The Effect of Exchange Rate Risk on Foreign Trade

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Abstract: *This paper explores the effect of exchange rate volatility on international trade flows of European Union Member States by applying a model of a monthly balance panel between 2002 and 2017.*
Starting from a general modified weighted model, we added some control variable to measure the good governance.
After a general analysis of all the European Union countries, we focus on the response of the trade on different partner regions, or various trade goods. By using country fixed effect model, we find that there is an adverse effect of the exchange rate volatility on trade flows for the European Union countries with small differences depending on partner region or the type of the goods trade.
Regarding the Governance Indicators we obtain different results, most of them having negative effect but with different statistically significance.

Keywords: *exchange rate risk; foreign trade; governance indicators; European Union.*

1. Introduction

The fixed exchange rate system agreed after the World War II breakdown in 1973. This causes a larger volatility on both nominal and real exchange rates. This fluctuations in exchange rates leads to a numerous researches of the effect of the exchange rate risk on various economical activities, among them on international trade.

As there have been major developments in the world economy since the last and more appropriate models, it is necessary to revisit the issue.

Some of the developments would appear to growth the risk in exchange rates as the liberalization of capital flows in the last twenty years and the increase in the cross-border transactions implying an increased exchange rate movements.

Transition economies are the most vulnerable on high exchange rates movements and the integration of the Europe's former communist countries to a market-based system lead to major adjustments in their exchange rates.

Other changes may have reduced the impact of exchange rate risk like the proliferation of financial hedging instruments over the last decades could reduce vulnerability to risks arising from volatile currency movements.

Also, the recent economic crisis shed light on the importance of institution explaining trade flows[1]. Thus, in this much-discussed relationship between trade and exchange rate volatility/risk, is now important to take intro account other control variables like the governance indicators. On the other side, the integration process of some Central and Eastern European countries with the European Union supported and accelerated the transformation through the existing European Union criteria and financial support. As a consequence the Central and Eastern European countries have come a long way in terms of good governance over time.

Most of the studies are focused on estimating exchange rate volatility effects on international trade of developed countries, especially in the United States (U.S.) as well as on specific developing regions from all over the world.

Even though the literature finds analysis on Western European countries or countries that formed the European Union at that time, no special emphasis was placed on the 28 countries currently forming the European Union.

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[1] Daniela Antonescu, *Dezvoltarea regională. Teorie și practică*, Editura Lumen, Iași, 2018, pp. 49-66.

Nowadays, the economies of the countries integrated in the European Union haven't a certain homogeneity, some of them still being in a transition economy or it wasn't integrated in the European Monetary Union. None of the studies investigated specifically the effect of effective exchange rate for the present structure of 28 countries members in European Union.

The objective is to determine the effect of exchange rate volatility on international trade flows therefore, this paper aims to fill this gap by estimating this effect on European Union member states and how is affected this causality through institutional environment. With the integration in European Union of the european transition countries from the Central and Eastern Europe, I explore the hypothesis that the effective exchange rate volatility negatively affect the foreign trade and through institutional framework, an increase in the governance indicators positively affect teh trade flows.

The results are generaly the same as those depicted from literature. By using country fixed effect model, we find that there is an adverse effect of the exchange rate volatility on trade flows for the European Union countries with small differences depending on partner region or the type of the goods trade.

Regarding the Governance Indicators I obtain intriguing results, most of them having negative effect but with different statistically significance.

The analyses doesn't take into account any instrumental variable or to insist to solve the endogeneity problems thus, the results obtained are limited but let the door open for future analysis.

2. Methodology

This study is based on the generalized gravity equation derived from the trade theory. In the traditional gravity model trade flows are explained by the economic size of the trading partners and the distance between them. Because the trade data gathered are not billateral one, but with different partners (economic regions), the gravity model has changed consequently (similar to a country–pair fixed effects on generalized gravity model).

Also, we have added the governance indicators ni the model as control variables. Even if we started the model with all of them together, the analisys will decide the best fitted model.

