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Abstract: There are many studies aiming at estimation of aggregate trade effects of the euro adoption by the old EU countries, which are based on the gravity model. In contrast to the existing literature we investigate whether the adoption of the common currency increases the export activity of individual firms. In particular, we refer to the new strand in the trade theory, based on the Melitz (2003) model, in which propensity to export depends on productivity and costs of exporting. There are many empirical studies, based on firm level data, showing the relevance of the Melitz (2003) model. Most of those studies demonstrate that export performance positively depends on firms' characteristics, but they do not take into account the impact of the common currency on the cost of exporting. There are only few studies analyzing implications of euro adoption for firms' exports of "old EU" members. In our empirical paper we use the firm level data basis set up by the EBRD and the World Bank. Using the probit model we analyze whether the accession of Slovenia and Slovakia to the Eurozone did increase the firms' propensity to export in those countries.

JEL code: F12, F14, F33

Introduction:

The accession to the Eurozone should have important consequences for trade flows of accessing countries. The standard argument is that the reduction in transaction costs due the elimination of the exchange rate risk should stimulate exports of existing firms and encourage non-exporters that previously limited their operations to their domestic markets only to start exporting (Baldwin *et al*., 2005). It is argued that the reduction of the transaction cost is important for countries that are characterized by the concentration of their trade with one large trading partner or a group of countries using the same currency. This is exactly the case for EU new member states (NMS) from Central and Eastern Europe (CEE) for which Germany is the main trading partner, and more than 50 per cent of their trade takes place with the members of the Eurozone.

The NMS must eventually join the Eurozone, however the majority of them have not introduced the common currency before 2014. The accession the Eurozone requires the fulfillment of the Maastricht convergence criteria. One of them is related to the accession to the exchange rate mechanism (ERM II). Estonia, Lithuania and Slovenia joined the ERM II already at the time of the accession to the EU in June 2004, Cyprus, Latvia and Malta in May 2005, while Slovakia in November 2005. Larger NMS such as Bulgaria, the Czech Republic, Hungary, Poland and Romania, that joined the EU despite their declarations to adopt the euro have not joined the ERM II so far.[1]

Slovenia was the first country to join the Eurozone in January 2007. Cyprus and Malta joined the Eurozone in January 2008, Slovakia in January 2009, and Estonia in January 2011 and Latvia is expected to do it in 2014. Therefore, it is possible to analyze ex post direct effects of the euro adoption for trade flows of only a small number of NMS for which data is available: Slovenia and Slovakia.

According to the empirical studies based on aggregate data the trade flows among the old members of the EMU have grown on average by 10–15 % due to the

[1] Bulgaria, although it did not officially enter the ERM II, pegged its currency to the euro since its creation in 1999 (before the Bulgarian lev was pegged to the German mark).

use of a common currency while the evidence for the NMS is ambiguous. The empirical evidence based on the firm level data on the trade consequences of the euro adoption is still rather scarce and in particular the evidence for the NMS is still missing.

The main aim of this paper is to evaluate the *ex post* effects of new EU member countries' accession to the European Economic and Monetary Union (EMU) on export performance of their firms. In our study we focus on two Central European countries: Slovakia and Slovenia which are the new EU member countries that have so far adopted the euro. Unfortunately, we cannot extend our analysis to include Estonia due to the lack of data covering the period after the Eurozone accession.

To evaluate these effects we use probit estimation, based on the Melitz (2003) model and firm-level data. In addition to the use of firm level data we also control for country characteristics such as the size and the level of development which may affect firms' propensity to export. This study will help in understanding whether and by how much the adoption of the euro contributed to the of firm's exports. In particular two different effects can be distinguished and analyzed. First, the extensive margin, which means a small positive differential effect on trade through an increase in the number of products exported. Second, an intensive margin means a larger positive differential effect on average value of exports per firm and/or per product[2].

