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Foreign Ownership and the Extensive Margins of Exports: Evidence for Manufacturing Enterprises in Germany[1]

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Abstract

We examine how foreign ownership of a firm affects the variety of goods that the firm exports and the number of countries it trades with. We construct a simple theoretical model of how foreign ownership may affect these extensive margins of exports and take this model to data from Germany, one of the leading actors on the world market for goods. In line with theoretical predictions we find that foreign-owned firms do export more goods to more countries after controlling for firm size, productivity and industry affiliation. These differences between foreign-owned firms and domestically controlled firms are highly statistically significant, and they are large from an economic point of view, with foreign-owned firms exporting up to 39% more goods to up to 31% more countries.

JEL classification: F14, F23

Keywords: international trade, foreign ownership, multinational enterprise, foreign direct investment, extensive margins of exports, Germany

1 Introduction

A striking feature of international trade data documented for a number of countries is the high degree of concentration of exports (see World Trade Organization (2008), p. 54 and Bernard et al. (2011), p. 10). A small number of firms is responsible for the lion's share of trade. Germany, one of the leading actors on the world market for goods, is a case in point. More than half of total exports from manufacturing industries stem from the largest 50 trading firms (Wagner (2012a), Table 3). Bernard et al. (2011, p. 10) argue that "[o]ne reason why international trade is so concentrated is that larger exporters not only export more of a given product to a given destination than smaller exporters, but also export more products to more destinations." Again, Germany is a case in point. While thousands of firms from manufacturing industries export only a small number of goods to a small number of countries, firms that trade many goods with many countries are responsible for the lion's share of exports (Wagner 2012a). Given these empirical facts, understanding the behavior of large multi-product, multi-destination exporters is crucial for understanding exporting in general.

The purpose of the current paper is to examine what it is about these large exporters that determines their export success and especially their extensive margins of exports. We focus on the role of two firm characteristics, in particular, namely productivity and foreign ownership, and try to quantify the separate effect of foreign ownership. Regarding firm productivity recent empirical studies by Bernard et al. (2011) for the United States and a replication study by Wagner (2012b) for Germany indicate that the number of products exported and the number of export destinations (i.e., the extensive margins) are positively and statistically highly significantly related with total exports, exports of the largest product across all markets (the intensive margin), and productivity. The basic idea why more productive firms export more products to more markets, according to the Bernard et al. (2011) model, is that these firms generate more profits, allowing them to cover a

wider range of product- and market-specific fixed export costs.

The second characteristic is foreign ownership. An overproportional share of large exporters in Germany is foreign-owned. In 2009 the share of foreign-owned firms in all firms active in foreign trade was 12 percent, it was 25 percent among the large trading firms with 1,000 or more employees, and 40 percent among the 50 largest exporting firms.[1] There are several reasons why we expect foreign ownership of a firm to influence the extensive margins of exports. First, foreign-owned firms can use the international networks and trade contacts of their parent companies, and should thus be able to connect with customers in more countries and for more goods. Second, foreign-owned firms might be less credit constrained due to credits from their parent companies, and this might help to finance trade costs at the extensive margins. Third, foreign-owned firms are known to invest more in research and development and to be more innovative (for Germany, see Weche Gelübcke (2013); see also Guadalupe et al. (2012)), and both innovative products and improved production processes will be positively linked with the extensive margins of exports.

We do not observe the exact reasons why foreign-owned firms exhibit a better export performance than domestically controlled firms and therefore will test for the presence of any unobserved advantages of foreign-owned firms by estimating a foreign ownership premium at the extensive margins of exports. The challenge here is to separate the role of foreign ownership from that of productivity and other observed firm characteristics like firm size and industry affiliation. As Weche Gelübcke (2013) reports, compared to firms

[1] Own calculations based on the data described in detail in Section 3 below. Even beyond exporting the distinction between foreign-owned firms and firms controlled by domestic owners is especially important in Germany, one of the leading destination countries for foreign direct investment (FDI) world-wide. Only the US, Hong Kong, the UK and France had a larger FDI inward stock than Germany in 2010 (see UNCTAD 2011, Annex table I.2). While the share of foreign-owned firms in all firms in Germany is tiny—according to the Federal Statistical Office only 1.1 percent of all firms were foreign-owned firms in 2008—these firms employed 12 percent of all employees, and they contributed 26.7 percent to the total turnover and 20.2 percent to total value added (Nahm 2011).

that are controlled by German owners, foreign-owned firms in Germany are on average larger and more productive, and they are more often (and to a higher degree) involved in exports. Hence productivity and foreign ownership are likely to be intertwined.

