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Foreign Ownership and Corporate Performance: The Czech Republic at EU Entry*

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Abstract

Does foreign ownership improve corporate performance or do foreign firms merely select more productive targets for takeover? Do workers benefit from foreign acquisitions? We answer these questions based on comparing the before/after change in several performance indicators of Czech firms subject to foreign takeover after 1997, i.e., after the initial waves of privatization were completed, with the corresponding performance change of matched companies that remain domestically owned until 2005. We find that the impact of foreign investors on domestic acquisitions is significantly positive only in non-exporting manufacturing industries, while it is small in both services and manufacturing industries competing on international markets.

Abstrakt

Má zahraničné vlastníctvo vplyv na zlepšenie podnikovej výkonnosti alebo si zahraničné firmy iba vyberajú viac produktívne ciele na prevzatie? Aký úžitok prinášajú zahraničné akvizície zamestnancom? Na tieto otázky odpovedáme na základe porovnania zmien *pred* a *po* v rámci niekoľkých ukazovateľov výkonnosti českých firiem podliehajúcim zahraničnému prevzatiu po roku 1997, t.j. po skončení prvej vlny privatizácie, oproti zodpovedajúcim zmenám vo výkonnosti u spárovaných spoločností, ktoré zostali domácimi až do roku 2005. Zistili sme, že vplyv zahraničných investorov na domáce akvizície je výrazne pozitívny hlavne v neexportujúcich odvetviach spracovateľského priemyslu, zatiaľ čo vo zvyšných sektoroch je tento vplyv len malý.

Keywords: productivity, foreign ownership, FDI

JEL classification: C23, D24, F2

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1 Introduction

Foreign Direct Investment (FDI) is likely to be one of the key channels of economic development for middle-income countries, particularly so for the post-communist economies of Central Europe (e.g., Alfaro et al., 2004; Neuhaus, 2006). Foreign-owned companies, a group that includes both greenfields and foreign acquisitions, are consistently more productive than domestically owned firms, as Sabirianova et al. (2005) demonstrate for the Czech Republic and Russia.¹ Taking the productivity advantage of FDI as a given, a large literature therefore studies its *indirect* impacts on domestic companies – productivity spillovers within and across industries (e.g., Javorcik, 2004). However, there is less work available measuring the *direct* causal productivity effects of foreign takeovers of domestic companies, even though such measurements are important for evaluating the benefits of greenfield vs. brownfield FDI support and for understanding the nature of FDI flows.

There is, of course, a large literature studying the effects of early-transition privatization of state-owned companies in post-communist economies. In one of the most complete analysis, Brown et al. (2006) suggest that privatizing state-owned companies to foreign entities during the 1990s generated larger productivity gains than privatization to domestic owners. In several transition economies, however, large FDI inflows started only after the mass privatization programs were completed. The Czech Republic is a case in point as it received a massive inflow of foreign capital only after 1997.²

In this paper, we therefore provide evidence on FDI's recent *direct* effects: We

¹For theory of and empirical tests supporting the productivity dominance of foreign-owned firms, see Helpman et al. (2004) and, e.g., Girma et al. (2004).

²Benefiting from investment subsidies and tax breaks introduced in 1997, Czech FDI inflows rose from below 3% of GDP in 1996 to 1997 to over 10% during 1999 to 2002. As a result, Czech FDI stock per capita reached 5,256 EUR in 2005, the end of our sample frame, which compares favorably with the 2005 FDI stock in Slovakia (2,721) or Poland (2,070).

assess the effects of over three hundred cases of foreign takeovers observed in a sample of Czech firms between 1997 and 2005. Unlike most of the work on privatization or, indeed, on foreign takeovers, we analyze not only manufacturing companies, but also the service sector, where the share of foreign capital as of 2005 was about 40% of that in manufacturing industries.³ We contrast the takeover effects across not only the services/manufacturing divide, but also across the groups of exporting and non-exporting manufacturing industries as these are likely to differ in terms of the strategies that multinationals use when entering a given sector. While acquiring a domestic company in a non-exporting sector eliminates a potential domestic competitor, acquiring a local company in an internationally competitive industry is more likely to be motivated mainly by high domestic-company performance and may therefore lead to smaller takeover productivity improvements.⁴

Further, we follow Brown et al. (2009) in studying not only the productivity effects of ownership changes, but also the effects on workers. Specifically, we ask whether foreign takeovers affect the wage bill of the company, i.e., the total earnings of employees. The question of interest to workers as well as policy makers is whether scale effects of takeovers outweigh the cost-cutting potentially associated with the higher productivity foreign owners impose on their acquisitions and, therefore, whether foreign acquisitions ultimately benefit the employees of domestic companies.

A fundamental problem with the identification of these causal effects is that multinational companies are likely to select the best domestic firms as acquisition

³Out of over ten studies of foreign ownership effects in the Czech Republic during the 1990s, the only one to cover the service sector is Kosová (2006), who focuses on the indirect effects of FDI. Outside of Central Europe, only Aitken and Harrison (1999) work with non-manufacturing data. The related literature is discussed in more detail in Section 2.

