Uncertainty and Trade Margins in Eastern Europe and Central Asia: A Firm-Level Analysis

Authors: Florian Johannsen[A]
Inmaculada Martínez-Zarzoso[B,A]

Filiations: [A] Georg-August Universität Göttingen, Germany
[B] Universitat Jaume I, Spain

Abstract
In this paper extend the literature using firm-level data by examining the effects of exchange rate volatility and other sources of uncertainty on the extensive and intensive margins of trade in a region comprising 26 countries, where exchange rate fluctuations and political instability are considerable. We focus not only on the effect of exchange rate volatility but also on the currency regime effect on trade and on the determinants of uncertainty. The region is dominated by countries that are small in an economic sense and have no well-developed financial markets. Furthermore, we examine whether importing and exporting activities are affected in a similar fashion and on the impact of different hedging tools on firms' engagement in international trade.

JEL classification: F15, F36
Key Words:

Contact Information
Address: Florian Johannsen
Chair of Economic Theory and Development Economics
Platz der Göttinger Sieben 3
37073 Göttingen
Germany
Email: florian.johannsen@wiwi.uni-goettingen.de

Uncertainty and Trade Margins in Eastern Europe and Central Asia: A Firm-Level Analysis

I - Introduction

The impact of volatility and exchange rate exposure on trade remains a vivid topic of academic debate, which was dominated for a longer time by the introduction of the Euro. While for the Eurozone in particular and currency unions in general a consensus was reached for most economists that a robust positive effect exists, for exchange rate volatility the results remain mixed. The most common approach to empirically evaluate the effect on trade of exchange rate volatility or of adopting a common currency has been to estimate a gravity model using aggregated or sectoral trade data at the country level. A number of empirical studies however investigates the impact of exchange rate volatility on export behaviour using firm-level data yielding mixed results. The estimated effects for the extensive margin of trade (an increase in the number of products exported) are not significant for Spain (Campa 2004) and positive for France (Guillou 2008). Studies on the intensive margin (increase in trade intensity in already exported products) find negative effects for France (Berthou & Fontagne 2008) and China (Héricourt & Poncet 2012) and no significant effects for Turkey (Solakoglu et al. 2008). The Euro Effect has also been investigates using firm-level data. Significant positive effects on exports are found only for the extensive margin in the case of France (Berthou & Fontagne 2008) for the intensive margin in Italy (Vicarelli & Pappalardo 2012) and for both margins in Germany (Etzel et al. 2013). All these studies focus on a single countries, which are big in economic sense with little volatility in the exchange rate. Some of them focus exclusively on large firms.

In this paper we go a step further and extend the literature using firm-level data by examining a huge region of 26 countries -instead of a single country- and by focusing on a region where exchange rate fluctuations are considerable. It is also worth mentioning that this region is dominated by countries that are not large in an economic sense and have no well-developed financial markets. The second novelty of this paper is the focus not only on the effect of exchange rate volatility but also on the currency regime effect on trade. Furthermore, we examine whether importing and exporting activities are affected in a similar fashion and on the impact of different hedging tools on firms' engagement in international trade. Finally we also provide results for a number of robustness checks.

The investigated region is particularly interesting as most countries located there have had a similar history in the last two decades and have undergone remarkable changes in exchange rate policy and continue to have different policy approaches today, which provides sufficient variation at the country level to implement this research. So far, only single country survey analyses have been conducted for Eastern Europe, in particular for Hungary and the Czech Republic, which investigate hedging practices of domestic firms (Bodnár 2009; Cadek et al. 2011).

Given the specific characteristics of the countries under examination, we first hypothesize that increasing volatility in the bilateral exchange rate with respect to the Euro leads to a rise in uncertainty for firms about future revenues and thereby to less involvement in export activities. Secondly, we expect that the impact of the existing exchange rate agreements (e.g. Euro or ERM II membership) goes beyond the reduction or elimination of exchange rate volatility, as it reduces uncertainty about future changes in the exchange rate and makes policy changes more difficult due to the binding character of the agreements.

The idea is that differences in the domestic exchange rate policy towards the Euro change the uncertainty horizon for the real value of firms' future revenues. While lower volatility in the exchange rate may encourage firms to engage in exporting activities in the short term, a certain degree of uncertainty remains as the exchange rate policy of their home country may change in the near future. More binding commitments in the form of the European Exchange Rate Mechanism II (ERM II) or Euro membership may lower the degree of uncertainty.

Our study is structured as follows: Section II provides a brief overview of the theoretical and empirical evidence with a focus on firm-level data studies. Section III contains information about our data and the empirical strategy, section IV discusses the results and section V concludes.

II - Literature Review

In this section the main existing theories and empirical applications closely related to our work are outlined and discussed. The next subsection provides a summary of the theoretical aspects and the following a brief summary of empirical studies that evaluate the effect of exchange rate volatility on trade with a special focus on studies using firm-level data.

II.I - Theory

The theoretical analysis of exchange rate volatility and trade indicates that in most cases negative effects prevail due to uncertainty about future revenues as described by Clark (1973). But the varying effects described in numerous scenarios rely to a large extent on the assumptions made. In particular, results show that the firms' level of risk aversion, the flexibility of a firm to shift from one market to another and alter the composition and origin of inputs appears to play an important role.

Clark (1973) considers the case of a single firm with no market power producing a single good under perfectly competitive conditions without imported components that is entirely exported to a foreign market. The firm gets paid in the foreign currency and has to convert it at the current exchange rate. As movements of the exchange rate are unpredictable and access to currency hedging is assumed to be limited, the proceeds vary. High costs for adjustments to the scale of production keep the firm from altering output in advance of the realization of the exchange rate. Thus, uncertainty about future exchange rates directly translates into uncertainty about future receipts in the domestic currency.

Under the assumption that the firm is risk averse and maximizes profits, it has to determine a level of output that incorporates this uncertainty. In this situation, the variability of profits depends completely on changes in the exchange rate. Thus, an increase in volatility of the exchange rate – while the average level remains unchanged – leads to a decrease in production, and hence in exports, due to the increased exchange rate risk. Inflexibility of firms to alter factor inputs can amplify the effect (Hooper & Kohlhagen 1978).

Several studies have described certain scenarios in which increasing volatility may have a positive effect, e.g. due to the possibility of higher average revenues (Canzoneri & Clark 1984) or via additional profit possibilities and the principle of sunk market-entry costs (Dixit 1989; Franke 1991). Broll & Eckwert (1999) describe the case of a firm that profits from variability in the exchange rate by seeing the home market as a save harbour and foreign markets as a source for additional revenues when the domestic currency depreciates.

In the specific case of Eastern Europe, another source of positive effects may stem from firms' common practice in that region to take out loans in foreign currencies to profit from lower costs of credit[1]. Intensifying export activities invoiced in the currency of the credit may then be seen as a

1 This Information has been obtained from surveys on exchange rate handling practice of firms for Hungary and the

way to lower credit risks in case of a depreciation of the firms' domestic currency. When assuming risk aversion, a firm may even accept lower revenues from exporting instead of selling to the domestic market in order to decrease total risk exposure. Higher exchange rate volatility can in this case lead to higher exports because of increasing exchange rate risks in order to lower credit risks. To our knowledge this effect has not yet been considered by the existing theories.

II.II - Empirical Studies

The empirical literature investigating trade effects of volatility in the bilateral exchange rate or currency unions is mostly based on country-level data. Some studies use disaggregated data to control for differences between industries or to emphasize the higher responsiveness of single sectors. There are no unambiguous results of empirical macro studies investigating the impact of exchange rate volatility, but most find weak and mostly significant negative effect. Studies differ in the sample of countries, the covered time period, the degree of disaggregation of the trade data and empirical methodology.[2] In a very comprehensive meta-regression on empirical macro-studies of the topic, Ćorić & Pugh (2010) find exchange rate volatility and trade to have a modestly negative relationship with pronounced heterogeneity and with little evidence of publication bias, but mainly positive evidence that this relationship is an authentic empirical effect. They find uncertainty arising from exchange rate volatility to be a serious concern for least developed countries, what points towards the importance of hedging instruments and thus the stage of development of financial markets in least developed countries.

The introduction of a common currency completely eliminates nominal exchange rate volatility between the members. Positive trade effects of currency unions can go beyond the elimination of volatility in the exchange rate as it also facilitates currency handling and lowers uncertainty in the long term due to the binding character of a currency union. Studies investigating trade effects of currency unions usually find robust positive effects. While early studies found extremely high results of an increase in trade up to 200 percent (Rose 2000), estimates have decreased to a positive effect between 5 and 30 percent, but remain robust. Most of the later studies focus on trade effects for the Eurozone.[3]

Czech Republic described in section II.III.

2 See survey papers on the relationship between exchange rate volatility and trade from Côté (1994), McKenzie (1999), Ozturk (2006), Bahmani-Oskooee & Hegerty (2007) and Auboin & Ruta (2011).

3 A good overview of the literature is delivered by Baldwin (2006).

Only a few studies take advantage of data at the firm-level and usually focus on firms in a single country. Empirical studies on trade effects of currency unions and exchange rate volatility based on firm-level data are shown in table II.1. Campa (2004) investigates the case of 2188 Spanish manufacturing firms for the years 1990-1997 and their responsiveness in export behaviour to exchange rate changes by estimating a dynamic discrete-choice model. He does not find a significant effect of exchange rate volatility on foreign market entry and exit, instead he finds evidence for sunk costs hysteresis to play an important role and that a depreciation of the domestic currency increases export volumes slightly via the extensive margin.

In a similar way, Guillou (2008) employs data on french manufacturing firms for the years 1994-2004 and distinguishes between effects on the probability to export and export intensity. On the one hand, she finds that for most industries a depreciation of the domestic currency affects the probability to export, while there is fairly no impact on the export intensity when introducing the lagged value of the dependent variable. Exchange rate volatility yields positive results on the probability to export for most industries.

Solakoglu et al. (2008) estimate the effect of exchange rate volatility on real exports for the years 2001-2003 using a sample of 143 large Turkish firms. According to their results, exchange rate volatility does not affect trade and firm size and the level of international activity do not influence a firms' responsiveness to volatility. They do find evidence for natural hedging via imported intermediaries.

In a more recent study, Héricourt & Poncet (2012) investigate the effect of real effective exchange rate volatility on export performance and the role of financial constraints. They employ export data for more than 100,000 Chinese exporters over the period 2000-2006 and find a negative effect on extensive and intensive margins of trade.

Several studies analyse the effect of membership in a currency union (usually the Euro) on export behaviour of domestic firms. In general, studies using firm-level panel data find that Eurozone membership significantly lowers the exchange rate risk to which domestic firms are exposed to (e.g. Bartram & Karolyi 2006). Vicarelli & Pappalardo (2012) employ difference-in-difference estimation techniques for a panel of around 21,000 Italian firms for the years 1996-2004 and find that the euro has had a positive influence on Italian exports, mostly through the intensive margin. Etzel et al. (2013) try to explain Germany’s export success story using data at the plant-level for the years 1996-2008. They find that higher plant-level competitiveness due to higher productivity or

lower wages is positively correlated with export intensity at the intensive and extensive margins. This lets them conclude that the introduction of the Euro has led to higher export demand for the relatively cheaper German products as separate regressions for the pre- and post-Euro periods reveal that the export promoting effect of competitiveness is strongest shortly after the Euro was introduced.

