

# Foreign takeovers and wages in Hungary

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# **FLOWENLA Discussion Paper**

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## Foreign takeovers and wages in Hungary

### ABSTRACT

This study investigates the “picking-the-winner” hypothesis of the wage premium that multinational firms (MNEs) pay relative to indigenous firms for the same type of worker. We apply Hungarian employee-employer matched data from 1992 until 2001 and find a U-shape pattern of the wage premium before and after a foreign takeover. Indeed, takeover targets pay a wage premium 9% above the average indigenous firm already before ownership change. Moreover, the reasons why a foreign firm takes over an indigenous firm are also reasons for those takeover targets to pay higher wages already before the takeover (“picking-the-winner” hypothesis). After a substantial drop in the first years after the takeover, foreign firms increase the wage premium above the initial level in the long run. Since productivity and firm employment follow the same U-shape pattern and employee turnover decreases substantially in the long run, the wage premium may also intend to reduce worker incentives to leave the MNE and transfer superior MNE technology as a free good to indigenous firms. However, self-selection accounts for up to 3 quarters of the Hungarian foreign firm wage premium.

**Keywords:** FDI, foreign takeover, cross-border M&A, picking winner, wage regression, employeeemployer

**JEL-Classification:** E24, F16, F23

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## 1) Introduction

Both the major growth of foreign direct investment (FDI) in the last decade and some spectacular development success stories such as Ireland have drawn attention to the impact of FDI on the local economy. Since the study of Aitken et al. (1999), economists are also aware of detrimental effects of FDI to the local economy. However, Aitken et al. (1996) established one major link through which multinationals can benefit the local economy: multinational enterprises (MNEs) seem to pay higher wages for a comparable type of worker than indigenous firms.

Indeed, if a country attracts new MNEs and these pay higher wages for a given local workforce, then this can be seen as a positive externality of MNEs on the local economy and would justify some sort of subsidies to MNEs by local authorities. For this reasoning to hold, any type of self-selection effect must be excluded. For example, such self-selection may occur, when MNEs are able to attract workers with better unobservable talents than domestic firms. The larger wage payments reflect the larger productivity of those workers but do not imply a wage rise of the economy on average. Another self-selection effect may be detectable when MNEs take over indigenous firms that did already have a positive unexplained wage premium compared to the average domestic firm. The latter self-selection effect has become known as the “picking-the-winner” hypothesis (Oulton, 1998): MNEs take over the most successful domestic firms (skim the cream) and these firms appear at the same time to pay higher wages even before they become foreign owned. The wage-premium is thus generally a firm characteristic but not specifically an ownership type characteristic.

The main focus of the present study is to evaluate to which extent is the foreign firm wage premium that is unexplained by industry-, region-, worker-, and firm characteristics due to

MNEs taking over domestic firms that paid already larger wages before. More specifically, does the wage premium relative to the average indigenous firm before takeover overbid or underbid the premium after takeover. We investigate this issue on Hungarian employee-employer matched data from 1992 until 2001 and find a U-shape pattern of the inexplicable wage premium. Target firms pay on average a wage premium of 9% immediately prior to the takeover. Contrary to what one may expect from the previous literature, the wage premium falls significantly immediately after the takeover. Only in the long run, the wage premium rises slightly above the initial level before the takeover. We show that the reasons why a foreign firm takes over an indigenous firm are also reasons for those takeover targets to pay higher wages. These reasons are large labour productivity, large share of white collar workers, and large operational profits. Moreover, the U-shape development of wages in the lifetime of a takeover is followed by total factor productivity. Moreover, there is evidence for labour force restructuring before and immediately after the merger and a below average worker mobility of foreign takeovers in the long run. These stylized facts are in line with the hypothesis that the wage premium may also intend to reduce worker incentives to leave the MNE and transfer superior MNE technology as a free good to indigenous firms in the long run. However, self-selection accounts for up to 3 quarters of the Hungarian foreign firm wage premium.

Our results distinguish from the only two previous studies on foreign takeovers and wages by Lipsey and Sjöholm (2002) and Conyon et al. (2002) in that they use plant level data rather than matched employee-employer data and do not provide evidence on the “picking-the-winner” hypothesis for Indonesia and the UK, respectively. In particular, Indonesian high-skilled wages are surprisingly even smaller in takeover target firms compared to the average indigenous firm and there is an immediate rise in the wage premium after the takeover.

The rest of the paper is organized as follows: section 2 reviews briefly the empirical and theoretical literature on wages, FDI and foreign takeovers; section 3 describes the data and the macroeconomic environment of Hungary; section 4 contains regression results and section 5 concludes.

## 2) Theory and Literature

The seminal work on wages and foreign-owned firms is Aitken et al. (1996). Apart from mixed evidence on wage spillover effects, this study finds an unexplainable wage cost premium that MNEs have compared to indigenous firms in spite of production function control variables for US, Venezuelan and Mexican manufacturing firms. These results have been extended for the US by Doms and Jensen (1998) and Felicino and Lipsey (1999) and replicated on a number of other countries such as Canada by Globerman, Ries, and Vertinsky (1994), the UK by Girma et al. (2001), Indonesia by Sjöholm and Blomström (2001, 2003), five African countries by Te Velde and Morrisey (2001), Ghana by Görg et al. (2002), and for Hungary by Kertesi and Köllő (1999, 2001) to mention a few.

While Aitken et al. (1996) already controlled for region, industry, and a broad category of human capital, Kertesi and Köllő (1999, 2001), Te Velde and Morrisey (2001) and Görg et al. (2002) control for personal characteristics such as human capital, occupation, experience, and training by using employer-employee matched data rather than firm or plant data, and Warner (2001) controls for country characteristics, when calculating the average wage premium for 5 occupations across 58 countries in 1998 based on over 3000 companies. While all of the control variables explain part of the wage premium – MNEs tend to be clustered more in centers where living cost and wages are large, have larger firm size and therefore larger wage

costs<sup>2</sup>, operate in high-wage sectors, employ more high-skilled workers, etc. – an inexplicable wage premium remains. Only Girma et al. (2000) explains the wage premium by the productivity advantage of foreign firms in the UK entirely on firm data. However, some qualifications are sometimes made. For example, Warner (2001) finds an unexplained wage premium only for high-skilled workers. Kertesi and Köllő (2001) argue that the young and high-skilled workers have the largest wage premium. Görg et al. (2002) find that a wage premium exists for Ghana only if a worker is receiving training on the job, whereas there is no wage premium for workers entering a MNE anew or for worker that do not receive training from the MNE.