The structure of this paper is as follows. In the next section we survey the literature on the impact of the euro adoption with the special focus on the Central and European countries. Then, we describe the analytical framework and discuss data sources. Finally, we first present estimation results on the *ex post* impact of the euro adoption on firms' export performance in Slovakia and Slovenia that have already adopted the common currency. The last section summarizes and concludes.

[2] Fontagne et al. (2009).

Literature review

Trade effects of the adoption of a common currency can be studied in a number of ways. Traditionally, the trade economists used to study empirically aggregate trade flows on the basis of augmented gravity equations derived from the neoclassical and new trade theories. In this approach binary variables, describing the participation in the exchange rate stabilization regimes and the membership in the monetary union are usually used. Additionally, some measures of exchange rate volatility can be included in the estimating equations.

In the context of Central and Eastern European countries several attempts were made to estimate *ex ante* trade effects of the euro adoption by these countries using the gravity model. The first such an attempt was made by Maliszewska (2004) who studied bilateral trade flows between the EU and the Central European countries during the period 1992-2002. She found, on the basis of OLS, that as a result of the euro adoption trade would increase on average by 23 per cent. According to her forecast the less open countries such as Poland, Latvia and Lithuania would experience a significant increase in trade, while already open countries such as the Czech Republic, Estonia and Slovakia would experience a decrease in trade.

The follow-up study by Belke and Spies (2008) led to a completely different conclusion. They estimated a gravity model using the Hausman-Taylor approach that allowed them to endogenize the EMU variable. In their study the estimated parameter on the EMU variable also turned out to be positive and statistically significant. However, in contrast to Maliszewska (2004) their forecast showed that relatively closed economies such as Poland, Latvia and Lithuania would experience a decrease in their exports while more open economies such as the Czech Republic, Estonia and Slovakia would experience an increase in their exports.

More recent attempts to study the *ex ante* trade effects of CEE countries joining the Eurozone using a gravity model were made by Cieślik, Michałek and Mycielski (2009, 2012a). They used the panel data analysis for the present members of the Eurozone and almost 100 other countries trading with the Eurozone countries.

Their results suggested that just after joining the Eurozone, Polish exports would increase by about 12 per cent, but the positive effect would gradually disappear over time.

The literature dealing with the *ex post* evaluation of the aggregate trade effects of euro adoption in the Central European countries is still relatively scarce. In particular, Aristovnik and Meze (2009) used a time series approach to study the *ex post* effect of the EMU creation for Slovenian trade. They argued that the trade benefits of the entry of new countries into the EMU would thus not be the same as the benefits of the initial formation of the EMU in the nineties. They validated their claim using the case-study evidence for Slovenia. Their regression analysis of time series showed that there had been a positive effect on Slovenia's exports into and a negative effect on its imports from the Eurozone precisely at the time of the creation of the EMU in 1999. However, they did not investigate the *ex post* effects themselves of 2006 Slovenia accession to the Eurozone.

This issue was taken up in the empirical study by Cieślik, Michałek and Mycielski (2012b,c) who studied the implications of accession of two new Central European countries: Slovenia and Slovakia to the already existing and functioning EMU. The authors employed a gravity model that controlled for an extended set of trade theory and policy variables. Trade theory variables included both the country size and factor proportion variables. Trade policy variables included the membership in GATT/WTO, CEFTA, OECD, EU and Europe Agreements. The gravity model was estimated using the panel data approach on a sample of CEE countries trading with the rest of the world during the period 1992-2009 using the fixed effects, random effects and Hausman-Taylor estimators. According to their results elimination of exchange rate volatility resulted in trade expansion for the CEE countries but the accession to the Eurozone did not have any significant effects on exports of Slovakia and Slovenia.[3]

[3] These results do not seem surprising given the fact that some of the studies for the old EU member states do not find any positive trade effect of the Eurozone creation. For example, Berger and Nitsch (2008) argued that the euro's impact on trade disappears if the positive trend in the institutional integration is controlled for.

