

Exchange Rate Policy and Trade:

Firms in Eastern Europe and Central Asia

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I - Introduction

The impact of volatility and movements of exchange rates on trade remains to be a vivid topic of academic debate, that for a longer time was dominated by the introduction of the Euro. While for the Euro and currency unions in general a consensus was reached for most economists that a robust positive effect exists, this not the case for volatility in the bilateral exchange rate. In both fields, most studies follow a macro approach that usually includes the estimation of a gravity model.

We want to revive the original focus on volatility in combination with currency agreements, but at a micro level. In this field, studies at the firm-level are rather scarce and focus on a single country only. We look at firms in 26 Eastern European and Central Asian countries and test how their decision to export and the intensity of their involvement in exporting activities is influenced by the exchange rate to the Euro. The region has the advantage of consisting of countries with a similar history in the last decades, that have experienced many changes in the exchange rate policy in recent years and remain to have very different approaches in this regard.

Investigating the trade enhancing effects of the Euro with non-EU15 countries has the advantage that there is no time gap between the introduction of the Euro in 1999 and Euro coins and notes entering circulation in 2002. Which of the two dates is more decisive for a Euro effect on firms' export behaviour remains unclear.

We primarily want to test two hypotheses:

H1: Increasing volatility in the bilateral exchange rate to the Euro leads to a rise in uncertainty for firms about future revenues and thereby to less involvement in export activities.

H2: The impact of 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 future revenues for firms. 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. More binding commitments with regard to the exchange rate policy in the form of ERM II or Euro membership may lower the degree of uncertainty even further.

At the same time, participation in ERM II and Euro means giving up an independent exchange rate policy and eliminates the a country's option to depreciate the domestic currency in order to boost export competitiveness of domestic firms and increase revenues¹.

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

II - Literature

In this chapter, we summarize the empirical results for the topic briefly with the main focus on empirical studies on the effect of exchange rate volatility on trade employing firm-level data, that are compared in Table II.1.

II.1 - Theory

The theoretical analysis of exchange rate volatility and trade is dominated by the negative trade effects due to uncertainty about future revenues as described by Clark (1973), combined with the inflexibility of firms to alter factor inputs (Hooper & Kohlhausen 1978).

Later 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), via additional profit possibilities or the principle of sunk 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 safe harbour and foreign markets as a source for additional revenues when the domestic currency depreciates.

Theoretical outcomes depend very much on the assumptions made and in general have no unambiguous finding. In the end, results show that the firms' level of risk aversion (Viaene & De

1 The ERM II allows a fluctuation band of 15% for countries in CEE and is seen as a necessary step towards Eurozone membership.

Vries 1992) and the flexibility of a firm to shift from one market to another and alter the composition and origin of inputs seems to play an important role.

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, but most studies find an insignificant or a weak but significant negative effect and differ severely 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. Uncertainty arising from exchange rate volatility seems 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.

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%, estimates have decreased to a positive effect between 5-30%, but remain robust. Most of the later studies focus on trade effects for the Eurozone.³

Only very few studies take advantage of data at the firm level and if, they usually focus on firms in a single country. 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 with the estimation of a dynamic discrete choice firm model. He does not find a significant effect of exchange rate volatility on foreign market entry and exit, but evidence for sunk costs hysteresis to

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).

play an important role and that a depreciation of the domestic currency increases export volumes slightly via the extensive margin.

In a similar attempt, 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. She finds a depreciation of the domestic currency to affect the probability to export or extensive margin for most industries positively, 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 extensive margin for most industries.

For 143 of the 500 biggest turkish firms, Solakoglu et al. (2008) estimate the effect of exchange rate volatility on real exports for the years 2001-2003. According to their results, there is neither a positive, nor a negative relationship and the firm size and level of international activity do not influence the responsiveness to volatility. They do find evidence for natural hedging.

In a more recent study, Héricourt & Poncet (2012) are investigating 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 margin of trade.

Several studies analyse the effect of a countries membership in a currency union (usually the Euro) on export behaviour of domestic firms. A study by Vicarelli & Pappalardo (2012) employing difference-in difference estimation techniques for a panel of around 21,000 Italian firms for the years 1996-2004 finds that the euro had a positive influence on Italian exports, mostly through the intensive margin.

