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A decade of Eurasian Integration:
An ex-post non-parametric assessment of the Eurasian Economic Union

Augusto Cerqua[*], Pierluigi Montalbano[**], Zhansaya Temerbulatova[***]

Abstract: This paper provides a sound *ex-post* evaluation of the impact of the Eurasian integration on member countries' bilateral trade after ten years of implementation. We overcome the main limitations of current empirical analyses on the effects of trade agreements, namely the aggregation of tariff and non-tariff barriers and the likely self-selection bias, by applying a mean balancing approach, a novel non-parametric method specifically designed to fully exploit time-series cross-sectional data. We thus compare the trade flows of the member countries in the Eurasian agreement with 754 exporter-importer pairs located in the Eurasian continent having similar pre-treatment features. Our results confirm the previous literature about the lack of a significant impact of the Eurasian customs union, but find positive net effects of more recent integration steps. These results are robust in respect of several sensitivity tests, and provide evidence of the need to deepen Eurasian integration.

Keywords: Eurasian Economic Union, bilateral trade, preferential trade agreements; policy evaluation; mean balancing

JEL Classification: F13, F14, F15

1. Introduction

In the last decade, despite the economic crisis, the process of international trade integration has remained strong, at both a regional and bilateral level, with an increasing number of preferential trade agreements (PTAs) being negotiated and implemented (UNCTAD, 2015). Although, in principle, multilateral trade liberalization is more efficient because it is not

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discriminatory and does not imply trade diversion[1], many countries consider PTAs[2] as a viable alternative for promoting trade integration (WTO, 2017). Eurasian integration has followed this general trend. On the eve of the process, none of the partner countries was a member of the WTO[3]. They did however reach a consensus on the gradual implementation of a regional process of trade integration. In 1994 the President of Kazakhstan, Nursultan Nazarbayev, promoted the need for integration in the Eurasian space, outlining the implementation of its key principles and practical steps. In 2000 Kazakhstan, Russia and Belarus signed the Eurasian Economic Community agreement. In 2010 the so-called Eurasian Customs Union (EACU) started to operate. In 2012 the same countries launched a Single Economic Space (EACU-SES) which, in 2015[4], was transformed into the Eurasian Economic Union (EAEU) and was extended, with two additional partners, Armenia and Kyrgyzstan. The EAEU was modeled as a supra-national union of sovereign States largely inspired by the European Union and implying the free movement of goods, services, capital and labor, as well as the implementation of coordinated policies in several economic sectors. The final aim is to establish a Eurasian single market with the potential to become a single integrated market of 180 million people acting as a possible bridge between the European Union and the New Chinese Silk Road initiative. Further proposals for the future establishment of a common currency have also been put forward.

This study aims to provide a sound ex-post assessment of the trade benefits of the Eurasian trade integration process for participating countries. We will focus on the effects on trade flows, paving the way for further investigations on possible broader effects on partner economies. Although studies have been conducted on the early stages of regional integration, to the best of our knowledge there has been no sound impact assessment of the effect of Eurasian integration on trade. The reason is twofold: first, only now, after ten years of Eurasian integration, can we make a reasonable assessment about *ex-post* impacts, especially for the EAEU, which represents the most critical step for Eurasian preferential trade integration going beyond static tariff reductions. Second, it is difficult to overcome empirical issues such as the construction of appropriate trade preference measures for different commodities and/or countries (Cipollina and Salvatici, 2011)

[1] As highlighted by Viner (1950) in the case of customs unions, PTAs divert trade flows outside the bloc (because of the price discrimination induced by the common external trade policy), substituting them with less efficient supply coming duty free from other members of the bloc. This implies welfare losses, because consumers have to pay more for getting products supplied by less efficient local producers.

