Effect of Euro Adoption on the Producer Welfare

and Foreign Trade of Slovakia

By

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Motivation

I had the opportunity to work as an intern at the Research Division, National Bank of Slovakia, Bratislava during the period of June 22 to June 31, 2015. I worked on the topic of Euro adoption while working there. I found the topic common currency and its potential impact very interesting due to the appeal of a common currency in the different region. I could not produce a complete study there due to the constraint of time. But I was highly interested and motivated in exploring the topic and to see the impact of common currency. Therefore, I decided to investigate the impact of the euro on the economy of Slovakia as Part of my master's thesis.

Secondly, due to my interest on the topic, I am now considering to study on the potential monetary and currency union in south Asia. And this study will act as a pathway to my future studies.

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Abstract

This study examines the micro and macro level effect of euro adoption in the economy of Slovakia. I investigate producer level effect of euro adoption in Slovakia using wage dynamics survey data through order probit model. I have found euro effect is positive for the foreign and large firm and export-oriented firms are more benefited from euro adoption.

In the second part of the study, I examine the effect of the euro on foreign trade using standard gravity equation with fixed effect model. The study builds a panel data set comprising bilateral trade data of 20 major partnering countries of Slovakia for the period of 2003 to 2014. The estimated coefficient of euro dummy found as positive and statistically significant at 10 percent level. Thus, participation in the euro zone is associated with the expansion of foreign trade of Slovakia.

JEL Classification: F45, F15, J51

Keywords: Euro, Slovakia, Firms, Export, Import

1. Introduction

The effect of the common currency is either positive or negative or even there is no impact is very important policy question. Scholars argued that countries with the largest export would expect to have a substantial positive effect due to the adoption of Euro. Under the Maastricht Treaty, all the EU member countries are obliged to adopt euro once they fulfill the required criteria except Denmark and United Kingdom which have a negotiation to remain outside of the Eurozone. Slovakia fulfilled the Maastricht convergence criteria of euro adoption and became a member of the eurozone on 2009 to fill the commitment as EU member state (EuropeanCommission, 2009). The country has a larger share of export and euro adoption is expected to be beneficial for the businesses, and the majority of the citizen of the country. Studies on monetary union found that countries who share the same currency in trade gain three times more than the country with different currency (Rose, 1999). The benefits of monetary union mostly appear through the trade channel rather other monetary or macro mechanism. The study shows that country will experience rising of approximately one-third of GDP per capita in twenty years in the case of increase 1% of trade with same currency (Frankel and Rose, 2000). Rose and Engel (2002) further argue that member of the currency union is likely to have more trade and comparative stable exchange rate regime.

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Suster (2006) argued adoption of Euro will save cost especially the cost of the transaction and remove associated risk of exchange rate thereby enhancing international trade in the country. Slovakia has recorded foreign trade 160 percent of its GDP and above 80 percent of its trade with European economies settling in euros. Therefore, firms and individuals those who are involved in foreign trade and financial transaction do not need to buy euros or sell it for their transaction even

if entities experience both expenditure and revenues at the same time in Euros then they can only exchange net difference which is reducing the cost of the transaction further. (Šuster, 2006). He further argued that adoption of Euro will further enhance foreign direct investment and it will boost the economy of Slovakia. Moreover, Entry to Eurozone would widen the macro stability of the economy which helps to draw more attention from foreign investors.

In contrast, few studies have specifically examined the impact and relationship of a common currency in micro level. Common currency reduces the firm level uncertainty of nominal exchange rate which fosters the volume of trade by the firm as well it promotes new firms to enter the market. The total share of Slovak export to EU has risen from 0.98 % in 2007 to 1.18 % in 2012 (commission, 2013).

The issue of common currency effect has received considerable attention to the scholar. The country Slovakia has passed a longer time under euro regime, however, this could be a good time to examine the impact of euro on the economy of Slovakia and to what extents the common currency created benefit to the firms of the economy. There is hardly found any academic study which evaluates the consequence of euro adoption in the economy of Slovakia. Consequently, it is important and rational to examine the relationship between euro as a common currency and the performance of economy from macro and micro perspective.

Therefore, this study is designed to explore the relationship between the introduction of the euro and economic performance of companies and the condition of foreign trade of Slovakia. The second chapter of the paper visited relevant existing studies which have already done in the light of the benefit of common currency. The third chapter outlines the methodology and estimation technique of the study. The fourth chapter investigates the impact of euro adoption on the producer welfare in the country. The fifth chapter presents the findings of the analysis of the effect euro on the foreign trade of Slovakia. Sixth chapter begins by laying out conclusion and the policy recommendation for the economy of Slovakia and chapter draws a conclusion based on the findings of the analysis.

2. Literature Review

There has been an inconclusive debate about the impact of a common currency among the scholars on the topic. The introductory part of this section provides a brief overview of the theory of currency union in the light of the benefits of the common currency. It then goes on to describe the empirical study that has already been done in the context of Slovakia as well as other eastern European economies.

Robert Mundell (1960) is the early scholar expressed the theory of optimal currency Area (OCA), Mundell argued increasing number of trade is one of the principle benefits when two countries make a currency union. However, critics have also argued that Mundell's theory of OCA based on 'a no econometric evidence' and researcher did not get robustness for the negative effect of exchange rate and trade flow volatility (Taglioni, 2008, p.11).

In a cross-country panel study, Rose (2000, p.1) discovered common currency and stability in exchange rate were powerful instruments to accelerate trade. Rose found that 'two countries with the same currency trade perhaps three times more than comparable countries with their own currencies'. Ross's estimations are found statistically robust. In another study Rose and van Wincoop (2001) have also found the same result using similar data set. Suster (2006) contends

Rose's findings and argued currency union enhances trade through reducing transaction cost and removing the risk of exchange rate volatility.

Nevertheless, Cieslik et. al (2012) criticized the findings of Rose by arguing that result of Rose may be overestimated due to the endogeneity and bias in sample selection in a monetary union. Barr et al. (2003) solved the endogeneity problem through an instrumental variable in examining the impact of EMU on EU and EFTA countries. This study found six percent increase of trade which is much lower than the estimation of Rose. But common currency increases trade in EMU is almost undisputed acknowledged by the scholars (Ross, 2001).