Berthou & Fontagne (2008) investigate export behaviour of French firms for the years 1998-2003 and include a dummy variable for Euro membership and a measure for exchange rate volatility in the same model. Estimating a model that consists of both variables allows to disentangle the 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: Recent Studies on Exchange Rate Volatility and Trade at the Firm-level

Study	Panel			Result		Methodology	
	# of Firms	Time	Country	Probability	Volume	Probability	Volume
Campa (2004)	2188	1990-1997	Spain	no effect	-	Dynamic discrete choice model	-
Guillou (2008)	47716	1994-2004	France	positive effect	-	RE Probit model	-
Solakoglu et al. (2008)	143	2001-2003	Turkey	-	no effect	-	OLS, FE, RE
Berthou & Fontagne (2008)	?	1998-2003	France	-	negative eff.	-	FE, RE
Héricourt & Poncet (2012)	113368	2000-2006	China	-	negative eff.	-	FE

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 for New Zealand).

Recent findings suggest that the impact of exchange rates on trade flows in general may be less than expected due to the types of firms that export. Berman et al. (2012) find that firms that export are generally bigger and more productive than others and in a situation of exchange rate depreciation tend to increase their margins rather than the volume of goods. For less productive firms, the reverse is true: they increase volume 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.

III - Empirical Analysis

Our empirical analysis is aiming to answer two different questions: What is the impact of volatility in the bilateral exchange rate of the domestic currency with the Euro on a firms' probability to export and 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.

We control for several firm specific characteristics such as the size of the firms in terms of employees and sales and quality certifications of the firm.

On a country level, we control for different monetary agreements such as direct pegs to the Euro, or a basket of currencies including the Euro, Eurozone membership including unilateral adoption

of the Euro and membership in the European Exchange Rate Mechanism II (ERM II). Furthermore, we control for movements in the nominal exchange rate to the Euro with respect to the past year and the general degree of trade liberalization for a given country, as well.

Firm-level data is from the Eastern Europe & Central Asia Panel Dataset from the World Bank Enterprise Surveys BEEPS and covers the years 2002, 2005, 2007 and 2009. The dataset combines information gathered in different surveys that are matched, if possible and dropped or left in their original form otherwise. The panel structure is displayed in Table A.1 and countries and industries covered in this study are displayed in Table A.3 and Table 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 Euro⁴ 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 derived from De Sousa et al. (2012).

III.I - 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 past year. 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.

As we have no information on the export destination, we assume that Euro still can have kind of a benchmark function for volatility in the domestic exchange rate, due to the Eurozone's importance as an export destination and the main competitor. This is obvious for countries already aligning their monetary or foreign policy towards the EU and the Euro, but less so 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

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

volatility measure constructed with exchange rates to the US Dollar. Estimated coefficients are a little less significant, but the general picture remains the same.

We believe that 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 suggest that the choice between real and nominal exchange rates does not change 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 just in the past. Nevertheless, a recent study shows using new and more sophisticated measures does not change the results significantly (Ćorić & Pugh 2010). The range of the volatility measure for each country as represented in the sample is displayed in Figure A.1.

III.II - The Probability to Export

The probability to export we investigate with a modified version of a standard probit model:

$$\rho_i = Pr(T_i = 1) = \Theta(y_0 + v_i + \sigma_j + \kappa VC_{ij} + \zeta FC_{ij}) \quad (1)$$

We include several firm- and country-specific variables and then estimate:

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

where $Exporter_{ijkt}$ is dummy variable that takes the value 1 if the firm i was an Exporter at time t and 0 otherwise, $\ln Sales_{it}$ denotes the natural log of total sales, $FirmSize_{it}$ is a measure of firm size in terms of employees⁵, $Quality_{it}$ is a dummy variable whether (1) or not (0) the firm has an internationally-recognized quality certification.

We have introduced three dummy variables to control for the exchange rate policy at time t of the country j : $Euro_{jt}$ takes the value 1 if the Euro was introduced as the domestic currency and 0 otherwise, ERM_{jt} takes the value 1 if country j takes part in the European Exchange Rate Mechanism II at time t and Peg_{jt} takes the value 1 if the domestic currency is pegged to the Euro or a basket of currencies that includes the Euro. $Volatility_{jt}$ is our measure of choice for the exchange rate of the domestic currency with the Euro for the 12 months of the past year and $\ln$

5 Firm size is a binary variable that takes the value 1 if the firm has less than 20 employees, 2 if the firm has between 20 and 99 and 3 if the firm has 100 or more employees.

$ExchangeRate_{jt}$ is the natural log of the first difference of the average exchange rate of country j with the Euro in year $t-1$. As a control for the degree of trade liberalization in a given country, we include the variable RTA_{at} , which is the total number of RTAs in force by country j in year t in the model.

In addition to a standard probit regression, we estimate the model with random effects and with and without industry, country and year dummies.