In the only other empirical study that includes both variables, measures for exchange rate volatility and currency unions, Berthou & Fontagne (2008) investigate export behaviour of French firms for the years 1998-2003. Estimating a model that consists of both variables allows to disentangle the trade effect of eliminated exchange rate volatility from the effect stemming from a common currency. They find trade deterring effects via the intensive and extensive margin of trade for exchange rate volatility and trade boosting effects for Euro membership only via the extensive margin.

Table II.1: Studies Investigating Trade Effects of Exchange Rate Volatility or Currency Unions at the Firm-level

			Sample		Effect on Margin		Methodology
	Authors	# of Firms	Time	Country	extensive	intensive	
Exchange Rate Volatility	Campa (2004)	2,188	1990-1997	Spain	no effect	-	Dynamic discrete choice
	Guillou (2008)	47,716	1994-2004	France	positive**	-	RE Probit
	Solakoglu et al. (2008)	143	2001-2003	Turkey	-	no effect	OLS, FE, RE
	Berthou & Fontagne (2008)	?	1998-2003	France	-	negative	FE, RE
	Héricourt & Poncet (2012)	113,368	2000-2006	China	-	negative	FE
Euro	Berthou & Fontagne (2008)	?	1998-2003	France	positive	no effect	FE, RE
	Vicarelli & Pappalardo (2012)	21,000	1996-2004	Italy	no effect	positive	Difference in Difference
	Etzel et al. (2013)	16,000*	1996-2008	Germany	positive	positive	FRACP, FRACPL, Tobit, Probit

*Notes: *observations at the plant level; **probability to export.*

Other studies focus on the impact of exchange rate volatility on general economic performance of firms (Carranza et al. 2003), firm value (Hutson & O'Driscoll 2009), plant-level investment (Kandilov & Leblebicioglu 2011) or are only descriptive (Sanderson 2009).

Recent findings suggest that the impact of exchange rates on trade flows in general may be lower than expected due to the type of firms that export. Berman et al. (2012) find that exporting firms are generally bigger and more productive than non-exporters and in a situation of depreciation of the domestic currency tend to increase their margins rather than the volume of sales. For less productive firms, the reverse is true: they increase the volume of exports rather than prices.

Although there is a positive impact of an exchange rate depreciation on the number of exporting firms or extensive margin, the effect is less evident on a macro level due to the smaller size of the firms starting to export.

II.III - Hedging Behaviour of Firms

There are several ways in which firms can reduce the exposure to exchange rate uncertainty. For instance, they can use internal hedging tools by importing intermediaries in the currency of the export destination. This only works when both are denoted in the same currency[4] and prices are passed through to the domestic market[5]. This firm behaviour is is usually referred to as "natural hedging". Alternative forms of internal hedging include pricing in the currency in which the majority of the costs are incurred or in the currency of mayor competitors, ensuring that comparative prices are less affected, inserting an exchange rate variation clause to protect margins or to borrow money in currencies that are used to buy intermediate inputs. In addition, firms can to a certain degree expedite or defer payments and thereby lower the exposure to exchange rate peaks.

The main alternative is hedging with the help of a financial institution. For this external hedging to be effective, access to a well-developed and functioning financial market is crucial. When available, a wide range of financial instruments is offered that allow to lower or eliminate the risk exposure. Among these are forward contracts, call and put options and swaps. Furthermore, firms can lend and borrow in foreign currencies, preferably in the currency of their export markets. Firms that are part of large multinationals are even more flexible in this regard and have direct access to the financial sector in several countries and commonly hold assets and liabilities in more than one currency.

Nevertheless, all forms of hedging are either imperfect, associated with additional costs and risks or availability is limited to large firms[6]. Natural hedging is also not available when importing intermediates is not an option or suppliers of intermediates can not be changed. In a study covering several countries in Eastern Europe and Central Asia, Raddatz (2011) finds that countries with more volatile exchange rates tend to export goods from sectors where natural hedging is

4 Exports and imports do not have to be necessarily denoted in the same currency to offset uncertainty effects. When volatility in the exchange rate is mostly driven by the domestic currency and exports and imports are denoted in different but less volatile currencies, exposure to uncertainty will already be lower and could by described as indirect hedging.

5 Fauceglia et al. (2012) provide evidence for a high exchange rate pass-through for intermediates in Switzerland.

6 Large corporations in the Eurozone have indeed access to hedging instruments to reduce exchange rate risk and they make use of it intensively (Döhring 2008). For small firms, this doesn't have to be the case.

possible and that this can help reduce the exposure to exchange rate risk. He finds only weak evidence showing that the availability of financial derivatives used for external hedging lowers the importance of natural hedging in a given sector.

Little evidence exists so far on how common is the use of hedging instruments in the region covered by our study. Two descriptive studies on hedging practice in Eastern Europe yield interesting findings. Cadek et al. (2011) investigate hedging behaviour of 2330 Czech firms using a survey. They find that around 60 percent of the firms are indeed hedging exports and that smaller firms are less likely to hedge. In addition, their findings indicate that the firms have not altered their hedging behaviour after the financial crisis. Bodnár (2009) analysing survey data for 672 firms for the year 2006 in a similar attempt for Hungary finds that firms take out a considerably large share of loans in Euros and Swiss Francs, but only an extremely small amount in US Dollars. Around 30 percent of Hungarian firms raise debt in foreign currencies and 25 percent of them claim to do so because of net income in foreign currencies. Hedging via the financial sector appears to be only a minor reason for taking loans in foreign currencies and only a small fraction of firms in the sample, around 7 percent, use foreign currencies mainly to hedge export revenues. According to the survey, firms report to have debt in foreign currencies due to lower costs of credits as the most important reason. Nevertheless, exchange rate volatility is expected to have a negative impact on the revenues of the firms and for those with loans in foreign currencies even more so than for firms with loans in the domestic currency only.

Summarizing, there is evidence that internal and external hedging are used by a notable number of firms in the region of interest depending on their size and sector. It is worth to note that in the case of external hedging it remains unclear whether hedging is the main purpose or just a side effect in the firms' efforts to lower the costs of credits. Some evidence points in the direction of the latter.

III - Empirical Analysis

Our empirical analysis is separated in two parts. First, we quantify the impact of volatility on the bilateral exchange rate of the domestic currency with the Euro and membership of currency agreements on a firms' probability to export and second, on the export intensity. The first question we try to answer with a Probit regression on the probability of a single firm to export and the second with a regression on the share of produced goods and services that is exported.

III.I - Data

Firm-level data is from the Eastern Europe & Central Asia Panel Dataset of the World Bank Enterprise Surveys BEEPS and covers the years 2002, 2005, 2007 and 2009. The dataset combines information gathered in different surveys and are matched by the World Bank. The panel structure of the data is displayed in table A.1 and countries and industries covered in this study are displayed in tables A.3 and A.4.

Information for the exchange rate policy dummies comes from IMF, ECB, Eurostat and national central banks. We distinguish between separate dummies for pegged exchange rates and membership in the ERM II or the Euro[7] and define exports as the sum of direct and indirect exports as reported by the firms. The number of regional trade agreements (RTA) signed by each country in the panel as a measure of trade liberalization is taken from De Sousa et al. (2012).

Unfortunately, the BEEPS dataset contains only limited information about the number of employees for each firm. Only for some cohorts questions about the precise number of employees are included in the questionnaire and due to the matching process, the BEEPS dataset only includes information on the number of employees in categorical variables. This makes it impossible to calculate a good measure of productivity without loosing most of the observations and thus, we do not include a measure of productivity in our empirical approach.

III.II - Volatility Measure

The measure volatility we use is the standard deviation of the first difference of the logarithms of the monthly domestic exchange rate to the Euro for the twelve months of the past year:

$$Volatility_{jt} = \text{Std. dev.}\left[\ln\left(e_{j,m}\right) - \ln\left(e_{j,m-1}\right)\right], m = 1...12 \quad , \quad (1)$$

where e is the exchange rate of country j in month m.

Exchange rate movements are measured as the natural logarithm of the difference between the average exchange rate of the past year and the year before. Data for the volatility measure and exchange rate movements are nominal monthly exchange rates from OANDA.com.

Since we do not have information about the destination of exports, we assume that the volatility of the local currency with respect to the Euro is a good proxy for exchange rate volatility in general. This assumption is reasonable because the main export destination for Eastern European countries

7 We treat the unilateral adoption of the Euro in the case of Montenegro like a Euro membership.

is the EU, as shown in figure A.1[8]. The EU is also the main competitor and the Euro is increasingly been used as an invoicing currency, especially in countries with the prospect to adopt the Euro in the future[9]. Evidence from some firm surveys supports this assumption. For instance in the Czech Republic, Cadek et al. (2011) find that more than 90 percent of firm exports go to other European countries and 75 percent of all export revenues are in Euro.

Thus, the importance of the Euro is obvious for countries already aligning their monetary or foreign policy towards the EU and the Euro, but less convincing for others. We assume that for the countries in our sample that have a more or less free-floating exchange rate, volatility of the exchange rate with the Euro is dominated by the volatility of the domestic currency and not volatility of the Euro. As a robustness check, we have estimated the same regressions with a volatility measure constructed with exchange rates with respect to the US Dollar. Estimated coefficients are lower and slightly less significant, but the general picture remains the same[10].

The use of nominal exchange rates instead of real exchange rates is justified by the fact that reliability and availability of real exchange rates is not given for many countries in the sample. Furthermore, empirical evidence suggests that the choice between real and nominal exchange rates does not change the magnitude and direction of the estimated coefficients and only timing effects can be different (Cotter & Bredin 2011). In macro studies, a broad variety of exchange rate volatility measures has been used in the past. Nevertheless, a recent study shows that using more sophisticated measures does not change the results significantly (Ćorić & Pugh 2010). The range of the volatility measure for each country for the years covered in our sample is displayed in figure A.2.

III.III - Model Specification

Based on the theoretical literature of heterogenous firms and international trade, we distinguish between the extensive and intensive margin of exports and estimate its determinants using two separate model specifications. In order to estimate the determinants of the probability to export

8 For most countries in the sample, more than half of total exports is exported to the EU-27 (figure A.1). Most currencies of countries that are members of the EU but not the Eurozone have a rather stable exchange rate to the Euro.

