CESIS Electronic Working Paper Series

Paper No. 340

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December, 2013

The Royal Institute of technology
Centre of Excellence for Science and Innovation Studies (CESIS)
http://www.cesis.se

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December 2013

Abstract

This is the first study of the link between internationalization and firm survival during the 2008/2009 crisis in Germany, a country which was hit relatively lightly compared to other countries. Moreover, it is the first study which looks at the role of importing, exporting and FDI simultaneously in the context of a global economic recession. We use a tailor-made representative dataset that covers all enterprises from the manufacturing sector with at least 20 employees. Our most striking result is to demonstrate the disadvantage of exporting for the chances of survival of a firm during the crisis in western Germany. Importing instead reveals a positive correlation with survival and firms that both export and import do not show a different exit risk relative to non-traders. A plausible explanation is that in a global recession, deteriorating markets abroad cause demand losses for exporters and improved conditions on factor markets which result in an advantage for firms sourcing from factor markets abroad. Two-way traders do not show a link with exit risk, supporting the idea that they were able to outweigh their losses from exporting with their gains from importing, in what could be called an export–import hedge. Furthermore, we cannot support the hypothesis that foreign multinationals are more volatile during times of economic crisis.

JEL Classification: F23, L60

Keywords: Exports, imports, foreign ownership, firm survival, economic crisis, Germany

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1 Introduction

Germany is one of the economies most integrated into the international division of labor. From only a few years ago Germany has been considered the world's leading export nation in terms of the total value of its exported goods. In the year 2012, Germany was the third largest exporter, and, at the same time, the third largest importer, demonstrating a considerable level of trade integration (World Trade Organization 2013, Appendix Table 1.2). In the dimension of foreign direct investment (FDI), only the US, Hong Kong, the UK, and France had a larger inward FDI stock than Germany and direct investments of German multinationals abroad made Germany ranked fourth in terms of outward FDI stocks in 2010 (UNCTAD 2011, Annex Table I.2).

Although trade integration generally enables welfare-increasing efficiency gains and the exploitation or generation of firms' competitive advantages, the recent global economic crisis, which started in 2008/09, shed light also on the negative aspects of economic internationalization. For example, Kleinert, Martin, and Toubal (2012) investigate the transmission of economic shocks within multinational firms' affiliate networks and Wagner (2013a) finds that idiosyncratic shocks to only a few internationalized large firms characterized the export collapse in German manufacturing. The recent economic crisis is an appropriate event for evaluating the general hypothesis of whether or not negative idiosyncratic shocks, such as a shrinking world demand or decreasing availability of investment funds, affect internationalized firms to a greater extent than nationally oriented competitors. In other words, whether internationalization increases an individual firm's vulnerability in times of economic deterioration.

The link between firm performance and international activities has been the subject of a huge strand of the empirical literature since the seminal work by Bernard and Jensen (1995).[1] Apart from other dimensions of firm performance, such as productivity and profitability, survival chances are a key aspect of firm performance which is of high importance to all stakeholders. Developments in trade theory have

[1] See Wagner (2012) for a survey of recent studies.

given an additional incentive to study firm survival in the context of international trade, since the so-called *new new trade theory* predicts a considerable impact of trade on industry structure, meaning in particular that less productive firms leave the market (see Melitz 2003 and Helpman 2013). Previous work on internationalization and firm closure can be separated into that referring to trade activities, including exporting and importing, and that referring to FDI and foreign ownership.[2]

To start with the trade criterion, why should exporting activities be linked to firm survival? Exporting can be considered a form of risk diversification through the spread of sales over different markets with different business cycle conditions or being in different phases of the product cycle (see Hirsch and Lev 1971). Therefore, exports might provide a chance to substitute sales abroad for sales at home when a negative demand shock to the home market would have otherwise forced a firm to close down. Furthermore, Baldwin and Yan (2011) argue that non-exporters are in general less efficient than exporters (younger, smaller, and less productive) and that, as a result, one expects that non-exporters are more likely to fail than exporters.

Regarding imports, imported intermediate inputs or capital goods might be cheaper and/or technically more advanced than inputs bought on the national market. Gibson and Graciano (2011) argue that the benefit of using imported inputs lies in a combination of the relative price and the technology embodied in the inputs. Imports, therefore, lead to an increase in price competitiveness and non-price competitiveness of importers compared to firms that do not import. Furthermore, there is empirical evidence of a positive link between imports and productivity (discussed in Vogel and Wagner 2010), documented by a significant productivity differential between firms that import and firms that do not trade internationally. Therefore, the probability of surviving can be expected to be higher for importers than for non-importers, *ceteris paribus*.