III.III - Export Intensity

To account for differences in the degree of their exporting activities of the firms, we estimate the effect of exchange rate volatility on the intensity of exports:

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

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 model is estimated with OLS and random effects and again with and without industry, country and year dummies.

IV - Results

Effects of exchange rate volatility on the probability to export and export intensity are estimated separately and are supplemented by regressions by industry to identify and quantify differences between industries.

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.

For country specific variables, estimates 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 significant in all regressions. Our measure for trade liberalization yields significant positive estimates for all regressions.

The effect of our measure of exchange rate volatility on a firms' probability to export is negative and in most cases significant (Table IV.1). The degree of the effect is differs depending on the estimation technique (column 1-3 are probit regressions, column 4-6 random effects probit regressions) and the used dummy variables.

The regression in column (5) in Table IV.1 is repeated for each industry in the sample (Table A.7). We find negative effects for 13 of 18 industries, which are significant only for the following industries: other manufacturing, fabricated metal products, retail, hotels and restaurants and IT⁶.

Trade liberalization measured as the number of signed RTAs has positive and significant impact on the probability to export for all non-service industries besides food.

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

Table IV.1: Probit Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
	Probit	Probit	Probit	RE Probit	RE Probit	RE Probit
ln Sales	0.0625*** (0.00529)	0.125*** (0.00640)	0.156*** (0.00959)	0.123*** (0.0127)	0.231*** (0.0168)	0.274*** (0.0215)
Quality	0.470*** (0.0261)	0.421*** (0.0283)	0.357*** (0.0296)	0.919*** (0.0652)	0.771*** (0.0638)	0.630*** (0.0605)
Size	0.293*** (0.0169)	0.189*** (0.0185)	0.175*** (0.0226)	0.610*** (0.0443)	0.372*** (0.0397)	0.332*** (0.0438)
Euro	0.170*** (0.0620)	0.406*** (0.0703)	-0.186* (0.109)	0.289** (0.121)	0.708*** (0.129)	-0.238 (0.186)
ERM	0.0677 (0.0423)	0.268*** (0.0469)	0.0432 (0.0892)	0.0697 (0.0852)	0.458*** (0.0906)	0.0930 (0.151)
Peg	-0.0282 (0.0356)	-0.0383 (0.0395)	-1.257** (0.628)	-0.0495 (0.0733)	-0.0795 (0.0761)	-2.173** (1.095)
ln ExchangeRate	-0.0324*** (0.00435)	-0.0348*** (0.00462)	-0.310** (0.155)	-0.0706*** (0.00988)	-0.0677*** (0.00996)	-0.544** (0.269)
Volatility	-0.716* (0.432)	-0.488 (0.381)	-0.866** (0.368)	-1.863*** (0.623)	-1.120* (0.587)	-1.494** (0.636)
RTA	0.00559*** (0.000756)	0.00962*** (0.000974)	0.00642** (0.00250)	0.0101*** (0.00151)	0.0178*** (0.00196)	0.00971** (0.00425)
Constant	-2.135*** (0.0620)	-1.851*** (0.0810)	-0.754 (0.743)	-4.264*** (0.229)	-3.476*** (0.233)	-1.417 (1.290)
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	17,354	17,354	17,354	17,354	17,354	17,354
R ²	0.104	0.216	0.260	-	-	-

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

The estimates of the effect of our measure of exchange rate volatility on export intensity are always negative (Table IV.2). Due to strong collinearity in the Euro and Peg variable with the country dummies, estimates are skewed in column (3) and (6). We therefore concentrate on the interpretation of estimates from regressions including industry and year dummies.

When estimating with year and industry dummies, Euro membership increases the export intensity by 5.1 percentage points for OLS and 4.5 with random effects. The impact of ERM II membership is slightly lower with 4.7 (OLS) and 4.1 (RE) percentage points. Even lower is the effect of exchange rate pegs with 2.1 (OLS) and 1.8 (RE) percentage points.

Again, the regression in column (5) in Table IV.2 is estimated again for each industry with year dummies (Table A.8). Of 18 industries, 13 yield negative estimates for our volatility measure and 7 are significant: other manufacturing, food, fabricated metal products, machinery and equipment,

construction, retail and hotels and restaurants. For the Euro dummy, estimates are positive in 14 of 18 categories of which 5 are significant: other manufacturing, non-metallic mineral products, basic metals, machinery and equipment and retail. Estimates for ERM dummy are positive for all but 4 industries and significant for other manufacturing, food, textiles, garments, machinery and equipment and transport.