⁴There is a growing theoretical literature on how firms choose modes of foreign market access, but little empirical work on the topic; see, e.g., Nocke and Yeaple (2007) for a general equilibrium model with heterogenous firms.

targets. In the absence of credible instrumental variables, most studies attempt to achieve progress on causality by conditioning on pre-takeover performance. An increasingly popular technique, see, e.g., Arnold and Javorcik (2005) or Girma et al. (2007), is to match foreign acquisitions to domestic firms with similar probability of being acquired by multinationals and to compare the before/after performance changes between the two groups. As argued by Blundell and Costa Dias (2000), this approach combines careful conditioning on observables through matching on pre-takeover performance (trends) with before/after differencing that eliminates time-constant unobservables. We follow their suggestion and apply the matched difference-in-differences approach to our sample of Czech manufacturing and service firms, effectively comparing the change in performance of companies taken over by foreign investors between the moment of acquisition and one to three years later with the corresponding change in performance of matched domestic companies.

Using several performance indicators, we find the impact of foreign investors on domestic acquisitions to vary across types of target industries. Based on data covering the experience of Czech firms around the moment of the Czech Republic's entry into the EU, we uncover significant effects of foreign takeovers only in the non-exporting manufacturing sector, consistent with the argument that firms in exporting manufacturing industries successfully face direct international competition and do not need to be 'disciplined' by foreign owners.

The paper is structured as follows. The next section covers the existing work on takeover effects and ownership change, with a focus on results available for the Czech Republic. Our empirical strategy and data are described in Sections 3 and 4, respectively, while Section 5 presents the findings. The last section concludes.

2 Literature Review

There are numerous studies estimating the direct effects foreign investors have on the performance of domestic companies during the early-transition mass-privatization period (see, e.g., Djankov and Murrell, 2002, for a survey; or Estrin et al., 2009). In this section, we first highlight those that focus on the Czech Republic and then briefly discuss groups of studies of ownership effects that differ in their preferred estimation technique.

A small literature estimates positive effects of foreign ownership on total factor productivity (TFP), or its growth, in the Czech Republic using data from 1992 to 1998 covering the mass privatization (e.g., Djankov and Hoekman, 2000; Jarolím, 2000; Damijan et al., 2003; Evenett and Voicu, 2003). These studies typically use small samples of manufacturing or publicly traded firms to estimate linear regressions with exogeneity in foreign status (or sample selection corrections)⁵ based on various arguments, including the exclusion of the firm's initial efficiency or the relative size of the given firm within its industry from the company performance regression. In the most detailed and careful study of the Czech mass-privatization experience to-date, Hanousek et al. (2007) instrument for ownership changes using pre-market initial conditions and detect positive effects of foreign ownership on various performance measures driven mainly by foreign industrial firms.⁶

The research on Czech firms undergoing mass privatization is typical of most of the existing work on ownership effects from other countries in that it relies on

⁵Variables affecting ownership status but unrelated to company performance (including potential future performance in absence of a takeover) can be used to either instrument for a foreign-ownership dummy in a pooled regression or to identify sample selection corrections in a switching-regression framework.

⁶Several recent papers also ask about the indirect effects of FDI on domestic Czech companies through productivity spillovers within and across industries (see, e.g., Kosová, 2006, or Stančík, 2007). The key identification problem of this literature, similar to the need for exogenous determinants of foreign ownership in the work on FDI's direct effects, is to identify variation in industry FDI inflow that is not driven by (estimates of) future growth of that industry.

panel-data techniques and postulates exclusion restrictions that allow for instrumental variable (IV) strategies.⁷ Some of this work combines the IV approach with fixed-effects estimation conditioning on lagged dependent variable and requires the (weak) exogeneity of lagged outcome and control variables (e.g., Benratello and Sembenelli, 2006). The identification of such dynamic GMM models, however, is fragile when the variables of interest are sufficiently persistent.

Convincing quasi-experiments affecting ownership but not performance are seldom found, especially once the focus shifts beyond pre-market initial conditions to late-transition data. Another strand of research thus attempts to control for the correlation between ownership type and company unobservables in a simple static regression framework using company fixed effects and/or time trends. A prime example of this body of work is provided by the analysis of long panel data from four transition countries by Brown et al. (2006), who suggest that privatizing state-owned companies to foreign entities generates larger productivity gains than privatization to domestic owners. The basic goal of these regressions is to compare the performance of domestic and foreign-owned firms after conditioning on both time-constant unobservables (captured by the firm fixed effects) and pre-takeover performance change (captured by the firm-specific time trends). However, to the extent that much of the data used in the estimation of these firm fixed effects and time trends comes from after the ownership change, these methods may ‘over-control’ and lead to an under-estimation of the effect of interest. Furthermore, regression-based techniques may suffer from the so-called lack of ‘common support’ (Barsky et al., 2002) when the characteristics of firms acquired by foreign investors differ from those of a significant share of firms in the data that remain domestic.

An increasingly popular alternative conditioning technique is to match foreign

⁷Only the early studies in this area did not attempt to account for the endogeneity (“cherry picking”) of foreign ownership, e.g., Aitken and Harrison (1999) for Venezuela.

acquisitions to domestic firms with similar probability of being acquired by multinationals based on pre-takeover performance and to compare the before/after performance changes between the two groups. Examples of this approach, which combines careful conditioning on observables through propensity score matching on pre-takeover performance (possibly including performance trends) with the before/after differencing that eliminates time-constant unobservables, are the studies of Arnold and Javorcik (2005) and Girma et al. (2007), who study Indonesian and UK manufacturing firms, respectively, and uncover significant foreign-takeover TFP effects.

