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TRADE REGIMES AND BILATERAL TRADE IN THE EU ENLARGEMENT PROCESS: FOCUS ON THE WESTERN BALKANS*

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This paper aims at investigating the role of different trade regimes in determining the bilateral trade of Western Balkan countries and the enlarged European Union between 2001–2010. Special focus is laid on the intra-regional trade of Western Balkan countries and complementarities of this sub-regional trade integration and the EU accession process. Using panel data, we estimated the gravity model of bilateral exports from Western Balkan and Central Eastern European countries to the core EU members in the 2001–2010 period. The results confirm the importance of EU membership for the development of acceding countries' trade and shed light on asymmetrical trade regimes as important factors of boosting the bilateral trade flows. Additionally, CEFTA 2006 has a significant contribution to intra-regional Western Balkans trade.

Keywords: EU enlargement, bilateral trade, trade regimes, gravity model, panel data, Western Balkan

JEL classification indices: C33, C36, F13–F15

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1. INTRODUCTION

The global trend in the world economy is that an increasing number of economies engage in trade liberalisation. This liberalisation can be unilateral, but it is usually a product of co-operation between economies. Countries tend to exchange trade concessions on all levels: bilateral, regional, and multilateral. However, until multilateral liberalisation is achieved, in cases when a WTO round of trade negotiation is not heading towards a foreseeable closure, more and more countries turn to regional trade integration. Focusing on Europe, all Central and Eastern European (CEE) countries as well as Western Balkan (WB) countries have a strategic goal of joining the European Union. The whole EU enlargement process implies a series of formal steps formulated in association agreements with significant variations in trade regime during this process, preceded by the fulfilment of economic and political requirements.

The fact is that the CEE countries are at a lower level of global competitiveness than the core EU member countries (EU-15). The general view is that any type of trade liberalisation leads to market opening and produces greater benefits for the more developed partners. That is the reason why the EU grants asymmetrical trade concessions in the accession process. As CEE received this non-reciprocal treatment in trade with the EU, countries of the Western Balkans were granted similar trade regime by EU unilateral trade measures (Autonomous Trade Measures, ATMs). Later on, as acceding countries move closer to the EU membership, their trade regime with the EU becomes more symmetrical, as stipulated by the Stabilisation and Association Agreements (SAA) for WB countries.

The EU acceding countries are encouraged by the EU members to liberalise their intra-regional trade, leading to the creation of regional free-trade areas, such as the former Central European Free Trade Agreement (CEFTA) for CEE countries and CEFTA 2006 for WB countries. Most of the empirical papers dedicated to the effects of EU enlargement on bilateral trade have considered the CEE countries in the period before or right after they became EU members. However, there are a few papers dealing with the effects of SAA and CEFTA 2006 on the bilateral trade of WB countries and they are usually focused on the period preceding the full application of CEFTA 2006 (for instance, Montanari 2005; Herderschee – Qiao 2007; Begović 2011). To the best of our knowledge, none of the papers analyses the period after the application of CEFTA 2006 and compares bilateral trade effects for CEE and WB countries. Therefore, based on the latest data, the analysis in this paper is focused simultaneously on the bilateral exports of two groups of EU accession countries: CEE and WB economies, at different stages of the EU accession process.

The main question that arises, and which is in the focus of this paper, is to what extent variations in trade regime towards the EU have positive effects on the bilateral trade of observed countries in the EU accession process. In case of CEE countries, we investigated whether the completion of trade integration with joining the EU leads to further increase in their bilateral exports to the EU-15. Since CEE (new EU member) countries were at a similar level of economic development in the recent past as WB countries are now, observing the CEE export patterns could help us perceive expected tendencies in WB bilateral exports on their road towards the EU membership. During the EU accession process, the acceding countries experienced variations in trade regimes, from asymmetric trade preferences towards reciprocity in trade relations. Hence, another important issue in the paper refers to the effects of ATMs and SAA on the WB trade. Finally, we encompass the effects of trade regimes on bilateral exports to non-EU markets in countries under observation, especially on intra-regional trade of acceding countries. In this section, the paper builds on our previous research where we explored the effects of CEFTA 2006 trade preferences (Dragutinović-Mitrović – Bjelić 2012).

To answer these questions, the gravity panel data model is used in estimating bilateral exports from the WB and CEE countries to the EU-15 in the 2001–2010 period. The results of our empirical analysis suggest several important conclusions: First, the EU membership plays an important role in enhancing bilateral exports of countries in our sample; second, asymmetrical trade preferences granted to acceding countries during the EU accession process are significant in boosting the bilateral exports of WB countries but later variations in the trade regime introduced by SAA are not significant; third, the CEFTA 2006 integration effect represents the most important factor in promoting intra-regional WB trade.

The paper is organised as follows: After the introduction, an empirical literature overview, relevant for our empirical analysis, is presented in Section 2. The background of the enlargement process and accompanying agreements as well as a short description of the dynamics of WB and CEE exports are given in Section 3. The model, data and methodology used in empirical analysis are presented in Section 4. Estimation results are contained in Section 5, followed by main conclusions in Section 6.