Hence, a wide array of empirical studies show that the introduction of the euro had a modest but positive impact on the value of aggregate trade flows inside the euro area for the old EU member states. However, the trade effects of the accession to the Eurozone for new member states of the EU are much less evident. These results are based on the gravity model and aggregate trade data. However, in the more recent literature it is argued that the aggregate data masks important microeconomic gains.

In particular, two types of microeconomic gains are distinguished that may arise even though aggregate trade flows do not change. First, the euro may increase the availability of differentiated varieties of both final and intermediate products. In addition to this it may also help existing exporters to increase the number of products exported and the number of destinations served. The aggregate exports may not change if richer product variety coincides with an offsetting reduction in average shipments per product. Second, the value of aggregate exports may be affected by the increased competition resulting in the compression of prices. Enhanced transparency and lower transaction costs associated with the introduction of the euro may lead to a fall in markups and prices across the euro area. With no major change in relative prices, aggregate trade flows should not change much either.

The alternative approach is based on the latest strand in the new trade theory, based on the Melitz (2003) model, in which export performance of heterogeneous firms depends on labor productivity and costs of exporting. The new approach to studying the trade effects of the euro is based on the latest strand in the trade theory literature. This new strand stresses the role of firm heterogeneity and has become popular in the last few years. In contrast to the previous literature, i.e Krugman (1980) model, which assumed that firms are symmetric, this new literature focuses on firms' heterogeneity in terms of productivity and export performance.

The empirical implementation of this model requires firm-level data. The trade implications of this model can be studied either on the basis of simulation models or using the micro-econometric analysis.

Empirical studies reveal that only a small fraction of the most productive firms account for the majority of exports; most firms do not export and concentrate their activities on domestic markets only. This latest strand of the new trade theory was initiated by Melitz (2003). He relaxed the key assumption of firms' symmetry in Krugman's (1980) monopolistic competition model and introduced firms' heterogeneity in terms of labour productivity.

The Melitz (2003) model implies important microeconomic effects of reduction in transaction costs. Namely, this reduction should lead to significant changes within sectors: growth of the most efficient firms, a richer variety of goods, tougher competition (i.e., smaller mark-ups), and, consequently, exit of the least efficient firms.

The Melitz (2003) model can be used to study a whole range of various issues related to the reduction of transaction costs. In particular, it can be used to analyze the effects of the adoption of the common currency on firms' export performance. In the light of this model it might be argued that the adoption of the common currency lowers trade costs and can positively affect the firm's export performance.

Testing for the microeconomic effects of the euro requires highly disaggregated data. Two possible approaches can be considered. The first approach is to use trade data at the product level. However, using such data, it is not possible to assess whether an increase in the value of bilateral exports in one product category can be explained by incumbent firms increasing the value of their shipments, or new firms exporting to the same trade partner within the same product category. The second approach is to use firm-level trade data which permits a description of the micro-level adjustment.

There are only few empirical studies that investigate the microeconomic trade effects of the accession to the Eurozone for the old EU member states (EU-15) and the empirical evidence for the new EU member states is virtually non-existent. In particular, Fontagne et al. (2009) analyze the implications of the euro adoption for Belgium and France using the second approach in the period of 1998-2003. They exploit firm-level export databases at the product level. For each exporter, they have information on the value of exports detailed by product CN8 category (10,000

product categories) which allow them to identify the destination market. On this basis, they compute the number of exporters on each market, the average number of products exported by firm on each market, and the average value of exports by product.

Their analysis tackles a difficult counterfactual question: what would have happened to European firms if the euro had not been introduced? This implies identifying an appropriate benchmark. Their approach, was to compare the behaviour of firms in countries that have adopted the euro and those that have not. They called the firms in the former countries the 'treated group' and firms in the latter countries the 'control group'. The main idea was to compare the dynamics of two different subsets of exports: trade flows that are 'treated' by the effects of the euro, and trade flows that are not 'treated'. This allows distinguishing among four groups of trade flows:

- Flows between euro-area countries;
- Flows between a euro-area and a non-euro area country;
- Flows between a non-euro area and a euro-area country;
- Flows from non-euro area countries.

