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The Performance of Foreign Affiliates in German Manufacturing: Evidence from a new Database

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Abstract

This study presents the first investigation into the performance of foreign-controlled enterprises in German manufacturing based on new micro-data from official statistics. A comprehensive set of performance variables was examined not only by comparing unconditional mean values but also by accounting for other determinants and differences across distributions. The analysis revealed a foreign ownership performance premium with regard to productivity, R&D and export intensities, and average wages. Only profitability did not seem to differ from German-owned enterprises. Results were verified by varying comparison groups of indigenous firms and separating for high- and low-tech sectors. Furthermore, a breakdown by country of origin and type of ownership showed considerable heterogeneity of foreign-controlled affiliates in Germany.

Keywords: foreign ownership, firm performance, inward FDI, multinational enterprise

JEL classification: F21, F23

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1. Introduction

Foreign-owned firms have long been the subject of public and academic debate. For example, foreign takeovers are associated with fears of downsizing (SVR 2007: 388) and receive unbalanced media coverage when compared to other takeovers (Friebel and Heinz 2011). Some authors even use the term *economic xenophobia* in this context (ibid.: 3). Another example poses the costly attraction of foreign direct investments (FDI) through governments in the hope that positive externalities will occur in favor of domestically-owned competitors (e.g., Görg and Greenaway 2004). Such efforts are not restricted to developing or transition economies but are also prevalent in Germany.

An indispensable precondition for assuming externalities or an adequate political treatment of foreign takeovers is reliable empirical evidence on differences in performance of foreign-owned firms compared to their domestically-owned counterparts. Although a huge body of literature was devoted to investigation of a foreign ownership performance premium, these studies produced ambiguous and country-specific results. With regard to Germany, there has been a lack of sector-specific studies and the databases used for these studies exhibited certain limitations.

This study counters these weaknesses by providing the first results based upon newly available enterprise-level information from official German statistics. This new database allows comparison of foreign *affiliates* with domestic *affiliates* for the first time. Common efficiency measures such as productivity and profitability as well as export behavior, wages, and R&D intensity were measured. The analysis extended beyond a simple comparison of unconditional means through use of premium regressions and tested for differences across the entire distribution of particular variables. Moreover, foreign-controlled enterprises were analyzed separately by country of origin and ownership type.

Foreign-controlled enterprises comprise approximately one percent of the entire German non-financial economy, but have a remarkable economic impact, especially within the manufacturing sector (see Figure 1). Considering the increased role of affiliates within a multinational company (Birkinshaw 2001), comprehensive knowledge about activities and the performance of foreign-controlled firms becomes more relevant.

Section 2 discusses the general theory linking foreign ownership and performance. Section 3 introduces more specific performance measures and surveys empirical findings with a focus on Germany. Data and variables used in the empirical analysis are introduced in Section 4, while Section 5 comments on the methodological strategy. Section 6 presents the results. Finally, Section 7 concludes with a summary and discussion of the most important findings.

[Figure 1 about here]

2. Firm performance and foreign ownership

Following theory, foreign-owned firms are widely assumed to have a performance advantage over their domestic counterparts.[1] [2] Definitely the most frequently cited theory is the hypothesis of a specific comparative advantage of multinational enterprises (MNEs) (Dunning 1988 and Caves 1974 and 1996: 162-180); foreign-owned firms - multinationals by definition[3] - are endowed with, for instance, a superior production technology or organizational superiority that is available within the entire multinational corporation at low marginal cost due to its public good character. These advantages may be the underlying reason for internationalization, as Dunning argues in the OLI paradigm framework, or may stem from cross-border activities themselves (Casson 1987: 33). In the latter case, better access to in- and output markets or the flexibility of shifting activities across national borders may impart comparative advantage. However, the heterogeneous roles of affiliates within a MNE calls the theory of inevitable transfer of specific advantages for MNE affiliates into question. Foreign-owned affiliates may serve as export platforms (Ekholm et al. 2007) or be part of an asset-seeking strategy (Narula and Zanfei 2005) in complex internationalization strategies (Helpman 2006: 590). Thus, the transfer of superior production technology from the parent may be irrelevant.

In addition to the heterogeneous roles of foreign affiliates within a multinational enterprise, other potential channels make a clear-cut theoretical prediction of performance

[1] The terms *foreign-owned*, *foreign-controlled* and *foreign* firms are used interchangeably. The same applies to the domestically-controlled group, while all firms are those located within the particular economy in consideration.

[2] For a more detailed discussion of theoretical channels affecting performance gaps of foreign-owned firms, see Bellak (2004) and Weche Gelübcke (2011b).

[3] Section 6.3 deals with this assumption in more detail.

differences rather difficult. Although MNEs may have lost much of the imprint of their countries of origin, differences in management culture and performance measures can still remain (Ferner 1997). Regardless of whether these differences can be traced back to differences in national business systems (Whitley 1992), factor endowments, or overall cultural variations (Hofstede 1992), the impact of these country-of-origin effects can strongly vary.

The foreignness of foreign-owned firms may also be responsible for performance gaps. In contrast to the aforementioned theories, in which multinationality and specific nationality are the relevant determinants, the feature of being foreign itself can have a notable impact on performance, too. This mechanism is referred to as "liability of foreignness" (Hymer 1977: 34) and describes disadvantages due to extra costs of operating in foreign markets. Some examples of such costs include communication and transport barriers (Buckley 2000: 294), higher search costs in factor markets, and monitoring problems due to spatial distance (Feliciano and Lipsey 2006: 75). The "liability of foreignness" is already included in the specific advantage hypothesis, which assumes that MNEs' comparative advantage outweighs their intrinsic disadvantages. However, MNEs' liabilities could outweigh their advantages, and causal effects may have been overlooked in previous studies.

3. Previous research and specific measures

Due to the advantageous and disadvantageous effects of foreign ownership, predicting performance from theory remains difficult; thus, focus is shifted to empirical research, especially to country-specific results since they could be highly dependent on country-specific factors (FDI motivation, for example). For Germany, empirical studies were performed. However, evidence was not sufficient for the assumption of stylized facts and therefore could not serve as the basis for policy decisions. The two main reasons were varied results and limitations of the utilized databases (see Section 4 on the latter).

Jungnickel and Keller (2003) and Günther and Gebhardt (2005) (for eastern Germany) found superior labor productivity for foreign-owned establishments using data from the German Institute for Employment Research (IAB). However, Mattes (2010) found no significant differences in labor productivity in a treatment analysis of foreign acquisitions

with the same data. Temouri et al. (2008) considered the capital intensity of firms in estimating the total factor productivity (TFP) using the Amadeus database and identified a foreign ownership premium only in high-tech manufacturing. Arndt and Mattes (2010) also used data offered by the Bureau van Dijk and merged that with information from the German central bank's Micro-database Direct Investment (MiDi). They examined changes in the TFP of domestically-owned MNEs after foreign takeovers and observed a significant positive effect of foreign acquisitions on productivity.

Since performance is a somewhat subjective term, there is a large set of indicator variables. One such important measure is profitability. In line with productivity, consensus has been established that financial efficiency is positively related to foreign ownership in general (Kocenda et al. 2011). However, additional evidence points to profit shifting by MNEs among their affiliates through tax motivated transfer pricing strategies (Dischinger and Riedel 2008), which implies that measured profitability does not necessarily mirror productivity.[4] A comprehensive analysis of profitability gaps in Germany is not available to date but Bellak (2004: 499) stated that empirical studies regularly reported higher profitability for the domestically-owned comparison group. The same picture emerged when looking at first descriptive results for European member states from feasibility studies of the Foreign Affiliates Statistics (FATS); where foreign affiliates from only eight out of seventeen countries showed a higher average gross operating rate (Grell 2008). In line with these results, Barbosa and Louri (2005) identified lower performance for foreign-owned affiliates in Portugal and Greece. Mantaloni (2000) found the same for the US. Conflicting results, however, have been found. For example, Yla-Antilla et al. (2005) and Aydin et al. (2007) observed superior return rates for foreign-owned affiliates in Finland and Turkey. Bellak et al. (2006) found no clear-cut but rather negative impact of foreign takeovers on domestically-owned firms, reporting above average profitability even before the acquisition took place. Instead, they found that ex ante poor performers' profitability increased.

Innovation is frequently cited as an important factor for international competitiveness between economies. Although there certainly is a difference between input, such as R&D expenditures, and innovative output, the former should be highly correlated with the latter (Jäkel and Multhaup 2005: 163). Foreign companies account for 25

[4] Furthermore, higher capital intensity of foreign-owned firms could make reinvestments favorable to external finance, so long as opportunity costs are lower for the former (Bellak 2004: 499).

percent of all R&D expenditures of firms in Germany. Therefore, Germany is the second main research site for MNEs in the world after the US (Belitz 2010: 11). A classical line of argument regarding MNEs and R&D efforts - in the framework of horizontal integration - implies a rather low share of foreign-controlled affiliates. This is because if a MNE went international to exploit competitive advantages, it should try to keep R&D activities within the headquarters to avoid "additional cost of transmitting knowledge, and [..] to avoid involuntary spillovers" (Dachs and Ebersberger 2009: 43). Nevertheless, in numerous cases, products have to be adjusted to local markets, which creates additional expenditures for so-called *adaptive innovations* (Balcet and Evangelista 2005). During the past few decades, R&D expenditures of foreign-owned affiliates have continuously increased (see Dalton and Serapio 1998 for the US, Lallement 2002 for France, and Fors 1998 for Swedish affiliates abroad). This points to a second possible MNE strategic pattern, *asset-seeking*, that could explain the relatively high R&D levels of foreign-controlled affiliates (Dalton and Serapio 1998). In the words of Narula and Zanfei (2005: 327), "foreign location provides access to complementary location-specific advantages that are less available in its primary or `home´ base". In this sense, shifting R&D activities to innovation centers abroad may facilitate spillovers to the favor of their conductors. This is especially pertinent to technologically highly sophisticated economies, like Germany.[5] Empirical evidence reveals similar R&D intensities for German and foreign MNEs in manufacturing and a convergence process across sectors during the last decades (Belitz 2010: 11ff. and OECD 2009: 123).[6]

Foreign-controlled firms should be expected to export more for many reasons (cf. Roper et al. 2006). According to MNE theories, they should be generally more competitive in international markets and enjoy better access to resources such as innovative output or the exporting department of the parent. Lower fixed costs of exporting for foreign affiliates can be explained also by the "foreignness channel", as they have an intrinsic information advantage in foreign markets. Empirical work by Arndt et al. (2009) and Engelmann and Fuchs (2008) provide support for these assumptions in Germany since their results showed

[5] Besides arguments concerning MNE strategies, different levels of technological sophistication of home countries may of course also play a major role regarding performance gaps in innovation activities of firms (Frenz and Ietto-Gillies 2007).

[6] Günther and Gebhardt (2005) as well as Günther et al. (2008) found no significant differences in the likelihood to invest in R&D and a lower R&D intensity for externally-owned firms with data for eastern Germany.

that foreign-owned firms are more likely and more intensively engaged in exporting compared to domestically-owned competitors.