The general model formula is :

$$ltrade_{it} = \alpha + \beta_1 vol_{it} + \beta_2 lgdppc_{it} + \beta_3 gdp_{it} + \beta_4 pop_{it} + \beta_5 larea_i + \beta_6 voiceacc_{it} +$$

$$\beta_7 polstab_{it} + \beta_8 goveff_{it} + \beta_9 regqual_{it} + \beta_{10} rulelaw_{it} + \beta_{11} contcorr_{it} +$$

$$\beta_{12} crisis_t + \beta_{13} euro_{it} + C_i + T_t + \varepsilon_{it}$$

where :

$ltrade_{it}$ – denotes the logarithm of the real value of the country i trade at time t;

vol_{it} – denotes the volatility (risk) of the billateral exchange rate of the country i at time t;

$lgdpcc_{it}$ – denotes the logarithm of the product of real GDP per capita of country i at time t;

gdp_{it} – denotes the GDP at market prices of country i at time t;

pop_{it} – denotes the population of country i at time t;

$larea_i$ – denotes the logarithm of the land area of country i;

$voiceacc_{it}$ – denotes the governance indicator - Voice and Accountability of country i at time t;

$polstab_{it}$ – denotes the governance indicator - Political Stability and Absence of Violence/Terrorism of country i at time t;

$goveff_{it}$ – denotes the governance indicator - Government Effectiveness of country i at time t;

$regqual_{it}$ – denotes the governance indicator - Regulatory Quality of country i at time t;

$rulelaw_{it}$ – denotes the governance indicator - Rule of Law of country i at time t;

$contcorr_{it}$ – denotes the governance indicator - Control of Corruption of country i at time t;

$crisis_t$ – is a dummy variable taking the value of 0 on the world crisis period of time t (2008-2010) and 1 otherwise;

$euro_{it}$ – is a dummy variable taking the value of 0 when the country i has euro currency at time t and 1 otherwise;

C_i – denote the country i specific dummy;

T_t – denote the time t specific dummy;

ε_{it} – denote the error term.

3. Empirical data and analysis

The data for the trade flow, exchange rate and other economical and geographical data has been gathered from the European Union statistical office - Eurostat. The data for the Worldwide Governance Indicators has been gathered from the World Bank Group.

Trade flow - The trade flow data is represented by the monthly gross value in euro of each EU country, differentiated on the following criteria :
  a) Type of trade flow
      - Imports
      - Exports
  b) Trade partner
      - EU countries with euro currency
      - All members of the European Union
      - All countries of the world
  c) Type of products classified after the Broad Economic Categories (BEC) :
      - Capital goods
      - Consumption goods
      - Intermediate goods
      - Total goods

For the model will be taking into account the sum of the imports and exports for different trade partners and BEC classification goods.

Effective Exchange Rate (EER) - The effective exchange rate data is represented by the monthly index related to 2010, differentiated on the following criteria :
  a) Type of exchange rate
      - Nominal Effective Exchange Rate (NEER)
      - Real Effective Exchange Rate (REER)

  b) Different trade-weighted baskets of competitor countries
      - Euro-area Member States – 19 countries
      - European Union Member States – 28 countries
      - European Union Member States plus other nine industrial countries

- European Union Member States plus other fourteen industrial countries

Volatility of Effective Exchange Rate - For the calculus of the Nominal/Real exchange rate volatility we take into account the monthly standard deviation of the last past 3, 6 or 12 months.

Gross Domestic Product per capita - The anually data is represented by the real volume of GDP per capita measured in euro per capita.

Gross Domestic Product - The anually data is represented by the Gross domestic product at market prices measured in million euro.

Population - The anually data is represented by the Total Population of the country in thousand persons.

Area - The data is represented by the Total Land Area of the country in square kilometre.

Governance indicators - The anually data is represented by all six indicators which are ranging from -2,5 to 2,5. The definitions are from the official Worldwide Governance Indicators site.

Countries - The countries are all 28 countries Members of the European Union.

Time - The panel data consist especially (for the principal variables as trade and volatility) on monthly values from january 2002 to december 2019 period. For the other time variant variables, the data are anually.

In Table 1, it is obviously that a specific trend arises depending on the types of goods trade as well as depending on the trade partner. The trade increase, for all partners, as the types of goods changes from capital to consumption and ending with the intermediate goods. Also is notable that intermediate goods are almost a half from total trades, thus this types of goods are the major ones in European Union countries.