The theoretical explanations for this empirically unexplained wage premium of MNEs with regard to indigenous firms rely on two different strands of ideas with contrary policy implications. The first group of explanations is based on a productivity advantage of MNEs relative to indigenous firms which generates a surplus and local workers participate in it. The second type of explanation assumes some selection process without a benefit to the local economy.

Among the first class of models are the ones of Fosfuri et al. (2001) and Glass and Saggi (2001). Foreign firms hold firm specific assets in form of some superior technology and face the risk that local employees spill over the superior knowledge to indigenous firms when changing job thereby reducing the competitive edge of the MNE in the local market. To reduce incentives for job change and avoid the subsequent knowledge spillover, MNEs pay a wage premium. Another model along these lines can be found in Görg et al. (2002). Given that MNEs have a firm specific asset, the return to human capital is larger there than in indigenous firms which induces workers to accumulate more human capital by on-the-job

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<sup>2</sup> This is a stylized fact of labour economics. See Oi and Iidsen (1999).

training over time, when the surplus is shared in a bargaining game with the firm owners. A wage premium remains restricted only to workers that experience worker training. More generally, rent sharing models combined with a productivity advantage of the MNE can explain the wage premium for all types of workers regardless of their skills or human capital accumulation.<sup>3</sup>

An example of the second type of explanation is the model of Mody et al. (2003). MNEs are assumed to have a superior technology in screening investment projects. Hence, they will end up acquiring the most productive indigenous firms. If productivity of domestic firms is based on unobservable worker characteristics, then MNEs appear to the econometrician as if they acquire firms that pay an inexplicable wage premium. Although not formally developed, efficiency wage theories such as Shapiro and Stiglitz (1984) suggest that some firms pay higher wages than others to set work incentives in the presence of shirking. Presumably, MNEs are more likely to be the firms that can afford to play the high-wage strategy and have more productive workers.

While there is no evidence on MNEs taking over domestic firms that already pay above average wages, there are two attempts to test for it. First, Lipsey and Sjöholm (2002) use Indonesian plant level data rather than matched employee-employer data and do not find evidence for the “picking-the-winner” hypothesis. Surprisingly, Indonesian high-skilled wages are even smaller in takeover target firms compared to the average indigenous firm and there is immediately an increase in the wage premium after the takeover. Second, Conyon et al. (2002) find a significant wage premium of foreign takeovers on UK plant data. However, they do not consider the wage premium before the takeover.

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<sup>3</sup> Empirical evidence for rent sharing within MNEs is provided by Budd et al. (2002).

Since we share the database with Kertesi and Köllő (2001), we use their study as point of departure for our analysis. With employee data, they confirm an inexplicable wage premium for Hungarian employees after controlling for employee-, region-, industry- and firm characteristics. We deviate from this study by first pooling annual cross section data using firm identifiers but not worker identifiers across years and by second studying foreign takeovers rather than foreign owned firms in general.

Following Kertesi and Köllő (2001), we first run a regression with the dependent variable employee gross wages and independent variables consisting of worker and firm characteristics and a foreign ownership dummy.<sup>4</sup> Worker characteristics are gender, a 4<sup>th</sup> order polynomial in total work experience, 4 education categories (EDUCATION1 primary school, EDUCATION2 vocational school, EDUCATION3 secondary school, EDUCATION4 higher education), and 3 occupation categories (blue collar, white collar low-skilled and white-collar high-skilled workers). Firm characteristics are 5 firm size classes in terms of employment, average labour productivity and capital intensity. In addition, there are control dummy variables for industry, region, and year. The foreign firm wage premium is estimated as the regression coefficient on foreign ownership dummy variables. In deviation to Kertesi and Köllő (2001), we also apply dummy variables with value 1 in the year before an indigenous firm is notified as foreign owned, in the year when a domestic firm is notified to have become foreign owned, in the second year thereafter, in the third year thereafter, and in the fourth year or more thereafter. Vice versa, we also have ownership change variables for foreign firms that become domestically owned and for foreign-owned firms without ownership change separated by the length of their stay in the sample.

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<sup>4</sup> Wage regressions have a standard set of control variables in labor economics. The first labor study with employee-employer matched data was Abowd et al. (1999).

### 3) Data

#### 3.1) Macroeconomic Background

Hungary opened up for foreign investors earlier than most other Central and Eastern European Countries (CEEC) both by large-scale privatization and by introducing a liberal regime for Greenfield investment. It was very successful in attracting FDI by western companies and stood out as host to FDI already in the early 1990s. The inward-FDI stock increased from 0.6 bn USD in 1990 to as much as 12 bn USD in 1995 and 24 bn USD in 2001. While the share in worldwide inward-FDI remained minimal, inward-FDI expanded much more rapidly than the domestic economy. The FDI/GDP ratio reached over 40 % in 2001, up from a mere 1.7 % in 1990. This rough measure of importance of inward-FDI has even surpassed respective average ratios for the EU(15). It is clearly higher than in other CEECs (see Table 1), although Hungary seems to have lost some ground against other CEECs in most recent years (UNCTAD, 2001). An important factor behind the growth of inward-FDI is a generous investment incentive scheme including, among others, tax breaks, free trade zones for individual firms, grants, and loan guarantees<sup>5</sup>.

Insert table 1 about here

In the non-financial business sector MNEs have gained dominant positions in important economic indicators: With a share of over 75 % in both exports and imports they largely determine Hungary's position in the international division of labour. Thanks to inward-FDI, Hungary has re-oriented foreign trade relations towards the EU to a similar extent as the

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<sup>5</sup> Interestingly, foreign-owned firms' share in pre-tax profits (around 65 %) is at least five times as high as their share in corporate profit taxes (around 12 %), indicating generous tax breaks for foreign investors (OECD, 2002, p. 111 ff).

southern and western peripheral EU member states (Hamar 2001). Gross fixed capital formation in the non-financial business sector is to almost 60 % realized by MNEs and they create about half the value added. However, the employment share is much lower, indicating clearly above-average productivity. MNEs are concentrated on manufacturing. They are characterised by above-average size. Also, there is a regional concentration on Budapest and some western districts close to the Austrian border.

In 1995, a stabilization programme brought major changes in the economic policy. There was a significant rise in the tariffs for imports, a crawling-peg devaluation of the national currency engineered an incentive for exports, the privatization of the state-property began to a large extent (electrical industry, banks and insurance companies among others). For attracting foreign capital, the state offered a wide scale of allowances to foreign investors, especially for Greenfield investments.