We address this challenge by constructing a simple heterogeneous firm model that shows how foreign ownership may affect the extensive margins of exports. The key testable prediction of our model with regard to the extensive margins of exports is that foreign ownership will raise the probability that a firm will export more products to more destinations, but only for sufficiently productive firms. We then use this model to guide the specification of our estimating equation and use newly available data for enterprises from manufacturing industries in Germany to test this hypothesis. To the best of our knowledge, the impact of foreign ownership on the extensive margins of export has not been investigated empirically before for Germany or any other country.[2]

To anticipate our most important finding: results are fully in line with the testable prediction of our model. The differences in extensive margins between foreign-owned and domestically controlled firms are highly statistically significant, and they are large from an economic point of view. Depending on the econometric specification, foreign-owned firms export between 23% and 39% more goods to between 11% and 31% more countries after controlling for firm size, productivity and industry affiliation. Foreign ownership is indeed a firm characteristic that should not be neglected when investigating the extensive margins of exports.

[2] Raff and Trofimenko (2013) show that foreign-owned firms in developing countries are more likely to engage in exporting and importing than comparable domestically owned firms. Manova and Zhang (2009) show that foreign-owned firms in China trade more on average than local privately owned firms and that their trading relationships tend to be more stable. Girma et al. (2008) study the role of foreign ownership and financial constraints on Chinese firms, but the emphasis is on innovation activity not trade. None of these papers attempts to measure the impact of foreign ownership on the extensive margins of exports.

The rest of the paper is organized as follows. Section 2 presents the theoretical model and discusses its testable predictions. Section 3 introduces the newly available data for German manufacturing enterprises and reports the results of our empirical investigation. Section 4 concludes.

2 Theoretical Framework

In this section we present a simple theoretical framework with heterogeneous firms based on Chaney (2005). We pursue two objectives with the model: first, we want to be precise about how foreign ownership interacts with firm productivity to determine the extensive margins of exports. Second, we want to motivate our empirical approach to identifying the impact of foreign ownership.

Consider three symmetric countries. Each country has two industries that use labor as the only input. One industry produces a homogeneous good with a constant unit labor requirement of 1. This is the numeraire good and since its price is set to 1 we also obtain a wage rate of 1. This good is freely tradable. The other industry produces a continuum of differentiated goods under increasing returns to scale and monopolistic competition.

2.1 Households

Each country has L consumers/workers, endowed with one unit of labor each. Individual preferences are given by the utility function

$$U = q_0 + \rho \ln Q_c, \qquad \rho < 1, \tag{1}$$

where q_0 denotes the consumption of the numeraire good, and Q_c is the aggregate consumption of differentiated goods. Letting $q_c(i)$ denote the quantity consumed of variety i, we assume that Q_c takes the following CES form:

$$Q_c = \left(\int_{i \in \Delta} q_c(i)^{\frac{\sigma-1}{\sigma}} di \right)^{\frac{\sigma}{\sigma-1}}, \tag{2}$$

where $\sigma > 1$ is the elasticity of substitution between varieties and Δ is the endogenous set of varieties.

Maximizing utility subject to the consumer's budget constraint and aggregating individual demands over the L consumers yields the following iso-elastic demand for variety i in a country:

$$q(i) = \frac{\rho L}{P^{1-\sigma}} p(i)^{-\sigma}, \tag{3}$$

where $p(i)$ is the consumer price of variety i, and

$$P = \left(\int_{i \in \Delta} p(i)^{1-\sigma} di \right)^{\frac{1}{1-\sigma}} \tag{4}$$

is the CES price index.

2.2 Firms

Firms in each country have access to the same technology. In the differentiated good industry each firm draws a random unit labor productivity $z \geq 0$. This is the productivity with which the firm produces its core product. The firm may also produce a non-core product; call this the β-version. The productivity for producing this version is smaller, namely z/β, with $\beta > 1$. When entering its domestic market a firm incurs a fixed cost F_d for its core product and a lower fixed cost for its non-core product; it turns out to be convenient to specify this lower fixed cost for the non-core product as $F_d/\beta^{\sigma-1}$.

To enter the export market a firm has to pay a fixed cost of exporting for each product/destination pair. Without loss of generality we make the simplifying assumption that the same fixed cost $F_x > F_d$ applies to each of the four possible pairs. Exporting also involves an iceberg transport cost $\tau \geq 1$.