Firms that both export and import can be expected to benefit from the positive effects of both forms of international trade on firm survival. Furthermore, two-way traders tend to be more productive than firms that either only import, or only

[2] For a more detailed survey of these two parts of the literature, see Wagner (2011 and 2013b) and Wagner and Weche Gelübcke (2012). The following summary is based on these publications.

export, or do not trade at all (see Vogel and Wagner 2010). Therefore, we expect the probability of firm exit to be smaller for two-way traders than for firms that only export or only import.

Surveying the empirical literature on the link between the international trade activities of a firm and its survival chances, Wagner (2011 and 2013b) concludes that the survival chances of exporters are generally higher even after controlling for individual firm characteristics, such as size, age, and productivity. His results for Germany show that importers and two-way traders have lower probabilities of closure, but that exporting does not seem to lower the exit risk.

Regarding foreign ownership ties, Baldwin and Yan (2011) argue that from a theoretical point of view the relation between foreign ownership and firm exit is not clear. On the one hand, foreign owned firms may have access to superior technologies belonging to their foreign owners that might increase their efficiency and lower the risk of exit. The greater propensity to invest in R&D found in foreign owned firms in Germany might lead to more innovation, improved competitiveness in Germany and in foreign markets, and might therefore increase the chances of survival. On the other hand, Baldwin and Yan (2011) point out that foreign owned firms are less rooted in the host country economy and that they can shift their activities to another country when the local economy deteriorates. This should increase the probability of shutdown compared to nationally owned firms.

Empirical studies reveal that the evidence is ambiguous and highly country dependent: foreign owned firms turn out to be more likely to exit in some countries and less likely in other countries. The only studies for Germany, by Andrews, Bellmann, Schank, and Upward (2012) and by Wagner and Weche Gelübcke (2012), conclude that there is a higher exit risk for foreign firms than for domestically owned firms when only dependent subsidiaries are considered, but that foreign owned firms do not differ when also domestically owned independent firms and group heads are part of the control group.

Firm-level studies on the link between firms' international status and their exit risk in the context of an economic crisis are rare. Narjoko and Hill (2007) investigate firm survival during the 1997/1998 Indonesian crisis and find export orientation

and foreign ownership to be highly significant determinants of both survival and recovery. Although a local crisis is never without an impact on other countries in an integrated economic world, it is a major feature of the recent economic crisis 2008/2009 that it can be characterized as a global phenomenon rather than a local one. This has a significant impact on theoretical considerations regarding the link between international exposure and performance. For example, in a local crisis framework, exporting would be clearly seen as risk diversifying and, therefore, as a measure for overcoming economic slow-downs. In contrast, if a crisis ramifies mainly abroad, export orientation would be regarded as much more risky than a focus on domestic sales. Alfaro and Chen (2012) find multinational subsidiaries worldwide to have been more resilient during the 2008/2009 global crisis. The key determinants turn out to be a vertical production link with the parent company and being more closely linked in financial terms. Godart, Görg, and Hanley (2012) focus on Ireland and conclude that foreign firms were not more likely to exit than domestically owned firms during the crisis. Amendola, Ferragina, Pittiglio, and Reganati (2012) bring together the aspects of trade relatedness, foreign ownership, and outward FDI as determinants for firm survival over the crisis with Italian data. Their findings point to more volatile multinational subsidiaries and more resilient Italian exporters. It is self evident that there are other factors shaping the survival chances in times of economic downturn. An important feature of economic distress is an increase in interest rates and a potential "credit crunch". Consequently, Abildgren, Vølund Buchholst, and Staghøj (2013) stress the importance of bank links in shaping survival chances. They use data on Danish non-financial firms and find a higher default probability of firms with links to "weak" banks during the crisis, but they do not focus on the role of internationalization.[3]

The contribution of our paper is to provide the first empirical study of the link between internationalization and firm survival during the 2008/2009 crisis in Germany. Hence, it is the first study for a country which was hit relatively lightly compared to

[3] Naidoo (2010) also looks at firms' behavior during the recent crisis and specifically at the role played by marketing. His analysis of Chinese export oriented SMEs reveals a positive correlation between marketing innovations and the perceived likelihood of survival.