Table 2 shows that there has been a steady inflow of foreign capital of about 2bn \$ across all years which amounts to about 20% of fixed capital formation of the Hungarian economy. Overall, there are by the end of 2001 about 27% of the workforce in the business sector employed in foreign-owned firms.

Insert Table 2 about here

GDP growth was picking up after the reform program only from 1997 onwards. This suggests that we have to pay attention to a structural break in the pre- and post-high growth years. Importantly, within our data period we do not have the typical post transition slump in the economy that could interfere with our analysis. The slump occurred in 1991. Interestingly,

wages were falling in the vein of the market reform in 1995 rendering Hungary far more competitive since then.

Importantly, the Hungarian collective bargaining system is firm based. Table 2 shows that on average about 10% of the workforce are organized in trade unions industry-wide and about 30% are organized on firm level. This implies that wage payments will have a strong firm-specific component. Hence, Hungary seems very suitable for finding evidence on firm level rent sharing models. Moreover, wage setting of firms is sufficiently independent and flexible for market theories on the wage premium to apply.

### 3.2) Data Description

Our analysis is based on the Hungarian „Structure of Earnings Survey” (SES). The SES data have been collected by the Hungarian Employment Office. The SES is a cross-section random sample of employees that contains detailed information about monthly gross earnings which includes monthly gross basic wage including ordinary allowances (overtime or nightshift allowances) and 1/12 part of the unordinary premium received in the last year. The main characteristics of individuals (age, gender, education, occupation) and some important information of firms employing them (firm identification code, industry, number of employees per firm and location of plants) are also known. The data collection occurred in May of every third year in 1986, 1989 and 1992, and from 1992 on every year. Since Hungary was not a market economy in earlier sample years, we consider only data from 1992 until the most recent year 2001.

A random sample is drawn from all employees in firms with a minimum threshold number of employment. Until 1994 only employees of firms with at least 20 full-time workers were drawn into the sample. In 1995 and 1996 the cross-section datasets consisted of employees of firms with 10 or more full-time employees, and from 1997 on of firms with 5 or more full-time employees. To keep the dataset homogenous we drop all observations of employees of firms with less than 20 employees. In line with previous studies such as Aitken et al. (1996), we restrict ourselves also to employees in the manufacturing sector.

Unfortunately, we are unable to follow an individual across years. However, we are able to follow firms across years. Hence, we pool all annual cross section employee data which are connected across years by their firm identifier. This distinguishes our data from Kertesi and Köllő (2001) which studies wages and foreign-owned firms in independent annual cross-section datasets. If no worker is drawn randomly in a year from a firm, then it disappears from our sample in this year. However, thanks to the large size of the SES samples (6-7% of total employment among the covered firm-size) there is a high probability that at least one employee of a firm reappears in subsequent years. Indeed, the average number of observations per firm is 5.6 out of a maximum of 10. However, it is important to keep in mind that our employee data are representative for Hungarian manufacturing employees in firms with more than 20 employees, but firm data are not. Firms with few employees are more likely to form shorter panels, because the probability is larger that none of its workers is drawn into the sample for some years.

Using the firm identifier<sup>6</sup>, balance sheet and profit and loss account data are merged into our new employee dataset.<sup>7</sup> In particular, we have information on the called-up share of capital

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<sup>6</sup> The firm identifier of our dataset is identical with the firm registration code used by the Hungarian Tax and Financial Control Administration and is therefore very reliable.

and the equity share of different types of owners (foreign, domestic private or state ownership), operating profits per employee, capital intensity, white collar worker share in total employment per firm, and average labour productivity (value added per worker). The nominal values (in Hungarian Forint) were deflated with the official Consumers Price Index published by the Hungarian Central Bureau of Statistics<sup>8</sup>.

We define a firm to be foreign owned if the share of foreign owners in the called-up share of capital exceeds 50% to keep our study comparable to Kertesi and Köllő (2001). Three types of foreign owned firms appear in our dataset. First, a firm appears first in our sample as a firm with less than 50% foreign equity participation and turns in a latter year into a firm with more than 50% foreign equity participation. We call these firms foreign takeovers of domestic firms.<sup>9</sup> Second, a firm appears in the first year of its sample life as a foreign owned one, but its foreign participation rate drops below 50% in a subsequent year. We call these firms domestic takeovers of foreign owned firms. Third, firms enter the dataset with a participation rate above 50% and stay this way throughout their sample life. Unfortunately, we cannot be sure whether these firms are Greenfield investments although many of them probably are. Particularly, if a firm of the third type is small, it may not have been sampled before although it existed. But then, this firm may have experienced an ownership change outside the sample and thus may be a foreign takeover. Moreover, we know for some years whether a worker was previously employed in a firm. We find frequently foreign-owned firms that enter our sample but employed already at least one worker in previous years. We keep in mind that we

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<sup>7</sup> We thank Jozsef Becsei from ECOSTAT in Hungary and his colleagues for their help in collecting the firm data.

<sup>8</sup> Source is Fazekas (2003).

<sup>9</sup> Originally, the firm identifier – firm fiscal code – changed if a completely new owner took over a company, but stayed the same if the foreign owner had previously a minority stake. However, Gábor Körösi of the Hungarian Academy of Sciences was able to identify fiscal code changes of existing plants and we used this information for identifying takeovers. Unfortunately, in the years 1995, 1996 and 1998 this procedure was not possible.

can be sure about all cases that we identify as takeovers, but there may be additional takeovers among those firms that we observe as foreign-owned throughout their sample life.

A particular problem is multiple ownership change in the case of 63 firms (3856 observations). Quite often this multiple ownership change was erratic due to foreign ownership participation rates close to 50% in general and some years slightly above and other years slightly below. Since it is not obvious how to classify these cases, we decided to exclude these 3856 observations (about 1% of the numbers of observations in our sample). Their small number cannot possibly affect our results.