2. OVERVIEW OF THE EMPIRICAL LITERATURE

A commonly used empirical tool for modelling trade integration effects on bilateral trade between countries is the gravity model. Its usage in international trade dates back to the 1960s. The original model relies on Newton's law of universal

gravitation in explaining bilateral trade flows between countries by their "economic masses" (measured by their GDP and population) and geographical distance between their economic centres (Linnemann 1966). Different empirical specifications of this model have been developed in the literature, and its augmented forms usually contain various trade promoting factors and trade barriers such as common language, common border, free trade agreements, currency union membership, etc. Parallel to the development of empirical specifications, the theoretical foundations for the gravity model are also researched, resulting in theoretical explanations based on international trade theories (e.g. Helpman 1987; Bergstrand 1989; Deardorff 1998; Anderson – van Wincoop 2003). After the disintegration of the Soviet Union, the model has been extensively used in predicting bilateral trade flows between the Western European countries and newly established countries in Central and Eastern Europe (CEE) (e.g. Wang – Winters 1992; Baldwin 1994; Nillson 2000).

In the recent literature, instead of estimation of trade potentials, the gravity model is predominantly used to measure the contribution of currency unions, free trade areas (FTAs), economic integrations, and the effects of various trade-related policies or exchange rate volatility on bilateral trade flows (e.g. Micco et al. 2003; Faruqee 2004; Papazoglou et al. 2006; Baier – Bergstrand 2007; Bussiere et al. 2008). Usually, authors have distinguished two levels of trade integrations: free trade areas and customs unions, as a higher level of integration. At one point, too large a number of bilateral FTAs made their administration too complicated, a phenomenon which is usually referred to as "spaghetti bowl" (Bhagwati 2008), while some authors underline the superiority of customs unions (Herderschee – Qiao 2007). Recent literature is more focused on the trade effects of monetary unions.[1] The general finding of the analyses focused on the European monetary union (EMU) is that EMU has a noticeable impact on intra-regional trade even at this early stage, and the effects on the currency union, depending on a sample or methodology, are estimated to range between 5% and 20% (Micco et al. 2003; Faruqee 2004).

The estimation of trade effects of FTAs has also been usually conducted in the empirical literature on gravity models. The literature suggests that these effects on trade between two countries should be positive as a result of relaxed (elimination of) various trade barriers. However, results from empirical literature, which are based on cross-sectional data, have been mixed. Baier – Bergstrand (2007) find that the treatment of FTAs as an exogenous variable is the main reason for mixed empirical results obtained in the earlier literature, resulting in biased downward estimates. The estimation results of their gravity panel data model indicates that

[1] There are some findings in the literature that bilateral trade is tripled between trade partners belonging to a currency union (Frankel – Rose 2002).

if the endogeneity of FTAs is taken into account, then, on average, the bilateral trade of two members will double in 10 years. The treatment of FTAs as endogenous is explained by the fact that unobserved time-invariant bilateral factors (such as various policy-related barriers), which are not explicitly included in the model, may be correlated with the FTA variable (Baier – Bergstrand 2007).

Many empirical papers have used the gravity model to examine the effects of exchange rates on bilateral trade flows (among the first authors was Bergstrand 1989).[2] Trade theory suggests that any devaluation (depreciation) of the national currency can have a positive effect on the rise in domestic country competitiveness on international markets, resulting in the increase of its exports. The latest studies devote more attention to the trade effects of exchange rate volatility (e.g. Fidrmuc – Horváth 2007), and some of them have shown that it has a limited effect on aggregate trade, while it tends to reduce bilateral trade (Clark et al. 2004).

As regards the literature on the Western Balkan countries, a large potential for growth in trade between them and the EU is found in Montanari (2005). However, the effects of asymmetrical trade preferences, granted by the EU unilaterally to Romania and Bulgaria, and later to other WB economies, have appeared to be the most significant factor, which sometimes causes actual trade to rise beyond trade potentials. Other investigations point out that CEFTA 2006, as a preparatory integration for future EU membership of the WB countries, should also have a significant effect on their intra-regional trade, but without danger of trade being diverted from trade with the EU (Herderschee – Qiao 2007). However, this statement has not been empirically validated in the literature so far, and this important issue will be addressed in the following sections of this paper.

3. EU ENLARGEMENT PROCESS AND TRADE REGIMES

At the beginning, EU agreements envisaged asymmetry in trade relations, but the final goal was the creation of free trade area between signatories, with the gradual introduction of symmetry in the transitory period. Stimulated by the EU, CEE states also started to co-operate intra-regionally through CEFTA, which regulated the intra-regional trade of its signatories, creating a free trade area for industrial goods.[3] Upon joining the EU[4], all CEE countries became part of the EU Customs

[2] Usually, researchers use real exchange rate to explore its influence on bilateral exports (Martinez –Zarzoso; Nowak – Lehmann 2003).

[3] Also, the three Baltic countries concluded the Baltic Free Trade Agreement (BAFTA) in 1993.

[4] In 2004, the new EU members were Cyprus, Malta and CEE countries (Poland, Czech Republic, Slovakia, Hungary, Estonia, Latvia, Lithuania, and Slovenia), and Romania and Bulgaria in 2007.