Depending on trade partner, can be seen a normal increasing trend from non-euro countries to total trade (with all countries of the world), but the proportion in volume lead to some evidence of European Union trade :

- the trade with the countries having euro currency (19 countries) is triple as for the countries don't integrated in Monetary Union (9 countries);
- the trade inside the European Union lies between 60 to 65% of total trade;

Table 1.
Summary statistics for trade on different type of good and trade partners in million euro.

Statistics / Variable	No. of observations	Mean	Standard deviation	Minimum	Maximum
Capital goods trade with non-euro countries	5.376	574,53	972,03	2,7	7.824,9
Capital goods trade with euro countries	5.376	1.721,81	2.324,77	10,5	13.028,2
Capital goods trade with EU countries	5.376	2.296,34	3.229,59	16,2	20.853,1
Capital goods trade with all of the world countries	5.376	3.886,61	5.947,28	22,3	39.538,0
Consumption goods trade with non-euro countries	5.376	839,42	1.103,71	11,0	9.128,6
Consumption goods trade with euro countries	5.376	2.748,50	3.446,91	36,8	17.668,5
Consumption goods trade with EU countries	5.376	3.587,93	4.459,55	52,0	26.797,2
Consumption goods trade with all of the world countries	5.376	5.190,37	6.765,35	70,2	39.431,1
Intermediate goods trade with non-euro countries	5.376	1.854,05	3.059,24	9,9	23.637,1
Intermediate goods trade with euro countries	5.376	6.256,70	8.187,03	45,5	45.544,2
Intermediate goods trade with EU countries	5.376	8.110,75	11.007,75	56,9	69.181,3
Intermediate goods trade with all of the world countries	5.376	12.827,12	17.758,88	96,5	109.534,8
Total goods trade with non-euro countries	5.376	3.614,98	5.732,05	32,7	45.486,7

Total goods trade with euro countries	5.376	11.726,56	15.207,66	122,0	84.401,9
Total goods trade with EU countries	5.376	15.341,54	20.511,43	156,4	129.888,7
Total goods trade with all of the world countries	5.376	23.795,61	33.246,12	247,7	211.288,3

In Table 2, the dummy variables reflect the changes during this period of time (2002-2019) and even there are now 19 countries with euro currency, the mean of 0,45 reflect that most of the changes happened in the last years. Also the crisis period dummy reflect the windows of time choosed for 3 years from 2008 to 2011.

Table 2.
Summary statistics for other variables.

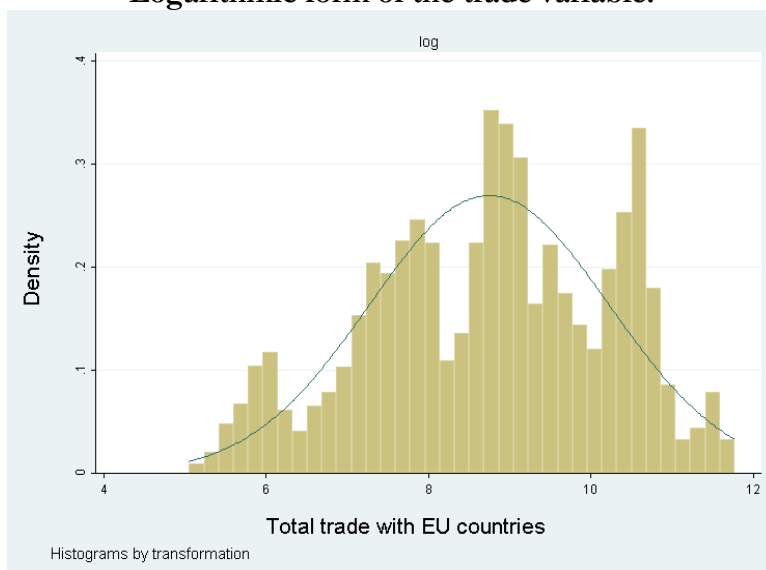| Variable \ Statistics	No. of observations	Mean	Standard deviation	Minimum	Maximum
GDP per capita in thousand euro	5.376	24,24	15,79	3,40	84,40
GDP in thousand billion euro	5.376	0,46	0,71	0,00	3,26
Population in million persons	5.376	17,92	22,66	0,40	82,68
Area in million Km²	5.376	0,16	0,17	0,00	0,67
Countries with euro dummy	5.376	0,45	0,50	0,00	1,00
Crisis period dummy	5.376	0,81	0,39	0,00	1,00

The values from Table 3 reflect also the strenghtness of the European Union, especially on those indicators important for such a partnership like voice and accountability and regulatory quality. There are almost positive even if in the European Union exist also some developing countries especially from Central and Eastern European region who experienced significant changes in public governance during the economic transition.