They compute the intensive and extensive margins of exports distinguishing among different types of destination: euro area, non-euro area EU, non-euro area Europe and non-euro area world.[4] The extensive margin is defined as the number of varieties exported, while the intensive margin as the average value of exports per variety. Specifically, they compare the evolution of the trade margins to euro-area destinations with the evolution of the trade margins to non-euro area destinations for Belgium and France.

In the case of France, the number of firms exporting to euro-area destinations decreased, while the average number of products exported per firm and the average number of destinations per variety increased. In the case of Belgium, the number of firms, the number of products exported per firm, and the number of destinations per variety increased. In the case of both countries the intensive margin increased for

[4] The euro area (the treated group) includes: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain. The non-euro area EU countries include: Denmark, Sweden, UK. The non-euro area Europe countries include: Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Norway, Poland, Slovakia, Slovenia, Switzerland.

these destinations. Hence, since introduction of the euro, fewer French firms export more products to more destination markets within the euro area while more Belgian firms export more products to more destinations within the euro area.

A similar pattern was observed for non-euro area EU destinations. However, contrary to what was observed for euro-area destinations, there was no variation in the number of countries served per variety within the non-euro area EU region. This was due to the fact that this region consists of three countries only. Hence, since the introduction of the euro, changes observed *within the European Union* did not differ much for destinations in the euro area and destinations outside the euro area.

The exports of French firms to non-euro area Europe and non-euro area world destinations behaved differently from exports to the EU destinations.[5] The number of exported products decreased, while there was a small increase in the number of exporting firms and in the number of destinations per variety. Unlike France, in the case of Belgium a decrease in the number of exporters, especially to destinations outside Europe was reported. Thus, after the introduction of the euro, fewer Belgian firms export more products to more destinations outside the EU. More French firms export fewer products to more destinations outside the EU.

Therefore, since introduction of the euro, changes in the total value of euro-area exports were driven mostly by the extensive margin (the number of exporting firms, products exported and countries served) in the case of euro-area destinations and by the intensive margin (the average value of exports per product and exporter across destinations) in the case of non-European destinations.

Moreover, the introduction of the euro reduced price volatility and price-discrimination among markets in the Eurozone compared to the markets outside the Eurozone. Given the size of the integrated market and the level of competition, price discrimination by European exporters was smaller towards the Eurozone countries than to the non-euro area EU countries and even smaller than to the rest of the OECD. After the introduction of the euro, euro-area exporters reduced the dispersion of their export prices in the euro area relative to markets outside the Eurozone. This was not the case for exporters belonging to countries outside the Eurozone.

[5] The study was conducted for the period preceding the Eastern enlargements and the CEE countries were not at that time the EU members.

Fontagne et al. (2009) also suggested that there have been changes in the geographical pattern in the firms' exports resulting from the exchange rate adjustments. Namely, real appreciation of the euro reduced French exports to old EU15 countries through the average value of exports per product and exporter, while the number of exporters, products exported and countries served was also affected when all destination countries were considered.

Another aspect of firms' reaction to the exchange rate adjustment was analyzed in the study by Berman et al. (2009). They also focused on export performance of French firms during the period of 1995-2005. Their results showed that high productivity firms reacted to a depreciation by increasing their export price rather than their export volume. The reverse was true for low productivity firms. The extensive margin response to exchange rate changes was modest at the aggregate level because firms that enter, following a depreciation, are smaller relative to existing firms.

In the context of central and Eastern European countries according to the best of our knowledge it seems that there are no formal empirical studies based on firm-level data. There are only some studies devoted to evaluation of ex ante effects of the accession to the Eurozone on trade flows based on surveys of the perception of firms. For example Klučka et al. (2009), surveyed firms and asked whether the accession to the Eurozone will eliminate the transaction costs, the exchange rate risk and will lead to the simplification of doing business with partners in the Eurozone which should result in trade expansion. This perception was especially pronounced among big enterprises in Slovakia. Moreover, small and medium size enterprises stressed the chances for new market acquisition. At the same time those firms expected an increase in competitive pressure from foreign competitors. But the authors did not estimate trade effects of the accession to the Eurozone.