Again, estimates for trade liberalization are positive and significant for all non-service industries besides food.

Table IV.2: Export Intensity Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	RE	RE	RE
In Sales	0.126 (0.0964)	0.772*** (0.0990)	1.170*** (0.145)	0.136 (0.0959)	0.740*** (0.0990)	1.080*** (0.143)
Quality	5.900*** (0.590)	4.762*** (0.557)	3.751*** (0.558)	5.115*** (0.575)	4.301*** (0.547)	3.465*** (0.548)
Size	7.030*** (0.348)	4.899*** (0.324)	4.556*** (0.378)	6.856*** (0.349)	4.928*** (0.327)	4.644*** (0.376)
Euro	2.505* (1.330)	5.068*** (1.245)	-2.015 (1.935)	1.946 (1.188)	4.485*** (1.150)	-0.556 (1.623)
ERM	1.561* (0.880)	4.695*** (0.816)	2.864* (1.551)	0.748 (0.800)	4.107*** (0.756)	2.782** (1.201)
Peg	3.714*** (0.756)	2.062*** (0.717)	-44.49*** (9.846)	3.796*** (0.775)	1.788** (0.735)	-42.21*** (8.926)
In ExchangeRate	-0.154* (0.0808)	-0.139* (0.0761)	-10.84*** (2.418)	-0.218*** (0.0830)	-0.168** (0.0782)	-10.30*** (2.191)
Volatility	-17.71*** (5.131)	-20.81*** (4.900)	-11.53** (5.139)	-20.20*** (4.501)	-20.36*** (4.337)	-8.935** (4.472)
RTA	0.133*** (0.0137)	0.125*** (0.0141)	-0.0135 (0.0347)	0.0980*** (0.0130)	0.108*** (0.0140)	-0.0414 (0.0326)
Constant	-6.626*** (1.005)	4.174*** (1.336)	56.35*** (11.49)	-5.169*** (1.001)	3.562*** (1.325)	53.58*** (10.38)
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	17,354	17,354	17,354	17,354	17,354	17,354
R ²	0.087	0.191	0.217	0.086	0.191	0.216

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

IV.I - 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 exchange rate uncertainty. To ensure that political uncertainty is not the driver of the negative trade effects we found, we reestimate column (2) and (5) of Table IV.1 and Table IV.2 and include a measure of political instability (Table A.9). 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”⁷. 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 move only slightly and remain highly significant for export intensity (column (6) and (8)).

V - Conclusion

We find strong evidence for both our hypotheses: a clear negative effect of exchange rate volatility for firms in Central Europe and Central Asia on either the probability to exports and the export intensity and a significant positive impact of more binding currency agreements such as the Euro or ERM II.

Our results are in contrast to some previous empirical micro studies, but are more in line with macro studies. Differences in the results in comparison to earlier micro studies, we attribute to differences between observed countries and firm size and differences in the methodology.

The effect of Euro and ERM II on export intensity is small (2-5 percentage points for the full sample), smaller than the usual effect for Euro membership on export volume in macro studies (5-30%). Very striking is that positive effects of Euro and ERM II membership are especially large and significant for sectors where long term investments play a huge role, such as machinery and equipment and manufacturing. A possible explanation is that more binding currency agreements encourage investments in these sectors. For the more flexible service sectors, exchange rate volatility is more likely to produce significant effects than the currency agreement dummies.

⁷ For a thorough description of the dataset see Kaufmann et al. (2010).

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A Appendix

Table A.1: Panel Structure

	(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
Croatia	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 Exporting	Exporting	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
Croatia	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