Table 3.
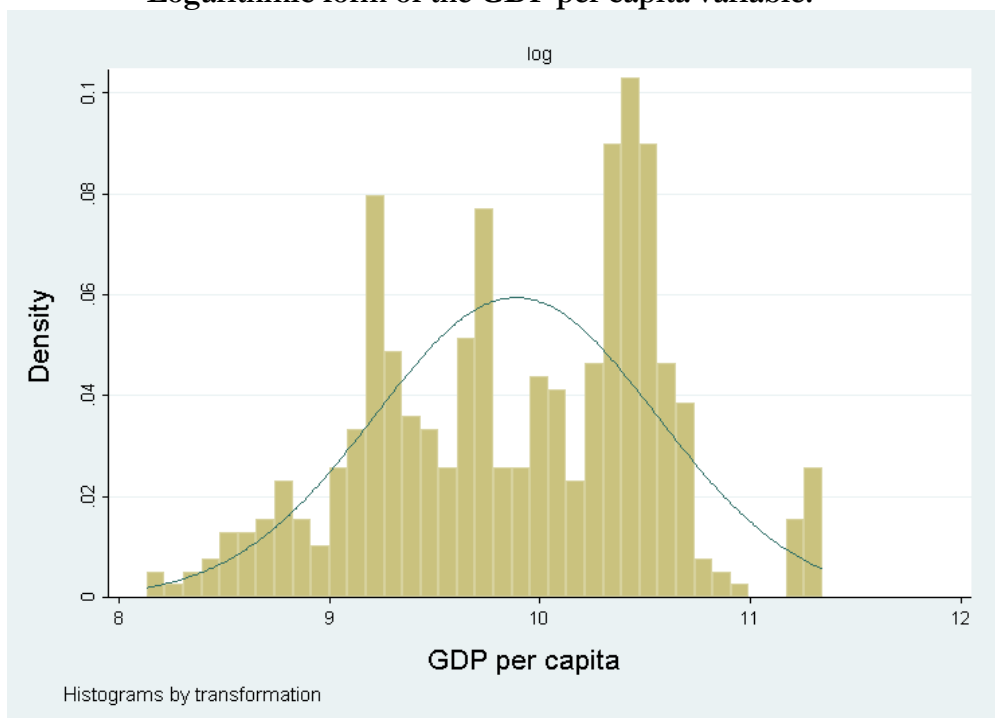**Summary statistics for governance indicators.**

Statistics / Variable	No. of observations	Mean	Standard deviation	Minimum	Maximum
Voice and Accountability	5.376	1,12	0,33	0,30	1,80
Political Stability and Absence of Violence/Terrorism	5.376	0,77	0,41	-0,50	1,80
Government Effectiveness	5.376	1,14	0,60	-0,40	2,40
Regulatory Quality	5.376	1,21	0,44	0,00	2,00
Rule of Law	5.376	1,13	0,61	-0,30	2,10
Control of Corruption	5.376	1,04	0,79	-0,40	2,50

According to other model strudied and analysing the data, is necessary to transform some of the variables in a logarithmic form. In Graph 1 and 2 can be seen the logarithmic form of the trade and GDP per capita.

Graph 1.
Logarithmic form of the trade variable.

Graph 2.
Logarithmic form of the GDP per capita variable.

To achieve the best fitted model, we been conducted some test including all the variables.

To avoid heteroskedasticity, the regression has been conducted for robustness.

In Table 4 are presented the results of no robust/robust regression of a country fixed or random effects.