9 The increasing relevance of the Euro as invoicing currency was found and well described by Kamps (2006).

10 Estimated coefficients for regressions with volatility to the US Dollar as an explanatory variable instead of volatility to the Euro are available upon request.

that we define as the extensive margin of trade we estimate a probit model that includes a number of firm- and country-specific variables and also industry (k), country (j) and time (t) fixed-effects and is given by:

$$Pr(Exporter_{ijkt}=1)=\Phi(\beta_0+\beta_1 \ln Sales_{ijkt}+\beta_2 FirmSize_{ijkt}+\beta_3 Quality_{ijkt}+\beta_4 Euro_{jt}+ \beta_5 ERM_{jt}+\beta_6 Peg_{jt}+\beta_7 \ln ExchangeRate_{jt}+\beta_8 Volatility_{jt}+\beta_9 RTA_{jt}+\kappa_j+\lambda_k+\alpha_t+\varepsilon_{ijkt}) \quad , \quad (2)$$

where $Exporter_{ijkt}$ is a dummy variable that takes the value one if firm i is an Exporter at time t and zero otherwise, ln $Sales_{ijkt}$ denotes the natural log of total sales, $FirmSize_{ijkt}$ is a measure of firm size in terms of employees[11], $Quality_{ijkt}$ is a dummy variable that takes the value of one if the firm has an internationally-recognized quality certification and zero otherwise.

We have introduced three dummy variables to control for the exchange rate policy in country j: First, $Euro_{jt}$ takes the value one if the Euro is the domestic currency at time t in country j and zero otherwis. Second, ERM_{jt} takes the value one if country j takes part in the European Exchange Rate Mechanism II and finally, Peg_{jt} takes the value one if the domestic currency is pegged to the Euro or to a basket of currencies that includes the Euro. $Volatility_{jt}$ is our measure of choice for volatility of the exchange rate of the domestic currency with the Euro for the twelve months of the past year and ln $ExchangeRate_{jt}$ is the natural log of the first difference of the average exchange rate of country j with respect to the Euro in year t-1. As a control for the degree of trade liberalization in a given country, the model includes the variable RTA_{jt}, which is the total number of RTAs in which country j participates in year t. In addition to a standard probit regression, we estimate the model with random effects and with and without industry, country and year dummies.

Furthermore, we estimate the determinants of the intensive margin of exports, defined as share of sales to foreign markets. The model is given by:

$$ExportIntensity_{ijkt}=\beta_0+\beta_1 \ln Sales_{ijkt}+\beta_2 FirmSize_{ijkt}+\beta_3 Quality_{ijkt}+\beta_4 Euro_{jt}+ \beta_5 ERM_{jt}+\beta_6 Peg_{jt}+\beta_7 \ln ExchangeRate_{jt}+\beta_8 Volatility_{jt}+\beta_9 RTA_{jt}+\kappa_j+\lambda_k+\alpha_t+\varepsilon_{ijkt} \quad , \quad (3)$$

where $ExportIntensity_{ijkt}$ is the share of total production that is exported of firm i at time t and varies between 0 and 100. All other variables are the same as described for equation (2).

The models specified in equations (2) and (3) are estimated with and without industry, country and year dummies. In addition, each sector is estimated separately in order to analyse sectoral differences in the responsiveness to exchange rate policy.

11 Firm size is a binary variable that takes the value one if the firm has less than 20 employees, two if the firm has between 20 and 99 and three if the firm has 100 or more employees.

IV - Results

In this section we present the estimation results of the determinants of the extensive and intensive margin of exports. Table IV.1 shows the results of model (2), which estimates the determinants of the extensive margin. In the first three columns a pooled probit model is estimated, that is augmented with year and industry fixed-effects in column two and country fixed-effects are added in column three. Our measure for exchange rate volatility yields negative and mostly significant estimates. This indicates that lower volatility in the exchange rate with respect to the Euro increases a firms' probability to export.

The estimates for variables capturing firm specific characteristics yield the expected signs and are statistically significant. The natural log of sales, the number of employees and the existence of internationally recognized quality certificates in the firm all have a positive impact on the probability and the intensity of exports. Higher sales and holding international and quality certificates increases the probability to export.

For country specific variables, estimates are rather mixed, especially for the exchange rate agreement dummies. Imperfections in the financial sector, which are likely to be present in many countries of our sample, can disturb the link between exchange rate movements and exports (Berman & Berthou 2009). Nevertheless, our variable capturing movements of the exchange rate has the expected sign and is mostly significant. Euro and ERM II membership increase the probability to export. Our measure for trade liberalization yields significant positive estimates for all regressions, indicating that a higher number of signed regional trade agreements in a country increases the probability of a domestic firm to export.

Reliability of our probit estimates may for some variables suffer from unobserved heterogeneity and in this case it is possible not interpret them as a causal relationship, but only as correlations between dependent and independent variables. Therefore, we estimate a linear probability and a probit model in a differences in differences (DID) design, which are reported in column four to six. While the interaction term for the year 2009 and ERM II dummy yields always insignificant estimates, it is always positive and significant for the Euro in the probit model. Interactions for different years and our dummy for fixed pegs yields mixed results. Thus, once we estimate our model in setting insusceptible for unobserved heterogeneity, the Euro is the only dummy variable

measuring exchange rate policy that has significant positive impact on the probability to become an exporter. Movements and volatility of the exchange rate we assume to be exogenous as they depend on the interaction of domestic and foreign factors via financial markets.

Table IV.1: Determinants of the Extensive Margin

					Differences in Differences	
	(1)	(2)	(3)	(4)	(5)	(6)
	Probit	Probit	Probit	LPM	Probit	Probit
ln Sales	0.0625***	0.130***	0.167***	0.0302***	0.121***	0.129***
	(0.00529)	(0.00655)	(0.00988)	(0.00173)	(0.00691)	(0.00722)
Quality	0.470***	0.424***	0.356***	0.123***	0.381***	0.373***
	(0.0261)	(0.0286)	(0.0299)	(0.00889)	(0.0286)	(0.0288)
Size	0.293***	0.183***	0.163***	0.0585***	0.199***	0.183***
	(0.0169)	(0.0188)	(0.0230)	(0.00533)	(0.0195)	(0.0199)
Euro	0.170***	0.394***	-	0.0329	-2.799***	-2.994***
	(0.0620)	(0.0710)		(0.0376)	(0.204)	(0.206)
Euro#2009	-	-	-	0.0622	3.249***	3.336***
				(0.0428)	(0.218)	(0.217)
ERM	0.0677	0.232***	-	0.0652***	0.183***	0.250***
	(0.0423)	(0.0472)		(0.0178)	(0.0613)	(0.0639)
ERM#2009	-	-	-	-0.0370	0.0633	-0.101
				(0.0250)	(0.0832)	(0.0910)
Peg	-0.0282	-0.0809*	-	-0.0224	-0.184*	-0.108
	(0.0356)	(0.0419)		(0.0298)	(0.106)	(0.108)
Peg#2005	-	-	-	0.0280	0.180	0.121
				(0.0385)	(0.149)	(0.150)
Peg#2007	-	-	-	-0.433***	0.0227	-1.514***
				(0.0838)	(0.126)	(0.339)
Peg#2009	-	-	-	0.0313	0.288**	0.201
				(0.0336)	(0.122)	(0.124)
ln ExchangeRate	-0.0324***	-0.0340***	-0.380**	-0.0106***	-0.0107***	-0.0529
	(0.00435)	(0.00469)	(0.158)	(0.00143)	(0.00142)	(0.0423)
Volatility	-0.716*	-0.590	-0.875**	-0.235*	-0.150	-0.266**
	(0.432)	(0.392)	(0.370)	(0.142)	(0.117)	(0.109)
RTA	0.00559***	0.00960***	0.00556**	0.00184***	0.00295***	0.00225***
	(0.000756)	(0.000983)	(0.00251)	(0.000248)	(0.000298)	(0.000629)
RTA#2005	-	-	-	-	-	0.0140**
						(0.00561)
RTA#2007	-	-	-	-	-	0.170***
						(0.0331)
RTA#2009	-	-	-	-	-	0.0228***
						(0.00545)
Year Dummies	No	Yes	Yes	Yes	Yes	Yes
Industry Dummies	No	Yes	Yes	Yes	Yes	Yes
Country Dummies	No	No	Yes	No	No	No
Observations	17,354	17,354	17,354	17,354	17,354	17,354
(Pseudo) R^2	0.104	0.216	0.260	0.214	-	-

*Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Results of model (3), that estimates the effect of exchange rate policy on export intensity or the intensive margin, are presented in table IV.2 in columns one to three. The estimates of the effect of our measure of exchange rate volatility on export intensity are always negative and significant. When estimating with year and industry dummies, Euro membership increases the export intensity by slightly over five percentage points. The impact of ERM II membership is slightly lower with slightly less than five percentage points. Much lower is the effect of exchange rate pegs with around two percentage points.

When considering the unobserved heterogeneity and estimating the model with a DID design similar to estimations on the extensive margin, estimates for the interactions measuring the effect of exchange rate policy, as shown in columns four and five, are no longer significant. Also pegged exchange rates do no longer have a significant impact on export intensity. While exchange rate volatility still has significant negative impact, it turns insignificant for exchange rate movements.

Table IV.2: Determinants of the Intensive Margin

				DID	
	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	OLS	OLS	OLS
ln Sales	0.126	0.772***	1.170***	0.688***	0.747***
	(0.0964)	(0.0990)	(0.145)	(0.104)	(0.106)
Quality	5.900***	4.762***	3.751***	4.783***	4.604***
	(0.590)	(0.557)	(0.558)	(0.557)	(0.557)
Size	7.030***	4.899***	4.556***	5.052***	4.936***
	(0.348)	(0.324)	(0.378)	(0.332)	(0.338)
Euro	2.505*	5.068***	-	6.481**	4.419
	(1.330)	(1.245)		(2.958)	(2.956)
Euro#2009	-	-	-	-1.129	-0.963
				(3.240)	(3.210)
ERM	1.561*	4.695***	-	4.484***	5.671***
	(0.880)	(0.816)		(1.019)	(1.056)
ERM#2009	-	-	-	0.778	-2.344
				(1.455)	(1.601)
Peg	3.714***	2.062***	-	3.459*	5.168**
	(0.756)	(0.717)		(2.099)	(2.106)
Peg#2005	-	-	-	1.210	-0.178
				(2.757)	(2.766)
Peg#2007	-	-	-	-4.380*	-9.434
				(2.554)	(6.177)
Peg#2009	-	-	-	-0.532	-2.479
				(2.321)	(2.335)
ln ExchangeRate	-0.154*	-0.139*	-10.84***	-0.117	-0.116
	(0.0808)	(0.0761)	(2.418)	(0.0765)	(0.0774)
Volat lity	-17.71***	-20.81***	-11.53**	-19.21***	-22.49***
	(5.131)	(4.900)	(5.139)	(4.883)	(4.971)
RTA	0.133***	0.125***	-0.0135	0.128***	-0.347***
	(0.0137)	(0.0141)	(0.0347)	(0.0142)	(0.0951)
RTA#2005	-	-	-	-	0.399***
					(0.0975)
RTA#2007	-	-	-	-	0.822
					(0.567)
RTA#2009	-	-	-	-	0.543***
					(0.0959)
Constant	-6.626***	4.174***	56.35***	4.726***	8.164***
	(1.005)	(1.336)	(11.49)	(1.375)	(1.683)
Year Dummies	No	Yes	Yes	Yes	Yes
Industry Dummies	No	Yes	Yes	Yes	Yes
Country Dummies	No	No	Yes	No	No
Observat ons	17.354	17.354	17.354	17,354	17,354
R^2	0.087	0.191	0.217	0.192	0.194

*Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

In order to investigate sectoral differences, the regressions in column two in tables IV.3 and IV.3 are run for each industry in the sample. The sign of the estimates are presented in table IV.3 and tables A.7 and A.8 show the complete regression results. We find negative effects for exchange rate volatility on the probability to export for 13 of 18 industries, which are significant only for the

following six sectors: other manufacturing, fabricated metal products, retail, hotels and restaurants and IT. Export intensity is affected negatively in 12 of 18 sectors and the effect is significant for five sectors. An appreciation of the domestic currency leads to a lower probability to export in 15 of 18 sectors with effects being significant for eight sectors, and to a lower export intensity in 14 of 18 sectors, only in five cases. Surprisingly, an appreciation increases export intensity of garments and IT sector[12].