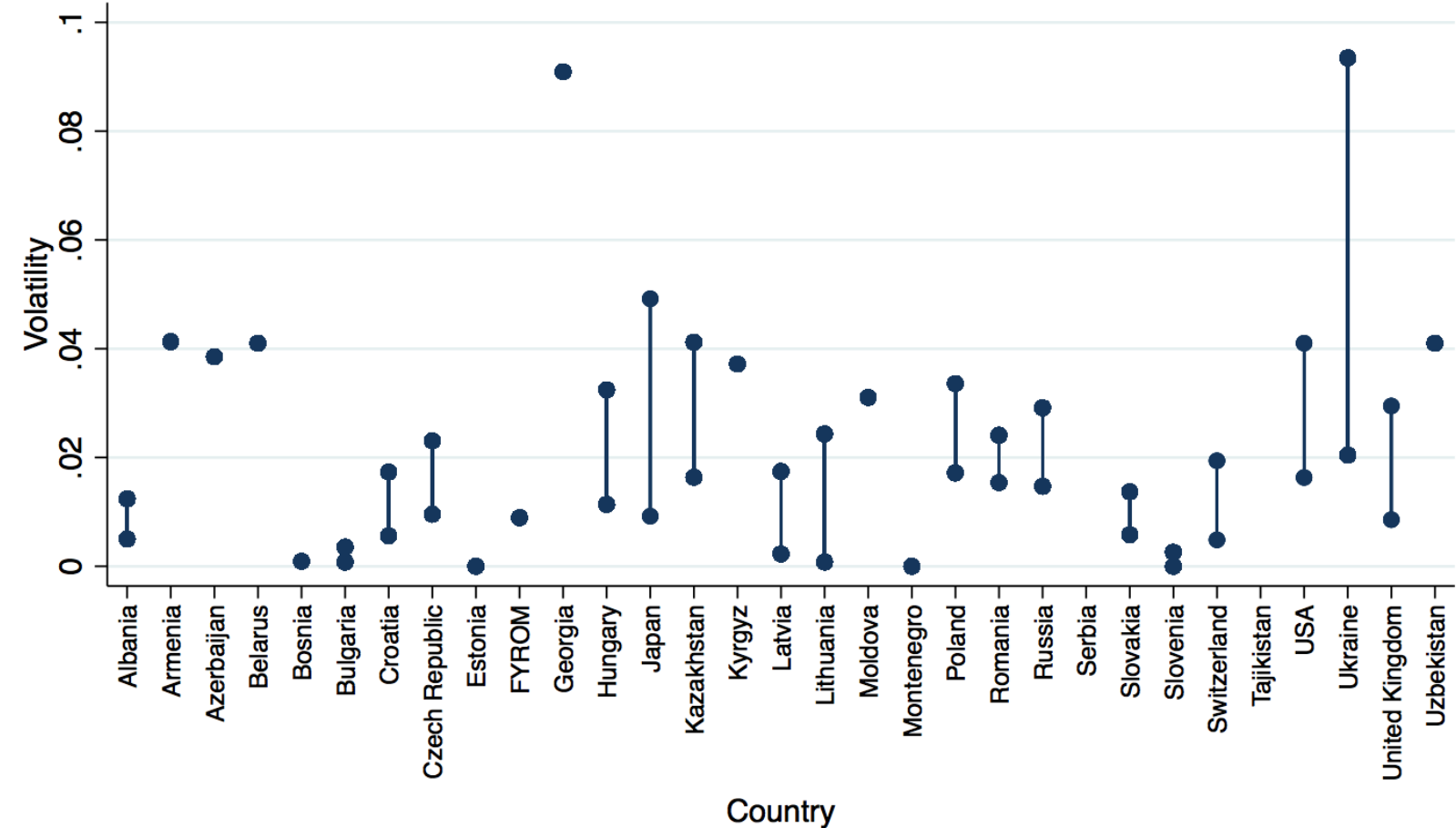
Table A.4: Firms by Industry

		(1)	(2)	(3)	(4)
Industry		Not Exporting	Exporting	Total	Share
Other manufacturing	2	667	496	1,163	0.43
Food	15	1,376	786	2,162	0.36
Textiles	17	97	139	236	0.59
Garments	18	551	391	942	0.42
Chemicals	24	120	131	251	0.52
Plastics & 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
Construction	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

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)
	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	Textiles	Garments	Chemicals	Plastics & rubber	Non metallic mineral products	Basic metals	Fabric. metal products	Machinery and equipment	Electronics	Construction	Other services	Wholesale	Retail	Hotel and restaurants	Transport	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
Croatia	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.1: 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	In Sales	Quality	Size	Euro	ERM	Peg	In ExRate	Volatility	RTA
ExportIntensity	1.00	0.18	0.17	0.24	0.05	0.05	0.07	-0.03	-0.06	0.12
In 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
In ExchangeRate	-0.03	0.15	0.03	0.05	0.03	-0.19	-0.28	1.00	0.07	-0.09
Volatility	-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: Probit Regression Results by Industry