Using country fixed or random effect, some variables must be eliminated. The land area, a fixed variable for each country are the same during the period make it unusable for a country fixed effect (due to coliniarity). Also the weighted variables used in most billateral models are not suitable all of them in our case when we use country fixed or random effect. GDP per capita, GDP and population are dependent to each other, so we decided to eliminate population variable from our model.

Table 4.
Results on different regressions for robustness and country effects.

Regression / Variable	Fixed effects	Random effects	Robust fixed effects	Robust random effects
Logarithm of GDP per capita	4,454***	4,450***	4,454***	4,450***
	(0,057)	(0,057)	(0,455)	(0,453)
12 month volatility of NEER with EU countries	-0,027***	-0,027***	-0,027***	-0,027***
	(0,003)	(0,003)	(0,009)	(0,010)
GDP in thousand billion euro	0,378***	0,368***	0,378***	0,368***
	(0,029)	(0,028)	(0,113)	(0,108)
Population in million persons	-0,020***	-0,017***	-0,020	-0,017
	(0,004)	(0,004)	(0,015)	(0,015)
Area in million Km²		4,482***		4,482**
		(1,253)		(1,997)
Voice and Accountability	-0,232***	-0,233***	-0,232***	-0,233***
	(0,025)	(0,025)	(0,065)	(0,065)
Political Stability and Absence of Violence/Terrorism	0,039***	0,039***	0,039	0,039
	(0,012)	(0,012)	(0,043)	(0,043)
Government Effectiveness	-0,124***	-0,122***	-0,124*	-0,122*
	(0,017)	(0,017)	(0,064)	(0,063)
Regulatory Quality	-0,241***	-0,239***	-0,241***	-0,239***
	(0,019)	(0,019)	(0,070)	(0,070)
Rule of Law	0,321***	0,319***	0,321***	0,319***
	(0,022)	(0,022)	(0,114)	(0,113)
Control of Corruption	-0,200***	-0,200***	-0,200***	-0,200***
	(0,017)	(0,017)	(0,057)	(0,057)
Crisis period dummy	0,028***	0,028***	0,028*	0,028*
	(0,005)	(0,005)	(0,015)	(0,015)
Countries with euro dummy	-0,190***	-0,190***	-0,190***	-0,190***
	(0,009)	(0,009)	(0,064)	(0,064)
Constant	-9,606***	-10,356***	-9,606***	-10,356***
	(0,265)	(0,375)	(2,035)	(1,772)
Number of observations	5376	5376	5376	5376
R²	0,14	0,14	0,90	0,14

Notes: ***/**/* statistically significant, respectively at 1%, 5% and 10% levels

To analyse also if an ordinary least square regression is suitable we test for random effects with Breusch-Pagan Lagrange multipliers test. From the results of the test we obtain $p<0,01$ (for 99% confidence interval) so we reject the null hypothesis and conclude that random effect is appropriate for our model. This is evidence of significant differences across countries.

To choose between a country fixed or random effect has been conducted the Hausman Test. Because $p<0,01$ (for 99% confidential interval), we reject the null hypothesis which suppose that the difference in coefficients are not systematic. So, the best fitted model is using the country fixed effects instead of a random one.

Having a time panel, we also conduct the test for time fixed effect. Because $p<0,05$ we reject the null hypothesis that the coefficients for all years are jointly equal to zero, therefore time fixed effect are needed for our model.

In Table 5 are presented the results using the country fixed effects and country-time fixed effects. There are a notable changes in coefficients but also in the significance of some of them. On country-time fixed effects the estimation results show an F or chi^2 model statistic reported to be missing. The program has done that so as to not be misleading, not because there is something necessarily wrong with the model.

Having a panel data with 28 countries and 191 periods of time, bigger than the clustered variable, the results cannot be tested against a zero value coefficients.

Is also important that for the common variable, that explain the effect between trade and exchange rate risk, the coefficients are kept with the correct sign and still significant.

For the crisis variable is notable that will cannot be used in a time fixed effect, being omitted due to coliniarity.

Despite the results of time fixed effect test, we will use further on the time fixed effects in interpreting and compairing the results.

Table 5.
Results on country and country-time fixed effects.