Turning to the control variables, we have gender, experience<sup>10</sup>, 4 categories of education levels (primary school-, vocational school-, secondary school participation, and higher education), 3 occupation categories (blue collar, white collar low-skilled, white collar high-skilled)<sup>11</sup> or a 4-digit occupation code (HSCO-93) with about 600 categories<sup>12</sup>, average labour productivity (value added per worker), capital intensity<sup>13</sup>, the share of white collar workers in total firm employment, operating profits, and a 2-digit NACE industry code. Moreover, we apply in all regressions a firm size category code with the five firm size categories 21-50, 51-300, 301-1000, 1001-3000, and more than 3000 employees per firm. In addition, we have a region code which captures 7 Hungarian NUTS 2 regions which are further divided into villages, cities, and county capitals. Fortunately the region code is based on plant location information but not on firm headquarter location information such that we do not risk misclassification of the region code.<sup>14</sup>

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<sup>10</sup> Age minus years spent in school minus common entry age into school (6 years). See Kertesi and Köllő (2001) for the precise definition.

<sup>11</sup> See Kertesi and Köllő (2001) for the precise definitions.

<sup>12</sup> The 4-digit occupation code changed 1993 and is not compatible with previous years. Whenever applying these 4-digit occupation fixed effects regressions, our dataset will reduce to the years 1994-2001.

<sup>13</sup> Capital intensity is calculated as book value of fixed assets per employee.

<sup>14</sup> See Fazekas (2000) for a description of this region code and the regional Hungarian inward FDI pattern.

We have 346674 full-time employees of 7198 different firms in our ten-year panel all together. The number of the firms varies between 2189 and 2925 per year, the number of employee observations between 30093 and 37473 in different years. 1548 of the 7198 firms in the dataset have been classified as foreign owned in the whole sample which corresponds to 118446 out of the 346674 employee observations in total. Table 3 shows the decomposition of firm types within our sample in each year.

Insert Table 3 about here

The number of foreign owned firms in our panel dataset rose continuously from 239 to 843 and the number of their sampled employees from 3769 to 18624 between 1992 and 2001. This reflects both the growth of the Hungarian economy as well as the increasing significance of inward FDI. Importantly, we could observe foreign takeovers in 214 cases (6958 employee observations in the year of takeover), 125 previously foreign owned firms (2117 employee observations in the first year of ownership change) were bought by domestic investors. Foreign takeovers are more or less evenly spread over the sample period and we do not expect any disturbances of our results from particular events or the sample window.

## 4) Results

### 4.1) Foreign-owned Firms and Wages

We first replicate a standard wage regression for Hungary as in Kertesi and Köllő (2001) which explains annual gross wages of a worker by her education, experience, occupation,

gender, average firm labour productivity, capital intensity, firm size, and region- and industry dummies. In addition, the variable of interest is a dummy with value 1 whenever an employee is working for a foreign-owned firm. The result is displayed in Table 4, specification (1).

Insert Table 4 about here

We confirm the result of Kertesi and Köllő (2001) on the same data that there is a wage premium paid by foreign-owned firms over the one of indigenous firms of 15 % even after controlling for worker and firm characteristics. This result also confirms on a worker survey rather than firm data the existence of a wage premium paid by foreign-owned firms that was first found by Aitken et al. (1996). The coefficients of the control variables are as expected. Gross wages are the higher the better the education, the higher a firms' average labour productivity and its capital intensity. Moreover, there is a typical non-linear relation between gross wages and job-experience. Male workers earn about 22% more than female-workers and white collar workers earn more than blue collar workers.

In deviation from Kertesi and Köllő (2001), we have pooled observations on all years together. Hence, we check for a structural break of our results over time. Since there was a break in GDP growth, we present in specification (2) and (3) of Table 4 results on observations until 1998 and after 1998, respectively. While some coefficients of control variables differ across the two sample halves, the coefficient on the foreign-ownership dummy does not. We also checked this coefficient for each year separately which is not reported in the paper and found that this coefficient varies only between 14% and 16%. Hence, we are confident that pooling all observations across years does not affect the estimates on our variable of interest.

Next, we investigate whether the wage-premium may stem from MNEs having a different employment structure than indigenous firms. For example, MNEs may undertake more specialized production steps due to intra-firm specialization and apply over-proportionately many workers for who learning-by-doing is more important than formal training. Then the wage premium may pick up the effect from MNE specialization in high-skilled, but low-formal-training jobs. When adding fixed effects for more than 600 occupations, however, the wage premium not only does not disappear, it even remains the same as can be seen from specification (4) of Table 4.

One of the possible explanations for the wage premium of MNEs is that the wage premium is not typical for the MNE as such but due to some unobservable firm characteristic that is particularly frequent among MNEs. For example, MNEs may frequently produce high-quality goods and pay a premium for a particular care that workers apply at their work. Abowd et al. (1999) found on French firm and worker survey data that gross wages depend both on unobserved worker characteristics, but also on unobserved firm characteristics. While we cannot implement worker fixed effects with our data, we introduce in specification (5) of Table 4 firm fixed effects without the foreign-ownership dummy. We observe that firm-fixed effects increase the  $R^2$  from 0.56 to 0,67. Hence, there exist some firms that follow a high-wage policy and other firms that follow a low-wage policy.

Finally, we add the foreign-ownership dummy in specification (6) of Table 4 to the specification (5) with firm fixed effects. Now, we need to be careful in the interpretation of this dummy. Since there are firm fixed effects and ownership is a firm characteristic, the foreign-ownership dummy explains only wage differentials between domestic and foreign-owned firms of those firms that change their ownership status in the sample. Surprisingly, the wage premium drops substantially to a mere 3% while still remaining significant at the 1%

level. This result suggests that takeovers behave fundamentally different to foreign owned firms in general and will thus be the focus of the rest of this paper.

#### **4.2) Takeovers and Wages**

So far, we found that ownership change between domestic and foreign investors may be correlated with the wage premium, but it is neither possible to follow the development of a takeover firm over time nor can we distinguish the two directions of change. Hence, we consider next the wage-premium of foreign takeovers one year before the ownership change, the year of the ownership change, one year thereafter, two years thereafter and three and more years thereafter. Ownership change is noticed by the change of foreign participation in firm equity from below 50% to above, when comparing one end-year balance sheet to the previous one. Specification (1) of Table 5 includes these takeover variables together with the control variables that were already used in Table 4. However, the control variables are suppressed from now on to ease presentation of the results.

Insert Table 5 about here

We find the main result of this paper: Those domestically-owned firms which will be taken over by foreign investors have already a 9% higher wage premium compared to the average Hungarian manufacturing firm even after controlling for employee-, location-, industry-, and firm characteristics. It is stunning that the wage-premium actually drops right after the foreign takeover. Only in subsequent years, the wage premium rises slightly above the level before the takeover which explains why there is a small wage-premium of foreign-owned firms when

controlling for firm-fixed effects in the previous table. The long-run value of the wage premium appears even slightly lower than its pre-takeover value.

