, the country group pattern in the estimates suggests that the foreign ownership premia we have unearthed in columns 3 and 4 in Table 3 are probably because of rent sharing.

We have also run regressions (not reported here, but available from the authors upon request) including interactions between foreign ownership and the human capital variables to see whether foreign-owned firms reward them differently from domestic firms. It turned out that they do not, with one exception. The coefficient to tenure is about 50 percent higher for the foreign-owned firm. (The same result is obtained for individual-level regressions, but there the difference is considerably smaller.) Higher rewards for tenure in foreign firms are consistent with these companies having more valuable firm-specific human capital and also that they pay an extra premium to retain workers who have acquired this.

It should be noted that although we include relatively many firm characteristics in the regressions in Table 3, the foreign ownership premium estimates may still be overestimated as the foreign-owned firms are significantly larger (and larger firms have typically been found to pay higher wages) but in our analysis all firms have the same weight. Furthermore, the firm-level aggregate variables we have used to describe differences in workforce composition may not be capturing the full extent of employee heterogeneity. However, as we will see next, this conjecture is only

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<sup>14</sup> See also Martins and Yang (2010).

confirmed to a limited extent by the estimations carried out on the individual-level data.

## 4.2 Individual-level analyses

Turning to the estimations where the units of observation are individual employees – see Table 4 – we may first notice that the unconditional foreign ownership premium is now considerably lower than for firm average wages:<sup>15</sup> 7 percent. This has also been observed by Heyman *et al.* (2006, 2007), Martins and Esteves (2008) and Earle and Telegdy (2008). Second, and more importantly, when we enter human capital variables, firm size, region and industry dummies into the wage regression, the differential increases substantially. In the full model, the foreign ownership premium is twice as large as the unconditional difference: 14 percent. This number differs only a little from the corresponding estimate from the firm-level regression which was 16 percent. Thus, the individual-level estimates do not seem to capture much additional employee heterogeneity.<sup>16</sup>

When we next distinguish between different origins of foreign ownership – see columns 3 and 4 of Table 4 – we find a positive unconditional premium for firms owned by investors from Western European countries, no premium in American and other European firms and that individuals employed in firms with Asian owners receive a lower wage than workers in domestically-owned firms. (The differences relative to the average foreign ownership premium in Table 4 are much smaller than the corresponding differences for firm wages.) After controlling for the same regressors as before, we can observe a considerable increase in the premium for employees in all foreign-owned firms except those with non-Western European owners. The premium for employees in Asian-owned firms turns positive and is now just below that of Western European and US-owned firms. Thus, the results in Table 4 reflect the marked differences in human capital, industry affiliation and firm size between firms with owners from different groups of countries that were shown in Table 2. Accounting for these differences significantly affects the wage premium estimates. Notably, these are, similar to the firm-level estimates, consistent with the notion that the strength of rent sharing is increasing in the parent–affiliate distance.

### 4.2.1 White- and blue-collar workers

Next, we examine whether the wage premium paid by foreign firms differs between white- and blue-collar workers. This is motivated by the expectation that if

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<sup>15</sup> This differential is moreover significantly lower than the one documented by Earle and Telegdy (2008) for Hungary; in their study the raw difference was about 44 per cent, controlling for year and region. Note that their estimate is obtained from firms that experience ownership changes.

<sup>16</sup> We estimated the firm-level regressions by Weighted Least Squares using firm size as weights, obtaining estimates (available from the authors) that are very close to those from the individual-level regressions.

**Table 4. Individual-level wage regressions. Dependent variable: log hourly wage**

Individual- and firm-level variables	1	2	3	4
Foreign	0.067* [0.031]	0.145*** [0.015]	– –	– –
Western Europe	–	–	0.069* [0.033]	0.147*** [0.015]
Other Europe	–	–	0.121 [0.106]	0.077 [0.071]
Asia	–	–	–0.099* [0.045]	0.118* [0.047]
United States	–	–	0.062 [0.066]	0.159*** [0.042]
Age <sup>2</sup>	–	0.020*** [0.001]	–	0.020*** [0.001]
Age-squared	–	–0.025*** [0.002]	–	–0.025*** [0.002]
Tenure	–	0.024*** [0.001]	–	0.024*** [0.001]
Tenure <sup>2</sup>	–	–0.044*** [0.004]	–	–0.044*** [0.003]
Female	–	–0.207*** [0.010]	–	–0.208*** [0.010]
Foreigner	–	–0.025 [0.021]	–	–0.022 [0.019]
No or primary education	–	–0.198*** [0.030]	–	–0.198*** [0.030]
Vocational training	–	–0.175*** [0.007]	–	–0.175*** [0.007]
University education	–	0.632*** [0.012]	–	0.633*** [0.012]
Regions, industry, firm size	–	Yes	–	Yes
Number of observations	1,011,874	1,011,874	1,011,874	1,011,874
Adjusted R <sup>2</sup>	0.004	0.447	0.005	0.447