other countries, and whose domestic demand experienced a relatively lesser decline. Furthermore, it is the first analysis adding the role of input sourcing and importing activities to FDI and export status. We use a tailor-made representative dataset that merges information from surveys performed by the German statistical offices, from administrative data collected by the Tax Authorities, and from a commercial data provider. The data covers all enterprises from the manufacturing sector with at least 20 employees. To anticipate the most important results, exporting appears to negatively affect survival chances in western Germany during the crisis. Importing instead reveals a positive correlation with survival and firms that both export and import do not show a different exit risk relative to non-traders. A plausible explanation is that in a global recession, deteriorating markets abroad cause demand losses for exporters and improved conditions in factor markets, something which results in an advantage for firms sourcing abroad. Furthermore, foreign subsidiaries do not show any different exit probabilities than German firms, therefore not supporting the hypothesis of more volatile multinationals. In eastern Germany, all our indicators for different aspects of internationalization remain statistically insignificant.

The rest of the paper is organized as follows. Section 2 describes the dataset and the definitions of the variables. Section 3 presents the descriptive results. Section 4 gives the probit estimates of survival premia dependent on several aspects of internationalization and other firm-level characteristics. Section 5 concludes.

2 Data and variables

This study uses a tailor-made enterprise level dataset that contains information from surveys performed by the German statistical offices, from data collected by the Tax Authorities, and from a commercial data provider.

The first source of data is the monthly and annual reports for establishments in mining, quarrying, and manufacturing industries described in Konold (2007). These surveys cover all establishments from the mining, quarrying, and manufacturing industries that employ at least 20 people in the local production unit or in the

company that owns the unit as a whole. The participation of firms in the survey is mandated by law. Participation in this survey is used to identify surviving and exiting firms (discussed in more detail below). This survey is also the source for information on the location of the firm in western Germany or eastern Germany, industry affiliation, whether a firm exports or not, labor productivity (measured as sales per employee), and the number of employees (used to measure firm size). Furthermore, given that the data start with the year 1995, this survey is used to distinguish between old firms (that were already covered by the survey in 1995) and new firms (that entered the survey in 1996 or later). Note that in this dataset, export refers to the amount of sales to a customer in a foreign country plus sales to a German export trading company; indirect exports (for example, tires produced in a plant in Germany that are delivered to a German manufacturer of cars who exports some of its products) are not covered by this definition. For this project, the information collected at the establishment level has been aggregated at the enterprise level to match the unit of observation from the other sources of data used here.

The second source of data is the German Turnover Tax Statistics Panel (described in detail in Vogel and Dittrich 2008). This dataset is based on the yearly turnover tax: all enterprises with a turnover that exceeds a rather low threshold (17,500 EUR since 2003) are covered. This dataset informs us whether a firm imports or not. Note, however, that imports are not directly recorded therein completely. Imports from EU member countries are reported under the item of "intra-Community acquisitions". The amount of imports from countries outside the EU is not included in the turnover tax statistics. In this case an import turnover tax is charged by the customs authorities. Nonetheless, this import turnover tax is deductible as an input tax, and is therefore reported in the dataset. From this information we know whether the enterprise imports from non-EU countries or not.

The third source of data is the survey of products (*Produktionsstatistik*). This survey is used to distinguish between firms that produce only one product and multi-product firms.

Information on the foreign ownership status of a firm is based on data from the commercial database MARKUS, a joint product of the commercial data providers

Bureau van Dijk and Creditreform. This database reports whether an enterprise is an affiliate, group head, or independent entity, and whether the group head of an affiliate is located abroad. Starting with the reporting year 2007, this information was linked to the German enterprise register system (*Unternehmensregistersystem*) by the German Federal Statistical Office (see Weche Gelübcke 2011 for details). A firm is regarded as foreign owned if it is an affiliate with a group head located in a foreign country and if more than 50% of the voting rights of the owners or more than 50% of the shares are controlled (directly or indirectly) by a firm or a person/institution located outside Germany.

The data from these sources were linked by using the enterprise register system that includes, among other things, information about the unique enterprise identifier used in the surveys conducted by the statistical offices and the unique turnover tax identifier used by the Tax Authorities. Our data covers the years from 2007 to 2010 but we start our analysis in 2008, immediately before the crisis unfolded its real economic impact.