Euro and ERM II membership increase the probability to export in 12 of 18 sectors and the export intensity in 14 of 18 sectors. Direct pegs yield very mixed estimates with 12 of 18 sectors facing negative effects on the probability to export and 8 on the export intensity. Trade liberalization measured as the number of signed RTAs a has positive and significant impact on the probability to export and export intensity for all non-service industries besides food.

Table IV.3: Direction of Coefficients for Sectoral Regressions

		Probability to Export					Export Intensity				
	Industry	Euro	ERM	Peg	ExRate	Volatility	Euro	ERM	Peg	ExRate	Volatility
2	Other manufacturing	+	-	-	-	-	+	+	-	+	-
15	Food	+	+	-	-	+	-	+	-	-	-
17	Textiles	-	+	-	-	-	-	+	-	-	-
18	Garments	-	+	+	-	-	-	+	+	+	-
23-24	Chemicals	-	-	+	-	+	+	+	+	-	+
25	Plastics & rubber	+	+	+	-	-	+	+	+	-	+
26	Non-met. mineral products	+	-	-	+	-	+	+	+	+	+
27	Basic metals	+	-	-	-	-	+	-	-	-	-
28	Fabricated metal products	-	+	-	-	-	+	+	-	-	-
29	Machinery and equipment	+	+	+	-	+	+	+	+	-	+
31-32	Electronics	-	+	-	-	-	+	+	-	-	-
45	Construction	+	+	+	-	-	+	+	+	-	-
50	Other services	+	+	+	-	+	+	+	+	-	+
51	Wholesale	+	+	-	-	+	+	+	+	-	+
52	Retail	+	+	-	-	-	+	-	-	-	-
55	Hotels and restaurants	-	-	-	+	-	+	-	-	-	-
60-64	Transport	+	+	-	-	-	+	+	+	-	-
72	IT	+	-	-	+	-	-	-	+	+	-

Notes: Shaded fields indicate significance at 10% level.

12 Results for the IT sector should be interpreted with caution, as more then half of the firms in this sector are from Bulgaria.

IV.I - Imported Intermediates

Firms are not only facing uncertainty about their revenues from exporting final goods and services due to exchange rate volatility, but also about their variable costs when importing inputs. To further investigate the impact of exchange rate policy on the use of imported intermediates, we use the share of directly and indirectly imported intermediates as the dependent variable in the following equation:

$$ImpIntermediates_{ijkt} = \beta_0 + \beta_1 \ln Sales_{ijkt} + \beta_2 FirmSize_{ijkt} + \beta_3 Quality_{ijkt} + \beta_4 Euro_{jt} + \beta_5 ERM_{jt} + \beta_6 Peg_{jt} + \beta_7 \ln ExchangeRate_{jt} + \beta_8 Volatility_{jt} + \beta_9 RTA_{jt} + \kappa_j + \lambda_k + \alpha_t + \varepsilon_{ijkt} \quad , \qquad (4)$$

with all independent variables being identical to the ones described for model (2).

Regression results presented in table IV.4 appear to be similar for some variables to the previous regressions on the intensive margin of exports. Sales and quality certificates have a significant positive impact as do the more binding exchange rate agreements Euro and ERM II. The peg dummy is also positive and significant, but only as long as no year or industry dummies are added to the model.

Different to the regression on export intensity in section III.III, a higher number of employees has a negative impact on import intensity, which is significant in half of the regressions. Coefficients of our volatility measure are all insignificant and turn positive when country dummies are included in the regression. Surprisingly, a depreciation of the domestic exchange rate leads to higher import shares for intermediates, although one should expect real prices for intermediates to increase[13]. This may be due to increased competitiveness and therefore increasing production due to higher foreign demand and no or little ability to substitute foreign intermediates with others from domestic production and the demand effect being stronger than the increase in production costs. Controlling for unobserved heterogeneity in columns four and five does not alter the results or interpretation to a larger extent. Also the positive and significant effect of Eurozone membership remains.

13 Assuming a high pass-through for prices of intermediates.

Table IV.4: Determinants of Import Intensity

				DID	
	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	OLS	OLS	OLS
ln Sales	1.686***	1.534***	2.685***	1.379***	1.245***
	(0.222)	(0.223)	(0.285)	(0.233)	(0.235)
Quality	3.824***	4.407***	2.734***	4.387***	4.160***
	(0.921)	(0.901)	(0.881)	(0.898)	(0.897)
Size	-1.084*	-0.552	-2.287***	-0.269	0.0739
	(0.636)	(0.611)	(0.689)	(0.624)	(0.627)
Euro	4.318	8.505***	-	-9.181	-9.485
	(2.626)	(2.647)		(6.605)	(7.136)
Euro#2009	-	-	-	20.40***	16.38**
				(7.208)	(7.689)
ERM	5.972***	11.17***	-	7.848***	8.511***
	(1.472)	(1.440)		(1.571)	(1.601)
ERM#2009	-	-	-	14.73***	9.182***
				(3.072)	(3.352)
Peg	5.778***	-0.443	-	-6.869***	-3.470
	(1.300)	(1.318)		(2.595)	(2.642)
Peg#2005	-	-	-	7.171**	3.935
				(3.459)	(3.492)
Peg#2007	-	-	-	3.252	67.50***
				(3.595)	(11.59)
Peg#2009	-	-	-	14.60***	11.08***
				(3.713)	(3.740)
ln ExchangeRate	-0.581***	-0.425***	-16.56***	-0.401***	-0.394***
	(0.138)	(0.134)	(4.220)	(0.136)	(0.137)
Volat lity	-3.530	-3.982	2.811	0.0992	-10.07
	(10.59)	(10.28)	(10.97)	(10.15)	(10.09)
RTA	-0.0452*	-0.130***	0.0160	-0.139***	-1.117***
	(0.0243)	(0.0283)	(0.0548)	(0.0288)	(0.159)
RTA#2005	-	-	-	-	0.950***
					(0.164)
RTA#2007	-	-	-	-	-6.064***
					(1.155)
RTA#2009	-	-	-	-	1.144***
					(0.164)
Constant	12.51***	27.35***	115.0***	28.09***	37.32***
	(2.369)	(2.794)	(20.07)	(2.861)	(3.265)
Year Dummies	No	Yes	Yes	Yes	Yes
Industry Dummies	No	Yes	Yes	Yes	Yes
Country Dummies	No	No	Yes	No	No
Observat ons	11,625	11,625	11,625	11,625	11,625
R^2	0.018	0.104	0.159	0.108	0.115

*Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.*

IV.II - Exchange Rate Uncertainty Exposure

In this section, we look at the impact of the availability of hedging instruments on a firms' reluctance to be exposed to exchange rate uncertainty from trade activities. We propose a measure of exchange rate volatility exposure that accounts for natural hedging in the form of

imported intermediates by taking the absolute difference between the share of directly or indirectly exported goods and services and directly and indirectly imported intermediate inputs. The measure takes the value 0 if the firm is neither importing nor exporting or shares of imports and exports are identical and 100 if the firm exports all products and does not import any inputs and or imports all intermediates without exporting any final goods or services.

We control for access to the financial market by introducing as an additional variable the involvement of private and public banks in investments in fixed assets. As firms partly or completely owned by foreign firms or individuals may have better access to internal hedging and foreign financial markets, we try to reflect that in our regression by including the share of foreign and state ownership of the individual firm as separate additional variables.

We introduce the new dependent and independent variables in equation (3) and estimate the following model:

$$\begin{aligned} Uncertainty_{ijkt} = {} & \beta_0 + \beta_1 \ln Sales_{ijkt} + \beta_2 FirmSize_{ijkt} + \beta_3 Quality_{ijkt} + \beta_4 Euro_{jt} + \beta_5 ERM_{jt} + \\ & \beta_6 Peg_{jt} + \beta_7 \ln ExchangeRate_{jt} + \beta_8 Volatility_{jt} + \beta_9 RTA_{jt} + \beta_{10} ForeignOwner_{ijkt} + \\ & \beta_{11} StateOwned_{ijkt} + \beta_{12} PrivateLoans_{ijkt} + \beta_{13} PublicLoans_{ijkt} + \kappa_j + \lambda_k + \alpha_t + \varepsilon_{ijkt} \end{aligned} \quad , \quad (5)$$

where $Uncertainty_{ijkt}$ is our measure to exchange rate uncertainty. $ForeignOwner_{ijkt}$ denotes the percentage of this firm that is owned by private foreign individuals, companies or organizations and $StateOwned_{ijkt}$ the percentage of this firm that is owned by the state or government. The proportion of a firms' total purchase of fixed assets in the past year that was financed is represented by $PrivateLoans_{ijkt}$ for funds from private banks, while $PublicLoans_{ijkt}$ represents the proportion for state-owned banks. All other variables are the same as described in section III.

Regression results are presented in table IV.5. Unfortunately, the number of observations in this regression is considerably lower due to a high number of missing observations for the additional variables and the uncertainty measure. Again, sales and quality certificates show a significant positive impact. Coefficients for all exchange rate policy dummies are positive with only ERM II and Euro being significant. Firm size in terms of number of employees has a negative impact on the exchange rate risk levels firms are willing to accept. Exchange rate movements show a significant negative impact in most regressions, while our volatility measure is always positive and mostly significant.

The results indicate that membership in a more binding currency agreement allows firms to engage in international trade with a lower degree of internal hedging. Thus, a greater discrepancy between exports and imports is acceptable for firms and allows for more flexibility with regard to import and export activities.

Access to and willingness to utilize hedging tools offered by the private financial sectors appears to be important, as well. For the public financial sector, we do not find a similar effect. Government or state owned firms choose to be less engaged in cross-border trade and thus less exposed to the uncertainty associated. The reason for the latter outcome could also be of political nature, e.g. using local inputs to support the domestic industry or the production of government subsidized goods for domestic consumption only. A depreciation of the domestic currency we find to increase exposure to exchange rate risk, probably driven by increasing exports due to improved competitiveness. Controls for unobserved heterogeneity with a DID approach shown in columns four and five do not alter results considerably.