Wage payments also characterize firm performance and are normally of broad public interest. Reasons for higher average payments of foreign-owned firms could be the distribution of higher profits through bargaining (Girma et al. 2002: 94),[7] the prevention of job turnover to maintain competitive advantages (Sjöholm and Lipsey 2006: 203), or as compensation for lack of information in foreign labor markets (Feliciano and Lipsey 2006: 75). Above average wages can also be used by human resource management as an incentive to prevent shirking and other absences, since resulting costs are higher for MNEs which produce more capital intensive (Globermann et al. 1994: 152f.). Higher wages also attempt to overcome disadvantages due to long-distance monitoring (Bellak 2004: 492). However, Jungnickel and Keller (2003) found that foreign-owned firms' higher wages in Germany disappeared when domestically-oriented indigenous firms were excluded. Borrmann et al. (2003) compared payments beyond collective agreements to account for heterogeneous skill levels and, again, found no significant differences. This agrees with later results from Arndt and Mattes (2010). Andrews et al. (2009) identified a remarkable self-selection of high wage firms into foreign takeovers.[8] Unfortunately, this study was neither able to identify differences in the actual paid price for labor factor nor the heterogeneous skill level compositions. However, Barba Navaretti and Vanables (2004: 165) stated that "[i]n advanced economies […] there is not much of a difference in the skill intensity of foreign-owned and national activities, particularly in the same industry."

4. Data and variables

Since the reporting year 2007, European Member States have been required to provide statistics on foreign-controlled firms within their respective economies (regulation (EC) 716/2007). The information of these so-called FATS (Foreign Affiliates Statistics) has to be gathered and processed at the national level before being reported to Eurostat in aggregate form. In German structural business statistics, information on foreign ownership and other

[7] Rent sharing across MNE entities could also increase overall negotiable profits, although it can be argued instead that bargaining power of the MNE workforce is restricted due to higher labor demand elasticities (Scheve and Slaughter 2005: 104).

[8] Furthermore, they examine wage changes for workers changing employers and reveal that "[r]ather than paying higher wages to existing workers, they take on new higher-paid workers." (Andrews at al. 2009: 313).

financial linkages was not sufficient to meet the FATS guidelines (Eurostat 2009). Therefore, the Federal Statistical Office and the German federal states' statistical offices obtained additional information from the commercial database *MARKUS*, which is distributed by Bureau van Dijk and Creditreform. Now that the new variables are linked to German official enterprise statistics and can thus be merged to several industry- and topic-specific surveys, new possibilities for comprehensive future research have opened up (see Weche Gelübcke 2011a on this new database and its research potential at length). In particular, FATS information states whether the ultimate controlling institutional unit (UCI) of an enterprise is located abroad and if the UCI is a legal or natural person. Therefore, indirect forms of control are accounted for and effective minority control - when several minority owners act in concert - is considered as far as possible (Eurostat 2009: 13ff.).

For this study in particular, the cost structure survey and the monthly reports from the manufacturing, mining, and quarrying sectors (sections C and B according to the German industry classification 2008) served as the bases for analysis (see Fritsch et al. 2004 for further information). These surveys cover units with at least twenty persons employed. Analyses were performed using the data package *AFiD-Panel Industrial Enterprises* provided by the research data centers (see Malchin and Voshage 2009 for description of the AFiD projects and Zühlke et al. 2004 for data accessibility).

Compared to other databases previously used for assessment of foreign-owned firm performance in the German economy, the framework of official statistics offers specific advantages. For example, official statistics are usually of a very high overall quality (Wagner 2010a: 134), offer a broad pool of variables for investigating enterprises in multiple contexts, and reporting units are enterprises instead of establishments, which are more appropriate in this context (Weche Gelübcke 2011a: 6).

Unfortunately, since data became only recently available, there is only information for the reporting years 2007 and 2008 to date. This calls for a cross-sectional approach; its associated shortcomings include no consideration of unobserved time-invariant heterogeneity. To take the newness and also the potential impact of the global financial and economic crisis in 2008 data into account, both years were analyzed simultaneously for assessing the robustness of the results. For the present analysis, enterprises were restricted to the manufacturing sector and comparison groups were composed by the guidelines

outlined in Sections 5 and 6.1. Enterprises that took part in the cost structure surveys but were not obliged to provide information on exports in the monthly reports were dropped from the sample (154 for 2007 and 313 for 2008). Table 1 shows the number of observations in the final analytical sample as well as their assignment across comparison groups.

[Table 1 about here]

To study efficiency, productivity and profitability were examined. Productivity was measured as the annual gross value added at factor costs per capita[9] and profitability was defined as ratio of operating profits and total turnover, namely the return on sales. To assess whether a performance gap in labor productivity was due to differing human capital intensities, the additional labor productivity variable was adjusted by wage (cf. Eurostat 2001: 49). To obtain this variable, labor productivity was divided by average per capita wages and could be interpreted in percentages. Thus, an adjusted labor productivity rate of 100 percent reflects no additional contribution of an average Euro personnel costs to profits. Average per capita wages, which were also considered separately, do not have to mirror human capital intensity exclusively even though high correlation can be expected between them. However, there was no information about particular skill-levels of the workforce provided in the data, so "labor quality" could not be controlled for; thus, conclusions regarding the actual paid price for labor factor were not obtained. Another performance measure, that also serves as covariate in the regression analyses, is firm size, defined as persons employed in full-time equivalents.[10]

Since Germany is one of the most advanced high tech economies and the second biggest research location for foreign MNEs, the innovation infrastructure and individual R&D investments are of vital importance (cf. Section 3). Therefore, the R&D intensity was measured by both per capita, in-house R&D expenses, and share of persons employed in R&D.

[9] Unfortunately, there is no information on the actual capital stock in the data which could be used to account also for the efficiency of capital employed. Although it is generally possible to estimate capital stocks (see Wagner 2010b), labor productivity has the advantage of simplicity and is not subject to estimation errors. Furthermore, capital intensity is partly controlled for by including two-digit industry covariates in subsequent regression models.

[10] This has also to be considered when interpreting the above mentioned measures, since the number of persons employed is defined in full-time equivalents here as well.

Another variable directly related to the level of a firm's internationalization is the export intensity, measured as the share of total turnover generated abroad. Indirect exports, for example through intermediate products, are not covered by this definition. Table 2 presents summary statistics of all variables.

[Table 2 about here]

5. Methodological strategy

Applied methodologies and econometric techniques can have a severe impact on results. For example, consider the relative performance of foreign-owned firms in comparison to the particular composition of the domestic group. A huge body of empirical literature has compared foreign-owned firms with the whole universe of domestically-owned units and has found pronounced performance gaps. A more recent strand of studies has restricted the domestic reference group to MNEs in order to stop comparing "apples with oranges"; performance advantages sometimes even disappeared (e.g., Domes and Jensen 1998). However, though comparison of domestic MNEs with foreign-controlled units is certainly more adequate than comparison with small independent firms in the domestic group, this approach is by no means perfect since domestic MNE *group heads* are compared with foreign *affiliates*. This study took a further step to isolate the proper reference group by limiting the domestically-owned firms to *affiliates*. Unfortunately, the data did not provide any information on the multinational status. Therefore, another group was generated, which consisted of domestically-controlled affiliates with an export intensity of at least thirty percent. The thirty percent cut-off served as an indicator of multinationality, although it was not a perfect one.[11] A third reference group of domestically-owned affiliates who export was created, with no limitation on export magnitude. This comparison allowed for comparison of differing levels of internationalization with performance gaps, and whether these gaps resulted from the tendency of foreign affiliates to more frequently be exporters.[12]

First, unconditional means of each individual performance measure for all comparison groups were compared with one another and differences were checked for

[11] This proxy was already used in previous studies such as Borrmann et al. (2003).
[12] The underlying assumption in this context is a performance premium due to the exporter status (see ISGEP 2008).

statistical significance with t-test statistics.[13] Next, regression analyses were carried out to examine the performance gaps independent of structural and size effects. The estimated model specifications were fairly simple and can be written as follows:

$$(\ln)Y_i = \beta_0 + \beta_1 fo_i + \beta_2 industry_i + \varepsilon_i \quad (1)$$

$$(\ln)Y_i = \beta_0 + \beta_1 fo_i + \beta_2 industry_i + \beta_3 size_i + \beta_4 size_i^2 + \varepsilon_i \quad (2)$$

Y denotes the set of performance variables described above and is converted to logarithmic form when possible. Fo is a dummy variable for foreign ownership that takes the value of 1 if an enterprise is under foreign majority-control and 0 otherwise. Model 1 includes two-digit industry-dummies to control for effects due to industry structure, while model 2, additionally, includes size-covariates to account for a potential impact of firm size. The measure of firm size is the number of persons employed and is also considered as squared term to account for non-linear effects. β is the set of parameters to be estimated. β_1 in particular represents the performance differences between the considered foreign-controlled and nonforeign-controlled observations. Finally, i denotes the establishment subscript and ε the error term.

Productivity and R&D intensity variables, as well as the return on sales, per capita wages, and size were estimated using the robust OLS technique. Probit estimators were applied to the dummy variables to estimate whether an establishment invested in R&D or engaged in exporting. Also, marginal effects were reported for convenient interpretation. Export intensity was a fractional response variable, as observations disproportionally occured near the lower bound of the distribution. This made the use of a GLM-estimator with a logit link function more appropriate, as proposed by Ramalho et al. (2011). Since the regression models include a minimum of covariates, these so-called premium regressions (used before e.g. by Bernard et al. 2007) do not claim to be "explanation" models but rather show the presence of statistically significant differences which make measures of model fitting of secondary interest.

[13] All computations were done with Stata 11 within the research data center of the statistical office of Berlin-Brandenburg for reasons of confidentiality. Access was provided via remote access to prevent the possible identification of particular statistical units in micro data.

Empirical research using micro data should never be solely carried out with mean values, whether conditional or unconditional, since observations are generally characterized by a considerable degree of heterogeneity (see Wagner 2011 at length on this). To check whether performance gaps hold along distributions of enterprise groups, this study also compared differences at quantiles and tested for statistical significance based on first order stochastic dominance using the nonparametric Kolmogorov-Smirnov test (for more details, see Conover 1999: 456ff.).[14] Given two independent random samples, the test evaluates whether all moments of the two cumulative distribution functions of a performance measure in case, $F_1(x)$ and $F_2(x)$, are statistically different from each other (two-sided) and whether one distribution dominates the other (one-sided). The specific null and alternative hypotheses are as follows:

$$H_0: F_1(x) - F_2(x) = 0 \quad \text{vs.} \quad H_1: F_1(x) - F_2(x) \neq 0, \text{ all } x \in R \qquad \text{(two-sided)}$$

$$H_0: F_1(x) - F_2(x) \leq 0 \quad \text{vs.} \quad H_1: F_1(x) - F_2(x) > 0, \text{ all } x \in R \qquad \text{(one-sided)}$$

6. Results

6.1 Relative performance of foreign-controlled enterprises

Studies comparing performance of foreign-owned with all domestically-owned firms almost always produce advantages in favor of foreign-owned firms (e.g. Eurostat 2001). As discussed in the previous section, great importance should be attached to the choice of the domestic reference group, and variations guide the obtainment of robust stylized facts. With this in mind, foreign-controlled *affiliates* were compared to domestically-owned *affiliates* only.