Regression " Variable	Country fixed effects	Country-Time fixed effects
Logarithm of GDP per capita	4,511*** (0,447)	3,256*** (0,413)
12 month volatility of NEER with EU countries	-0,029*** (0,010)	-0,020** (0,009)
GDP in thousand billion euro	0,292*** (0,076)	-0,082 (0,074)
Voice and Accountability	-0,231*** (0,066)	-0,102 (0,075)
Political Stability and Absence of Violence/Terrorism	0,039 (0,044)	0,114** (0,049)
Government Effectiveness	-0,104* (0,061)	0,047 (0,047)
Regulatory Quality	-0,232*** (0,072)	-0,091 (0,064)
Rule of Law	0,305** (0,113)	0,159 (0,107)
Control of Corruption	-0,191*** (0,056)	-0,084 (0,070)
Crisis period dummy	0,028* (0,015)	-0,393*** (0,049)
Countries with euro dummy	-0,185*** (0,064)	-0,085 (0,050)
Constant	-10,188*** (1,884)	-5,104*** (1,716)
Number of countries	28	28
Number of observations	5376	5376
R^2	0,14	0,10

Notes: ***/**/* statistically significant, respectively at 1%, 5% and 10% levels

5. Results and discussions

In Table 6 are presented the results using country fixed effects on nominal and real effective exchange rate risk.

The results that despite what risk will take into account, nominal or real effective exchange rate, the variables keep their sign and remain significant in 95% confidential interval. For both cases „political stability" does'n has statistical significance and „government effectiveness" remain in 90% confidential interval.

Table 6.
Results on country-fixed effects for NEER/REER.

Variable / Regression	NEER	REER
Logarithm of GDP per capita	4,511*** (0,447)	4,614*** (0,431)
12 month volatility of NEER with EU countries	-0,029*** (0,010)	
12 month volatility of REER with EU countries		-0,019** (0,007)
GDP in thousand billion euro	0,292*** (0,076)	0,280*** (0,077)
Voice and Accountability	-0,231*** (0,066)	-0,237*** (0,069)
Political Stability and Absence of Violence/Terrorism	0,039 (0,044)	0,033 (0,045)
Government Effectiveness	-0,104* (0,061)	-0,108* (0,062)
Regulatory Quality	-0,232*** (0,072)	-0,221** (0,081)
Rule of Law	0,305** (0,113)	0,317*** (0,113)
Control of Corruption	-0,191*** (0,056)	-0,196*** (0,056)
Crisis period dummy	0,028* (0,015)	0,036** (0,015)
Countries with euro dummy	-0,185*** (0,064)	-0,177** (0,065)

Constant	-10,188*** (1,884)	-10,642*** (1,820)
Number of countries	28	28
Number of observations	5376	5376
R^2	0,14	0,14

Notes: ***/**/* statistically significant, respectively at 1%, 5% and 10% levels

The interpretation of the main variable results is that for an increase of one units in the nominal effective exchange rate risk will lead to a decrease in the trade flows of 2,9%. Also is for the real effective exchange raterisk, but the decrease in the trade flow is of 1,9%. The smaller effect in the real exchange rate risk than for the nominal one is that for internation trade flows, the partners are more careful to the change of this rate which reflects its relative position in terms of price and cost competitiveness.

Regarding the GDP per capita, an increase of 10% in its value will lead to an increase in trade flows of 45,11%. Also for the GDP, an increase of 1 thousand billion euro in its value will lead to an increase of 29,2% in the trade flows.

Regarding the governance indicators we obtain intriguing results. For the statistical significant indicators the sign is negative (except for the "rule of law" indicator) despite the general literature who consider a positive effect on the trade flow. Even if it is consider that an increasing in the good governance index will lead to an increase in trade flows, this concept will fit more on less developed countries facing great problems over time in social, political and administrative issues. For developed countries, this are no problem anymore and a more restrictive governance that will lead in an increase of these indices will also restrict the partnership with other countries, as in our case, in trade flows.

The interpretation for the "rule of law" index is that for an increase with one point in this governance indicator will lead to an increase in trade of 30,5%. The differences relative to nominal or real effective exchange rate risk case are very smaller showing some independence from these.

Another intriguing results on these indicators is that all of them are positively correlated to trade and main variable but changing their sign in the

model. It can be a sign of diminishing causality but also of the smoothness in time of such variables leading to interpret them as a categorical or dummy variable.