Table IV.5: Natural Hedging Regression Results

				DID	
	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	OLS	OLS	OLS
ln Sales	1.930***	1.602***	2.610***	1.573***	1.451***
	(0.278)	(0.285)	(0.347)	(0.290)	(0.294)
Quality	2.514**	2.883***	2.050**	2.857***	2.913***
	(0.988)	(0.997)	(1.000)	(0.997)	(1.000)
Size	-6.283***	-5.604***	-7.035***	-5.517***	-5.256***
	(0.739)	(0.740)	(0.827)	(0.748)	(0.756)
Euro	11.05***	11.30***	-	-26.39***	-24.68***
	(2.505)	(2.589)		(1.706)	(1.847)
Euro#2009	-	-	-	39.55***	38.23***
				(3.349)	(3.358)
ERM	7.392***	8.118***	-	6.022***	5.319***
	(1.516)	(1.521)		(1.693)	(1.724)
ERM#2009	-	-	-	9.444***	10.66***
				(3.177)	(3.421)
Peg	2.034	1.407	-	-4.108	-1.008
	(1.699)	(1.659)		(2.761)	(2.823)
Peg#2005	-	-	-	7.480**	4.440
				(3.800)	(3.844)
Peg#2009	-	-	-	9.463**	6.455
				(3.992)	(4.034)
ln ExchangeRate	-0.309**	-0.304**	-4.905	-0.292**	-0.176
	(0.148)	(0.146)	(5.020)	(0.147)	(0.149)
Volat lity	15.14	15.01	12.46	15.86*	5.552
	(9.432)	(9.175)	(11.21)	(9.173)	(9.456)
RTA	-0.241***	-0.278***	-0.0786	-0.289***	-1.025***
	(0.0263)	(0.0312)	(0.0695)	(0.0315)	(0.171)
RTA#2005	-	-	-	-	0.791***
					(0.176)
RTA#2009	-	-	-	-	0.713***
					(0.177)
Foreign Owner	0.109***	0.102***	0.0919***	0.101***	0.102***
	(0.0146)	(0.0145)	(0.0145)	(0.0145)	(0.0145)
State Owned	-0.0760***	-0.0555***	-0.0561***	-0.0553***	-0.0523***
	(0.0145)	(0.0151)	(0.0152)	(0.0151)	(0.0151)
Private Loans	0.0587***	0.0590***	0.0434***	0.0567***	0.0587***
	(0.0150)	(0.0147)	(0.0147)	(0.0147)	(0.0148)
Public Loans	-0.0122	-0.0142	0.00864	-0.0125	-0.00597
	(0.0239)	(0.0237)	(0.0243)	(0.0238)	(0.0238)
Constant	18.01***	30.24***	55.63**	30.37***	36.93***
	(2.994)	(3.436)	(24.17)	(3.509)	(3.854)
Year Dummies	No	Yes	Yes	Yes	Yes
Industry Dummie	No	Yes	Yes	Yes	Yes
Country Dummie	No	No	Yes	No	No
Observat ons	7,344	7,344	7,344	7,344	7,344
R^2	0.04	0.074	0.105	0.077	0.080

*Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.*

IV.III - Political Instability

Times of political instability can undermine trust in the independence of the central bank and future monetary and exchange rate policy and thereby lead to an increase in volatility of the exchange rate. In such a case, trade deterring effects may actually stem from political uncertainty rather than from exchange rate uncertainty. To ensure that political uncertainty is not the driver of the negative trade effects we found, we reestimate column two of tables IV.3 and IV.3 and include a measure of political instability (table IV.6). We use the "Political Stability and Absence of Violence" variable from the Worldwide Governance Indicators (WGI) project of the World Bank which is supposed to capture "perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism"[14]. It is in standard normal units and ranges from -2.5 (high instability) to 2.5 (low instability). Although the measure for political instability is significant and has the expected positive sign, coefficients of our exchange rate volatility measure change only slightly and remain highly significant for the intensive margin.

14 For a thorough description of the dataset see Kaufmann et al. (2010).

Table IV.6: Political Stability

	Probability to Export		Export Intensity	
	(1)	(2)	(3)	(4)
	Probit	Probit	OLS	OLS
ln Sales	0.0385***	0.0371***	0.772***	0.734***
	(0.00196)	(0.00196)	(0.0990)	(0.0982)
Quality	0.140***	0.139***	4.762***	4.734***
	(0.0100)	(0.0100)	(0.557)	(0.557)
Size	0.0580***	0.0612***	4.899***	4.987***
	(0.00568)	(0.00570)	(0.324)	(0.324)
Euro	0.140***	0.126***	5.068***	4.592***
	(0.0264)	(0.0263)	(1.245)	(1.259)
ERM	0.0886***	0.0845***	4.695***	4.529***
	(0.0165)	(0.0164)	(0.816)	(0.818)
Peg	-0.0116	-0.0111	2.062***	2.078***
	(0.0119)	(0.0119)	(0.717)	(0.718)
ln ExchangeRate	-0.0107***	-0.0110***	-0.139*	-0.155**
	(0.00142)	(0.00142)	(0.0761)	(0.0765)
Volat lity	-0.150	-0.0945	-20.81***	-18.88***
	(0.117)	(0.118)	(4.900)	(4.926)
RTA	0.0030***	0.0021***	0.125***	0.0911***
	(0.000298)	(0.000348)	(0.0141)	(0.0167)
Polit ical Stability	-	0.0360***	-	1.370***
		(0.00752)		(0.347)
Constant	-	-	4.174***	4.277***
			(1.336)	(1.336)
Year Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Country Dummies	No	No	No	No
Observat ions	17,354	17,352	17,354	17,352
R^2	-	-	0.191	0.192

*Notes: Reported values are marginal ef fects at the mean of the independent variables; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

IV.IV - Regional Differences

Despite many similarities with regard to their common history as Post-Soviet states, economic and political background and orientation differ within our sample of countries especially between countries in Europe and Asia. We want to identify whether a firms' export behaviour is affected differently by our variables of interest depending on the location.

Therefore, in an additional robustness check we split the sample in two parts. The first part consists of countries that are located on the European continent. The second of countries located in Asia. We reestimate model (3) on export intensity for both groups of countries. Estimation results are presented in table A.9. Coefficients for firm characteristics, namely the natural logarithm of sales, the dummy variable controlling for quality certificates and the number of employees in a firm, are positive and significant. The effect of quality certificates on export

intensity is higher for Central Asian firms and the number of employees has a stronger impact of European firms. The exchange rate variables show very particular effects for both regions. While an exchange rate appreciation yields positive but insignificant estimates for Asian firms, coefficients are positive for European countries and significant when country dummies are included. Exchange rate volatility yields always negative but significant estimates for European firms and positive and mostly significant estimates for their Asian counterparts. Estimates for the number of signed RTAs is mostly positive, but insignificant. Exchange rate agreements were only signed by European countries, thus there are no estimates for these variables for Asian firms.

The results indicate that the significant negative estimates for the volatility measure in the other models were driven by European firms in the sample. The same applies for movements in the exchange rate. Thus, the exchange rate appears to have very little impact on export activities for Asian firms. Possible reasons are manifold, ranging from a higher importance of other trade barriers such as tariffs, non-tariff barriers and transport costs to sufficient access to internal and external hedging instruments or a higher importance of regional trade that is less affected by exchange rate variations of the domestic currency to the Euro.

V - Conclusion

We find strong evidence for both hypotheses tested in this paper: First, we find a clear negative effect of exchange rate volatility on a firms' probability to export and on their export intensity. Second, we find a significant positive impact of more binding currency agreements in the form of Euro or ERM II membership. The latter effect is only robust for the extensive margin of trade.

Our results concerning exchange rate volatility are in contrast to some of the previous empirical firm-level studies, being more in line with country-level studies. Differences in the outcome in comparison to earlier micro studies are probably due to differences between observed countries, smaller average firm size in our sample compared to previous studies and slight differences in methodology and variables in the estimated models. Robustness checks show that the significant negative results for exchange rate volatility are driven by firms located in Eastern Europe, while for firms in Central Asia other aspects rather than movements of or volatility in the exchange rate to the Euro seem to determine export activities. Furthermore, the effect of exchange rate volatility can not be attributed to political instability that could be increasing volatility of the domestic exchange rate with respect to the Euro and thereby has an impact on a firms' export behaviour.

The effects of Euro and ERM II on export intensity are small (2-5 percentage points for the full sample), smaller than the usual effect for Euro membership on export volume found in most recent macro studies (5-30 percent). In addition, the finding is not robust to controls for unobserved heterogeneity.

It is striking that positive effects of Euro and ERM II membership are larger and significant for sectors where long term investments play an important role, such as machinery and equipment and manufacturing. A possible explanation is that more binding currency agreements encourage investments in these sectors. While the impact of exchange rate volatility on export behaviour is more significant for sectors providing services, currency agreements have a more pronounced and significant impact on industries producing goods. This could be attributed to the nature of contracts that are more short-term based for services and therefore are less affected by long term exchange rate agreements. For manufacturing, where long term investments play a huge role, exchange rate agreements are more important.

We also find evidence indicating that firms do not lower the overall exposure to exchange rate risks from trade activities when exchange rate volatility is rising, but binding exchange rate arrangements, access to private credits and a higher share of foreign ownership let them increase their exposure. As argued in the paper, this could be due to firms taking out loans in foreign currencies due to lower costs of credits and intensifying export activities to hedge for the exchange rate risks of the loans. The significant impact of private credits on exchange rate exposure due to importing and exporting activities could indicate this fact.

Bibliography

Auboin, M. & Ruta, M., 2011. The Relationship Between Exchange Rates and International Trade: A Review of Economic Literature. *WTO Working Paper*, 17(October).

Bahmani-Oskooee, M. & Hegerty, S.W., 2007. Exchange rate volatility and trade flows: a review article. *Journal of Economic Studies*, 34(3), pp.211 – 255.

Baldwin, R., 2006. The Euro's Trade Effect. *ECB Working Paper Series*, 594.

Bartram, S.M. & Karolyi, G.A., 2006. The impact of the introduction of the Euro on foreign exchange rate risk exposures. *Journal of Empirical Finance*, 13(4-5), pp.519–549.

Berman, N. & Berthou, A., 2009. Financial Market Imperfections and the Impact of Exchange Rate Movements on Exports. *Review of International Economics*, 17(1), pp.103 – 120.

Berman, N., Martin, P. & Mayer, T., 2012. How do Different Exporters React to Exchange Rate Changes? *The Quarterly Journal of Economics*, 127(1), pp.437 – 492.

Berthou, A. & Fontagne, L., 2008. The Euro and the Intensive and Extensive Margins of Trade: Evidence from French Firm Level Data. *CEPII Working Papers*, 6.

Bodnár, K., 2009. Exchange rate exposure of Hungarian enterprises – results of a survey. *MNB Occasional Papers*, 80.

Broll, U. & Eckwert, B., 1999. Exchange Rate Volatility and International Trade. *Southern Economic Journal*, 66(1), pp.178 – 185.