Union and their membership in CEFTA was terminated. As EU members, CEE countries follow the Common Trade Policy, resulting in the termination of all previous trade agreements with third countries. But there were some limitations of the membership rights of these new EU members, such as limitations in the free movement of labour, of access to subsidies and such, which kept them from fully integrating with the EU internal market. Even though the tariffs were abolished in trade with the EU, goods from new member countries did not easily find their way to the EU single market (Chevassus-Lozza et al. 2008). The reason was that CEE exports were faced with significant non-tariff barriers introduced by the EU.[5]

The accession of the Western Balkans[6] to the EU is a slightly different process, since EU designed a new type of accession agreements, the Stabilisation and Association Agreements (SAA). These agreements are different from the Europe agreements in the part where the EU insists more on the fulfilment of certain political conditions. Before SAA, in 2000, the EU had adopted unilateral trade measures, the so-called Autonomous Trade Measures (ATMs),[7] which granted the WB countries tariff free and quota free access to the EU single market for almost all export products from this region, except for sugar, textiles, and certain kinds of meat, fish and wine. The ATMs are nonreciprocal and asymmetrical in favour of the Western Balkans, which was not obliged to reciprocate by granting trade preferences to the EU (Bjelić – Dragutinović-Mitrović 2012). With the signing of SAA, the reciprocity in trade with the EU is introduced, slowly opening the WB markets to the EU goods, in the transitory period of usually 6 years.[8] As for the original CEFTA, an important precondition for the WB countries for EU membership is the development of regional co-operation in the Western Balkans. The first step was the signing of 32 bilateral trade agreements between the WB countries, which have been in force as of 2003. However, since the network of bilateral trade agreements was too complicated to administer, the WB economies made a single trade agreement, the so-called CEFTA 2006, adopted in 2006 and entering into force in 2007.[9]

5 Increase of non-tariff barriers was probably meant to replace the decrease in tariffs, because even a small increase of these non-tariff barriers significantly reduces exports (Damijan et al. 2006).

6 These countries include Albania, Bosnia and Herzegovina, Croatia, Montenegro, Macedonia, Serbia, and Kosovo, as a separate customs territory under UNSCR 1244.

7 EC 2007/2000/EC.

8 Council Regulation (UE) N° 1336/2011 of 13 December 2011, Official Journal of the Ecs, L 347, 30.12.2011, p.1.

9 CEFTA-2006 signatories are Albania, Bosnia and Herzegovina, Croatia, Montenegro, Macedonia, Moldova, Serbia, and Kosovo (a separate customs territory under UNSCR 1244 and ICJ Opinion). The original signatories of CEFTA 2006 were also Romania and Bulgaria, but they left CEFTA in 2007 before full application, when they became EU members.

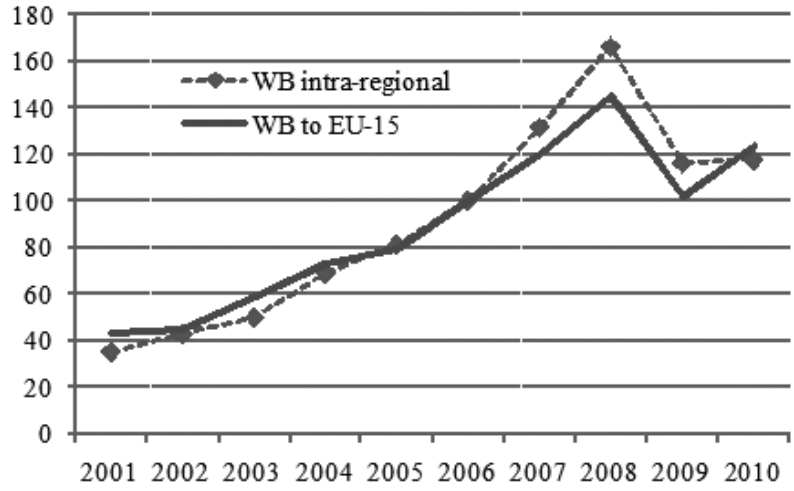

Figure 1. WB exports to EU-15 and intra-regional WB exports (Indices, 2006 = 100)

Source: Authors' calculation based on UN Comtrade database.

Trade liberalisation and regional trade agreements are expected to have an overall positive effect on the bilateral trade flows of countries. However, this may not be a universal finding, particularly for developing countries such as the WB countries. Political and historical circumstances specific to the WB region may be factors which diminish the expected positive effects of SAA and CEFTA 2006. In the period under observation, the SAA came into force in three out of five WB countries (the FYR Macedonia in 2004, Croatia in 2005, and Albania in 2009). However, with the implemented SAA, the SAA benefits do not seem to significantly reflect either on the dynamics of the WB bilateral exports to the EU-15 *(Figure 1),* or on its dynamics in each of the three countries. This may be due to the fact that positive effects of trade liberalisation on the WB bilateral exports were achieved even before the SAA implementation through ATMs, which granted asymmetrical trade preferences to the WB economies (Dragutinović-Mitrović – Bjelić 2012). On the other hand, one could notice a growing tendency of intra-regional WB trade in the implementation period of CEFTA 2006 *(Figure 1).*[10] Such dynamics of exports could be a direct result of CEFTA 2006 trade preferences, but also a consequence of the depreciation of some of WB currencies, implying the importance of price competitiveness in determining their bilateral trade.

[10] Due to the global crisis, a standstill in the growing dynamics appeared in the last two years not only in the WB countries, but also in all other countries under observation.

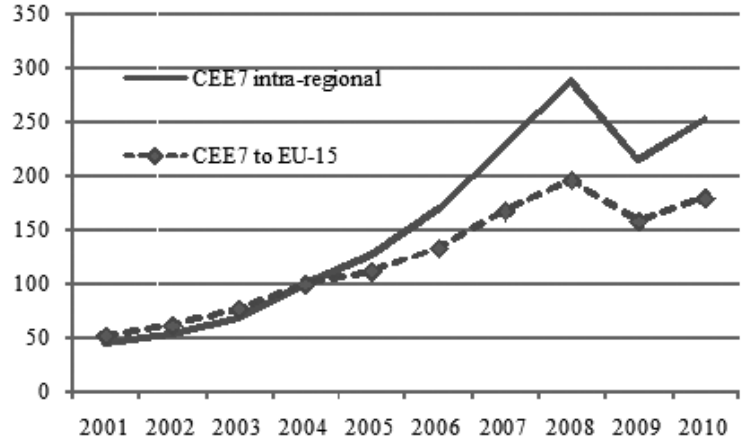

Figure 2. CEE7 exports to EU-15 and intra-regional CEE7 exports (Indices, 2004 = 100)

Note: CEE7 (former CEFTA) countries are Poland, Czech Republic, Slovakia, Hungary, Slovenia, Romania and Bulgaria.