This result is fully in line with the “picking-the-winner” hypothesis but in strong contrast to the previous literature which suggests that foreign-owned firms pay higher wages for comparable jobs and thus a foreign-takeover suggests a rise of wages, not a fall. In particular, the hypothesis that MNEs implement a superior technology in their acquisition does not explain why the target firms paid already a higher wage premium before. Instead, there seems to be a self-sorting process at work. Those firms that afford higher wages are preferred targets for foreign takeovers. Still, technology transfer may contribute to the wage-premium of foreign takeovers as well, but when comparing its size of about 3% (from Table 4, specification (6)) the self-sorting effect of 9% seems to be far more important.

In the same regression, we control also for domestic takeovers of foreign-owned firms. Foreign-owned firms pay a wage premium larger than the average domestically-owned firm, but smaller than the average foreign-owned firm. In particular, the wage premium rises rather than falls directly after the takeover. Perhaps, the results indicate the additional cultural and information problems foreign investors are facing when restructuring acquired firms at least in an initial phase.<sup>15</sup> Still in the same regression, we report also those foreign-owned firms that may be Greenfield investments or unverifiable foreign takeovers. These firms have clearly the largest wage premium and it is even increasing the longer these firms are in the sample. This suggests that our findings remain restricted to foreign takeovers only, since Greenfield investments may be different.

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<sup>15</sup> Dickerson (1997) reports a decrease of profits after takeovers in UK manufacturing firms.

Next, we add firm fixed effects in specification (4) of Table 5. The unexplained wage-premium of domestic firms prior to a foreign takeover increases to 12%. The U-shape wage premium development over the years of a takeover firm remains valid. Now, the long run wage premium of acquired firms is substantially larger than their pre-takeover value. In addition, firm-fixed effects increase substantially the  $R^2$  of the regression. Specification (5) applies a cluster-regression allowing for intra-firm heteroscedasticity and autocorrelation and specification (6) is a random effects estimator. In both cases, the main results pertain, although slight variation of some coefficients occurs.

Kertesi and Köllő (2001) argue that the wage premium is most pronounced for young and high-skilled workers. Hence, we separate our sample into observations belonging to three different worker groups: blue collar, low-skilled white collar, and high-skilled white collar workers. Table 6 presents the results without firm fixed effects but with the usual control variables as in Table 4. In general, all profession groups show the same U-shaped development of the wage premium, although there is a ranking of the size of the premium with blue collar workers having the lowest and high-skilled white collar workers the highest premium before the takeover and in the long run after the takeover. Interestingly, the premium becomes insignificant in the takeover year for the high-skilled white collar workers.

Insert Table 6 about here

This result implies that the wage premium is not entirely due to higher productivity in foreign-owned firms, because even blue-collar workers or low-skilled white collar workers have a similarly large wage premium, even though they cannot possibly participate much in the alleged technology advantage of foreign owners. This finding is, however, in line with a rent sharing hypothesis. Then, all professions participate in extra-rents of the firm.

Specifications (4)-(6) repeat the previous ones with firm fixed effects. Again, the U-shape pattern re-occurs except for white-collar high-skilled workers. The firm fixed effects explain now completely the white-collar high-skilled wage premium before the takeover. In other words, there are firms that pay more and others that pay less to their management. However, there is no evidence that managers are rewarded for their firm becoming a potential foreign-takeover target.

In a final step, we want to shed light on the self-selection process: which firms are the ones taken over by foreign owners and how does this relate to the wage premium before the takeover? For this purpose, we run a treatment regression where we apply treatment to those firms that are 1 year prior to takeover. The selection equation explains the probability of a firm being a takeover target by their share of white collar workers, their average labour productivity, and their operating profits besides region-, industry- and year dummies that are not reported.

Insert Table 7 about here

Specification (3) in Table 7 displays the selection equation and shows that those indigenous firms that have a larger share of white collar workers, a larger average labour productivity and slightly larger operating profits are indeed more likely to be a takeover target. This corresponds to the “picking-the-winner” hypothesis. The second stage estimations are then reported in specification (2).

A highly significant Wald-test indicates that the firms which are more likely to be takeover targets also tend to pay a higher unexplained wage premium. When taking the difference of

the wage premium between firms that are one year prior to a foreign takeovers and those that are not conditional on those firms becoming takeovers, we find that the wage premium is reduced from 9% of the corresponding OLS estimate in specification (1) to 7% in the treatment regression. Hence, those criteria that increase the likelihood of a foreign takeover contribute 2 percentage points to the wage premium of firms prior to the takeover.

Some care has to be taken when interpreting the size of this effect. It may be underestimated, because the fit of the first stage estimation with a Pseudo  $R^2$  of 0.09 is fairly low and points at an omitted variable problem. In other words, there may be firm characteristics that are known to the foreign investor but not to the econometrician which explain at the same time why firms are attractive for foreign takeovers and why they pay higher wages. For example, some indigenous firms may be able to attract the most talented workers within their profession. Those firms may be particularly attractive to foreign investors. Since these talents are unobservable to the econometrician and our dataset does not allow for individual fixed effects, the concentration of good talents in some firms that are takeover targets will show up as a wage premium of foreign owned firms. Attracting foreign investors will then not necessarily increase domestic wages. Instead, the self-selection process will sort low-talented workers to domestic firms lowering their average wages and high-talented workers to foreign-owned firms increasing their average wage. On average, however, wages may remain constant across all Hungarian workers.

When evaluating our results, two remarks need to be made. First, the “picking-the-winner” hypothesis, while clearly at work in our dataset on Hungarian firms, is by no means the only explanation for the wage premium not even among cross-border M&As. The larger wage premium of those firms that we cannot identify exactly as Greenfield investment suggests that a different explanation may apply to them. Second, the labour market issue of what are the

unobserved firm characteristics that trigger larger wage payments remains unresolved. Finally, we turn to an explanation for the time path of the wage premium after the foreign takeover.

### **4.3) Explanation for the Long-run Wage Premium**

When explaining the U-shape development of the wage premium during the course of foreign takeovers, we first compare the development with total factor productivity. For this purpose, we estimate a production function with value added per worker as dependent variable and capital intensity, share of white-collar workers, firm-, region-, year dummies, and the same takeover dummies as in Table 5. Although we estimate a firm regression, we weight each observation by the number of employees per firm in our wage survey sample to keep the results across datasets comparable. The number of observations that are reported in Table 8 are then deflated by the weights.