*Note:* Robust standard errors clustered by firm shown in brackets; \*\*\* $P < 0.001$ , \*\* $P < 0.01$ , \* $P < 0.05$ .

foreign firms pay their employees a premium to reduce labour turnover, this is likely to accrue mainly to white-collar workers through whom most of the potential knowledge transfer would occur. However, as can be seen from Table 5, both

**Table 5. Individual wage regressions, white-collar and blue-collar workers.**  
**Dependent variable: log hourly wage**

	White	Blue	White	Blue	White	Blue	White	Blue
Foreign	0.110*	0.070	0.169***	0.133***				
	[0.051]	[0.037]	[0.023]	[0.014]				
Western Europe					0.108*	0.074**	0.170***	0.138***
					[0.053]	[0.038]	[0.024]	[0.014]
Other Europe					0.262*	0.006	0.160*	-0.037
					[0.111]	[0.101]	[0.073]	[0.094]
Asia					0.086	-0.095*	0.162*	0.084*
					[0.046]	[0.047]	[0.066]	[0.043]
United States					0.047	0.105**	0.166*	0.173***
					[0.150]	[0.039]	[0.084]	[0.028]
Human capital, firm size	No	No	Yes	Yes	No	No	Yes	Yes
Regions, industry	No	No	Yes	Yes	No	No	Yes	Yes
Number of observations	466,580	545,222	466,580	545,222	466,580	545,222	466,580	545,222
Adjusted $R^2$	0.008	0.010	0.454	0.428	0.009	0.012	0.454	0.430

*Note:* Robust standard errors clustered by firm in brackets; \*\*\* $P < 0.001$ , \*\* $P < 0.01$ , \* $P < 0.05$ .

categories of employees receive a premium and the differential between white- and blue-collar workers is only about 4 percent. This small magnitude calls into doubt the notion that foreign firms pay a wage premium to their employees to prevent knowledge spillovers. As before, the premium increases as we account for human capital, firm size, region and industry.

When we distinguish between owner-country groups, some differences surface again. The conditional wage premia for employees in Western European and US enterprises are quite robust to differences in specification and are very close to those observed in the aggregate. We may note that the difference between blue- and white-collar workers' premia is rather small, with US firms paying slightly higher wage premia to blue-collar workers than to white-collar workers, which is the opposite to what we would expect according to the 'prevention of worker turnover' hypothesis. Asian firms pay both categories of employees a wage premium – in the unconditional model they actually pay less to blue-collar workers than domestic firms do. The wage premium is about twice as large for white-collar employees as for blue-collar workers. In line with the spillover hypothesis we find that firms with owners from 'other Europe' pay their white-collar workers more than domestically-owned firms do. As a robustness check we have also



distinguished between employees with university or vocational education and workers with basic, low and general secondary education. The estimates are very similar to those in the Table 5: a very small difference in the foreign ownership premium is found between the two skill groups.<sup>17</sup>

#### 4.2.2 Firm age, level of technology and unions

In this section we test two hypotheses. First, we test whether the foreign wage premium is paid as a means to compensate for job uncertainty. We would expect that jobs in younger firms are less secure and hence younger foreign-owned firms pay higher premia than the older companies. Second, we expect the more technologically advanced firms to have a stronger interest in retaining their employees and consequently, foreign firms that use more advanced technologies pay a wage premium for keeping valuable employees with firm- or industry-specific skills and knowledge. To test these hypotheses we add dummies capturing age of the firm and the level of technology they use, and their interactions with the foreign ownership dummy to the regressions.

We define a firm as 'old' if the average tenure of its five longest tenured employees exceeds 12 years. We choose 12 years as threshold value as this implies that the firm existed prior to the main privatization processes in the Czech Republic. Thus, the younger firms are more likely to be foreign-owned greenfield births<sup>18</sup> whereas the older companies mainly consist of former domestic firms acquired by foreign investors. We define technologically advanced firms as firms with above industry mean value of expenditures on R&D, software, licences, patents and other know-how. Applying these definitions to our sample firms, 58 percent of the foreign firms are old compared with 68 percent of the domestic firms. Of the foreign firms 24 percent are more technologically advanced, which is almost three times as large as the proportion of the Czech firms (8.4 percent).