Even when the group of comparison was domestically-owned affiliates, remarkable relative performance advantages in favor of foreign-controlled affiliates remained (see Table 3). Foreign-owned enterprises in German manufacturing industries were, on average, larger by about 200 employees and achieved a superior annual labor productivity of almost 20,000 EUR per capita. The productivity gap even held when the measure was corrected by the higher wage payments of more than 7,000 EUR. Foreign firms also spent around 2,000 EUR

[14] The application of quantile regressions does not produce any feasible results here due to convergence issues.

more on R&D activities per person and had around four percent of all employees engaged in this area, which is twice the share of their domestic counterparts. All these differences were statistically significant at a high level of $\alpha < 0.01$. Only returns on sales did not exhibit a quantitatively relevant difference nor are they significantly different from each other at any conventional level. The picture remained the same if foreign-controlled affiliates were compared to domestic exporters. Differences in this case were slightly smaller but still present. Even if domestic affiliates with an export intensity of at least thirty percent served as comparison group, foreign affiliates generated a productivity premium of more than 9,000 EUR in 2007 and more than 7,000 EUR in 2008. The wage adjustment supported this result. In contrast, no significant differences remained in R&D intensity and firm size.

[Table 3 about here]

To examine whether these differences resulted from the possible self-selection of foreign-controlled enterprises into more productive subsectors of manufacturing or from size advantages (i.e. greater economies of scale or market power), industry and size effects were controlled for in premium regressions (cf. Section 5). As can be seen in Table 4, estimations of model one revealed statistically highly significant coefficients for the foreign ownership dummy variable, and these gaps persisted after incorporating size covariates in the model. However, as expected, differences tended to shrink in model two and significant size coefficients pointed to a generally positive influence on measured firm performance (Table A2).[15] Quantitatively speaking, in the conditional mean comparison afforded by model two, foreign-controlled affiliates ceteris paribus were more productive by over 14,000 EUR, paid around seventeen percent higher wages,[16] and were more likely to invest in R&D and to engage in exporting, both by more than eight percent. Also, the magnitude of R&D per capita investments was more pronounced, with a moderate average difference of around 900 EUR. Coefficients of export intensity were estimated via GLM with a logit link function (cf. Section 5) and could therefore not be interpreted quantitatively. However, to offer an impression of the extent of these differences, simulations for hypothetical enterprises were

[15] A negative and significant coefficient of the squared firm size points to a hump-shaped function but the maximum lies far outside the actually observed data and can therefore be neglected for interpretation. Only regarding profitability, size covariates seem not to have a significant influence and the impact on export intensity is rather small.

[16] Coefficients from estimations of log variables are obtained via exponential transformation $100*(\exp(\beta_x)-1)$.

conducted and reported in Table 5. Profitability was the only performance measure under consideration that showed comparable significance levels by no means.

[Table 4 about here]

[Table 5 about here]

Significant differences again remained if the domestic comparison group was restricted to only exporting affiliates. After going one step further and limiting the reference group to enterprises with greater than thirty percent export intensity, interestingly, the labor productivity premium was still 6,500 EUR in 2007 and 5,100 EUR in 2008 data, significant at the one-percent level. However, this gap may have been mostly driven by the seven percent average wage premium, received by workers in foreign-owned affiliates, since differences in wage adjusted labor productivity were far from being statistically significant. Advantages regarding R&D intensity can likewise not be acknowledged as the probability to invest in R&D appears lower by eight percent and other indicators are insignificant.

To assess whether performance differences in means also appeared along distributions, common percentiles are reported in Table 6. Although the hierarchy at quantiles mainly lent support to mean comparison results, exceptions illustrated heterogeneity concerns, such as the lower quantiles of adjusted labor productivity. Furthermore, the Kolmogorov-Smirnov test was applied to test whether the empirical distribution function of a particular performance measure stochastically dominated another (cf. Section 5). The p-values reported in Table 7 clearly motivated the rejection of the null hypothesis stating that distributions are equal in all cases in which differences were reported in previous stages of the analysis. The two-sided tests also supported the assumption of superior performance for the group of foreign-controlled enterprises in these cases. The sole exception was adjusted labor productivity, where the hypothesis that values of foreign units were smaller than others could not be rejected at a defensible level in every comparison. Besides this one exception, results indicated that foreign-controlled firms enjoy superior performance in both unconditional and condition mean comparisons both in averages and along all values of the empirical distribution functions according to the concept of first order stochastic dominance.

[Table 6 about here]

[Table 7 about here]

According to the previously presented results, there is strong empirical evidence for significant performance gaps between domestic- and foreign-controlled affiliates in favor of the latter. However, conclusions regarding underlying determinants and causality were far from feasible. That being said, the interaction of foreign affiliates with varying populations of domestic entities revealed patterns that reflected a "pecking-order"; the more domestic affiliates exported, or, in other words, the more enterprises were internationalized, the better their average performance measures. This fact led to decreasing differences with foreign-controlled enterprises. When an export intensity of more than thirty percent was reached, the foreign productivity premium becomes hard to defend, since, once corrected by wages, differences become insignificant. Although export intensity was basically an approximation for multinationality, this result could point to the fact that multinationality is a way more important determinant for firm performance than foreignness.

Following the wide spread assumption that companies engage in FDI to exploit their specific advantages - in manufacturing due to superior technology first and foremost (cf. Section 2), perhaps performance advantages are more likely to emerge in sectors where production technology plays a major role. For this purpose, a separate analysis of performance differences by high- and low-tech sectors was carried out according to the OECD classification (see Laafia 2002: 7). The sector distribution by enterprise type is shown in Table 1 and reveals a considerably salient foreign presence in high-tech sectors, namely of around eighteen percent, seven percentage points more than in low-tech. The conditional mean comparison of performance gaps between these areas may be surprising, as differences were much more pronounced in the low-tech comparison, at least for 2007 data (Table 8). A possible explanation could be the overall high level of technological sophistication in the German economy, which implies that German-controlled enterprises can compete with technological advances of their foreign counterparts.[17] However, these differences disappeared in the 2008 data, which were traced back to a relatively sharp

[17] This did not oppose the substantial FDI in the German high-tech sectors, since asset-seeking or technology-sourcing strategies (cf. Section 2) should be considered additionally.

decline in mean productivity for foreign subsidiaries.[18] By and large, there were no notable differences regarding evidence for performance gaps once high- and low-sectors were examined separately.

[Table 8 about here]

6.2 Country-of-origin effects

Theoretical considerations and also some empirical surveys argued for the existence of performance differences due to the national origins of investment (cf. Section 2). For example, studies found a productivity advantage exclusively for US firms (e.g. Criscuolo and Martin 2009). Thus, accounting for heterogeneity of the foreign-owned enterprise group in terms of group head location, firms were broken down in three categories by country of origin. The distribution turned out to be very similar to general inward FDI statistics (Deutsche Bundesbank 2010), wherein the US was the outstanding extra-European investor with more than twenty percent of all majority foreign-owned affiliates. Only nine percent were controlled by group heads located in other extra-European countries, while around seventy percent can be traced back to European countries (Table 9).[19]

The simple mean comparison of performance measures revealed that there was a statistically significant performance premium in favor of all three groups of origin when compared to their domestic counterparts (see Table 9). Only the difference between domestic affiliates and other extra-European firms found no confirmation in the t-test. Table 10 showed not only coefficients from conditional premium regressions but also p-values from testing these coefficients against each other. More precisely, the alternative hypothesis that coefficients were statistically different from each other was tested via f- and χ^2-statistics.

US firms enjoyed a productivity advantage of around 10,000 EUR across all domestic comparison groups, although a general premium could not be exclusively assigned to US affiliates. Looking at wage adjusted labor productivity, only coefficients of European and US

[18] The mean value of labor productivity declines by almost ten percent from 2007 to 2008, which was a change from 81,620 EUR to 73,574 EUR in absolute numbers. Other unconditional mean values are not reported here for reasons of space.

[19] Note that the term *European countries* refers to members of the European Economic Area and Switzerland, excluding special and overseas territories.

affiliates were significantly different from zero and became insignificant when compared to domestically-controlled subsidiaries with an export intensity of at least thirty percent. This probably indicates that productivity differences in general were not straightforward when the domestic reference group showed a high degree of internationalization. Additionally, US enterprises appeared to have higher export intensities (for an estimate of the magnitude, see Table 5) but no higher probability to export than that for European firms. Moreover, European enterprises seemed to pay lower average wages than all other foreign firms by up to nine percent, as compared to US firms.[20]

[Table 9 about here]

[Table 10 about here]

6.3 Differences among foreign-controlled enterprises by ownership type

Almost all studies in the field of foreign-owned firms use the adjectives *foreign-owned* and *multinational* interchangeably. According to the most widely accepted definition, a multinational enterprise is "an enterprise that engages in foreign direct investment (FDI) and owns or, in some way, controls value-added activities in more than one country" (Dunning and Lundan 2008: 3). This assumption appears appropriate since foreign-owned affiliates are foreign direct investments by definition. However, problems arise if the ultimate controlling institutional unit is, for example, an individual rather than an enterprise in the strict sense. Moreover, this implicit conclusion may lead to misinterpretation and distort the relationship between theory and empiricism, as it is furthermore assumed that the traditional MNE theories apply without modification. The problem is that the FDI label, especially if there is a threshold of at least 51 percent, not only implies a lasting interest of the investor but also integration into the production process of the controlling unit. For instance, this is the line of argument most studies use to assume the public-good transfer of specific advantages, and, therefore, a superior performance of foreign-controlled firms. Although majority owners that are rather portfolio-oriented, such as financial institutions, could also transfer competitive advantages such as knowledge, those cases put certain strain on the legitimacy of the scope of this assumption.

[20] Note again that differences in wages can merely be due to different qualification levels of the workforce.

Since the new database contained information on the group head type, two groups were created to investigate whether the type of group head affected performance gaps. For the first, enterprises which were very likely to be bound into a multinational production network are called “classical MNEs”, since their ultimate controlling institutional unit was an industrial company. The second group contained enterprises whose mechanisms and modes of operation differed from classic MNEs. Controlling investors of this group could be individuals and families, banks, insurance, and other financial companies, mutual and pension funds, or states and governments (cf. Weche Gelübcke 2011a). The second group comprised 20 percent and 22 percent of the data in 2007 and 2008, respectively.

The nontraditional MNEs paid lower average wages and had considerably lower average R&D intensity and export quota as compared with affiliates of an industrial company, at least in 2008 (Table 11 and 12). These results may lend support to the idea that these affiliates neither serve as technology-seeking instruments for a foreign group head nor engage in intra-firm trade. However, other performance measures were not significantly different, calling the relevance of technological transfer advantages into question. In the framework of portfolio investments, it seems more plausible to assume a self-selection process of foreign ownership, irrespective of multinational status. This becomes an important aspect when it comes to the evaluation of causal determinants of performance gaps.

[Table 11 about here]

[Table 12 about here]

7. Concluding remarks

Foreign-controlled enterprises carry remarkable economic weight within the German economy, particularly the German manufacturing sector. Policy decisions regarding foreign enterprises should be based upon stylized facts from empirical investigations. To move towards this objective, this study used new data from German official statistics to examine performance differences of foreign-controlled enterprises in the manufacturing sector for the first time. This database possesses the advantage of high-quality data, affording a look at previously neglected performance variables, such as R&D intensity, which are of high

importance for the German economy. Moreover, this study contributes to literature by offering a sector-specific analysis and considers the enterprise rather than the establishment level.

