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The Effect of Free Trade Agreements on Bilateral Trade Flows: The Case of Cefta

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Abstract: The purpose of this paper is to argue that free trade agreements do not necessarily improve trade between member countries. The effects of such agreements depend on the historical, political and ethnic circumstances in trading partner countries and the specifics of their relations. The sample consists of panel data, which includes CEFTA member countries and their major trading partners for the period 1999-2007. Results of the gravity model suggest that trade liberalisation did not improve trade in the region for the observed period, when controlling for the other trade determinants. This finding may be a result of recent conflicts between the observed countries of the region.

Keywords: Gravity model, bilateral trade flows, free trade agreements, CEFTA

JEL classifications: C33, C52, F13, F15

Introduction

Conventional wisdom is that trade liberalisation leads to improved trade performances between countries through the mechanisms of trade creation and trade diversion. The aim of this paper is to argue that the introduction of a free trade area may not necessarily have this effect, instead the outcome is dependent on the specific circumstances of member countries. Our findings support the previous findings of Yamarik and Ghosh (2005) and Subasat (2008).

The impact of the free trade agreement on bilateral trade relations between CEFTA member countries is likely to reflect not just economic but also political relations between countries of the region. Most of the current CEFTA member countries are Western Balkan countries that have specific political relations, which may potentially affect liberalization-trade relationship in unexpected directions (Bartlett,

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2009). Although implementation only started in 2007, liberalization's effect on trade may precede the formal signature of the agreement as CEFTA evolved from previous trade agreements between member countries. In the model below we seek to estimate the impact of this liberalisation process on member countries' trade.

The Effect of Free Trade Agreements on International Trade

As trade policies between trading partners are believed to have a significant impact on bilateral trade flows, variables which reflect those policies are usually included in gravity model which estimate the determinants of trade flows between trading partners. In order to capture this effect it has become common in studies to include a dummy variable for free trade agreements in gravity models as a main feature of trade liberalisation. A common finding is that they appear to have significant positive effect on bilateral trade flows (e.g. Baier and Bergstrand, 2009; Caporale et. al, 2009). This positive effect is usually attributed to trade creation and trade diversion effects[1]. Though previous research on this topic is fairly conclusive, with results varying in different studies from small positive (Micco et al., 2003; Blomqvist, 2004) to large positive effect (Adam et al., 2003, Rose, 2004) of trade liberalisation on trade flows this finding is not universal, especially when considering small and underdeveloped countries like most of the current CEFTA member countries. Subasat (2008) argues that the relationship between trade liberalization and intensity of trade flows is not conclusive and that it depends on the sample specifics. Indeed, sensitivity analysis conducted by Yamarik and Ghosh (2005) suggests further caution about the supposed strong positive effect of FTA on trade than is the literature on this topic. They found that "trade creation result in most regional trading arrangements are not robust to changes in conditioning set of variables" (Yamarik and Ghosh, 2005, p.111). Therefore, they conclude that the effect of FTAs should be determined on a case-by-case basis.

The effect of trade liberalisation on bilateral trade flows depends on countries' potentials and capacities, especially where exports are concerned. Santos-Paulino (2004) notes that trade liberalisation usually has a positive effect on imports and exports, but that in developing countries it may worsen the balance of payment as in these countries imports are likely to rise faster than exports. Other important features that have to be considered and that can disturb the expected effect of trade liberalisation on bilateral trade flows are the historical and political circumstances and ethnic considerations in the countries which are liberalising their trade flows. These latter factors will be discussed in the context of CEFTA member countries in the next section.

The Western Balkan Context

All CEFTA member countries, apart from Moldova, are Western Balkan countries which have had very turbulent economic and political histories. Until 1991 these countries were strongly connected as (with the exception of Albania) members of Yugoslavia[2], but after its breakup wars and conflicts affected. The economic, political and ethnic consequences of these conflicts persist, though these countries now share a common objective of EU accession.

In 1999 the international community created the Stability Pact for South Eastern European countries. Under the Stability Pact the EU launched the Stabilisation and Association Process (SAP). The SAP envisaged that each of the SEE countries would sign Stabilisation and Association Agreement (SAA) with EU. The Stability Pact also led to South East European countries (SEECs) signing a Memorandum of Understanding (MoU) on trade liberalisation in 2001 which required formation of free trade area among SEECs. This was to be done by creation of a network of bilateral Free Trade Agreements (FTA) between countries - 31 agreements were signed by 2004 (see *appendix 1*). Bilateral FTAs have been criticised for creating a 'spaghetti bowl' of differentiated trade relations which are likely to result in trade deflection[3] and trade diversion (Bartlett, 2009). Croatia has been a CEFTA member from 2003, while B&H, Serbia and Montenegro, Kosovo, FRY Macedonia, Albania and Moldova joined in 2006 with implementation from the end of 2007.

The arguments for creation of a free trade area among Western Balkan countries usually offered are: to encourage regional integration (to reconcile relations between conflicting countries); development of competitiveness of the region in the global (and especially EU) market as countries separately are too weak to compete and should benefit from scale economies, which are supposed to result from increased regional integration and avoidance of potential adverse shocks from the EU (Bartlett, 2009; Adam et al., 2003).

