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The effect of non-tariff barriers on exports of CEFTA member countries[1]

Merima Orlić[2]

Selena Duraković[3]

Abstract

The purpose of this paper is to investigate whether the CEFTA membership improved trade between members and whether it affected the trade between CEFTA members and EU in the accession process. We also estimate the effect of non-tariff barriers on trade between members, and observe CEFTA membership conditionality of this effect. The sample consists of panel data, which includes CEFTA member countries and their major trading partners for the period 1996-2017. We use dynamic Poisson model that control for country-pair effects to address heteroscedasticity and the presence of zero in the trade matrix and we account for endogeneity of regional trade agreements by using a two-stage procedure. Our findings confirm that CEFTA membership increased bilateral exports of its members. Moreover, we find that non-tariff barriers deter trade, while traditional gravity determinants (distance and tariffs) lost their importance for bilateral trade between countries.

Keywords: CEFTA, non-trade barriers, Poisson model, two-stage procedure

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[2] Merima Orlić, Associate professor at School of Economics and Business, University of Sarajevo; merima.balavac@efsa.unsa.ba

[3] Selena Duraković, Associate professor at School of Economics and Business, University of Sarajevo; selena.begovic@efsa.unsa.ba

1. Introduction

The effect of multilateral trade agreements on trade is ambiguous and difficult to single out due to other trade agreements between member and non-member countries, specificity of relations between member countries, as well as individual countries' factors. Since there is a tendency of reducing and very often eliminating trade measures, non-trade measure (NTMs) are gaining more attention and importance. NTBs have been shown to potentially deteriorate trade more than tariffs (Hummels 2007, Hummels and Schaur 2013). NTBs reduce trade by increasing the cost of doing business and by restricting full access to markets (as in the case of quotas). NTMs which are not released under the free trade agreement might decrease the trade, regardless of membership in the free trade areas. Consequently, NTBs are now becoming a part of, so called, deep trade agreements.

This paper investigates the impact of CEFTA membership on exports between the members and whether it affects the export of CEFTA members towards EU countries in the accession process. Current literature shows substantial effect of regional trade agreements on exports (Cipollina and Salvatici, 2010; Head and Mayer, 2014). We contribute to the literature by providing additional findings of the effect on CEFTA. Furthermore, focus of our paper is on the effect of NTMs on CEFTA member countries' export. After shorty discussing the importance of non-tariff measures and CEFTA agreement specifics and trends, the model and empirical research will be presented and discussed.

2. The importance of non-tariff barriers

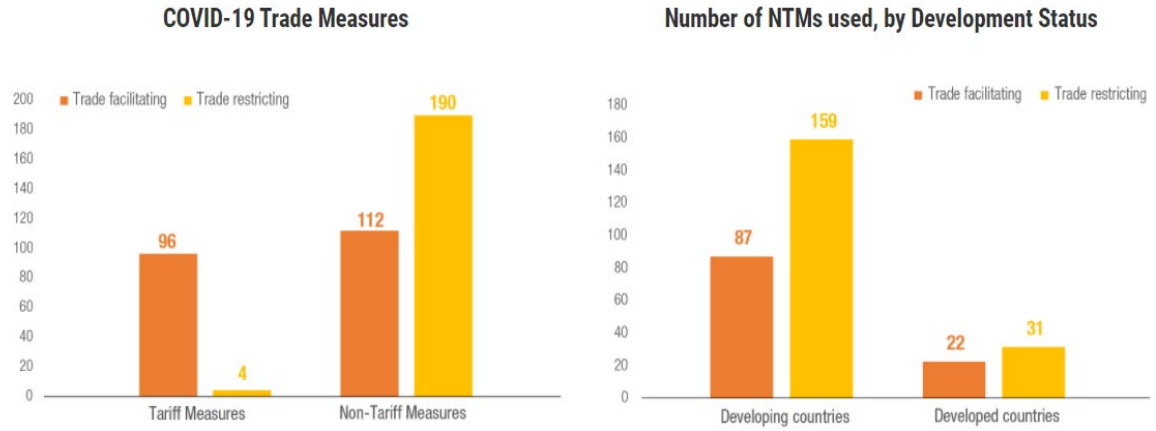
Declining tariffs around the world and phasing out of quantitative restrictions and command-and-controls measures intensifies the debate in the literature and among policy makers on the other regulations that may influences trade. Despite reduction in tariffs, trade costs remain high with increase in different number of non-tariff measures, especially in less developed countries. Measures, other than tariffs and tariff-rate quotas, that can influence trade, prices or both are broadly defined as non-tariff measures. Their objective is to reduce the influence of market failures, such as the one associated with health risk, negative externalities or asymmetries of information (von Tongeren et al., 2009; Beghin et al., 2012). Some literature investigates whether these new measures might be a substitute for previously negotiated tariff cuts (e.g. Beverelli et al., 2014; Aisbett and Pearson, 2012; Moore and Zanardi, 2011). Also, some authors outline the possibility that government might be using them to substitute for declining tariffs (Kee et al, 2009; Beverli et al., 2014; Orefice, 2017). NTBs are becoming an integral part of trade agreement design, posing a call for policy makers for assessment of their effects (Felbermayr, 2016; Felbermayr et al., 2017).