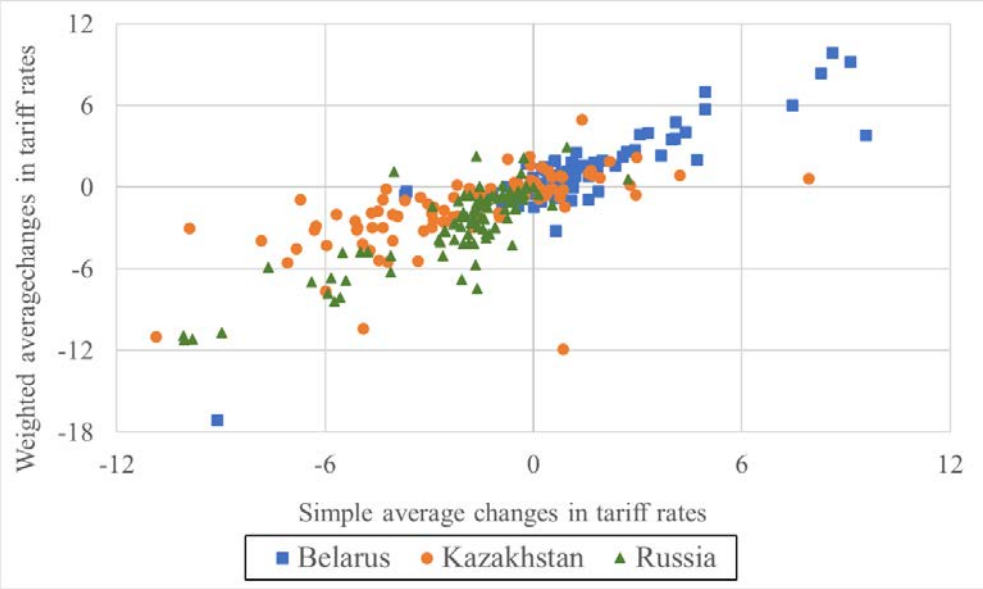
[2] With the generic term PTAs, we include various degrees of interdependence among the partner economies, mostly free trade areas (FTAs) and customs unions (CUs) and, recently, deeper and more comprehensive forms of trade integration, encompassing further economic and political integration.

[3] After a long process of negotiations that lasted over 18 years, the Russian Federation became a member of the WTO in 2012; Kazakhstan in 2015, whereas Belarus is still completing its accession process.

[4] The EAEU agreement was signed in May 29, 2014 and came into force on January 1, 2015.

and self-selection bias, especially for treatments that have comprehensive and long-lasting effects on outcomes, such as in the case of EAEU (Baier and Bergstrand, 2009; Montalbano and Nenci 2014; Saia 2017). Figure 1 provides an example of the cited difficulties in measuring preferential schemes. Although common wisdom is that the EACU closely mimics Russia's previous tariff schedule (Isakova et al., 2016), plotting the changes in applied tariffs before and after EACU (both weighted and unweighted averages) according to two-digit Harmonized System (HS) classification, we are unable to detect a clear pattern for changes in trade policy post-EACU. Since national tariff schedules often have thousands of tariff lines, characterized by large variations in tariff rates, it is a very challenging exercise to compare sectors/countries in the context of trade policy, and outcomes are highly dependent on the aggregation level and methods used for identification (Cipollina and Salvatici, 2011)

Figure 1 – Changes in effectively applied tariff rates before and after EACU: a comparison between weighted and simple averages (two-digit HS classification).



Source: Authors' elaboration from World Integrated Trade Solution data.
Notes: Weighted average applied rates are weighted by the product import shares corresponding to each partner country.

Self-selection in trade agreements is also a well-known issue. Considering the fact that partner countries generally sign trade agreements with a view to increasing bilateral trade, it is not immediately apparent whether trade flow outcomes are the effects of or the causes of PTAs. Since Persson's seminal work (2001), literature in the area of trade has acknowledged that standard log-linear gravity estimates could not adequately take into account non-linearity and self-selection bias. A common way to overcome this bias is to rely on matching techniques (Chintrakarn 2008; Baier and Bergstrand 2009; Magrini et al. 2017). However, this latter strand of the literature also