On the other side, there are a few complications regarding the process of liberalisation amongst Western Balkan countries which can be argued to lead towards a "complex and contradictory process of simultaneous integration and disintegration of the region" (Bartlett, 2009). Firstly, the EU required the Western Balkan countries to liberalize their trade among each other in order to sign SAAs and to engender regional cooperation conventions between themselves after signing[4], but at he same time the European Union liberalised trade with the countries of the region unilaterally by using "Autonomous Trade Preferences" (ATPs) that allowed duty and quota-free access for the majority of SEEC exports[5], which "cut across the region and disrupt their mutual (intra-CEFTA) trade relations" (Bartlett, 2009, p.25). This is also known as the "hub-and-spoke" problem. There is a threat that there will be no improvement in trade between SEE countries ("spoke") that became CEFTA members as the EU ("hub") is also opening its market to these countries and it is likely

that CEFTA members will focus on the EU rather than the CEFTA market and will "end up being a set of small peripheral economies that are next to each other, rather than integrated with one another" (Christie, 2002, p.26).

Trade liberalisation can negatively influence country's balance of payment and consequently its economic performance if a country did not build its competitiveness before opening its economy. This has been a case for the less developed Western Balkan countries (e.g. B&H, Kosovo) in the moment of their trade liberalisation, as they previously did not build capacities for their export improvements. Other obstacles to the development of trade (especially exports) in the region are: a lack of institutions (for quality control and certification), weak linkages to international markets, poor transport infrastructures, poor quality institutions which appear to be major determinants in the development process of the external sector (Fugazza, 2004). Other obstacles include: the persistence of non-tariff barriers (long waiting time for getting a license and quotas imposed on imports); corruption among customs officials; lack of common technical regulations and standards; inadequate sanitary and phytosanitary regulations, as well as an underdeveloped so-called backbone service sector, such as financial intermediation, transport and telecommunications (Hadziomeragic et al., 2007; Adam et al., 2003).

All of these complications suggest that we could find perverse signs on some variables in our model of trade flows estimated in the following section. As Bartlett (2009, p.44) argued:

> "The Balkan case indicates the potential unreadiness for trade liberalisation of Western Balkan countries and complexities of regional integration, and that in a politically and ethnically divided region, policies designed to promote regional economic cooperation may in practice have contradictory effects, opposed to those that were intended by their designers drawing on experience of more benign environments."

Estimating Bilateral Trade Relations

The gravity model, which has been used for over 40 years for estimation of bilateral trade determinants, specifies economic mass (national income) of the countries of interest and the distance between them as major bilateral trade determinants. In the recent studies economists use an extended gravity model including other variables considered to be important determinants of international trade flows. There is no consensus on which variables to add as determinants of bilateral trade flows. Commonly used determinants in recent studies are: regional trade agreements (Yamarik and Ghosh, 2005, Rose 2000, 2005), variability of exchange rate (Pugh et al, 1999; Clark et al, 2004), membership in institutions which promote trade (Rose, 2005, Engelbrecht and Pearce, 2007) and the effects of border on trade (Anderson and Wincoop, 2003).

Other researchers have been trying to improve the gravity model by including additional variables such as population variables; dummy variables to account for shared characteristics between countries that are likely to induce or inhibit trade between them, such as dummy variables for common border, common language, membership in free trade agreements and institutions that promote trade (Clark et al., 2004) and monetary variables, such as exchange rate variability, currency union, foreign currency reserves (Kandogan, 2007).

Eichengreen and Irwin (1988) tried to improve model by emphasizing the importance of a shared history between countries in free trade areas, arguing that free trade agreements may be a result of previous connections and relations between countries. History can also affect trade through political, historical and economic circumstances from the past, such as wars, recessions, exchange rate shocks, affiliation, networks and other temporary or permanent changes that may have permanent effect on trade of observed countries (Anderson and Smith, 2007). In order to capture this effect they suggested inclusion of lagged dependent variable in the gravity model. Although Eichengreen and Irwin found evidence for hysteresis their addition was widely ignored in subsequent literature. If hysteresis is an important determinant of trade flows then many gravity models which did not take it into account suffer from a missing-variable bias (Anderson and Smith, 2007). On the other hand, inclusion of the lagged dependent variable may cause problems with estimation. As the lagged dependent variable is likely to be correlated with unobserved terms from the past, which are captured by the error term, the inclusion of the lagged dependent variable is likely to induce a problem with endogeneity. However, recent developments, especially the introduction of dynamic panel estimation, enable this problem to be addressed. The change from cross-sectional data to time-series panels "has allowed the use of a lagged dependent variable, country fixed effects for exporters and/or importers, log-first-differences of variables, and estimations of time-varying regression parameters" (Schaefer et al., 2008, p.3). These potential problems regarding endogeneity, heterogeneity and omitted variable bias are addressed in the following analysis.

Data and Sources

In an attempt to assess the impact of the CEFTA (and the previous network of free trade agreements between CEFTA countries) on the export performance of member countries we estimate a gravity model comprising of 20 countries for the period 1999–2007. In addition to the seven CEFTA member countries (Kosovo is not included becuase of a lack of data) are 13 countries which are the main exporting partners of the CEFTA member countries and capture virtually all the export markets for the CEFTA member countries.