Cadek, V., Rottova, H. & Saxa, B., 2011. Hedging Behaviour of Czech Exporting Firms. *Czech National Bank Working Paper Series*, 14.

Campa, J.M., 2004. Exchange rates and trade: How important is hysteresis in trade? *European Economic Review*, 48(3), pp.527 – 548.

Canzoneri, M.B. & Clark, P.B., 1984. The effects of exchange rate variability on output and employment. *International Finance Discussion Papers*, 240.

Carranza, L.J., Cayo, J.M. & Galdon-Sanchez, J.E., 2003. Exchange rate volatility and economic performance in Peru: a firm level analysis. *Emerging Markets Review*, 4(4), pp.472–496.

Clark, P.B., 1973. Uncertainty, exchange risk, and the level of international trade. *Economic Inquiry*, 11(3), pp.302–313.

Ćorić, B. & Pugh, G., 2010. The effects of exchange rate variability on international trade: a meta-regression analysis. *Applied Economics*, 42(20), pp.2631 – 2644.

Côté, A., 1994. Exchange Rate Volatility and Trade: A Survey. *EconWPA*, 9406001.

Cotter, J. & Bredin, D., 2011. Real and Nominal Foreign Exchange Volatility Effects on Exports – The Importance of Timing.

Dixit, A.K., 1989. Entry and Exit Decisions under Uncertainty. *Journal of Political Economy*, 97(3), pp.620 – 38.

Döhring, B., 2008. Hedging and invoicing strategies to reduce exchange rate exposure - a euro-area perspective. *European Economy - Economic Papers*, 299.

Etzel, D., Hauptmann, A. & Schmerer, H.-J., 2013. Dissecting the German export miracle: Plant-level evidence. *Economic Systems*, 37(3), pp.387–403.

Fauceglia, D., Shingal, A. & Wermelinger, M., 2012. "Natural hedging" of exchange rate risk: The role of imported input prices. *MPRA Paper*, 39438.

Franke, G., 1991. Exchange rate volatility and international trading strategy. *Journal of International Money and Finance*, 10(2), pp.292 – 307.

Greene, W., 2010. Testing hypotheses about interaction terms in nonlinear models. *Economics Letters*, 107(2), pp.291–296.

Guillou, S., 2008. Exports and exchange rate : a firm-level investigation. *Documents de travail de l'OFCE: 2008-02*.

Héricourt, J. & Poncet, S., 2012. Exchange Rate Volatility, Financial Constraints and Trade: Empirical Evidence from Chinese Firms. *CEPII Working Papers*, 35.

Hooper, P. & Kohlhagen, S.W., 1978. The effect of exchange rate uncertainty on the prices and volume of international trade. *Journal of International Economics*, 8(4), pp.483 – 511.

Hutson, E. & O'Driscoll, A., 2009. Firm-Level Exchange Rate Exposure in the Eurozone.

Kamps, A., 2006. The euro as invoicing currency in international trade. *Working Paper Series*, 665.

Kandilov, I.T. & Leblebicioglu, A., 2011. The impact of exchange rate volatility on plant-level investment: Evidence from Colombia. *Journal of Development Economics*, 94(2), pp.220 – 230.

Kaufmann, D., Kraay, A. & Mastruzzi, M., 2010. The Worldwide Governance Indicators: Methodology and Analytical Issues. *World Bank Policy Research Working Paper*, 5430.

McKenzie, M.D., 1999. The Impact of Exchange Rate Volatility on International Trade Flows. *Journal of Economic Surveys*, 13(1), pp.71 – 106.

Ozturk, I., 2006. Exchange Rate Volatility and Trade: A Literature Survey. *International Journal of Applied Econometrics and Quantitative Studies*, 3(1).

Puhani, P. a., 2012. The treatment effect, the cross difference, and the interaction term in nonlinear "difference-in-differences" models. *Economics Letters*, 115(1), pp.85–87.

Raddatz, C., 2011. Over the hedge : exchange rate volatility, commodity price correlations, and the structure of trade. *World Bank Policy Research Working Paper Series*, 5590.

Rose, A.K., 2000. One Money, One Market: Estimating the Effect of Common Currencies on Trade. *Economic Policy*, 15(30), pp.7–46.

Sanderson, L., 2009. Exchange rates and export performance: evidence from micro-data. *Reserve Bank of New Zealand Bulletin*, pp.43 – 52.

Solakoglu, M.N., Solakoglu, E.G. & Demirağ, T., 2008. Exchange rate volatility and exports: a firm-level analysis. *Applied Economics*, 40(7), pp.921–929.

De Sousa, J., Mayer, T. & Zignago, S., 2012. Market access in global and regional trade. *Regional Science and Urban Economics*, 42(6), pp.1037 – 1052.

Vicarelli, C. & Pappalardo, C., 2012. Euro introduction and export behaviour of Italian firms. *MPRA Paper*, 43386.

A Appendix

Table A.1: BEEPS Surveys

	(1)	(2)
	Freq.	Percent
only in 2009	5,967	34.38
only in 2007	1,789	10.31
only in 2005	3,387	19.52
only in 2002	2,232	12.86
only in 2002, 05	1,334	7.69
only in 2005, 09	1,917	11.05
only in 2007, 09	11	0.06
only in 2002, 05, 09	712	4.10
Total	17,354	100

Table A.2: Number of Firms per Survey by Country

	(1)	(2)	(3)	(4)	(5)
	2002	2005	2007	2009	Total
Albania	110	146	215	32	503
Belarus	0	0	0	226	226
Georgia	0	0	0	258	258
Ukraine	381	453	0	604	1438
Uzbekistan	0	0	0	361	361
Russia	298	390	0	745	1433
Poland	333	750	0	299	1382
Romania	206	524	0	355	1085
Serbia	82	165	0	361	608
Kazakhstan	198	424	0	431	1053
Moldova	0	0	0	350	350
Bosnia	0	0	0	280	280
Azerbaijan	0	0	0	355	355
FYROM	0	0	0	311	311
Armenia	0	0	0	278	278
Kyrgyz	0	0	0	185	185
Estonia	163	202	0	261	626
Czech Republic	142	304	0	192	638
Hungary	194	480	0	281	955
Latvia	160	171	0	248	579
Lithuania	178	180	0	247	605
Slovakia	128	151	0	205	484
Slovenia	182	200	0	270	652
Bulgaria	194	214	980	238	1626
Croat a	115	188	601	97	1001
Montenegro	0	2	0	80	82
Total	3,064	4,944	1,796	7,550	17,354

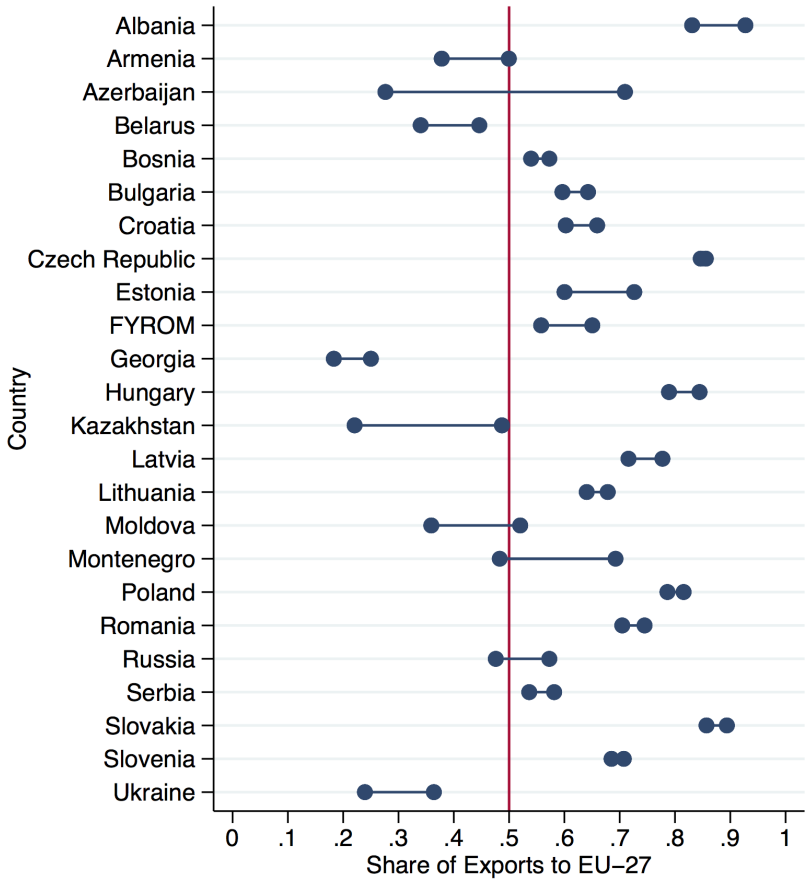
Table A.3: Firms by Country

	(1)	(2)	(3)	(4)
Country	Not Export ng	Export ng	Total	Share
Albania	364	139	503	0.28
Armenia	241	37	278	0.13
Azerbaijan	329	26	355	0.07
Belarus	170	56	226	0.25
Bosnia	176	104	280	0.37
Bulgaria	1,083	543	1,626	0.33
Croat a	570	431	1,001	0.43
Czech Republic	402	236	638	0.37
Estonia	399	227	626	0.36
FYROM	174	137	311	0.44
Georgia	225	33	258	0.13
Hungary	600	355	955	0.37
Kazakhstan	952	101	1,053	0.10
Kyrgyz	157	28	185	0.15
Latvia	409	170	579	0.29
Lithuania	388	217	605	0.36
Moldova	290	60	350	0.17
Montenegro	68	14	82	0.17
Poland	993	389	1,382	0.28
Romania	853	232	1,085	0.21
Russia	1,186	247	1,433	0.17
Serbia	356	252	608	0.41
Slovakia	289	195	484	0.40
Slovenia	289	363	652	0.56
Ukraine	1,118	320	1,438	0.22
Uzbekistan	320	41	361	0.11
Total	12,401	4,953	17,354	0.29

Table A.4: Firms by Industry

		(1)	(2)	(3)	(4)
Industry		Not Export ng	Export ng	Total	Share
Other manufacturing	2	667	496	1,163	0.43
Food	15	1,376	786	2,162	0.36
Text les	17	97	139	236	0.59
Garments	18	551	391	942	0.42
Chemicals	24	120	131	251	0.52
Plast cs & rubber	25	83	88	171	0.51
Non metallic mineral	26	153	91	244	0.37
Basic metals	27	38	42	80	0.53
Fabricated metal products	28	508	416	924	0.45
Machinery and equipment	29	316	397	713	0.56
Electronics	31	83	93	176	0.53
Construct on	45	1,588	181	1,769	0.10
Other services	50	1,308	273	1,581	0.17
Wholesale	51	1,480	507	1,987	0.26
Retail	52	2,608	257	2,865	0.09
Hotel and restaurants	55	646	117	763	0.15
Transport	60	595	432	1,027	0.42
IT	72	184	116	300	0.39
Total	**All**	12,401	4,953	17,354	0.29

Figure A.1: Range of the Share of Exports to EU-27 by Country (2002, 2005, 2007 and 2009)*