Comparison between tariff and non-tariff measures is challenging. Non-tariff measures are not solely trade policy instrument as they may also be used as a tool for human, animal and

plant life protection. This all corroborates discussion among both professionals and academics whether it should be a part of the trade agreements. Increasing number of studies recognise that NTMs might increase or reduce trade while enhancing welfare (Beghin et al., 2012; Carrère and De Melo, 2011). Yet the predominant findings in the literature is that non-tariff measures reduce trade, but the overall effect depends on the type of measures. While NTMs, such as quotas and prohibitions, have negative impact on trade, some argue that other measures such as sanitary and phytosanitary measures (SPS) and technical barriers to trade (TBT) might be trade and welfare enhancing due to better allocation of resources (Beghin et al., 2012; Cadot et al., 2018). In particular, SBS might increase quality and/or TBT (eg. labelling) increase trust and consequently trade. NTM might increase welfare due to market imperfection such as asymmetric information and consumption externalities. Growing importance of non-tariff measures and standards and compliance costs related to them create a challenge for developing economies to benefit from international trade (Ehrich and Mangelsdorf, 2018).

Due to importance of sanitary measures during the Covid19 pandemic the number of NTMs has been increasing during the last year and a half: "As of August 2020, the way of using tariff measures and NTMs differed - most tariff measures were to facilitate trade and targeted imports with over 100 countries either reducing or eliminating tariffs on essential goods, while NTMs were mainly used to restrict trade and applied to exports. To be specific, 97 out of 101 tariff measures were trade facilitating while only 4 measures were trade restricting. Also, slightly less than one third of NTMs (104 out of 283) were trade facilitating measures, while almost two thirds of them (179 out of 283) were trade restricting measures." (Lee and Prabhakar, 2021). This stresses out the importance of NTMs, especially in the recent, and potentially future, period (Figure 1).

Figure 1: Covid19 Trade Measures, March 2021



Source: https://unctad.org/topic/trade-analysis/non-tariff-measures/covid-19-and-ntms (last access: 30/09/2021)

During the pandemic some CEFTA countries introduced new trade and non-trade measures, mostly restricting the trade of medical devices and drugs and new sanitary measures (for more details see: https://cefta.int/covid-19-cefta-updates/). However, due to lack of data for other variables in our model, we focus on the period before the pandemic.

3. Trade in CEFTA countries

Current CEFTA countries became members in 2006. These are currently: Albania, Bosnia and Herzegovina, Kosovo, Moldova, Montenegro, North Macedonia and Serbia. Before these, the members were Central European countries which, by joining the EU, abandoned this agreement as they moved to a higher level of integration.