Source: Authors' calculation based on UN Comtrade database.

In the same period, CEE countries passed through all stages of the EU association process and became EU members. According to the export dynamics of CEE7, i.e. former CEFTA countries *(Figure 2),* it is evident that their intra-regional exports grew faster in the years following the EU accession, but that the trend in their bilateral exports toward the EU-15 has not changed compared to the period prior to their EU membership.

The overview presented above raises the research question of this paper: to what extent variations in trade regimes in the EU enlargement process, defined by different intra-regional and extra-regional trade agreements, determine the dynamics of WB and CEE bilateral exports. When considering this general question, three specific questions are addressed. The first is to find out whether the completion of trade integration into the EU leads to further increase of bilateral exports to the EU. The answer should help perceive expected patterns in WB bilateral exports in their EU accession process. The second question refers to the comparison of the contribution of asymmetric trade preferences in the EU integration process (ATMs) to the effects of later implemented EU accession agreements (SAA), which introduced symmetry. The third question is related to the direction of bilateral exports of observed countries to non-EU markets like CEFTA 2006 and countries with FTAs. The intra-regional trade in CEFTA 2006 is important for the bilateral trade flows of member countries. Since exports of

WB and CEE countries were partly governed by bilateral FTAs before multilateral arrangements (CEFTA 2006, EU), we set out to estimate the effects of these "spaghetti bowl" regimes. The answers will be offered in Section 5, based on the results of the gravity model estimation.

4. MODEL, DATA, AND METHODOLOGY

The gravity model is estimated on the basis of bilateral export flows from CEE and WB countries to EU-15 and their intra-regional exports as well. The sample contains 430 country-pairs observed for 2001–2010, which in total gives 4,300 panel observations.[11] The following augmentative form of gravity model is estimated:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln TGDP_{ijt} + \beta_2 \ln SIM_{ijt} + \beta_3 RFE_{ijt} + \beta_4 \ln D_{ij} + \beta_5 Border_{ij} + \beta_6 FTA_{ijt} +$$

$$+\beta_7 ATM_{ijt} + \beta_8 SAA_{ijt} + \beta_9 CEFTA_{ijt} + \beta_{10} EU_{ijt} + \beta_{11} CEE7_{ij} + \beta_{12} CEE7\_04_{ijt} +$$

$$\beta_{13} \ln RER_{ijt} + \mu_{ij} + \lambda_t + u_{ijt}. \quad (1)$$

First, the three right-hand variables of gravity model (1) are used in an attempt to investigate the effects of theory-based factors on trade flows of CEE and WB countries. The theory suggests that the higher level of the overall GDP of two countries (TGDP) increases bilateral trade between them, and that more similar countries in terms of their SIM/GDP[12] tend to have higher intra-industry trade (for instance, Helpman 1987, or Egger 2002). Furthermore, according to the H-O-S trade model, international trade is explained by comparative advantages based on differences in relative factor endowments (RFE). Contrary to this, the Linder hypothesis indicates that the closer countries in terms of their per capita incomes are, the larger the intra-industry trade between them. The empirical literature also suggests this specification for modelling bilateral trade of developed, mostly OECD countries, while there is no clear support for its usage in the case of less developed countries (Debaere 2005). Since a small part of exporters

[11] CEE: Czech Republic, Slovakia, Poland, Hungary, Slovenia, Bulgaria, Romania, Estonia, Latvia, and Lithuania. WB: Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, and Serbia. Due to the lack of data on bilateral exports, the following country pairs were dropped from the analysis: Albania–Luxemburg, Albania–Latvia, Albania–Lithuania, FYR Macedonia–Luxemburg, FYR Macedonia–Latvia, Bosnia and Herzegovina–Latvia. The choice of 2001 as the first year of the observed period was predetermined by the availability of data for all considered variables.

[12] System of Integrated Models/Global Development Processes.

in our sample are OECD members, an interesting question is whether observed trade flows are characterised by the dominance of inter-industry or intra-industry trade. In other words, the issue is to test whether CEE and WB countries' bilateral trade flows are based on comparative advantages resulting from differences in RFE, or whether the Linder hypothesis holds.

Dependent variable X_{ijt} in model (1) represents trade flow from country *i* to country *j* in the year *t*, while its determinants are defined as follows:

- $TGDP_{ijt}$ – the overall GDP of two trading partners in year *t*, i.e. the sum of GDP of exporter country *(*GDP_{it}*)* and importer country *(*GDP_{jt}*)* which should positively affect bilateral trade.
- $SIM_{ijt} = 1 - (\frac{GDP_{it}}{GDP_{it} + GDP_{jt}})^2 - (\frac{GDP_{jt}}{GDP_{it} + GDP_{jt}})^2$ – the similarity of trading partners *(i)* and importer *(j)* country in the year *t*, in terms of their GDP. It can take value from 0 (absolute divergence in size) to 0.5 (equal country size) and captures the intra-industry trade patterns between similar countries.
- $RFE_{ijt} = \left| \ln \frac{GDP_{it}}{POP_{it}} - \ln \frac{GDP_{jt}}{POP_{jt}} \right|$ – the difference in relative factor endowments, proxied by absolute value of the difference between GDP per capita of countries *i* and *j* (POP_{it} and POP_{jt} are population in countries *i* and *j*). The *RFE* variable takes minimal (zero) value for countries with identical relative factor endowments. Following trade theories, a larger difference in relative factor endowments is expected to decrease intra-industry trade share, and to increase inter-industry (and total) trade.

