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by

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Foreign Ownership and Firm Performance in German Services: First Evidence based on Official Statistics

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Abstract

This study provides first comprehensive analyses of foreign-controlled enterprises in the German service sector based on new micro data from official statistics. Various performance measures were examined by comparing unconditional and conditional means and quantile regression techniques were applied. Results reveal persistently superior performance for foreign-controlled affiliates when compared to German-owned affiliates. In contrast, the relationship for profitability is exactly the opposite. Labor productivity becomes insignificant when the comparison group consists of domestically-owned affiliates with a high degree of internationalization. A breakdown by country of origin shows that European affiliates pay lower wages and export less compared to other foreign affiliates and that there is no productivity advantage in favor of US firms like in manufacturing.

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

JEL classification: F15, F21, F23

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1. Motivation

Due to their influencial role in economic globalization, multinational enterprises (MNEs) attract substantial academic and public interest. Moreover, MNEs and their affiliates are of increasing importance in international division of labor (Birkinshaw 2001). Although foreign-owned enterprises amount to approximately one percent of all German enterprises of the non-financial economy, they generate a disproportionate economic impact (see Figure 1). Fears of downsizing (SVR 2007: 388), potentially exaggerated by unbalanced media coverage (see Friebel and Heinz 2011), may accompany expansion or takeovers by foreign firms. Thus, governments engage in strategically-motivated efforts to restrict foreign ownership, which in Germany are mostly limited to foreign wealth funds. On the other hand, treatment of foreign-owned firms in economic policy is driven by assumptions on direct or indirect positive economic impacts on the aggregate economy, for example through positive externalities (e.g., Görg and Greenaway 2004 and Smeets 2008).

Do foreign-owned firms enjoy a superior or suffer an inferior relative performance compared to their German counterparts?[2] Or is there no significant difference? Existing empirical research has not yet established a conclusive answer. International studies produce rather ambiguous results, and, for Germany in particular, evidence is insufficient for assuming stylized facts. Furthermore, there is a dearth of evidence for the German service sector,[3] even though it accounted for 73 percent of gross domestic product in Germany in 2009 (World Bank 2011) and is characterized by a foreign presence that is as equally impactful as that in the manufacturing sector (Figure 1). The importance of the tertiary sector in general has experienced a remarkable appreciation during the last decades worldwide (see Nissan et al. 2011 for details) and is still much less subject to empirical economic analysis than manufacturing. Limitations of data and a more difficult tracking of the produced intangible output are two reasons (ibid.: 66). In particular, internationalization aspects of service industries, such as FDI and trade, suffer a lack of investigation, although they became an explicit part of the agenda for international trade negotiations (Raff and Ruhr 2007: 299). The mode of FDI, among other internationalization strategies, is

[2] The terms *foreign-owned* and *foreign-controlled* are used interchangeably here and refer to majority ownership of more than 50 percent. The use of the term *performance* refers to a relatively general concept of the operation characteristics of firms and, therefore, goes beyond ratios of profitability and productivity, including also measures like wage payments and export behavior.

[3] An exemption is Temouri et al. (2008).

acknowledged to be much more important for services firms than for those from manufacturing (e.g., UNCTC 1989: 92),[4] what places increased emphasis on the investigation of foreign affiliates in services.

This study puts forth the first empirical analysis of foreign-controlled enterprise performance in the German service sector, based on new micro data of official statistics with information from the EU-wide Foreign Affiliates Statistics (FATS) that have only recently become available for the years 2007 and 2008. Apart from labor productivity, paid wages and size, export behavior and profitability are examined, which are neglected in the context of foreign ownership to date. Taking heterogeneity issues into account, inter alia quantile regressions are applied and a breakdown by country of origin is performed. Additionally, differences between foreign-controlled exporters and non-exporters are studied. Unfortunately, the analysis remains restricted to cross-sectional data and therefore suffers from associated disadvantages, such as the inability to establish causal relationships and account for unobserved heterogeneity. Prior to empirical analysis, this paper provides a detailed theoretical differentiation of potential causal effects that can be covered by a dichotomous foreign ownership variable, to generally legitimize the application of such an explanatory variable, even if causality is in focus.

Section 2 discusses the theoretical underpinnings of the empirical analysis in published literature. Section 3 reviews previous empirical work with emphasis on German datasets, while Section 4 presents the database and definition of variables used in this analysis of the German service sector. The results are reported and discussed in the sub-sections of 5. Section 6 concludes.

[Figure 1 about here]

[4] Reasons are for example "the intangibility and perishability of many services" that cause high cross-border transaction costs (UNCTC 1989: 92) and the general difficulty of specifying the transfer of knowledge which can be of high relevancy for licensing strategies in knowledge intensive services (Raff and Ruhr 2007: 303).

2. Theoretical considerations

Despite the prevalence of inductive logic in the empirical research practice, theoretical considerations are of fundamental importance to develop a symbiotic relation between theory and empiricism. Theory should put possible explanations regarding a performance gap between foreign and domestically-owned firms. Unfortunately, the theory underlying a possible causal relationship between firm performance and foreign ownership remains fragmented. Although the following considerations stem mainly from manufacturing contexts, they are generally applicable to services, too. Nevertheless, one should keep in mind major differences between the two sectors, for example regarding intangible asset and labor intensity (see Tanaka 2011: 12 for evidence on MNEs), that can affect the particular weight of a certain reasoning. On the other hand, a clear-cut distinction of both producing activities is sometimes not possible. For instance, due to the intermediary character of producer services for manufactured goods, there are "blurring boundaries between manufacturing and services" (Solé Parellada et al. 2011: 2).

2.1 Comparative advantages of MNE affiliates and strategic patterns

The most frequently-mentioned explanation argues for a superior performance of foreign-owned firms in almost all fields and can be labeled the "specific advantage hypothesis" (Bellak 2004: 486). The theory dates back to seminal work by Dunning (1988) and Caves (1974 and 1996: 162-180) and was developed in an attempt to explain the origin of internalized international firm activities through foreign direct investment (FDI). According to Dunning's prominent OLI-paradigm, a firm-specific ownership advantage is a necessary precondition for domestic firms to become a MNE. This advantage can either be tangible or intangible (like advanced technology or organizational superiority) and is available to affiliates within the MNE network at low marginal costs due to its public good character. Thus, foreign-owned firms, which participate in a multinational network, are endowed with a "genuine" comparative advantage over their domestic counterparts which are not part of an MNE. However, there is another possibility for MNEs to attain a firm-specific advantage, the neglect of which constitutes the primary criticism of Dunning's paradigm (e.g., Casson 1987: 33). Comparative advantages can emerge after a business becomes multinational due to the fact of being multinational per se or being geographically diversified, respectively. For

instance, benefits can result from better access to markets and resources in a material and immaterial sense, as well as from overall flexibility to shift activities or profits across borders (see Bellak 2004: 487f. for a more comprehensive compilation). Opportunities for Relocation are especially true for services firms, as they generally have lower exit and entry costs (Nguyen et al. 2004: 274) and are less dependent on external finance (Borchert and Mattoo 2009: 3). Not all so-called *network advantages* require multinationality, however since a nationally-restricted network of entities could achieve benefits of the same type, even though to a smaller extent.[5] Nevertheless, in the context of this work, this theory offers a theoretical explanation for why foreign MNE subsidiaries could exhibit performance advantages over domestically oriented firms, whether they result from a priori advantages of MNEs or network effects.

Since a MNE consists of various sub-entities, each entity can play a different role within the network and follow individual strategic patterns. Assuming that affiliates aim to source technology or knowledge or operate as an export platform, specific advantages of the parent - for instance, a more efficient production technique - must not inevitably be transferred to the affiliate. The same applies for acquisitions of competitors for reasons of market power or the acquisition of poor performing "lemons" with the purpose of enhancing firm value in the future. In general "[s]ourcing strategies of business firms have become more complex than ever before, and so have the integration strategies of multinational corporations" (Helpman 2006: 590). It becomes apparent here that the comparative performance of MNE subsidiaries depends heavily on the type of activity and that the unit of analysis can play a major role for theoretical assumptions as well as empirical results, whether it be headquarter or affiliate, enterprise or establishment.

From the above discussion, one can conclude that the presented considerations solely cover participants of multinational networks and ignore cases in which firms are foreign-controlled but not part of a company network. Furthermore, the discussion only applies to comparison between foreign-owned firms and domestically-owned non-multinationals. Even if all units in a considered population were foreign-owned multinationals or domestically-owned non-multinationals, assumptions based on the idea of

[5] E.g., Frenz and Ietto-Gillies (2007) distinguish between national and international networks and find a higher probability for UK firms to be innovative in the latter case, while the former range between firms without any network and those with an international one.

comparative advantage are not as clear-cut as is often implied in the literature due to the heterogeneous roles and strategies of MNE affiliates.

2.2 Country-of-origin effects

Apart from the aforementioned explanation for a performance gap, a second, well-represented line of argument has been described that refers to the owner's identity in terms of nationality. Contrary to the perception of multinationals as "footloose" or "stateless" that lost any imprint of their national origin in the convergence process of economic and cultural globalization, stands the vast consensus that "[t]he notion of the global corporation transcending national boundaries is, very largely, myth" (Ferner 1997: 19).[6] Following empirical evidence, various researchers assume that an MNE´s home country influences firm performance in the fields of human resource management and industrial relations, but also on productivity measures.[7] Outcome differences in firm performance are traced back to variations in the institutional arrangement of the national business systems, such as labor market regulations (Whitley 1992), overall cultural differences that manifest themselves in the respective firm´s corporate governance structure (Hofstede 1992), and different factor endowments. However, a sharp separation of these mechanisms from one another seems certainly unfeasible. Therefore, MNEs should be perceived as a "two-way vector of dynamic change within national business systems – both bringing to host countries their own nationally distinctive ways of doing things, and taking from the host environment lessons for adoption at home" (Ferner et al. 2001: 124).[8]

One can emphasize that theoretical considerations assuming country-of-origin effects are likewise not suitable for implying a universal and intrinsic impact of foreign ownership across countries. This is because particular attributes of firms, traced back to the country of origin, do not vary among national borders in absolute terms and are therefore much more consistent than the characteristic of being foreign-controlled. Although such considerations are more conceivable in the context of MNE affiliates rather than with foreign-owned firms,

[6] For a more comprehensive discussion of this debate see Woodward and Nigh (1998).

[7] For example Wächter et al. (2003) investigate US affiliates in Germany and find significant variations in patterns of human resource management due to a "competitive managerial capitalism" typically observed in the US business system as such, and Ferner et al. (2001) attest a considerable magnitude of "Germanness" for German MNE subsidiaries in Britain and Spain. Bloom and Van Reenen (2010) just as Bloom et al. (2011) provide evidence for an impact on productivity measures, among others.

[8] A concrete example of „forward and reverse diffusion" in management practices is given in a case study by Hayden and Edwards (2001).

the influence of something like a “national culture” or business culture on firm performance could be extended to the latter as well. However, the general direction of potential country-of-origin effects is not obvious and should be varying.