By and large, foreign-controlled affiliates enjoyed performance advantages as compared to their domestically-controlled counterparts. Foreign-controlled enterprises were larger and exhibited economically relevant performance premiums in productivity measures, R&D and export intensity. Foreign-controlled firms also paid above-average wages, even when industry and size effects were accounted for. Only profitability did not significantly differ from German-owned enterprises, which agreed with the mixed results from other international studies but contradicted results for the German service sector, in which the average return on sales was lower for foreign affiliates (Weche Gelübcke 2011b). Differences in labor productivity persisted even when indigenous enterprises with a high degree of internationalization served as the reference group and when analysis was split into high- and low-tech sectors. The latter result contradicted Temouri et al. (2008), who found a performance premium only in the high-tech manufacturing sector.

These labor productivity gaps, regardless of the mechanism, may have been driven by a wage premium. Results for R&D intensities appeared in line with previous work, as there was no premium left when domestically-owned affiliates with a striking degree of internationalization were considered. Hence, one should assume a considerable number of foreign affiliates in German manufacturing engaged in more than purely asset exploiting strategies. In a breakdown by country of origin, US affiliates stood out for higher productivity and export intensity within the population of foreign affiliates, but were not more likely to engage in exporting. European affiliates were distinctive in their significantly lower average wages.

Performance differences were also examined between foreign affiliates which were part of a multinational production chain in the classical sense, and those which were under foreign ownership via other, less conventional means. Unfortunately, evidence was not clear-cut and differences appeared only in 2008 data. Nevertheless, more research should be done in this area to introduce a different view on the heterogeneous group of foreign-controlled firms and to counter possible inaccuracies regarding the interpretation of empirical results.

Although this analysis certainly had several limitations, such as the "non-explanatory" character of premium regressions, missing information on the multinational status of domestic firms, and general shortcomings of cross-section data, it provided reliable results on the relative performance of foreign-controlled affiliates in the German manufacturing sector. These conclusions were strengthened by the similarity in performance gap results for two reporting years. Future enhancements of the overall database on international control linkages, for example with respect to FATS or the EuroGroups register (Eurostat 2010), would permit a more comprehensive, long-overdue empirical investigation of foreign-controlled economic activities across Europe.

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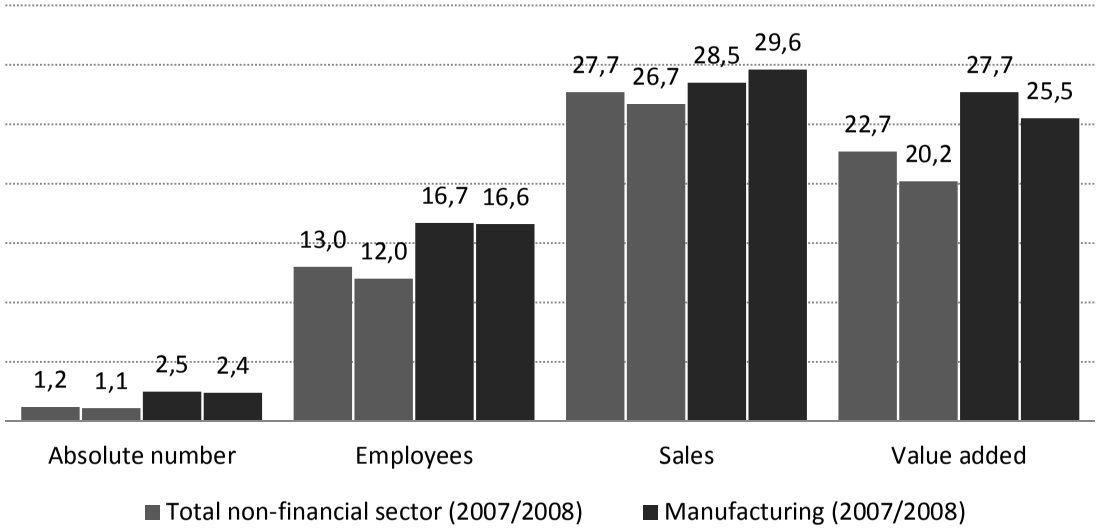
Appendix

[Table A1 about here]

[Table A2 about here]

Figure 1: Foreign-controlled enterprises in German non-financial sectors (%)



Source: according to Feuerhake et al. (2010) and Nahm (2011).
Note: 2007 data according to German industry classification 2003 and 2008 data according to classification 2008.

Table 1: Enterprise groups

	2007			*2008*		
	All	*High-tech*	*Low-tech*	*All*	*High-tech*	*Low-tech*
N	14,162	5,784	8,378	16,746	6,965	9,781
Foreign-controlled affiliates	13.99 (1,981)	18.29 (1,058)	11.02 (923)	13.44 (2,250)	17.57 (1,224)	10.49 (1,026)
Domestically-controlled affiliates	44.06 (6,239)	42.46 (2,456)	45.15 (3,783)	42.84 (7,174)	42.94 (2,991)	42.77 (4,183)
Domestically-controlled affiliates that export	35.29 (4,997)	37.24 (2,154)	33.93 (2,843)	33.74 (5,650)	36.73 (2,558)	31.61 (3,092)
Domestically-controlled affiliates with export quota ≥ 30%	16.27 (2,304)	22.04 (1,275)	12.28 (1,029)	15.62 (2,616)	20.86 (1,453)	11.89 (1,163)

Note: Reported are percentages with absolute numbers in brackets; High-tech industries include the medium- and high-tech sectors according to the OECD sectoral approach (see Laafia 2002: 7).

Table 2: Summary statistics

Y	*year*	*mean*	*std.dev.*	*p1*	*p10*	*p25*	*p50*	*p75*	*p90*	*p99*
Employees	2007	301.76	2,064.02	19	29	45.5	93	227	552	2,854
	2008	266	1,915.58	20	28.5	42	83	196	478	2,484
Labor	2007	64,326.76	42,281.69	10,226.12	29,191.08	40,733.62	56,699.64	77,346.53	105,159.9	209,149.5
productivity[a]	2008	60,770	44,632.26	8,931.03	27,078.63	38,578.63	53,498.3	72,815.12	99,843.71	203,040.3
Wage adjusted	2007	178.71	85.28	36.32	116.78	138.1	163.08	200.11	255.42	483.46
labor productivity	2008	172.29	88.22	25.58	111.52	133.74	158.09	193.9	244.75	481.26
Return on sales	2007	10.5	32.69	-20.72	-1.1	4.07	9.65	16.46	24.21	44.1
	2008	9.7	18.49	-21.04	-2.38	3.14	8.62	15.45	23.23	45.08
Wage per capita[a]	2007	35,686.39	12,151.21	12,483.41	20,702.63	27,037.09	35,014.93	43,202.22	50,938.47	68,465.81
	2008	35,007.8	12,006.69	12,457.49	20,243.61	26,307.32	34,161.01	42,488.01	50,501.07	67,629.22
R&D investment	2007	2,210.42	7,547.76	0	0	0	0	1,175.72	6,191.51	30,102.98
per capita[a]	2008	2,130.88	7,315.21	0	0	0	0	1,108.23	5,942.86	29,689.8
R&D employees	2007	2.39	6.11	0	0	0	0	1.82	7.74	29.73
(%)	2008	2.42	5.93	0	0	0	0	1.95	8.02	29.33
Export intensity	2007	26.44	26.71	0	0	0.98	18.54	45.35	67.31	94.72
(%)	2008	25.49	26.51	0	0	0.56	16.99	43.67	66.51	94.54

N: 14,166(2007); 16,746(2008).
Note: [a] In EUR per year.

Table 3: Unconditional means by enterprise group

Y	*Foreign controlled affiliates*		*Domestically controlled affiliates*					
			All affiliates		*Exporter*		*Export intensity ≥ 30 %*	
	2007 (N: 1,981)	2008 (N: 2,250)	2007 (N: 6,239)	2008 (N: 7,174)	2007 (N: 4,997)	2008 (N: 5,650)	2007 (N: 2,304)	2008 (N: 2,616)
Employees	495.01	443.86	285.63***	251.62***	319.77***	284.08***	479.87	410.45
	(1,179.17)	(1,093.2)	(1,183.62)	(986.92)	(1,314.01)	(1,101.85)	(1,887.07)	(1,526.02)
Labor productivity	83,557.03	79,373.96	64,413.3***	60,845.2***	66,958.91***	63,964.19***	74,280.07***	71,812.57***
	(58,833.46)	(66,849.09)	(39,078.91)	(40,453.17)	(39,865.1)	(42,005.04)	(42,320.07)	(49,093.36)
Wage adjusted	192.17	184.04	179.44***	171.94***	180.61***	173.78***	184.27**	178.58*
labor productivity	(110.2)	(130.16)	(85.93)	(82.11)	(88.42)	(83.35)	(86.61)	(89.4)
Return on sales	10.23	9.05	10.07	9.54	10.1	9.77	11.02	10.65*
	(30.06)	(23.31)	(42.23)	(18.82)	(16.49)	(19.83)	(14.65)	(24.0)
Wage per capita	43,245.65	43,200.04	35,812.05***	35,215.09***	37,071.96***	36,698.79***	40,256.14***	40,057.31***
	(11,761.39)	(12,079.86)	(11,659.39)	(11,232.46)	(11,341.68)	(11,015.16)	(11,217.6)	(11,217.23)
R&D investment	4,415.6	4,175.9	2,119.54***	2,196.45***	2,568.21***	2,663.24***	4,155.45	4,126.63
	(9,839.37)	(9,918.84)	(6,804.51)	(7,634.78)	(7,463.28)	(8,429.36)	(8,977.32)	(10,560.89)
R&D employees	4.19	3.91	2.27***	2.4***	2.71***	2.87***	4.1	4.06
	(7.88)	(7.42)	(5.64)	(5.72)	(6.07)	(6.14)	(7.1)	(6.85)
Export intensity	43.2	42.82	25.45***	24.95***	31.77***	31.68***	54.6***	54.23***
	(28.7)	(28.67)	(25.7)	(25.59)	(24.98)	(24.86)	(17.07)	(17.09)

Note: Reported are mean values with standard deviation in brackets; Significance levels for t-test of statistical differences versus means of foreign-controlled enterprises at the 10% (*), 5% (**) and 1% (***) level (see Table A1 in the appendix for exact p-values).