has its limitations, mainly due to the inability to fully consider time-variant unobservables. In this work we apply the mean balancing (MB) approach, which overcomes the main limitations depicted above for conducting an empirical evaluation of the effects of FTAs. MB is a weighting-based approach that builds upon the synthetic control method (SCM) by forming a 'synthetic control' unit whose pre-treatment history closely matches that of the average of the treated units. This method shares with other matching and reweighting methods the ability to overcome the issue of finding an appropriate overall measure to synthetize both tariff and non-tariff barriers, since it focuses more directly on outcome changes induced by the treatment. At the same time, MB allows the treatment to have a long-lasting effect on the outcome and, unlike SCM, it accommodates multiple treated units in a single run, and improves feasibility and stability with reduced user discretion.

Our results confirm the previous literature about the lack of a significant impact of EACU on aggregate, and negative impacts specifically for Kazakhstan. However, we find mixed but positive net effects for EAEU where internal bilateral trade flows seem to have gained momentum in recent years for all countries, including Kazakhstan and the newcomers. These results are robust in response to several robustness tests. The article consists of five sections. Section 2 presents the literature review. Section 3 describes the MB method and data sources. Section 4 shows the empirical results, while Section 5 offers conclusions.

2. Literature Review

The literature on the impact of preferential trade agreements (PTAs) on countries' trade flows is extensive (for a review see, *inter alia*, Baier and Bergstrand, 2007; Cipollina and Salvatici, 2010; Limão, 2016; Baccini et al. 2017; Cheong and Tang, 2018). Most of the empirical literature agrees in finding positive effects of PTAs on trade flows among members, primarily when they address far more than tariff reductions, as in the case of "deep" PTAs (Baier and Bergstrand 2007, 2009; Fugazza and Nicita, 2013; Limão, 2016; Baccini et al. 2017; Jagdambe and Kannan, 2020). Some works highlight trade diversion effects on non-member countries (see Carrére 2006; Lee and Shin 2006; Romalis 2007; Mattoo et al., 2017; Pfaffermayr, 2020). A few studies suggest a minimal impact (Hoekman and Nicita 2011; Kohl 2014). Others consider evidence to be inconclusive (Calvo-Pardo et al., 2009; Freund, 2010).

The literature on the Eurasian case is more limited. Most of it consists of ex-ante computable general equilibrium assessments (De Souza, 2011; World Bank, 2012), along with some very preliminary *ex-post* empirical studies (EBRD, 2012; Isakova et al., 2016; Tarr, 2016; Kirkham, 2016; Vinokurov, 2017; Bayramov et al., 2019). These preliminary studies agree on the likely positive effects of EACU for Russia, because of the similarity of its pre-treatment tariff

structure with the new common external trade policy of the EACU, and the likely negative effects for Kazakhstan, because of its more liberal pre-treatment trade regime.[5] A first careful *ex-post* impact assessment of the effects of the EAEU on participating countries' trade flows was carried out by Adarov (2018). He found that the net trade impact of Eurasian integration was overwhelmingly positive for Belarus, generally positive for Russia, and mixed for Kazakhstan. He also highlights that the trade creation effect was mainly associated with the EACU's establishment in 2010, whereas the creation of the EAEU in 2015 did not positively affect member countries' trade.

The heterogeneous outcomes of the above-mentioned empirical studies are usually linked to the heterogeneity of samples, time periods, model specifications and PTA characteristics (Foster et al., 2011). In terms of applied techniques, the gravity model is by far the most popular. Many gravity applications have been traditionally applied to evaluate the impact of PTAs on trade flows, such as, *inter alia*, to study the influence of FTAs in Mediterranean countries (Márquez-Ramos and Martínez-Zarzoso, 2014; Kahouli and Maktouf, 2015), the impact of the ASEAN – China Free Trade Area (Yang & Martinez-Zarzoso, 2014), the 'Belt-and-Road' initiatives (Jing et al., 2020), Malaysia and OIC Member Countries (Abidin et al., 2013), the Comprehensive and Progressive Trans-Pacific Partnership (Shepherd, 2019), and the Korea-Australia Free Trade Agreement (Quansah & Ahn, 2017). All these studies have in common the use of a gravity approach to assess the impact of trade agreements on trade flows.