Profit maximization in the case of CES demand functions requires a firm with marginal cost c to set a price at a constant mark-up over its marginal

cost: $p(c) = \sigma c/(\sigma - 1)$. A firm with labor productivity z has a marginal cost $1/z$ for producing its core variety, β/z for the non-core variety, τ/z for producing and exporting its core variety, and $\beta\tau/z$ for producing and exporting its non-core variety.

The operating profit that a firm with marginal cost c earns by selling its core product at home, namely $(p(c) - c)q(c)$, can now be computed by using the relevant expressions for $p(c)$ and $q(c)$. Since the operating profit on the non-core product in the domestic market is just a fraction $1/\beta^{\sigma-1}$ of that of the core product, and since by assumption the fixed cost associated with the non-core product is this same fraction of the fixed cost of the core product, we may write the total profit that a firm earns by selling both versions in its home market as:

$$\pi_d(z) = \left(1 + \frac{1}{\beta^{\sigma-1}}\right)\left[\frac{\rho L}{\sigma}\left(\frac{\sigma}{(\sigma-1)zP}\right)^{1-\sigma} - F_d\right]. \tag{5}$$

The profits of exporting the core-product, respectively non-core product, to one destination are then given by:

$$\pi_x(z) = \frac{\rho L}{\sigma}\left(\frac{\sigma\tau}{(\sigma-1)zP}\right)^{1-\sigma} - F_x \tag{6}$$

$$\pi_{x\beta}(z) = \frac{\rho L}{\sigma}\left(\frac{\sigma\beta\tau}{(\sigma-1)zP}\right)^{1-\sigma} - F_x. \tag{7}$$

2.3 Foreign Ownership

As already mentioned in the introduction there are a number of potential advantages that foreign ownership may bring when it comes to exporting. In our data we do not observe the source of this advantage for a particular firm, nor do we observe whether and, if so, how much each individual firm benefits from foreign ownership. A simple way to model foreign ownership that is consistent with this is to assume that it offers a firm a random draw of an asset

or ability A that helps it to overcome barriers to foreign-market entry. In particular, let A and z be drawn from the joint cumulative distribution $G(A, z)$, and let the marginal distribution of z be given by $G_z(z) \equiv \lim_{A\to\infty} G(A, z)$.[3]

We formally think of A as an asset that a firm can combine with the profit it earns on the domestic market to finance the fixed costs of exporting for n product/destination pairs:

$$\pi_d(z) + A \geq nF_x. \tag{8}$$

What is behind this is the assumption of a market failure that prevents firms from leveraging potential export proceeds to overcome exporting fixed costs. This failure could be due, for instance, to financial market imperfections.[4] This market failure can be overcome if the firms has enough A. More precisely, since $\pi_d(z)$ is strictly increasing in z, a very productive firm may be able to pay one or several F_x even without a large endowment of A, whereas a firm with a very low labor productivity may not even be able to export its core product to a single market even if A is large.

2.4 Equilibrium

To simplify the characterization of equilibrium we assume that import prices have a negligible effect on the domestic price index. That is, we approximate the price index in (4) by:

$$P \approx \frac{\sigma(1+\beta)}{\sigma - 1} \left(\int_{z\in\Delta} z^{\sigma-1} dG_z(z) \right)^{\frac{1}{1-\sigma}}. \tag{9}$$

We can then derive the the cut-off level of labor productivity, $\bar{z}_d$, at which a firm would earn exactly zero profit in the domestic market: $\pi_d(\bar{z}_d) = 0$. Firms

[3] Our modelling follows Chaney (2005) who interprets A as a liquidity shock. In his model Chaney investigates how draws of z and A affect the propensity of a firm to export. Raff and Trofimenko (2013) follow a similar approach to examine how draws of z and A affect the likelihood that a firm will engage in direct versus indirect exports. The current model, by contrast, focuses on the extensive margins of exports.