2.3 Foreignness

One more major line of argument can be identified in the literature of international firm activity and appears to be the only one that bears the ability of explaining a causal effect of foreign ownership per se. It is thus astonishing that these considerations have, to the best of the author´s knowledge, never been explicitly set out separately in the context of a comparative performance of foreign-controlled firms. The term “foreign-owned” does not primarily imply that the owner is of a special nationality, but that the owner is *not* of the nationality of the economy in consideration and therefore a stranger. In other words, the feature referred to in this case is first and foremost her or his foreignness, and not being of a specific nationality. Theoretical considerations generally point out the “liability of foreignness” (Daamen et al. 2007), which can be induced through extra costs required to overcome various obstacles, such as communication issues (spatial distance, different languages and intercultural mistrust) and transport (Buckley 2000: 294), as well as the additional effort in monitoring work processes and searching for appropriate employees resulting from information deficits in foreign markets (Feliciano and Lipsey 2006: 75). The fact of being a stranger in foreign markets can have specific severity for services firms as these sell mostly customized and non-standardized products that demand for more intense communication with customers (e.g., Eickelpasch and Vogel 2011: 513). Furthermore, a broad range of services are so-called experience goods that can be subject to moral hazard. Therefore, customers tend to prefer services whose quality is not in question, and, hence, may create a disadvantage for foreign suppliers (Raff and Ruhr 2007: 301f.).

Strictly speaking, the additional costs of foreignness are already incorporated in the idea of specific comparative advantages and the corresponding assumption that the advantages outweigh the disadvantages (Buckley 2000: 300). However, foreignness may merit separation of this assumption to demonstrate that a foreign ownership variable can indeed capture more than just a residual of “status-specific parameters influencing a firm´s […] performance that cannot be specified otherwise“ (Günther and Gebhardt 2005: 96) as it is supposed to be the fact at times in the literature. Certainly, a proper method of measuring

and isolating this effect is far from easy since learning effects over time may add a dynamic dimension.

2.4 Specific measures of performance

While the outlined arguments thus far apply to productivity measures in principle - which is surely the aspect of performance that has received the most attention - other figures need some supplemental remarks although productivity can have a basic influence on other measures itself.

Profitability reflects comparative advantages that are not inherently included in productivity. The two normally go hand in hand, since relative productivity advantages or disadvantages should mirror a direct impact on profitability in the same direction. However, this is not necessarily the case if accounting policy criteria are taken into consideration. For example, MNEs could shift profits from high- to low-tax countries through the manipulation of transfer prices to reduce their tax burden. Indeed, beyond anecdotal evidence, Dischinger and Riedel (2008) provide empirical evidence for the bias of intangible assets within MNE affiliates towards low-tax affiliates, what can be assessed as a hint for profit-shifting activities, or, at least, as facilitation of the latter. Thus, a potential dependence of measured profitability on the affiliates´ tax environment is revealed.[9]

Wages paid by foreign-owned firms are often expected to be higher on average, compared to those of domestically-owned firms, resulting from distributing higher profits through bargaining (Girma et al. 2002: 94), prevention of job turnover (Sjöholm and Lipsey 2006: 203), or compensation for disadvantages on the labor market (Feliciano and Lipsey 2006: 75). Here, again, most considerations point to multinationality status rather than foreign ownership as the main causal factor. Unfortunately, this study remains highly descriptive regarding a wage gap, because data used neither allows to control for different skill levels nor for actual hours of work what makes it impossible to draw any reliable conclusions on the paid price for the labor factor, independent of its quality (see inter alia Almeida 2007 on this).

[9] Nevertheless, profit shifting is capable of causing a “bias” in measured productivity as well (see Maffini and Mokkas 2011).

The classical idea of a vertically-integrated MNE includes a sufficient explanation for trade between affiliates and their parent. Beyond that, in practice, subsidiaries export to third-party countries as well (export platforms) and only recently some steps evolved to deal with the question, how this behavior can be absorbed by theory.[10] Far from comprehensive theory, some simple considerations give rise to a higher probability of being an exporter for foreign-controlled firms: For example, these firms could be bound into a cross-border value creation chain as part of a multinational network by definition. Or, a critical level of fixed costs of exporting (Cole et al. 2010: 267, among others) itself might facilitate the export-decision in favor of firms with productivity advantage anyway, which in turn might be MNE network participants. Finally, it seems plausible to impute foreign-owned firms (and not only MNEs) an average information advantage regarding foreign markets because of the existing ties with at least one foreign country.

Finally, after this outline of theoretical considerations it should be maintained as a matter of fact that even theoretical pre-considerations by no means end up in straightforward assumptions whether there should be a performance gap due to foreign ownership or there should be none, or if an existing gap should be in favor or to the disadvantage of foreign-owned firms (see Table 1).

[Table 1 about here]

Moreover, it should not be astonishing if a non-ambiguous effect of foreign ownership per se cannot be identified in empirical research since *already according to theoretical pre-considerations* it is primarily multinationality (as a special case of network effects) that seems to affect performance. On the other hand, one should not rule out the possibility of a causal relationship between foreign ownership and performance.

[10] Ekholm, Forslid and Markusen (2007) just as Lu, Lu and Tao (2010) develop trade-models which include a third country and therefore can help to understand the strategic motivation of the so called export platforms.

3. Previous empirical research

International studies on comparative performance of foreign-owned firms exhibit ambiguous results, although tendencies of a methodological dependence can be disentangled. In cases where data allows for holding some decisive factors constant beyond the standard constants of industry and size (e.g., input heterogeneity or multinationality), performance gaps tend to shrink and sometimes even disappear (e.g., Globerman et al. 1994). Even if foreign acquisitions are taken as exogenous treatments to identify a causal effect of foreign ownership, a remarkable amount of investigations still report statistically significant gaps of economically-relevant magnitude (for a more detailed survey see Barba Navaretti and Venables 2004: 155-162, Pfaffermayr and Bellak 2002, Bellak 2004 or Lipsey 2004).[11] Bellak (2004: 484) summarizes that "the relevance of foreign ownership as a determinant of performance gaps is often overstated". While this is unquestionably the case, it does not imply redundancy from an econometric nor from a theoretical perspective.

The majority of international studies refer to manufacturing and still relatively little is known about foreign-owned firms in services. Two exceptions were performed with UK data: analysis of the entire non-manufacturing sector by Oulton (1998) and the explicit investigation of the service sector by Griffith et al. (2004). Both find considerable productivity advantages for foreign companies and establishments, even if foreign-owned firms are compared to domestic multinationals. While Oulton (1998) observes a larger gap than in manufacturing, Griffith et al. (2004) finds a smaller difference and additional evidence for selection effects through foreign takeovers instead of productivity improvements after ownership change.

The variability in international results for the comparative performance of foreign-owned firms merits an increasing emphasis on country-specific surveys. Among empirical work based on German data that go beyond a comparison of means, two strands of performance measures are targeted: productivity and several variables directly geared to the labor market. Borrmann et al. (2003) and Jungnickel and Keller (2003) analyze data of the IAB Establishment Panel and obtain quite similar results of significant and positive foreign-

[11] The problem of limited comparability of results across studies is of great extent due to a wide variety of applied methods and data quality as well as differing thresholds for "foreign ownership". The latter ranges between 10 and 51 percent of foreign shares.

ownership productivity premiums and insignificant wage differences, when domestic establishments with an export quota of at least thirty percent serve as reference group. Mattes (2010) applies a common difference-in-difference approach combined with propensity score matching to compare foreign takeovers and non-takeovers in the same dataset and finds no significant gap for productivity nor for the level of employment.[12] Hijzen et al. (2010) follow the same methodological approach but concentrate on wages and other working conditions across three skill levels using linked employer employee data from the IAB Establishment Panel and the employment statistics register (*Beschäftigtenstatistik*). Results point to higher wages in foreign-owned firms in all skill categories in Germany, job stability, hours of work and union coverage are not affected by foreign ownership. In this analysis the entire universe of domestiacally-owned enterprises is referred to. Andrews et al. (2009) also investigate wage differences based on the IAB Establishment Panel and look also from the perspective of employees changing their employer, as treatment, and yield a more or less significantly positive foreign wage premium. Here again, all German-owned firms serve as group of comparison. Arndt and Mattes (2010) restrict their treatment analysis to foreign takeovers of domestic MNEs and therefore exclude possible performance differences due to multinationality. Nevertheless, productivity is considerably higher in foreign-owned firms while employment seems equal. Unlike other mentioned studies, Arndt and Mattes use the Microdatabase Direct Investment (MiDi) in combination with balance-sheet information provided by the Bureau van Dijk. The sole work treating services separately is Temouri et al. (2008), who also use data offered by the Bureau van Dijk. The more detailed results demonstrate heterogeneity across industries by reporting productivity advantages of foreign majority-owned firms for the overall service sector but not in the high- or low-tech service sectors. In the manufacturing sector, foreign firms enjoy significantly higher productivity in high-tech industries, but no advantage in the low-tech manufacturing sector.

Although sophisticated empirical analyses exist for German data, some shortcomings remain: little work focuses on services separately, certain measures were cancelled out of analysis thus far, like export behavior[13] or profitability, and one could further argue that German MNEs are not necessarily the proper reference group. Finally, the ratio of

[12] However, he fails to take general effects of acquisitions and the multinational status into account and includes only two post-acquisition years in his analysis.

[13] An exemption is Arndt et al. (2009: 112f.) where OLS premium regressions are performed with all German-owned establishments as comparison group. However, evidence regarding export behavior of foreign-owned firms is rare to find even internationally.

comparability and variation of studies to produce robust stylized facts seems not sufficient yet.

4. Data and variables

To pursue matters connected with foreign ownership of firms in Germany, to date, three sources could be found which provide information on this aspect of ownership structure: the Establishment Panel of the Institute for Employment Research of the Federal Labor Services (IAB) (Kölling 2000), the FDI micro database of the Central Bank (MiDi) (Lipponer 2003) and datasets from the private company Creditreform. Recently, a new database emerged that seems capable to overcome some shortcomings of previous statistics and allows extended future research in the field (Weche Gelübcke 2011). According to a regulation of the European Parliament and the Council of the European Union (No. 716/2007) "a common framework for the systematic production of Community statistics on the structure and activity of foreign affiliates" was developed. The German statistical offices were forced to merge information, whether an enterprise is under foreign or domestic majority-ownership, received from the already mentioned private vendor, with the official structural business statistics database (*Unternehmensregister*). Apart from feasibility studies, the first reliable information was available for the reporting years 2007 and 2008 (Feuerhake et al. 2010 as well as 2009 and Schmidt et al. 2009). The analysis was therefore restricted to a cross-sectional approach. For robustness reasons, both years were analyzed although they are not perfectly comparable. For 2008 a new sample was drawn. Furthermore, measures in 2008 might already be affected by the global economic and financial crisis.

Whereas the Federal Statistical Office delivers the produced statistics on inward foreign affiliates (IFATS) to Eurostat, new information is available to researchers within the framework of official statistics to analyze the economic activity of FDI-enterprises. In addition to general advantages of official statistics due to a non-exclusive accessibility,[14] sampling and response matters,[15] a broader pool of characteristics of the statistical units can be analyzed which is not tailored specifically to a labor demand (IAB) or monetary (MiDi)

[14] For this study, the micro data was analyzed via remote access at the Research Data Centers of the statistical offices (FDZ) Berlin-Brandenburg and Lower Saxony because of confidentiality reasons.