Table 4: Regression estimates

Variable (Y)	*Year*	*Reference group of domestic affiliates*					
		All affiliates (estimates with N = 8,220(2007); 9,424(2008))		*Exporter* (estimates with N = 6,973(2007); 7,900(2008))		*Export intensity ≥ 30 %* (estimates with N = 4,285(2007); 4,866(2008))	
		(1)	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*
Employees[a]	2007	164.63***	-	136.53***	-	-17.03	-
		(5.23)		(4.13)		(0.34)	
	2008	164.39***	-	136.94***	-	5.88	-
		(6.15)		(4.91)		(0.15)	
Labor productivity[a]	2007	16,278.51***	15,027.46***	13,926.15***	12,910.38***	6,619.19***	6,467.38***
		(12.54)	(11.48)	(10.64)	(9.81)	(4.57)	(4.48)
	2008	15,232.81***	14,054.2***	12,548.33***	11,629.19***	5,270.38***	5,112.66***
		(11.4)	(10.44)	(9.41)	(8.67)	(3.48)	(3.38)
Wage adjusted labor productivity[a]	2007	10.64***	10.58***	8.94***	8.9***	2.59	2.59
		(4.08)	(4.02)	(3.37)	(3.33)	(0.88)	(0.88)
	2008	9.85***	9.69***	7.42***	7.39***	0.77	0.78
		(3.55)	(3.44)	(2.65)	(2.6)	(0.25)	(0.25)
Return on sales[a]	2007	-0.13	-0.18	-0.33	-0.34	-0.91	-0.92
		(0.14)	(0.19)	(0.42)	(0.44)	(1.11)	(1.12)
	2008	-0.77	-0.83	-0.98*	-1.03*	-1.77**	-1.78**
		(1.41)	(1.48)	(1.72)	(1.76)	(2.38)	(2.39)
Wage per capita[a]	2007	6,536.83***	5,867.65***	5,492.03***	4,948.37***	2,928.1***	2,851.16***
		(22.92)	(20.83)	(18.88)	(17.3)	(8.74)	(8.79)
	2008	6,731.54***	6,092.11***	5,610.49***	5,097.2***	2,924.26***	2,833.88***
		(24.98)	(22.87)	(20.41)	(18.85)	(9.21)	(9.17)
R&D investment[a]	2007	1,503.57***	984.9***	1,155.49***	712.53***	17.91	-42.79
		(6.64)	(4.31)	(4.93)	(3.03)	(0.06)	(0.16)
	2008	1,365.16***	886.48***	983.64***	579.02**	-180.7	-255.25
		(6.2)	(3.93)	(4.28)	(2.48)	(0.61)	(0.88)
R&D employees[a]	2007	1.21***	0.93***	0.86***	0.63***	-0.09	-0.12
		(6.82)	(5.33)	(4.72)	(3.49)	(0.39)	(0.54)
	2008	0.96***	0.71***	0.57***	0.36**	-0.28	-0.31
		(5.96)	(4.41)	(3.45)	(2.21)	(1.42)	(1.63)
R&D investment probability[c]	2007	0.36***	0.25***	0.22***	0.13***	-0.09**	-0.13***
		(10.49)	(6.96)	(6.27)	(3.38)	(2.22)	(3.12)
	2008	0.3***	0.2***	0.16***	0.06*	-0.15***	-0.19***
		(9.49)	(5.7)	(4.81)	(1.72)	(4.04)	(4.99)
Marginal effects	2007	0.14	0.1	0.09	0.05	-0.04	-0.05
	2008	0.12	0.08	0.06	0.02	-0.06	-0.08

Export intensity[b]	2007	0.69***	0.65***	-	-	-	-
		(21.94)	(20.45)				
	2008	0.73***	0.68***	-	-	-	-
		(24.52)	(22.72)				
Export probability[c]	2007	0.5***	0.43***	-	-	-	-
		(10.21)	(8.71)				
	2008	0.57***	0.5***	-	-	-	-
		(12.59)	(10.72)				
Marginal effects	2007	0.1	0.08				
	2008	0.12	0.1				
Log(employees)[a]	2007	0.57***	-	0.5***	-	0.19***	-
		(19.05)		(16.09)		(5.17)	
	2008	0.58***	-	0.49***	-	0.18***	-
		(21.06)		(17.25)		(5.27)	
Log(wage per capita)[a]	2007	0.18***	0.16***	0.15***	0.13***	0.07***	0.07***
		(24.87)	(23.0)	(19.95)	(18.54)	(8.95)	(8.99)
	2008	0.18***	0.17***	0.15***	0.13***	0.07***	0.07***
		(26.19)	(24.16)	(20.74)	(19.25)	(8.88)	(8.82)

Note: Reported are coefficients with |t-/z-values| in brackets; Model 1 includes 2-digit industry dummies, model 2 controls for size additionally; [a] OLS estimator; [b] GLM estimator; [c] Probit estimation; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table 5: Simulations of export intensity for hypothetical enterprises (%)

year	*group*	*model 1*	*model 2 (number of employees)*			
			10	*100*	*500*	*1000*
2007	Foreign-controlled affiliates	0,42	0,31	0,31	0,34	0,37
	Domestically-controlled affiliates	0,26	0,19	0,19	0,21	0,23
	Origin of control: US			0,61		
	Europe			0,53		
	other			0,56		
2008	Foreign-controlled affiliates	0,51	0,31	0,32	0,35	0,38
	Domestically-controlled affiliates	0,34	0,19	0,19	0,21	0,24
	Origin of control: US			0,58		
	Europe			0,51		
	other			0,6		

Table 6: Quantiles by enterprise group

Y	*year*	*group*	*p10*	*p25*	*p50*	*p75*	*p90*
Employees	2007	Foaff	52	99.2	214.5	476.5	1011
		Doaff	31	50	102	240	568
		Doaffex	32.7	53.5	113.5	271	628
		Doaffex30	41	74	160.5	411.25	855
	2008	Foaff	47.5	90.5	183.75	425.1	888.65
		Doaff	30.5	46.6	93.75	211	502
		Doaffex	32	50.1	104.5	237	569.5
		Doaffex30	38	65	143	354.5	790
Labor productivity	2007	Foaff	38,786.23	53,585.21	72,793.2	98,639.13	131,987.9
		Doaff	30,360.93	42,300.53	57,399.2	77,130.03	103,788.6
		Doaffex	33,521.04	44,908.49	59,572.96	79,444.35	105,827.2
		Doaffex30	38,474.27	50,868.7	66,859.53	87,781.57	116,449.9
	2008	Foaff	34,460.55	51,029.6	70,671.39	96,206.44	130,776.5
		Doaff	28,686.18	39,801.55	54,302.67	72,887.23	97,533.07
		Doaffex	31,477.02	43,003.32	56,916.56	75,755.24	101,223.7
		Doaffex30	35,906.98	48,425.85	64,435.1	83,633.2	113,849.6
Wage adjusted labor productivity	2007	Foaff	107.54	140.18	174.71	221.45	287.73
		Doaff	116.43	138.55	163.69	201.44	256.33
		Doaffex	116.13	139.36	164.88	203.45	257.69
		Doaffex30	117.7	142	168.42	210.14	264.7
	2008	Foaff	96.79	132.64	167.38	216.24	282.97
		Doaff	110.92	133.71	158.87	194.17	244.66
		Doaffex	111.28	134.84	160.47	196.49	247.48
		Doaffex30	113.47	137.03	164.27	202.42	258.58
Return on sales	2007	Foaff	-3.04	3.77	10.13	17.52	26.71
		Doaff	-1.3	3.9	9.4	16.24	23.58
		Doaffex	-1.37	3.96	9.6	16.38	23.67
		Doaffex30	-0.61	4.56	10.49	17.18	24.73
	2008	Foaff	-5.56	2.18	8.93	17.03	25.29
		Doaff	-2.53	3.0	8.4	15.05	22.33
		Doaffex	-2.33	3.22	8.6	15.36	22.94
		Doaffex30	-1.67	3.64	9.28	16.13	24.66
Wage per capita	2007	Foaff	29,145.28	35,528.45	42,799.71	49,673.7	57,445.59
		Doaff	21,635.4	27,764.69	35,169.82	42,721.14	50,108.56
		Doaffex	23,517.63	29,200	36,330.69	43,593.61	50,944.43
		Doaffex30	26,931.37	32,871.38	39,786.34	46,893.66	53,978.1
	2008	Foaff	28,127.12	34,865.54	42,807.18	50,536.01	57,852.64

		Doaff	21,398.45	27,254.04	34,446.97	42,268.64	49,464.35
		Doaffex	23,241.5	28,869.02	35,951.37	43,393.03	50,574.38
		Doaffex30	26,276.7	32,278.44	39,546.39	46,677.29	54,394.67
R&D investment	2007	Foaff	0	0	364.16	4,817.46	12,389.28
		Doaff	0	0	0	1,178.65	6,092.76
		Doaffex	0	0	0	2,000	7,500
		Doaffex30	0	0	647.9	4,666.53	12,052.51
	2008	Foaff	0	0	66.61	4,580.46	11,985.76
		Doaff	0	0	0	1,339.9	6,071.74
		Doaffex	0	0	0	2,103.51	7,634.44
		Doaffex30	0	0	655.0	4,453.78	11,243.32
R&D employees	2007	Foaff	0	0	0.5	5.22	12.56
		Doaff	0	0	0	1.94	7.48
		Doaffex	0	0	0	2.82	8.94
		Doaffex30	0	0	0.99	5.14	12.5
	2008	Foaff	0	0	0	4.86	11.99
		Doaff	0	0	0	2.06	7.94
		Doaffex	0	0	0	3.13	9.5
		Doaffex30	0	0	0.97	5.26	12.42
Export intensity	2007	Foaff	2.38	17.81	42.85	65.97	82.35
		Doaff	0	1.25	17.68	43.52	64.45
		Doaffex	2.5	9.8	27.03	50.13	68.69
		Doaffex30	33.73	40.51	52.11	65.99	79.99
	2008	Foaff	1.42	18.21	42.82	65.49	81.83
		Doaff	0	0.94	16.95	42.58	63.74
		Doaffex	2.48	9.7	27.37	49.2	68.25
		Doaffex30	34.1	40.01	51.19	65.66	80.13

N: See Table 1.
Note: Abbreviation foaff for foreign owned affiliates, doaff for domestically owned affiliates, doaffex for exporters, and doaffex30 for exporters with export intensity of at least thirty percent.

Table 7: Kolmogorov-Smirnov Test statistics (p-values)

Y	*Null hypotheses*	*Comparison group of domestically-controlled affiliates*					
		All affiliates		*Exporter*		*Export intensity ≥ 30 %*	
		2007	2008	2007	2008	2007	2008
Employees	H_0: equal	0.000	0.000	0.000	0.000	0.000	0.000
	H_0: fof>	0.000	0.000	0.000	0.000	0.000	0.000
	H_0: fof<	1.000	1.000	1.000	1.000	0.960	0.978
Labor productivity	H_0: equal	0.000	0.000	0.000	0.000	0.000	0.000
	H_0: fof>	0.000	0.000	0.000	0.000	0.000	0.000
	H_0: fof<	0.940	0.575	0.954	0.527	0.942	0.435
Wage adjusted	H_0: equal	0.000	0.000	0.000	0.000	0.000	0.000
labor productivity	H_0: fof>	0.000	0.000	0.000	0.000	0.000	0.000
	H_0: fof<	0.009	0.000	0.019	0.000	0.009	0.000
Return on sales	H_0: equal	0.014	0.000	0.023	0.000	0.008	0.001
	H_0: fof>	0.007	0.000	0.012	0.000	0.288	0.173
	H_0: fof<	0.013	0.001	0.017	0.001	0.004	0.000
Wage per capita	H_0: equal	0.000	0.000	0.000	0.000	0.000	0.000
	H_0: fof>	0.000	0.000	0.000	0.000	0.000	0.000
	H_0: fof<	1.000	1.000	1.000	0.999	1.000	0.998
R&D investment	H_0: equal	0.000	0.000	0.000	0.000	0.025	0.000
	H_0: fof>	0.000	0.000	0.000	0.000	0.560	0.708
	H_0: fof<	1.000	0.999	0.999	0.998	0.012	0.000
R&D employees	H_0: equal	0.000	0.000	0.000	0.000	0.020	0.000
	H_0: fof>	0.000	0.000	0.000	0.000	0.535	0.859
	H_0: fof<	1.000	0.999	1.000	0.998	0.010	0.000
Export intensity	H_0: equal	0.000	0.000	0.000	0.000	0.000	0.000
	H_0: fof>	0.000	0.000	0.000	0.000	0.230	0.329
	H_0: fof<	1.000	1.000	0.000	0.000	0.000	0.000