Most of the data for bilateral trade flows are taken from the International Monetary Fond DOTS (Director of Trade Statistics) database. Some data were not available in DOTS database (for Montenegro and Serbia for some years) and were obtained from national statistics. Data for nominal GDP, GDP per capita and CPI index (used for calculation of real exchange rate) are taken from the World Bank World Development Indicators database (apart for CPI for Bosnia and Herzegovina and Montenegro which are taken from national statistics, and adjusted to the base year 2000). Bilateral exchange rates between countries are calculated through using the exchange rate of each national currency in respect to dollar at the end of the year (usually on the last day of the year) which is taken from UN database (http://www.un.org/depts/treasury, Accessed 15 July 2009). For countries which used their own currencies before adopting the euro, their national currency is transformed to euros (for the period before its adoption) in order to be comparable (to avoid large changes in exchange rates which are due to the introduction of a new currency rather than real change in exchange rates) using the official rates of national currency and euro on the day of conversion. The exchange rate is expressed as units of domestic (exporter's) currency for a unit of foreign (importer's) currency. Distance is calculated by using great circle distance between capitals of observed countries by using the calculator on http://www.marinewaypoints.com/learn/greatcircle.shtml (Accessed 17 July 2009). Data on the dates of bilateral free trade agreements signed between CEFTA member countries (before joining CEFTA) are taken from the Stability Pact for South Eastern Europe website (see *appendix 1*). All data are expressed in nominal terms, apart from the exchange rate which is in real terms as we are interested in the effect of real changes of exchange rate variability on trade. All data are expressed in dollars.

As the dependent variable export flows are considered. The exports are used rather than imports because most of the studies on international trade examine the effect of exports on trade flows (Matyas, 1997; Cheng and Wall, 2005; Anderson and Smith, 2007) and because it reflects countries' growth potentials and productive capacities.

Empirical Results

The review of theoretical and empirical research above founds that some studies included the lag dependent variable in their estimations and some did not. In our analysis, as suggested by Schaefer et al. (2008), results from both static and dynamic model will be presented.

Static model

As suggested by Cheng and Wall (2005) and Adam et al. (2003) the most appropriate static model specification is a model with country-pair and time fixed effects[6]. As all variables in the gravity equation are constructed as measures of country i relative to country j it seems natural to assume that the specific effect is also expressed as a measure of country i to country j (Adam et al., 2003). In other words, each cross section in our panel represents a different bilateral flow.

This model specification addresses the problem of heterogeneity between country-pairs (which may be the result of previous relations between countries) by inclusion of trade-pair fixed effects, hence removing the country-pair specific time-invariant variables, such as distance, common border, common language (the model used by Cheng and Wall, 2005). Time fixed effects are also included in the model to control for time-specific factors such as world business cycles and global shocks as well as variables of our interest (equation 1).

$$\begin{aligned} \ln EXP_{ijt} = A + \alpha_{ij} + \gamma_t + b_1 \ln(GDP_{it} GDP_{jt}) + b_2 |\ln GDPPC_{it} - \ln GDPPC_{jt}| + \\ + b_3 \ln ERV_{ijt} + b_4 CEFTA_{ijt} + b_5 FTAcefta_{ijt} + b_6 EU_{ijt} + b_7 EMU_{ijt} + \varepsilon_{ijt} \end{aligned} \quad (1)$$

where, $lnEXP_{ijt}$ is logged exports of country i to country j in period t; α_{ij} is country-pair fixed effect, γ_t is time-fixed effect; $ln(GDP_{it}GDP_{jt})$ is logged product of nominal GDPs of countries, which is a measure of the level of development; $|lnGDPPC_{it} - lnGDPPC_{jt}|$ is absolute difference between two countries' per capita GDPs, which should capture Linder effect (an underlying rationale of the Linder effect is: the closer the per capita incomes of two countries are there will be more (intra-industry) trade between them); $lnERV_{ijt}$ is standard deviation of annual changes in the real exchange rate between currencies of countries i and j in period t; $CEFTA_{ijt}$ is dummy variable which takes value 1 if both countries were CEFTA members in period t; $FTAcefta_{ijt}$ is dummy variable which takes value 1 for years in which (current CEFTA) counties were members of bilateral free-trade arrangement (before joining CEFTA), EU_{ijt}, EMU_{ijt} are dummy variables which are 1 if both trading partners are EU (EMU) member countries in period t; ε_{ijt} is normally distributed error term and A is a constant term.

The significance of the model with group (country-pair) and time fixed effects is tested by a standard F-test and the null hypothesis that included variables (most of which are country-pair fixed effects) are significantly equal to zero is rejected at all conventional levels (*Appendix 2*). Moreover, autocorrelation between residuals is tested by using the Wooldridge test for autocorrelation in panel data which generates a test statistic to compare with critical values and thus enables formal hypothesis testing (*Appendix 3*). The null hypothesis that there is no first-order autocorrelation is on the border line of rejection at 5% significance level (p-value 0.0458). As autocorrelation is not too high it is possible to interpret the estimated coefficients as

giving economic meaning, because they might potentially be expected to be unbiased and consistent in respect to residual autocorrelation. According to the results of two-way fixed effect model[7] with robust standard errors[8] (*Appendix 2*) only two variables are significant: the product of GDPs of countries and variable that is supposed to capture the Linder effect. Both of these have a positive effect on exports indicating that the higher the income of countries is the higher the exports from country i to country j will be and exports between countries from the sample are likely to be higher the more different countries are (although we expected the sign on Linder effect to be negative). The exchange rate variable has a positive but insignificant effect. The effect of CEFTA is positive but also insignificant, while the effect of free trade agreements between CEFTA member countries is negative and insignificant (for sign and size of coefficients see *table 1*).