[15] "[T]he units covered by the survey are usually obliged to report (and to report the true figures), and the survey often is a census covering all units from a well-defined population. Therefore, data from official statistics are high quality data." (Wagner 2010a: 134)

perspective. Furthermore, the reporting unit is the enterprise rather than the establishment, which may help to reduce a bias due to heterogeneous roles of parts of an enterprise and can be seen as the appropriate unit of analysis in this context.[16]

In particular, the following analysis is founded on the structural survey in the service sector (SiD), which is a questionnaire-based stratified random sample that covers approximately 15 percent of enterprises from the service sector with at least 17,500 EUR turnover, according to the German classification WZ2003 (section I and K).[17] For the analysis of firm performance, common variables are calculated whose summary statistics are shown in Table 2. Labor productivity and the return on sales are considered as well-established measures of efficiency and represent firm performance in a stricter sense. The former calculated as gross value added at factor costs per capita[18] and the latter as a ratio of operating profit and total turnover. Further variables of interest are the export intensity, defined as the ratio of turnover generated abroad and revenue from self-employed activities, and annual gross wage per capita. Firm size is defined by the number of employees.[19]

To generate the final analytical sample, both observations with missing values and the upper (99th) and lower (1^{rst}) percentile of labor productivity and return on sales are dropped.[20] Additionally, cases were restricted to enterprises from section K (real estate, renting and business activities) with at least one employee subject to social security payments. Reporting units with turnover less than 250,000 EUR must be excluded because

[16] Certainly, this can hardly be more than a step in the right direction since the object of interest, the foreign-owned enterprise, in turn might itself part of a multinational network and different activities can be spread across its affiliates on an upper hierarchical level again (for a discussion of the appropriate unit of analysis see Pfaffermayr and Bellak 2002: 31f.).

[17] For a detailed description of this survey see Federal Statistical Office (2008), for the reporting year 2007 and Vogel (2009).

[18] While this relatively simple measure of productivity does not account for capital intensity, like total factor productivity does, it has the advantage of simplicity. It cannot be affected by errors of estimating the capital stock. Moreover, capital intensity is captured partly by industry dummies.

[19] The variable of employed persons does not reflect full-time equivalents as information of part-time employees is not provided in the data.

[20] Summary statistics for these two variables without dropping the extremely different cases are presented in the appendix (Table A1). For example, for the first percentile, a labor productivity of -110,362 EUR and a return on sales of -155 percent are reported for 2007. At the other tail of the distribution, it is a productivity of 1.34 million EUR per person, and a return on sales of 157 percent. Reasons for these outliers can be reporting errors, idiosyncratic events or an exceptionally different behavior, but none of this should distort results for the vast majority of enterprises (Wagner 2011: 10f.). Confidentiality of the data prohibits the identification of single cases and allows only for treating outlier issues in an accumulated way. This procedure appears appropriate if one looks at the premium regressions including outliers in Table A2, where almost all statistical significances are covered by a relatively small group of observations.

they were obliged to answer only an abbreviated questionnaire and therefore provided insufficient information. The final sample, however, contains N = 33,922 enterprises for 2007 and N = 41,292 for 2008. Observations can be divided into subpopulations of domestically-owned units which are independent (22,059 ≙ 65.03% for 2007 and 28,608 ≙ 69.28% for 2008), which are part of a multi-establishment enterprise (9,030 ≙ 26.62% for 2007 and 9,594 ≙ 23.24% for 2008) or which are headquarters of a multi-establishment enterprise (1,280 ≙ 3.77% for 2007 and 1350 ≙ 3.27% for 2008). Finally, there are enterprises under foreign control (1,553 ≙ 4.58% for 2007 and 1,740 ≙ 4.21% for 2008).

[Table 2 about here]

5. Empirical analysis of foreign-owned enterprise´s relative performance

5.1 Unconditional perspective

Numerous German and international studies report superior average performance measures in favor of foreign-owned firms compared to the entire population of domestically-owned ones. On one hand, foreign-owned firms tend to be larger, more productive, and have higher personnel expenses. On the other hand, foreign-owned firms produce more capital-intensive and with a pronounced demand for relatively high-skilled labor. Apart from a simple comparison of means, much of this comparison draws upon analyses in which the reference group is composed of all units that can be labeled “domestically-owned”. But since the oft-cited study of Doms and Jensen (1998), it seems obvious that this cannot be the adequate group of comparison. Foreign-owned firms in a given economy, or dependent units which are linked via cross-border networks with headquarters abroad, should be compared with dependent units which belong to a cross-border network and have their headquarters in the domestic economy. However, to the best of the author´s knowledge, such a comparison does not exist to date. In their frequently-cited work, Doms and Jensen (1998) proposed an idea for their US dataset which has since become common practice if allowed by the data - the domestic group of comparison should be restricted to units being part of a multinational network, whether parents or affiliates.

While their strategy appears plausible at first glance, especially under the assumption of firm-specific competitive advantages as public goods, one may still raise concerns since

headquarters are compared to affiliates here. The data at hand allows distinguishing dependent from independent from headquarter enterprises, as it was shown in the previous section. To achieve the best possible comparison group given the restrictions of the data, this study defines domestically-controlled dependent affiliates as a reference for foreign-owned affiliates, as there is no information about the multinational status in the data. Although this grouping is not an ideal solution, it contributes a new, interesting variation to other operationalizations. To counter this perceived deficit, another group of domestically-controlled enterprises is generated, consisting of those affiliates with noticeable international trade activities as can be assumed for MNE affiliates, which in this case is measured by an export quota of at least thirty percent. This treatment is in line with previous studies like Borrmann et al. (2003) but should not conceal its tentative character, though. Furthermore, a third group is created, composed of all domestically-owned exporters. Thereby, the well-established findings of a superior performance of exporters, irrespective of their ownership status, are taken into account (see Wagner 2007 for a survey).

In line with previous evidence, the foreign-controlled enterprises in this dataset seem to employ on average around 138 more persons in both years, have an average productivity advantage of 12,407 EUR in 2007 and of 23,059 EUR in 2008 (per person and per year). They paid a 22,047 EUR higher average annual wage in 2007 and still 19,435 EUR in 2008, and have a considerable higher export quota of 9.75 and 12.13 percentage points compared to domestically-owned affiliates. Interestingly, only profitability appears not advantageous since the return on sales is on average 8.08 and 3.71 percentage points lower for the foreign-owned group (results are shown in Table 3). All differences are statistically different from zero at a high level of $\alpha < 0.01$ or 0.05. Compared to domestically-owned exporters, significant differences between the two groups hold, even though they shrink. Productivity is an exception, because differences even more than double in 2007. If the domestic group with at least thirty percent of international sales serves as reference, the productivity differential turns insignificant while the average size premium increases.

[Table 3 about here]

Coping with micro data reveals considerable heterogeneity among statistical units. This observation is not surprising but necessitates a treatment beyond analyzing mean values (see Wagner 2011 on this at length). In this sense, differences at common percentiles are described in Table 4. Although the distributions echo the picture drawn from mean comparisons, they also illustrate heterogeneity concerns. For example, in 2007 regarding the 90th percentile of all domestically-owned enterprises and the 10th percentile of the domestically-owned exporters exhibited a productivity advantage in favor of the domestic enterprises. Additionally, the Kolmogorov-Smirnov test was applied to test whether one empirical distribution function stochastically dominates another (H_0: $F(x) = G(x)$) (Conover 1999: 456ff.). The p-values reported in Table 4 support rejection of the null hypothesis at a highly-significant level in most cases. Therefore, there is not only a difference in means but also a first order stochastic dominance across the empirical distribution functions for the considered measures. The sole exception is the productivity comparison with domestically-owned enterprises that gain at least thirty percent of their sales abroad.

[Table 4 about here]

5.2 Conditional perspective

While unconditional comparisons contrast mean values of descriptive statistics, a conditional approach can be seen as a step forward to identify "fundamental differences" (Bellak 2004: 484), or to detect the reasons thereof. Although unconditional results surely possess policy relevance too, evidence from conditional analysis should be of higher importance.

As it became clear in the previous section, foreign-owned enterprises are larger on average and might be located more likely in certain sectors, for instance with above-average capital intensity. Davies and Lyons (1991) demonstrate in an early decomposition of productivity differences with UK data that nearly half of the differential is due to a structural effect determined by the fact that firms in consideration were located in highly-productive sectors. Thus, in line with earlier empirical work, structural and size effects will be controlled for in subsequent regressions. The estimated models were kept fairly simple[21] and can be written as follows:

[21] The estimated models do not claim to be "explanation models" since their purpose is to show only statistical differences. These so-called premium regressions were previously applied in several studies like e.g., Bernard et

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

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

The endogenous variable Y refers to the various performance measures introduced above and is logarithmized whenever possible,[22] while fo denotes a dummy variable that takes the value 1 if the enterprise is under foreign control and 0 otherwise. Model 1 only includes a set of two-digit industry dummies whereas in model 2 the number of persons employed was added in absolute and squared terms to account for non-linear effects. Besides the establishment subscript i and the error term ε, β represents the particular parameter to be estimated, including β_1 that expresses the difference between foreign-owned establishments and the chosen reference group of the domestic population.

Most performance variables were estimated by using the robust OLS technique and are reported in Table 5.[23] The coefficients of Model 1 show that a foreign ownership premium persists after accounting for industry structure. Foreign-controlled enterprises are on average more than fifty percent larger than their dependent domestic counterparts and even up to 84 percent than those with a relatively high export quota, ceteris paribus.[24]

Model 2 lends more meaningful descriptions of the data due to its inclusion of firm size. First, size has a statistically-significant negative effect on productivity since β_3 is negative. This finding directly contradicts evidence from the manufacturing sector but largely the case in the service sector. One possible explanation addresses differences in compensating the labor factor (see Vogel 2011: 27 for a similar argument). The squared term is positive and statistically significant but very small, therefore the maximum of a u-shaped function lies far outside the actually observed size range and can be neglected for interpretation (size covariates for all estimations are reported in Table A3). For labor productivity, results show a foreign ownership premium of more than 32,000 EUR in 2007 and 2008 on average and other things being equal. This is much higher than the unconditional mean premium. Nonetheless, the coefficient turns insignificant if the group of comparison consists of domestic enterprises with a high export ratio. Gross wages are also

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al. (2007). Therefore, measures of model fitting are of secondary interest and are not reported in the following tables. R^2-levels from productivity and profitability estimations of model 2 range between 6 and 10 percent. When enterprises are separated by country of origin, R^2-levels are fairly similar.

[22] Only the variables of persons employed and wages can actually be considered here.

[23] All estimations were executed with Stata 11.

[24] Values are obtained via exponential transformation $100*(\exp(\beta_1)-1)$ from estimations of log(persons employed).

higher by 67 and 63 percent in foreign-owned enterprises compared to domestically-owned affiliates, by 31 and 26 percent compared to domestic exporters, and by 25 and 16 percent in comparison to domestic exporters with high export intensity. As mentioned above, the lack of information about the quality of labor prevents conclusive statements on the paid factor price. In contrast to the above results, return on sales turns out to be significantly less in foreign-controlled entities by approximately around five or six percentage points for 2007, irrespective of the reference group. In the 2008 data, this gap decreases by more than three percentage points. Compared to domestic exporters, there is no significant difference. Compared to those with at least thirty percent sales abroad, the difference is even more than four percentage points.

Table 5 displays the results of Probit estimations of export participation. Coefficients indicate a higher probability for foreign-owned enterprises to be exporters, but can only be interpreted quantitatively with the help of marginal effects, which are given as well; the probability of a foreign-owned enterprise to engage in exporting, thus, lies 14 and 23 percent above that of domestic ones from the same sector and of the same size in 2007 and 2008, respectively. Superior export positions can also be seen for sales generated internationally, namely about eight and eleven percentage points more on average, ceteris paribus. To achieve this result, the export quota was estimated in the framework of a generalized linear model with a Logit link function because observations are cumulated at the lower bound of the endogenous variable due to a disproportionately number of enterprises without export behavior at all. Such fractional response variables demand a particular estimation technique as described by Ramalho et al. (2011). Because the reported coefficients cannot be interpreted in a straightforward way, simulations of hypothetical enterprises were executed (Table 6). The simulated export intensities also advocate for the assumption of a decreasing difference with increasing firm size.