Geographical distance *(*D_{ij}*)* between main economic centres of trading partners *i* and *j* is used as a proxy for transport and transaction costs, and should have a negative influence on the bilateral trade. *Border* is a dummy variable which takes the value 1 for countries that share common border and 0 otherwise. It is expected that common border promotes exports between countries.

Since our sample period 2001–2010 also includes sub-period in which FTAs' effects could be observed, we cover the bilateral trade effects of FTAs by a relevant dummy variable *(FTA)*. The additional effects of trade liberalisation in the EU enlargement process and in intra-regional bilateral trade of accession countries are captured by two sets of dummy variables. The first set is related to WB countries:

- The effects of asymmetric trade preferences granted by the EU for the bilateral trade of WB countries are captured by dummy variable *ATM*. The variable takes the value 1 for the period of ATMs' validity for the observed WB country (period before SAA entered into force) and 0 otherwise.
- The effects of the Stabilization and Association Agreement on WB exports to the EU is evaluated by variable *SAA,* which takes the value 1 for the period from SAA entering into force: from 2004 for Macedonia, from 2005 for Croatia, from 2009 for Albania onwards, and 0 otherwise.[13]
- Dummy variable *CEFTA* is created to measure the effects of the CEFTA agreement adopted in 2006, on bilateral export flows of its signatories. Since the application of CEFTA started in 2007, this variable assumes the value 1 from 2007 onwards if both countries are CEFTA 2006 members, and 0 otherwise. Both variables are expected to have significant positive effects on the WB bilateral exports.

For CEE countries, the second set of dummy variables is introduced:

- The *EU* dummy variable, which encompasses the effect of the EU integration on bilateral exports of CEE countries. This variable takes the value 1 from the period of CEE accession to the EU: from 2004 for the Czech Republic, Slovakia, Poland, Hungary, Slovenia, Estonia, Latvia, and Lithuania, from 2007 for Bulgaria and Romania, and 0 otherwise. The effect of joining the EU is expected to be positive for their trade with EU-15 since their becoming a member of the single EU market removed all other trade barriers.
- The level of intra-regional bilateral export flows among CEE7, former CEFTA members, in the observed period is captured by dummy variable *CEE7,* whereas the effect of joining the EU on their intra-regional trade is covered by dummy variable *CEE7_04*.

To encompass the effects of depreciation of the exporter's currency on its exports, variable RER_{ijt}, which represents real bilateral exchange rate, is introduced in the form of:

$$RER_{ijt} = NER_{ijt} \cdot \frac{CPI_{jt}}{CPI_{it}} \quad , \tag{2}$$

where NER_{ijt} represents nominal bilateral exchange rate of country i (the local currency value of 1 unit of importer j currency), while CPI_{it} and CPI_{jt} are consumer price indices of exporter and importer countries i and j in the year t (base

[13] The effects of SAA for Serbia and Bosnia and Herzegovina cannot be analysed in the observed period, since they are still not in force.

year, 2005). Variable RER_{ijt} is obtained as NER_{ijt} multiplied by the importer country's CPI_{jt} and divided by CPI_{it} of the exporter country. Real exchange rate defined in such a way is expected to have a positive regression coefficient, meaning that depreciation of the exporter's currency could make domestic goods price competitive on foreign markets, leading to its higher foreign demand and the increase of its bilateral exports. In this way, we try to clarify the contribution of domestic currency depreciation to bilateral trade dynamics in comparison to the trade regimes effects.

Model (1) is in the form of a two-way panel data model with bilateral (country-pair) specific effects μ_{ij} and time effects λ_t, while the term u_{ijt} is the remainder disturbance. In controlling both bilateral and time specific effects, our panel data set allows having greater flexibility in modelling differences in behaviour across country-pairs and over time. Bilateral effects capture the heterogeneity across country-pairs due to omitted variables specific to trading partners such as cultural, historical, and other time-invariant factors. Time effects capture the effects of omitted time-varying factors (invariant across country-pairs) on bilateral trade and reflect common shocks or the overall trend towards globalisation (Bussiere et al. 2008).

In constructing gravity model variables, the following sources are used. Data on bilateral export flows in current million USD are taken from the UN Comtrade database for most countries, while the data for Bosnia and Herzegovina, FYR Macedonia and Albania are used from UNCTAD database. Data on GDP, GDP per capita in current million USD, and GDP deflators are used from the IMF World Economic Outlook database. Real GDP and GDP per capita variables are constructed based on GDP deflator indices, with 2005 as the base year. Data on geographical distance between economic centres of two countries are from the website www.worldatlas.com. In defining FTA variable, we used a list of bilateral free trade agreements given in Herderschee – Quiao (2007) in *Appendix Table I.3–I.4*. Since this source only contains information on FTAs up to 2005, and not for all WB countries, we also used the list of bilateral agreements in WB specified in the CEFTA 2006 agreement.[14] Information on agreements in relation to the EU and CEFTA integrations (ATMs and SAA) is obtained from the European Commission website as well as the CEFTA 2006 website. Finally, the UNCTAD database is a source of data on bilateral nominal exchange rates, while data on consumer price indices (2005 = 100) come from the IMF database.