The benefits of monetary union mostly appear through the trade channel rather other monetary or macro mechanism. The study shows that country will experience rising of approximately one-third of GDP per capita in twenty years in the case of increase 1% of trade with same currency (Frankel and Rose, 2000). Similarly, IMF (2015) argued that euro adoption would have two important benefits a. It would generate trade which would act to enhance the growth of the country. Based on the estimate of Frankel and Rose, IMF further claimed that euro adoption in new member states in central Europe would generate 10 to 20 percent more real GDP in twenty years period. At the same time, IMF acknowledges that it is not entirely clear what mechanism will generate this large effect, but the elimination of transaction cost and exchange rate uncertainty could explain a minor reason. Secondly, euro will improve the perceived risk of the country in two way i.e. through the risk of exchange rate risk and through the facility of lender of last resort provided by European Central Bank in an international reserve currency (John Bluedorn, 2015).

The possible risk for a country of introducing euro is to cope with the asymmetric demand shocks without having independent monetary measures. However, Common currency enables the monetary authority like ECB to adopt more pragmatic monetary policy due the more stable money demand in the wider region under complete financial liberalization and openness of capital market (Bofinger, 1994 as cited in Horvath, 2004). On the other hand, new member states have limited scope to manage the demand as well as the real shock arise or prevail in the economy. The cost of currency union depends on the nature of shock a member country is facing (Horvath, 2004). Mundell argues that if countries face symmetric shock then the overall response of union will suffice and it would not create any additional burden to the individual economy but in case of shock is asymmetry then an overall response of currency union would create a harmful impact on the economy. However, Optimality of currency union is still debatable, McKinnon (1963) argues optimum currency area need to have three sustained characteristics e.g. full employment, price stability, and external account balance.

There is a few literature particularly finds the micro level impact of common currency. Common currency reduces firm uncertainty about the volatility of nominal exchange rate risk that would lead the volume of cross-border trade by the firm. In a setup of heterogeneous firm Melitz (2003) finds the export value of firms increase when the total variable cost of trade decrease and new firms join into the export market (Fontagné, 2008). Baldwin and Taglioni (2004) made an experiment on single goods exporting firm and found that if the uncertainty related to nominal exchange rate reduces, firm's exports more and new exporter entry into the market. Bernard et al. (2006) found similar findings in a study on multi-product companies, a reduction of trade variable cost enables the company to go for the export market and it increases the volume of goods produced by each company.

In contrast, Di Mauro et. al. (2009) found that lower trade cost compels less productive companies to go out of business due to the high degree of competition in international market. But the competition in the market lowers the prices and increases the average productivity. They found

that euro has enhanced the overall competitiveness of the firm within Eurozone but it differs along the member states as well as the type of firms and its specializations.

Slovak national bank identifies several direct benefit of euro adoption in the perspective of Slovakia. Due to the openness of the economy and joining into EU, the volume of trade between Slovakia and EU member states have been increased largely. In addition to that euro, adoption eliminates the transaction costs in euro transactions and transaction cost in administration and accounting. Furthermore, common currency removes the risk of the exchange rate in a business transaction and it ensures higher price transparency. The common currency indirectly brings benefit through attracting foreign direct investment in the economy, enhancing international trade thus promoting GDP growth of the country (Šuster, 2006).

Some studies have examined the effect of euro adoption on the central European countries, the studies are mainly focused on ex-ante trade effect, there is virtually no ex-post evaluation of trade effect in the perspective of central and eastern Europe. Maliszewska (2004) estimated the impact of the euro on central European country and found that common currency will significantly increase trade in the less open economy for instance in Poland, Latvia, and Lithuania but the trade will decrease in the open economy such as Slovakia, Estonia and Czech Republic. Recently, Cieślik, Michałek and Mycielski (2009) examined the euro effect of Poland on trade using gravity model, they found polish export will increase after joining to Eurozone but the positive impact will disappear over time (Cieślik et al, 2009 as cited In Cieslik, 2012).

3. Empirical Methodology

This study is divided into two different parts, the first part of the analysis investigates the effect of euro adoption on producer welfare and the second part of the study examine the effect of the euro adoption on the volume of import and export of Slovak economy. We have adopted ordered probit regression model and used the wage dynamics survey data of National Bank of Slovakia in analyzing the producer level impact. Secondly, in analyzing the effect of euro adoption on foreign trade, we have adopted standard gravity equation of trade with fixed effect model.

4. Effect of Euro adoption on the Producer Welfare

In the section that follows, the producer level impact of the euro in Slovakia is discussed.

4.1 Empirical Methodology

As was pointed out in the methodology section of this paper, we use the survey data of National Bank of Slovakia where dependent variables are qualitative and categorical. Therefore, order probit model expressed in the equation 1 would provide the best estimate in the analysis.

 $y_i^* = x_i'\beta + \mu_i \dots \dots (1)$ $y_i = j \text{ if } \alpha_{j-1} < y_i^* \le \alpha_j$ $i = 1, 2, 3 \dots n$

The probability that observation *I* will select alternative *j* is:

$$p_{ij} = p(y_i = j) = p(\alpha_{j-1} < y_i^* \le \alpha_j) = F(\alpha_j - x_i'\beta)$$

In ordered probit, F is standard normal cumulative distribution function. Paper produces the marginal effect of the model as to know the probability of changing an independent variable in

any of the three categories e.g. negative impacts, neutral and positive impact we have for our dependent variables.

4.2 Data description

In analyzing the firm-level impact, wage dynamics survey data has been used and this dataset was collected as part of a joint effort undertaken by the Wage Dynamics Network of European System of Central Banks (ESCB). In particular, Wage Dynamics Network (WDN) is an ECB lead research network comprised of the economist from ECB and European Union central Banks.

The survey group of WDN conducted a survey on the firm's labor market behavior in 2007. Slovakia joined to the network and participated in the WDN2 survey in 2009. WDN3 survey data has been used in conducting this research. This survey was conducted by national Bank of Slovakia in 2014 as a follow-up of 2009. The survey questionnaire was distributed among 7999 firms active in the private sector which has employees more than five. The enterprises were chosen randomly based on stratified sampling using the firm registry information of Slovak statistical office. In November 2014, the firms were approached via mail and e-mail and they filled online questionnaire during December 2014 and January 2015. The questionnaire was addressed to either the CEO of the Company or the Human Resource Manager. The final dataset comprises of the response of 621 enterprises

Out of 43 different questions of the questionnaire, this study particularly focuses on the two (2) specific questions which are related to the euro effect. The question no 42. (CS5.3) - Compared to the situation before 2009, what was the impact of the euro adoption on the following factors in your firm? (Appendix A. 1). And question no 43. (CS5.4) - How would you characterize the overall impact of the euro adoption on your firm? (Appendix A. 2). The respondents were asked to assess the impact in five categories 'Strongly negative impact', 'Moderately negative impact;

'Unchanged', 'Moderately positive impact', 'Strongly positive impact'. Prior to the estimation through oprobit model, the survey findings is discussed in a raw form.