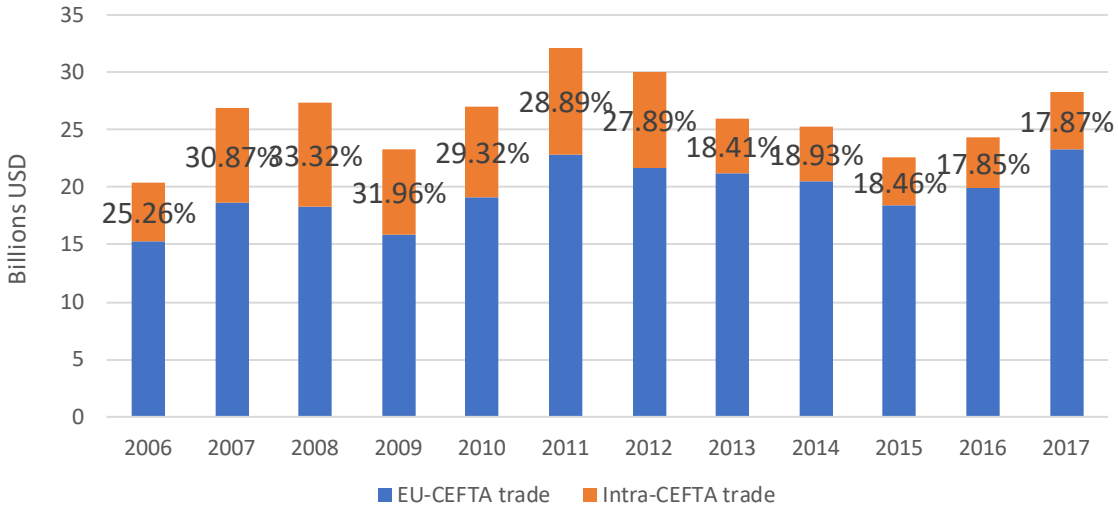
3.1. CEFTA agreement

All CEFTA member countries, apart from Moldova, are Western Balkan economies which have had very turbulent economic and political backgrounds. Until 1991 these countries were strongly connected as (with the exception of Albania) members of Yugoslavia, 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 European Union (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 the 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. Bilateral FTAs have been criticised for creating a 'spaghetti bowl' of differentiated trade relations which could likely result in trade deflection and trade diversion (Bartlett, 2009). All these bilateral agreements have been replaced by CEFTA- regional free trade agreement signed in December of 2006. Croatia had been a CEFTA member from 2003 until its accession to the EU in 2013, while Bosnia and Herzegovina (B&H), Serbia and Montenegro, Kosovo, North 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 economies which are 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 economies 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 Western Balkan economies to liberalize their trade among each other in order to sign SAAs and to engender regional cooperation conventions between themselves after signing, but at the 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, 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). Ergezer (2017) noted that the increase in CEFTA parties bilateral trade with their FTA partners has been higher than the increase of intra-CEFTA trade since 2010. The Western Balkan economies trade primarily trade with the EU and then with one another (see Figure 2). Intra-regional trade represents only a fifth of all goods exports from the Western Balkan economies and a tenth of imports (Kaloyanchev et al., 2018[4]).

Figure 2. The share of intra-CEFTA trade and EU-CEFTA trade



Source: Authors calculation based on UNCTAD data

There some obstacles to the development of trade (especially exports) in the region, such as a lack of institutions (for quality control and certification), weak linkages to international markets, poor transport infrastructures, poor quality institutions (Fugazza, 2004), the

[4] https://ec.europa.eu/info/sites/default/files/economy-finance/dp080_western_balkans.pdf

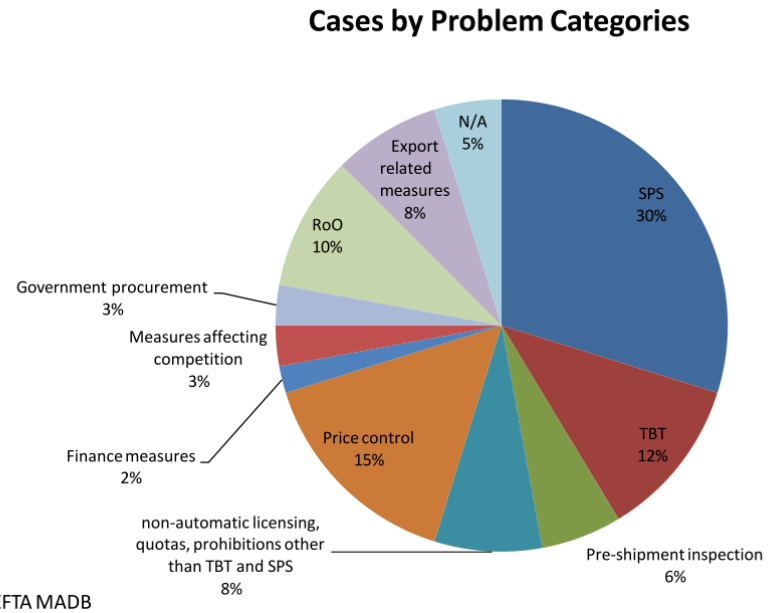
persistence of non-tariff barriers (long waiting time for getting a license and quotas imposed on imports); corruption among customs officials; lack of common technical regulations and standards; inadequate sanitary and phytosanitary regulations, as well as an underdeveloped so-called backbone service sector, such as financial intermediation, transport and telecommunications (Hadziomeragic et al., 2007; Adam et al., 2003). All of these complications suggest that that the perverse sign of trade agreement on trade could and, sometimes is, found in studies (see e.g. Begovic, 2011).