Empirical methodology and data description

The new strand of trade theory provides a useful toll for the analysis of trade performance in response to the reduction of transaction costs. In our preliminary study we consider only one microeconomic effect of the common currency. In particular, we refer to the Melitz (2003) model and focus on the effect of increased participation of non-exporters in international markets which is an equivalent of studying the extensive margin effects.

In the Melitz (2003) model, productivity differences among firms are the key variable explaining the firm's ability to enter export markets. In this model firm productivity is exogenously given and each firm has to pay a fixed cost when entering the domestic and foreign markets. The model predicts that the most productive firms with the lowest marginal costs can pay the fixed cost of entry and become an exporter. On the one hand, a fall in the importing costs will force the least productive firms to exit the domestic market and reallocate market shares from these firms to the more productive ones. As a result, the average level of productivity within the sector will increase. On the other hand, a reduction in the exporting costs will reduce the threshold level of productivity that firms need to achieve in order to export, and consequently the non-exporters with the highest productivity will be able to enter the foreign market.

The importance of the firm productivity for exporting has been confirmed by the EFIGE (2010) report. In this report it has been demonstrated that firm export performance in seven EU countries depends on labour productivity and other firm characteristics. Unfortunately, these studies did not include the countries of Central and Eastern Europe with the exception of Hungary. Similar studies for the Visegrad countries (i.e. the Czech Republic, Slovakia, Hungary and Poland) and separately for Poland were conducted by Cieślik, Michałek and Michałek (2012 a, b). Their analysis showed that the productivity of the labour force was positively related to the probability of exporting. In addition, in their empirical studies, other factors such as spending on R&D, size of the firm, internationalization of the firm, and the stock

of the human capital may affect export business decisions were examined. These results were similar to the results presented in the EFIGE (2010) report.

However, in all the aforementioned studies, the authors did not control for the participation in the Eurozone. Therefore, in this section we use the probit model with the clustered standard errors to study the relationship between exporting and the common currency, having controlled for firms' characteristics and the EU membership. Based on the previous theoretical literature, we develop an empirical model to investigate how the reduction in transaction costs associated with entering markets in other countries that share the common currency affects the probability of exporting. This probability is modeled as a linear function of firm, industry and country characteristics. In addition to account for the unobserved heterogeneity we run the probit model with clustered standard errors. The clustering is done with respect to the country.

Let Y_i* be our dependent variable indicating the export status of firm i. This variable is a latent variable. This means that instead of observing the volume of exports, we observe only a binary variable Y_i indicating the sign of Y_i^*. Our dependent variable follows a binary distribution and takes the value 1 when the firm exports and 0 otherwise:

$$Y_t = \begin{cases} 1 \;\; if \; Y_i^* > 0 \\ 0 \;\; if \; Y_i^* = 0 \end{cases}$$

Moreover, we assume that $Y_i^* = X_i\theta + \varepsilon_i$, where X_i is a vector of explanatory variables affecting exports, θ is the vector of parameters on these variables that needs to be estimated and ε_i is an error term which is assumed to be normally distributed with a zero mean. Hence, the probability that a firm exports can be written as:

$$Pr(Y_i = 1|X_i) = \Phi(\beta + X_i\theta)$$

Our analysis is based on the EBRD-World Bank Business Environment and Enterprise Performance Survey (BEEPS) data collected by the World Bank and the European Bank for Reconstruction and Development for the post-communist countries located in Central and Eastern Europe. The surveys covered the manufacturing and services sectors and are representative of the variety of firms according to sector and location within each country. The data was collected for the years 2002, 2005, 2009 and 2010. In all countries where a reliable sample frame was

available (except Albania), the sample was selected using stratified random sampling.[6] However, only a small proportion of firms appears every year in the sample.[7] We assume that export activity occurs when at least one percent of sales revenue comes from sales made abroad. In Table 1, we present the list of countries, for which data was available and export propensity of firms from those countries.