The estimates of the main and interaction effects are given in Table 6. The first column presents results from firm-level regressions whereas the second column is based on individual-level data.<sup>19</sup> Firm- and individual-level regressions yield similar patterns in the estimates. As for the main effects, we find that foreign-owned firms pay a wage premium and that technologically more advanced firms do, too. In the individual-level regression older firms attach a negative coefficient, but not in the firm-level analysis. All interaction terms are insignificant in the firm as well as in the individual-level regressions. All in all, the estimates provide no support for the hypothesis that foreign wage premia are compensating for higher job

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<sup>17</sup> The same pattern emerges when we distinguish between different ownership regions. These results are available from the authors upon request.

<sup>18</sup> Some of them can of course also be foreign acquisitions of young domestic firms.

<sup>19</sup> Note that because the technology variable is not available for all companies, the estimation sample is smaller than that in the previous estimations.

**Table 6. Firm- and individual-level wage regressions with firm age and technology dummies and their interactions**

	Firm level	Individual level
Foreign	0.113*** [0.030]	0.115*** [0.031]
Old	0.003 [0.022]	-0.058* [0.025]
Old × foreign	0.036 [0.031]	0.011 [0.033]
HighTech	0.094** [0.030]	0.102*** [0.026]
HighTech × foreign	-0.038 [0.041]	-0.015 [0.045]
Human capital	Yes	Yes
Regions, industry, firm size	Yes	Yes
Number of observations	1,374	698,560
Adjusted $R^2$	0.652	0.434

*Notes:* Robust standard errors in brackets; \*\*\* $P < 0.001$ , \*\* $P < 0.01$ , \* $P < 0.05$ . In individual-level regressions robust standard errors are clustered by firm.

insecurity and the hypothesis that the wage premium is used as a retention device gains no support either.

Finally, some words about the possible influence of trade unions. An argument sometimes made is that foreign investors pay a wage premium to prevent the workplaces from becoming unionized. There are a number of reasons why we do not think this carries much weight, at least not in the case of Czech Republic. First, after the collapse of the Communist system under which union membership was mandatory, people have been rather sceptical of unions. Second, unions are much less present in the young, post-1994 firms.<sup>20</sup> If the purpose of the wage premium is to keep unions out, then we would observe a higher premium in the younger foreign-owned firms and we do not; see Table 6. Third, we added dummies for collective agreements (at firm or industry level) as measures of union presence to the individual-level wage regressions and obtained very small 'union membership premium' estimates: typically 1 percent or below for firm-level agreements and negative

<sup>20</sup> Of the firms in our estimation sample with no collective wage agreement, at the firm or industry level, 50 percent are young firms; 66 percent of the young and 32 percent of the old firms have no collective agreements.

estimates for industry-level agreements. Thus, unions' influence on wages seems to be minor and would hence not be a major concern of foreign investors.

### 4.3 Wage and productivity differences

Next, we approach the question of why foreign firms pay higher wages than domestic ones from another angle by considering to what extent the pay differences are reflecting differences in productivity. Recall that in Figures 1 and 2 we showed that differences in productivity between foreign and domestic firms exceed those in wages. A simple regression of firm-level production functions with capital, labour and materials as inputs and foreign ownership dummies document large productivity differences between domestic and foreign-owned firms. The difference ranges from 48 to 41 percent when log sales and log value added, respectively, are used as dependent variables.

It thus seems natural to ask whether the differences in wages between foreign and domestic firms that remain after controlling for human capital, industry and location reflect differences in productivity. These could be because of the use of superior capital and production technology but could also arise because of differences in intangibles (such as management style, work organization).

In the following section we will use the firm-level data to compare productivity and wages and to test for whether the foreign ownership premium is associated with higher productivity. Following Brown and Medoff (1978), Hellerstein and Neumark (1999) and Hellerstein *et al.* (1999), we jointly estimate firm-level production functions and hourly wage functions and compare the relative marginal products and relative wages across firm types (and for various demographic groups<sup>21</sup>). The wage equations are essentially the same as those presented in Table 3. But the estimation sample is slightly smaller because of somewhat lower availability of adequate data on sales or value added which are our measures of output. Thus, we allow productivity to vary with the composition of the firms' workforces and by industry and region. Note that to the extent that biases because of worker unobservables affect our estimated productivity and wage differentials similarly, they do not affect our comparison of relative productivity and wages.