[Table 5 about here]

[Table 6 about here]

Although conditional evidence was found in various regressions thus far, the analysis remains tied to mean values. Conditional quantile regression seems to be the proper approach to surmount this deficit and extract more information from the dataset. The

method enables an interpretation of the particular effects at certain percentiles, even though interpretation is not free of obstacles. Quantile regression was introduced by Koenker and Bassett (1978) and has recently been applied more frequently to face challenges of coping with micro data (e.g., Dimelis and Louri 2002, Barbosa and Louri 2005 and Grasseni 2010). Estimations of size, labor productivity, return on sales and gross wages were performed for all deciles here, with variation of reference groups, and are shown in Tables 7, 8 and 9.[25] First and foremost, the overarching rejection of the null hypothesis, which states that coefficients are equal across quantiles (f-test), leads to the confirmation of the applicability of this method. The only cases where this hypothesis cannot be rejected in both years are profitability estimates versus German enterprises with high export quota. For 2008 data this applies to profitability estimates versus all German exporting affiliates and productivity estimates with export intensive German enterprises as well. Turning to individual coefficients, one sees that relatively few enterprises drive the productivity mean premium of previous regressions as it is only surpassed from the 80th percentile.[26] Return on sales offers more variety in terms of sign and significance. Here, the premium is insignificant at the upper range of enterprises in every specification and sometimes this is the case for even more than half of the observations. Additionally, differentials turn positive at upper deciles in comparison with all German affiliates as well as exporters thereof in 2007 but only for estimates with all German exporters in 2008.[27] However, these coefficients are not statistically significant at any conventional level. Moreover, it reveals that the much higher profitability differentials for 2007 data compared to 2008, stem from considerable differences at the lower bound as the reported coefficients at the 10th percentile tend to be a multiple of the one at the 20th in every specification. Furthermore, the positive size premium can only not be expected for affiliates below the 4th decile in the 2007 comparison with German exporters.

[Table 7 about here]

[Table 8 about here]

[Table 9 about here]

[25] Standard errors were obtained via bootstrapping resampling with 50 replications.

[26] Note that results regarding labor productivity with 2007 data are only available for model 1 due to a lack of convergence, thus coefficients are not conditioned on firm size.

[27] Again, for 2007 model 2 could not be estimated successfully in the comparison with domestic exporters (cf. previous fn.).

In summary, a conditional analysis of mean values indicates that performance differences remain after addressing effects of industry structure and size if the German group of comparison includes all dependent enterprises. If the makeshift indicator of multinational network participation is used to restrict the comparison to domestic enterprises with an export quota of at least thirty percent, differences in labor productivity lose their statistical significance. However, performance differentials of foreign-controlled enterprises can be distinguished from a mere export premium since they persist when the reference group is limited to German exporters although differences decrease (except wages). By extending the analysis to account for conditional effects using quantiles, one uncovers considerable heterogeneity across the distribution of enterprises. The quantile analysis provides essential insight, especially regarding profitability, but predominantly supports other results.

5.3 Differences by origin of control

To evaluate whether there are performance differences among enterprises whose control originates from different countries, or rather from institutional units located in differing economic frameworks, three categories of origin were created: affiliates with a parent in the US, in European countries,[28] or in other nations. The pattern of origin looks very similar to that of inward FDI in general (Deutsche Bundesbank 2010), namely the vast majority of enterprises are controlled from other European states (71%) and, among all other nations, the US is the most important source of investments (22%) (Table 10). Therefore, it seems of interest that several international studies find a productivity premium which can be assigned exclusively to US firms (see Criscuolo and Martin 2009) although evidence is based mainly on manufacturing data. Such a clear-cut US advantage does not seem to apply generally to foreign-owned enterprises in the German service sector. This is because coefficients, conditional on firm size and industry, are not significantly different from each other on any conventional error level for 2007. For 2008, a clear picture is missing as well. Even though coefficients for US and European enterprises differ significantly, those of the US and the category “others” do not and also a difference between European and other cannot be stated (see Table 11). Regardless, the quantitative premium for US and other affiliates is much the same (around 46,000 EUR versus domestic units) in the 2007 data, while European

[28] “European countries” refers to members of the European Economic Area and Switzerland, excluding special and overseas territories.

enterprises gain an average premium of only slightly more than half of that value. Compared to the domestic group with striking export activities, there remains a significant premium of about 27,000 EUR only for US affiliates with an error probability of some six percent. The 2008 data reveals a somewhat more exposed role of US affiliates since coefficients stay highly significant across all comparison groups and are higher than the other two groups of foreign-controlled affiliates by between 20,000 and 30,000 EUR. Regarding profitability, the performance gap seems clearly to the disadvantage of foreign-controlled affiliates, irrespective of origin, since it persists throughout almost all variations of the domestic group in both years, except in the comparison with domestic exporters in 2008. Quantitatively speaking, the return on sales on average ceteris paribus is roughly between two and seven percentage points lower for foreign-controlled affiliates.

In the 2007 data, European affiliates display different bahavior when export behavior and wages are taken into consideration: While all foreign-owned enterprises pay notably higher per capita wages on average compared to their German counterparts, European entities appear to pay up to 50 percent less than US and other affiliates. The likelihood of engaging in exports is twelve percent higher for European firms but only seven and twelve percentage points lower compared to US and other affiliates, respectively. The same pattern shows up for the magnitude of exports as can be seen from simulations in Table 6. These differences hold only regarding wages and export intensity, when the 2008 cross-section is taken into consideration.

[Table 10 about here]

[Table 11 about here]

5.4 Exporter premium among foreign-controlled enterprises

Foreign-controlled firms generally export more often and a higher share of their output. When these firms are compared to domestic ones with a pronounced export activity, most performance differences turn insignificant. According to these results, the question arises whether the feature of exporting is a more reliable indicator for superior performance than foreign ownership. For generating a rather differentiated picture of the relevant attributes and to generally investigate the export behavior of foreign-controlled affiliates a comparison of exporters and non-exporters *within* this population seems of interest. Empirical studies of

an exporter performance premium that explicitly distinguish between domestically- and foreign-owned firms are rare. An example using Chinese data is Lu et al. (2010), who find foreign-owned[29] exporters to be less productive than foreign-owned non-exporters. This negative exporter productivity premium, in a way, contradicts other findings that generally attest a superior performance in favor of exporters (Wagner 2007). At a first glance, there are performance disadvantages for foreign-controlled exporters in German services, too, when compared to foreign-owned non-exporters. In the simple mean comparison, foreign exporters suffer a productivity disadvantage of -22,600 EUR in 2007 and -12,000 EUR in 2008 and also a profitability drawback of -3.53 percentage points in 2007 and -2.15 percentage points in 2008 (Table 12). Possible explanations could refer to different business strategies within the foreign-owned group, such as using affiliates as export platforms (Ekholm et al. 2007) or other asset sourcing strategies. However, when industry and size is controlled for, coefficients are far from being statistically significant on conventional levels (Table 13). The performance similarity may be due to much lower fixed costs of exporting for foreign-controlled firms than for domestically-controlled counterparts because the former join cross-border ties by definition and may be endowed inevitably with knowledge about foreign markets. Therefore, the self-selection of advantageous firms into exporting (e.g., Melitz 2003) could play a minor role within the population of foreign-owned firms. Finally, since differences between exporters and non-exporters within the group of foreign-controlled enterprises are ceteris paribus far from being obvious even if only a minimum of covariates is applied, exporting seems to be a relatively weak indicator for average performance advantages of foreign-owned enterprises in the German services.

[Table 12 about here]

[Table 13 about here]

[29] They use a threshold of 25% for the definition of foreign ownership.

6. Concluding remarks

In times of an ever-increasing economic weight of MNE affiliates and the associated cross-border linkages of economic activity around the globe, demand for a robust basement of stylized facts should be satisfied to draw policy decisions upon it. A neat example form assumptions of externalities from the presence of foreign-owned firms that should be based on comprehensive knowledge about performance differences between those and the domestically-owned firms of a considered economy.

This study demonstrated that a causal impact channel of foreign ownership per se appears possible from a theoretical point of view. This provides a powerful justification for the general investigation of the foreignness feature of foreign-owned firms and is neglected in most previous studies. Other effects that can be captured by a dichotomous foreign ownership variable and are not intrinsically due to foreignness were discussed as well.

To counter to the lack of knowledge about foreign-controlled enterprises in the German service sector, their relative performance was examined by comparing unconditioned and conditioned means as well as distributions along quantiles to allow for heterogeneity across individual enities. For this study, a newly available database within the framework of official statistics was used, and, for example, allowed for generating a reference group of domestic dependent affiliates. Results show that foreign-controlled enterprises in the German service sector were characterized by fifty percent more employees, 67 and 63 percent higher wage payments, and a lower return on sales by around 2 to 6 percentage points compared to domestic affiliates on average and ceteris paribus. Foreign-controlled firms had a 14 and 23 percent higher probability to engage in exporting coupled with a superior export intensity of some 8 and 11 percentage points in 2007 and 2008. Most of the performance differences persisted when foreign-owned enterprises were compared to domestically-controlled exporters and domestically-owned exporters with at least thirty percent of sales abroad, although they tended to shrink. Labor productivity is an important exception where differences became insignificant in comparison with the domestic group characterized by a high degree of internationalization. These findings seemed generally consistent with previous research and support evidence that other factors like multinationality may be more important factors for explaining a superior performance of foreign-owned firms than foreignness itself. Moreover, results of quantile regressions weaken a universal assumption of performance gaps among foreign-owned affiliates. From a

policy perspective, both conclusions implicate that a general and uniform treatment of foreign-owned firms should be regarded with caution as it might be inappropriate. Further important insights are the distinct placement of European enterprises among all others in respect of export behavior and wage payments and that a certain US productivity advantage, as it is reported in many studies for the manufacturing sector, does not seem to exist in the German service sector.

Although the cross-sectional data and the “non-explanatory” premium regression models suffer from numerous limitations regarding their explanatory power and demand for future research, this study provides an important step to understanding the role of foreign-controlled affiliates in German services in presenting the first comprehensive econometric analysis based on new data from German official statistics.

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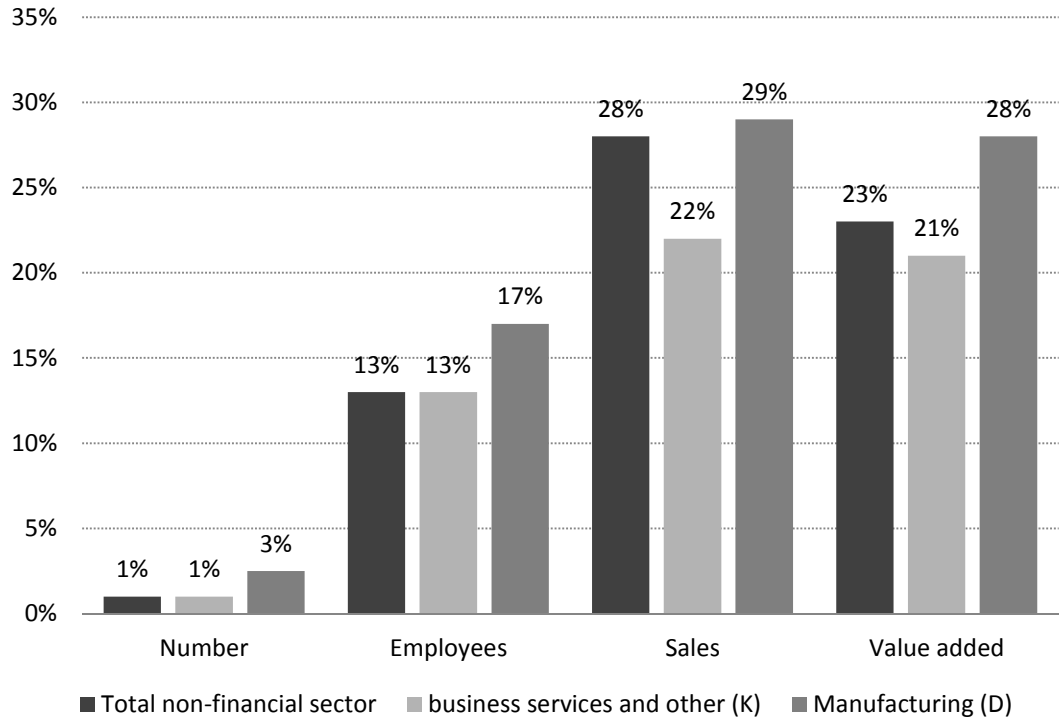
Figure 1: Foreign-owned enterprises in German non-financial sectors



Source: According to Feuerhake et al. (2010).