The traditional gravity model is based on the assumption that trade flows between two countries are positively related to the relative size of the partners' economies and negatively related to their distance apart (Head and Mayer, 2014). In this framework, the effect of trade agreements is usually estimated by including dummy variables to check for the presence of PTAs and assess the extent to which PTA partners trade more than would be otherwise predicted by using standard bilateral trade determinants. This is a workable solution, but unsatisfactory for several reasons, including possible nonlinearities in relations between FTAs, trade flows and the other covariates. Other possible biases are due to the likely self-selection traditionally associated with FTA treatment, namely countries joining an FTA are unlikely to be randomly chosen, but rather share the same characteristics used by the gravity equations to explain trade flows. Various non-parametric methods have been applied so far to solve this self-selection issue (Persson, 2001; Baier and Bergstrand, 2009; Montalbano and Nenci, 2014; Magrini et al., 2017). As stated above, a common drawback of this specific strand of the literature is the inability to allow the effect of unobservable bias to change over time. Thus, assessing the trade effects of PTAs using the MB

[5] Kazakhstan's tariff schedule underwent the most significant changes, which affected more than half of the tariff lines (Isakova et al., 2016).

approach, we are able to take into account the long-lasting effect of treatment on outcome. This represents an innovative and viable alternative to previous ways of addressing self-selection bias in trade literature (Hannan, 2016; Saia 2017, Adarov, 2018).

3. Methodology and Data

3.1 Methodology

As an alternative approach to both log-linear gravity equation and standard matching techniques, we have employed the mean balancing (MB) approach proposed by Hazlett and Xu (2018). This method transparently builds the counterfactual scenario of treated exporter-importer pairs relying on minimum modeling assumptions. MB is based on a generalized DID setting in which all exporter-importer pairs under consideration begin as untreated, and then a subset of exporter-importer pairs undergoes a treatment that begins at a given time. This setting allows the treatment to have a long-lasting effect on the outcome, as long as we make a direct comparison between potential outcomes under the two treatment histories. This approach builds upon the SCM – a weighting-based approach that finds weights on control units that form a 'synthetic control' unit, whose pre-treatment history closely matches that of a single treated unit (Abadie et al., 2010). MB accommodates multiple treated units in a single run, and assigns weights to control exporter-importer pairs by seeking balance on the first P principal components of the features (pre-treatment periods of the dependent variable and pre-treatment covariates), where P is chosen automatically by a method that minimizes the worst-case bias. MB never fits a model directly, hence the risk of an erroneous extrapolation based on estimated model parameters is minimized. The average treatment effect on the treated (ATT), in each post-treatment period ($t > T_0$), is obtained by taking the difference between the average of post-treatment outcomes of treated exporter-importer pairs and the 'synthetic' control, as follows:

$$\widehat{ATT}_t = \frac{1}{N_{tr}} \sum_{G_i=1} Y_{it} - \sum_{G_i=0} w_i Y_{it}, \qquad T_0 < t \leq T,$$

where N_{tr} is the number of treated pairs, G_i is the group indicator (equal to 1 if *i* belongs to the treated group, and equal to 0 if *i* belongs to the control group), Y_{it} is the log of export flows from country *i* to country *j* at time *t*, w_i is the control weight. The weights w_i are non-negative and their sum is equal to one. MB relies on minimum assumptions: (1) among exporter-importer pairs with the same pre-treatment histories, the exporter-importer pair that receives the treatment is independent of potential outcomes of the untreated exporter-importer pairs in the post-treatment periods, i.e. $Y_{it} \perp G_i | Y_{i,pre}, \ \forall t > T_0$; (2) each unit's expected post-treatment outcomes are

approximately linear; (3) there exists a set of non-negative weights $\{w_i\}_{G_i=0}$ for the control units such that $\sum_{G_i=0} w_i = 1$ and the pre-treatment outcomes are balanced between the treatment and reweighted control group.