[4] See Raff et al. (2009) for a more detailed discussion of potential market failures that could be solved by foreign ownership.

with labor productivity less than $\bar{z}_d$ will not produce, those with greater productivity will sell both their core and non-core product in the domestic market. Using (9) in (5) this cut-off can be written in implicit form as:

$$\bar{z}_d = \frac{1}{1+\beta}\left(\frac{\sigma F_d}{\rho L}\int_{z\geq\bar{z}_d} z^{\sigma-1}dG_z(z)\right)^{\frac{1}{\sigma-1}}. \tag{10}$$

To simplify notation define a function $h(\cdot)$ with $h' > 0$ such that

$$\bar{z}_d = h(F_d). \tag{11}$$

To characterize the equilibrium it turns out to be convenient to deal separately with each of the two extensive margins. That is, we first consider whether firms with productivity exceeding $\bar{z}_d$ will be able to export their core product and, if so, to how many markets (one or two). Second, we consider multi-product firms with productivity exceeding $\bar{z}_d$ and determine whether they will export zero, one or two products to a single destination market.

2.4.1 One Product, Two Export Markets

We derive the equilibrium in three steps. The first step is to consider firms for which constraint (8) is not binding. We can then use equation (6) to implicitly define a cut-off level of labor productivity $\bar{z}_x > \bar{z}_d$, such that firms with productivity $z > \bar{z}_x$ are able to export their core product to both export destinations, whereas firms in the productivity range $\bar{z}_d < z \leq \bar{z}_x$ sell only on the domestic market. We can write this cut-off level of productivity as:

$$\bar{z}_x = \tau\left(\frac{F_x}{F_d}\right)^{\frac{1}{\sigma-1}} h(F_d)$$

Figure 1 shows cutoffs $\bar{z}_d$ and $\bar{z}_x$ as horizontal lines.

The second step is to consider the cut-off levels of labor productivity in the presence of constraint (8). Specifically we use (8) to implicitly define $\bar{z}_x(A)$ and $\bar{z}_{xx}(A)$ such that a firm below the respective cut-off cannot export to one, respectively two destination markets:

$$\pi_d(\bar{z}_x(A)) + A = F_x, \tag{12}$$

$$\pi_d(\bar{z}_{xx}(A)) + A = 2F_x. \tag{13}$$

Defining $B \equiv \left(1 + 1/\beta^{\sigma-1}\right)$ and using (12) and (13) we obtain

$$\bar{z}_x(A) = \left(\frac{BF_d + F_x - A}{BF_d}\right)^{\frac{1}{\sigma-1}} h(F_d), \tag{14}$$

$$\bar{z}_{xx}(A) = \left(\frac{BF_d + 2F_x - A}{BF_d}\right)^{\frac{1}{\sigma-1}} h(F_d). \tag{15}$$

Notice that $\bar{z}_x(A)$ and $\bar{z}_{xx}(A)$ are both decreasing in A with $\bar{z}_x(A) < \bar{z}_{xx}(A)$. These two curves are also shown in Figure 1.

The third step is to combine the "unconstrained" cut-off lines from step 1 with the "constrained" cutoffs from step 2. This is also illustrated in Figure 1. First consider the two curves $\bar{z}_x(A)$ and $\bar{z}_x$, where we have assumed that $(BF_d + F_x)/BF_x > \tau^{\sigma-1}$ so that $\bar{z}_x(0) > \bar{z}_x$ and the two curves intersect at a positive level of A. Firms in the set Ω in Figure 1 do not have enough A to export even to one market. But given that their productivity exceeds $\bar{z}_x$, they would be able to export if they had a large enough endowment of A (to the right of $\bar{z}_x(A)$). Second consider curves $\bar{z}_{xx}(A)$. Firms in set Ψ are able to export to a single destination but do not have enough A to export to more than one market. To summarize, the more A a firm has the greater is the probability that it will export to more than one market, provided that its productivity exceeds $\bar{z}_x$.

2.4.2 Two Products, One Export Market

We derive the equilibrium for this case using the same three steps as above. The first step is to consider firms for which constraint (8) is not binding. We can use equation (7) to implicitly define an additional cut-off level of

labor productivity $\bar{z}_{x\beta}$ with $\bar{z}_{x\beta} > \bar{z}_x > \bar{z}_d$ such that firms with productivity $z > \bar{z}_{x\beta}$ are able to export both their core and non-core products, whereas firms in the productivity range $\bar{z}_x < z \leq \bar{z}_{x\beta}$ export only their core product. Firms in the productivity range $\bar{z}_d < z \leq \bar{z}_x$ do not export but sell both products on the domestic market. We can write $\bar{z}_{x\beta}$ as:

$$\bar{z}_{x\beta} = \beta\tau \left(\frac{F_x}{F_d}\right)^{\frac{1}{\sigma-1}} h(F_d)$$

Figure 2 shows cutoffs $\bar{z}_x$ and $\bar{z}_{x\beta}$ as horizontal lines.