Table 1: Potential channels affecting the performance of foreign-controlled affiliates

Effect	*Examples*	*Relevant factor*	*Expected impact on productivity*
(Genuine) specific advantage of MNE	Superior technology or organizational advantages	Multinationality	+
Network effects	Overall flexibility, such as profit and activity shifting	Multinationality/part of nationally-restricted network	+
Specific role of affiliate	Asset sourcing strategies and export platforms	Business strategy of group head	-/+
Country of origin	Factor endowments, specific business systems and other cultural differences	Nationality	-/+
(Liability of) foreignness	Additional costs for market entry and communication	Foreign control	-

Note: This table is for illustrative purposes only and does not claim to be enumerative. The separation of effects is not that clear-cut as may be suggested, as, for example the liability of foreignness and also network effects can be already captured by the specific advantage hypothesis. This table shows only the expected impact on overall productivity and it has to be kept in mind that the direction can also be reversed for other measures in case.

Table 2: Summary statistics

Y	*year*	*mean*	*std.dev.*	*p1*	*p10*	*p25*	*p50*	*p75*	*p90*	*p99*
Employees	2007	67.18	497.01	1	3	6	12	32	107	925
	2008	68.01	447.61	2	4	7	15	37	118	874
Labor productivity[ac]	2007	87929.04	130854	-6973	15672.39	30156.7	51287.65	88280.5	178367.5	716995.6
	2008	77249.72	97008.06	4612.95	17878.36	31987.6	51662.89	82285.04	146027.4	538350
Return on sales[c]	2007	23.8	27.89	-45	-2.14	5.11	18.02	40.37	62.73	95.36
	2008	27.51	25.86	-26.29	0.42	7.84	22.82	44.49	64.06	93.27
Wage per capita[a]	2007	31276.3	34353.6	1920	7342.71	13863.33	24428.32	39712.4	57657	148000
	2008	28369.74	25569.4	1490.21	7335.88	13362.28	22802.89	37173.25	53627.32	109678.8
Export quota[b]	2007	3.23	12.79	0	0	0	0	0	4.49	78.86
	2008	4.13	13.86	0	0	0	0	0.02	9.86	82.16
Log(employees)	2007	2.7	1.42	0	1.1	1.79	2.49	3.47	4.67	6.83
	2008	2.9	1.34	0.69	1.39	1.95	2.71	3.61	4.77	6.77
Log(wage per capita)	2007	10.01	0.86	7.56	8.9	9.54	10.1	10.59	10.96	11.91
	2008	9.95	0.86	7.31	8.9	9.5	10.03	10.52	10.89	11.61

N: 33922(2007); 41292(2008).
Note: [a] In EUR per year; [b] In shares of sales abroad (percent); [c] Upper and lower 1 percent are excluded; [d] In thousand EUR per year.

Table 3: Unconditional means by enterprise groups

Y		*Foreign controlled affiliates*		*Domestically controlled affiliates*					
				All affiliates		*Exporter*		*Export quota ≥ 30 %*	
		(N: 1553(2007); 1740(2008))		2007 *(N: 9030)*	2008 *(N:9594)*	2007 *(N: 1431)*	2008 *(N: 2369)*	2007 *(N: 277)*	2008 *(N: 387)*
Employees	2007	mean	237.38	99.24***		116.12**		53.54***	
		(std. dev.)	(1828.52)	(385.68)		(445.98)		(94.71)	
		t-test (p-value)		0.0031		0.0114		0.0001	
	2008	mean	252.1		114.77***		118.77***		78,26***
		(std. dev.)	(1712.1)		(405.53)		(544.33)		(163,09)
		t-test (p-value)			0.0009		0.0017		0.0000
Labor productivity	2007	mean	127941.5	115535**		99042.62***		111799.7	
		(std. dev.)	(215976.1)	(217273.2)		(166214.1)		(154807.4)	
		t-test (p-value)		0.0368		0.0000		0.1355	
	2008	mean	111672.9		88613.61***		84067.13***		105188
		(std. dev.)	(125580)		(117351.6)		(86419.24)		(102495.2)
		t-test (p-value)			0.0000		0.0000		0.2816
Return on sales	2007	mean	10.46	18.54***		14.7***		15.99**	
		(std. dev.)	(41.02)	(37.01)		(27.54)		(35.33)	
		t-test (p-value)		0.0000		0.0008		0.0197	
	2008	mean	16.94		20.65***		16.88		20.78
		(std. dev.)	(23.89)		(24.73)		(20.68)		(23.72)
		t-test (p-value)			0.0000		0.9355		0.0041***
Wage per capita	2007	mean	59548.62	37500.98***		44209.52***		47314.47***	
		(std. dev.)	(54688.34)	(48090.1)		(34560.47)		(34412.32)	
		t-test (p-value)		0.0000		0.0000		0.0000	
	2008	mean	52838.9		33404.1***		40779.54***		45114.18***
		(std. dev.)	(38722.76)		(28466.03)		(23583.66)		(26986)
		t-test (p-value)			0.0000		0.0000		0.0000
Export quota	2007	mean	12.47	2.72***		17.16***		60.69***	
		(std. dev.)	(26.05)	(11.66)		(24.71)		(23.95)	
		t-test (p-value)		0.0000		0.0000		0.0000	
	2008	mean	15.89		3.76***		15.21		57.97***
		(std. dev.)	(27.02)		(12.81)		(22.12)		(22.85)
		t-test (p-value)			0.0000		0.3895		0.0000

Note: Significance at the 10% (*), 5% (**) and 1% (***) level.

Table 4: Quantiles and Kolmogorov-Smirnov tests

Y	*year*	*group*	*p10*	*p25*	*p50*	*p75*	*p90*	*K-S-test (p-values)*		
								H_0: equal	*H_0: fof>*	*H_0: fof<*
Employees	2007	foaff	4	11	35	112	307			
		doaff	3	6	17	57	193	0.000	1.000	0.000
		doaffex	5	11	29	80	203	0.000	0.142	0.000
		doaffex30	3	7	22	58	136	0.000	0.976	0.000
	2008	foaff	7	17	46	132	360			
		doaff	5	10	26	82	241	0.000	1.000	0.000
		doaffex	7	14	32	81	203	0.000	0.904	0.000
		doaffex30	6	12	31	81	169	0.000	0.998	0.000
Labor productivity	2007	foaff	20863.05	45976.1	77324.06	124787.3	242858			
		doaff	13331.15	29047.91	56123.07	107500.3	251156.7	0.000	0.568	0.000
		doaffex	26381.97	42209.88	63091.5	96468.5	161529	0.000	0.038	0.000
		doaffex30	26902.63	47018.68	67470.2	115173.1	231404	0.143	0.391	0.072
	2008	foaff	25851.93	48496.11	77254.2	124230.9	210702.2			
		doaff	15316.28	30046.77	54809.31	93108.34	185420.5	0.000	0.984	0.000
		doaffex	25598.61	42324.41	63813.05	94080.16	146098.6	0.000	0.995	0.000
		doaffex30	33295.4	48344.64	77958.57	114942.5	203033.7	0.344	0.173	0.387
Return on sales	2007	foaff	-23.44	0.36	9.71	26.95	51.79			
		doaff	-5.47	2.89	12.12	32.36	62.31	0.000	0.000	0.999
		doaffex	-3.61	3.67	10.78	23.25	43.58	0.000	0.000	0.025
		doaffex30	-10.09	3.58	13.68	29.63	54.19	0.015	0.007	0.943
	2008	foaff	-4.86	2.79	11.44	27.37	48.87			
		doaff	-1.16	4.27	13.99	32.08	56.45	0.000	0.000	0.981
		doaffex	-1.48	4.32	12.22	25.46	45.39	0.004	0.002	0.237
		doaffex30	-2.77	5.86	16.09	32.8	54.28	0.001	0.000	0.938
Wage per capita	2007	foaff	19613.29	33347.5	49417.35	69001.77	98628.91			
		doaff	9315.33	17406.17	30472.36	44944	63285.3	0.000	0.999	0.000
		doaffex	17740.4	26668.64	38738.57	53266.36	70479.41	0.000	0.993	0.000
		doaffex30	18158.3	27841.7	40330.45	56666.67	76471.45	0.000	0.987	0.000
	2008	foaff	18532.05	32049.32	46847	64630.42	85665.78			
		doaff	9018.03	16935.32	29256.61	42906.48	59079.25	0.000	0.994	0.000
		doaffex	16364.59	25662.19	37629	50636.38	67598.5	0.000	0.989	0.000
		doaffex30	18519	28589.05	40130.95	55970.77	73215.54	0.000	0.969	0.000
Export quota	2007	foaff	0	0	0	8.88	52.92			
		doaff	0	0	0	0	2.98	0.000	1.000	0.000
		doaffex	0.31	1.28	6.49	20.77	51.91	0.000	0.000	0.803
		doaffex30	33.43	39.88	54.25	80.37	100	0.000	0.000	1.000
	2008	foaff	0	0	0.12	21.07	60.61			
		doaff	0	0	0	0	9.03	0.000	1.000	0.000
		doaffex	0.31	1.34	5.81	19.04	45.11	0.000	0.000	0.019
		doaffex30	33.07	38.96	50.77	73.41	100	0.000	0.000	1.000

N: see tab. 2.
Note: Abbreviation foaff for foreign owned affiliates, doaff for domestically owned affiliates, doaffex for exporters and doaffex30 for exporters with export quota of at least 30 percent; K-S-test p-values against distribution of foaff at any time.