Finally, while there are several results available on the effects of foreign takeovers on firm productivity, less attention has been paid to the effects on firm wage bill and employment, even though these two variables are important from the perspective of political economy of FDI. Brown et al. (2009) are the first to combine evidence on productivity effects with estimates of wage and employment effects of ownership change of manufacturing firms of four transition economies (but not the Czech Republic); they suggest that foreign takeovers have scale-expansion effects that dominate the productivity-improvement effects, leading to a positive effect on workers' wages.

In this paper, we apply the matched difference-in-differences comparison to a sample of Czech manufacturing and service-sector firms from 1995-2005. Unlike the existing analysis of the Czech Republic, or indeed of other countries from Central Europe, we estimate the effects of foreign takeovers that took place after 1997, i.e., after the mass privatization programs were completed. Unlike almost all of the work on both transition and developing economies, we study the experience of not only manufacturing, but also service-sector firms, and we differentiate between exporting and non-exporting manufacturing industries. Finally, we also measure the

consequences of foreign acquisitions not only for company performance indicators, but also for their wage bills – a variable more interesting for workers subject to such an ownership change.

3 Estimation Approach

To circumvent the selection into foreign-owned status (“cherry picking” by foreign investors), we draw on the microeconomic evaluation literature and employ propensity-score matching to compare changes in performance associated with foreign takeovers to changes in performance in highly similar companies that remain domestic. Specifically, one can estimate the causal effect of foreign ownership on a given outcome indicator by assuming that the assignment to foreign-owned status is as good as random conditional on observables summarized in the propensity score, i.e., within a group of firms that share a similar predicted probability of being acquired by foreign investors $P(X_{t-1}) \equiv P(FDI_t = 1|X_{t-1})$, where t corresponds to the timing of the foreign acquisition. The outcome measure of interest in our case consists of the difference between a company’s performance at the time of being acquired and one to three years later, i.e., $Y_{t+k} - Y_t$, where $k = 1, 2, 3$.

The causal effect of interest, an average effect of treatment on the treated, is defined as the difference between the average outcome measure of firms that were acquired by foreign investors, denoted $E[Y_{1,t+k} - Y_{1,t}|FDI_t = 1]$, which is easy to obtain from data, and the hypothetical counterfactual outcome of these same firms had they not been acquired: $E[Y_{0,t+k} - Y_{0,t}|FDI_t = 1]$. The counterfactual is estimated based on the conditional independence assumption (Rosenbaum and Rubin, 1983) as the average outcome of firms that were not acquired by foreign investors, but that had the same probability of being acquired as of time t – the

same value of the propensity score:

$$E [Y_{0,t+k} - Y_{0,t} | FDI_t = 1, P(X_{t-1})] = E [Y_{0,t+k} - Y_{0,t} | FDI_t = 0, P(X_{t-1})]. \quad (1)$$

The probability of being acquired (the propensity score) is assumed to depend on a set of time-changing observable characteristics, chiefly firm-level balance-sheet indicators, entered both contemporaneously and lagged to capture pre-takeover performance trends; the exercise is performed within groups defined by (matching is ‘exact’ on) year and industry.⁸ Equation (1) implies that a basic requirement for the implementation of the matching approach is a sufficiently large overlap between the distribution of the propensity score of the acquired and the domestic companies (the *common support* condition).⁹

4 Data

The company-level balance-sheet annual data used in this study come from the *ASPEKT* commercial database, which is a Czech source for the *Amadeus* EU-wide data and is widely used in empirical research (e.g., Hanousek et al., 2007; Hanousek et al., 2009). Crucially, the *ASPEKT* data provide information on companies’ ownership structure and, thus, allow one to identify foreign-owned companies. We interpret a company as foreign-owned if it has at least 10% of its equity owned by a foreign investor.¹⁰

⁸The procedure is implemented using Mahalanobis-metric matching with replacement in the latest version of the `psmatch2` Stata routine provided by Leuven and Sianesi (2003).

⁹An assessment of the matching quality consists of checking whether the matching procedure is able to balance the distribution of the relevant variables across the control and treatment group. To this effect, we perform two-sample t-tests as suggested by Rosenbaum and Rubin (1985).

¹⁰This threshold is used also in the official definition of FDI by the Czech National Bank and in studies of firm-level data by Evenett and Voicu (2003), Damijan et al. (2003), or Javorcik (2004). The average share of a foreign investor in a Czech company in our data is 3.0%.

The purpose of the study is to contrast the performance of domestic firms that were acquired by foreign investors to that of firms that remain domestic-owned. We therefore disregard information on foreign-owned greenfields in most of the analysis.¹¹ After dropping observations with inconsistent financial information, firms with fixed assets of less than 1 million CZK (approximately 30,000 EUR), as well as industrial branches involving a strong regulatory role of the government,¹² the resulting sample contains information on 4,049 companies from forty 2-digit NACE industrial sectors and covers the 1995-2005 period, generating 26,163 firm-year observations.¹³

An overview of the year-ownership and industry-ownership structure of the sample is provided in Tables 2 and 3, respectively. In a typical year, there are over two thousand companies in the data. We observe 324 cases of foreign takeovers and foreign-owned data represent almost 6% of all firm-year observations. The timing of foreign acquisitions mimics the time series of aggregate FDI inflow as recorded by the Czech National Bank (CNB), rising swiftly after 1997.¹⁴ Table 3 shows that in some industries, as many as 20% of firms in our sample were acquired by foreign investors during the sample frame, while there are no foreign takeovers in several 2-digit industries. The share of foreign capital in each industry, which reflects both foreign takeovers and greenfields, also varies widely from low levels in, e.g., the leather or hotel and restaurant industries, to 0.8 in insurance and pension

¹¹Greenfields were preliminarily identified as firms newly appearing in the sample with (near) 100% foreign ownership; all such cases were then checked manually (information on these firms was found on the Internet) to confirm that the observed firm is in fact not an acquisition of a previously domestically owned company.