Bearing in mind the advantages of panel data approach over the cross-section methodology, taking into account the bilateral (exporter and importer) heteroge-

[14] The final articles of the CEFTA 2006 Agreement contain the list of bilateral agreements, with the information on their entry into force.

neity, in choosing the estimation method of gravity model we followed the empirical literature on panel data. Various panel data techniques are used in the literature to estimate the gravity model. Many of them used within-group estimator for one-way or two-way fixed effects (FE) model, error components generalised least square estimator (EC-GLS) for random effects (RE) model, Hausman-Taylor instrumental variable method (Egger 2002; Cheng – Wall 2005; Serlenga – Shin 2007; Bussiere et al. 2008). Furthermore, the Poisson fixed effects method and the Poisson pseudo-maximum likelihood method have been used as solutions for zero trade flows problem (for instance, Silva – Tenreyro 2006, or Westerlund – Wilhelmsson 2011).[15]

Looking at the estimation methods of gravity models in the empirical literature, it seems that its choice mostly depends on econometric problems, the purpose of the analysis, the sample of countries, and the observed period. For instance, the use of a within-group estimator is often recommended for capturing bilateral specific effects and avoiding bias estimates due to correlation between regressors and bilateral effects (Bussiere et al. 2008, etc.). Also, FE specification is proposed when the analysis is focused on the estimation of typical trade flows between an *ex ante* predetermined selection of countries (Egger 2000). Since the choice of FE model raises the problem of the estimation of time-invariant variables in the gravity model, two solutions are often suggested in the literature:

- Hausman-Taylor instrumental variable estimation of the RE model (Egger 2002; Serlenga – Shin 2007), and
- two-step estimation of the FE model (Martinez-Zarzoso – Nowak-Lehman 2003; Cheng – Wall 2005; Bussiere et al. 2008). The second step in this two-step procedure implies the estimation of an additional regression of bilateral (country-pair) effects on all time invariant explanatory variables.

5. ESTIMATION RESULTS

To select the appropriate estimation method for gravity model (1), we first analyse univariate characteristics of time-varying variables, i.e. their stationary property, and employ several panel unit root tests (Levin, Lin and Chu [LLC], Im, Pesaran and Shin [IPS] and Maddala-Wu Fisher-type tests). Most of the considered tests

[15] It is also worth noting that a few papers take into account possible non-stationarity in variables (Faruqee 2004; Fidrmuc 2009).

reject the null hypothesis of unit root, implying that the observed variables are stationary *(Table 1)*.[16] This enables us to apply estimation methods for stationary panels.[17]

Table 1

Panel unit root test results

Variable	LLC	IPS – W statistics	ADF Fisher
ln Xijt	–19.5623 ***	–5.9441***	–2.1901**
ln TGDP	–15.0372***	–13.9387***	–2.9720**
ln SIM	–12.7067***	–0.6634	–2.5476**
RFE	–16.7439***	–3.8718***	–1.2774*
ln RER	–26.8088***	–11.4319**	–1.7752**

Notes: *, ** and *** refer to statistical significance at the 10%, 5% and 1% level, respectively. The number of lags included in the regression model is determined by the Akaike information criterion (AIC) as suitable criteria for a short time span. Deterministic components: bilateral effects included.

Heterogeneity across panels is accounted for by the estimation of the gravity model both in the form of fixed and random two-way effects specifications.[18] Bilateral specific effects in the FE model are captured by country-pairs dummy variables, while being treated as a component of the error term in the RE model. Time effects in both specifications are comprised by T–1 time dummy variables, i.e. they are treated as fixed.

Both tests for individual effects (F test for the FE model and Honda one-sided test for the RE model) imply that the bilateral effects are significant and have to be accounted for *(Table 2)*. Furthermore, time effects should also be included in both specifications as it is confirmed by F test results. To make a choice between the FE and RE model, i.e. to check for correlation between the bilateral effects and regressors in the RE model (single endogeneity problem), we used the Hausman test robust to heteroscedasticity (Wooldridge 2002).[19] The testing

[16] We also applied the Pesaran CADF test for unit roots in heterogeneous panels which takes into account potential cross-section dependence, but the results again imply the rejection of the null hypothesis that all series are non-stationary.

[17] All estimation and testing procedures are done in Stata/SE 11.2.

[18] FE and RE specifications are estimated by within-group estimator and error-components generalised least squares (EC-GLS) estimator, respectively.

[19] The reason for using the test is that although heterogeneity is captured by bilateral specific effects, the remainder disturbance may still suffer from heteroscedasticity and then the standard Hausman test is not valid.

result indicates a correlation between bilateral (country-pair) effects and some of the regressors in the RE model. Hence, RE estimates are biased, whereas FE estimates are consistent.