Table 8: Regression estimates by sector (model 2)

Variable (Y)	*Year*	*Reference group of domestic affiliates*					
		All affiliates		*Exporter*		*Export intensity ≥ 30 %*	
		2007	*2008*	*2007*	*2008*	*2007*	*2008*
Labor productivity[a]	Low-tech	17,015.36***	13,957.76***	14,640.27***	11,385.79***	9,278.51***	5,158.3**
		(8.08)	(6.96)	(6.99)	(5.84)	(4.02)	(2.45)
	High-tech	12,752.33***	13,881.29***	10,951.5***	11,625.31***	4,171.79**	5,097.62**
		(7.93)	(7.83)	(6.66)	(6.4)	(2.27)	(2.41)
Wage adjusted labor productivity[a]	Low-tech	17.78***	14.56***	15.46***	11.8**	10.23**	4.33
		(3.96)	(3.07)	(3.4)	(2.47)	(2.0)	(0.82)
	High-tech	4.06	5.83*	3.05	4.0	-3.14	-1.43
		(1.39)	(1.79)	(1.02)	(1.21)	(0.92)	(0.38)
Return on sales[a]	Low-tech	-0.91	0.36	-0.36	0.19	-1.22	-0.05
		(0.65)	(0.69)	(0.26)	(0.35)	(0.81)	(0.08)
	High-tech	0.76	-1.89*	-0.18	-2.09**	-0.5	-3.11**
		(0.69)	(1.94)	(0.31)	(2.08)	(0.72)	(2.51)
Wage per capita[a]	Low-tech	4,919.27***	5,062.78***	3,951.87***	4,086.88***	2,252.02***	2,057.76***
		(13.29)	(14.55)	(10.52)	(11.58)	(5.0)	(4.98)
	High-tech	6,527.43***	6,764.35***	5,670.22***	5,756.95***	3,234.18***	3,322.27***
		(15.63)	(17.18)	(13.39)	(14.41)	(7.05)	(7.49)
R&D investment[a]	Low-tech	669.52***	368.11***	541.29***	221.73*	106.84	-229.33
		(4.23)	(3.11)	(3.29)	(1.79)	(0.49)	(1.42)
	High-tech	1,514.91***	1,502.79***	1,080.63**	1,023.75**	-27.08	-190.66
		(3.71)	(3.68)	(2.58)	(2.43)	(0.06)	(0.38)
R&D employees[a]	Low-tech	0.5***	0.27**	0.32**	0.09	0.01	-0.35**
		(3.32)	(2.39)	(2.05)	(0.75)	(0.07)	(2.29)
	High-tech	1.42***	1.13***	0.97***	0.63**	-0.17	-0.26
		(4.51)	(3.96)	(3.03)	(2.17)	(0.47)	(0.82)
R&D investment probability[c]	Low-tech	0.24***	0.2***	0.11**	0.06	-0.14**	-0.24***
		(4.74)	(4.01)	(2.19)	(1.17)	(2.28)	(4.14)
	High-tech	0.25***	0.18***	0.12**	0.05	-0.13**	-0.17***
		(4.88)	(3.86)	(2.37)	(1.06)	(2.17)	(3.24)
Export intensity[b]	Low-tech	0.67***	0.65***	-	-	-	-
		(12.85)	(12.65)				
	High-tech	0.61***	0.64***	-	-	-	-
		(14.19)	(16.09)				
Export probability[c]	Low-tech	0.43***	0.54***	-	-	-	-
		(6.58)	(8.49)				
	High-tech	0.43***	0.44***	-	-	-	-

		(5.67)	(6.59)				
Log(wage per capita)[a]	Low-tech	0.15***	0.15***	0.11***	0.12***	0.06***	0.05***
		(14.58)	(14.96)	(11.08)	(11.35)	(5.18)	(4.56)
	High-tech	0.17***	0.17***	0.14***	0.14***	0.08***	0.08***
		(17.04)	(18.28)	(14.34)	(15.01)	(7.08)	(7.41)

N: Low-tech estimates with 4,661(2007) and 5,209(2008) vs. all affiliates, 3,766(2007) and 4,118(2008) vs. exporters, and 1,952(2007) and 2,189(2008) vs. exporters with high export intensity. High-tech estimates with 3,514(2007) and 4,215(2008) vs. all affiliates, 3,212(2007) and 3,782(2008) vs. exporters, and 2,333(2007) and 2,677(2008) vs. exporters with high export intensity.
Note: Reported are coefficients with |t-/z-values| in brackets; Model 2 includes 2-digit industry dummies and controls for firm size additionally; High-tech industries include the medium- and high-tech sectors according to the OECD sectoral approach (see Laafia 2002: 7); [a] OLS estimator; [b] GLM estimator; [c] Probit estimation; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table 9: Unconditional means by country of origin with t-test statistics

Y	*Foreign-controlled enterprises by country of origin*			*T-test (p-values) by domestically-controlled comparison groups*					
				All affiliates		*Exporter*		*Export intensity ≥ 30 %*	
	Country	*2007*	*2008*	*2007*	*2008*	*2007*	*2008*	*2007*	*2008*
Employees	US	665.5	639.29	0.0000	0.0000	0.0001	0.0000	0.0464	0.0046
		(1,704.3)	(1,637.19)						
	Europe	451.04	387.73	0.0000	0.0000	0.0001	0.0003	0.5544	0.5550
		(1,047.21)	(928.39)						
	Other	374.82	367.76	0.0311	0.0006	0.1970	0.0166	0.0559	0.3255
		(491.39)	(437.56)						
Labor productivity	US	94,090.55	91,915.42	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		(76,272.86)	(93,127.29)						
	Europe	81,334.37	76,036.02	0.0000	0.0000	0.0000	0.0000	0.0001	0.0203
		(54,356.83)	(58,990.66)						
	Other	83,574.98	77,048.36	0.0000	0.0000	0.0001	0.0005	0.0240	0.1672
		(51,224.8)	(50,761.25)						
Wage adjusted labor productivity	US	195.48	189.39	0.0101	0.0045	0.0177	0.0113	0.0789	0.0864
		(123.42)	(132.51)						
	Europe	194.42	184.02	0.0000	0.0011	0.0000	0.0059	0.0041	0.1696
		(110.17)	(135.63)						
	Other	183.06	172.17	0.6162	0.9709	0.7368	0.8037	0.8686	0.3306
		(90.94)	(88.03)						

Return on sales	US	11.79	10.93	0.0619	0.1360	0.0318	0.2202	0.3373	0.7884
		(15.12)	(19.79)						
	Europe	10.76	9.08	0.2891	0.3039	0.1341	0.1398	0.6011	0.0098
		(13.53)	(14.88)						
	Other	3.28	3.75	0.3516	0.1794	0.3483	0.1628	0.2881	0.1113
		(93.11)	(59.56)						
Wage per capita	US	47,239.88	47,536.56	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		(11,978.18)	(11,572.28)						
	Europe	41,781.99	41,641.15	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
		(11,478.71)	(11,748.63)						
	Other	45,232.06	45,308.97	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		(11,624.33)	(12,885.81)						
R&D investment	US	6091.29	6316.4	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000
		(10,885.49)	(10,609.8)						
	Europe	3,797.56	3,480.29	0.0000	0.0000	0.0000	0.0037	0.2630	0.0506
		(9,403.61)	(9,854.67)						
	Other	4,934.93	4,552.99	0.0014	0.0010	0.0070	0.0082	0.3774	0.5588
		(11,056.92)	(9,702.01)						
R&D employees	US	5.73	5.74	0.0000	0.0000	0.0000	0.0000	0.0003	0.000
		(8.48)	(8.46)						
	Europe	3.68	3.28	0.0000	0.0000	0.0000	0.0468	0.1141	0.0007
		(7.81)	(7.13)						
	Other	4.14	4.32	0.0011	0.0001	0.0126	0.0040	0.9381	0.6071
		(7.19)	(6.82)						
Export intensity	US	51.69	50.71	0.0000	0.0000	0.0000	0.0000	0.0453	0.0079
		(28.45)	(28.07)						
	Europe	40.13	39.2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		(28.54)	(28.35)						
	Other	46	50.79	0.0000	0.0000	0.0000	0.0000	0.0002	0.0983
		(28.76)	(28.45)						

N: US 409(2007), 481(2008); Europe 1316(2007), 1459(2008); Other 165(2007), 193(2008).
Note: Reported are mean values with standard deviation in brackets; All values refer to foreign-owned firms, the associated values of the domestically-owned comparison groups are given in Table 3.

Table 10: Regression estimates by country of origin and reference group

Variable (Y)	*year*	*reference group*	*model*	*Country of origin*			*F-/Chi2-tests (H_0)*		
				US	*Europe*	*Other*	*us = eur*	*us = other*	*eur = other*
Employees[a]	2007	doaff	(1)	160.26	58.47	-48.68			
				(1.57)	(1.39)	(0.84)	(0.2638)	(0.0285)	(0.0427)
		doaffex	(1)	261.83***	109.18***	17.54			
				(3.01)	(3.37)	(0.39)	(0.0761)	(0.0067)	(0.0588)
		doaffex30	(1)	89.64	-40.27	-134.6**			
				(0.92)	(0.86)	(2.3)	(0.1317)	(0.0137)	(0.0625)
	2008	doaff	(1)	200.44**	38.69	-44.76			
				(2.24)	(1.02)	(0.79)	(0.0441)	(0.0028)	(0.0721)
		doaffex	(1)	301.6***	93.31***	42.27			
				(3.97)	(3.33)	(1.15)	(0.0067)	(0.0011)	(0.1913)
		doaffex30	(1)	301.6***	93.31***	42.27			
				(3.97)	(3.33)	(1.15)	(0.0067)	(0.0011)	(0.1913)
Labor productivity[a]	2007	doaff	(1)	25,498.85***	13,991.7***	14,720.65***			
				(7.05)	(9.55)	(3.85)	(0.0031)	(0.0391)	(0.8571)
			(2)	24,688.3***	13,651.92***	14,697.9***			
				(6.79)	(9.35)	(3.84)	(0.0046)	(0.0564)	(0.7961)
		doaffex	(1)	23,499.11***	12,022***	12,961.14***			
				(6.59)	(8.12)	(3.36)	(0.0030)	(0.0429)	(0.8170)
			(2)	21,774.24***	11,232.71***	12,658.4***			
				(6.02)	(7.61)	(3.28)	(0.0068)	(0.0816)	(0.7252)
		doaffex30	(1)	16,011.39***	4,563.85***	5,444.53			
				(4.49)	(2.77)	(1.38)	(0.0034)	(0.0422)	(0.8286)
			(2)	15,332.54***	4,560.99***	5,835.93			
				(4.27)	(2.78)	(1.48)	(0.0061)	(0.0692)	(0.7538)
	2008	doaff	(1)	25,490***	11,750.39***	10,457.27***			
				(6.29)	(7.58)	(2.97)	(0.0018)	(0.0050)	(0.7335)
			(2)	24,607.38***	11,490.36***	10,375.57***			
				(6.03)	(7.43)	(2.94)	(0.0030)	(0.0081)	(0.7695)
		doaffex	(1)	23,692.48***	9,945.24***	8,933.81**			
				(5.96)	(6.44)	(2.53)	(0.0017)	(0.0056)	(0.7900)
			(2)	21,889.69***	9,325.88***	8,511.02**			
				(5.41)	(6.07)	(2.4)	(0.0046)	(0.0127)	(0.8306)
		doaffex30	(1)	23,692.48***	9,945.24***	8,933.81**			
				(5.96)	(6.44)	(2.53)	(0.0017)	(0.0056)	(0.7900)
			(2)	21,889.69***	9,325.88***	8,511.02**			
				(5.41)	(6.07)	(2.4)	(0.0046)	(0.0127)	(0.8306)