Insert Table 8 about here

Interestingly, the results in specification (1) of Table 8 show that takeover targets have a significantly larger total factor productivity compared to the average indigenous firm. However, the above-average productivity is smaller in percentage terms than the wage premium. While wages fall after the takeover, total factor productivity rises instead gradually over the years after the takeover.

Next, we investigate whether the increase in total factor productivity is due to a cut of employment. We estimate a regression with firm employment as dependent variable and

control variables analogue to the production function estimation of specification (1). From specification (2), we can see that indeed employment of takeover firms falls by 2% when comparing the level before and after the takeover. In the long run, employment of foreign acquisitions rises, however, by about 9%. This indicates that productivity gains may be obtained in the short run from lay-offs and in the long-run from the implementation of superior foreign technology.<sup>16</sup>

Finally, we try to find indications of a change in the structure of employment. For four years, 1997, 1998, 2000, and 2001, our dataset contains a variable that indicates whether a worker is new in this firm or has been working for it already in the previous year. When separating the effect of the wage premium in the year of the takeover for new workers and old workers in specification (3), we find that the fall in the wage premium after takeover is much more pronounced for new workers who do not receive any significant positive wage premium any more, but also involves wage cuts of established workers of the acquired firm.

Specification (4) estimates a Logit-regression to explain the probability of a worker being new in a firm. As control variables are used those for the wage regressions. The probability that a worker is new in the firm is very large before the takeover and about average immediately after the takeover but decreases significantly below average in the long run after a foreign acquisition. This is in contrast to the development of employment in the course of a foreign takeover. If employment falls, but the probability of hiring new workers rises, then there must be some replacement of old workers immediately after the takeover. If instead the probability of being a new worker falls while employment rises, then the newly hired workers stick firmly to the acquired firm in the long run. The extremely large change in the workforce

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<sup>16</sup> If we assume capital to be fixed in the short run, then a (marginal) productivity increase together with an employment cut can be seen as a movement along the labour demand curve, whereas an increase in productivity together with an increase in employment is an outward shift of the labour demand curve.

before the takeover indicates another piece of information as to which firms are takeover targets. Obviously, there takes place a major restructuring of the workforce even before the takeover. Those firms that manage restructuring on their own may well signal ability to reform and future productivity to prospective foreign investors.

Taken the pieces of information of this section on foreign takeovers in the long run together, the productivity, employment and wage increase and the low labour turnover are all indications for the wage premium as a protection device against spillover effects. The employment and productivity data suggest that MNEs implement a superior technology, while the low worker turnover indicates that the worker incentives to leave the MNE and transfer superior MNE technology as a free good to indigenous firms is substantially reduced by the wage premium. However, the largest part of the wage premium of foreign takeovers is explained by the “picking-the-winner” hypothesis.

## 5) Conclusion

One important piece of evidence for how MNEs may benefit the local economy is a wage premium that MNEs pay relative to indigenous firms even when controlling for firm, worker, industry, and region characteristics. For such a wage premium to indicate really a benefit to the local economy, self selection processes must be excluded. One self-selection process is the tendency of MNEs to buy out the best indigenous firms that at the same time tend to pay higher wages relative to the rest of the economy (“picking-the-winner” hypothesis).

We test this hypothesis on Hungarian manufacturing employee-employer matched data from 1992 until 2001 and find evidence for such a hypothesis. Takeover target firms pay a wage

premium of 9% even before the takeover takes place. Moreover, the same characteristics that render an indigenous firm a takeover target also induce this firm to pay higher wages. Only in the long run, we find some hints as well that MNEs implement a superior technology and use the wage premium to reduce incentives for their workforce to leave the company and transfer know-how as a public good to indigenous firms. However, self-selection accounts for up to 3 quarters of the Hungarian foreign firm wage premium.

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## Tables

**Table 1: Inward FDI stock as percentage of GDP in 1999**

Hungary	39.9
Czech Republic	33.0
Poland	17.2
Spain	20.5
Portugal	21.2
Ireland	50.7
EU	22.2

Source: UNCTAD, World Investment Report, 1999.

**Table 2: FDI Inflows, share in gross fixed capital formation and GDP growth**

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
FDI inflow <sup>†</sup>	1479	2350	1144	4553	2275	2173	2036	1944	1957	n.a.
GFKF <sup>†</sup>	20.2	32.7	13.9	49.7	23.5	21.4	18.3	18.8	n.a.	n.a.
GDP growth <sup>‡</sup>	-3.1	-0.6	2.9	1.5	1.3	4.6	5.1	4.6	n.a.	n.a.
Real wage growth <sup>‡</sup>	3.8	5.0	-0.8	-5.9	-2.2	1.5	2.3	2.6	n.a.	n.a.
Industry union worker share <sup>□</sup>	41.9*	12.7*	11**	5**	12.4***	13.2***	16.5***	n.a.	n.a.	n.a.
Worker share firm contracts <sup>°</sup>	27.2*	32.4*	29.5**	27.8**	31.6***	30.6***	31.5***	n.a.	n.a.	n.a.

Notes: FDI inflow: in Mill. US\$; GFKF: Share of FDI inflows in gross fixed capital formation (in %); GDP growth rate in percent; Real wage growth rate in percent; n.a. not available; Union worker share – industry: Share of covered employees with industry wide working contracts among the total employment in the competitive sector (%); Worker share firm contracts: Share of covered employees with firm-level collective contracts among the total employment in the competitive sector (%); \* Employees of firms with more than 20 employees; \*\* Employees of firms with more than 10 employees; \*\*\* Employees of firms with more than 5 employees;

Source: <sup>†</sup> UNCTAD, World Investment Report, 1997, 2000. <sup>‡</sup> World Development Indicators, CD ROM; <sup>□</sup> Héthy (2000), p. 11, <sup>°</sup> Neumann (2000), p. 52;

Table 3: Domestic and foreign-owned firms and number of ownership changes in the sample

Year	# indigenous firms	# foreign-owned firms	# new foreign takeovers of domestic firms	# new domestic takeovers of foreign firms	# new unclassified firms with foreign ownership
1992	1950	239	28	8	205
1993	2110	426	22	3	183
1994	2197	513	31	9	114
1995	1968	583	25	10	121
1996	1821	613	25	21	73
1997	1779	653	18	12	85
1998	1817	681	12	25	81
1999	1885	728	27	17	96
2000	2076	843	26	20	139
2001	2093	832	-	-	100
Total	-	-	214	125	-