As the preceding FTAs, CEFTA is concerned in reduction of barriers for trade in goods, such as tariffs, export taxes and trade remedies, among others. Each bilateral FTA had slightly different coverage, in terms of the list of protected items and the timelines for tariff reduction. This disparity could limit the trade among the countries that signed FTAs (Adam et al., 2003). In addition, unlike previous FTAs, CEFTA includes clauses among which are the liberalisation of trade in services; competition policy consistent with the EU, investment policies; and required ratification of a series of intellectual property-related agreements. However, CEFTA is viewed as a 'shallow' trade agreement, with the limited scope in comparison to other agreements such as the EU, European Free Trade Agreement or EU-Norway (Hofmann et al., 2017). Furthermore, with exception to provision for tariffs on agricultural and manufacturing goods, the legal enforceability of CEFTA is weak and there are ongoing negotiations between members to expand the coverage.

3.2. Non-tariff measures in CEFTA

NTMs have always been among the CEFTA priorities since its foundation. In 2007, subcommittee on NTMs and TBTs has being formed, followed by the working groups in 2010-2013 period. TBT Compilation of databases and TBT notifications were part of the 2008-2013 priorities. In the following 2013-2016 period, negotiation on trade facilitation (Additional Protocol 5) has been concluded.

Figure 3 Non-tariff barriers in CEFTA

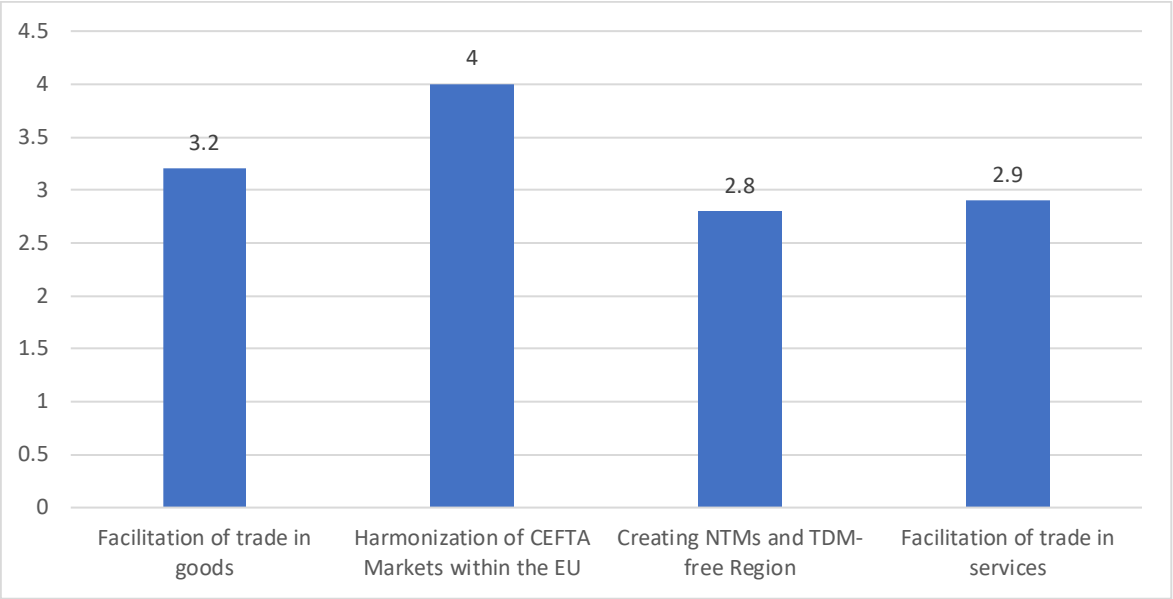


Source : CEFTA MADB

Furthermore, Multilateral Framework on the Elimination of NTBs in CEFTA is made:

- Subcommittee on non-tariff measures with working groups is created
- CEFTA Market Access Barriers Database created and represents an on-line tool for identification and elimitation on NTBs
- Negotiations for AP5 to CEFTA 2006 started during 2015 in order to, among others, conduct mutual trade relations in accordance with the WTO. There has been progress of the implementation of AP5 on Trade Facilitation by entering into force of the Decision on mutual recognition of the Authorized Economic Operators type S.
- Multi-annual Action Plan on a Regional Economic Area in the Western Balkans (MAP), prepared by the RCC, at the Berlin Process summit in 2017. Figure 4 represents a review of the progress of MAP implementation based on the latest available data.

Figure 4. MAP Implementation in WB6 at the Level of Objectives (May 2018)



Source: Regional Cooperation Council, CEFTA, 2018

Scores at the level of objectives are simple averages of activity-level scores. Scoring is performed on a scale that assesses the stage of preparedness in MAP implementation, and includes the following scores: 1 – early stage (no actions taken), 2 – some level of preparation (preliminary steps undertaken), 3 - moderately prepared (implementation started, structures and mandates in place), 4 – good level of preparation (implementation advanced with preliminary results evidenced), and 5 – well advanced (measure fully implemented). Further information on scoring available in the Methodology on monitoring and reporting on the Multi-annual Action Plan for a Regional Economic Area in the Western Balkans (MAP).

4. Literature on the effect of CEFTA on trade between member countries

There is an extensive literature which investigates the effect of FTAs on trade between member countries. 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. 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. 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. Moreover, most of the non-tariff barriers are still imposed between free trade agreement member countries which might restrict the trade between them.

There is an extensive literature investigate the impact of CEFTA on trade among its initial members and these found that it CEFTA supports trade expansion among its members (Adam et al., 2003; De Benedictis, De Santis, and Vicarelli, 2005; Bussière, Fidrmuc, and Schnatz, 2008; Cieslik and Hagemejer, 2011). However, the literature assessing the effect of new CEFTA on trade has been very limited. Dragutinović-Mitrović and Bjelic (2015) found the positive effect of CEFTA(2006) on CEFTA members' trade. Some literature on the Western Balkan FTAs suggest that there are other factors that make it difficult to expect quick fixes in value-added changes only because of FTA (Begovic, 2011; Petreski et al. 2015; USAID, 2016). Studies that investage the effect of NTBs on Western Balkan intra-trade and their trade with the EU are also scarce and have mixed results (Bjelic et al., 2013; Tosevska-Trpcevska and Tevdovski, 2014).

5. The econometric model and methodology

5.1. Data

The sample consists of panel data, which includes CEFTA member countries and their major trading partners for the period 1996-2017. In light of the discussion in gravity literature on the use annual or interval data, we follow studies that use interval data, as it is argued that using annual data is biased as variables, both dependent and independent, will likely not be unable to adjust in just one year (Cheng and Wall, 2005; Dai et al, 2017). In our preferred models we opt for 3-years interval as in Trefler (1993) or Oliviero and Yotov (2012) and check for different intervals and for consecutive years in the robustness check.

Trade data comes from the Commodity Trade Statistics Database (COMTRADE) and CEPII TradeProd data. Traditional gravity variables such as bilateral distances, language and adjacency dummy variables were compiled from the CEPII Distance database. Distance is proxied by population-weighted average distance between exporting country and major market in Europe. The major advantage of the CEPII data is that the same population weights have being used to construct both, international and intra-national distance (Mayer and Zignago, 2006).

Tariffs and non-tariff barriers are taken from ESCAP-World Bank Trade Cost Database. These measures are based on the comprehensive trade costs measure proposed by Jacks,

Meissner and Novy (2009) and are derived from theory-consistent gravity equation. Tariffs are measured as ad-valorem trade costs and non-tariff barriers are generally defined as all additional costs other than tariffs that can have influence on trade in goods bilaterally.[5] In our analysis, we use NTBs for all goods.