The second step is to consider the cut-off levels of labor productivity in the presence of constraint (8). We have already defined $\bar{z}_x(A)$ and $\bar{z}_{xx}(A)$ and can now interpret them as meaning that a firm below the respective cut-off cannot export one, respectively two products. These two curves are also shown in Figure 2.

The third step is to combine the "unconstrained" cut-off lines from step 1 with the "constrained" cutoffs from step 2. This is also illustrated in Figure 2. First consider the two curves $\bar{z}_x(A)$ and $\bar{z}_{x\beta}$, where we have assumed that $(BF_d + F_x)/BF_x > (\beta\tau)^{\sigma-1}$ so that $\bar{z}_x(0) > \bar{z}_{x\beta}$ and the two curves intersect at a positive level of A. Firms in the set Θ in Figure 2 do not have enough A to export even their core product. But given that their productivity exceeds $\bar{z}_x$, they would be able to export at least their core product if they had a large enough endowment of A (to the right of $\bar{z}_x(A)$). Second consider firms in the set Φ. These firms are able to export their core product because their productivity is greater than $\bar{z}_x$. However, these firms cannot export their non-core product for two possible reasons. Either their productivity is below $\bar{z}_{x\beta}$, in which case they would not be able to export their second product even if they had unlimited A. Or their productivity exceeds $\bar{z}_{x\beta}$, but they lack sufficient A. Only in the latter case will an increase in A raise the probability of exporting more than one good.

2.5 Testable Predictions

The model helps us make the point that to correctly measure the impact of A on a firm's extensive margins of exports, we have to control for the firm's labor productivity z. There are two reasons why a firm may fail to export more than one product and/or to export to more than one market. First even if its labor productivity is sufficiently high to export to one or more product/destination pairs under perfect market conditions, a market failure may prevent it from doing so. Foreign ownership may then help overcome this market failure. Second, the firm's labor productivity may be so low that even foreign ownership would not help. Hence if we fail to control for the firm's labor productivity we would wrongly attribute too much of its inability to export to its ownership status. In other words, we would overestimate the impact of foreign ownership, because firms with too low a labor productivity would not export even if they were foreign owned.

The key testable predictions of the model with regard to the extensive margins of exports then is that foreign ownership will raise the probability that a firm will export more products to more destinations, but only for sufficiently productive firms.

3 Econometric Investigation

The empirical investigation uses a newly constructed data set that is based on customs' records about goods exported to countries outside the European Union and on information delivered by firms about goods exported to EU member countries.[5] These transaction-level data were aggregated at the level of the exporting enterprise by the German Statistical Office for the first time for the reporting year 2009. The data include information at the firm level

[5]For details see Statistisches Bundesamt, Qualitätsbericht Außenhandel, Januar 2011. Note that exports to EU countries are only recorded in the transaction-level data if they exceed a limit of 400.000 Euro.

about the number of different goods exported and the number of destination countries.

These firm level data on exports were linked to the enterprise register system to match the data with information on the ownership status of the firm. Using this information we can identify foreign owned firms and domestically controlled firms. A firm is regarded as a foreign owned firm when more than fifty percent of the voting rights of the owners or more than fifty percent of the shares are controlled (directly or indirectly) by a firm or a person / institution located outside Germany. Domestically controlled firms are defined accordingly.

In a first step foreign owned firms were compared with domestically controlled firms with regard to the number of different goods exported and the number of different countries exported to.[6] Table 1 reports results for firms from West Germany and East Germany separately.[7] Foreign-owned firms export more goods to more countries than domestically controlled firms, both on average and in the (larger) percentiles of the distribution of the number of goods exported and the number of countries exported to.

[Table 1 near here]

Results reported in Table 1 are in accordance with predictions from the theoretical model introduced in Section 2 above. However, foreign owned firms are known to be larger and more productive than domestically controlled firms in Germany (Wagner and Weche Gelübcke (2012)), and both firm size and productivity are positively linked with the number of goods exported and the number of countries traded with (see Bernard et al. (2011) for the U. S. and Wagner (2012b) for Germany). Therefore, to test whether the

[6] Note that by construction the data set contains only firms that export. A good is an eight-digit number from the official nomenclature for the statistics of foreign trade.