Source: SES database and own calculations;

Table 4: Wage regressions with foreign-ownership dummy variable

Dependent variable:	OLS	OLS 1993- 1998	OLS 1999- 2001	Occupation FE <sup>†</sup>	Firm FE <sup>‡</sup>	Firm FE
Gross Wages	(1)	(2)	(3)	(4)	(5)	(6)
Foreign Ownership	0.15*** (88.16)	0.15*** (70.56)	0.15*** (47.35)	0.15*** (84.77)	-	0.03*** (10.33)
EDUCATION1	0.15*** (90.00)	0.16*** (79.00)	0.13*** (43.15)	0.10*** (54.49)	0.15*** (97.78)	0.15*** (97.83)
EDUCATION2	0.27*** (135.02)	0.29*** (123.64)	0.21*** (56.69)	0.18*** (73.72)	0.27*** (142.13)	0.27*** (142.19)
EDUCATION3	0.72*** (194.28)	0.74*** (173.52)	0.63*** (88.20)	0.43*** (82.80)	0.71*** (205.78)	0.71*** (205.46)
EXPERIENCE	0.06*** (44.85)	0.05*** (34.56)	0.07*** (29.75)	0.05*** (37.75)	0.05*** (44.69)	0.05*** (44.75)
EXPERIENCE <sup>^</sup> 2	-0.32*** (-28.75)	-0.26*** (-20.00)	-0.42*** (-22.30)	-0.29*** (-25.49)	-0.29*** (-27.46)	-0.29*** (-27.52)
EXPERIENCE <sup>^</sup> 3	0.85*** (23.21)	0.66*** (15.36)	1.17*** (19.37)	0.76*** (20.70)	0.75*** (21.70)	0.75*** (21.75)
EXPERIENCE <sup>^</sup> 4	-0.83*** (-20.48)	-0.63*** (-13.27)	-1.16*** (-17.74)	-0.73*** (-17.99)	-0.73*** (-18.95)	-0.73*** (-18.99)
White Collar Managerial	0.54*** (79.73)	0.45*** (61.47)	0.85*** (53.30)	-	0.55*** (87.43)	0.55*** (87.45)
White Collar Non-Managerial	0.19*** (81.61)	0.15*** (54.21)	0.25*** (64.48)	-	0.19*** (93.56)	0.19*** (93.47)
Male	0.22*** (144.46)	0.22*** (121.19)	0.21*** (78.74)	0.15*** (77.62)	0.22*** (155.44)	0.22*** (155.46)
Log Average Labor Productivity of firm	0.14*** (126.24)	0.13*** (101.10)	0.16*** (69.72)	0.16*** (119.04)	0.05*** (28.24)	0.05*** (27.82)
Log capital- intensity	0.008*** (10.52)	0.004*** (4.04)	0.02*** (12.99)	0.004*** (4.97)	0.004 (0.25)	-0.0008 (-0.50)
F-test	-			121.68*** (0.00)	18.66*** (0.00)	16.66*** (0.00)
R <sup>2</sup>	0.56	0.55	0.60	0.64	0.67	0.67
Observations	343 450	235655	107795	275 389	343 450	343 450

Notes: heteroscedasticity-consistent t-values are in parenthesis. \*\*\* denotes 99% significance level, \*\* 95%, \* 90%. Additional control variables include firm size categories, year dummies, 2-digit industry dummies and 21 region dummies. <sup>†</sup> F-Test for significance of joint significance of 538 occupation-group fixed-effects with 538 and 274787 degrees of freedom. Probability of insignificance in parenthesis; <sup>‡</sup> F-Test for significance of firm fixed effects. Probability of insignificance in parenthesis; EXPERIENCE<sup>^</sup>X means EXPERIENCE to the power of X.

Table 5: Wage regressions with takeovers

Dependent variable: Gross Wages	OLS Foreign- Takeover of Domestic Firms (1)	OLS Domestic Takeover of Foreign Firms (2)	OLS Un- classified Foreign Firms <sup>†</sup> (3)	Firm-FE Foreign- Takeover of Domestic Firms (4)	OLS-Cluster Foreign- Takeover of Domestic Firms (5)	Firm-RE Foreign- Takeover of Domestic Firms (6)
1-Year before Ownership Change	0.09*** (18.17)	0.06*** (6.51)	-	0.12*** (18.31)	0.11** (2.33)	0.12*** (22.63)
1-Year after Ownership Change	0.05*** (11.42)	0.08*** (8.56)	0.16*** (47.65)	0.07*** (11.96)	0.06** (3.36)	0.07*** (12.96)
2-Years after Ownership change	0.06*** (12.52)	0.06*** (6.23)	0.12*** (33.10)	0.09*** (15.62)	0.07*** (3.95)	0.10*** (16.82)
3-Years after Ownership Change	0.11*** (20.74)	0.08*** (6.64)	0.18*** (39.95)	0.15*** (21.10)	0.13*** (6.65)	0.15*** (22.13)
4- or more Years after ownership change	0.06** (44.85)	0.02*** (2.57)	0.21*** (85.14)	0.20*** (32.44)	0.16*** (7.03)	0.20*** (34.59)
F-test		-		16.53*** (0.00)	-	-
R <sup>2</sup>		0.57		0.68	0.57	0.53
Observations		346 275		343 450	343 450	343 450

Notes: heteroscedasticity-consistent t-values are in parenthesis. \*\*\* denotes 99% significance level, \*\* 95%, \* 90%. <sup>†</sup> X-Years after ownership change has no meaning for unclassified firms (= firms that enter as foreign owned firms into the sample and stay this way). Instead, X-years of sample entry are counted. FE is a fixed effect estimation with firm-specific fixed effects. RE is a firm-random effect estimator; OLS Cluster is a GLS estimator that allows for intra-firm autocorrelation and firm-specific heteroscedasticity of general form. F-Test for significance of firm fixed effects. Probability of insignificance of fixed effects in parenthesis. Additional control variables include firm size categories, year dummies, 2-digit industry dummies and region dummies, EDUCATION1, EDUCATION2, EDUCATION3, EDUCATION4, EXPERIENCE<sup>1</sup>, EXPERIENCE<sup>2</sup>, EXPERIENCE<sup>3</sup>, EXPERIENCE<sup>4</sup>, white collar managerial and non-managerial, male, log average labour productivity of firm, log capital intensity. With firm specific fixed effects the last two variables are excluded. Dummy variables for unclassified firms and for domestic takeovers of foreign owned firms are always included.