5.2. The model

Anderson and Yotov (2016) argues that sizable proportion of the effects of the FTAs are assign to non-tariff barriers. In our baseline estimation augmented gravity model is specified as shown in equation (1):

$$X_{ij,t} = \exp(\pi_{it} + \chi_{jt} + \beta_1 \ln(DIST)_{ij} + \beta_2 CNTG_{ij} + \beta_3 LNAG_{ij} + \beta_4 CLNY_{ij} + \beta_5 \ln(TARIFF)_{ij,t} + \beta_6 ln(NON - TARIFF_{ij,t}) + \beta_7 \mathrm{CEFTA}_{ij,t} + \beta_8 SAA_{ij,t} + \beta_9 FTA_{ij,t})x\, \varepsilon_{ij,t} \quad (1)$$

Dependent variable χ_{jt} is bilateral export between partners i and j at time t. π_{it} represent vector of exporter -time fixed effects and χ_{jt}-vector of importer time fixed effects. Further, set of standard gravity variables as a proxy for bilateral trade costs: logarithm of bilateral distance (ln $DIST_{ij}$), the presence of contiguous border ($CNTG_{ij}$), common language ($LANG_{ij}$), colonial ties ($CLNY_{ij}$) and regional trade agreements. CEFTA_{ij} is a dummy variables taking value of 1 in a year in which exporting country belong to the CEFTA, and zero otherwise. FTA_{ij} is a dummy variable capturing the presence of free trade agreements between partners. Furthermore, the EU enlargement process and related trade liberalisation is also expected to have some influence on bilateral exports of partners. To account for that, dummy variable SAA taking value of 1 when the Stabilization and Association Agreement (SAA) enter into force is included.

Furthermore, to account for endogeneity, country-pair fixed effects (z_{ij}) are included in equation (2):

$$X_{ij,t} = \exp(\pi_{it} + \chi_{jt} + z_{ij} + \beta_1 \ln(TARIFF)_{ij,t} + \beta_2 ln(NON - TARIFF_{ij,t}) + \beta_3 \mathrm{CEFTA}_{ij,t} + \beta_8 SAA_{ij,t} + \beta_9 FTA_{ij,t})x\, \varepsilon_{ij,t} \quad (2)$$

The gravity has been workhorse model for estimation of the effects of RTAs and FTAs on bilateral trade. Estimates of the traditional model is mixed, ranging from positive (Aitken,1973; Abrams, 1980; Brada and Mendez, 1983), insignificant (Bergstrand (1985) and Frankel, Stein and Wei (1995) to even negative (Frankel, 1997). Ghosh and Yamarik (2004) confirm fragility of the effects of FTA on trade. However, recent studies that have utilized

[5] For technical details see Duval (2015)

advances in gravity estimation shown large effects of FTAs on trade between member countries in comparison to non-member countries (Baier and Bergstrand, 2007).

Consistently with a previous literature, it is expected to find that distance is an obstacle to trade, while trade is expected to intensify when countries share common border, have colonial ties or speak the same language.

5.3. Estimation methodology

The conventional cross-section specification of the gravity model omitting country-pairs specific effects is shown to be misspecified producing the bias estimated of the effects of RTAs on bilateral trade (Matyas, 1997; Soloaga and Winters, 2001; Anderson and Van Wincoop, 2003). In contrast to the traditional cross-sectional model, panel data appears to be more suitable as it enables to include country-pair (exporter, importer) and time effects which enable to control for country pair heterogeneity (Egger and Pfaffermayr, 2003).

We have applied the most recent developments in the empirical gravity literature to address methodological challenges. Broadly, we could classify the issues of concern as multilateral resistance, heteroscedasticity in trade flow data and the presence of zero trade flows, dynamics of trade and potential endogeneity of regional trade agreements.

To address the issue of unobservable multilateral resistance raised Anderson and van Wincoop (2004), the full set of exporter-time and importer-time country fixed effects are included to account for country-specific effects that may influence trade between them (Feenstra, 2004; Head and Mayer,2014; Permartini and Yotow (2016). The exporter-time fixed effects will also absorb the exporter value of output as well as all other observable and unobservable exporter-specific characteristics.