A firm is identified as an exit if it has reported to either the monthly report or the annual report for establishments in mining, quarrying, and manufacturing industries in 2008 but not in the recovery year 2010. Consequently, we assume the identified firms to have exited the market at some point in 2009 or 2010.

It should be noted that the definition of *firm exit* used here is not without problems. First of all, if a firm relocates outside Germany or changes its activities from mining, quarrying, or manufacturing to services or agriculture, it no longer reports to the monthly report or the annual report for establishments in mining, quarrying, and manufacturing industries and, therefore, is considered as an exit. To the best of our knowledge and according to information from the employees in the official statistical office who are in charge of preparing the data used here, this is only rarely the case.

Second, the industry classification of the monthly reports and the Turnover Tax Statistics was subject to changes in the year 2009. This means that some identified exits may not be real exits but rather firms which became classified as being outside the scope of the surveys used here in 2009. Therefore we had to exclude the whole

of those industries which experienced such re-classifications, namely the publishing sector and the recycling sector.[4]

Third, firms that shrink below the threshold of 20 employees in the local production unit or in the company that owns the unit are no longer obliged to report to the survey (but often do so at least for some years anyway), and if they did not report in 2009 or 2010 they are considered as exits here but are in fact survivors. To reduce the uncertainty in the classification of a firm as an exit related to the threshold of 20 employees, we excluded all firms below a threshold of 30 employees in 2008.[5] Note that neither a change in the legal form of the firm nor a change in the ownership (due to a merger or an acquisition) nor a relocation of the firm inside Germany leads to an erroneous classification of a firm as an exit, because the identification number of the firm used in official statistics will not change. Unfortunately, it is not possible to investigate further the data for firms identified as exits according to the definition used here due to the strict confidentiality of the firm level data. A certain degree of fuzziness, therefore, remains, and this should be kept in mind when putting the results from the empirical investigation into perspective.

3 Descriptive results

The final sample contains information about 36,183 enterprises, of which 288 left the market in the years 2009 or 2010. The overall exit rate in our sample is hence below one percent. This seems very low compared to other results for the pre-crisis period from the same database by Wagner and Weche Gelübcke (2012), who report an exit rate of 2.77% for the 2007 exit cohort. This huge difference is mainly due to the exclusion of firms with less than 30 employees and points to higher exit rates among small firms, which is in line with theoretical considerations that assume a "liability of smallness" due to, for instance, disadvantages of scale, more restrictive

[4] Within the publishing sector, there were 2,371 observations dropped from the sample, including 33 exits. In the recycling sector, there were 191 observations and no exits. For the descriptive statistics of the final sample, see Section 3.

[5] All estimates are also reported without this additional threshold in the Appendix.

access to capital markets, and a lower level of management skills (Audretsch 1995: 149 and Strotmann 2007). Even after excluding firms with below 30 employees from our sample, still 76% of exiting firms had between 30 and 50 employees (see Table 1).

Surprisingly, the descriptive statistics in Table 1 also reveal that only 25% of exits were firms without any trade activities and 67% of exiting firms reported either solely export activities or export and import activities in 2008. Only 8% of exits happened within the group of only importing firms. This somehow contradicts the general expectation of only domestically oriented firms' being more likely to exit than internationally oriented firms due to risk diversification and generally higher productivity levels. In this respect, the picture appears to be different from the pre-crisis evidence, which shows an exit rate among non-trading firms that is almost twice the exit rate among firms that are involved in exporting activities (Wagner and Weche Gelübcke 2012). However, if we consider the risk diversification reasoning in the light of a global crisis it may not be too surprising to see exporting firms more vulnerable.

[Table 1 about here]

The figures of exits by ownership categories in Table 1 do not surprise. The major share of exiting firms (57%) was labeled *independent entity* and was therefore not part of any domestic or foreign enterprise group. Only 7% of exits were foreign subsidiaries, supporting the assumption that affiliates of multinationals have higher survival chances due to a network effect and access to internal resources.

Furthermore, younger and less productive firms show higher exit rates, in line with the assumption of a "liability of newness" due to a lack of experience in the particular market (Audretsch 1995: 149) and the predictions by theoretical models of industrial dynamics, such as Jovanovic (1982), for the role of firms' productivity levels for entry, exit, and growth. The number of products seem to have little influence on the exit rate as both categories – one-product firms and two or more product firms – show similar exit rates. Multi-product firms are generally regarded as the more resilient firms because they are diversified across product markets and thus are able to reduce their sales default risk (e.g., Jovanovic and Gilbert 1993 and Lipczynski and Wilson 2001: 324f.).