¹²Agriculture, forestry, fishing, utilities, public administration, health and education; NACE codes 1, 2, 5, 41, 75, 80, and 85.

¹³We also observe 1,018 unique greenfields with foreign ownership in our sample, 5,743 firm-year observations in total. Including the greenfields, our panel data thus have 31,906 observations.

¹⁴To check for potential attrition bias related to ownership, we compared the exit rates of ‘always-domestic’ and ‘after-takeover’ firms and found it nearly identical in all years.

funding.¹⁵

We list 2-digit NACE industries in three groups: services, exporting, and non-exporting manufacturing.¹⁶ An industry is considered to be ‘exporting’ if it exports at least 50% of its production on average over the period 1995-2005.¹⁷ The average share of foreign-owned assets in our three groups of industries ranges from 13% in the service sector to 38% in the exporting manufacturing industries. Similarly, the share of foreign capital in a given industry in acquisitions (as opposed to greenfields) is the lowest in the service sector. Most foreign investors in services apparently build greenfields, which may reflect the relatively low Czech share of employment in the service sector in an EU comparison.

Table 4 provides summary statistics of all firm-level variables used in the estimation. Balance-sheet information is used to form four corporate performance indicators: ratios of profit over total assets; debt over total assets; a simple measure of total factor productivity (residuals from industry-specific regressions of firm value added on fixed assets and staff costs); and the company wage bill (unfortunately, employment is not available).

The Table provides descriptive statistics not only for the sample we work with, but also for the matched sub-sample of firms where the ‘treatment’ and ‘control’ firms used are only those that could be matched to their counterparts based on

¹⁵To check the representativeness of the *ASPEKT* data with respect to foreign ownership, we compare the official FDI figures (from the CNB) listed in the third column of Table 3 to estimates of the share of foreign fixed assets based on our sample (calculated by summing up the capital of both foreign acquisitions and greenfields). The correlation between the two measures across 2-digit NACE industries, weighted by the share of fixed assets of each industry covered by the sample, is 0.96.

¹⁶A small group of ‘other industries’ is also included in the data when we analyze all industries.

¹⁷The output and export statistics were obtained from the OECD. We have alternatively defined exporting manufacturing industries using only the 1995-1997 time window, which led to the reclassification of four 2-digit NACE categories from the ‘exporting’ to the ‘non-exporting’ group; this change, however, had no material effect on the estimated effects of foreign acquisition reported in the next section.

the estimated propensity score within industry and year cells.¹⁸ Clearly, matching sheds almost half of the data, suggesting that the common support problem is a relevant concern in these data. In particular, several of the service-sector industries are lost from the matching comparison including telecommunications and computer services.¹⁹

Before estimating the causal effects of foreign ownership, we provide one last descriptive comparison. Specifically, we ask whether foreign-owned firms out-perform domestic-owned ones on average within years and industries. We answer this descriptive question by running a simple OLS regression with our panel data (including greenfields), where we condition on year and 2-digit NACE industry dummies as well as three ownership indicators: a dummy that equals 1 during the two years before an entry of foreign equity into a domestic company; a dummy that equals 1 for all years after the foreign acquisition; and a separate dummy for foreign-owned greenfields; domestic-owned companies are the base group. Using such simple comparisons, and additionally controlling for the logarithm of firm staff costs, we find that greenfields have statistically significantly higher level of profits over total assets (by 0.06) compared to domestic-owned companies, while the differences between domestic-owned company-year observations and those for firms (about to be) acquired by foreign investors are not statistically discernible. Using the wage bill as the dependent variable, and replacing firm staff costs with firm fixed assets in the conditioning set, we find that all three foreign-ownership dummy coefficients are positive and statistically significant, ranging from 0.20 for foreign acquisitions to 0.35 for greenfields. Similarly, using TFP as the dependent variable, and condi-

¹⁸The propensity score controls for profits over total assets as well as for other firm-level variables, see Table 5 for details.

¹⁹Matching also effectively excludes observations with extreme values of profits over total assets. Dropping those observations manually (i.e., those that exceed 0.15 in absolute value) does not lead to sizeable changes in the estimated coefficients. Similarly for liabilities over total assets (with the exclusion threshold at 2).

tioning only on year and industry dummies, we find that all three foreign-ownership dummy coefficients are positive and statistically significant, ranging from 0.07 for domestic firms about to be acquired by foreign investors to 0.24 for greenfields. In short, foreign ownership is associated with higher productivity, profits, or wages of Czech companies.

5 Results

5.1 Propensity Score Estimation

Our first task is to estimate the propensity score – the probability that an individual firm with certain characteristics is acquired by a foreign entity in a given year. Such analysis is interesting in its own (descriptive) right, and it also provides the key continuous conditioning variable for the matching exercise. A set of logit specifications for the probability of foreign takeover is reported in Table 5. The propensity score is predicted based on company age and either fixed assets or staff costs (depending on the outcome performance measure: profit or liabilities over assets, TFP, and wages); each specification then additionally controls for the level of the outcome variable from one and two years prior to the current year, which is meant to control for trends in performance prior to takeover.