Considering that some countries do not trade, the existence of zero in trade matrix may result in biased gravity estimated in case when log-linear specification is used. In addition, Silva and Tenreyro (2006) argue bias and inconsistent gravity estimates may also arise as consequence of heteroscedasticity is trade flows. Silva and Tenreyro (2006) recommend that both concerns will be address by using Poisson pseudo maximum likelihood (ppml) model.

Furthermore, the literature raises an issue of potential endogeneity of free trade agreements (Trefler, 1993). It is argued that there is simultaneity between agreements and trade as more open economies are more incentivized to implement more liberal policies. To account for endogeneity of regional trade agreements, we follow Agnosteva, Anderson and Yotov (2014) and use a two-stage procedure that consider first estimation of the pair fixed effects from the first-stage gravity equation which are regressed on standard gravity variables in a second-stage estimation. Inclusion on county-pair fixed effects consider the

unobservable associations between the endogenous variable and the error term in gravity equations, allowing to account for the endogeneity of agreement variables (Baier and Bergstrand, 2007). In addition, pair-fixed effects in gravity model accounts for all the time invariant bilateral trade costs. Yet pair-fixed effects will absorb time-invariant variables such as standard set of gravity variables, studies show that they better proxy bilateral trade costs than traditional gravity variables (Egger and Nigai, 2015; Agnosteva et al, 2014). Yotov (2016) argue that pair-fixed effect account not just for all multilateral resistances, but also for differences in economic size, expenditure of domestic consumers, etc.

Finally, following Wooldridge (2010) and Baier and Bergstrand, 2007) we can test whether model consider "reverse causality" between trade and trade agreements via pair fixed effect by including in specification variable that is proxy for future level of agreements. For agreements to be exogenous to trade flows, coefficients on future level of agreements should not be statistically significant.

6. Estimated results and discussion

Table 1. present the results of equations (1) and (2) for aggregate exports. As explained above, ppml is our preferred estimator. We estimate the effect of NTBs on trade using three different specifications: first, baseline ppml with country-pair effects, then two-stage procedure to account for potential endogeneity of free trade agreements and test for reverse causality of trade agreements (CEFTA and FTA).

Table 1. Baseline results for aggregate exports

	(1)	(2)	(3)
	PPML	ENDOGENEITY	REV_CAUSALITY
ln_dis	0.285		
	(0.142)**		
ln_tariff	-1.556	-0.204	-3.065
	(2.314)	(2.140)	(1.920)
ln_nontariff	-3.511	-1.949	-3.359
	(0.164)***	(0.404)**	(0.127)***
Evercol	0.385		
	(0.120)***		
Comlang	-0.127		
	(0.139)		
Contig	0.082		
	(0.101)		
CEFTA	1.297	0.724	1.016

	(0.213)***	(0.181)***	(0.254)***
SAA	-0.355	-0.011	-0.499
	(0.110)***	(0.145)	(0.160)**
FTA	0.073	-0.050	-0.063
	(0.123)	(0.132)	(0.133)
FTA_lead3			-0.150
			(0.115)
CEFTA_lead3			0.008
			(0.209)
cons	22.712	15.705	24.603
	(0.967)**	(2.845)**	(0.874)**
N	743	758	760
R2	0.994	0.999	0.993

Notes: The dependent variable is always bilateral export in levels. The estimator is PPML. Robust standard errors are clustered by country pair and reported in parentheses. The years in the data are 1996, 1999, 2002. 2005, 2008, 2011, 2014 and 2017.
$^{+}$ $p < 0.10$, * $p < .05$, ** $p < .01$

Across all regressions presented in the table, the explanatory power – measured by the correlation coefficient between the model and the data, dubbed as pseudo-R2 – is very high.

Column 2 of Table 1 shows the coefficients of benchmark specification which is estimated via ppml, accounting for potential endogeneity of trade agreements. The coefficients on future leads of agreements in column 3 of Table 1 is not statistically significant from zero, which is an indication that estimated results in column 2 are free from "reverse causality". Hence, we will refer to results in column 2 in our interpretation of the results. The results suggest that trade increases among CEFTA countries. Bilateral exports between partners that sign CEFTA increases by 106.2%.[6] At the same time, additional liberalisation in forms of SAA and FTAs does not have statistically significant effect on exports between partner countries. Similar findings are obtained in the previous empirical studies with focus on CEFTA countries (Dragutinovic and Bjelic, 2015; Herderschee – Qiao 2007).