84% of exiting firms were located in western Germany, which reflects almost exactly the share of observations in the total sample located in western Germany, which is 82%.

4 Results from probit estimates

To go beyond the descriptive evidence about the role of internationalization in the survival chances of firms during times of crisis, we estimate the probability of firm exits in a nonlinear binomial probit model. We estimate the conditional probability of firm i leaving the market, $EXIT$, during the period $t+1$ (2009/2010), conditioned on a set of firm-level characteristics X in the pre-crisis period t (2008). The model can be written as follows, with Φ as the standard normal distribution:

$$Pr(EXIT_{it+1} = 1) = \Phi(x\beta) = \Phi(\alpha + \delta X'_{it} + \epsilon_{it})$$

In a first version of the model above, we include only indicator variables for the different aspects of internationalization as firm-level characteristics (Model 1). In particular, we include three indicator variables: the first takes the value '1' if a firm only exports, the second, if it only imports, the third if it both exports and imports (two-way traders), and the fourth indicates whether a firm is under foreign control. A next version of the model adds other covariates motivated in the previous section (Model 2). We include two dummies for size: one for medium sized firms (50–249 employees), and one for large firms (more than 250 employees), a dummy variable indicating whether or not a firm was established before 1996, and another, indicating whether or not a firm is a multi-product seller. Moreover we add labor productivity (measured in 1,000 EUR). All these covariates are likely to be correlated with a firm's probability of survival. A third version of our model includes additional indicators that consider whether a firm is an independent entity or if a firm is a group head, controlling other subsidiaries located in Germany or abroad (Model 3). The reference group here is thus the group of firms which are controlled by a German group head, in other words, the group of domestic dependent firms. All versions include industry dummies at the 2-digit level to control for general differences between sectors and

are estimated separately for western and eastern Germany to account for regional differences.[6]

Table 2 reports the average marginal effects (AME) of our probit estimates for western and eastern Germany separately. Instead of calculating a marginal effect only at one specific value of a variable or at a hypothetical sample mean, AME consider marginal effects along the entire distribution of a variable. If we only control for general differences across industries in Model 1, only being an importer and being a two-way trader lowers the exit risk of firms in western Germany during the crisis years. Being an importer (a two-way trader) in the pre-crisis period lowers the risk of exit in the following period by 0.6 (0.2) percentage points relative to firms without trade activities and *ceteris paribus*. Although the absolute values of the marginal effects for both variables seem to be fairly small, their significance should not be neglected. All marginal effects here have to be interpreted in relation to the overall exit rate in western Germany which is 0.8% (it is also 0.8% in the overall sample and 0.7% in the eastern German sample). Considering the overall exit rate of the sample, a 0.6 (0.2) percentage point change of the exit probability seems large. Engaging only in exports and being part of a foreign multinational network does not seem to have a statistically significant link with the exit probability during a global crisis. Pre-crisis results instead show exporting to be negatively correlated with exit risk (Wagner and Weche Gelübcke 2012). When adding additional covariates in Model 2, the estimates for the western German sample give all control variables the expected negative sign and are statistically significant at common levels, except firm age, which is statistically insignificant. The control for these additional factors brings about a change in the significance of our trade variables and, other factors being held constant, exporting without importing is positively correlated with exit risk, which means that exporting firms are 0.4 percentage points more likely to exit if they do not import, than are non-trading firms. This result is surprising and supports

[6] Even more than 20 years after German reunification in 1990, the eastern and western regions of Germany still differ markedly in economic terms. This has recently been confirmed by a 2011 report on Eastern Germany's economic situation and perspectives, carried out by leading German research institutes (IWH 2011) .

the hypothesis that the diversification mechanism of exporting does not work during times of a global recession. Importing instead is correlated with a firm's default risk in the other direction. A possible explanation for this finding is that exporters rely on product prices on markets abroad and suffer from a decreasing demand and declining prices in export markets. On the other hand, firms obtaining their inputs from factor markets abroad benefit from exactly the same mechanism of decreasing demand and prices in the country providing these input factors. Therefore it seems plausible that, in a global recession, German firms experienced losses through exporting and gains from importing. Two-way traders are not significantly correlated with exit risk anymore in our Model 2 estimates. This supports the explanation given above because firms which are engaged in both exporting and importing were probably able to outweigh their losses from exporting with their gains from importing.