Older firms are more likely to be acquired as are larger firms and those with higher staff costs. A positive trend in profitability and a negative trend in liability (conditional on other controls) appear to predict the chances of a foreign takeover, while higher lagged TFP level is associated with a higher probability of foreign equity entering a given firm.²⁰ The results are thus consistent with foreign investors “cherry picking” domestic firms. There appears to be little relationship between

²⁰The estimated propensity score coefficients are not materially affected when we add 2-digit industry and year dummies, i.e., the variables on which we match ‘exactly’.

company wage bills (conditional on firm size) and the takeover chances. These propensity scores are used in the difference-in-differences with matching estimation in the next section.²¹

Table 6 presents an auxiliary set of logit specifications controlling for profit over total assets, where we additionally condition on the share of foreign greenfields and takeovers in the given industry and year. These specifications are meant to shed some light on the industry-specific strategies that foreign investors follow when entering a given market. Estimation is performed on the full sample as well as on sub-samples of companies that operate in non-exporting manufacturing industries, exporting manufacturing industries, and in the service sector. The magnitude of the coefficients is broadly similar across the three industry groups, although we find the positive effect of *Takeover share* to be statistically significant only in the service sector. While there is no relationship between the presence of greenfields and the decision of a foreign investor to acquire a domestic firm, there appears to be strong industry-level consistency in the location of takeovers. For example in the service sector, ‘moving’ from the lowest to the highest observed industry *Takeover share* (from 0 to 0.06) increases the probability of another takeover by about two percentage points.

Table 6 also shows that the importance of the pre-acquisition trend in profits over assets is mainly coming from the service sector and, possibly quantitatively more importantly even if not statistically significantly, from the exporting manufacturing industries. On the other hand, there appears to be little “cherry picking” in the non-exporting sector, consistent with the notion that company performance

²¹To assess how well the propensity score performed in balancing observables across the matched treatment and controls, we performed two-sample t-tests suggested by Rosenbaum and Rubin (1985) and evaluated pseudo R2 statistics before and after matching. There were no systematic differences in the distribution of covariates after matching and the pseudo-R2 was close to zero (0.01, down from 0.06 before matching). Similar conclusions come from F-tests on the joint significance of all regressors.

may be less important for the acquisition decision in this sector.

5.2 Foreign-Ownership Effects

In this section, we report the results of the matched difference-in-differences analysis of the performance change gap between domestic and foreign companies one to three years after acquisition. Tables 7 to 10 report the results for the four performance indicators we study. In all four cases, we find that foreign ownership leads to substantial improvements in corporate performance indicators of firms in the non-exporting manufacturing industries, with typically the strongest impact two years after the foreign takeover,²² while no significant effects are estimated for the remaining two industry groups.²³

The magnitude of the estimated effects in the non-exporting industries is economically significant too. For example, the two-year change in profits over assets (liabilities per total assets) driven by a foreign acquisition corresponds to about one-tenth (twentieth) of the all-sample standard deviation of all observed two-year changes in this variable. Focusing on the TFP performance measure and using the estimate from three years after the foreign acquisition, the effect corresponds to about one-quarter of the all-sample standard deviation in these three-year changes. Finally, the impact of a foreign acquisition on the change in the (log) wage bill, and therefore on the workers subject to foreign takeover, is certainly economically significant at the 25 percentage points of the wage bill growth rate above the domestically owned firms two years after the acquisition. The timing of the onset

²²Girma et al. (2007) uncover a similar time pattern in their study of foreign ownership effects.

²³The one exception to this statement is the large negative wage-bill effects estimated for both exporting manufacturing and service industries three years after foreign takeover. However, these estimates are based on the lowest number of matched ‘treatment’ companies of all of the estimated specifications, and we thus hesitate to draw strong conclusions. Perhaps the scope for scale effects is limited in these industries.

of these effects in the non-exporting manufacturing industries, with profits rising early on, wage bills throughout and TFP only in year $t + 3$, is consistent with the presence of some short-term (“low-hanging”) profit opportunities implemented after takeover such as the sale of non-core assets. Our results for total factor productivity and wage bills are in line with those from Arnold and Javorcik (2005), although their estimated effects of foreign acquisitions in Indonesia are substantially larger in magnitude.

We have performed a number of robustness checks that signalled little sensitivity of these conclusions to sample choices or to details of the estimation technique. Among other checks, we have tried dropping the last year of the sample (2005), where there is somewhat less data, and we also experimented with using only industries where the sample coverage of the firm population was above the 30th percentile of the industry distribution of coverage. Instead of following the performance indicators for each year after the acquisition separately, we additionally re-estimated the matching exercises whilst focusing on 2-year and 3-year moving average windows of performance, and we also assessed the sensitivity to defining exporting industries using 1995-1997 data instead of the whole sample period.

Most importantly, we have estimated the foreign-acquisition effects based on an alternative grouping of manufacturing industries. Instead of dividing the industries based on strong exporting performance, we have divided manufacturing industries based on their openness to international competition defined as share of import plus export on the aggregate import and export from a given year. We then divided industries into low/medium/high openness using the 33rd and 66th percentiles of the industry distribution of openness. Similar to our main set of findings, we uncovered significant foreign-acquisition effects only in the low-openness group of industries, while the size of the estimated treatment effects was broadly consistent

with those reported in the main set of findings.

6 Conclusion

There is a large literature studying the effects of ownership changes during early-transition privatization, but much less work on the effects of recent FDI, which is, arguably, the more important ‘engine of growth’ in post-communist countries. Furthermore, most of the FDI-related research focuses on its indirect effect, such that we know comparatively little about the direct effect of foreign takeovers on domestic companies and the choices of mode of foreign-market access (greenfield vs. brownfield) that foreign investors make.