Wage adjusted labor productivity[a]	2007	doaff	(1)	16.09***	12.15***	1.99			
				(2.61)	(3.98)	(0.28)	(0.5567)	(0.1233)	(0.1768)
			(2)	16.2***	12.19***	1.99			
				(2.62)	(3.99)	(0.28)	(0.5510)	(0.1209)	(0.1750)
		doaffex	(1)	14.24**	10.09***	0.2			
				(2.3)	(3.25)	(0.03)	(0.5387)	(0.1249)	(0.1885)
			(2)	14.31**	10.12***	0.19			
				(2.29)	(3.25)	(0.03)	(0.5357)	(0.1240)	(0.1874)
		doaffex30	(1)	7.87	3.7	-6.4			
				(1.26)	(1.07)	(0.89)	(0.5476)	(0.1200)	(0.1805)
			(2)	8.01	3.68	-6.52			
				(1.28)	(1.06)	(0.9)	(0.5325)	(0.1140)	(0.1761)
	2008	doaff	(1)	15.81***	9.54***	-1.92			
				(2.67)	(2.69)	(0.31)	(0.3590)	(0.0377)	(0.1072)
			(2)	15.82***	9.54***	-1.93			
				(2.66)	(2.69)	(0.31)	(0.3586)	(0.0377)	(0.1069)
		doaffex	(1)	13.7**	7.14**	-3.94			
				(2.33)	(2.0)	(0.63)	(0.3363)	(0.0382)	(0.1192)
			(2)	13.72**	7.14**	-3.96			
				(2.3)	(1.99)	(0.63)	(0.3370)	(0.0386)	(0.1188)
		doaffex30	(1)	13.7**	7.14**	-3.94			
				(2.33)	(2.0)	(0.63)	(0.3363)	(0.0382)	(0.1192)
			(2)	13.72**	7.14**	-3.96			
				(2.3)	(1.99)	(0.63)	(0.3370)	(0.0386)	(0.1188)
Return on sales[a]	2007	doaff	(1)	1.08	0.44	-7.59			
				(1.22)	(0.63)	(1.03)	(0.4499)	(0.2338)	(0.2732)
			(2)	1.09	0.44	-7.59			
				(1.25)	(0.64)	(1.03)	(0.4471)	(0.2342)	(0.2733)
		doaffex	(1)	0.86	0.38	-7.65			
				(1.1)	(0.84)	(1.04)	(0.5627)	(0.2410)	(0.2727)
			(2)	0.88	0.38	-7.65			
				(1.13)	(0.86)	(1.04)	(0.5545)	(0.2424)	(0.2732)
		doaffex30	(1)	0.26	-0.17	-8.24			
				(0.31)	(0.34)	(1.11)	(0.6144)	(0.2415)	(0.2736)
			(2)	0.27	-0.17	-8.25			
				(0.33)	(0.34)	(1.11)	(0.5993)	(0.2425)	(0.2739)
	2008	doaff	(1)	0.75	-0.74	-6.26			
				(0.81)	(1.63)	(1.46)	(0.1305)	(0.1082)	(0.1975)
			(2)	0.74	-0.74	-6.26			
				(0.79)	(1.63)	(1.46)	(0.1329)	(0.1087)	(0.1976)
		doaffex	(1)	0.61	-0.84*	-6.4			

				(0.65)	(1.76)	(1.49)	(0.1394)	(0.1077)	(0.1945)
			(2)	0.52	-0.87*	-6.42			
				(0.54)	(1.78)	(1.5)	(0.1576)	(0.1113)	(0.1952)
		doaffex30	(1)	0.61	-0.84*	-6.4			
				(0.65)	(1.76)	(1.49)	(0.1394)	(0.1077)	(0.1945)
			(2)	0.52	-0.87*	-6.42			
				(0.54)	(1.78)	(1.5)	(0.1576)	(0.1113)	(0.1952)
Wage per capita[a]	2007	doaff	(1)	9,265.93***	5,089.7***	7,530.35***			
				(15.85)	(15.69)	(8.62)	(0.0000)	(0.0915)	(0.0074)
			(2)	8,787.62***	4,889.4***	7,518.15***			
				(14.96)	(15.43)	(8.68)	(0.0000)	(0.2147)	(0.0035)
		doaffex	(1)	8,568.03***	4,415.15***	6,952.18***			
				(14.58)	(13.22)	(7.94)	(0.0000)	(0.1155)	(0.0053)
			(2)	7,607.83***	3,977.52***	6,788.33***			
				(12.91)	(12.26)	(7.83)	(0.0000)	(0.4219)	(0.0017)
		doaffex30	(1)	5,847.64***	1,835.23***	4,286.06***			
				(9.6)	(4.87)	(4.83)	(0.0000)	(0.1274)	(0.0069)
			(2)	5,456.54***	1,839.91***	4,524.47***			
				(9.06)	(5.06)	(5.17)	(0.0000)	(0.3581)	(0.0027)
	2008	doaff	(1)	9,674.52***	5,119.15***	7,460.61***			
				(18.31)	(16.54)	(8.43)	(0.0000)	(0.0286)	(0.0110)
			(2)	9,140.21***	4,963.25***	7,415.85***			
				(17.32)	(16.32)	(8.43)	(0.000)	(0.0862)	(0.0073)
		doaffex	(1)	8,979.31***	4,489.69***	6,929.44***			
				(16.86)	(14.19)	(7.78)	(0.0000)	(0.0431)	(0.0082)
			(2)	7,937.59***	4,134.41***	6,692.36***			
				(15.04)	(13.38)	(7.58)	(0.0000)	(0.2145)	(0.0051)
		doaffex30	(1)	8,979.31***	4,489.69***	6,929.44***			
				(16.86)	(14.19)	(7.78)	(0.0000)	(0.0431)	(0.0082)
			(2)	7,937.59***	4,134.41***	6,692.36***			
				(15.04)	(13.38)	(7.58)	(0.0000)	(0.2145)	(0.0051)
R&D investment[a]	2007	doaff	(1)	2,019.16***	1,077.63***	1,586.05*			
				(3.92)	(4.23)	(1.9)	(0.0935)	(0.6543)	(0.5561)
			(2)	1,600.69***	902.71***	1,577.35*			
				(3.21)	(3.62)	(1.89)	(0.1965)	(0.9805)	(0.4322)
		doaffex	(1)	1,785.52***	893.47***	1,402.81*			
				(3.44)	(3.38)	(1.67)	(0.1118)	(0.6922)	(0.5557)
			(2)	999.25**	538.53**	1,277.79			
				(1.97)	(2.07)	(1.52)	(0.3938)	(0.7702)	(0.3899)
		doaffex30	(1)	492.51	-201.85	207.75			
				(0.91)	(0.64)	(0.24)	(0.2164)	(0.7685)	(0.6371)

			(2)	131.99	-185.8	451.45			
				(0.25)	(0.61)	(0.53)	(0.5576)	(0.7379)	(0.4603)
	2008	doaff	(1)	2,428.51***	844.7***	1,234.46*			
				(5.11)	(3.27)	(1.78)	(0.0025)	(0.1485)	(0.5921)
			(2)	1,960.43***	709.87***	1,200.66*			
				(4.25)	(2.79)	(1.75)	(0.0134)	(0.3497)	(0.4965)
		doaffex	(1)	2,158.28***	636.74**	1,027.8			
				(4.46)	(2.39)	(1.47)	(0.0038)	(0.1725)	(0.5919)
			(2)	1,325.3***	356.91	849.98			
				(2.79)	(1.34)	(1.22)	(0.0557)	(0.5584)	(0.4952)
		doaffex30	(1)	2,158.28***	636.74**	1,027.8			
				(4.46)	(2.39)	(1.47)	(0.0038)	(0.1725)	(0.5919)
			(2)	1,325.3***	356.91	849.98			
				(2.79)	(1.34)	(1.22)	(0.0557)	(0.5584)	(0.4952)
R&D employees[a]	2007	doaff	(1)	1.69***	0.87***	0.74			
				(4.4)	(4.16)	(1.32)	(0.0563)	(0.1500)	(0.8138)
			(2)	1.46***	0.78***	0.73			
				(3.85)	(3.75)	(1.13)	(0.1047)	(0.2664)	(0.9321)
		doaffex	(1)	1.45***	0.67***	0.56			
				(3.78)	(3.12)	(0.99)	(0.0687)	(0.1781)	(0.8413)
			(2)	1.04***	0.49**	0.49			
				(2.75)	(2.31)	(0.87)	(0.1884)	(0.4034)	(0.9996)
		doaffex30	(1)	0.37	-0.23	-0.41			
				(0.93)	(0.89)	(0.72)	(0.1627)	(0.2394)	(0.7530)
			(2)	0.2	-0.22	-0.3			
				(0.5)	(0.88)	(0.52)	(0.3247)	(0.4568)	(0.8947)
	2008	doaff	(1)	1.81***	0.51***	0.89*			
				(5.1)	(2.77)	(1.89)	(0.0008)	(0.1127)	(0.4466)
			(2)	1.58***	0.45**	0.87*			
				(4.47)	(2.43)	(1.85)	(0.0032)	(0.2205)	(0.3906)
		doaffex	(1)	1.51***	0.27	0.66			
				(4.23)	(1.44)	(1.39)	(0.0015)	(0.1405)	(0.4408)
			(2)	1.09***	0.13	0.57			
				(3.08)	(0.71)	(1.19)	(0.0125)	(0.3618)	(0.3831)
		doaffex30	(1)	1.51***	0.27	0.66			
				(4.23)	(1.44)	(1.39)	(0.0015)	(0.1405)	(0.4408)
			(2)	1.09***	0.13	0.57			
				(3.08)	(0.71)	(1.19)	(0.0125)	(0.3618)	(0.3831)
Export intensity[b]	2007	doaff	(1)	0.89***	0.57***	0.67***			
				(15.14)	(15.85)	(7.15)	(0.0000)	(0.0375)	(0.3328)
			(2)	0.86***	0.56***	0.67***			