[7] The economy differs between West Germany and the former communist East Germany even some 20 years after unification in 1990, and this holds especially for exports (see Wagner (2008) for a detailed analysis). Therefore, all computations were performed for West Germany and East Germany separately.

implications of our model hold in firms from German manufacturing industries it is necessary to test whether foreign-owned firms export more goods to more countries ceteris paribus after controlling for firm size, productivity and industry. For this purpose we match information on the number of employees in the firm from the enterprise register system with both information on the total turnover of the firm (taken from the regular survey of manufacturing firms) and the firm level export transaction data. Total turnover per employee is used as a measure of labor productivity.[8]

Table 2 reports the estimated foreign ownership (or foreign affiliation status) premium for the number of different goods exported and the number of different countries exported to. This premium is based on the estimated coefficients of a dummy variable for foreign controlled affiliates from a regression of the log of the number of goods exported (or the log of the number of countries exported to) on this dummy variable (taking domestically controlled affiliates as the reference group) plus the number of employees (also included in squares), labor productivity (defined as total sales per employee) and a full set of 2-digit industry dummy variables and a constant. The premium is computed from the estimated coefficients ß as (exp(ß) – 1)*100. In a first step the empirical model was estimated using Ordinary Least Squares (OLS). Given that OLS is known to be highly sensitive with regard to observations with extreme values (or outliers), we repeat all estimations using the fully robust MM estimator instead (see Verardi and Croux (2009) for details).

[8]Productivity is measured as labor productivity because information on the capital stock of a firm is not available, so more elaborate measures of total factor productivity cannot be used in this study. Bartelsman and Doms (2000, p. 575) point to the fact that heterogeneity in labor productivity has been found to be accompanied by similar heterogeneity in total factor productivity in the reviewed research where both concepts are measured. In a recent comprehensive survey Syverson (2011) argues that high-productivity producers will tend to look efficient regardless of the specific way that their productivity is measured. Furthermore, Foster, Haltiwanger and Syverson (2008) show that productivity measures that use sales (i.e. quantities multiplied by prices) and measures that use quantities only are highly positively correlated. Therefore, we argue that labor productivity is a suitable proxy for productivity at the firm level.

[Table 2 near here]

Results in Table 2 are fully in line with the predictions of our theoretical model. Foreign-owned firms do export more goods to more countries after controlling for firm size, productivity and industry affiliation. These differences between foreign-owned firms and domestically controlled firms are highly statistically significant, and they are large from an economic point of view, ranging from 11.6 percent to 39 percent.

4 Concluding Remarks

While the estimated foreign-ownership premium is different among firms in East and West Germany, and between empirical models estimated by OLS and the highly robust MM-estimator, the big picture is the same all over. Foreign-owned firms do export more goods to more countries after controlling for firm size, productivity and industry affiliation. These differences between foreign-owned firms and domestically controlled firms are highly statistically significant, and they are large from an economic point of view. The bottom line, then, is that it is important to differentiate between foreign-owned firms and domestically controlled firms to understand the extensive margins of exports of manufacturing firms.

Our findings shed light on the current economic and political debate on current account imbalances in the Euro zone and on the apparent competitiveness of German exporters especially from the manufacturing sector.[9] Recall from the introduction that the 50 largest exporters in this sector are responsible for half of German manufacturing exports. It is therefore these firms that by and large determine German export competitiveness. Around

[9] See, for instance, Fuhrmans (2010) and recent comments on www.voxeu.org by Mickey Levy (http://www.voxeu.org/article/how-restore-competitiveness-eu), Charles Wyplosz (http://www.voxeu.org/article/germany-current-accounts-and-competitiveness) and Dalia Marin (http://www.voxeu.org/article/germany-s-super-competitiveness).

40% of these firms are majority foreign-owned, and these firms are significantly more successful at the extensive margins of exports than domestically controlled firms. There is hence nothing particularly "German" about export competitiveness at least not in the sense of firm ownership and control. Rather foreign-owned firms appear to thrive in the structural and macroeconomic conditions provided by Germany. Given these same conditions there is nothing that should prevent these firms from being equally competitive elsewhere.