Based on data covering the experience of Czech companies around the time of the Czech Republic’s entry into the EU and using the matched difference-in-differences approach, we find that foreign takeovers significantly boost several corporate performance indicators in non-exporting manufacturing industries, but have little effect in other industries. Workers of these firms benefit from the acquisitions as well, at least in terms of their wages. These findings are consistent with the argument that firms in exporting manufacturing industries face direct international competition and do not need to be ‘disciplined’ by foreign owners.²⁴ Our study complements the results of Alfaro (2003), who in a cross-country study of FDI effects, finds that manufacturing FDI generates a positive growth effect, while the impact is ambiguous in the service sector.²⁵ The absence of a statistically or economically significant effect of takeovers on service-sector firms may be driven by market regulation or structure and motivates future work on service-sector FDI.

²⁴In a related analysis, Konings et al. (2003) suggest that exposure to international trade and competition is one of the key driving forces of the restructuring of Ukrainian firms during 1998-2000.

²⁵Similarly, using firm-level data, Gorodnichenko et al. (2007) suggest that FDI spillovers vary significantly by sectors.

7 References

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Table 1: Definition of Industry-Level FDI Variables.

FDI share	Foreign direct investment divided by fixed assets at the 2-digit NACE industry level. (Source: Czech National Bank.)
FDI share by takeovers	Industry-level fixed assets of domestic companies acquired by foreign investors divided by industry fixed assets. (Source: Aspekt.)
FDI share by greenfields	Industry-level fixed assets of foreign companies built by foreign investors divided by industry fixed assets. (Source: Aspekt.)
Takeover share	Product of industry <i>FDI share</i> and <i>FDI share by takeovers</i> .
Greenfield share	Product of industry <i>FDI share</i> and <i>FDI share by greenfields</i> .

Table 2: Number of Companies by Year.

The column ‘always domestic’ gives the number of companies observed in a given year that remain domestic throughout the sample frame; the column ‘before acquisition’ gives the number of domestic companies observed in a given year that are to be acquired by a foreign entity later; the column ‘after acquisition’ gives the number of observed companies that are foreign-owned as of a given year; the column ‘N’ gives the total number of firm observations in the sample, which contains no greenfields. The last column ‘acquisitions’ gives the number of foreign acquisitions in a given year.

year	firm-year observations			N	acquisitions
	always domestic	before acquisition	after acquisition		
1995	1,841	244	0	2,085	0
1996	2,093	262	5	2,360	5
1997	2,236	210	64	2,510	57
1998	2,275	192	94	2,561	32
1999	2,302	162	126	2,590	36
2000	2,271	126	163	2,560	47
2001	2,242	81	199	2,522	51
2002	2,230	56	211	2,497	31
2003	2,159	31	221	2,411	29
2004	1,984	10	220	2,214	23
2005	1,638	0	215	1,853	13
Total	23,271	1,374	1,518	26,163	324

Table 3: FDI Share and Structure by Industry as of 2005.

The column 'N' gives the number of companies in the sample observed at least once, while the second column shows the (cumulative) share of these companies taken over by foreign entities. The third column presents the official FDI share on industry fixed assets as of 2005 and the last one shows the share of FDI capital in companies acquired by foreign investors (as opposed to built by them). See Table 1 for variable definitions. A sector is considered to be export oriented if it exports at least 50% of its production abroad on average over the 1995-2005 period.

NACE	N	Share of takeovers	FDI share	Takeover share on FDI
<i>Non-exporting manufacturing</i>				
15 Food products and beverages	327	0.09	0.23	0.03
20 Wood and wood products	154	0.08	0.19	0.02
21 Pulp, paper and paper products	29	0.14	0.51	0.02
22 Publishing and printing	162	0.12	0.23	0.01
23 Coke, refined petroleum and nuclear fuel	14	0.21	0.28	0.07
26 Other non-metallic mineral products	161	0.08	0.38	0.01
27 Basic metals	99	0.12	0.29	0.01
28 Fabricated metal products	461	0.10	0.22	0.01
Total	1,407	0.10	0.28	0.03
<i>Exporting manufacturing</i>				
17 Textiles	95	0.09	0.17	0.02
18 Wearing apparel; dressing and dyeing of fur	22	0.00	0.08	0.00
19 Leather and leather products	25	0.08	0.03	0.00
24 Chemicals and chemical products	139	0.12	0.31	0.03
25 Rubber and plastic products	68	0.15	0.41	0.01
29 Machinery and equipment n.e.c.	119	0.13	0.28	0.06
30 Office machinery and computers	22	0.09	0.50	0.02
31 Electrical machinery and apparatus n.e.c.	86	0.05	0.44	0.04
32 Radio, TV and communication equipment	38	0.08	0.65	0.01
33 Medical, precision and optical instruments	49	0.06	0.42	0.01
34 Motor vehicles, trailers and semi-trailers	15	0.20	0.57	0.44
35 Other transport equipment	13	0.08	0.13	0.04
36 Furniture; manufacturing n.e.c.	27	0.07	0.12	0.01
37 Recycling	36	0.03	0.17	0.03
Total	754	0.10	0.38	0.04
<i>Services</i>				
50 Sale and repair of motor vehicles	140	0.06	0.14	0.01
51 Wholesale trade, except of motor vehicles	663	0.06	0.32	0.01
52 Retail trade; repair of personal goods	290	0.05	0.27	0.03
55 Hotels and restaurants	49	0.04	0.06	0.01
60 Land transport; transport via pipelines	22	0.09	0.08	0.00
63 Supporting and auxiliary transport activities	10	0.00	0.01	0.00
64 Post and telecommunications	9	0.11	0.52	0.05
65 Financial intermediation	152	0.08	0.73	0.06
66 Insurance and pension funding	26	0.15	0.80	0.06
67 Activities auxiliary to financial intermediation	32	0.13	0.38	0.05
70 Real estate services	65	0.09	0.03	0.00
72 Computer and related services	15	0.07	0.38	0.01
73 Research and development	8	0.00	0.02	0.00
74 Other business services	51	0.12	0.35	0.02
Total	1,532	0.07	0.13	0.01
<i>Other industries</i>				
10 Mining of coal and lignite	19	0.00	0.01	0.00
11 Extraction of crude petroleum and natural gas	4	0.00	0.05	0.00
14 Other mining and quarrying	57	0.11	0.34	0.02
45 Construction	276	0.08	0.10	0.00
Total	356	0.08	0.08	0.01