Table 5: Regression estimates

Variable (Y)	*Year*	*Reference group of domestic affiliates*					
		All affiliates (estimates with N = 10583(2007); 11334(2008))		*Exporter* (estimates with N = 2984(2007); 4109(2008))		*Export quota ≥ 30 %* (estimates with N = 1830(2007); 2127(2008))	
		(1)	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*
Employees[a]	2007	133.41***	-	128.82**	-	190.59***	-
		(0.005)	()	(0.010)	()	(0.000)	()
	2008	139.71***	-	142.78***	-	187.72***	-
		(0.001)	()	(0.001)	()	(0.000)	()
Labor productivity[a]	2007	30864.41***	32878.34***	25285.98***	26480.52***	8983.96	11112.86
		(0.000)	(0.000)	(0.000)	(0.000)	(0.400)	(0.299)
	2008	30118.23***	32015.27***	24079.75***	25275.59***	-462.07	1462.43
		(0.000)	(0.000)	(0.000)	(0.000)	(0.937)	(0.803)
Return on sales[a]	2007	-5.48***	-5.36***	-4.64***	-4.66***	-6.38***	-6.51***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.006)
	2008	-2.37***	-2.05***	-0.44	-0.26	-4.69***	-4.48***
		(0.000)	(0.001)	(0.539)	(0.716)	(0.000)	(0.001)
Wage per capita[a]	2007	20969.9***	21657.35***	15902.58***	16335.22***	12678.34***	13663.23***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	2008	18241.28***	18779.29***	12244.51***	12560.9***	8235.73***	8850.62***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Export quota[b]	2007	1.42***	1.44***	-0.37***	-0.36***	-2.38***	-2.35***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	2008	1.45***	1.48***	0.06	0.09	-1.97***	-1.92***
		(0.000)	(0.000)	(0.314)	(0.134)	(0.000)	(0.000)
Export probability[c]	2007	0.51***	0.49***	-	-	-	-
		(0.000)	(0.000)	()	()	()	()
	2008	0.64***	0.64***	-	-	-	-
		(0.000)	(0.000)	()	()	()	()
Marginal effects	2007	0.14***	0.14***	-	-	-	-
		(0.000)	(0.000)	()	()	()	()
	2008	0.23***	0.23***	-	-	-	-
		(0.000)	(0.000)	()	()	()	()
Log(employees)[a]	2007	0.45***	-	0.22***	-	0.61***	-
		(0.000)	()	(0.000)	()	(0.000)	()
	2008	0.44***	-	0.39***	-	0.53***	-
		(0.000)	()	(0.000)	()	(0.000)	()
Log(wage per capita)[a]	2007	0.49***	0.51***	0.26***	0.27***	0.21***	0.22***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	2008	0.47***	0.49***	0.22***	0.23***	0.14***	0.15***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Note: Reported are coefficients with p-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 6: Simulations of export intensity for hypothetical enterprises

year	*group*	*model 1*	*model 2 (number of employees)*			
			10	*100*	*500*	*1000*
2007	Foreign controlled affiliates	0.11	0.11	0.11	0.07	0.08
	All domestically controlled affiliates	0.03	0.03	0.03	0.03	0.02
	Domestically controlled exporter	0.13	0.16	0.16	0.14	0.12
	Domestically controlled exporter with quota ≥ 30 %	0.45	0.58	0.57	0.54	0.5
	Origin of control: US			0.04		
	Europe			0.02		
	other			0.06		
2008	Foreign controlled affiliates	0.15	0.16	0.16	0.13	0.11
	All domestically controlled affiliates	0.04	0.04	0.04	0.03	0.03
	Domestically controlled exporter	0.15	0.1	0.1	0.08	0.07
	Domestically controlled exporter with quota ≥ 30 %	0.57	0.4	0.39	0.34	0.27
	Origin of control: US			0.05		
	Europe			0.04		
	other			0.05		

Table 7: Quantile regression estimates with reference group: domestically owned affiliates

Variable (Y)	*year*	*model*	*p10*	*p20*	*p30*	*p40*	*p50*	*p60*	*p70*	*p80*	*p90*	*F-test (p-value)*
Employees	2007	(1)	2.56e-15	2***	5***	8***	13***	21***	33***	52***	109***	
			(1.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
	2008	(1)	2***	4***	7***	11***	17***	26***	35***	53***	128***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
Labor productivity	2007	(1)	7850.09***	11555.74***	18436***	22253.02***	23552.48***	26699.8***	30300.75***	36177.62***	62963.3***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
	2008	(1)	9735.32***	14557.15***	19089.7***	21069.62***	22490.62***	24315.27***	30223.31***	42414.08***	60235.65***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
		(2)	10483.13***	16098.99***	20179.04	22464.07***	24279.86***	25340.09	31064.26***	44994.52***	61735.94***	
			(0.000)	(0.000)	(0.131)	(0.007)	(0.000)	(0.467)	(0.000)	(0.000)	(0.000)	(0.0000)
Return on sales	2007	(1)	-17.93***	-4.11***	-2.12***	-1.39**	-1.38**	-1.22	-1.15	0.8	0.45	
			(0.000)	(0.000)	(0.000)	(0.011)	(0.028)	(0.086)	(0.267)	(0.588)	(0.849)	(0.0000)
		(2)	-17.5***	-4.29***	-2.1***	-1.38***	-1.3***	-1.06	-0.65	2.04	0.78	
			(0.000)	(0.000)	(0.000)	(0.003)	(0.007)	(0.111)	(0.957)	(0.999)	(0.726)	(0.0004)
	2008	(1)	-3.33***	-1.78***	-1.53***	-1.75***	-1.51***	-2.21***	-1.64	-1.67	-3.12	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.004)	(0.101)	(0.158)	(0.130)	(0.0182)
		(2)	-3.42***	-1.67***	-1.54***	-1.53***	-1.46	-1.29	-0.83	-0.72	-2.43	
			(0.000)	(0.001)	(0.000)	(0.003)	(0.810)	(0.121)	(0.411)	(0.607)	(0.268)	(0.1554)
Wage per capita	2007	(1)	9066.89***	12324.03***	15126.57***	16199.53***	17531.02***	18894.81***	21254.89***	23967.89***	32909.25***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
		(2)	9847.01***	13274.81***	15414.51***	16990.12***	18196.18***	19902.76***	21501.33***	24417.92***	32977.09***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
	2008	(1)	8156.38***	11378.14***	14020.85***	15716.88***	16098.45***	16961.91***	18773.36***	21434.73***	26172.83***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
		(2)	8862.81***	12590.49***	14307.93***	15988.73***	16820.49***	17817.28***	19237.93***	21692.76***	26265.52***	
			(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
Log(employees)	2007	(1)	1.24e-14	0.29***	0.47***	0.49***	0.51***	0.57***	0.54***	0.48***	0.55***	
			(1.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0003)
	2008	(1)	0.29***	0.41***	0.43***	0.41***	0.49***	0.48***	0.43***	0.41***	0.5***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0911)
Log(wage per capita)	2007	(1)	0.62***	0.56***	0.51***	0.48***	0.44***	0.41***	0.41***	0.39***	0.41***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
		(2)	0.63***	0.61***	0.55***	0.51***	0.46	0.43***	0.42***	0.41***	0.42***	
			(0.000)	(0.000)	(0.000)	(0.000)	(1.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
	2008	(1)	0.55***	0.5***	0.5***	0.47***	0.44***	0.39***	0.38***	0.38***	0.37***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
		(2)	0.57***	0.58***	0.53***	0.5***	0.46***	0.42***	0.4***	0.39***	0.37***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)

N: 10583(2007); 11334(2008).
Note: Reported are coefficients with p-values in brackets; Model 1 includes 2-digit industry dummies, model 2 controls for size additionally; F-test null hypothesis: coefficients are equal across quantiles; Standard errors obtained using bootstrapping method with 50 replications; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table 8: Quantile regression estimates with reference group: domestically owned exporter

Variable (Y)	*year*	*model*	*p10*	*p20*	*p30*	*p40*	*p50*	*p60*	*p70*	*p80*	*p90*	*F-test (p-value)*
Employees	2007	(1)	2.18e-14	1	1	3**	6***	14***	23***	41***	106***	
			(1.000)	(0.151)	(0.361)	(0.034)	(0.003)	(0.001)	(0.001)	(0.000)	(0.000)	(0.0005)
	2008	(1)	1**	3***	4***	7***	15***	27***	41***	65***	163***	
			(0.025)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
Labor productivity	2007	(1)	-4855.39**	-448.08	6876.86***	10686.6***	14396.91***	16878.63***	21313.33***	28110.57***	50358.06***	
			(0.013)	(0.829)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.0000)
	2008	(1)	788.55	3026.19**	8955.04***	10592.55***	12390.75***	16713.59***	20697.66***	32597.06***	53928.44***	
			(0.514)	(0.043)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
Return on sales	2007	(1)	-19.6***	-5.04***	-2.87***	-1.85***	-0.95	-0.66	0.16	4.06**	4.97	
			(0.000)	(0.000)	(0.000)	(0.006)	(0.277)	(0.512)	(0.899)	(0.017)	(0.069)	(0.0000)
	2008	(1)	-3.08***	-1.99***	-1.65***	-1.15**	-0.97*	-0.98	0.54	0.77	1.15	
			(0.002)	(0.000)	(0.000)	(0.016)	(0.076)	(0.279)	(0.586)	(0.560)	(0.506)	(0.2182)
		(2)	-3.16***	-1.93***	-1.8***	-1.17*	-0.84	-0.63	0.93	2.03	1.41	
			(0.001)	(0.000)	(0.000)	(0.055)	(0.125)	(0.466)	(0.330)	(0.196)	(0.557)	(0.0708)
Wage per capita	2007	(1)	2615.36***	5862.1***	8439.9***	10038.49***	10999.26***	14026.13***	15620.36***	18592.15***	27661.88***	
			(0.008)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
		(2)	4036.52***	6714.05	9176.95***	10230.36***	11504.24***	14064.52***	15629.81**	18454.36***	27588.7***	
			(0.000)	(0.402)	(0.000)	(0.000)	(0.000)	(0.000)	(0.035)	(0.000)	(0.000)	(0.0000)
	2008	(1)	1893,12**	4884,73***	7098,27***	8589,75***	9703,97***	11063,07***	13669,77***	15043,63***	20247,63***	
			(0,015)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,0000)
		(2)	3666,17***	5845,27***	7697,3***	8972,94***	9975,47***	10975,5***	13736,32***	14976,56***	20296,99***	
			(0,000)	(0,006)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,0000)
Log(employees)	2007	(1)	3.41e-15	0.95	0.07	0.17**	0.21***	0.33***	0.34***	0.35***	0.49***	
			(1.000)	(0.332)	(0.432)	(0.047)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0094)
	2008	(1)	0.13	0.24***	0.22***	0.28***	0.43***	0.48***	0.53***	0.49***	0.61***	
			(0.132)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
Log(wage per capita)	2007	(1)	0.14***	0.21***	0.26***	0.26***	0.26***	0.28***	0.28***	0.29***	0.32***	
			(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0963)
		(2)	0.22***	0.26***	0.28***	0.27***	0.26***	0.28***	0.28***	0.29***	0.32***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.2918)
	2008	(1)	0.11**	0.19***	0.22***	0.23***	0.22***	0.23***	0.26***	0.24***	0.27***	
			(0.022)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0169)
		(2)	0.18***	0.22***	0.24***	0.24***	0.23***	0.23***	0.26***	0.24***	0.27***	
			(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.1607)

N: 2984(2007); 4109(2008).
Note: Reported are coefficients with p-values in brackets; Model 1 includes 2-digit industry dummies, model 2 controls for size additionally; F-test null hypothesis: coefficients are equal across quantiles; Standard errors obtained using bootstrapping method with 50 replications; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table 9: Quantile regression estimates with reference group: domestically owned exporter with export quota ≥ 30%