Once we have estimated the two equations we can make use of a Wald test to test for equality of the foreign-domestic productivity and wage differential estimates. Table 7 reports results of the joint estimation of the Cobb-Douglas production functions<sup>22</sup> and wage equations. In the production functions we use two

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<sup>21</sup> As for demographic variables it should be noted, however, that our results do not allow us to distinguish between two explanations: that the demographic group in question has a lower productivity or that the group is over-represented in low-productivity firms.

<sup>22</sup> As a robustness check we also estimated more flexible translog production functions obtaining very similar results. As the interpretation of the Cobb-Douglas estimates is more straightforward, only these are presented.

Table 7. SUR<sup>a</sup> estimates of wage equations and production functions<sup>b</sup>

	Log sales	Log hourly wage	Wald test [ $\chi^2(1)$ ] <sup>c</sup>	Log value added	Log hourly wage	Wald test [ $\chi^2(1)$ ] <sup>c</sup>
Foreign owned	0.272*** [0.055]	0.158*** [0.016]	4.93**	0.300*** [0.045]	0.153*** [0.015]	13.02***
Age	-0.043*** [0.006]	-0.015*** [0.002]	23.36***	-0.034*** [0.005]	-0.014*** [0.002]	21.65***
Tenure	-0.008 [0.005]	0.007*** [0.002]	9.03***	0.006 [0.004]	0.007*** [0.001]	0.02
Share females	-0.650*** [0.099]	-0.409*** [0.029]	6.67***	-0.635*** [0.080]	-0.414*** [0.027]	9.18***
Share foreign workers	-0.228 [0.314]	-0.169 [0.094]	0.04	-0.374 [0.232]	-0.270*** [0.078]	0.24
Share no education	0.798 [1.197]	-0.009 [0.357]	0.52	-0.030 [0.519]	-0.189 [0.175]	0.11
Share lower secondary	-0.320* [0.138]	-0.135** [0.041]	2.08	-0.104 [0.106]	-0.092* [0.036]	0.01
Share university degree	2.829*** [0.265]	1.836*** [0.077]	16.00***	2.340*** [0.186]	1.690*** [0.062]	14.61***
Other regressors	<i>K, L, M</i>			<i>K, L</i>		
Controls: firm size, region, industry	Yes	Yes	Yes	Yes	Yes	
Constant	13.140*** [0.106]	4.676*** [0.031]		10.999*** [0.088]	4.688*** [0.029]	
Number of observations	1,086	1,086		1,547	1,547	
Adjusted $R^2$	0.547	0.624		0.467	0.587	

Notes: <sup>a</sup>Seemingly Unrelated Regressions;

<sup>b</sup>Note that all continuous variables have been de-meaned.

<sup>c</sup>Test of difference in estimates equals zero;

\*\*\*  $P < 0.001$ , \*\*  $P < 0.01$ , \*  $P < 0.05$ .

alternative dependent variables, sales and value added, and we use three input factors: number of employees ( $L$ ), physical capital ( $K$ ) and materials ( $M$ ).<sup>23</sup> The third and sixth columns contain the Wald tests.

<sup>23</sup> The data on capital and materials are based on information from firms' balance sheets and income statements prepared by CreditInfo Czech Republic (a firm specialized in collecting information for assessments of firms' credit worthiness). Firm capital ( $K$ ) is defined as value of fixed assets, materials ( $M$ ) as the value of raw materials and consumables.

Beginning with the productivity differentials we may note that firms with an older workforce, higher shares of female employees, less educated workers and foreign workers have lower productivity. The *ceteris paribus* level of total factor productivity level in foreign-owned firms is 27–30 percent higher than in the domestic firms. Thus, a notable fraction of the raw productivity differential – 48 and 41 percent as measured by log sales and log value added, respectively – can be explained by differences in human capital, region and industry. Notably, the proportion attributable to these factors is vastly higher than in the case of firm-level wages.

We find that for most groups of workers the analysis rejects the hypothesis that wage differentials are equal to differences in marginal products. The only exceptions are the estimates for the share of foreign workers, for the share of workers with lower education and for tenure when value added is used as the dependent variable. For employees with a university education the difference is particularly large: their wage is considerably lower than their contribution to productivity. Notably, the gender wage gap is smaller (especially when sales is the dependent variable in the production function) than the gender productivity gap.<sup>24</sup> This is not consistent with notions of wage discrimination, but it should be noted that we cannot account for gender segregation in the estimations.