A further econometric problem accounted for is autocorrelation in the error term u_{ijt} of the FE model, as it produces inefficient estimates of the regression coefficients and biased standard errors, also leaving doubt about the Hausman test validity. The Bhargava-Franzini-Narendranathan (BFN) Durbin-Watson test

Table 2

Gravity model – FE and RE estimation results

Dependent variable: ln X_{ijt}

Variables	(1) Fixed bilateral and time effects	(2) Random bilateral and fixed time effects
ln TGDP	0.906***	1.928***
ln SIM	0.920***	1.076***
RFE	0.569***	0.173**
ln D	–	–2.084***
Border	–	0.574**
EU	0.147*	0.324***
ATM	0.337***	0.236***
SAA	0.229**	0.130
CEFTA	0.380***	0.581***
FTA	0.239***	0.475***
CEE7	–	0.359*
CEE7_04	0.114	0.050
ln RER	0.589***	–0.056
Constant	–7.320***	–3.523***
R^2	0.5875	0.7535
F test – individual effects	41.97 (0.000)	
Honda test – random individual effects		86.27 (0.000)
Time effects – *F* test	34.01 (0.000)	214.64 (0.000)
Modified BFN–Durbin Watson test	1.14570	
Baltagi–Li joint LM test		11326.67 (0.000)
LM test for serial correlation, assuming individual random effects		294.67 (0.000)
Hausman robust test		242.506 (0.000)

Notes: *, ** and *** refer to statistical significance at the 10%, 5% and 1% level, respectively (in parenthesis are *p* values). *T*–1 fixed time dummies are included in all specifications of gravity model.

Source: Authors' calculations.

for the FE model indicates the presence of AR(1) in disturbances u_{ijt}.[20] Hence, according to Baltagi – Liu (2012), we applied the within-GLS estimator to estimate the FE AR(1) model, which uses the Prais–Winsten transformation to correct serial correlation in the first step (Column (3), *Table 3*).[21]

The FE AR(1) estimator, although consistent, does not provide for the direct estimation of the coefficients of time-invariant variables such as distance, border, and CEE7. If these variables are not correlated with individual effects, we can get consistent estimates of regression coefficients by applying the two-step procedure explained in the previous section. On the other hand, the Hausman-Taylor instrumental variable estimator, by allowing for the serial correlation of the AR(1) type in the remainder disturbances u_{ijt} (HT AR(1)), produces efficient estimates compared to FE AR(1) estimates, provided that a set of proper instrumental variables exist (Egger 2002, Serlenga – Shin 2007, Baltagi – Liu 2012). Thus, we applied the HT AR(1) estimator on the gravity model. We experimented with several HT sets of instruments and checked which of them is valid by the Sargan–Hansen over-identification test robust to heteroscedasticity (Wooldridge 2002). As could be expected, the single endogeneity of the FTA variable is confirmed by testing results. According to the same test, it seems that TGDP and distance variables are also singly endogenous, i.e. important sources of correlation with bilateral effects. Following this result, the appropriate HT set of instruments is constructed and the HT AR(1) specification is estimated, with efficient estimates compared to consistent FE AR(1). Consequently, the main estimation results are summarised according to the HT AR(1) specification (last two columns in *Table 3*).

Concerning the effects of standard gravity model determinants, we can conclude that a significant positive relationship exists between the TGDP and SIM variables and bilateral trade flows. This coincides with both theoretical and empirical findings that the similarity of trade partners (in terms of their GDP) and their overall GDP increase bilateral trade between them. The impact of differences in relative factor endowments (RFE) is also significantly positive: 1% increase of this difference leads to 0.529% increase in bilateral exports, meaning that trade flows between observed countries are based on comparative advantages. Contrary to more developed countries mostly characterised by intra-industrial trade, this positive relation may imply that inter-industry trade dominates in the observed

[20] The same conclusion is derived for the RE model by both Baltagi–Li joint LM tests for first-order serial correlation and individual effects, and the LM test for serial correlation assuming random individual effects *(Table 2)*.

[21] Following Egger (2002) and using the Prais–Winsten transformation, we also estimated the RE AR(1) model. However, the Hausman test again indicates a single endogeneity problem, so that the EC-GLS method produces biased estimates of RE AR(1) whereas FE AR(1) estimates remain consistent.

sample of countries, at a lower level of economic development than the core EU members. Hence, a larger difference in factor endowments increases the volume of inter-industry and total trade.

Distance as a proxy for transportation costs has a significant negative impact on bilateral flows, indicating lower bilateral exports along with greater distance between trade partners. The effect of the common border in HT AR(1) specifications is not significant. The reason for that may be that for most of the countries sharing the common border, this effect is compensated by intra-regional dummy variables.

Table 3

Gravity model – FE AR(1) and HT AR(1) estimation results

Dependent variable: ln X_{ijt}

Variables	(3) FE AR(1)	(4) HT AR(1)	(5) HT AR(1)
ln TGDP	0.844 ***	0 .906***	0.763 ***
ln SIM	0.871 ***	0.833***	0.718 ***
RFE	0.545 ***	0.529***	0.492 ***
ln D	–	–2.031***	–2.124***
Border	–	–0.0084	–0.0056
EU	0.139**	0.154**	0.151***
ATM	0.161**	0.156**	0.131**
SAA	0.109	0.106	0.039
CEFTA	0.353***	0.365***	0.392***
FTA	0.214***	0.225***	0.202***
CEE7	–	0.674**	0.985 ***
CEE7_04	0.073	0.098*	0.139**
ln RER	0.176 **	0.143**	0.125 **
wb_cee06			0.161**
wb_cee07			0.131*
wb_cee08			0.174**
wb_cee09			0.169**
wb_cee10			0.382***
cee_wb08			0.199***
cee_wb09			0.206**
cee_wb10			0.260***
Constant	–1.331***	–1.200 ***	–0.156**
R^2	0.611	0.701	0.725
Sargan–Hansen overidentif. test		7.638 (0.571)	13.034 (0.264)

Notes: *, ** and *** refer to statistical significance at the 10%, 5% and 1% level, respectively (in parenthesis are *p* values). *T*–1 fixed time dummies are included in all specifications of gravity model.

Source: Authors' calculations.