Table 4: Summary Statistics.

All financial variables are in millions of 2000 Euros. Total factor productivity (TFP) is measured as residuals from regressions of Value added on Fixed assets and Staff costs by 2-digit NACE industry. Matching is based on p-score estimation from the first column of Table 5.

variable	whole sample			matched sample		
	observations	mean	std. deviation	observations	mean	std. deviation
Total assets	26,143	21.29	146.79	10,247	24.02	174.67
Age	26,055	6.61	4.37	10,247	6.97	3.86
Profit	26,145	0.54	10.41	10,247	0.49	10.49
Value added	24,077	4.08	23.26	9,922	4.42	25.22
Liabilities	26,111	10.51	59.85	10,246	11.58	70.32
Wage bill	17,528	1.73	5.86	7,647	1.81	6.47
Fixed assets	25,503	13.35	126.35	10,201	15.65	149.58
Staff costs	25,127	1.95	7.28	10,229	2.19	8.49
Profit to total assets	26,125	0.00	2.23	10,247	0.02	0.20
Debt to total assets	26,125	0.79	12.06	10,246	0.54	0.65
TFP	22,590	0.02	23.91	9,623	-0.11	20.87

Table 5: P-score Estimation.

The table presents the marginal effects from Logit estimation asking whether a domestic company becomes foreign-owned.

<i>Age</i>	0.015*** (0.002)	0.015*** (0.002)	0.015*** (0.002)	0.017*** (0.002)
<i>Age</i> ²	-0.0003*** (0.0001)	-0.0003*** (0.0001)	-0.0002*** (0.0001)	-0.0003*** (0.0001)
$\ln SC_{t-1}$	0.017*** (0.002)	0.016*** (0.002)		
$\ln FA_{t-1}$			0.014*** (0.003)	
<i>PROFIT</i> / <i>TA</i> _{<i>t</i>-1}	0.004 (0.004)			
<i>PROFIT</i> / <i>TA</i> _{<i>t</i>-2}	-0.005** (0.002)			
<i>LIAB</i> / <i>TA</i> _{<i>t</i>-1}		-0.004 (0.006)		
<i>LIAB</i> / <i>TA</i> _{<i>t</i>-2}		0.0002*** (0.0000)		
$\ln WAGES_{t-1}$			-0.009 (0.010)	
$\ln WAGES_{t-2}$			0.015 (0.010)	
$\ln TFP_{t-1}$				0.005 (0.004)
$\ln TFP_{t-2}$				0.011*** (0.004)
N	17,274	17,268	12,149	16,194
χ^2	188.132	192.442	125.229	141.553
<i>pseudoR</i> ²	0.065	0.065	0.076	0.045

Note: *Age* stands for years since company incorporation, *FA* stands for company fixed assets, *SC* is staff costs, *TA* is total assets, *WAGES* is wage bill, *PROFIT* stands for profit/loss, *LIAB* denotes company liabilities, and *TFP* denotes company total factor productivity. All financial variables are in thousands of CZK. Robust standard errors are in parentheses; they have been corrected for clustering at company level. Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Table 6: P-score Estimation with Foreign Shares included.

The table presents the marginal effects from Logit estimation asking whether a domestic company becomes foreign-owned.

	All	Manufacturing		Services
	industries	Nonexporting	Exporting	
<i>Age</i>	0.014*** (0.002)	0.016*** (0.003)	0.011*** (0.004)	0.022*** (0.005)
<i>Age</i> ²	-0.0002*** (0.0001)	-0.0003*** (0.0001)	-0.0002* (0.0001)	-0.0007*** (0.0002)
$\ln SC_{t-1}$	0.017*** (0.002)	0.020*** (0.004)	0.024*** (0.006)	0.008** (0.004)
<i>PROFIT/TA</i> _{<i>t-1</i>}	0.004 (0.004)	-0.012 (0.014)	0.010 (0.008)	0.003 (0.003)
<i>PROFIT/TA</i> _{<i>t-2</i>}	-0.004** (0.002)	-0.007 (0.015)	-0.010 (0.010)	-0.004** (0.002)
Takeover share	0.223** (0.101)	0.426 (0.344)	0.219 (0.143)	0.293** (0.119)
Greenfield share	0.047 (0.039)	-0.003 (0.080)	0.056 (0.054)	0.066 (0.059)
N	17274	7299	3820	4748
χ^2	201.831	99.703	37.660	64.732
<i>pseudoR</i> ²	0.068	0.076	0.059	0.076

Note: *Age* stands for years since company incorporation, *SC* is staff costs, *TA* is total assets, and *PROFIT* stands for profit/loss. See Table 1 for definitions of ‘Takeover share’ and ‘Greenfield share’. A sector is considered to be export oriented if it exports at least 50% of its production abroad on average over the 1995-2005 period. All financial variables are in thousands of CZK. Robust standard errors are in parentheses; they have been corrected for clustering at company level. Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Table 7: Matching Results – Profit per Total Assets.