Variable (Y)	*year*	*model*	*p10*	*p20*	*p30*	*p40*	*p50*	*p60*	*p70*	*p80*	*p90*	*F-test (p-value)*
Employees	2007	(1)	2***	4***	6***	8***	12***	21***	31***	54***	151***	
			(0.007)	(0.000)	(0.001)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
	2008	(1)	3***	5***	6***	9***	17***	27***	41***	68***	185***	
			(0.001)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0000)
Labor productivity	2007	(1)	-4748.36	-6478.93*	2715.84	4950.09**	5873.85	6311.39	8476.14	12910.69	-10216.86	
			(0.165)	(0.052)	(0.412)	(0.046)	(0.137)	(0.199)	(0.216)	(0.277)	(0.750)	(0.0049)
	2008	(1)	-5303.1**	-1857.12	-23.45	-1021.27	-2971.9	-5851.88*	714.41	-727.27	3923.61	
			(0.012)	(0.453)	(0.995)	(0.663)	(0.348)	(0.081)	(0.878)	(0.945)	(0.845)	(0.1927)
Return on sales	2007	(1)	-14.03*	-4.28**	-2.97**	-2.82**	-4.86***	-4.07**	-3.81*	-3.51	-5.1	
			(0.010)	(0.021)	(0.029)	(0.017)	(0.002)	(0.018)	(0.067)	(0.508)	(0.316)	(0.2358)
		(2)	-14.94***	-4.52***	-2.98**	-2.9**	-4.91***	-4.21**	-3.73*	-3.2	-4.81	
			(0.001)	(0.001)	(0.016)	(0.029)	(0.001)	(0.032)	(0.062)	(0.997)	(0.356)	(0.1758)
	2008	(1)	-3.33*	-3.52***	-3.75***	-3.18***	-5.03***	-5.89***	-6.98***	-7.07***	-8.05**	
			(0.061)	(0.000)	(0.000)	(0.006)	(0.000)	(0.008)	(0.003)	(0.004)	(0.026)	(0.7324)
		(2)	-3.4*	-3.46	-3.7***	-3.15**	-4.99***	-4.82*	-6.43	-6.59**	-7.5	
			(0.096)	(0.994)	(0.000)	(0.012)	(0.000)	(0.051)	(0.619)	(0.029)	(0.822)	(0.4333)
Wage per capita	2007	(1)	2152.35	5749.65***	7770.85***	7721.03***	9538.59***	11604.65***	12375.38***	14267.86***	17619.71***	
			(0.271)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0255)
	2008	(1)	117.72	2214.02	4604.1***	6145.54***	7236.35***	7463.11***	9225.34***	10209.48***	13489.61***	
			(0.955)	(0.141)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.0220)
		(2)	1662.54	3248.91	5359.59***	6772.11***	8032.99***	7856.01***	9676.33***	9714.05***	13437.36***	
			(0.411)	(0.191)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.002)	(0.004)	(0.0137)
Log(employees)	2007	(1)	0.51***	0.41***	0.47***	0.45***	0.49***	0.58***	0.62***	0.74***	0.89***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0255)
	2008	(1)	0.36**	0.41***	0.33***	0.33***	0.47***	0.56***	0.55***	0.58***	0.78***	
			(0.020)	(0.002)	(0.008)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.1609)
Log(wage per capita)	2007	(1)	0.1	0.21***	0.23***	0.19***	0.22***	0.23***	0.21***	0.2***	0.21***	
			(0.231)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.7477)
		(2)	0.12*	0.24***	0.25***	0.19***	0.23***	0.24***	0.22***	0.21***	0.21***	
			(0.090)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.5856)
	2008	(1)	0.01*	0.09*	0.14***	0.16***	0.17***	0.15***	0.17***	0.15***	0.16***	
			(0.094)	(0.081)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	(0.5669)
		(2)	0.1	0.12**	0.17***	0.17***	0.18***	0.16***	0.17	0.15***	0.16**	
			(0.243)	(0.033)	(0.000)	(0.000)	(0.000)	(0.000)	(0.937)	(0.001)	(0.013)	(0.8990)

N: 1830(2007); 2127(2008).
Note: Reported are coefficients with p-values in brackets; Model 1 includes 2-digit industry dummies, model 2 controls for size additionally; F-test null hypothesis: coefficients are equal across quantiles; Standard errors obtained using bootstrapping method with 50 replications; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table 10: Unconditional means by country of origin

Y	*Foreign controlled enterprises by country of origin*				*T-test (p-values) by domestically controlled comparison groups*					
					All affiliates		*Exporter*		*Export quota ≥ 30 %*	
			2007	2008	2007	2008	2007	2008	2007	2008
Employees	US	mean	208.39	229.5	0.0830*	0.0494**	0.1505	0.0618*	0.0148**	0.0103**
		std.dev.	(1155.54)	(1108.96)						
	Europe	mean	255.11	269.57	0.0153**	0.0079***	0.0334**	0.0109**	0.0018***	0.0011***
		std.dev.	(2090.12)	(1976.66)						
	Other	mean	140.88	146.52	0.2983	0.3494	0.5549	0.4338	0.0333**	0.0501*
		std.dev.	(409.08)	(382.47)						
Labor productivity	US	mean	131366.1	131667.7	0.1448	0.0000***	0.0058***	0.0000***	0.1701	0.0035***
		std.dev.	(198074.6)	(141078.4)						
	Europe	mean	125156.5	106574.9	0.1638	0.0000***	0.0006***	0.0000***	0.1843	0.8271
		std.dev.	(219192.5)	(123440.4)						
	Other	mean	136019.3	110467.5	0.2126	0.0308**	0.0314**	0.0099***	0.2007	0.6386
		std.dev.	(167251.9)	(113336.2)						
Return on sales	US	mean	9.96	15.7	0.0000***	0.0002***	0.0292**	0.3813	0.0409**	0.0040***
		std.dev.	(37.46)	(24.6)						
	Europe	mean	10.79	17.43	0.0000***	0.0000***	0.0134**	0.5054	0.0450**	0.0160**
		std.dev.	(41.11)	(23.59)						
	Other	mean	9.32	15.32	0.0029***	0.0065***	0.0918*	0.4256	0.0759*	0.0163**
		std.dev.	(31.4)	(21.78)						
Wage per capita	US	mean	72219.44	65705.13	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
		std.dev.	(64089.16)	(43828.18)						
	Europe	mean	53777.75	48506.59	0.0000***	0.0000***	0.0000***	0.0000***	0.0104**	0.0520*
		std.dev.	(49022.63)	(36653.93)						
	Other	mean	73045.13	56833.39	0.0000***	0.0000***	0.0000***	0.0000***	0.0002***	0.0009***
		std.dev.	(65947.05)	(36523.68)						
Export quota	US	mean	17.77	19.03	0.0000***	0.0000***	0.7310	0.0199**	0.0000***	0.0000***
		std.dev.	(30.39)	(29.95)						
	Europe	mean	9.58	14.2	0.0000***	0.0000***	0.0000***	0.2518	0.0000***	0.0000***
		std.dev.	(22.68)	(25.61)						
	Other	mean	24.27	21.34	0.0000***	0.0000***	0.0488***	0.0205**	0.0000***	0.0000***
		std.dev.	(35.8)	(29.36)						

N: US 337(2007), 365(2008); Europe 1059(2007), 1159(2008); Other 104(2007), 130(2008).
Note: All values refer to foreign owned firms, the associated values of the domestically owned comparison groups are given in table 2; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table 11: 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)	103.56	150.8**	44.56			
				(0.104)	(0.020)	(0.267)	(0.5979)	(0.4254)	(0.1506)
		doaffex	(1)	96.52	146.33**	39.75			
				(0.136)	(0.030)	(0.341)	(0.5837)	(0.4419)	(0.1498)
		doaffex30	(1)	158.06**	207.93***	105.6**			
				(0.015)	(0.002)	(0.012)	(0.5846)	(0.4771)	(0.1567)
	2008	doaff	(1)	113.66*	149.5**	33.19			
				(0.054)	(0.011)	(0.329)	(0.6606)	(0.2268)	(0.0758)*
		doaffex	(1)	125.09**	157.44***	44.62			
				(0.038)	(0.009)	(0.210)	(0.6914)	(0.2273)	(0.0828)*
		doaffex30	(1)	173.75***	200.51***	96.11***			
				(0.005)	(0.001)	(0.008)	(0.7410)	(0.2491)	(0.0995)*
Labor productivity[a]	2007	doaff	(1)	43873.14***	24715.34***	45002.75***			
				(0.000)	(0.000)	(0.004)	(0.1208)	(0.9522)	(0.2306)
			(2)	46045.23***	26815.4***	46090.4***			
				(0.000)	(0.000)	(0.004)	(0.1193)	(0.9981)	(0.2545)
		doaffex	(1)	39597.44***	20374.64***	38868.93**			
				(0.000)	(0.007)	(0.017)	(0.1190)	(0.9691)	(0.2718)
			(2)	40817.77***	21616.98***	39426.95**			
				(0.000)	(0.004)	(0.015)	(0.1190)	(0.9409)	(0.2898)
		doaffex30	(1)	25114.87*	3239.88	23163.02			
				(0.082)	(0.772)	(0.203)	(0.0740)*	(0.9171)	(0.2360)
			(2)	27312.44*	5464.69	24713.29			
				(0.059)	(0.626)	(0.174)	(0.0740)*	(0.8897)	(0.2523)
	2008	doaff	(1)	48681.15***	21057.96***	30499.24***			
				(0.000)	(0.000)	(0.002)	(0.0006)***	(0.1358)	(0.3642)
			(2)	50546.66***	22749.46***	31117.66***			
				(0.000)	(0.000)	(0.002)	(0.0006)***	(0.1101)	(0.4200)
		doaffex	(1)	45831.22***	17665.05***	26594.83***			
				(0.000)	(0.000)	(0.007)	(0.0005)***	(0.1124)	(0.3868)
			(2)	47101.29***	18846.57***	27093.54***			
				(0.000)	(0.000)	(0.006)	(0.0005)***	(0.0980)*	(0.4232)
		doaffex30	(1)	22395.95**	-7376.17	1433.72			
				(0.012)	(0.229)	(0.894)	(0.0002)***	(0.0817)*	(0.3920)
			(2)	24456.51***	-5470.14	2627.07			
				(0.006)	(0.374)	(0.807)	(0.0002)***	(0.0693)*	(0.4303)
Return on sales[a]	2007	doaff	(1)	-4.79**	-5.78***	-6.22**			
				(0.020)	(0.000)	(0.042)	(0.6788)	(0.6948)	(0.8930)
			(2)	-4.65**	-5.65***	-6.14**			
				(0.024)	(0.000)	(0.044)	(0.6741)	(0.6814)	(0.8808)
		doaffex	(1)	-4.26**	-4.42***	-5.52*			
				(0.049)	(0.003)	(0.077)	(0.9469)	(0.7282)	(0.7368)
			(2)	-4.27**	-4.44***	-5.53*			
				(0.049)	(0.003)	(0.077)	(0.9453)	(0.7299)	(0.7399)
		doaffex30	(1)	-5.97**	-6.19**	-7.25**			
				(0.043)	(0.012)	(0.050)	(0.9245)	(0.7245)	(0.7485)
			(2)	-6.08**	-6.31**	-7.33**			
				(0.039)	(0.011)	(0.048)	(0.9236)	(0.7315)	(0.7570)
	2008	doaff	(1)	-3.47***	-2.33***	-3.5*			