Table 1. A comparison of the propensity to export among the firms Central and Eastern European countries. **(**Countries that adopted euro till 2010 are marked bold**)**

Export (national sales less than or equal 99% of establishment's sales)		
Country	**Mean**	**Freq.**
Slovenia[euro2007]	**0,55**	**685**
Croatia	0,42	1148
Serbia	0,37	900
Slovakia[euro2009]	**0,37**	**654**
FYROM	0,36	736
Estonia	0,35	660
Lithuania	0,35	680
Hungary	0,35	1149
Bosnia	0,35	737
Czech Rep.	0,35	857
Bulgaria	0,32	1853
Latvia	0,29	651
Albania	0,27	732
Poland	0,27	2008
Belarus	0,26	848
Moldova	0,24	887
Ukraine	0,22	1902
Romania	0,21	1382
Russia	0,17	2359
Montenegro	0,13	153
Total	**0,31**	**20981**

Source: own calculations based on the BEEPS data.

[6] The sampling methodology is explained in the Sampling Manual (available at http://www.enterprisesurveys.org/Methodology/).

[7] This means that the application of panel data analysis is not possible. Therefore, we used the standard probit procedure on the pooled dataset without controlling for individual firm effects.

However, the great degree of heterogeneity in export performance, even among the CEE countries, cannot only be explained by the standard country characteristics that are usually stressed by the traditional trade theory. Therefore, it is also important to study the role of the common currency and the EU membership in determining export performance, together with firm characteristics, specifically for the new trade theory.

The probability of exporting for analyzed CEE firms is dependent on firm, sector and country characteristics. Firm and sector characteristics are based on survey questions regarding the individual characteristics of the firm, sector of activity, legal and economic status, characteristics of managers and the size of the firm, economic performance and key characteristics of the reviewed firms, as well as stakeholders. Unfortunately, set of our explanatory variables is not available for all firms. As a result the number of observations is greatly reduced compared to the number of firms reported in Table 1. The sample used in our econometric analysis includes cross-section data for less than five thousand observations for firms located in the CEE countries for which explanatory variables were available in all analyzed years.

In addition to firm characteristics we also included country characteristics such as the EMU and EU membership. The EMU membership variable is a dummy variable that takes value 1 when the country is the member of the Eurozone and zero otherwise. In the similar manner we define the EU membership variables which takes value 1 when the country is a member of the European Union.

We also included the country characteristics reflecting the size of the domestic market (level of GDP in current US dollars) and the level of development, proxied by the level of GDP per capita (expressed also in current US dollars). Those variables are very frequently used in estimations of bilateral trade flows, based on gravity models. The expected sign of GDP level variable is negative, since countries with larger markets are usually less open, while the GDP pc should have positive sign because more developed countries are more open in the majority of

cases. In our estimations we used both variables in logarithms. Finally, we also control for individual time and sectoral effects.

In Table 2 we present firm characteristics used in our study.

Table 2. Explanatory variables: Firm characteristics

Variable Name	BEEP input Name	Description
Lprod	lprod=log(lprod) prod=exchange rate*(d2/l1)	Logarithm of productivity expressed as total amount of annual sales per full time employee. The annual sales are converted from local currencies to USD.
Firm_size	l1	Logarithm of no. permanent, full-time employees of this firm at end of last fiscal year
Age		Logarithm of number of years since start of operations
Luniv	luniv=log(ECAq69)	Logarithm of % employees at end of fiscal year with a university degree.
lRaD	RaD=(ECAo4/d2)*100 lRaD=log(RaD)	Logarithm of % of total annual sales spent on research and development.
foreign_tech	e6	The use of technology licensed from a foreign-owned company
foreign_cap	b2b	Shares in capital of private foreign individuals, companies or organizations.