Controlling for quality of the labour input, the productivity gap between foreign and domestic firms is almost twice as large as the corresponding wage differential. However, before interpreting this as an indication that foreign-owned companies are not paying their employees their marginal productivity, one should first notice that the productivity differential may capture differences in the quality of capital employed in foreign and domestic firms. Moreover, in a former transition economy context, it is important to account for the fact that (some) domestic firms may be maximizing worker income, minimizing labour turnover costs, or both (efficiency wages) and, as shown by Prasnikar *et al.* (1994), are paying wages exceeding the marginal product of labour.

When we again distinguish between the four different owner-country groups, see Table 8, we find that firms with owners from the Western Europe and the United States are considerably more productive than domestic firms and the other foreign firms. The Western European and the US wage differential with respect to the domestic firms is about half of the productivity difference.

## 5. Discussion and concluding remarks

Summing up, we find that location in industry or region plays only a marginal role in explaining the wage differential between foreign and domestic firms. Thus, the bulk of the ownership difference in hourly wages is within industry and region.

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<sup>24</sup> Dong and Zhang (2009) also find that the relative wage of unskilled female workers exceeded their relative productivity in the Chinese manufacturing sector.

**Table 8. SUR estimates of wage equations and production functions, by continents of origin<sup>a</sup>**

	Log sales	Log hourly wage	Wald test [ $\chi^2(1)$ ] <sup>b</sup>	Log value added	Log hourly wage	Wald test [ $\chi^2(1)$ ] <sup>b</sup>
Western Europe	0.291*** [0.056]	0.169*** [0.016]	5.29**	0.327*** [0.045]	0.160*** [0.015]	16.08***
Other Europe	-0.030 [0.240]	-0.015 [0.071]	0.00	-0.137 [0.202]	0.011 [0.068]	0.64
Asia	0.017 [0.262]	0.012 [0.077]	0.00	-0.451* [0.229]	-0.020 [0.078]	4.23**
United States	0.315 [0.246]	0.173* [0.073]	0.38	0.445* [0.186]	0.195** [0.063]	2.16
Other regressors	K, L, M			K, L, M		
Controls: human capital, region, industry	Yes	Yes		Yes	Yes	
Number of observations	1,086	1,086		1,547	1,547	
Adjusted R <sup>2</sup>	0.548	0.627		0.473	0.589	

Notes: <sup>a</sup>Note that all continuous variables have been de-measured.

<sup>b</sup>Test of difference in estimates equals zero;

\*\*\*  $P < 0.001$ , \*\*  $P < 0.01$ , \*  $P < 0.05$ .

Strikingly, the differential is not explained by differences in human capital. Unlike in some other countries, foreign multinational firms in the Czech Republic do not employ more highly qualified labour than domestic firms. This indicates that the location decisions of foreign investors have mainly been driven by the lower wage costs rather than the closeness to new markets. Controlling for human capital variables leads to only a small reduction in the foreign ownership premia in the firm-level analysis, and actually gives rise to an increase in the differential in the individual-level regressions.

Having ruled out location and human capital as the main drivers of the foreign ownership premium, the remaining candidate explanations are rent sharing and payment of higher pay as a means to reduce worker turnover and knowledge spillover. Beginning with the latter, we would expect this motive to be more important for white-collar workers or more skilled employees. Our findings suggest that the premium is indeed higher for white-collar workers and employees with higher education, but the differences relative to the blue-collar workers and less educated employees, respectively, are quite small. When we distinguish between firms that

use more advanced technologies and those that do not, the difference in the foreign ownership wage premium is negligibly small. Consequently, the results do not lend support to the prevention of spillover hypothesis. The observed wage premia do not seem to compensate for higher job insecurity as older firms (acquired before the privatization programmes) rather than younger foreign firms pay a higher wage premium.

Our preferred candidate for explaining the observed pattern in the wage equation estimates is rent sharing. In particular, the differences in foreign ownership premia across groups of home countries of the parent companies suggest that parent companies from Western Europe and North America are sharing rents with their employees in Czech affiliates because their bargaining position is weaker than that of parent companies from economically and culturally more similar countries. The lack of differences in wage premia across the groups of employees mentioned before could reflect that rents are shared with all employees to preserve a good workplace atmosphere. The gap in labour productivity between foreign and domestically-owned firms is about twice as large as the corresponding gap in wages. Rent sharing within international companies is an important, but often neglected, effect of globalization on local economic outcomes. And yet, there are several potential sources of rent sharing in international firms: insider–outsider relations, implicit contracts, fairness concerns and creation of goodwill to reduce government intervention. In future work, we aim to provide more direct evidence on rent sharing in the Czech labour market utilizing the same data source as in the current article.

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