After controlling standard gravity variables, the effects of trade regime variables are considered. The most important change in trade regime is the EU membership that we estimate by the *EU* variable, measuring changes in CEE exports to the EU in the period from their formal joining the EU. Our analysis shows that the effect of EU integration on CEE bilateral exports is significant and positive, contributing to the additional increase of the new EU members' exports to the EU-15. This contribution is about 16.6%, on average {[exp(0.154) – 1]·100 = 16.6%}. CEE7 countries, former CEFTA members, had significantly higher intra-regional trade than the sample average in the whole observed period (significant *CEE7* dummy variable). Moreover, additional increase in their intra-regional trade is noted after their EU membership (measured by the *CEE7_04* dummy), since a more liberal regime in their mutual trade is introduced in comparison to the liberalisation that they experienced through CEFTA.

A further issue concerns the comparison of the effects of asymmetrical trade preferences (captured by the *ATM* variable) to the effects of SAA on WB countries' trade with the EU. The estimation results indicate that ATMs have significantly stimulated their bilateral exports resulting in its increase by 16.9%, on average. However, additional liberalisation in the form of SAA does not seem to have contributed to the dynamics of their bilateral trade. The result also coincides with an earlier finding that SAA do not show a strong impact on WB countries' bilateral exports (Herderschee – Qiao 2007). This is possibly due to the fact that most of the trade benefits WB countries received through ATMs, whereas SAA did not further liberalise their exports, but rather WB imports. To analyse it deeper, we have added set of dummy variables reflecting changes in WB–EU trade relations (Column (5), *Table 3*).[22] Results show that significant changes in WB exports toward CEE countries have occurred from 2006, which is due to the fact that most of the CEE countries, as new EU members, had to approve the application of ATMs in 2005. On the other hand, results also indicate that CEE exports toward WB countries have significantly increased from 2008, which is due to the adoption of SAA by CEE countries, as new EU members.

Further, CEFTA 2006 has a positive and significant contribution – increasing bilateral trade of its members by 44% {[exp(0.365) – 1]·100 = 44%}. This is expected, since WB countries are traditional trade partners, they belonged to a common market of former Yugoslavia, and have cultural and language similarities. The effects of non-EU trade regimes are controlled with the *FTA* dummy, which shows a positive and significant impact on bilateral trade flows of the observed countries: it increases two member countries' trade by about 25.3%, on

[22] Column (5) in *Table 3* contains only significant dummy variables for WB to CEE export flows and CEE to WB exports in several years.

average {[exp(0.225) – 1]·100 = 25.3%}. The estimated regression coefficient for real exchange rate as a proxy of price competitiveness is positive and significant. When controlling other gravity model variables, it appeared that 1% depreciation (devaluation) of the exporter's currency increases its exports by 0.15%.

6. CONCLUSIONS

We have investigated the effects of different trade regimes on bilateral trade of WB and CEE countries in the EU accession process from 2001 to 2010. The analysis corroborated our main hypothesis that along with significant effects of standard gravity model variables, trade regime variation in the EU accession process stimulated bilateral trade of the observed countries. Analysing the final stage of CEE countries on their path to EU membership, we concluded that the completion of trade integration in the EU lead to further increase of their bilateral exports to the EU. This trend is noted both in their trade with EU-15 and their intra-regional trade.

The results for WB countries indicate that trade integration with the EU has a positive effect on their trade. But, we have found out that greater positive effects on WB trade have been achieved during the first stages of their EU integration, when asymmetric trade preferences (ATMs) were applied, than in the later stages when SAA came into effect introducing symmetry, when no significant impact occurred. This is due to the low international competitive position of WB economies *vis-á-vis* the EU as their main partners. As less competitive partners, WB countries enjoyed asymmetric trade benefits unilaterally granted by the EU, and SAA did not bring any new benefits in their trade with the EU. Even more, SAA introduced symmetrical trade preferences and forced WB countries to open their market to EU goods. Related to all this, our further analysis confirmed the increase in WB exports to CEE countries after their adoption of ATMs, as new EU members. Also, the opening of the WB markets towards CEE, with the application of SAA, created more favourable trade regime that boosted CEE exports toward these countries.

Concerning trade flows to non-EU markets, we found that CEFTA 2006 represents the highest contributing factor to WB intra-regional trade. This is expected since these countries are natural trade partners with convergent economies at the same level of competitiveness. Contrary to some other obstacles in their trade with the core EU members, like technical barriers to trade, fewer barriers are present in their intra-regional trade. Besides, trade relations between acceding countries before their EU membership were governed by a series of bilateral FTAs. The analysis showed that these trade regimes played an important role in determining the mutual trade of EU acceding countries. Since there were some

indications that the exchange rate substantially determined bilateral trade flows of the observed countries, our results confirm certain contribution, which, however, does not overshadow the trade regimes' importance as the primary factor.

Our analysis demonstrates that trade regimes are important factors in determining trade flows, even when the real exchange rate is introduced as a determinant. With the process of EU accession, the trade regime varies from asymmetrical, in favour of acceding countries, to fully symmetrical at the moment when EU membership is achieved. However, these variations are not in line with the level of competitiveness of WB acceding countries. Being at a lower level of competitiveness, WB countries cannot fully stand the competitive pressure from the EU market. Therefore, apart from trade regime effects, the subject of our future research could be the investigation of the effects of competitiveness on the exports of the WB countries. Furthermore, it will be interesting to observe the effects of exchange rate volatility rather than its value, which we observed. This is especially true for Serbia, where significant variation in exchange rate is noted, since most of the other WB countries have stable exchange rates, either Euro as a currency or some kind of currency board.

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