MB inherits the same useful properties as the SCM in coping with time-varying confounding by explicitly using the pre-treatment outcome data. In the case of many pre-intervention periods and a good covariate balancing, it can be shown that MB, just as the SCM, provides an unbiased estimator of the treatment effect for the treated (Abadie, 2020). MB offers additional advantages over SCM by (1) accommodating multiple treated units in a single run, (2) providing standard errors of estimates in the presence of several treated units, and (3) improving feasibility and stability with reduced user discretion.

3.2 Data and sample selection

Our chosen unit of analysis is the exporter-importer pair, and our chosen outcome is the export flows (in logs) from country *i* to country *j*. To build up a sound counterfactual, we model the synthetic cohort by using standard gravity variables, i.e. the economic size of trading countries as measured by their respective GDP values, and trade frictions as measured by their bilateral geographical distance.[6] Although the average cost of shipping has declined over time, according to the gravity framework, geographical distance remains a robust predictor of trade frictions between pairs of countries (Rickard, 2020). The reason is twofold: i) the general decline in the absolute cost of shipping does not imply that the marginal cost per percentage increase in distance should also decline over time (Frankel et al., 1997); ii) distance is not only related to shipping costs but also to a more general 'cultural unfamiliarity' with more distant economies (Linemann, 1966).

We integrated the above set of gravity variables by checking for additional factors that are important determinants of trade agreements, such as the degree of participation of the countries involved in bilateral trade in global value chains (GVCs)[7], and standard measures of *informational frictions*, such as common language, common past colonial relations and common legal origins.[8] The choice to check for participation in GVCs is motivated by the increased relevance of international fragmentation of production in driving trade flows, especially regional flows, since

[6] It is worth noting here that the use of the gravity variables for selection of observables is not equivalent to the use of a gravity approach for assessing the effect of PTAs. The use of gravity variables here is designed to improve balancing by detecting sources of nonrandom selection bias provided by the theory, whereas the comparison in trade outcomes follows an entirely nonparametric procedure in which covariate balancing is the core assumption to be made.

[7] The EORA database (https://worldmrio.com/) provides a balanced global MRIO for 186 countries and 25 harmonized sectors in the period 1990-2015 (Lenzen et al., 2013).

[8] Language is a dummy variable that takes the value of 1 if 20% of the population in *i* and *j* countries speak the same language.

1990 (World Bank, 2020), and the empirical evidence of the so-called 'chain effect' in driving bilateral trade flows across countries, especially when addressing regional trade agreements (Blanchard et al., 2016; Ruta, 2017; Balié et al., 2019). Data on trade flows have been obtained from the International Monetary Fund, Direction of Trade Statistics (IMF DOTS) database. GDP data were taken from World Development Indicators of the World Bank. Common language and distance variables were obtained from the CEPII Gravity Database. GVC data were taken from the EORA dataset. GVC participation is measured as the sum of both backward participation (i.e. the use of foreign inputs for exports) and forward participation (i.e. the supply of domestic inputs for other countries' exports), and is computed as percentages of countries' exports according to the methodology devised by Borin and Mancini (2016, 2019). Summary statistics of the variables used in our empirical analysis are presented in Table 1.

We present here our two main empirical analyses, along with a set of robustness tests. The first analysis is focused on the potential impact on trade of the Eurasian Customs Union (EACU), which came into force in 2010 for three member countries: Russia, Kazakhstan and Belarus. The second analysis is focused on the EAEU, in this case 2015 is considered as the treatment year for five countries: Russia, Kazakhstan, Belarus, Armenia and Kyrgyzstan.[9]