4.3 Survey findings Analysis

From the following figure no 1 it can be seen that in answering the question what was the impact of euro adoption on the ten factor e.g. currency exchange costs, exchange rate hedging costs, administrative costs (dual reporting), input costs (materials, intermediates), competitive pressures, price setting difficulty, doing business in euro area, acquiring new markets, acquiring new markets, acquiring new investment, In all of the factors, substantial portion of the respondent think that the situation of firm was unchanged after the adoption of the euro. But interestingly, in the case of the question of the overall impact of the euro, 16.12 % of the respondent support strong positive impact and 43.91% of the respondent in favor moderately positive impact, adding both of the response, 60.03 % respondent said that there is the positive impact of Euro on their firm.



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In order to find the producer level impact in narrowing the focus, we merged the response category strongly negative impact and moderately negative impact as negative 'unchanged as it is and the moderately positive impact and strongly positive impact are merged together as a positive impact. The ten factors are also grouped into two categories, e.g. currency exchange, exchange rate hedging, administrative and Input cost are assumed as supply-side impact. On the other hand competitive pressures, price setting difficulty, doing business, acquiring new markets, acquiring new customers, acquiring new investment are categorized as demand side impact. As shown in figure 2, 53.03 % respondent said that euro has a positive impact on firm demand, comparatively, only 17 % respondent believe that there is negative impact of Euro. Conversely, in the case of firm supply side impact 40.57 % has a positive opinion and 35% think that euro had a negative impact on the supply side of the enterprises.



Figure 2 Impact of Euro Adoption on Slovak Firm

4.4 Estimation results

Estimation results reported in the following Table 3 based on the order probit model. As we mentioned earlier, the ten dependent variables are categorized into two, a. supply side impact b. demand side impact. The variables currency exchange, exchange rate hedging, administrative and Input cost are assumed as supply-side impact. On the other hand competitive pressures, price setting difficulty, doing business, acquiring new markets, acquiring new customers, acquiring new investment are categorized as demand side impact.

On the other hand, independent variables are firm's size, Ownership, a sector of business, share of export.

Size of the firm: Firms size is categorized into four based on the number of employees which can be seen from the following Table 1.

	number of employees	Freq.	Percent
Small firm	05-19	162	26.09
Lower Mid-firm	20-49	168	27.05
Medium firm	50-199	203	32.69
Large firm	200 or more	88	14.17
	Total	621	100

Table 1 Size of the firm based on employees.

Source: WDN Survey (2014), NBS

Ownership dummy: Ownership dummy defined as foreign ownership =1, otherwise 0 which presents domestic ownership. Sector: wage dynamics network survey data set has six different sectoral distribution of firm which can be seen in the following Table 2.

Sector	Freq.	Percent	
Manufacturing	192	30.92	
Electr.,gas,water	17	2.74	
Construction	54	8.7	
Trade	129	20.77	
Bus. services	204	32.85	
Financial			
intermediary	25	4.03	
Total	621	100	
Source: WDN Survey (2014), NBS			

Table 2 Sectoral breakdown of Slovak firms

Export status represents the firms have twenty percent of exporting products. The regression output based on order probit model is depicted in the following table 3.

	(1)	(2)			
VARIABLES	Supply	Demand			
Large firm	0.91***	-0.09			
	(0.110)	(0.106)			
Ownership	0.01	0.66***			
	(0.131)	(0.129)			
Bus. services	0.43***	0.03			
	(0.115)	(0.111)			
Export status	0.68***	0.60***			
	(0.112)	(0.106)			
Constant cut1	0.11	-0.65***			
	(0.082)	(0.085)			
Constant cut2	0.82***	0.45***			
	(0.087)	(0.083)			
Observations	594	577			
Standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

Table 3 Effect of euro adoption on producer welfare in Slovakia

Column 1 of Table 3 shows that large firm would more likely have a higher cost, we checked the robustness the result with another firm size. In the case of the number of employees are more than 200 then result is positive and significant. On the other hand, we did not find the industrial sector coefficient is as robust, we checked with the regressor like manufacture, construction, and trade but the result is not significant in most of the cases except bus services. Important to mention that the export dummy is always positive and significant in different specification. Column 2 of Table 3 reports the demand status of the firm, the estimated coefficient of ownership shows that foreign firm would be more likely to create a new market, investment, customers and higher price setting difficulties and competitive pressure. The export status (twenty percent export of total selling's) is robust which shows that export oriented firm is more likely to get higher benefits from euro adoption.

With a view to examining the impact of the euro on producer welfare further, we run regression following ordered probit model on all ten dependent variables which were grouped previously as supply side and demand side. The estimation results on all the ten dependent variables are presented in the Table B.11 and B.12. Secondly, this section presents the result of the marginal effect of euro adoption on all the dependent variable to examine the probability of independent variable into the three response categories i.e. Positive effect, unchanged and Negative effect.

Euro adoption and marginal effects on currency exchange related costs

Table B1 shows the Marginal effects of currency exchange related costs in three different categories i.e. Positive effect, unchanged and Negative effect.

Larger firm: One person increase in employee size of the firm is associated with being 24 percent more likely to be in the positive effect in terms of currency exchange related costs, 12 percent less likely to be no impact, and 13percent less likely to be in negative effect category.

Foreign Owner: foreign ownership is associated with being 9 percent less likely to be in positive effect category, 3 percent more likely to remain unchanged and 5 percent more likely to experience the negative effect in terms of currency exchange related cost.

Bus service sector: Bus service sector is 16 percent more likely to have a positive effect, 8 percent less likely to be in unchanged condition and 7 percent less likely to have a negative effect.

Export Status: one percent increase in the export product of firms is associated with being 29 percent more likely to have a positive impact on currency exchange related cost, 15 percent less likely to remain unchanged and 13 percent less likely to have a negative effect.

Euro adoption and marginal effects on exchange rate hedging costs

Larger firm: One person increase in employee size of the firm is associated with being 17 percent more likely to be in the positive effect in terms of exchange rate hedging costs, 9 percent less likely to be in unchanged, and 8 percent less likely to be in negative effect category.

Foreign Owner: foreign ownership is associated with being 3 percent less likely to be in positive effect category, and unchanged and negative effect parameters are statistically not significant.

Bus service sector: marginal effect for bus service sector is also insignificant and seems no association with exchange rate hedging costs.