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Industry	2	15	17	18	23-24	25	26	27	28	29	31-32	45	50	51	52	55	60-64	72
	Other manu- facturing	Food	Textiles	Garments	Chemicals	Plastics & rubber	Non-met. mineral products	Basic metals	Fabricated metal products	Machinery and equipment	Electronics	Construc- tion	Other services	Wholesale	Retail	Hotels and restau- rants	Transport	IT
In Sales	0.166*** (0.0521)	0.398*** (0.100)	0.301 (0.184)	0.171*** (0.0319)	0.646*** (0.247)	0.652* (0.393)	-0.00987 (0.0514)	0.280* (0.159)	0.215*** (0.0648)	0.944*** (0.205)	0.0916 (0.0736)	0.254*** (0.0668)	0.456*** (0.0958)	0.325*** (0.0719)	0.120*** (0.0401)	0.153*** (0.0402)	0.336*** (0.0741)	0.144 (0.226)
Quality	0.495** (0.200)	1.110*** (0.303)	0.224 (0.382)	0.249 (0.153)	1.726* (0.918)	4.738*** (1.501)	0.518* (0.292)	0.440 (0.569)	0.471** (0.195)	0.0595 (0.589)	0.119 (0.230)	0.832*** (0.228)	0.994*** (0.290)	1.110*** (0.265)	0.718*** (0.207)	0.401** (0.169)	0.742*** (0.244)	-0.0139 (0.800)
Size	0.562*** (0.155)	0.544*** (0.165)	0.913* (0.535)	0.740*** (0.0806)	1.331* (0.700)	0.228 (0.803)	0.746* (0.401)	0.00687 (0.437)	0.550*** (0.171)	2.388*** (0.471)	0.355** (0.172)	-0.163 (0.142)	-0.332** (0.160)	0.0237 (0.121)	0.176* (0.100)	0.360*** (0.101)	-0.695*** (0.174)	0.776 (0.683)
Euro	0.496 (0.428)	0.896 (0.562)	-0.907 (0.938)	-0.0321 (0.716)	-1.156 (3.114)	4.139 (3.573)	0.606 (0.664)	5.314 (5.376)	-0.108 (0.367)	4.573** (1.851)	-0.227 (0.676)	0.454 (0.423)	0.0709 (0.827)	0.163 (0.437)	0.737*** (0.284)	-0.227 (0.358)	0.0972 (0.518)	1.465 (2.390)
ERM	-0.131 (0.250)	1.806*** (0.619)	0.669 (0.763)	0.491 (0.305)	-0.289 (2.951)	0.151 (2.669)	-0.172 (0.386)	-1.862 (1.157)	0.508 (0.408)	1.016 (1.885)	0.293 (0.715)	0.0347 (0.325)	0.604** (0.280)	0.523 (0.331)	0.0969 (0.209)	-0.218 (0.249)	0.587* (0.314)	-2.986 (1.876)
Peg	-0.571** (0.258)	-0.333 (0.254)	-1.247 (0.794)	0.378** (0.179)	0.617 (2.024)	1.050 (1.403)	-0.0136 (0.355)	-0.518 (1.215)	-0.735** (0.294)	3.235** (1.445)	-1.351** (0.544)	0.487 (0.332)	0.127 (0.372)	-0.243 (0.256)	-0.487** (0.228)	-0.544* (0.305)	-0.0467 (0.315)	-1.663 (1.721)
In ExchangeRate	-0.0569* (0.0318)	-0.134*** (0.0420)	-0.172 (0.121)	-0.0151 (0.0189)	-0.962*** (0.259)	-0.447 (0.294)	0.00761 (0.0451)	-0.161 (0.115)	-0.0681** (0.0306)	-0.323*** (0.117)	-0.102 (0.0711)	-0.0922** (0.0422)	-0.0564 (0.0378)	-0.0683** (0.0343)	-0.0227 (0.0241)	0.0326 (0.0265)	-0.0677* (0.0370)	0.220 (0.207)
Volatility	-23.97*** (6.496)	0.770 (1.176)	-12.61 (12.88)	-2.398 (2.897)	31.47 (29.56)	-29.94 (55.36)	-3.954 (6.128)	-26.06 (16.24)	-17.47** (7.382)	2.526 (11.96)	-6.442 (10.68)	-2.242 (2.389)	0.429 (1.531)	2.417 (1.590)	-16.26*** (6.075)	-17.22*** (6.327)	-1.786 (1.721)	-131.0* (73.97)
RTA	0.0117** (0.00559)	-0.0152* (0.00778)	0.0118 (0.0149)	0.0324*** (0.00459)	0.0982** (0.0422)	0.0952** (0.0411)	0.0229* (0.0129)	0.0463** (0.0215)	0.0165** (0.00653)	0.0819*** (0.0229)	0.0218** (0.0106)	-0.00410 (0.00680)	0.00126 (0.00735)	0.0258*** (0.00758)	0.0116** (0.00525)	0.00209 (0.00561)	0.00714 (0.00664)	0.0142 (0.0337)
Constant	-4.153*** (0.990)	-5.781*** (1.413)	-5.234* (3.082)	-4.798*** (0.430)	-7.962*** (3.047)	-11.19** (4.736)	-2.318* (1.281)	-3.805** (1.926)	-4.199*** (1.122)	-18.41*** (2.771)	-1.365 (1.057)	-4.905*** (1.027)	-6.475*** (1.236)	-6.081*** (1.142)	-4.071*** (0.974)	-3.227*** (0.457)	-3.283*** (0.776)	-4.045 (2.942)
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
Observations	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