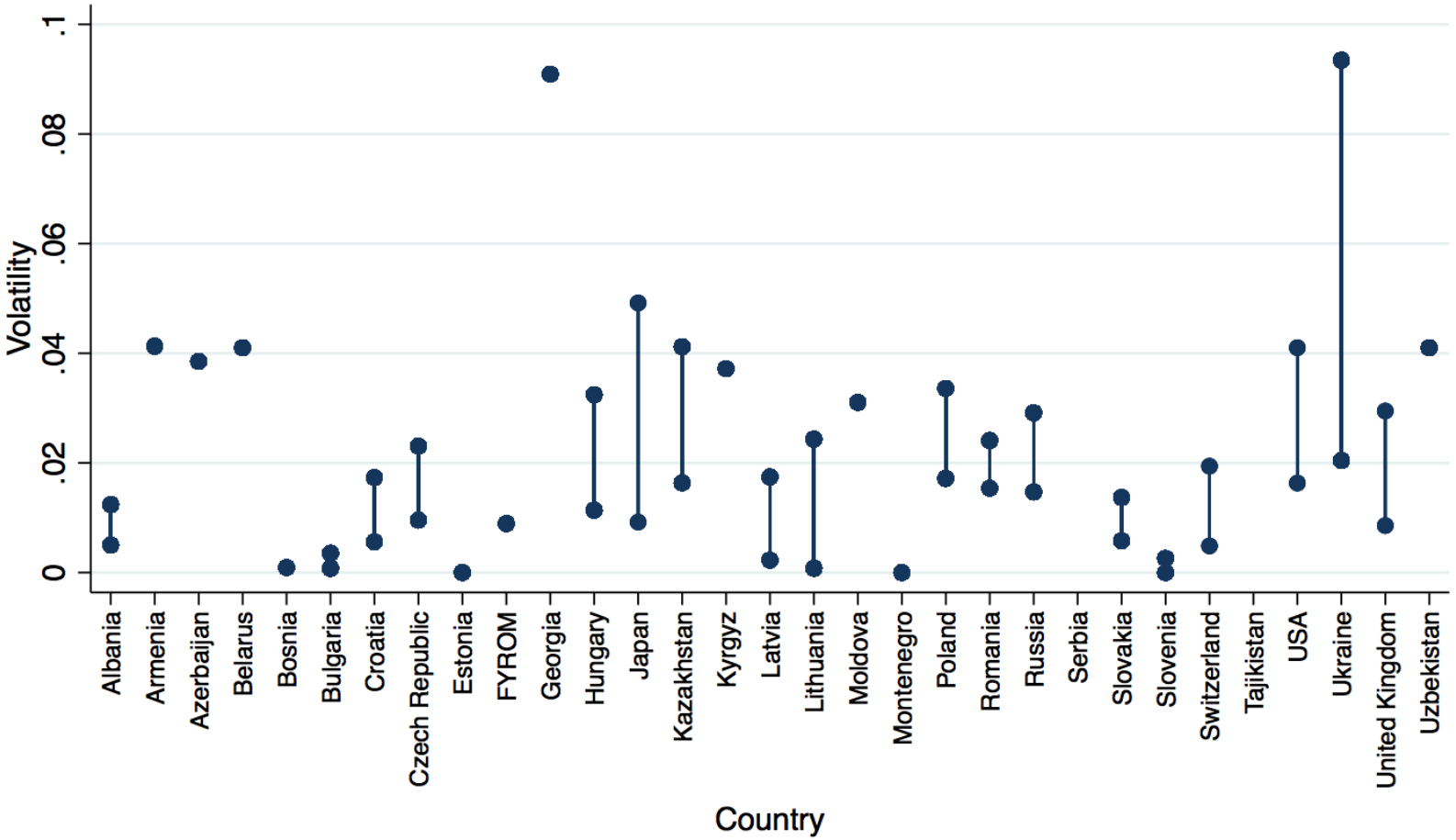
Source: UN Comtrade

***Data for Uzbekistan is unavailable. Data for Montenegro is for the years 2007 and 2009 only.**

Table A.5: Firms per Industry and Country

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Industry	2 Other manu-facturing	15 Food	17 Text les	18 Garments	23-24 Chemicals	25 Plast cs & rubber	26 Non metallic mineral products	27 Basic metals	28 Fabric. metal products	29 Machinery and equipment	31-32 Electronics	45 Construct on	50 Other services	51 Wholesale	52 Retail	55 Hotel and restaurants	60-64 Transport	72 IT	All
Albania	21	59	22	7	8	5	10	7	14	1	0	60	41	84	68	51	44	1	503
Belarus	21	13	7	13	6	5	7	1	8	4	0	12	5	25	81	1	11	6	226
Georgia	22	39	1	1	1	1	12	7	4	0	0	45	7	14	70	17	17	0	258
Ukraine	119	225	11	135	11	2	17	2	38	113	3	123	180	175	144	58	64	18	1,438
Uzbekistan	15	28	10	10	9	3	17	3	7	12	6	36	7	28	112	25	31	2	361
Russia	106	198	13	102	78	16	16	8	76	82	16	165	160	145	153	34	58	7	1,433
Poland	48	160	12	131	2	17	16	3	142	66	2	155	131	177	155	35	114	16	1,382
Romania	53	187	8	104	13	7	9	4	87	55	3	87	97	97	169	40	59	6	1,085
Serbia	53	68	14	7	11	9	6	4	29	11	6	64	63	83	103	28	44	5	608
Kazakhstan	64	204	4	65	5	4	16	1	32	54	9	140	87	121	169	28	44	6	1,053
Moldova	15	47	2	18	2	2	3	0	14	3	1	41	13	24	128	10	27	0	350
Bosnia	44	11	3	8	2	5	2	2	18	8	2	34	9	38	75	9	10	0	280
Azerbaijan	22	39	8	3	4	1	13	1	6	10	7	30	21	33	120	15	16	6	355
FYROM	25	25	6	27	2	2	4	3	10	3	2	43	3	38	82	12	23	1	311
Armenia	22	28	4	2	9	1	6	6	7	5	1	24	8	16	83	26	20	10	278
Kyrgyz	20	29	8	3	2	4	5	2	1	3	4	24	6	13	42	5	13	1	185
Estonia	64	46	5	12	2	4	7	1	11	7	3	77	87	69	116	58	50	7	626
Czech Republic	47	60	3	4	9	11	9	7	25	25	7	82	87	67	92	45	49	9	638
Hungary	61	108	8	47	5	13	8	6	129	63	5	90	87	121	112	35	45	12	955
Latvia	54	49	4	12	0	1	5	2	7	6	0	51	81	109	124	24	48	2	579
Lithuania	58	58	14	10	1	4	6	0	6	10	7	84	53	73	101	50	65	5	605
Slovakia	22	40	3	5	7	3	5	4	18	18	2	58	100	67	73	24	28	7	484
Slovenia	32	57	10	4	7	12	10	3	33	29	4	90	101	80	85	41	44	10	652
Bulgaria	71	215	24	159	47	23	18	1	75	103	73	70	83	155	233	52	70	154	1,626
Croat a	76	157	31	53	7	16	16	2	123	22	13	80	64	126	143	35	29	8	1,001
Montenegro	8	12	1	0	1	0	1	0	4	0	0	4	0	9	32	5	4	1	82
Total	1,163	2,162	236	942	251	171	244	80	924	713	176	1,769	1,581	1,987	2,865	763	1,027	300	17,354

Figure A.2: Range of Volatility to the Euro (2001, 2004, 2006 and 2008)*



***Coverage for years and countries as in the study sample (see Table A.3)**

Table A.6: Correlation Table

	ExportIntensity	ln Sales	Quality	Size	Euro	ERM	Peg	ln ExRate	Volat lity	RTA
ExportIntensity	1.00	0.18	0.17	0.24	0.05	0.05	0.07	-0.03	-0.06	0.12
ln Sales	0.18	1.00	0.28	0.61	0.17	0.02	0.07	0.15	-0.01	0.12
Quality	0.17	0.28	1.00	0.31	0.08	0.00	0.05	0.03	-0.04	0.12
Size	0.24	0.61	0.31	1.00	0.03	0.00	0.02	0.05	0.03	-0.01
Euro	0.05	0.17	0.08	0.03	1.00	-0.06	-0.07	0.03	-0.09	0.21
ERM	0.05	0.02	0.00	0.00	-0.06	1.00	-0.12	-0.19	-0.17	0.36
Peg	0.07	0.07	0.05	0.02	-0.07	-0.12	1.00	-0.28	-0.17	0.16
ln ExchangeRate	-0.03	0.15	0.03	0.05	0.03	-0.19	-0.28	1.00	0.07	-0.09
Volat lity	-0.06	-0.01	-0.04	0.03	-0.09	-0.17	-0.17	0.07	1.00	-0.35
RTA	0.12	0.12	0.12	-0.01	0.21	0.36	0.16	-0.09	-0.35	1.00