The crisis and euro dummy variables has the expected sign thus avoiding that period of time when financial crisis strike, the trade flows increases. Also for the countries which are not still in the euro zone, the trade flows are smaller than in the euro currency countries. Relative to the risk, the real effective exchange rate increase the crisis dummy variable being the most affected rate during the financial crisis instead of a change-restricted nominal one. The euro dummy has the same trend of decreasing for effective real exchange rate risk than in case of the nominal one being the rate reflecting more the international trade flows trends.

Regarding the crisis event window is important to be analyzing more carefully due to the shifting response of the market, administrations or different partners.

In Table 7 are presented the results differentiated on import or export. The sign hasn't been change and the decreasing trend from nominal to real effective exchange rate are the same revealing an increasing negative effect on exports.

Table 7.
The effect of nominal/real effective exchange rate risk on imports/exports.

Regression Variable	Import	Export	Import	Export
Logarithm of GDP per capita	4,622*** (0,380)	4,239*** (0,557)	4,714*** (0,373)	4,596*** (0,398)
12 month volatility of NEER with EU countries	-0,024*** (0,008)	-0,037*** (0,014)		
12 month volatility of REER with EU countries			-0,015** (0,006)	-0,026** (0,010)
GDP in thousand billion euro	0,355*** (0,072)	0,218** (0,094)	0,345*** (0,073)	0,204** (0,096)
Voice and Accountability	-0,192*** (0,068)	-0,320*** (0,104)	-0,198*** (0,071)	-0,328*** (0,106)

Political Stability and Absence of Violence/Terrorism	0,014 (0,037)	0,072 (0,086)	0,010 (0,037)	0,064 (0,088)
Government Effectiveness	-0,130** (0,056)	-0,103 (0,105)	-0,133** (0,057)	-0,109 (0,106)
Regulatory Quality	-0,118 (0,070)	-0,406*** (0,095)	-0,110 (0,077)	-0,392*** (0,106)
Rule of Law	0,222** (0,096)	0,429** (0,168)	0,232** (0,096)	0,444** (0,169)
Control of Corruption	-0,136** (0,059)	-0,266*** (0,070)	-0,140** (0,058)	-0,272*** (0,071)
Crisis period dummy	0,030** (0,014)	0,034 (0,020)	0,038*** (0,013)	0,043* (0,022)
Countries with euro dummy	-0,159*** (0,055)	-0,243** (0,112)	-0,153** (0,055)	-0,234** (0,113)
Constant	-11,429*** (1,585)	-9,551*** (2,422)	-11,839*** (1,557)	-10,105*** (2,318)
Number of countries	28	28	28	28
Number of observations	5376	5376	5376	5376
R^2	0,14	0,18	0,14	0,18

Notes: ***/**/* statistically significant, respectively at 1%, 5% and 10% levels

In Table 8 and 9 are presented the results differentiated on how was calculated the volatility as standard deviation on 3 months, 6 months or 12 months basis. The sign hasn't been change and the decreasing trend from nominal to real effective exchange rate are the same revealing an increasing negative effect on a 3 months computing basis.

Table 8.
The effect of nominal effective exchange rate risk on different
calculation of volatilities.

Regression / Variable	3 months volatility	6 months volatility	12 months volatility
Logarithm of GDP per capita	4,632*** (0,366)	4,588*** (0,437)	4,511*** (0,447)
3 month volatility of NEER with EU countries	-0,036** (0,015)		
6 month volatility of NEER with EU countries		-0,033*** (0,012)	
12 month volatility of NEER with EU countries			-0,029*** (0,010)
GDP in thousand billion euro	0,283*** (0,079)	0,284*** (0,078)	0,292*** (0,076)
Voice and Accountability	-0,237*** (0,070)	-0,232*** (0,068)	-0,231*** (0,066)
Political Stability and Absence of Violence/Terrorism	0,039 (0,044)	0,037 (0,044)	0,039 (0,044)
Government Effectiveness	-0,104* (0,061)	-0,106* (0,061)	-0,104* (0,061)
Regulatory Quality	-0,228*** (0,078)	-0,226*** (0,077)	-0,232*** (0,072)
Rule of Law	0,312** (0,116)	0,310** (0,115)	0,305** (0,113)
Control of Corruption	-0,195*** (0,056)	-0,195*** (0,056)	-0,191*** (0,056)
Crisis period dummy	0,041*** (0,014)	0,035** (0,014)	0,028* (0,015)
Countries with euro dummy	-0,180*** (0,065)	-0,181*** (0,065)	-0,185*** (0,064)
Constant	-10,732*** (1,827)	-10,531*** (1,841)	-10,188*** (1,884)
Number of countries	28	28	28
Number of observations	5376	5376	5376