Table 1. Estimated coefficients from the preferred static (two-way fixed effects) model

Variable	Estimated coefficient
$\ln(GDP_{it}GDP_{jt})$	0.95536***
$\lvert \ln GDPPC_{it} - \ln GDPPC_{jt} \rvert$	0.45598***
$\ln ERV_{ijt}$	0.02959
$CEFTA_{ijt}$	0.15984
$FTAcefta_{ijt}$	-0.16099
EU_{ijt}	0.04963
EMU_{ijt}	0.11665

Note: ***, **, * donates that variables are statistically significant at the 1%, 5% and 10%, respectively

However, as argued above this static model might be misspecified as it does not include any influences from the past which may have significant effects on dependent variable. There are also some variables that might affect the dependent as well as independent variables and some variables (free trade agreement) might be endogenous, which are not accounted for in the static estimation and which may make our estimates biased and seriously undermine the validity of the estimation results. Moreover, as mentioned above the autocorrelation is on the border line.

Dynamic model

Eichengreen and Irwin (1998, p.56) concluded that they would "never run another gravity model equation that excludes lagged trade flows" and since some of the recent studies have included the lagged dependent variable in the gravity model we have also estimated the model with the lagged dependent variable in order to test for significance of any "history effect".

A dynamic model, which simply adds a lagged dependent variable (which captures the effect of history on trade) to the original "Newtonian" specification, is estimated (equation 2).

$$\begin{aligned} \ln EXP_{ijt} = A + b_0\mathbf{ln(EXP_{ijt-1})} + b_1 \ln(GDP_{it}GDP_{jt}) + b_2 \ln DIST_{ij} + b_3|\ln GDPPC_{it} - \\ - \ln GDPPC_{jt}| + b_4 \ln ERV_{ijt} + b_5 combrd_{ij} + b_6 comlang_{ij} + b_7 CEFTA_{ijt} + \\ + b_8 FTAcefta_{ijt} + b_9 EU_{ijt} + b_{10} EMU_{ijt} + \gamma_t + \varepsilon_{ij} \end{aligned} \quad (2)$$

All General Method of Moments (GMM) techniques for estimating dynamic panel models are suitable for panels with large cross section (N) and short time series (T) which is relatively the case with our sample (20 countries and 7 years of data). Dynamic panel estimators require as few as three periods of data to be usable, although 'four or more will be preferable' (Greene, 2007, E11-83, as cited in Pugh, 2009). The motivation for dynamic panel is to overcome the above mentioned limitations of static panel analysis. Other advantages of GMM are that distributional assumptions, such as normality, are not required and that enables us to control for unobserved heterogeneity of the same individuals over time (Verbeek, 2000, as cited in Pugh, 2009).

The results of the "system" GMM can be interpreted as the diagnostics are satisfactory: p-value of Hansen test is 0.494 (which is above Roodman's rule of thumb threshold of p=0.25). Arellano-Bond test for AR(2) in first differences is also satisfied (hypothesis of no second-order autocorrelation is "accepted" at conventional levels), although test for AR(1) is only satisfied at 10% significance level. The "difference-in-Hansen" test is suggesting that differenced instruments for level equations are valid, indicating that the "system" GMM is preferable over the "difference" GMM model[9] (Appendix 5). According to results of the "system" GMM estimates (*Appendix 5*) the lagged dependent variable (*lnexp L1*) is highly significant and positive indicating that the effect of history (past relations between two countries) on current exports is important, implying that dynamic specification is likely to be more comprehensive than the static one. The lagged dependent variable suggests that the current level of exports will be 65% of the previous year[10] level of exports irrespective of the current value of the independent variables. Moreover, all variables which are commonly included in the gravity model (income - $ln(GDP_{it}GDP_{jt})$, distance - *lndist*, common border - *combrd* and common language - *comlang*) are significant and have the expected signs in this dynamic specification. According to the results, holding other factors constant: if GDPs of trading partners (i and j) increase for 1% exports from country i to country j will increase for 0.3%; if distance between countries i and j increases for 1% exports from country i to country j will decrease for 0.42%; if countries i and j share the border exports from country i to country j is by 26.21%[11] higher than for countries which do not have same border; if the same language is spoken in countries i and j exports from country i to country j is by 36.26%

higher than export between countries in which the language spoken is not the same. The Linder effect now has a negative sign (contrary to the sign in the static model) which is consistent with our expectations. The exchange rate (ER) variability variable again did not pass robustness checks and is insignificant when time dummies are included. One possible reason for this insignificance of ER variability is that there is no control for different ER regimes. However, there is no consensus on the impact of ER regimes on exports. The free trade agreement variable appears as significant (at the 10% level) and negative, indicating that when both trading partners are members of pre-CEFTA network of free trade agreements exports from country i to country j is by 29.73% lower than if one or both were not members. This result may be a consequence of the political situation in the region and trade diversion from the region towards the EU market as a result of the Autonomous Trade Preferences discussed above. The CEFTA variable is negative as well, but insignificant. Estimated coefficients and significance of the variables from the preferred dynamic model are presented in *table 2* (results are from the two-step robust 'xtabond2' estimation[12]).