In choosing the set of potential control exporter-importer pairs (the so-called 'donor pool'), Abadie and Gardeazabal (2003) proposed the use of selection criteria that can only select exporter-importer pairs that can be potentially considered as a valid counterfactual for the treated exporter-importer pairs. This highly reduces the risk of overfitting (Abadie, 2020). Thus, as a starting point, we considered in our analysis only exporter-importer pairs located in the Eurasian continent. However, we excluded those exporter-importer pairs that did not trade with each other in at least one year between 1995 and 2009. We then excluded all countries already belonging to a CU, such as the European Union countries Turkey, Switzerland and Gulf Cooperation Council countries. This was designed to minimize selection bias in evaluating the impact on trade flows of joining a CU (and subsequently also a common market). We also excluded from the control group all exporter-importer pairs involving Azerbaijan, Georgia, Moldova, Tajikistan, Ukraine, Uzbekistan and Turkmenistan. These are the former Soviet Republics that are members of the Commonwealth of Independent States (CIS) FTA established in April 1994, which did not join EACU/EAEU.[10] Since these countries are likely subject to trade diversion, we did not consider them as a valid

[9] We naturally excluded from the second empirical analysis all the exporter-importer pairs considered as treated since 2010, as the EACU is expected to have had an impact on bilateral trade flows.

[10] Georgia was part of the CIS FTA until 2009 (in 2008 there was a war between Russia and Georgia), while Turkmenistan is an associate member. For more details on the implementation of the CIS FTA, see Dragneva and de Kort (2007).

counterfactual[11]. Lastly, we excluded all exporter-importer pairs involving Syria because of the Syrian civil war, which began on March 15, 2011. The final sample is made up of 774 exporter-importer pairs, 20 of which are treated (all potential combinations between the five countries belonging to EAEU), observed annually over the period 1995-2019. The period considered has sufficient coverage before and after the inception of the EAEU to build a credible counterfactual scenario and assess the short- and medium-term impact of the EACU and EAEU.

Table 1 – Descriptive statistics

Variable	**Mean**	**Std. Dev.**	**Min**	**Max**
Ln exports from country *i* to country *j*	1.37	5.15	-6.91	12.22
Ln GDP country *i*	11.18	2.05	6.96	16.48
Ln GDP country *j*	11.18	2.05	6.96	16.48
Ln Distance	8.29	0.80	4.71	9.43
GVC share country *i*	0.43	0.13	0.18	0.88
GVC share country *j*	0.43	0.13	0.18	0.88
Common language (1=yes)	0.11	0.31	0	1
Common past colonial relationship (1=yes)	0.11	0.31	0	1
Common legal origins (1=yes)	0.26	0.44	0	1
Number of exporter-importer pairs – years		19,280		
Number of exporter-importer pairs		774		

4. Results

We begin the empirical analysis by reporting aggregate estimates of export flows in Figure 2. We start with the aggregate estimates of the six exporter-importer pairs of Russia, Kazakhstan and Belarus, which created the EACU in 2010 (Panel A). We then report the aggregate estimates of the remaining 14 exporter-importer pairs of the five countries that joined the EAEU in 2015 (Panel B). Both panels show the average values of treated exporter-importer pairs versus the 'synthetic control' unit.[12]

[11] For empirical tests on the presence of trade diversion toward these countries, see Appendix A.

[12] Table B.1 in Appendix B displays the weights of each control exporter-importer pair for both analyses.

Figure 2 – Actual and synthetic counterfactual export flows in logs

Panel A – Treatment start in 2010 (EACU) for the 6 exporter-importer pairs of Russia, Kazakhstan and Belarus

Panel B – Treatment start in 2015 (EAEU) for the remaining 14 exporter-importer pairs