[Table 2 about here]

The Model 3 estimates for western Germany do not change the picture regarding our trade indicators and it turns out that being part of an enterprise group, either domestic or foreign, does not matter for survival during the crisis in Germany, since not only does the foreign ownership dummy remain insignificant, but so do the dummies for being an independent entity or a group head.

The results for eastern Germany in Table 2 reveal different results: they do not point to any significant influence of trade and ownership on survival chances.

5 Robustness

Beside the average marginal effects, there are other possible ways of calculating marginal effects, and this methodological change might change the results. To take into account this possibility, we additionally present marginal effects at the sample mean (MEM) in Table 3. The marginal effects in Table 3 differ only very slightly from those in Table 2, thereby supporting the robustness of our results. In general, we prefer the average marginal effects because they consider effects along the entire distribution and not only one hypothetical case as do the marginal effects at the

sample mean. For a more detailed discussion of marginal effects, see Williams (2012) and Cameron and Trivedi (2010: 343ff.).

[Table 3 about here]

Another issue is whether or not the exclusion of all firms with less than 30 employees from our analysis changes our results. To test this, we repeated all estimations with the sample including those small firms below the threshold of 30 employees in Tables A.1 and A.2. It turns out that exporting activities still exhibit a positive and statistically significant sign, supporting the validity of our finding regarding export activities. However, the coefficient of being an importer is no longer statistically significant, although its sign remains negative.

6 Concluding remarks

We provide the first study on the internationalization–firm-survival link during the 2008/2009 crisis in Germany, a country which was hit relatively lightly compared to other countries. Moreover, it is the first study which, in the context of a global economic recession, looks simultaneously at the roles of importing, exporting, and FDI. We use a tailor-made representative dataset that merges information from surveys performed by the German statistical offices, from administrative data collected by the Tax Authorities, and from a commercial data provider. The data covers all enterprises from the manufacturing sector with at least 20 employees.

Our most striking result is to demonstrate a disadvantage of exporting for the survival chances of a firm during a global economic recession. Importing instead reveals a positive correlation with survival, but firms that both export and import do not show a different exit risk relative to non-traders. A plausible explanation is that in a global recession, deteriorating markets abroad cause demand losses for exporters (either in terms of price or magnitude) and improved conditions in factor markets, something which results in an advantage for firms sourcing from factor markets abroad. In other words, German firms experienced losses through exporting and gains from importing. Two-way trading is not significantly correlated with exit risk.

This supports the explanation given above, because firms which are engaged in both exporting and importing were probably able to outweigh their losses from exporting with their gains from importing, something which could be called an "export–import hedge." However, these findings apply only to western Germany, as all our indicator variables for the several aspects of internationalization remain insignificant in the eastern German sample.

Furthermore, foreign subsidiaries do not show any different exit probabilities than German firms. Therefore, we cannot support the hypothesis that foreign firms and/or foreign multinationals are more volatile during times of economic crisis.

We can conclude that internationalization as such seems to have made firms neither more resilient nor more prone to exit during the 2008/2009 economic crisis in Germany. It was rather the specific mode of trade integration that mattered.

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Table 1: Descriptive statistics for 2008

	Survivors		Exits	
	Number of firms	Share (%)	Number of firms	Share (%)
All firms	35,895	99.20	288	0.80
Number of employees				
<50	16,101	44.86	218	75.69
50–249	15,893	44.28	62	21.53
250<	3,901	10.87	8	2.78
International trade				
No trade	7,365	20.52	70	24.31
Exports only	10,235	28.51	97	33.68
Imports only	3,557	9.91	24	8.33
Exports and imports	14,738	41.06	97	33.68
Ownership				
Foreign owned	3,437	9.58	20	6.94
Domestic independent	16,837	46.91	163	56.60
Domestic dependent	14,160	39.45	101	35.07
domestic group head	1,461	4.07	4	1.39
Firm age				
Founded before 1996	17,594	49.02	122	42.36
Founded after 1996	18,301	50.98	166	57.64
Labor productivity				
Bottom 1/3	11,855	33.03	137	47.57
Middle 1/3	11,960	33.32	80	27.78
Top 1/3	12,080	33.65	71	24.65
Number of products				
One	13,859	38.61	138	47.92
Two and more	22,036	61.39	150	52.08
Region				
Western	29,360	81.79	242	84.03
Eastern	6,535	18.21	46	15.97