Table 2. Estimated coefficients from the "system" GMM estimation

Variable	Estimated coefficient
lnexp L1	0.6477***
$\ln(GDP_{it}GDP_{jt})$	0.2889***
$\lvert lnGDPPC_{it} - lnGDPPC_{jt} \rvert$	-0.0987**
$lnERV_{ijt}$	0.2532
lndist	-0.424***
combrd	0.2328**
comlang	0.3094**
$CEFTA_{ijt}$	-0.1336
$FTAcefta_{ijt}$	-0.3529*
EU_{ijt}	-0.1237**
EMU_{ijt}	-0.0659

Note: ***, **, * donates that variables are statistically significant at the 1%, 5% and 10%, respectively

Conclusion

In the recent gravity literature there is no consensus about the variables that should be included in the gravity model or about the method of estimation which is likely to provide the most appropriate results when estimating the bilateral trade determinants. In this paper alternative specifications were estimated and the dynamic model estimated by "system" GMM appears as the preferred one (according to diagnostic

tests and significance of the lagged dependent variable). We think that the "history" effect cannot be directly captured by the fixed effects (as noted in some studies) and that inclusion of lagged dependent variable, when dynamics are present, is important in order to get unbiased estimates. Furthermore, it is important to treat free trade agreements variables as endogenous as they may be a result, as well as a source, of potentially higher trade between countries, which can be done by GMM estimation.

All variables which are commonly included in the model appear as significant in our preferred specification and have expected signs – income, common border and common language have positive effects on exports while distance has a negative effect, ceteris paribus. The exchange rate variability variable did not turn out to be significant and did not pass robustness checks and, therefore, we cannot make any inference about sign and size of the estimated coefficient on this variable. The variable for free trade agreements between CEFTA countries appears to be significant and has a negative effect on exports. This result suggests that the conventional wisdom that trade liberalisation leads to improved trade performances between member countries does not apply in the case of CEFTA. A finding which supports the argument of Yamarik and Ghosh (2005) that rather than assuming beneficial results, the effect of each FTA needs to be analysed on a case by case basis. Given the unique recent history of the Western Balkans we do not find these results surprising. The absence of positive trade effects should not be interpreted as a criticism of the creation of CEFTA since there are also potential political and institutional benefits from such a process. It does however suggest that the anticipated economic benefits of this agreement may have been exaggerated.

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NOTES

[1] Trade creation is present when imports (which are cheaper after signing FTA) replace (more expensive) domestic production. Trade diversion occurs when country lowers its imports from the third country and increase imports of the same goods from countries from free trade area (because they are cheaper in those countries due to absence of tariffs on goods imported from free trade area).

[2] Slovenia, Croatia and Macedonia resign Yugolavia in 1991, B&H in 1992, Montenegro in 2006 and Kosovo in 2008.

[3] "Trade deflection can arise when, in the absence of effectively implemented rules of origin, the country with the lowest external tariffs is likely to serve as an entry point into its partner's market (with higher tariffs) for the goods originating in non-member countries" (Hadziomeragic, 2007, p. 77).

[4] The EU signed SAAs with Macedonia and Croatia in 2001 which eventually came into force in 2004. SAAs have also been signed with Albania in 2006, with Montenegro in 2007, and with Serbia, and Bos-

nia and Herzegovina, in 2008. Kosovo, which declared its independence in February 2008, is the only Western Balkan country which has not yet signed an SAA with the EU (Bartlett, 2008, p. 27).

[5] In 2000, the EU granted ATPs to all the Western Balkans allowing nearly all exports to enter the EU without customs duties or limits on quantities. Only wine, sugar, baby beef and certain fisheries products enter the EU under preferential tariff quotas. These preferences, which were renewed in 2005 until 2010, have contributed to an increase in the Western Balkans' exports to the EU by approximately 8% per year. In 2007, the EU was the region's largest trading partner for both imports (61.3%) and exports (63.2%)

(http://ec.europa.eu/trade/issues/bilateral/regions/balkans/ - website accessed on 2 July 2009).

[6] Estimates and diagnostics for the other static model specifications are available on demand

[7] Hausman specification test was performed in STATA 10 (Appendix 4). The respective p-value is 0.0000 and thus the null hypothesis that the random effects estimator is consistent is soundly rejected. Consequently, we can conclude that the fixed effects estimator is the more appropriate specification than random effects estimator.

[8] All reported results include robust standard errors as it is suggested to rely on those results as those are corrected for potential heteroscedasticity. Baum (2006, p.137) also notes that in large dataset it has become increasingly common to report results using the robust estimator of the VCE.

[9] Estimates and diagnostics for the "difference" GMM and estimates of different specifications (with different number of instruments used) are available on demand.

[10] To control for persistance effect one lag of dependent variable is enough as focus of the study was not on the persisatnce effect as such. Also, in StataCorp (2007, p.96) it is suggested to use one lag of dependent variable as "the moment conditions using higher lags are redundant".

[11] Percentage changes in the predicted y for dummy variables are calculated by formula 100*[exp( ) - 1] (see Wooldridge, 2006, p.238).

[12] "… 'xtabond2', unlike 'xtabond', makes available a finite-sample correction to the two-step covariance matrix derived by Windmeijer (2000). This can make two-step robust more efficient than one-step robust, especially for system GMM" (Stata help for 'xtabond2'). Robust standard errors are used to correct for heterogeneity (which is usually present in the panel data).

REFERENCES

Adam, A., Kosma, S. T. and McHugh, J., (2003), 'Trade-Liberalization Strategies: What Could Southeastern Europe Learn from CEFTA and BFTA?', *IMF working paper*.

Anderson, M. A. and Smith, S. L. S., (2007), 'How Does History Matter? Hysteresis in Canadian Trade', *North American Journal of Economics and Finance*, 18(3): 279-279.

Anderson, J. E., and van Wincoop, E., (2003)., 'Gravity with Gravitas: A Solution to the Border Puzzle', *American Economic Review*, 93(1): 170-192.

Baier, S. L. and Bergstrand, J.H., (2009), 'Estimating the effects of free trade agreements on international trade flows using matching econometrics', *Journal of International Economics*, 77: 63-76.