Export Status: one percent increase in the export product of firms is associated with being 20 percent more likely to have a positive impact on exchange rate hedging costs, 12 percent less likely to remain unchanged and 8 percent less likely to have a negative effect.

Euro adoption and marginal effects on Administrative costs (especially dual reporting

Table B3 shows the marginal effects of euro adoption on administrative costs especially dual reporting cost in three categories i.e. Positive effect, unchanged and Negative effect.

Larger firm: firm size is associated with being 22 percent more likely to be in the positive effect of the euro in terms of administrative costs especially dual reporting cost, 3 percent less likely to remain unchanged, and 19 percent less likely to be in negative effect category.

Foreign Owner: foreign ownership is associated with being 8 percent more likely to be in positive effect category, 2 percent less likely to remain unchanged and 6 percent less likely to experience the negative effect in terms of administrative cost.

Bus service sector: Bus service sector is 6 percent more likely to have a positive effect, 1 percent less likely to be in unchanged condition and 5 percent less likely to have a negative effect.

Export Status: one percent increase in the export product of firms is associated with being 21 percent more likely to have a positive impact, 4 percent less likely to remain unchanged and 17 percent less likely to have a negative effect.

Euro adoption and marginal effects of input costs (materials, intermediates)

Table B4 presents the marginal effects on input costs especially materials, intermediate cost

Larger firm: One person increase in employee size of the firm is associated with being 19 percent more likely to be in the positive effect in terms of input costs (materials, intermediates), 3 percent less likely to remain unchanged, and 16 percent less likely to be in negative effect category.

Foreign Owner: foreign ownership is associated with being 17 percent less likely to be in positive effect category, 4 percent more likely to remain unchanged and 13 percent more likely to experience the negative effect in terms on of input costs (materials, intermediates).

Bus service sector: Bus service sector is 8 percent more likely to have a positive effect, 1 percent less likely to be in unchanged condition and 7 percent less likely to have a negative effect.

Export Status: one percent increase in the export product of firms is associated with being 12 percent more likely to have a positive impact on materials and intermediate cost, 2 percent less likely to remain unchanged and 10 percent less likely to have a negative effect.

Euro adoption and marginal effects on competitive pressures

The marginal effects on competitive pressures are reported in the Table B5

Larger firm: One person increase in employee size of the firm is associated with being 8 percent more likely to be in the positive effect in terms of competitive pressure due to the adoption of the euro currency, 1 percent less likely to be no impact, and 9 percent less likely to be in negative effect. Foreign Owner: foreign ownership is associated with being 4 percent more likely to be in positive effect category, 1 percent more likely to remain unchanged and 5 percent less likely to experience the negative effect in terms of competitive pressure.

Bus service sector: Bus service sector is 10 percent more likely to have a positive effect, and 10 percent less likely to have a negative effect.

Export Status: exporting firms are associated with being 5 percent more likely to have a positive impact on competitive pressure, and 6 percent less likely to have a negative effect.

Euro adoption and marginal effects on price setting difficulty

Table B6 shows the marginal effects on price setting difficulty.

Larger firm: coefficient of the larger firm is not significant in term of price setting difficulty which means that firm size seems do not have an association with price setting.

Foreign Owner: foreign ownership is associated with being 9 percent more likely to be in positive effect category, 2 percent less likely to remain unchanged and 7 percent less likely to experience the negative effect in terms of currency exchange related cost.

Bus service sector: Bus service sector also does not show any association.

Export Status: one percent increase in the export product of firms is associated with being 19 percent more likely to have a positive impact **o**n price setting difficulty, 5 percent less likely to remain unchanged and 14 percent less likely to have a negative effect.

Euro adoption and marginal effects on doing business in the euro area

Table B7 presents the marginal effects of doing business in the euro area.

Larger firm: estimated parameter of doing business in euro area does not show any significant result.

Foreign Owner: foreign ownership firms are associated with being 24 percent more likely to have a positive effect, in another word, the foreign firm is more like to get benefit from euro adoption compare to the domestic firm, 22 percent less likely to remain unchanged and 2 percent less likely to experience the negative effect.

Bus service sector: Bus service sector is 13 percent less likely to have a positive effect, 11 percent less likely to be in unchanged condition and 7 percent less likely to have a negative effect.

Export Status: one percent increase in export is associated with being 20 percent more likely to have a positive impact on doing business in the euro area, 18 percent less likely to remain unchanged and 2 percent less likely to have a negative effect. Therefore, it is fair to comment that exporting firms more privileged in doing business in euro area, the possible explanation can be, euro zone framework provides exporting firms' opportunity to expand their business in wide market area and firm can easily grow due to the lack of barriers under common framework and elimination of transaction cost

Euro adoption and marginal effects on acquiring new markets

The marginal effects on acquiring new markets are reported in Table B8

Larger firm: Firm size is associated with being 17 percent less likely to be in have a positive effect in terms of creating new markets, and 6 percent more likely to be in negative effect category. Foreign Owner: estimated parameter show that foreign ownership does not have a significant association with acquiring new markets.

Bus service sector: Bus service sector is 7 percent less likely to have a positive effect, 4 percent more likely to be in unchanged condition and 3 percent more likely to have a negative effect.

Export Status: exporting firms are more likely to acquire new markets

Euro adoption and marginal effects on acquiring new customers

Table B9 presents the firm level marginal effects of euro adoption on acquiring new customers in Slovakia.

Larger firm: the larger firm is associated with being 10 percent less likely to be in the positive effect, 6 percent less likely to be in unchanged, and 3 percent more likely to be in negative effect category.

Foreign owner and bus sector explanatory variables do not provide any statistically significant result.

Export Status: exporting firms are associated with being 15 percent more likely to have a positive impact on acquiring a new customer, 11 percent less likely to remain unchanged and 4 percent less likely to have a negative effect.

Euro adoption and marginal effects on acquiring new investment

Table B10 outlines the marginal effects of euro adoption on acquiring new investment.

Larger firm: One person increase in employee size of the firm is associated with being 5 percent less likely to have the positive effect in acquiring new investment, 3 percent more likely to remain unchanged, and 2 percent more likely to have a negative effect.

Foreign Owner: foreign ownership is associated with being 17 percent more likely to be in positive effect, 13 percent less likely to remain unchanged and 4 percent less likely to have experience of negative effect.

Export Status: one percent increase in the export product of firms is associated with being 11 percent more likely to have a positive impact on acquiring new investment, 7 percent less likely to remain unchanged and 4 percent less likely to have a negative effect.

Therefore, based on the evidence discussed above, it can be said that euro effect is positive if the ownership is foreign and the firm is large in size. One explanation can be, Export-oriented firms are getting more incentives due to euro adoption as a large portion of Slovak exports concentrated within the euro area.