Table 2: Probit estimates of firm exits in 2009 and 2010

	Western Germany			Eastern Germany		
	(1)	(2)	(3)	(1)	(2)	(3)
Only exporters	0.002	0.004**	0.004**	-0.001	-0.0004	-0.0004
	(1.00)	(2.25)	(2.20)	(0.27)	(0.12)	(0.12)
Only importers	-0.006**	-0.005**	-0.005*	0.0002	0.001	0.001
	(2.26)	(1.98)	(1.95)	(0.05)	(0.11)	(0.16)
two-way traders	-0.002*	0.001	0.001	-0.003	-0.002	-0.002
	(1.89)	(0.49)	(0.52)	(0.74)	(0.47)	(0.42)
foreign owned	-0.002	0.001	0.001	-0.007	-0.007	-0.005
	(1.11)	(0.61)	(0.51)	(1.11)	(1.03)	(0.80)
independent	-	-	-0.0001	-	-	0.003
			(0.08)			(0.95)
domestic group head	-	-	-0.002	-	-	omitted
			(0.73)			
50–249 employees	-	-0.007***	-0.007***	-	-0.008***	-0.008***
		(4.84)	(4.84)		(3.06)	(2.88)
250< employees	-	-0.012***	-0.012***	-	-0.003	-0.002
		(2.98)	(2.87)		(0.52)	(0.37)
established before 1996	-	-0.001	-0.001	-	0.001	0.002
		(1.55)	(1.52)		(0.36)	(0.44)
Multi-product firms	-	-0.002**	-0.002**	-	-0.004*	-0.004
		(2.01)	(2.01)		(1.68)	(1.62)
Labor productivity	-	-8.72e-06*	-8.58e-06*	-	-9.78e-07	-2.57e-07
		(1.78)	(1.83)		(0.34)	(0.10)
2-digit industry dummies	yes	yes	yes	yes	yes	yes
Number of firms	23,603	23,603	23,603	3,918	3,918	3,810

Notes: Reported are estimated average marginal effects (AME) with |z-values| in parentheses; Statistical significance at the 10% (*), 5% (**) and 1% (***) level; Standard errors are adjusted for 2-digit industry clusters.

Table 3: Marginal effects at the sample mean for probit estimates

	Western Germany			Eastern Germany		
	(1)	(2)	(3)	(1)	(2)	(3)
Only exporters	0.001	0.003**	0.003**	-0.001	-0.0003	-0.0003
	(1.01)	(2.32)	(2.25)	(0.27)	(0.12)	(0.12)
Only importers	-0.006**	-0.004**	-0.004**	0.0002	0.0004	0.001
	(2.39)	(2.03)	(2.00)	(0.05)	(0.11)	(0.16)
two-way traders	-0.002*	0.001	0.001	-0.003	-0.002	-0.001
	(1.92)	(0.49)	(0.52)	(0.75)	(0.47)	(0.41)
foreign owned	-0.002	0.001	0.001	-0.006	-0.005	-0.004
	(1.14)	(0.62)	(0.51)	(1.15)	(1.06)	(0.82)
independent	-	-	-0.0001	-	-	0.002
			(0.08)			(0.96)
domestic group head	-	-	-0.002	-	-	omitted
			(0.72)			
50–249 employees	-	-0.005***	-0.005***	-	-0.006***	-0.006***
		(5.95)	(6.03)		(4.00)	(3.59)
250< employees	-	-0.009***	-0.009***	-	-0.002	-0.001
		(3.51)	(3.34)		(0.51)	(0.36)
established before 1996	-	-0.001	-0.001	-	0.001	0.001
		(1.50)	(1.47)		(0.37)	(0.45)
Multi-product firms	-	-0.002*	-0.002*	-	-0.003*	-0.003
		(1.95)	(1.96)		(1.76)	(1.64)
Labor productivity	-	-6.67e-06*	-6.54e-06*	-	-7.41e-07	-1.92e-07
		(1.85)	(1.89)		(0.34)	(0.10)
2-digit industry dummies	yes	yes	yes	yes	yes	yes
Number of firms	23,603	23,603	23,603	3,918	3,918	3,810

Notes: Reported are estimated marginal effects at the sample mean (MEM) with |z-values| in parentheses; Statistical significance at the 10% (*), 5% (**) and 1% (***) level; Standard errors are adjusted for 2-digit industry clusters.