Table 6: Wage regressions with foreign takeovers of domestic firms by occupation group

Dependent variable:	OLS	OLS	OLS	Firm-FE	Firm-FE	Firm-FE
Gross Wages	Blue collar workers	White-collar low-skilled workers	White-collar high-skilled workers	Blue collar workers	White-collar low-skilled workers	White-collar high-skilled workers
	(1)	(2)	(3)	(4)	(5)	(6)
1-Year before Ownership Change	0.07*** (9.41)	0.12*** (16.14)	0.15*** (4.00)	0.09*** (10.34)	0.15*** (15.17)	0.06 (1.07)
1-Year after Ownership Change	0.05*** (7.87)	0.06*** (9.14)	0.03 (0.43)	0.06*** (7.90)	0.08*** (9.39)	0.03 (0.65)
2-Years after Ownership change	0.05*** (8.25)	0.07*** (8.35)	0.19*** (3.12)	0.07*** (8.67)	0.10*** (10.28)	0.17*** (2.69)
3-Years after Ownership Change	0.10*** (17.28)	0.13*** (11.98)	0.14** (2.11)	0.11*** (13.15)	0.17*** (13.55)	0.14** (1.96)
4- or more Years after ownership change	0.13** (34.15)	0.20*** (27.91)	0.21*** (5.04)	0.15*** (18.06)	0.26*** (25.15)	0.18*** (2.60)
F-test	-	-	-	17.13*** (0.00)	9.07 (0.00)	7.20*** (0.00)
R <sup>2</sup>	0.50	0.53	0.65	0.67	0.66	0.89
Observations	193 539	143 261	9475	191 952	142 126	9 372

Notes: heteroscedasticity-consistent t-values are in parenthesis. \*\*\* denotes 99% significance level, \*\* 95%, \* 90%. F-Test for firm fixed effects. Probability of insignificance of fixed effects in parenthesis. Additional control variables include firm size categories, year dummies, 2-digit industry dummies and region dummies, EDUCATION1, EDUCATION2, EDUCATION3, EDUCATION4, EXPERIENCE1, EXPERIENCE2, EXPERIENCE3, EXPERIENCE4, white collar managerial and non-managerial, male, log average labour productivity of firm, log capital intensity. With firm specific fixed effects the last two variables are excluded. Dummy variables for unclassified firms and for domestic takeovers of foreign owned firms are always included.

Table 7: IV-Wage regressions with takeovers of domestic firms by foreigners

Dependent variable: Gross Wages	OLS (1)	Treatment Regression 2 <sup>nd</sup> stage (5)	Treatment Regression 1 <sup>st</sup> stage (6)
1-Year before Ownership Change	0.09*** (18.17)	0.45*** (27.26)	-
1-Year after Ownership Change	0.05*** (11.42)	0.06*** (12.15)	-
2-Years after Ownership change	0.06*** (12.52)	0.07*** (14.52)	-
3-Years after Ownership Change	0.11*** (20.74)	0.13*** (22.41)	-
4- or more Years after ownership change	0.06** (44.85)	0.15*** (40.09)	-
Share of white collar workers	-	-	0.15*** (14.16)
Operating Profit	-	-	0.01*** (4.75)
Average Labour Productivity	-	-	0.09*** (12.82)
Difference of gross wages 1 year before takeover conditional on a firm being taken over or not	-	0.07	-
Wald-Test	-	375.81*** (0.00)	-
R <sup>2</sup>	0.57	-	0.09 <sup>†</sup>
Observations	346 275	299072	299072

Notes: heteroscedasticity-consistent t-values are in parenthesis. \*\*\* denotes 99% significance level, \*\* 95%, \* 90%. <sup>†</sup> Pseudo R<sup>2</sup>. Additional control variables include firm size categories, year dummies, 2-digit industry dummies and region dummies, EDUCATION1, EDUCATION2, EDUCATION3, EDUCATION4, EXPERIENCE1, EXPERIENCE2, EXPERIENCE3, EXPERIENCE4, white collar managerial and non-managerial, male, log average labour productivity of firm, log capital intensity. Wald-Test for independence of equations. Probability for independent equations in parenthesis.

Table 8: Productivity and employment with foreign-takeovers

Dependent variable:	Firm-FE Average Labor Productivity	Firm-FE Employment	Firm-FE Gross Wages	Logit new worker
	y (1)	(2)	(3)	(4)
1-Year before Ownership Change	0.06*** (8.39)	-0.00 (-0.10)	0.14*** (8.09)	0.78*** (10.91)
1-Year after Ownership Change	0.09*** (12.76)	-0.02*** (-6.12)	-	0.03 (0.32)
1-Year after Ownership Change; new workers	-	-	-0.04 (-1.30)	-
1-Year after Ownership Change; old workers	-	-	0.04** (2.53)	-
2-Years after Ownership change	0.14*** (21.96)	0.02*** (4.07)	-0.08*** (-4.48)	-0.57*** (-5.78)
3-Years after Ownership Change	0.18*** (23.72)	0.10*** (21.20)	0.05** (2.49)	-0.07 (-0.82)
4- or more Years after ownership change	0.26*** (35.37)	0.09*** (19.91)	0.02*** (1.07)	-0.29*** (-6.99)
F-test	121.92*** (0.00)	159.76*** (0.00)	13.99*** (0.00)	-
R <sup>2</sup>	0.86	0.98	0.73	0.05 <sup>†</sup>
Observations	299 233	299 333	137 864	137 864

Notes: heteroscedasticity-consistent t-values are in parenthesis. \*\*\* denotes 99% significance level, \*\* 95%, \* 90%. <sup>†</sup> Pseudo R<sup>2</sup>. F-Test for significance of firm fixed effects. Probability of insignificance of fixed effects in parenthesis. Additional control variables include firm size categories, year dummies, 2-digit industry dummies and region dummies, EDUCATION1, EDUCATION2, EDUCATION3, EDUCATION4, EXPERIENCE1, EXPERIENCE2, EXPERIENCE3, EXPERIENCE4, white collar managerial and non-managerial, male, log average labour productivity of firm, log capital intensity. With firm specific fixed effects the last two variables are excluded. Regression (3) and (4) contain only observations of the years 1997, 1999, 2000, and 2001 due to data availability.