The estimated coefficient for tariffs is small and statistically insignificant. We were expecting to get such result as the most variation in tariffs have been absorbed by the fixed effects. On the other hand, as expected, non-tariff barriers seem to be an instrument of trade diversion; increase in costs associated with non-trade barriers by 1 percent yields

[6] The overall percentage change in exports resulting from any given agreement proxy is calculated as exp(β) - 1.

bilateral export reduction of 1.95%. Our results produce an important policy input revealing that non-tariff barriers have larger effect on exports than some forms of trade agreements.

7. Robustness checks

Several robustness checks have been obtained to check sensitivity of the results. These include check for different methodology used (OLS) and different data frequency (annual and different intervals).

Table 2. Robustness check

	(1)	(2)	(3)
	OLS	Annual data	4 year intervals
ln_tariff	-9.541	-4.812	-6.451
	(3.329)**	(1.799)**	(2.018)
ln_nontariff	-4.333	-3.750	-3.422
	(0.213)**	(0.135)**	(0.141)**
CEFTA	0.482	0.402	1.483
	(0.428)	(0.108)**	(0.330)**
SAA	0.184	-0.293	-0.261
	(0.312)	(0.129)*	(0.166)
FTA	0.411	0.073	0.206
	(0.228)+	(0.109)	(0.161)
cons	30.708	26.105	24.784
	(1.513)**	(0.974)**	(0.991)**
N	741	2308	620
R2	0.918	0.994	0.992

OLS estimates are reported in column 1 in Table 2. The main difference in comparison to the results estimated with the ppml method is the significance of tariffs and insignificance of CEFTA dummy. However, we see from the results in Table 2 that these variables are very similar to the results from the baseline specification even when we use different frequency of data. The latter finding is similar to what has been found in the previous literature: the effect of agreements on trade have been mixed in traditional models, while estimates that utilized recent advances in gravity modeling more often report positive effects of agreements on trade.

Discussion on whether to use annual or interval data when estimating gravity model is very active in more recent literature. Some authors argue that use of annual data improve

efficiency of estimated coefficients as more data is used (Egger et al., 2020; Dhingra et al., 2021). Hence, we also check for continuum model, and results are reported in column 2 in Table 2. Now, both CEFTA and tariffs do have statistically significant effect. The size of the effect of CEFTA when continuum data is used is reduced in half than in case of 3-year interval data (now membership in CEFTA is expecting to increase trade by 50%), corroborating the argument that it takes time for trade to adjust to agreements. This is further confirmed when larger time interval is observed (colomun 2 in Table 2), with results now showing even larger size of the coefficient on CEFTA than in case of baseline specification. However, the main conclusion regarding the effectiveness of CEFTA and no-tariff barriers, main variables of our interest, holds in cases when 3-year and 4-year interval trade data are used. Similarity of findings using trade data with different time intervals is found in other studies (Yotov, 2016).

8. Conclusion

We investigate the role of non-tariff barriers for exports from CEFTA countries among themselves and with EU. On the top of non-tariff barriers, we were particularly interested in the effect of CEFTA agreement on exports between partners. Our review of the small cognate literature suggests that traditional gravity models have methodological challenges that needs to be addressed. Accordingly, our estimation strategy is relaying on methodology that is proposed to tackle identified issues, and that is Pseudo Likelihhod Models with country-pair (exporter, importer) and time effects which enable to control for country pair heterogeneity. We use two-stage procedure to account for potential endogeneity of trade agreements. In addition, to investigate the robustness of our findings, we report estimates using different estimator and different frequency of data.

Our study provide evidence that non-tariff barriers significantly reduce exports from CEFTA countries, replacing the role of tariffs, which also in our study is shown to have trade-neutral effects. Trade integration with the EU and other free trade agreements does not have an impact on CEFTA countries trade with EU. CEFTA membership seems to be largely beneficial for its members. This comes as no surprise, as most of the CEFTA countries are natural trading partners, sharing very strong historical ties and similar level of development. Also, CEFTA is a successor of series of bilateral FTAs, which spur trade between members before regional trade agreement enters the force.

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