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

Table A.8: Export Intensity Regression Results by Industry

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Industry	2	15	17	18	23-24	25	26	27	28	29	31-32	45	50	51	52	55	60-64	72
	Other manu- facturing	Food	Textiles	Garments	Chemicals	Plastics & rubber	Non-met. mineral products	Basic metals	Fabricate metal products	Machinery and equipment	Electronics	Construc- tion	Other services	Wholesale	Retail	Hotels and restau- rants	Transport	IT
In Sales	0.947* (0.556)	1.493*** (0.294)	2.124* (1.278)	-0.0244 (0.666)	2.003** (0.831)	1.391* (0.816)	-0.880 (0.747)	3.683** (1.696)	2.521*** (0.630)	2.952*** (0.825)	-1.016 (1.578)	0.503*** (0.129)	1.185*** (0.230)	0.581** (0.230)	0.111 (0.0808)	1.498*** (0.472)	3.016*** (0.541)	-0.626 (1.225)
Quality	1.711 (2.450)	6.528*** (1.427)	0.885 (5.556)	-2.340 (3.849)	-0.422 (3.397)	14.55*** (4.386)	1.005 (3.695)	1.860 (5.717)	3.114 (2.482)	1.459 (2.867)	5.014 (5.186)	1.177* (0.644)	4.571*** (1.682)	4.885*** (1.373)	1.731** (0.773)	8.006** (3.817)	7.707*** (2.906)	-2.363 (5.522)
Size	10.65*** (1.724)	5.254*** (0.936)	17.61*** (3.583)	24.80*** (1.865)	6.608** (2.737)	1.459 (2.911)	11.31*** (2.449)	2.527 (4.301)	10.16*** (1.739)	10.30*** (2.040)	13.85*** (3.478)	-0.163 (0.412)	-0.640 (0.702)	0.234 (0.795)	0.805** (0.358)	5.658*** (1.441)	-9.704*** (1.583)	7.659* (4.150)
Euro	10.66* (6.069)	-5.376** (2.488)	-13.16 (13.10)	-7.742 (11.83)	21.38 (18.61)	9.898 (8.303)	22.77* (13.49)	38.99*** (9.294)	7.129 (6.297)	25.40*** (6.920)	17.04 (15.10)	1.163 (1.686)	1.871 (5.794)	0.187 (2.945)	3.335** (1.576)	0.588 (6.277)	0.782 (7.221)	-8.247 (7.105)
ERM	10.22*** (3.734)	9.731** (4.043)	19.97** (9.253)	20.73*** (6.795)	7.387 (11.62)	13.05 (10.84)	3.142 (8.555)	-9.883 (11.91)	7.037 (6.640)	16.14*** (5.865)	18.76 (14.63)	1.210 (0.944)	0.683 (1.351)	3.563 (2.706)	-0.568 (0.841)	-4.611 (2.826)	7.978** (3.914)	-6.314 (4.619)
Peg	-1.397 (3.718)	-1.046 (2.095)	-10.90 (7.548)	17.52*** (4.164)	5.837 (5.381)	10.09* (5.183)	2.624 (6.430)	-1.563 (13.04)	-5.015 (4.097)	3.854 (6.619)	-18.10** (8.564)	1.976 (1.458)	1.818 (1.948)	4.384** (1.857)	-1.323*** (0.495)	-5.846** (2.287)	2.810 (4.028)	6.645 (9.377)
In ExchangeRate	0.0351 (0.424)	-0.512** (0.223)	-0.901 (1.202)	1.389*** (0.477)	-4.342*** (0.742)	-0.469 (0.710)	0.149 (0.689)	-1.818* (1.074)	-0.179 (0.352)	-0.243 (0.481)	-0.180 (1.241)	-0.0803 (0.0685)	-0.0610 (0.149)	-0.0457 (0.178)	-0.0858 (0.0643)	-0.0604 (0.346)	-0.583 (0.389)	2.082* (1.234)
Volatility	-149.3** (61.80)	-29.66*** (7.819)	-67.60 (172.6)	-31.87 (56.35)	179.0 (173.2)	93.39 (99.28)	32.39 (83.46)	-121.5 (164.1)	-263.0*** (82.99)	132.2** (60.69)	-51.52 (201.2)	-11.39** (5.763)	0.130 (5.759)	7.206 (9.137)	-25.82*** (9.726)	-56.96*** (21.63)	-20.31 (24.65)	-34.78 (59.75)
RTA	0.167** (0.0688)	-0.0867* (0.0457)	0.348* (0.178)	0.678*** (0.0960)	0.733*** (0.167)	0.389*** (0.109)	0.470*** (0.133)	0.508** (0.192)	0.229*** (0.0771)	0.418*** (0.0909)	0.482** (0.191)	-0.0306 (0.0187)	0.00286 (0.0259)	0.108*** (0.0379)	0.0152 (0.0148)	0.109* (0.0634)	0.00691 (0.0787)	0.314* (0.168)
Constant	-23.39*** (7.901)	-4.194 (3.010)	-39.93*** (15.30)	-45.47*** (6.727)	-15.22 (9.873)	-21.68** (10.48)	-11.66 (9.086)	-47.25** (21.04)	-38.24*** (7.200)	-53.80*** (9.061)	2.498 (21.31)	-2.571** (1.225)	-7.541*** (2.245)	-3.860* (2.139)	-0.390 (0.908)	-15.68*** (4.616)	2.521 (5.949)	-11.90 (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
Observations	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