As shown in both panels of Figure 2, the balance in the pre-treatment values of the outcome variable is nearly perfect. Moreover, Table 2 shows that the pre-treatment averages of the additional covariates are also quite well matched for aggregate analyses. This is clearly a good sign for the robustness of our empirical analysis. Thus, we are confident that the synthetic provides

a meaningful counterfactual to disentangle the effects on trade flows of joining EACU and EAEU for partner countries. From this perspective, we can say that the effects of the EACU on member countries' overall bilateral trade flows are far from being substantial. As Panel A shows, the changes to post-treatment bilateral trade flows of EACU members are, on average, lower than those of the non-member donor pool of countries that are included in our synthetic control and, in any case, not statistically different from zero, as shown in Figure B.1 in Appendix B. This means that the EACU did not provide any boost to intra-area trade. This is not unexpected, since tariffs within the area were already zero before the formation of the CU (bilateral FTAs were in place well before 2010), and the main effects on intra-area trade could be attributed mainly to trade diversion effects determined by the new common external tariff towards the rest of the world (which was only applied in July 2011). Furthermore, assuming that the common external tariff was largely based on the prevailing Russian duties, we cannot expect these trade diversion effects to be relevant for Russia (the leading trading partner in the area). On the other hand, it is potentially high for Kazakhstan, the member country characterized pre-EACU by a more open trade regime with non-member countries.[13]

Table 2 – Covariate balancing over the whole pre-treatment period

	Exporter-importer pairs treated in 2010			**Exporter-importer pairs treated in 2015**		
	Treated	Balanced controls	Without mean balancing	Treated	Balanced controls	Without mean balancing
Average GDP of the exporter/importer in logs	11.21	11.18	10.78	9.88	10.26	11.21
Average Distance in logs	7.42	7.50	8.30	7.68	7.82	8.30
Average GVC share of the exporter/importer	0.54	0.53	0.42	0.48	0.47	0.44
Same language dummy	1	0.94	0.10	0.43	0.34	0.10
Past colonial relationship dummy	1	0.91	0.08	1	0.78	0.08
Common legal origin dummy	0.33	0.34	0.25	0.71	0.58	0.25

The empirical analysis regarding the EAEU needs to be examined with due caution, for several reasons. First, at the time of the implementation of the EAEU, both Russia and Kazakhstan also joined the WTO. Since WTO commitments prevail over those of CUs (regional agreements are allowed only if they do not raise further obstacles to multilateral liberalization), this implied a

[13] It worth noting that in 2008-2010 there was a noticeable and sharp decline in mutual trade among partner countries, the effect of the 2008-2009 crisis. Due allowance is made for this general trend in our analysis.

parallel fall in the CET rate under the EAEU to a level not exceeding the bound MFN rate. This resulted in a general reduction in duties applied by EAEU member countries to all their WTO partners outside the bloc (e.g. Kazakhstan went back to its pre-EACU customs barriers of 2007). This relaxation of CET under the EAEU is supposed to induce a parallel reduction in previous trade diversion, and thus lower intra-area trade flows. However, the implementation of the EACU came along with the extension of the agreement to two non-EACU but WTO members, namely Armenia and the Kyrgyz Republic. In both cases CET under EAEU implied a rise in tariffs applied to third countries, thus trade diversion for these countries will remain, and more intra-area trade is likely for them. Finally, the implementation of the EAEU also implies a reduction in the so-called non-tariff barriers (NTBs)[14]. The debate about the trade effects of NTBs is endless (Berden and Francois, 2015; Ghodsi and Stehrer, 2019). By taking advantage of the Eurasian Single Market's gradual implementation, we can separately identify the effects of NTBs from the common tariff schedule by looking at the changes in trade flows associated with the shift from the EACU to the EAEU in 2015, net of self-selection. In this case, the implementation of further stages of integration in the various chapters of the single market should ideally foster trade flows among bloc countries. Our aggregate analysis provides the net comprehensive effect on intra-EAEU trade flows of all these interacting factors. The subsequent focus by country pair will complement our analysis with a more granular picture of bilateral empirical evidence.

As panel B in Figure 2 shows, the net effect of the EAEU is mixed: at the start of the process changes in post-treatment bilateral trade flows for EAEU countries were, on average, lower than those of the synthetic control, before gaining momentum in more recent years. We ought to stress here that although these differences are not statistically significant (see Panel B of Figure B.1 in Appendix B), the gradual implementation of a common regulatory framework within the EAEU - including the reduction of many possible NTBs within the framework of the Single Market - has the potential to support the transition of member countries to more effective Eurasian economic integration. This is consistent with conclusions reached in previous studies.