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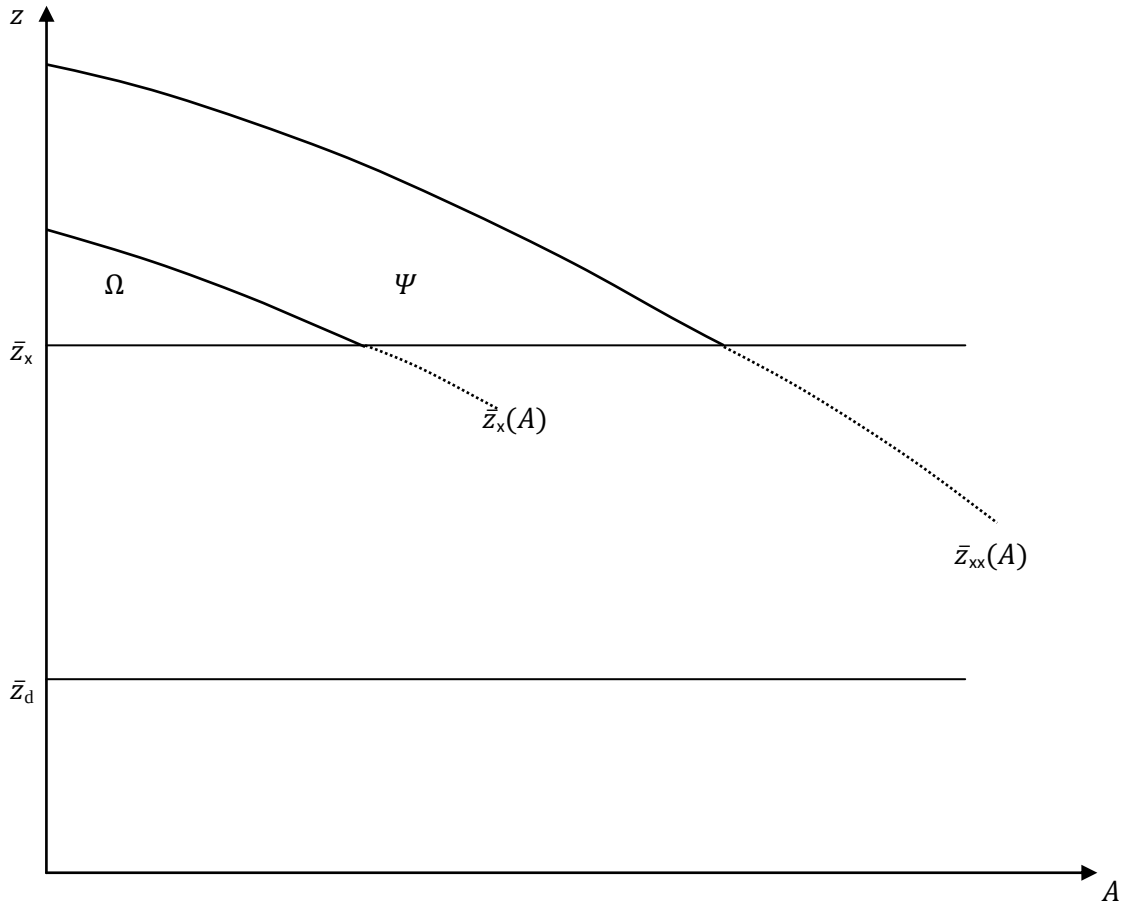