Bartlett, W., (2009), 'Regional Integration and Free-Trade Agreements in the Balkans: Opportunities, Obstacles and Policy Issues', *Economic Change and Restructuring*, 42(1-2): 25-46.

Baum, C.F., (2006), *An Introduction to Modern Econometrics Using Stata* (A Stata Press Publication, StataCorp LP, College Station, Texas).

Blomqvist H.C., (2004), 'Explaining Trade Flows of Singapore', *Asian Economic Journal*, 18(1).

Caporale, G. M., Rault, C., Sova, R. And Sova, A., (2009), 'On the Bilateral Trade Effects of Free Trade Agreements between the EU-15 and the CEEC-4 Countries', *Review of World Economics (Weltwirtschaftliches Archiv)*, 145(3): 573-573.

Cheng, I.H and Wall, H. J., (2005), 'Controlling for Heterogeneity in Gravity Models of Trade and Integration', *Federal Reserve Bank of St. Louis Review*, 87(1): 49-63.

Christie, E., (2002), 'Potential Trade in Southeast Europe: A Gravity Model Approach', *WIIW Working Papers* No. 21.

Clark, P., Tamirisa, N., and Wei, S.J., (2004), 'Exchange Rate Volatility and Trade Flows - Some New Evidence', *IMF working paper*.

Eichengreen, B. and Irwin, D. A., (1998), 'The Role of History in Bilateral Trade Flows, in Frankel, J.A. (ed.), *The regionalization of the world economy*, Chicago: University of Chicago Press.

Engelbrecht, H.J., Pearce, C., (2007), 'The GATT/WTO Has Promoted Trade, but Only in Capital-Intensive Commodities!', *Applied Economics*, 39(10-12): 1573-1581.

Fugazza, M., (2004), 'Export performance and its determinants: supply and demand constraints', *United Nations - Trade Analysis Branch, Policy Issues in International Trade and Commodities*, Study Series No. 26.

Hadziomeragic, A., Jakubiak M., Oruc, N., Paczyñski, W., (2007), 'Regional Free Trade Agreements of Bosnia and Herzegovina: Analysis and policy recommendations', *Center for Social and Economic Research, CASE report paper*, No. 69.

Kandogan Y., (2007), 'Sensitivity of international blocs' trade effect to alternative specifications of the gravity equation', *Journal of Applied Economics*, X(2): 337-360.

Matyas, L., (1997), 'Proper econometric specification of the gravity model', *World Economy*, 20(3): 363-368.

Micco A., Stein E., Ordonez G., (2003), '*The currency union effect on trade: Early evidence from EMU'*, Economic Policy, 37: 316–356.

Pugh. G., (2009), *'Lecture notes on the GMM estimation of dynamic panel models: an intuitive explanation of the principles'*, Staffordshire University Business School.

Pugh, G., Tyrrall, D. and Tarnawa, L., (1999), 'Exchange Rate Variability, International Trade and the Single Currency Debate: a Survey' in Meeusen (ed.) *Economic Policy in the European Union: Current Perspectives* (Cheltenham, UK: Edward Elgar).

Rose, A., (2000), 'One Money, One Market: Estimating the Effect of Common Currencies on Trade Forthcoming', *Economic Policy*, (30): 7-33.

Rose, A., (2004), 'Do We Really Know That the WTO Increases Trade', *The American Economic Review*, 94(1): 98-114.

Rose, A., (2005), 'Which International Institutions Promote International Trade?', *Review of International Economics*, 13(4): 682-698.

Santos-Paulino, A.U.,(2004), 'Trade Liberalization and the Balance of Payments in Selected Developing Countries', *The Manchester School*, 72(1): 100-118.

Schaefer, K. C., Anderson, M. A. and Ferrantino, M. J., (2008), 'Monte Carlo Appraisals of Gravity Model Specifications', *Global Economy Journal*, 8(1).

Subasat, T., (2008), 'Do Liberal Trade Policies Promote Trade Openness?', *International Review of Applied Economics*, 22(1): 45-61.

Yamarik, S. and Ghosh, S., (2005), 'A Sensitivity Analysis of the Gravity Model', *International Trade Journal*, 19(1): 83-126.

Wooldridge, J. (2006) *Introductory Econometrics: A Modern Approach*, Thomson, South-Western, USA

http://www.stabilitypact.org/, Stability Pact for South Eastern Europe website (Accessed 6 July 2009

http://www.un.org/depts/treasury, United Nations Operational Rates of Exchange (1997-2007) (Accessed 15 July 2009)
http://www.marinewaypoints.com/learn/greatcircle.shtml (Accessed 17 July 2009)
http://esdsw2.mc.manchester.ac.uk/WDS_DOTS/TableViewer/tableView.aspx?ReportId=9738, IMF DOTS Direction of Trade Statistics database (Accessed 20 July 2009)
http://esdsw2.mc.manchester.ac.uk/WDS_WB/TableViewer/dimView.aspx?ReportId=57, World Bank World Development Indicators database (22 July 2009)
http://geophysics.ou.edu/solid_earth/readings/testkey/geographic percent20coordinates.htm (Accessed 15 July 2009)
http://www.nbs.rs, National Bank of Serbia (Accessed 13 July 2009)
Internal sources from Central Banks of Bosnia and Herzegovina, Serbia and Montenegro
http://ec.europa.eu/trade/issues/bilateral/regions/balkans/ (Accessed on 2 July 2009)