Table A.7: Probability to Export by Industry (Probit)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	2	15	17	18	23-24	25	26	27	28	29	31-32	45	50	51	52	55	60-64	72
Industry	Other manu-facturing	Food	Text iles	Garments	Chemicals	Plast ics & rubber	Non-met. mineral products	Basic metals	Fabricate metal products	Machinery & equipment	Electronics	Construc-t ion	Other services	Wholesale	Retail	Hotels & restaurants	Transport	IT
ln Sales	0.166***	0.398***	0.301	0.171***	0.720***	0.652*	-0.00987	1.296**	0.215***	0.944***	0.0916	0.254***	0.456***	0.325***	0.120***	0.153***	0.336***	0.144
	(0.0521)	(0.100)	(0.184)	(0.0319)	(0.247)	(0.393)	(0.0514)	(0.517)	(0.0648)	(0.205)	(0.0736)	(0.0668)	(0.0960)	(0.0719)	(0.0401)	(0.0402)	(0.0741)	(0.226)
Quality	0.495**	1.110***	0.224	0.249	1.982*	4.738***	0.518*	2.056	0.471**	0.0594	0.119	0.832***	0.993***	1.110***	0.718***	0.401**	0.742***	-0.0139
	(0.200)	(0.303)	(0.382)	(0.153)	(1.036)	(1.501)	(0.292)	(1.858)	(0.195)	(0.589)	(0.230)	(0.228)	(0.290)	(0.265)	(0.207)	(0.169)	(0.244)	(0.800)
Size	0.562***	0.544***	0.913*	0.740***	1.485*	0.228	0.746*	0.0827	0.550***	2.388***	0.355**	-0.163	-0.332**	0.0237	0.176*	0.360***	-0.695***	0.776
	(0.155)	(0.165)	(0.535)	(0.0806)	(0.774)	(0.803)	(0.401)	(1.335)	(0.171)	(0.471)	(0.172)	(0.142)	(0.160)	(0.121)	(0.100)	(0.101)	(0.174)	(0.683)
Euro	0.496	0.896	-0.907	-0.0321	-1.229	4.139	0.606	76.55	-0.108	4.573**	-0.227	0.454	0.0709	0.163	0.737***	-0.227	0.0972	1.465
	(0.428)	(0.562)	(0.938)	(0.716)	(3.397)	(3.573)	(0.664)	(0)	(0.367)	(1.851)	(0.676)	(0.423)	(0.827)	(0.436)	(0.284)	(0.358)	(0.518)	(2.390)
ERM	-0.131	1.806***	0.669	0.491	-0.307	0.151	-0.172	-8.612**	0.508	1.016	0.293	0.0347	0.604**	0.523	0.0969	-0.218	0.587*	-2.986
	(0.250)	(0.619)	(0.763)	(0.305)	(3.168)	(2.669)	(0.386)	(3.777)	(0.408)	(1.885)	(0.715)	(0.325)	(0.280)	(0.331)	(0.209)	(0.249)	(0.314)	(1.876)
Peg	-0.571**	-0.333	-1.247	0.378**	0.668	1.050	-0.0136	-1.882	-0.735**	3.234**	-1.351**	0.487	0.127	-0.243	-0.487**	-0.544*	-0.0467	-1.663
	(0.258)	(0.254)	(0.794)	(0.179)	(2.075)	(1.403)	(0.355)	(3.993)	(0.294)	(1.445)	(0.544)	(0.332)	(0.372)	(0.256)	(0.228)	(0.305)	(0.315)	(1.721)
ln ExchangeRate	-0.0569*	-0.134***	-0.172	-0.0151	-1.080***	-0.447	0.00761	-0.732*	-0.0681**	-0.323***	-0.102	-0.0922**	-0.0564	-0.0683**	-0.0227	0.0326	-0.0677*	0.220
	(0.0318)	(0.0420)	(0.121)	(0.0189)	(0.252)	(0.294)	(0.0451)	(0.380)	(0.0306)	(0.117)	(0.0711)	(0.0422)	(0.0378)	(0.0343)	(0.0241)	(0.0265)	(0.0370)	(0.207)
Volat lity	-23.97***	0.770	-12.61	-2.398	34.90	-29.94	-3.954	-118.5**	-17.47**	2.526	-6.442	-2.242	0.429	2.416	-16.26***	-17.22***	-1.786	-131.0*
	(6.496)	(1.176)	(12.88)	(2.897)	(32.08)	(55.36)	(6.128)	(46.88)	(7.382)	(11.96)	(10.68)	(2.389)	(1.531)	(1.590)	(6.075)	(6.327)	(1.721)	(73.97)
RTA	0.0117**	-0.0152*	0.0118	0.0324***	0.109**	0.0952**	0.0229*	0.231***	0.0165**	0.0819***	0.0218**	-0.00410	0.00126	0.0258***	0.0116**	0.00209	0.00714	0.0142
	(0.00559)	(0.00778)	(0.0149)	(0.00459)	(0.0445)	(0.0411)	(0.0129)	(0.0834)	(0.00653)	(0.0229)	(0.0106)	(0.00680)	(0.00735)	(0.00758)	(0.00525)	(0.00561)	(0.00664)	(0.0337)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Dum.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Observat ions	1,163	2,162	236	942	251	171	244	80	924	713	176	1,769	1,581	1,987	2,865	763	1,027	300

*Notes: Reported values are marginal ef fects at the mean of the independent variables; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Table A.8: Export Intensity Regression Results by Industry (OLS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	2	15	17	18	23-24	25	26	27	28	29	31-32	45	50	51	52	55	60-64	72
Industry	Other manu-facturing	Food	Text les	Garments	Chemicals	Plast ics & rubber	Non-met. mineral products	Basic metals	Fabricate metal products	Machinery & equipment	Electronics	Construc-t on	Other services	Wholesale	Retail	Hotels & restaurants	Transport	IT
ln Sales	0.947*	1.493***	2.124*	-0.0244	2.003**	1.391*	-0.880	3.683**	2.521***	2.952***	-1.016	0.503***	1.185***	0.581**	0.111	1.498***	3.016***	-0.626
	(0.556)	(0.294)	(1.278)	(0.666)	(0.831)	(0.816)	(0.747)	(1.696)	(0.630)	(0.825)	(1.578)	(0.129)	(0.230)	(0.230)	(0.0808)	(0.472)	(0.541)	(1.225)
Quality	1.711	6.528***	0.885	-2.340	-0.422	14.55***	1.005	1.860	3.114	1.459	5.014	1.177*	4.571***	4.885***	1.731**	8.006**	7.707***	-2.363
	(2.450)	(1.427)	(5.556)	(3.849)	(3.397)	(4.386)	(3.695)	(5.717)	(2.482)	(2.867)	(5.186)	(0.644)	(1.682)	(1.373)	(0.773)	(3.817)	(2.906)	(5.522)
Size	10.65***	5.254***	17.61***	24.80***	6.608**	1.459	11.31***	2.527	10.16***	10.30***	13.85***	-0.163	-0.640	0.234	0.805**	5.658***	-9.704***	7.659*
	(1.724)	(0.936)	(3.583)	(1.865)	(2.737)	(2.911)	(2.449)	(4.301)	(1.739)	(2.040)	(3.478)	(0.412)	(0.702)	(0.795)	(0.358)	(1.441)	(1.583)	(4.150)
Euro	10.66*	-5.376**	-13.16	-7.742	21.38	9.898	22.77*	38.99***	7.129	25.40***	17.04	1.163	1.871	0.187	3.335**	0.588	0.782	-8.247
	(6.069)	(2.488)	(13.10)	(11.83)	(18.61)	(8.303)	(13.49)	(9.294)	(6.297)	(6.920)	(15.10)	(1.686)	(5.794)	(2.945)	(1.576)	(6.277)	(7.221)	(7.105)
ERM	10.22***	9.731**	19.97**	20.73***	7.387	13.05	3.142	-9.883	7.037	16.14***	18.76	1.210	0.683	3.563	-0.568	-4.611	7.978**	-6.314
	(3.734)	(4.043)	(9.253)	(6.795)	(11.62)	(10.84)	(8.555)	(11.91)	(6.640)	(5.865)	(14.63)	(0.944)	(1.351)	(2.706)	(0.841)	(2.826)	(3.914)	(4.619)
Peg	-1.397	-1.046	-10.90	17.52***	5.837	10.09*	2.624	-1.563	-5.015	3.854	-18.10**	1.976	1.818	4.384**	-1.323***	-5.846**	2.810	6.645
	(3.718)	(2.095)	(7.548)	(4.164)	(5.381)	(5.183)	(6.430)	(13.04)	(4.097)	(6.619)	(8.564)	(1.458)	(1.948)	(1.857)	(0.495)	(2.287)	(4.028)	(9.377)
ln ExchangeRate	0.0351	-0.512**	-0.901	1.389***	-4.342***	-0.469	0.149	-1.818*	-0.179	-0.243	-0.180	-0.0803	-0.0610	-0.0457	-0.0858	-0.0604	-0.583	2.082*
	(0.424)	(0.223)	(1.202)	(0.477)	(0.742)	(0.710)	(0.689)	(1.074)	(0.352)	(0.481)	(1.241)	(0.0685)	(0.149)	(0.178)	(0.0643)	(0.346)	(0.389)	(1.234)
Volat lity	-149.3**	-29.66***	-67.60	-31.87	179.0	93.39	32.39	-121.5	-263.0***	132.2**	-51.52	-11.39**	0.130	7.206	-25.82***	-56.96***	-20.31	-34.78
	(61.80)	(7.819)	(172.6)	(56.35)	(173.2)	(99.28)	(83.46)	(164.1)	(82.99)	(60.69)	(201.2)	(5.763)	(5.759)	(9.137)	(9.726)	(21.63)	(24.65)	(59.75)
RTA	0.167**	-0.0867*	0.348*	0.678***	0.733***	0.389***	0.470***	0.508**	0.229***	0.418***	0.482**	-0.0306	0.00286	0.108***	0.0152	0.109*	0.00691	0.314*
	(0.0688)	(0.0457)	(0.178)	(0.0960)	(0.167)	(0.109)	(0.133)	(0.192)	(0.0771)	(0.0909)	(0.191)	(0.0187)	(0.0259)	(0.0379)	(0.0148)	(0.0634)	(0.0787)	(0.168)
Constant	-23.39***	-4.194	-39.93***	-45.47***	-15.22	-21.68**	-11.66	-47.25**	-38.24***	-53.80***	2.498	-2.571**	-7.541***	-3.860*	-0.390	-15.68***	2.521	-11.90
	(7.901)	(3.010)	(15.30)	(6.727)	(9.873)	(10.48)	(9.086)	(21.04)	(7.200)	(9.061)	(21.31)	(1.225)	(2.245)	(2.139)	(0.908)	(4.616)	(5.949)	(11.86)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Dum.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Observat ons	1,163	2,162	236	942	251	171	244	80	924	713	176	1,769	1,581	1,987	2,865	763	1,027	300
R^2	0.182	0.190	0.260	0.359	0.362	0.304	0.233	0.521	0.207	0.243	0.234	0.024	0.049	0.038	0.029	0.141	0.071	0.121

*Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Table A.9: Robustness Check - Regional Differences

	Asia			Europe		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
ln Sales	0.279**	0.327**	1.048***	-0.0311	0.691***	1.117***
	(0.138)	(0.139)	(0.198)	(0.129)	(0.132)	(0.175)
Quality	5.752***	4.715***	3.912***	5.557***	4.292***	3.566***
	(0.934)	(0.915)	(0.914)	(0.695)	(0.650)	(0.651)
Size	2.148***	1.547***	0.676	8.885***	6.358***	5.769***
	(0.417)	(0.426)	(0.487)	(0.441)	(0.404)	(0.461)
Euro	-	-	-	2.164	4.500***	-
				(1.338)	(1.245)	
ERM	-	-	-	1.281	5.115***	-
				(0.883)	(0.816)	
Peg	-	-	-	2.391***	0.466	-
				(0.770)	(0.735)	
ln ExchangeRate	0.0561	0.0577	85.54	-0.0737	-0.0272	-9.118***
	(0.146)	(0.142)	(96.50)	(0.0903)	(0.0850)	(2.344)
Volatility	58.91**	84.38***	90.55	-23.35***	-37.65***	-14.93***
	(23.14)	(24.48)	(181.4)	(5.212)	(5.503)	(5.365)
RTA	2.197***	2.219**	38.03	0.0474***	0.0297*	0.0151
	(0.739)	(0.867)	(38.50)	(0.0153)	(0.0172)	(0.0406)
Constant	-29.27***	-27.43***	-466.1	-3.622***	7.576***	50.23***
	(8.775)	(9.698)	(480.3)	(1.362)	(1.742)	(11.23)
Year Dummies	No	Yes	Yes	No	Yes	Yes
Industry Dummies	No	Yes	Yes	No	Yes	Yes
Country Dummies	No	No	Yes	No	No	Yes
Observations	3,923	3,923	3,923	13,431	13,431	13,431
R^2	0.046	0.089	0.105	0.086	0.216	0.232

*Notes: Reported probit regressions results are marginal effects; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*