Figure 1: One Product, Two Export Markets

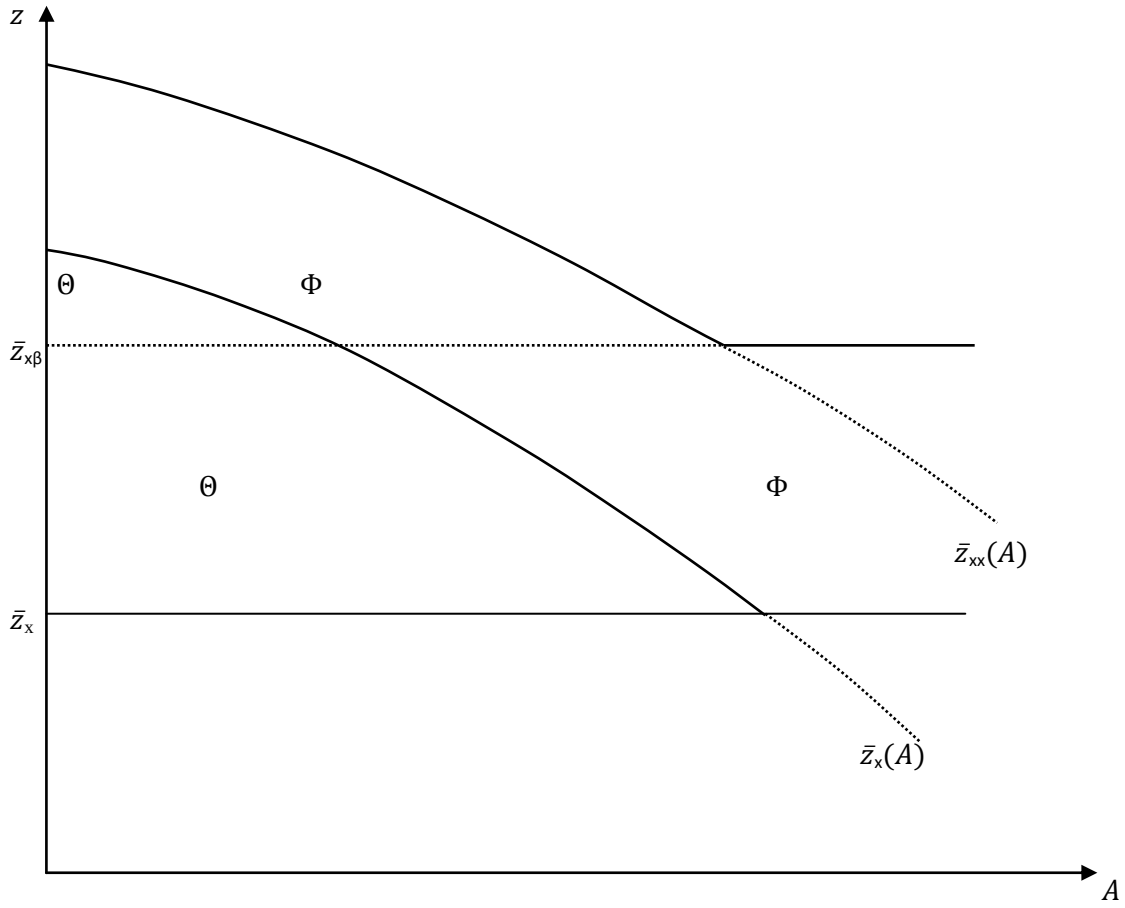

Figure 2: Two Products, One Export Market

Table 1: Number of exported products and number of countries exported to by ownership status: German manufacturing enterprises, 2009

		Number of firms	Mean	p1	p10	p25	p50	p75	p90	p99
Number of goods										
West Germany	Foreign controlled affiliates	1,492	41.2	1	2	5	13	44	104	391
	Domestically controlled affiliates	5,029	27.7	1	1	3	8	24	70	282
East Germany	Foreign controlled affiliates	299	18.9	1	1	3	7	18	44	190
	Domestically controlled affiliates	743	12.2	1	1	2	5	12	28	97
Number of countries										
West Germany	Foreign controlled affiliates	1,483	27.4	1	5	11	22	37	57	102
	Domestically controlled affiliates	4,972	20.7	1	2	6	16	29	46	87
East Germany	Foreign controlled affiliates	297	19.2	1	2	5	14	28	43	79
	Domestically controlled affiliates	735	14.0	1	1	3	10	19	33	72

Source: Research Data Center of the German Statistical Office, Foreign Trade Statistics 2009, own calculations.

Note: p1, p10 etc. are percentiles of the distribution of the number of goods exported and the number of countries exported to, respectively. The number of firms differs between the top and the bottom panel of the tables because some transactions with some goods and/or some countries are not reported due to confidentially.

Table 2: Foreign affiliation status premium for number of exported goods and number of countries exported to, German manufacturing enterprises, 2009[1]

	West Germany		East Germany	
	Foreign affiliation premium (%)	Significance (p-value)	Foreign affiliation premium (%)	Significance (p-value)
OLS regression				
Number of goods exported	39.10	0.000	23.37	0.012
Number of countries exported to	26.69	0.000	25.86	0.002
MM regression				
Number of goods exported	27.12	0.000	36.34	0.006
Number of countries exported to	11.63	0.000	31.00	0.002

Source: Research Data Center of the German Statistical Office, Foreign Trade Statistics 2009, own calculations.

[1] The reported foreign affiliation premium is based on the estimated coefficients of a dummy variable for foreign controlled affiliates from an OLS regression (upper panel) or from a fully robust MM regression (lower panel) of the log of the number of goods exported (or the log of the number of countries exported to) on this dummy variable (taking domestically controlled affiliates as the reference group) plus the number of employees (also included in squares), labor productivity (defined as total sales per employee) and a full set of 2digit industry dummy variables and a constant. The premium is computed from the estimated coefficients ß as (exp(ß) – 1)*100. The p-values are based on heteroscedasticity-robust standard error estimates.

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