APPENDIX

Appendix 1. Free trade agreements between Western Balkan countries as of 31 December 2006

	Albania	B&H	Croatia	Macedonia	Moldova*	Serbia and Montenegro**	UNMIK/ Kosovo***
Albania		applied 01/12/04 WTO****	applied 01/06/03 WTO	applied 15/07/02 WTO	applied 01/11/04 WTO	applied 01/08/04 WTO	applied 01/10/03 WTO
Bosnia and Herzegovina	applied 01/12/04 WTO		applied 01/02/05 WTO	applied 01/07/02 WTO	applied 01/10/04 WTO	applied 01/06/02 WTO	signed 19/10/06 provisional application 01/12/06
Croatia	applied 01/06/03 WTO	applied 01/02/05 WTO		applied 11/06/97 revised 11/06/02 applied 11/07/02 WTO	applied 01/10/04 WTO	applied 01/07/04 WTO	signed 28/09/06 provisional application 01/11/06
Macedonia	applied 15/07/02 WTO	applied 01/07/02 WTO	applied 11/06/97 revised 11/06/02 applied 11/07/02 WTO		applied 01/12/04 WTO	signed 21/10/05 applied 01/06/06	applied 02/02/06
Moldova*	applied 01/11/04 WTO	applied 01/10/04 WTO	applied 01/10/04 WTO	applied 01/12/04 WTO		applied 01/09/04 WTO	
Serbia and Montenegro**	applied 01/08/04 WTO	applied 01/06/02	applied 01/07/04 WTO	signed 21/10/05 applied 01/06/06	applied 01/09/04 WTO		
Kosovo***	applied 01/10/03 WTO	signed 19/10/06 provisional application 01/12/06	signed 28/09/06 provisional application 01/11/06	applied 02/02/06			

* Moldova is accosiated to the process with an extended timeline
** Serbia & Montenegro started negotiation process when it was known as FR Yugoslavia; therefore, both names may appear on the agreements
*** All agreements in line with UNSCR 1244
****FTA notified to WTO
Source: http://www.stabilitypact.org/ (Accessed on 6 July 2009)

Appendix 2 – Fixed effect model (with time dummies and cpair fixed effects) – robust SE (the preferred static model)

. xi: xtreg lnexp lngdpij linder sdlrerd lndist combrd comlang cefta ftacefta eu emu i.time, fe i(cpair) vce(robust)
i.time _Itime_1999-2007 (naturally coded; _Itime_1999 omitted)

Fixed-effects (within) regression		Number of obs	= 2130
Group variable: cpair		Number of groups	= 380
R-sq: within = 0.1876		Obs per group: min	= 1
between = 0.4854		avg	= 5.6
overall = 0.4788		max	= 6
		F(12,1738)	= 126.17
corr(u_i, Xb) = -0.3366		Prob > F	= 0.0000

(Std. Err. adjusted for clustering on cpair)

lnexp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lngdpij	.9553635	.124779	7.66	0.000	.7106306	1.200096
linder	.4559839	.1175453	3.88	0.000	.2254389	686529
sdlrerd	.0295944	.1662344	0.18	0.859	-.296446	.3556348
lndist	(dropped)					
combrd	(dropped)					
comlang	(dropped)					
cefta	.1598377	.2745519	0.58	0.561	-.3786492	.6983246
ftacefta	-.1609966	.2312902	-0.70	0.486	-.6146331	.2926398
eu	.0496353	.0360995	1.37	0.169	-.0211678	.1204384
emu	.1166456	.0875046	1.33	0.183	-.0549798	.288271
_Itime_2000	(dropped)					
_Itime_2001	(dropped)					
_Itime_2002	.29757	.1532879	1.94	0.052	-.003078	.5982181
_Itime_2003	.1419365	.1013963	1.40	0.162	-.0569351	.3408082
_Itime_2004	.0726453	.0733901	0.99	0.322	-.0712969	.2165875
_Itime_2005	-.0250932	.0796678	-0.31	0.753	-.1813481	.1311618
_Itime_2006	.1110126	.0554993	2.00	0.046	.0021602	.219865
_Itime_2007	(dropped)					
_cons	-30.18423	6.419053	-4.70	0.000	-42.77411	-17.59435
sigma_u	2.5506078					
sigma_e	.85520669					
rho	.8989387	(fraction of variance due to u_i)				

Appendix 3 - Xtserial – testing for residual autocorrelation

```
. xtserial lnexp lngdpij linder sdlrerd lndist combrd comlang cefta ftacefta eu emu
year2000 year2001 year2002 year20
> 03 year2004 year2005 year2006 year2007

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F(  1,     348) =          4.016
      Prob > F =                0.0458
```

Appendix 4 – Hausman test

. hausman fixed random

	---- Coefficients ---- (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lngdpij	9553635	.9949944	-.0396309	.1526765
linder	.4559839	.0180715	.4379125	.1448401
sdlrerd	.0295944	.0772784	-.047684	.0332445
cefta	.1598377	.1244753	.0353624	.0174328
ftacefta	-.1609966	-.2461777	.0851811	.0176624
eu	.0496353	-.0279306	.0775659	.0209395
emu	.1166456	-.0814321	.1980777	.1557844
_Itime_2003	.1419365	-.1849549	.3268915	.1795995
_Itime_2004	.0726453	-.2760845	.3487298	.1154668
_Itime_2005	-.0250932	-.3984172	.373324	.0828604
_Itime_2006	.1110126	-.2957068	.4067194	.0371407