				(0.008)	(0.001)	(0.068)	(0.4316)	(0.9925)	(0.5637)
			(2)	-3.14**	-2.04***	-3.38*			
				(0.016)	(0.005)	(0.076)	(0.4512)	(0.9152)	(0.5049)
		doaffex	(1)	-1.43	-0.1	-1.84			
				(0.285)	(0.901)	(0.341)	(0.3562)	(0.8585)	(0.3861)
			(2)	-1.24	0.07	-1.76			
				(0.356)	(0.932)	(0.361)	(0.3655)	(0.8183)	(0.3610)
		doaffex30	(1)	-5.73***	-4.34***	-6.22***			
				(0.001)	(0.002)	(0.006)	(0.3354)	(0.8283)	(0.3496)
			(2)	-5.01***	-4.14***	-6.09***			
				(0.002)	(0.003)	(0.007)	(0.3444)	(0.7966)	(0.3322)
Wage per capita[a]	2007	doaff	(1)	33171.07***	15569.51***	34398.21***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.8669)	(0.0045)***
			(2)	33888.24***	16277.24***	34755.26***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.9055)	(0.0052)***
		doaffex	(1)	27816***	10363.14***	29423.7***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.8260)	(0.0041)***
			(2)	28222.66***	10793.65***	29608.15***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.8494)	(0.0045)***
		doaffex30	(1)	24636.51***	7054.56***	26376.36***			
				(0.000)	(0.006)	(0.000)	(0.0000)***	(0.8121)	(0.0038)***
			(2)	25602.92***	8042.92***	27056.88***			
				(0.000)	(0.002)	(0.000)	(0.0000)***	(0.8421)	(0.0043)***
	2008	doaff	(1)	29276.51***	13314.37***	20263.59***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.0211)**	(0.0375)**
			(2)	29779.09***	13783.8***	20428.87***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.0165)**	(0.0463)**
		doaffex	(1)	24530.45***	8176.24***	15877.5***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.0270)**	(0.0216)**
			(2)	24841.17***	8480.48***	15997.84***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.0236)**	(0.0247)**
		doaffex30	(1)	20657.58***	4052.85**	11750.32***			
				(0.000)	(0.022)	(0.001)	(0.0000)***	(0.0230)**	(0.0217)**
			(2)	21287.13***	4646.89***	12113.85***			
				(0.000)	(0.009)	(0.000)	(0.0000)***	(0.0191)**	(0.0258)**
Export quota[b]	2007	doaff	(1)	1.76***	1.17***	2.09***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.1351)	(0.0000)***
			(2)	1.78***	1.19***	2.11***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.1443)	(0.0000)***
	2008	doaff	(1)	1.57***	1.32***	1.61***			
				(0.000)	(0.000)	(0.000)	(0.0374)**	(0.8229)	(0.0878)*
			(2)	1.58***	1.33***	1.61***			
				(0.000)	(0.000)	(0.000)	(0.0345)**	(0.8761)	(0.0977)*
Export probability[c]	2007	doaff	(1)	0.62***	0.42***	0.76***			
				(0.000)	(0.000)	(0.000)	(0.0123)**	(0.3580)	(0.0102)**
			Marginal effects	0.19***	0.12***	0.24***			
				(0.000)	(0.000)	(0.000)			
			(2)	0.62***	0.41***	0.75***			
				(0.000)	(0.000)	(0.000)	(0.0123)**	(0.3516)	(0.0098)***
			Marginal effects	0.19***	0.12***	0.24***			
				(0.000)	(0.000)	(0.000)			
	2008	doaff	(1)	0.54***	0.6***	0.7***			
				(0.000)	(0.000)	(0.000)	(0.4087)	(0.2934)	(0.5338)

			Marginal effects	0.2***	0.22***	0.25***			
				(0.000)	(0.000)	(0.000)			
			(2)	0.54***	0.6***	0.68***			
				(0.000)	(0.000)	(0.000)	(0.4035)	(0.2939)	(0.5386)
			Marginal effects	0.2***	0.22***	0.25***			
				(0.000)	(0.000)	(0.000)			
Log(employees)[a]	2007	doaff	(1)	0.63***	0.38***	0.41***			
				(0.000)	(0.000)	(0.006)	(0.0144)**	(0.2032)	(0.8421)
		doaffex	(1)	0.4***	0.16**	0.16			
				(0.000)	(0.016)	(0.297)	(0.0175)**	(0.1575)	(0.9935)
		doaffex30	(1)	0.78***	0.55***	0.53***			
				(0.000)	(0.000)	(0.002)	(0.0276)**	(0.1517)	(0.9117)
	2008	doaff	(1)	0.59***	0.35***	0.36***			
				(0.000)	(0.000)	(0.003)	(0.0085)***	(0.1058)	(0.9672)
		doaffex	(1)	0.58***	0.34***	0.33***			
				(0.000)	(0.000)	(0.008)	(0.0093)***	(0.0882)*	(0.9380)
		doaffex30	(1)	0.71***	0.48***	0.47***			
				(0.000)	(0.000)	(0.001)	(0.0089)***	(0.0909)*	(0.9583)
Log(wage per capita)[a]	2007	doaff	(1)	0.71***	0.39***	0.7***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.8797)	(0.0000)***
			(2)	0.74***	0.41***	0.71***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.7534)	(0.0000)***
		doaffex	(1)	0.48***	0.16***	0.48***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.9754)	(0.0000)***
			(2)	0.49***	0.17***	0.49***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.9153)	(0.0000)***
		doaffex30	(1)	0.42***	0.1**	0.42***			
				(0.000)	(0.041)	(0.000)	(0.0000)***	(0.9220)	(0.0000)***
			(2)	0.44***	0.11**	0.43***			
				(0.000)	(0.014)	(0.000)	(0.0000)***	(0.8540)	(0.0000)***
	2008	doaff	(1)	0.67***	0.36***	0.53***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.0082)***	(0.0014)***
			(2)	0.69***	0.38***	0.53***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.0037)***	(0.0031)***
		doaffex	(1)	0.47***	0.13***	0.34***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.0159)**	(0.0001)***
			(2)	0.48***	0.14***	0.34***			
				(0.000)	(0.000)	(0.000)	(0.0000)***	(0.0114)**	(0.0002)***
		doaffex30	(1)	0.41***	0.05	0.25***			
				(0.000)	(0.229)	(0.000)	(0.0000)***	(0.0101)**	(0.0002)***
			(2)	0.41***	0.07	0.26***			
				(0.000)	(0.117)	(0.000)	(0.0000)***	(0.0068)***	(0.0002)***

N: 2007: Reference group. doaff = 10507; Reference group doaffex = 2934; Reference group doaffex30 = 1780; 2008: Reference group. doaff = 12600; Reference group doaffex = 4023; Reference group doaffex30 = 2041.
Note: Abbreviation foaff for foreign owned affiliates, doaff for domestically owned affiliates, doaffex for exporters and doaffex30 for exporters with export quota of at least 30 percent; Reported are coefficients with p-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 12: Unconditional mean comparison of foreign owned affiliates by export participation

group	*Year (N)*		*Employees*	*Labor productivity*	*Return on sales*	*Wage per capita*
foaffex	2007 (537)	mean	273,78	105644	11,34	59341,6
		std. dev.	(1295,23)	(120749,8)	(24,43)	(40763,3)
	2008 (895)	mean	207,23	105879,1	15,95	54982,11
		std. dev.	(904,01)	(108650,6)	(22,42)	(35181,7)
foaffnonex	2007 (953)	mean	228,4	128224,6	14,87	57656,35
		std. dev.	(212189)	(173046,2)	(31,04)	(59682,37)
	2008 (845)	mean	299,62	117809,6	18,1	50568,88
		std. dev.	(2273,69)	(141124,2)	(25,33)	(42052,37)
exporter premium	2007		45,38	-22580,6***	-3,53**	1685,25
t-test (p-value)			0,6086	0,0032	0,0154	0,5192
exporter premium	2008		-92,39	-11930,5**	-2,15*	4413,23**
t-test (p-value)			0,2708	0,0493	0,0744	0,0180

Note: foaffex stands for foreign controlled affiliates with export participation, foaffnonex for those without export activities.

Table 13: Regression estimates for foreign owned affiliates by export participation

Variable (Y)	*year*	*employees*		*Labor productivity*		*Return on sales*		*Wage per capita*	
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Foaffex-dummy	2007	60,78	-	-9905,53	-8397,36	-1,77	-1,76	125,89	801,89
		(0,506)	()	(0,165)	(0,238)	(0,219)	(0,224)	(0,963)	(0,766)
	2008	-91,4	-	-4189,3	-4499,24	-1,24	-1,26	3232,23*	3114,02
		(0,288)	()	(0,459)	(0,425)	(0,285)	(0,277)	(0,089)	(0,100)

N: 1490 (2007) and 1740 (2008).

Appendix

Table A1: Summary statistics (including outliers)

Y	*year*	*mean*	*std.dev.*	*p1*	*p10*	*p25*	*p50*	*p75*	*p90*	*p99*
Labor productivity	2007	145835.3	3736625	-110362	13925.47	29568.35	51493.89	90839.64	201898.1	1337295
(in EUR per year)	2008	129024	3336068	-17416	16428.81	31417.58	51813.19	84110.66	159095.1	1057550
Return on sales	2007	-3890304	652000000	-154.95	-4.14	4.65	17.98	41.39	66.2	156.85
	2008	-2584851	470000000	-72.95	-0.67	7.32	22.78	45.44	66.81	127.76

N: 35324(2007); 42996(2008).

Table A2: Regression estimates (including outliers)

Variable (Y)	*Year*	*Reference group of domestic affiliates*					
		All affiliates (estimates with N = 10994(2007); 12114(2008))		*Exporter* (estimates with N = (2007); (2008))		*Export quota ≥ 30 %* (estimates with N = (2007); (2008))	
		(1)	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*
Labor productivity	2007	253510.1	258252.5	285917.6	289732.4	134230	142040.7
		(0.239)	(0.233)	(0.216)	(0.214)	(0.396)	(0.381)
	2008	209893.5	215291	211072.1	215959.2	109227.1*	117138.6*
		(0.238)	(0.230)	(0.175)	(0.172)	(0.095)	(0.091)
Return on sales	2007	632628.7	622478.2	471635.7	466072.8	812623.5	794899
		(0.401)	(0.402)	(0.444)	(0.451)	(0.351)	(0.359)
	2008	1647325	1666496	1647068	1681537	1705768	1787588
		(0.232)	(0.233)	(0.247)	(0.248)	(0.248)	(0.249)

Note: Reported are coefficients with p-values in brackets; Model 1 includes 2-digit industry dummies, model 2 controls for size additionally; OLS estimator; Significance at the 10% (*), 5% (**) and 1% (***) level.

Table A3: Regression estimates of firm size covariates (model 2)

Variable (Y)	*Year*	*Reference group of domestic affiliates*					
		All affiliates (estimates with N = 10583(2007); 11334(2008))		*Exporter* (estimates with N = 2984(2007); 4109(2008))		*Export quota ≥ 30 %* (estimates with N = 1830(2007); 2127(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	-25,69	0,0004	-15,54	0,0002	-15,75	0,0003
		(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)
	2008	-20,92	0,0004	-12,18	0,0002	-14,08	0,0002
		(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)
Return on sales[a]	2007	-0,002	3,23e-08	0,0002	-1,24e-09	0,0008	-1,26e-08
		(0,000)	(0,000)	(0,642)	(0,851)	(0,065)	(0,100)
	2008	-0,004	6,69e-08	-0,002	3,45e-08	-0,002	2,93e-08
		(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)
Wage per capita[a]	2007	-8,54	0,0001	-5,37	0,00008	-7,19	0,0001
		(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)
	2008	-5,76	0,00009	-3,04	0,00004	-4,38	0,00006
		(0,000)	(0,000)	(0,000)	(0,001)	(0,000)	(0,000)
Export quota[b]	2007	-0,0004	5,51e-09	-	-	-	-
		(0,007)	(0,020)	()	()	()	()
	2008	-0,0006	8,84e-09	-	-	-	-
		(0,000)	(0,000)	()	()	()	()
Export probability[c]	2007	0,00008	-2,27e-09	-	-	-	-
		(0,069)	(0,458)	()	()	()	()
	2008	-0,00002	-9,67e-12	-	-	-	-
		(0,540)	(0,986)	()	()	()	()

Note: Reported are coefficients with p-values in brackets; [a] OLS estimator; [b] Glm estimator; [c] Probit estimation; Significance at the 10% (*), 5% (**) and 1% (***) level.

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