5. Effect of Euro Adoption on the Foreign Trade of Slovakia

The second part of this study focuses on the macro level effect of the euro on the foreign trade of Slovakia. The study identifies the relation of euro adoption and the condition of export and import in the economy of Slovakia.

5.1 Empirical methodology

Gravity models have been used widely used to estimate the impact of a regional association, currency union and various distortion of trade (Bougheas, Demetriades and Morgenroth 1999, De Grauwe and Skudelny 2000, as cited in Joan Costa-i-Font, 2010). Rose and Frankel argues (2002, p.440) that gravity model of trade is a 'natural vehicle' to estimate the effect of common currency. In the analyzing the effect of the euro on Slovakia, this research follow the gravity model of trade. In a general Gravity model, trade equation can be described by following

 $X_{ij} = GS_i M_j \phi_{ij}$

Where, X_{ij} represents the volume of trade from country i to country j. M_j represent the factors which create total importer's demand, for instance GDP of importing country. S_i denotes the capacity of exporting country such as GDP of exporting country. G is considered as gravitational constant. ϕ_{ij} expresses as the bilateral accessibility of trade from country i to country j.

5.2 Estimation Methods

This study uses the Fixed Effect model in estimating relationship between Euro and foreign trade

of Slovakia which is in the followings.

 $Log \ Percapita \ real \ Export \ Import_{ijt} = \alpha_i + \delta_t + \beta 1 log \ realgdp_{it} + \beta 2 \ Euro_{it} \ +$

 $\beta_4 log \ percapita \ Slovak \ real \ gdp_{it} + U_{it}$

Where, *Log Percapita real Export Import*_{*ijt*} = export and import of Slovakia to partnering country j in year t

log realgd p_{it} = Percapita real gdp of all partnering country j

Euro_{*it*} = dummy variable that takes value 1 if year is year>=2009 (the year slovakia join eurozone) otherwise 0.

percapita Slovak real gdp_{it} = Real per capita gdp of Slovakia in year t

 $U_{it} = \text{error term}$

The typical approach to estimating this equation consists in taking logs of both sides, leading to a log-log model of the form. However, the intuition in choosing fixed effect model in gravity equation, it permits to consider unobserved factors that illustrate flows between partnering countries. In addition, model avoids the inconsistent estimates generated by OLS in case unobserved heterogeneity prevail. However, fixed effect model does not allow time-invariant variables, therefore, this study avoids explanatory variables for instance: distance, language.

5.3 Data Description

In this analysis we use bilateral trade of export and import as the dependent variable, here export determines the volume of trade in goods Slovakia is exporting to major trade partners and import expresses total trade in goods Slovakia is importing from major trade partners. In both the cases, Slovakia is treated as reporting country. The dataset covers the period 2003 to 2014, No of partnering country: 19, Period: 12, yearly data.

Countries in the sample are from different categories:

Euro Zone Country (7): Germany, Belgium, France, Austria, Italy, Netherland, Spain,

EU but Non-Euro Country (6): Czech Republic, Poland, Hungary, UK, Sweden, Romania,

Outside of EU Euro (6): Russia, China, USA, Turkey, Switzerland, Korea

Per capita real export and import: export and import data expressed in current thousands US dollar and data extracted from OECD bilateral trade database by industry and end user category. Nominal export and import data were transformed to real through adjusting with GDP deflator of reporting country. Per capita real export and import were made through the dividing population of the country Slovakia. Population and GDP deflator data come from World Development Indicators published on-line by the World Bank in Washington.

Real GDP: GDP variable measures the size of the partnering country, the variable is measured at market prices constant 2005 in thousands US dollar, data comes from World Development Indicators.

Per capita Slovak Real GDP: GDP reflects the size of the country, the variable is measured at market prices constant 2005 in thousands US dollar, data comes from World Development Indicators.

Following figure 3 depicts the scenario of foreign trade of Slovakia in real terms before and after joining to the euro zone. Figure shows, trade decreases with almost all the following partnering countries in the year 2009 but in the long run, trade regain.



Figure 3 Log real per capita GDP of the Partnering Country of Slovakia.

Source: Author's own calculation

5.4 Estimation Results

In this part, we first present the estimation result of euro adoption and its impact on bilateral trade of Slovakia that has already joined to the euro zone. Secondly, we present estimation result for Hungary that did not join in euro zone following same methodology and estimation technique.

Estimation results for Slovakia

The result of the estimation is in the following Tables 4. In column (1) of Table 4 presents the estimates of the standard gravity equation through the fixed effects model in which the dependent variable is defined as the log per capita exports and import of Slovakia. The GDP parameter of the estimates of both the reporter country Slovakia and partnering country were

positive and significant at 1 percent level.

	(1)	(2)
VARIABLES	Log Per capita Real Export Import	Log Per capita Real Export Import
	1 71444	1 7 / 444
Log Real GDP	$1./4^{***}$	$1./6^{***}$
EUDO 2000	(0.332)	(0.554)
LUKO_2009	(0.03)	
Per Capita Slovak real	5 72***	4 54***
GDP	5.72	1.0 1
	(0.772)	(0.650)
EURO_2007	× /	0.17***
		(0.056)
Constant	-59.63***	-55.43***
	(5.998)	(6.451)
	• • •	• • •
Observations	231	231
r2_overall	0.0460	0.0459
r2_between	0.0956	0.0964
r2_within	0.8317	0.8363
Number of countries	20	20

Table 4 Estimation result for Slovakia Yearly data 2003 to 2014

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

The estimated coefficient of euro dummy which is defined as 1 if the year is year>=2009 otherwise 0 is positive and statistically significant at 10 percent level. Thus, participation in the euro zone is associated with the expansion of foreign trade of Slovakia.

Turning to the column 2 of Table 4, following same model and variable as like column 1 but with the year dummy of 2007, we see the coefficient of EURO_2007 is statistically significant at 1 percent level and much higher than the coefficient of EURO_2009. though Slovakia has joined into the euro zone in 2009 but the intuition behind looking on 2007 is, The Slovak currency Koruna joined the ERM II (exchange rate mechanism) on 28 November 2005 for meeting the exchange rate stability of Maastricht criteria (Šuster, 2006). In addition, the country was close to filling other convergence criteria by the end of 2007 (Lalinský, 2008). Moreover, the economic actors already have an estimation of potential euro adoption in Slovakia. Therefore, the estimated coefficient of EURO_2007 may possibly be explained as a positive association of potential euro adoption of Slovakia.