				(14.31)	(15.32)	(7.2)	(0.0000)	(0.0842)	(0.2495)
	2008	doaff	(1)	0.91***	0.58***	0.92***			
				(16.64)	(16.63)	(11.19)	(0.0000)	(0.9173)	(0.0001)
			(2)	0.86***	0.56***	0.92***			
				(15.51)	(16.13)	(11.12)	(0.0000)	(0.5653)	(0.0000)
Export probability[c]	2007	doaff	(1)	0.59***	0.43***	0.53***			
				(5.31)	(7.65)	(3.1)	(0.1805)	(0.7521)	(0.5728)
			Marginal effects	0.1	0.08	0.09			
			(2)	0.52***	0.39***	0.49***			
				(4.53)	(6.82)	(2.87)	(0.2945)	(0.8819)	(0.5705)
			Marginal effects	0.09	0.07	0.08			
	2008	doaff	(1)	0.61***	0.46***	1.08***			
				(6.13)	(8.88)	(4.95)	(0.1727)	(0.0508)	(0.0057)
			Marginal effects	0.11	0.09	0.14			
			(2)	0.51***	0.42***	1.02***			
				(4.89)	(7.92)	(4.65)	(0.4404)	(0.0320)	(0.0072)
			Marginal effects	0.08	0.08	0.12			
Log(employees)[a]	2007	doaff	(1)	0.71***	0.42***	0.47***			
				(11.76)	(12.06)	(5.99)	(0.0000)	(0.0147)	(0.5253)
		doaffex	(1)	0.71***	0.42***	0.48***			
				(11.66)	(11.69)	(6.03)	(0.0000)	(0.0152)	(0.4725)
		doaffex30	(1)	0.4***	0.11**	0.17**			
				(6.15)	(2.57)	(2.06)	(0.0000)	(0.0172)	(0.4594)
	2008	doaff	(1)	0.76***	0.41***	0.47***			
				(13.64)	(12.92)	(5.93)	(0.0000)	(0.0020)	(0.4823)
		doaffex	(1)	0.76***	0.4***	0.47***			
				(13.44)	(12.2)	(5.97)	(0.0000)	(0.0023)	(0.3831)
		doaffex30	(1)	0.76***	0.4***	0.47***			
				(13.44)	(12.2)	(5.97)	(0.0000)	(0.0023)	(0.3831)
Log(wage per capita)[a]	2007	doaff	(1)	0.24***	0.14***	0.2***			
				(19.3)	(17.28)	(10.03)	(0.0000)	(0.0687)	(0.0070)
			(2)	0.23***	0.14***	0.2***			
				(18.31)	(17.0)	(10.13)	(0.0000)	(0.1821)	(0.0032)
		doaffex	(1)	0.22***	0.12***	0.18***			
				(17.41)	(14.13)	(9.07)	(0.0000)	(0.0961)	(0.0037)
			(2)	0.2***	0.11***	0.18***			
				(15.62)	(13.23)	(9.0)	(0.0000)	(0.4083)	(0.0011)
		doaffex30	(1)	0.14***	0.05***	0.11***			
				(10.94)	(5.04)	(5.28)	(0.0000)	(0.1023)	(0.0043)
			(2)	0.14***	0.05***	0.11***			

			(10.45)	(5.2)	(5.63)	(0.0000)	(0.3106)	(0.0016)
2008	doaff	(1)	0.25***	0.14***	0.19***			
			(21.17)	(17.79)	(8.82)	(0.0000)	(0.0069)	(0.0430)
		(2)	0.24***	0.14***	0.19***			
			(19.98)	(17.57)	(8.83)	(0.0000)	(0.0278)	(0.0302)
	doaffex	(1)	0.23***	0.12***	0.17***			
			(19.09)	(14.68)	(7.93)	(0.0000)	(0.0136)	(0.0259)
		(2)	0.2***	0.11***	0.16***			
			(17.02)	(13.89)	(7.75)	(0.0000)	(0.0989)	(0.0168)
	doaffex30	(1)	0.23***	0.12***	0.17***			
			(19.09)	(14.68)	(7.93)	(0.0000)	(0.0136)	(0.0259)
		(2)	0.2***	0.11***	0.16***			
			(17.02)	(13.89)	(7.75)	(0.0000)	(0.0989)	(0.0168)

N: 2007: Reference group doaff = 6239; Reference group doaffex = 4997; Reference group doaffex30 = 2304; 2008: Reference group doaff = 7174; Reference group doaffex = 5650; Reference group doaffex30 = 2616.

Note: Abbreviation foaff for foreign-owned affiliates, doaff for domestically-owned affiliates, doaffex for exporters and doaffex30 for exporters with export intensity of at least thirty percent; Reported are coefficients with |t-values| in brackets; Model 1 includes 2-digit industry dummies, model 2 controls for size additionally; [a] OLS estimator; [b] GLM estimator; [c] Probit estimation; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table 11: Unconditional mean comparison of foreign owned affiliates by type of group head

Group	*Year (N)*	*Employees*	*Labor productivity*	*Wage adjusted labor productivity*	*Return on sales*	*Wage per capita*	*R&D investment*	*R&D employees*	*Export intensity*
foaffmne	2007 (1,591)	518.03	83,646.05	191.27	10.29	43,625.01	4,680.31	4.43	44.08
		(1,280.27)	(58,386.29)	(110.17)	(32.94)	(11,754.61)	(10,457.58)	(8.21)	(28.79)
	2008 (1,754)	450.87	79,136.93	180.47	8.94	43,826.19	4,482.39	4.19	43.85
		(1,170.45)	(66,871.95)	(113.63)	(24.84)	(12,266.92)	(10,519.61)	(7.84)	(28.68)
foaffnonmne	2007 (389)	401.74	83,166.33	195.83	9.96	41,684.27	3,335.38	3.22	39.68
		(606.11)	(60,774.63)	(110.54)	(12.86)	(11,688.66)	(6,665.8)	(6.28)	(28.12)
	2008 (495)	419.78	80,185.27	196.72	9.45	40,952.07	3,067.97	2.85	39.11
		(760.52)	(66,893.79)	(176.36)	(16.85)	(11,111.82)	(7,308.13)	(5.37)	(28.35)
MNE premium (p-value of t-test in brackets)	2007	116.29***	479.72	-4.56	0.33	1,940.74***	1,344.93***	1.21***	4.4***
		(0.0090)	(0.8882)	(0.4666)	(0.7569)	(0.0035)	(0.0017)	(0.0014)	(0.0061)
	2008	31.09	-1,048.34	-16.25*	-0.51	2,874.12***	1,414.42***	1.34***	4.74***
		(0.4815)	(0.7582)	(0.0529)	(0.5949)	(0.0000)	(0.0006)	(0.0000)	(0.0011)

Note: foaffmne stands for foreign controlled affiliates with industrial company as group head, foaffnonmne for others; Reported are mean values with standard deviation in brackets.

Table 12: Regression estimates for foreign controlled affiliates by type of group head

	Year (N)	*Employees*	*Labor productivity*	*Wage adjusted labor productivity*	*Return on sales*	*Wage per capita*	*R&D investment*	*R&D employees*	*Export intensity*
Model		*(1)*	*(2)*	*(2)*	*(2)*	*(2)*	*(2)*	*(2)*	*(2)*
Foaffmne-dummy	2007 (1,980)	110.34**	-1,371.02	-4.07	0.05	840.21	599.95	0.65	0.11
		(2.37)	(0.41)	(0.66)	(0.04)	(1.41)	(1.58)	(1.92)	(1.62)
	2008 (2,249)	14.77	-2,460.9	-16.49*	-0.75	1,996.59***	674.65*	0.69**	0.14**
		(0.34)	(0.68)	(1.95)	(0.77)	(3.81)	(1.79)	(2.44)	(2.32)

Note: Reported are coefficients with |t-values| in brackets; Model 1 includes 2-digit industry dummies, model 2 controls for size additionally; All estimations with OLS technique, only export intensity with GLM estimator; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table A1: Regression estimates of firm size covariates (model 2)

Variable (Y)	*Year*	*Reference group of domestic affiliates*					
		All affiliates (estimates with N = 8,220(2007); 9,424(2008))		*Exporter* (estimates with N = 6,978(2007); 7,900(2008))		*Export intensity ≥ 30 %* (estimates with N = 4,285(2007); 4,866(2008))	
		Number of employees	*(Number of employees)^2*	*Number of employees*	*(Number of employees)^2*	*Number of employees*	*(Number of employees)^2*
Labor productivity[a]	2007	7.35***	-0.0001***	6.92***	-0.0001***	5.53***	-0.00009***
		(7.6)	(5.96)	(7.23)	(5.83)	(5.87)	(5.15)
	2008	7.2***	-0.0001***	6.58***	-0.0001***	5.08***	-0.00009***
		(6.2)	(5.61)	(5.74)	(5.33)	(4.24)	(4.27)
Return on sales[a]	2007	0.0003	-6.00e-09	0.00009	-2.86e-09	0.00004	-1.83e-09
		(0.69)	(0.86)	(0.33)	(0.59)	(0.11)	(0.35)
	2008	0.0004	-8.90e-09	0.0004	-8.73e-09	0.0003	-7.86e-09
		(1.11)	(1.52)	(1.1)	(1.5)	(0.88)	(1.32)
Wage per capita[a]	2007	3.93***	-0.00006***	3.72***	-0.00006***	3.08***	-0.00005***
		(11.32)	(6.42)	(11.06)	(6.4)	(10.02)	(6.25)
	2008	3.9***	-0.00006***	3.68***	-0.00006***	3.14***	-0.00005***
		(11.11)	(7.75)	(10.86)	(7.73)	(10.19)	(8.28)
R&D investment[a]	2007	3.06***	-0.00004***	3.05***	-0.00004***	2.93***	-0.00004***
		(8.77)	(6.46)	(8.59)	(6.35)	(7.85)	(5.91)
	2008	2.92***	-0.00004***	2.91***	-0.00004***	2.93***	-0.00004***
		(8.67)	(6.78)	(8.46)	(6.64)	(8.13)	(6.47)
Export intensity[b]	2007	0.0003***	-4.35e-09***	-	-	-	-
		(9.71)	(6.83)				
	2008	0.0003***	-5.04e-09***	-	-	-	-
		(9.73)	(8.71)				

Note: Reported are coefficients with |t-values| in brackets; [a] OLS estimator; [b] GLM estimator; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table A2: T-values of unconditional mean comparison by enterprise group

Y	*Year*	*Comparison group of domestically-controlled affiliates*		
		All affiliates	*Exporter*	*Export intensity ≥ 30 %*
Employees	2007	0.0000	0.0000	0.7496
	2008	0.0000	0.0000	0.3755
Labor productivity	2007	0.0000	0.0000	0.0000
	2008	0.0000	0.0000	0.0000
Wage adjusted labor productivity	2007	0.0000	0.0000	0.0100
	2008	0.0000	0.0005	0.0938
Return on sales	2007	0.8552	0.8598	0.2868
	2008	0.3668	0.1968	0.0185
Wage per capita	2007	0.0000	0.0000	0.0000
	2008	0.0000	0.0000	0.0000
R&D investment	2007	0.0000	0.0000	0.3690
	2008	0.0000	0.0000	0.8669
R&D employees	2007	0.0000	0.0000	0.6795
	2008	0.0000	0.0000	0.4547
Export intensity	2007	0.0000	0.0000	0.0000
	2008	0.0000	0.0000	0.0000

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