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

Table A.9: Robustness Check - Political Stability

	Probability to Export				Export Intensity			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit	Probit	RE Probit	RE Probit	OLS	OLS	RE	RE
In Sales	0.0385*** (0.00196)	0.0371*** (0.00196)	0.231*** (0.0168)	0.222*** (0.0166)	0.772*** (0.0990)	0.734*** (0.0982)	0.740*** (0.0990)	0.694*** (0.0983)
Quality	0.140*** (0.0100)	0.139*** (0.0100)	0.771*** (0.0638)	0.769*** (0.0638)	4.762*** (0.557)	4.734*** (0.557)	4.301*** (0.547)	4.268*** (0.547)
Size	0.0580*** (0.00568)	0.0612*** (0.00570)	0.372*** (0.0397)	0.392*** (0.0405)	4.899*** (0.324)	4.987*** (0.324)	4.928*** (0.327)	5.030*** (0.327)
Euro	0.140*** (0.0264)	0.126*** (0.0263)	0.708*** (0.129)	0.643*** (0.130)	5.068*** (1.245)	4.592*** (1.259)	4.485*** (1.150)	4.076*** (1.160)
ERM	0.0886*** (0.0165)	0.0845*** (0.0164)	0.458*** (0.0906)	0.446*** (0.0908)	4.695*** (0.816)	4.529*** (0.818)	4.107*** (0.756)	4.062*** (0.756)
Peg	-0.0116 (0.0119)	-0.0111 (0.0119)	-0.0795 (0.0761)	-0.0764 (0.0762)	2.062*** (0.717)	2.078*** (0.718)	1.788** (0.735)	1.813** (0.736)
In ExchangeRate	-0.0107*** (0.00142)	-0.0110*** (0.00142)	-0.0677*** (0.00996)	-0.0696*** (0.0100)	-0.139* (0.0761)	-0.155** (0.0765)	-0.168** (0.0782)	-0.184** (0.0784)
Volatility	-0.150 (0.117)	-0.0945 (0.118)	-1.120* (0.587)	-0.776 (0.592)	-20.81*** (4.900)	-18.88*** (4.926)	-20.36*** (4.337)	-18.03*** (4.363)
RTA	0.00295*** (0.000298)	0.00205*** (0.000348)	0.0178*** (0.00196)	0.0124*** (0.00221)	0.125*** (0.0141)	0.0911*** (0.0167)	0.108*** (0.0140)	0.0712*** (0.0162)
PoliticalStability	-	0.0360*** (0.00752)	-	0.222*** (0.0501)	-	1.370*** (0.347)	-	1.571*** (0.341)
Constant	-	-	-	-	4.174*** (1.336)	4.277*** (1.336)	3.562*** (1.325)	3.655*** (1.324)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Dummies	No	No	No	No	No	No	No	No
Observations	17,354	17,352	17,354	17,352	17,354	17,352	17,354	17,352
R^2	-	-	-	-	0.191	0.192	0.191	0.191

Reported probit and re probit regression results are marginal effects.

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