Returning to the coefficient of EURO dummy 2009, There may have several possible explanation of the difference of estimated coefficient between two-year dummy, one possible explanation might be the proximity of euro joining the year 2009 to the global financial crisis. The controls variable GDP also contains information on the financial crisis. The growth shocks of the partnering countries were channeled to Slovakia through low trade growth. According to IMF direction of trade statistics yearbook, 30 percent of import and 46 percent of Slovak export are constituted from euro zone country in the year 2014 (IMF, 2015). Wörgötter (2013) argued that financial crisis hit the economy of Slovakia severely. GDP declined 4.9 percent in 2009 and foreign trade of Slovakia shrank by 15 percent.

In order to get further insights and identify the euro effect on foreign trade of Slovakia, we run the regression following the same model and estimation technique for the case of Hungary. There is a number of similarities between the two countries. Hungary and Slovakia have joined the European Union in the same year in 2004 and both the country are the member of OECD and Visegrad group. Both the country has similarities in terms of foreign trade, Table C1 in appendices chapter show that turnover of foreign trade in GDP was in increasing trend in both the countries during the period of 2004 to 2008 where Slovakia reached at 150 % in 2008 and a similar situation was also observed in Hungary as of 140%. Table C2 in appendix chapter depicts that share of Hungarian and Slovak foreign trade turnover with EU27 (total trade) was also growing in similar ways. The difference between the countries in our analysis, Slovakia is a member of common currency union but Hungary is not. Moreover, the objective of this paper is to find an explanation of a policy question rather establishing a theory, therefore, it seems fair to choose Hungary and compare the estimated coefficient of Hungary to the Slovakia.

In analyzing Hungarian case, we followed similar dependent and independent variable following standard gravity equation with fixed effect regression technique.

Hungary	(1)	(2)			
VARIABLES	Log Per capita Real	Log Per capita Real			
	Export Import	Export Import			
Log Real GDP	0.82	0.60			
	(0.656)	(0.590)			
Dummy_2009	0.02				
	(0.056)				
Log Per Capita	3.14***	2.75***			
Hungarian real GDP					
C	(0.807)	(0.498)			
Dummy 2007		0.13*			
5—		(0.068)			
Constant	-24.71**	-19.62*			
	(11.631)	(11.004)			
Observations	236	236			
R-squared	0.556	0.579			
r2_overall	0.2628	0.2719			
r2 between	0.2766	0.2771			
r2 within	0.5558	0.5789			
Number of country	20	20			
Robust standard errors in parentheses					

Table 5 Estimation result for Hungary Yearly data 2003 to 2014

*** p<0.01, ** p<0.05, * p<0.1

Export-import and GDP data of top twenty trade partnering countries were extracted from the same source as like Slovak case analysis. The year dummy 2009 was chosen in similar ways as 1 if the year is year>=2009 otherwise 0. In both Hungarian and Slovak model, we used per capita GDP and per capita export and import in order to control for the size of the economy. Table 5 shows the estimated result for Hungary. The coefficient of our interested year dummy in table 5, column 1 is positive but not significant statistically.

This result may be explained by the fact that financial crisis affects the foreign trade performance of Hungary. Secondly, comparing the estimated coefficient of Slovakia in Table 4 and estimated a parameter of Hungary in Table 5, we observe that estimated coefficient of year dummy of Slovakia is higher than Hungary. A possible explanation of this results may be the case, Slovakia is the member of euro zone which helps Slovakia during the financial crisis. On the other hand, it is difficult to explain the result of Hungary but one of the insights can be that Hungary is not the member of the euro zone and it has an association with the trade performance of Hungary during the period of financial crisis.

We run regression following the same gravity model with same variable and data set using year fixed effect techniques for both the country Slovakia and Hungary. The estimation result of year fixed effect for Slovakia and Hungary are shown in Table 4 and Table 5 in the appendix chapter. The estimated parameter of interested year dummy of both the country are significant at 1 percent level but the estimated coefficient of Slovakia is 8 percent higher than of Hungary (Table 4 and table 5 in the appendix chapter). These results support the previously estimated result of the countries.

Based on the findings of the analysis, it seems fair to comment that in the absence of financial crisis of 2009, the impact of euro adoption in Slovakia would be higher.

As we also mentioned in the literature review, Maliszewska (2004) estimated the impact of the euro on central European country and found that common currency will significantly increase trade in the less open economy for instance in Poland, Latvia, and Lithuania but the trade will decrease in the open economy such as Slovakia, Estonia and Czech Republic. In a recent paper, Cieślik, et. al (2012) examined the consequence of euro adoption on the foreign trade of Slovakia and Slovenia. Cieślik, et. al (2012) followed standard gravity equation with fixed effect model, the definition of EMU dummy was set as 1 if both the countries are the member of the monetary union in a year otherwise 0 and this definition is different from our Euro dummy of 2009. However, the estimated coefficient of their EMU dummy was negative and statistically insignificant. In addition, Cieślik, et. al (2012) analyzed the effect of common currency on the trade of Poland using gravity model, they found polish export will increase after joining to Eurozone but the positive impact will disappear over time (Cieślik et al, 2009 as cited In Cieslik, 2012).

6. Conclusion and Policy Recommendation

The main objective of this study was to examine the ex-post effect of euro adoption for Slovakia and draw policy recommendation for the country. Slovakia is the successful post-communist country who managed to join into Eurozone early in January 2009.

Slovakia experienced high economic growth before joining to euro zone which was driven by the major economic reform measures during 1998-2006 and the accession to the European union. The country recorded highest GDP growth in the EU 10.4 % in 2007. In the same year, the country was capable of fulfilling the Maastricht criteria which pave the way to join into the euro area on 1 January 2009 (Okáli, 2009). As pointed out in the findings chapter, Rose (2000) claimed common currency has a large effect on the international trade.

The economy adopted liberalization policy to promote its foreign trade, foreign investment in the country and country is characterized as highly open in terms of international trade. It is ranked as the 14th economy in terms of export volume. In 2014, the share of its Export and import to GDP is 91.85 % and 88.20% respectively (WoldBank, 2015). Therefore, foreign trade is 180% of the total GDP of Slovakia. In the year 2014, 30 % of import and 46 % of its export are constituted from euro zone country. This large volume of trade with the euro area is one of the determinant factors to bring positive effect for the economy to the greater extent. In addition, Common currency itself facilitates trade within the union. The estimation result of our study also finds the similar

positive effect of the euro in term of bilateral trade performance of the country. The year dummy of 2009 depicts the positive association between euro access and the expansion of foreign trade of the country. On the other hand, comparing the trade performance of neighboring country hungry which is similar to Slovakia in terms trade performance, we found that financial crisis depressed the trade performance of Slovakia and this decline seems partly compensated by the membership of euro zone. Therefore, it seems fair to comment that due to euro membership Slovakia face lower vulnerability during the financial crisis.