A Appendix

Table A.1: Probit estimates of firm exits without size threshold

	Western Germany			Eastern Germany		
	(1)	(2)	(3)	(1)	(2)	(3)
Only exporters	-0.0001	0.003*	0.003*	-0.004	-0.002	-0.002
	(0.05)	(1.80)	(1.76)	(1.23)	(0.74)	(0.73)
Only importers	-0.004**	-0.003	-0.003	2.35e-06	0.001	0.001
	(2.15)	(1.45)	(1.42)	(0.00)	(0.33)	(0.40)
two-way traders	-0.004***	0.0001	0.0002	-0.003	-0.001	-0.001
	(2.95)	(0.10)	(0.14)	(0.75)	(0.18)	(0.13)
foreign owned	-0.002	0.002	0.002	-0.006	-0.005	-0.004
	(1.62)	(0.91)	(0.76)	(1.06)	(0.75)	(0.56)
independent	-	-	-0.0001	-	-	0.003
			(0.04)			(1.01)
independent	-	-	-0.003	-	-	omitted
			(1.01)			
50–249 employees	-	-0.01***	-0.01***	-	-0.01***	-0.011***
		(6.72)	(6.96)		(2.89)	(2.70)
250< employees	-	-0.017***	-0.02***	-	-0.003	-0.003
		(3.65)	(3.51)		(0.53)	(0.39)
established before 1996	-	-0.001	-0.001	-	0.001	0.002
		(1.57)	(1.49)		(0.45)	(0.54)
Multi-product firms	-	-0.002*	-0.002*	-	-0.011***	-0.005***
		(1.73)	(1.73)		(2.85)	(2.86)
Labor productivity	-	-7.08e-06	-6.96e-06	-	-8.16e-06	-6.49e-06
		(1.35)	(1.40)		(0.92)	(0.74)
2-digit industry dummies	yes	yes	yes	yes	yes	yes
Number of firms	29,367	29,367	29,367	5,415	5,415	5,269

Notes: Reported are estimated average marginal effects (AME) with |z-values| in parentheses; Statistical significance at the 10% (*), 5% (**) and 1% (***) level; Standard errors are adjusted for 2-digit industry clusters.

Table A.2: Marginal effects at the sample mean for estimates without size threshold

	Western Germany			Eastern Germany		
	(1)	(2)	(3)	(1)	(2)	(3)
Only exporters	-0.0001	0.003*	0.003*	-0.004	-0.002	-0.002
	(0.05)	(1.82)	(1.77)	(1.24)	(0.74)	(0.73)
Only importers	-0.004**	-0.002	-0.002	2.09e-06	0.001	0.001
	(2.19)	(1.49)	(1.45)	(0.00)	(0.34)	(0.40)
two-way traders	-0.004***	0.0001	0.0001	-0.003	-0.001	-0.0004
	(3.01)	(0.10)	(0.14)	(0.75)	(0.17)	(0.13)
foreign owned	-0.002	0.001	0.001	-0.006	-0.004	-0.003
	(1.64)	(0.94)	(0.79)	(1.07)	(0.75)	(0.56)
independent	-	-	-0.0001	-	-	0.003
			(0.04)			(0.99)
independent	-	-	-0.002	-	-	omitted
			(1.00)			
50–249 employees	-	-0.008***	-0.008***	-	-0.008***	-0.007***
		(8.64)	(9.21)		(3.75)	(3.39)
250< employees	-	-0.013***	-0.013***	-	-0.003	-0.002
		(4.39)	(4.14)		(0.52)	(0.39)
established before 1996	-	-0.001	-0.001	-	0.001	0.001
		(1.52)	(1.44)		(0.46)	(0.55)
Multi-product firms	-	-0.002*	-0.002*	-	-0.004***	-0.004***
		(1.66)	(1.67)		(3.11)	(3.01)
Labor productivity	-	-5.55e-06	-5.44e-06	-	-6.24e-06	-4.91e-06
		(1.39)	(1.44)		(0.95)	(0.75)
2-digit industry dummies	yes	yes	yes	yes	yes	yes
Number of firms	29,367	29,367	29,367	5,415	5,415	5,269

Notes: Reported are estimated marginal effects at the sample mean (MEM) with |z-values| in parentheses; Statistical significance at the 10% (*), 5% (**) and 1% (***) level; Standard errors are adjusted for 2-digit industry clusters.