R^2	0,14	0,14	0,14

Notes: ***/**/* statistically significant, respectively at 1%, 5% and 10% levels

Table 9.
The effect of real effective exchange rate risk on different calculation of volatilities.

Regression Variable	3 months volatility	6 months volatility	12 months volatility
Logarithm of GDP per capita	4,659*** (0,429)	4,640*** (0,429)	4,614*** (0,431)
3 month volatility of REER with EU countries	-0,029** (0,011)		
6 month volatility of REER with EU countries		-0,024*** (0,009)	
12 month volatility of REER with EU countries			-0,019** (0,007)
GDP in thousand billion euro	0,280*** (0,080)	0,279*** (0,079)	0,280*** (0,077)
Voice and Accountability	-0,241*** (0,070)	-0,236*** (0,069)	-0,237*** (0,069)
Political Stability and Absence of Violence/Terrorism	0,037 (0,044)	0,035 (0,044)	0,033 (0,045)
Government Effectiveness	-0,105 (0,062)	-0,107* (0,061)	-0,108* (0,062)
Regulatory Quality	-0,226*** (0,080)	-0,224*** (0,081)	-0,221** (0,081)
Rule of Law	0,318** (0,116)	0,317*** (0,114)	0,317*** (0,113)
Control of Corruption	-0,198*** (0,056)	-0,198*** (0,056)	-0,196*** (0,056)
Crisis period dummy	0,043*** (0,014)	0,040*** (0,014)	0,036** (0,015)
Countries with euro dummy	-0,178** (0,065)	-0,178** (0,065)	-0,177** (0,065)

Constant	-10,843*** (1,804)	-10,758*** (1,808)	-10,642*** (1,820)
Number of countries	28	28	28
Number of observations	5376	5376	5376
R^2	0,14	0,14	0,14

Notes: ***/**/* statistically significant, respectively at 1%, 5% and 10% levels

6. Conclusions

As a general conclusion, the effective exchange rate risk has a negative effect on trade in both cases, nominal or real, revealing as most of the studies concludes that as the risk increase there are a decrease in trade flow.

All the models revealed also a decreasing negative effect of the real effective exchange rate risk over the nominal one being more appropriate rate in the trade relationships.

The depreciation of effective exchange rate could deteriorate also the trade balance, more visible in the developing countries due to high import and a lack of export capacity. For the transition countries is important to have a monetary stability and using the volatility of the exchange rate to stimulate the export could disturb trade equilibrium. Its important to use other policy tools like increasing productivity, consumption of domestic goods. However prior taking a policy decision must be done an enhanced analysis for each country.

In Clark et all. (2004), the members of currency unions trade more than triple aparently from a reduction in exchange rate volatility, but in our case this difference is quite smaller being related to only EU countries. As the trade partnership enlarge, the difference increase but loose their statistical significance.

Regarding the euro zone dummy, the results confirm Dell' Ariccia (1999) that it has a positive effect on trade.

The results also revealed the importance of the type of goods trade or the trade partner being necessary to complete the investigation with other possible variables differentiated on trade or partners.

Not all the governance indicators fitted to our model like political stability or the rule of law. For those indicators which has a negative impact on trade flow an appropriate conclusion is that for most european countries and in a common institutional, political and administrative like European Union is, an increase in this indicators seem to have more restrictive effect on trade, thus decreasing the flow.

Also, the time window of the crisis chosen may have play an important role in the results which can be improved by an enhanced analysis in possible delayed response times.

The model has shown his limit to the time fixed effect and also not using any instrumental variables so the model hasn't been checked to possible endogeneity problems. This lets the door open for future and enhanced analysis.

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