Estimation results

In Table 3 we present our estimation results. In column (1) we show the baseline results without controlling for country characteristics, while in column (2) we also check the robustness of our results by controlling for the country size and the level of development. In column (3) we control for the robustness of the results by adding individual time effects. Finally, in column (4) we control also for the sector specific effects.

The key explanatory variables stressed by the Melitz (2003) model – productivity is expressed as the total amount of annual sales per full time employee (*lprod*). Other factors that may affect export activity include the level of innovation proxied by the R&D spending (lRaD), the stock of human capital proxied by the percentage of employees with university degrees (*luniv*). In addition, we control for the foreign ownership (*foreign_cap*), the foreign technology (foreign_tech) and the age (*age*) and the size of the firm (*firm_size*).

Table 3: Estimation results (standard errors in parentheses)

VARIABLES	1	2	3	4
lprod	0.0464***	0.0306***	0.0263***	0.0244**
	(0.0118)	(0.00928)	(0.00846)	(0.0104)
firm_size	0.249***	0.257***	0.234***	0.232***
	(0.0203)	(0.0174)	(0.0178)	(0.0168)
age	0.00267	0.00180	0.00268*	0.00241*
	(0.00190)	(0.00163)	(0.00155)	(0.00132)
foreign_cap	0.00778***	0.00744***	0.00785***	0.00734***
	(0.000827)	(0.000771)	(0.000866)	(0.000567)
lRaD	0.0914***	0.0951***	0.0870***	0.0765***
	(0.0332)	(0.0330)	(0.0337)	(0.0222)
luniv	0.0629***	0.0660***	0.0669***	0.0695***
	(0.0104)	(0.0113)	(0.0109)	(0.0108)
foreign_tech	0.444**	0.416***	0.0188	
	(0.177)	(0.141)	(0.0963)	
EU	0.337***	0.119	0.269***	0.203**
	(0.0983)	(0.101)	(0.102)	(0.0842)
EMU	1.421***	1.049***	0.606***	0.596***
	(0.283)	(0.225)	(0.210)	(0.211)
lgdp		-0.140***	-0.149***	-0.155***
		(0.0329)	(0.0378)	(0.0420)
lgdp_per_capita		0.322***	0.239***	0.304***
		(0.0555)	(0.0650)	(0.0501)
d_other_manuf				0.546***
				(0.142)
d_food				-0.0157
				(0.171)
d_textiles				0.209
				(0.273)
d_electro_IT				0.724**
				(0.284)
d_construc				1.256*
				(0.688)
d_wsale_retail				0.715*
				(0.379)
d_hotel_trans				-0.553
				(0.766)
Time effects	No	No	Yes	Yes
Constant	-2.392***	-1.372**	0.163	-0.612
	(0.206)	(0.643)	(0.960)	(0.905)
Observations	4,544	4,544	4,544	5,614
Log likelihood	-2345	-2308	-2274	-2924
Pseudo R2	0.179	0.192	0.204	0.195

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

Firstly, we will discuss the benchmark results presented in column (1) for the standard firm characteristics but without the country size and the level of economic development variables. Our estimation results reveal that almost all the variables are statistically significant with the exception of the age variable. The estimated parameter on the key explanatory variable – the EMU membership displays a positive sign and is statistically significant at the 1 per cent level. This means that firms from the Eurozone countries face the lower transaction costs in entering the markets in other Eurozone countries and reveal a higher propensity to export. In addition to this the estimated parameter on the EU membership also displays a positive sign and is also statistically significant at the 1 per cent level. However, the magnitude of the estimated parameter on the EMU variable is about four times as large as the one on the EU variable. This means that from the perspective of the CEE countries the accession to the EU increases the propensity to export of their firms and the accession to the Eurozone generates an additional increase in the extensive margin of exports.

The signs of the estimated parameters for our control variables are in line with expectations and results from other empirical studies based on the Melitz (2003) model. In particular, the level of labor productivity is positively related to the probability of exporting and statistically significant at the 1 per cent level. Moreover, the level of R&D spending and proportion of workers with university degrees are positively related to the probability of exporting. Finally, the probability of exporting increases with the firm's size, the foreign ownership and the use of foreign technology.