The table presents a comparison of the change in performance of companies taken over by foreign investors between the moment of acquisition and one to three years later with the corresponding change in performance of matched domestic companies. See Table 3 for industry grouping. The performance measure is profit over total assets (*PROFIT/TA*).

	All industries	Manufacturing		Services
		Nonexporting	Exporting	
$t + 1$	0.038 (0.026)	0.061* (0.034)	0.019 (0.035)	-0.008 (0.027)
N treated matched	206	101	46	41
N controls matched	12,760	5,469	2,844	3,416
$t + 2$	0.191* (0.099)	0.141*** (0.045)	0.017 (0.029)	0.004 (0.138)
N treated matched	172	84	40	33
N controls matched	10,075	4,383	2,282	2,609
$t + 3$	-0.057 (0.044)	-0.082 (0.121)	-0.002 (0.044)	-0.006 (0.038)
N treated matched	144	68	38	25
N controls matched	7,766	3,421	1,788	1,954

Note: Bootstrapped standard errors are in parentheses; they have been corrected for clustering at company level. Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Table 8: Matching Results – Liabilities per Total Assets.

The table presents a comparison of the change in performance of companies taken over by foreign investors between the moment of acquisition and one to three years later with the corresponding change in performance of matched domestic companies. See Table 3 for industry grouping. The performance measure is liabilities over total assets ($LIAB/TA$).

	All	Manufacturing		Services
	industries	Nonexporting	Exporting	
$t + 1$	-0.008 (0.048)	-0.035 (0.342)	0.019 (0.133)	0.004 (0.049)
N	12,984	5,579	2,898	3,457
N treated matched	207	99	47	43
N controls matched	12,751	5,469	2,843	3,410
$t + 2$	-0.332 (0.360)	-0.672** (0.297)	-0.019 (0.254)	0.009 (0.077)
N	10,267	4,476	2,331	2,642
N treated matched	172	85	42	36
N controls matched	10,067	4,382	2,281	2,604
$t + 3$	-0.327** (0.134)	-0.357** (0.171)	0.038 (0.111)	-0.080 (0.108)
N	7,928	3,499	1,832	1,980
N treated matched	143	69	38	24
N controls matched	7,759	3,420	1,787	1,950

Note: Bootstrapped standard errors are in parentheses; they have been corrected for clustering at company level. Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Table 9: Matching Results – Wage Bill.

The table presents a comparison of the change in performance of companies taken over by foreign investors between the moment of acquisition and one to three years later with the corresponding change in performance of matched domestic companies. See Table 3 for industry grouping. The performance measure variable is the logarithm of the company wage bill ($\ln WAGES$).

	All	Manufacturing		Services
	industries	Nonexporting	Exporting	
$t + 1$	0.069*	0.169**	-0.085	0.158
	(0.041)	(0.070)	(0.071)	(0.178)
N	9,182	4,276	2,165	2,116
N treated matched	134	71	34	24
N controls matched	9,021	4,193	2,126	2,086
$t + 2$	0.114	0.254**	-0.115	-0.150
	(0.073)	(0.101)	(0.109)	(0.265)
N	7,295	3,438	1,749	1,626
N treated matched	115	60	30	18
N controls matched	7,155	3,366	1,713	1,601
$t + 3$	0.013	0.401**	-0.326**	-0.747**
	(0.083)	(0.192)	(0.155)	(0.341)
N	5,655	2,698	1,379	1,219
N treated matched	90	50	28	12
N controls matched	5,534	2,638	1,345	1,198

Note: Bootstrapped standard errors are in parentheses; they have been corrected for clustering at company level. Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Table 10: Matching Results – Total Factor Productivity.

The table presents a comparison of the change in performance of companies taken over by foreign investors between the moment of acquisition and one to three years later with the corresponding change in performance of matched domestic companies. See Table 3 for industry grouping. The performance measure is the logarithm of total factor productivity ($\ln TFP$); see Table 4 for the definition of TFP.

	All industries	Manufacturing Nonexporting	Exporting	Services
$t + 1$	-0.003 (0.035)	-0.003 (0.050)	-0.037 (0.049)	-0.143 (0.156)
N	12,209	5,401	2,796	3,039
N treated matched	205	104	44	34
N controls matched	11,991	5,292	2,746	2,999
$t + 2$	0.021 (0.038)	0.034 (0.078)	-0.052 (0.131)	-0.160 (0.201)
N	9,635	4,315	2,239	2,327
N treated matched	176	85	40	28
N controls matched	9,447	4,224	2,191	2,295
$t + 3$	0.166** (0.082)	0.183*** (0.071)	-0.007 (0.134)	-0.085 (0.129)
N	7,418	3,357	1,756	1,738
N treated matched	147	73	34	23
N controls matched	7,261	3,281	1,714	1,714

Note: Bootstrapped standard errors are in parentheses; they have been corrected for clustering at company level. Significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

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