In analyzing the micro level impact of the euro currency in Slovakia, our study finds that large firms have more likelihood to have the greater positive effect of euro adoption and the foreign owner and export-oriented firms are more likely to be benefited from euro adoption. A possible explanation may, foreign owner's firms are more comfortable to conduct and expand their business in euro currency and within Eurozone. In addition, Euro adoption brings a large volume of credit to the economy, Slovak firms borrow credit in an unlimited way due to the lower interest rate of ECB. Furthermore, euro access resulted in an increase the confidence of investors and credit rating status of the economy has increased from BBB+ to A+ rating (Sario, 2010).

In order to achieve a sustainable, fair, balanced growth and to take maximum benefit from euro currency, Slovak republic should expand upon the reform measures it adopted before joining the European Union.

Firstly, with a view to improving fiscal framework, the country should set up fiscal consolidation strategy in such a way so that it could support the post-crisis recovery for a longer period and allocate more spending on the growth targeting policies.

Secondly, the country needs a domestic engine of growth. In this respect, Government can invest money in human capital development, enhance the business environment in the country, strengthen the culture of innovation, and improve the quality of institutional performance

Thirdly, Slovakia needs to ensure high employment rates, relevant policy measures including education reform can be done in this respect. The quality of education would reduce inequalities, enhance human capital and boost economic growth ultimately (OECD, 2013).

A combination of prudent fiscal policy and necessary reform measures together with common monetary policy could help the country to highest benefit from common currency and this could act as an accelerator of economic growth of the Economy.

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Appendices

Appendix A. 1 Survey questionnaire

42. (CS5.3) - Compared to the situation before 2009, what was the impact of the euro adoption on the following factors in your firm? <u>Please choose ONE option for each line.</u>						
	Strongly negative impact	Moderately negative impact	Unchanged	Moderately positive impact	Strongly positive impact	
Currency exchange related costs						Dome
Costs of hedging against exchange rate fluctuations						Forei
Administrative costs (especially dual reporting)						
Input costs (especially material and intermediate goods)						
Competitive pressures						
Price setting (difficulty)						
Doing business with partners within the euro area						
Acquiring new markets						
Acquiring new customers						
Acquiring new investment						

Appendix A. 2: Survey questionnaire

43. (CS5.4) - How would	you characterise the overall impact of the euro adoption on your firm?	
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Strongly negative	Moderately negative	No	Moderately positive	Strongly positive
impact	impact	impact	impact	impact

Currency exchange	Positive Effect	Unchanged	Negative effect
related costs			
Large firm	0.24***	-0.12***	-0.13***
Foreign Owner	-0.09**	0.03**	0.05*
Bus Services	0.16***	-0.08***	-0.07***
Export Status	0.29***	-0.15***	-0.13***

Table B1: Ordered Probit for marginal effects of currency exchange related costs

Table B2: Ordered Probit for marginal effects of exchange rate hedging costs

Exchange rate	Positive Effect	Unchanged	Negative effect
Large firm	0.17***	-0. 09***	-0. 08***
Foreign Owner	-0. 03	0. 02	0.01
Bus Services	0.01	-0. 01	-0. 01
Export Status	0. 20***	-0. 12***	-0. 08***

Table B3: Ordered Probit for marginal effects of Administrative costs (especially dual reporting)

Administrative costs	Positive Effect	Unchanged	Negative effect
Large firm Foreign Owner	0.22*** 0.08*	-0.03*** -0.02	-0.19*** -0.06**
Bus Services	0.06*	-0.01	-0.05*
Export Status	0.21***	-0.04***	-0.17***

Table B4 Ordered Probit for marginal effects of input costs (materials, intermediates)

Input costs	Positive Effect	Unchanged	Negative effect
Large firm	0.19***	-0.03**	-0.16***
Foreign Owner	0.17***	-0.04**	-0.13**
Bus Services	0.08**	-0.01	-0.07*
Export Status	0.12***	-0.02**	-0.10***

Competitive	Positive Effect	Unchanged	Negative effect
pressures			
Large firm	0.08***	0.01	-0.09***
Foreign Owner	0.04^{***}	0.01	-0.05
Bus Services	0.10**	-0.00	-0.10***
Export Status	0.05***	0.01	-0.06**

Table B5 Ordered Probit for marginal effects on competitive pressures

Table B6: Ordered Probit for marginal effects on price setting difficulty

Price setting difficulty	Positive Effect	Unchanged	Negative effect
Large firm	0.04	-0.01	-0.03
Foreign Owner	0.09***	-0.02*	-0.07***
Bus Services	-0.01	0.00	-0.01
Export Status	0.19***	-0.05***	-0.14***

Table B7 Ordered Probit for marginal effects of doing business in the euro area

Doing business in the	Positive Effect	Unchanged	Negative effect
euro area			
Large firm	-0.03	0.03	-0.00
Foreign Owner	0.24***	-0.22**	-0.02***
Bus Services	-0.13**	0.11***	0.02**
Export Status	0.20***	-0.18***	-0.02***

Table B8 Ordered Probit for marginal effects on acquiring new markets

Acquiring new	Positive Effect	Unchanged	Negative effect
Large firm	-0.17***	0.10	0.06***
Foreign Owner	0.02	-0.01**	-0.01
Bus Services	-0.07**	0.04***	0.03**
Export Status	0.20***	-0.14***	-0.06***

Table B9: Ordered	Probit for marginal	effects on acquiring new	w customers

Acquiring new	Positive Effect	Unchanged	Negative effect
Large firm	-0.10***	0.06***	0.03***
Foreign Owner	-0.03	0.02	0.01
Bus Services	-0.01	0.01	-0.00
Export Status	0.15***	-0.11***	-0.04***

Table B10: Ordered Probit for marginal effects of acquiring new investment

Acquiring new	Positive Effect	Unchanged	Negative effect
investment			
Large firm	-0.05*	0.03*	0.02*
Foreign Owner	0.17**	-0.13***	-0.04***
Bus Services	0.02	-0.01	-0.01
Export Status	0.11***	-0.07***	-0.04***