In column (2) of Table 3, we control for two country characteristics: their size and the level of economic development both of which are statistically significant at the 1 per cent level and display expected signs. The estimated parameter on the level of economic development – GDP per capita variable – displays a positive sign while estimated parameter on the variable reflecting the size of the home market – the GDP level – displays a negative sign. These results are in line with empirical studies based on the aggregate data. On the one hand, bigger economies are usually less open and their firm have smaller incentives to export. On the other hand more

developed countries are more export oriented as it is easier for their firms to enter foreign markets.

In this case, the estimated parameter on the EMU variable remains positive and statistically significant at the 1 percent level and its magnitude decreases significantly compared to the baseline estimation. Similarly, the inclusion of the country specific variables does not affect the estimates of the coefficients on the other variables with the exception of the EU membership which loses its previous statistical significance.

In column (3) of Table 3 we control for the time specific effects which are jointly statistically significant. As a result of including time variables the magnitude of the estimated parameter on the EMU variable decreases significantly but the level of significance does not change. Moreover, the estimated parameter on the EU variable remains positive and becomes again statistically significant at the 1 per cent level. Finally, the estimated parameter on the use of foreign technology variable loses its statistical significance. Therefore, in the next column we report the estimation results omitting this variable. This allows us to increase the number of observation by more than 1000 observations.

In column (4) of Table 3 we control for sector-specific effects with other services treated as the benchmark. In the majority of cases the estimated parameters on the sectoral dummies were statistically significant but at different levels of statistical significance. The estimation results for other variables were similar to those reported in column (3). [8] The estimated parameter on the EMU variable displays a positive sign and remains statistically significant at the 1 per cent level. However, its magnitude slightly decreases. Similarly, a slight drop in the magnitude of the estimated parameter on the EMU variable is observed. The estimated parameter on the productivity variable became statistically significant at the 5 per cent level.

Thus, it seems that our results regarding the EMU variable are robust with respect to the time and sector specific effects.

[8] In this estimation we dropped the use of foreign technology variable which was not statistically significant.

Conclusions

In this paper, we investigated the ex post effects of the accession to the Eurozone by two Central and Eastern European countries that have so far adopted the euro: Slovenia and Slovakia on the export activity of their firms. In contrast to the previous studies that were based on the gravity model and the aggregate trade flows we used the extended Melitz (2003) model and the firm-level data. The key explanatory variable in this model was the level of productivity. In addition to this we also controlled for other factors that may affect export activity such as the level of innovation, the stock of human capital, the foreign ownership and the use of foreign technology and the age and the size of the firm. In addition we also controlled for country characteristics such as size and the level of development.

Our estimation results demonstrated that the EMU membership positively affects the probability of exporting. This means that firms from Slovenia and Slovakia after the accession to the Eurozone indeed reveal a higher propensity to export. Moreover, the EU membership is also positively related to the probability of exporting. The estimated parameters on our control variables such as productivity, the size of the firm and the stock of human capital, were in line with the results of previous empirical studies based on the Melitz (2003) model. Also the estimated parameters on the country characteristics were in line with expectations. Finally, we controlled for both individual time and sectoral effects.

The result concerning the significance of the EMU membership is different from our previous estimations based on the aggregate trade flows. However, these two sets of empirical results are not mutually exclusive. The results based on the aggregate data may not properly reflect microeconomic gains as the value of aggregate exports may be affected by the increased competition resulting in the compression of prices. In addition, the estimations based on the aggregate data can mask gains resulting from changes in extensive and intensive margins.

However, our results based on the firm-level data should also be treated with caution as we were unable to use panel data and we estimated only the equivalent of

the extensive margin effects. The more accurate analysis of both the extensive and intensive margin effects requires a more detailed disaggregated data on the geographical structure of exports which are currently not available.

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