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

```
Test:  Ho:  difference in coefficients not systematic

              chi2(11)     =  (b-B)'[(V_b-V_B)^(-1)](b-B)
                           =      73.26
              Prob>chi2    =  0.0000
              (V_b-V_B is not positive definite)
```

Appendix 5 – "system" GMM estimated with xtabond2, with minimum instruments, but not collapsed (treating cefta and ftacefta as endogenous) (the preferred dynamic model)

```
. xi: xtabond2 lnexp L.lnexp lngdpij linder sdlrerd lndist combrd comlang cefta
ftacefta eu emu i.time, gmm(L.lnexp, laglimits(1 1)) gmm(ftacefta cefta, laglimits
(2 2)) iv(lngdpij linder sdlrerd lndist combrd comlang eu emu i.time) two robust

i.time            _Itime_1999-2007    (naturally coded; _Itime_1999 omitted)
Favoring space over speed. To switch, type or click on mata: mata set matafavor speed, perm.
_Itime_2000 dropped due to collinearity
_Itime_2001 dropped due to collinearity
_Itime_2007 dropped due to collinearity
Warning: Two-step estimated covariance matrix of moments is singular.
Using a generalized inverse to calculate optimal weighting matrix for two-step estimation.
Difference-in-Sargan statistics may be negative.

Dynamic panel-data estimation, two-step system GMM

Group variable : cpair                          Number of obs      =      2093
Time variable  : time                           Number of groups   =       380
Number of instruments = 43                      Obs per group: min =         1
Wald chi2(16)  =  7476.67                                      avg =      5.51
Prob > chi2    =     0.000                                     max =         6
```

lnexp	Coef.	Corrected Std. Err.	z	P>|z|	[95%	Conf. Interval]
lnexp						
L1.	.6476753	.1174671	5.51	0.000	.417444	.8779065
lngdpij	.2889787	.1044579	2.77	0.006	.0842449	.4937124
linder	-.0986999	.0464431	-2.13	0.034	-.1897268	-.0076731
sdlrerd	.2531785	.1627105	1.56	0.120	-.0657281	.5720852
lndist	-.4240023	.1486736	-2.85	0.004	-.7153972	-.1326074
combrd	.2327617	.1080895	2.15	0.031	.0209101	.4446133
comlang	.3094208	.1499529	2.06	0.039	.0155186	.603323
cefta	-.133595	.1873821	-0.71	0.476	-.5008571	.2336672
ftacefta	-.3528664	.2147847	-1.64	0.100	-.7738367	.0681039
eu	-.1236696	.0620561	-1.99	0.046	-.2452973	-.0020419
emu	-.0659344	.0768943	-0.86	0.391	-.2166446	.0847757
_Itime_2002	-.0164873	.0522292	-0.32	0.752	-.1188546	.08588
_Itime_2003	.0213511	.0293885	0.73	0.468	-.0362493	.0789516
_Itime_2004	.0597311	.0259287	2.30	0.021	.0089117	.1105504
_Itime_2005	-.0213723	.0265308	-0.81	0.420	-.0733717	.0306271
_Itime_2006	.0443178	.0298477	1.48	0.138	-.0141826	.1028183
_cons	-4.674977	2.168236	-2.16	0.031	-8.924642	-.4253117

```
Instruments for first differences equation
  Standard
    D.(lngdpij linder sdlrerd lndist combrd comlang eu emu _Itime_2000
    _Itime_2001 _Itime_2002 _Itime_2003 _Itime_2004 _Itime_2005 _Itime_2006
    _Itime_2007)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L.L.lnexp
    L2.(ftacefta cefta)
Instruments for levels equation
  Standard
    _cons
    lngdpij linder sdlrerd lndist combrd comlang eu emu _Itime_2000
    _Itime_2001 _Itime_2002 _Itime_2003 _Itime_2004 _Itime_2005 _Itime_2006
    _Itime_2007
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    D.L.lnexp
    DL.(ftacefta cefta)
```

```
Arellano-Bond test for AR(1) in first differences: z =  -1.64  Pr > z =  0.102
Arellano-Bond test for AR(2) in first differences: z =   0.66  Pr > z =  0.512
```

```
Sargan test of overid. restrictions: chi2(26)   = 220.88  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(26)   =  25.45  Prob > chi2 =  0.494
  (Robust, but can be weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
  GMM instruments for levels
    Hansen test excluding group:     chi2(12)   =   7.24  Prob > chi2 =  0.841
    Difference (null H = exogenous): chi2(14)   =  18.21  Prob > chi2 =  0.198
  gmm(L.lnexp, lag(1 1))
    Hansen test excluding group:     chi2(15)   =  16.54  Prob > chi2 =  0.347
    Difference (null H = exogenous): chi2(11)   =   8.90  Prob > chi2 =  0.631
  gmm(ftacefta cefta, lag(2 2))
    Hansen test excluding group:     chi2(8)    =   5.74  Prob > chi2 =  0.677
    Difference (null H = exogenous): chi2(18)   =  19.71  Prob > chi2 =  0.349
  iv(lngdpij linder sdlrerd lndist combrd comlang eu emu _Itime_2000 _Itime_2001 _Itime_2002 _Itime_2003
_Itime_2004 _I
> time_2005 _Itime_2006 _Itime_2007)
    Hansen test excluding group:     chi2(13)   =  14.96  Prob > chi2 =  0.310
    Difference (null H = exogenous): chi2(13)   =  10.48  Prob > chi2 =  0.654
```