Table B.11: Euro adoption and estimation result for Slovak firm

	(1)	(2)	(3)	(4)
VARIABLES	Currency exchange related costs	Exchange rate hedging costs	Administrative costs (especially dual reporting)	Input costs (materials, intermediates)
T C				
Large firm	0.66***	0.51***	0.63***	0.60***
	(0.105)	(0.105)	(0.102)	(0.102)
Foreign Owner	-0.25**	-0.11	0.23*	0.50***
	(0.123)	(0.123)	(0.121)	(0.121)
Bus Services sector	0.42***	-0.03	0.18*	0.27**
	(0.110)	(0.107)	(0.106)	(0.106)
Export Status	0.76***	0.58***	0.60***	0.38***
-	(0.106)	(0.105)	(0.103)	(0.101)
Constant cut1	-0.51***	-0.90***	-0.10	-0.18**
	(0.082)	(0.087)	(0.080)	(0.079)
Constant cut2	0.98***	0.93***	1.11***	1.27***
	(0.088)	(0.088)	(0.088)	(0.092)

Observations	605	597	1	601		602	
Standard errors in parentheses							
		*** p<0.01	, ** p<0.05, *	° p<0.1			
Table B.12: Euro	adoption and	estimation re	esult for Slova	ık firm			
	(1)	(2)	(3)	(4)	(5)	(6)	
VARIABLES	competitive	price	doing	acquiring	acquiring	acquiring	
	pressures)	setting	business in	new	new	new	
		difficulty	the euro	markets	customer	investment	
			area				
Large firm	0.31***	0.17	-0.08	-0.56***	-0.29***	-0.18*	
	(0.102)	(0.103)	(0.110)	(0.109)	(0.107)	(0.109)	
Foreign Owner	0.18	0.33***	0.63***	0.09	-0.11	0.54***	
	(0.119)	(0.122)	(0.133)	(0.129)	(0.126)	(0.129)	
Bus Services	0.39***	-0.03	-0.35***	-0.24**	0.03	0.08	
sector							
	(0.106)	(0.107)	(0.115)	(0.112)	(0.111)	(0.113)	
Export Status	0.21**	0.67***	0.53***	0.60***	0.45***	0.36***	
I I	(0.102)	(0.105)	(0.110)	(0.110)	(0.107)	(0.108)	
Constant cut1	-0.40***	-0.64***	-1.86***	-1.68***	-1.63***	-1.39***	
	(0.080)	(0.083)	(0.125)	(0.109)	(0.106)	(0.102)	
Constant cut2	1.31***	1.25***	0.41***	0.60***	0.56***	0.95***	
	(0.093)	(0.093)	(0.085)	(0.086)	(0.085)	(0.089)	
Observations	599	599	592	595	596	596	
		Standard e	errors in paren	theses			

*** p<0.01, ** p<0.05, * p<0.1

C.1: Year	fixed effect	model for	Hungary
0.1.1.601	ince cireet	11100001101	

Hungary	(1)	
VARIABLES	ln_pc_Reximp_hu	
In Pool CDP	0.66	
III_Keal_GDP	(0.607)	
Dummy 2009	0.54***	
	(0.155)	
2004.year	0.18***	
2	(0.040)	
2005.year	0.27***	
	(0.072)	
2006.year	0.41***	
	(0.099)	
2007.year	0.55***	
	(0.128)	
2008.year	0.62***	
2000	(0.147)	
2009.year	-0.21^{***}	
2010 year	(0.030)	
2010.year	-0.12^{+++}	
2011o.year	-	
2012	0 10***	
2012.year	-0.12^{****}	
2013 year	(0.019)	
2013.year	(0.025)	
2014 year	-0.09**	
2011.you	(0.037)	
Constant	-14.33	
	(12.284)	
Observations	236	
Number of country	20	
r2_overall	0.2719	
r2_between	0.2768	
r2_within	0.6178	

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

Table C2. Share of Hungarian and Slovak foreign trade turnover to GDP

	2004	2005	2006	2007	2008
Hungary	113%	116%	134%	136%	140%
Slovakia	136%	138%	155%	156%	150%

Source: UN COMTRADE, 2009 as cited in (Ondřej ŠKUBNA, 2011)

Table C3. Share of Hungarian and Slovak foreign trade turnover with EU27 (total trade)

	2004	2005	2006	2007	2008
Hungary	77.9%	71.6%	69.2%	68.0%	66.7%
Slovakia	77.5%	74.6%	72.6%	72.0%	72.0%

Source: UN COMTRADE, 2009 as cited in (Ondřej ŠKUBNA, 2011)

Slovakia	(1)
VARIABLES	Log Per capita
	Real Export
	Import
log_Real_GDP	1.75***
	(0.341)
EURO_2009	0.62***
	(0.141)
2004.year	0.15***
	(0.043)
2005.year	0.22***
• • • •	(0.069)
2006.year	0.41***
2007	(0.089)
2007.year	0.68***
2000	(0.116)
2008.year	0.80^{***}
2009o.year	(0.130)
2010 year	0 10***
2010.yeai	(0.020)
2011 year	(0.020)
2011.yeai	(0.040)
2012 year	0 17***
2012.yeu	(0.037)
2013 year	0.24***
2010.jour	(0.045)
2014.vear	0.22***
	(0.054)
Constant	-36.92***
	(6.943)
Observations	231
Number of country	20
r2_overall	0.0462
r2_between	0.0963
r2 within	0.8386

Table C4. Estimation result of year fixed effect for Slovakia

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

Hungary	(1)		
VARIABLES	ln_pc_Reximp_hu		
ln_Real_GDP	0.66		
	(0.617)		
Dummy_2009	0.54***		
	(0.155)		
2004.year	0.18***		
	(0.040)		
2005.year	0.27***		
	(0.072)		
2006.year	0.41***		
	(0.099)		
2007.year	0.55***		
	(0.128)		
2008.year	0.62***		
	(0.147)		
2009.year	-0.21***		
	(0.036)		
2010.year	-0.12***		
	(0.024)		
2011o.year	-		
2012.year	-0.12***		
-	(0.019)		
2013.year	-0.10***		
	(0.025)		
2014.year	-0.09**		
	(0.037)		
Constant	-14.33		
	(12.284)		
Observations	236		
Number of country	20		
r2_overall	0.2719		
r2_between	0.2768		
r? within	0.6178		

Table C5. Estimation result of year fixed effect for Hungary 2003-2014

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

Austria
Switzerland
Sweden
Hungary
Slovakia
Serbia
Russian Federation
Romania
Germany
Croatia
China
Bulgaria
Belgium,
Luxembourg
United States
Turkey
Poland
Spain
United Kingdom
France
Italy
Czech Republic

Table C6. List of the country for the estimation of Hungary