A separate analysis of individual treatment effects of the EACU carried out via MB is reported in Figure 3. For every single estimate we have looked at the same set of covariates as in the main analysis, and we have dropped from the donor pool exporter-importer pairs with a pre-treatment value of export flows at least 75% larger or smaller than that of the treated exporter-importer pair. This choice limits the potential for extrapolation bias (see Abadie et al., 2010).

[14] The term 'non-tariff barriers' (NTBs) is used here in preference to 'non-tariff measures' (NTMs). The choice is motivated by the focus here on their anti-trade role rather than on their more general economic effects (Ferrantino, 2006).

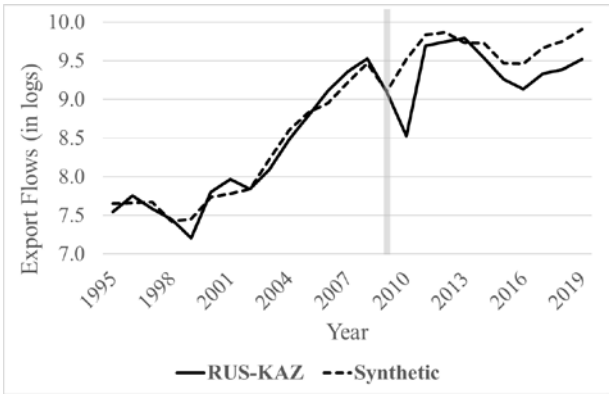
The individual exporter-importer pair estimates provide further insights into the heterogeneous effects of the two main waves of the Eurasian integration process (EACU/EAEU). As expected, Kazakhstan is the trade partner that lost more trade after EACU. Then, consistently with aggregate estimates, Kazakh export flows gained momentum after the more recent implementation of the Eurasian single market compared with Russia, Belarus and Armenia. However, within the framework of bilateral trade with Kazakhstan post-EACU, the main beneficiary country is Belarus rather than Russia. This is reasonable since, unlike Kazakhstan, where on average tariffs increased after EACU, and Russia, where average tariffs remained practically unaltered, the average post-treatment tariffs for Belarus were seen to fall (Isakova et al., 2016). The Russian Federation increased its export flows compared with its synthetic counterfactual towards Armenia, but no significant rises were recorded towards Belarus, Kazakhstan, and Kyrgyzstan. Although Belarus is the country that has benefited mostly from CET, its exports compared to its synthetic counterfactual are sizable only towards Russia. The two newcomers registered a more positive results: Armenia recorded a greater increase in export flows than its counterfactual with both Russian and Belarus, whereas for Kyrgyzstan such increases were towards Armenia and Belarus. Overall, country pairs' net effects suggest that further integration within the Eurasian single market and the likely reduction of NTBs have provided additional benefits to EACU original member countries. These positive effects also extend to the smaller newcomer economies.

Figure 3 – Actual and synthetic counterfactual export flows in logs for each exporter-importer pair

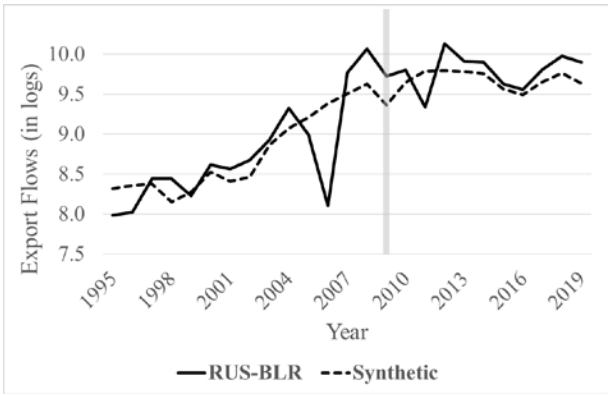
Figure 3 (Continue)

Exporter = Russia

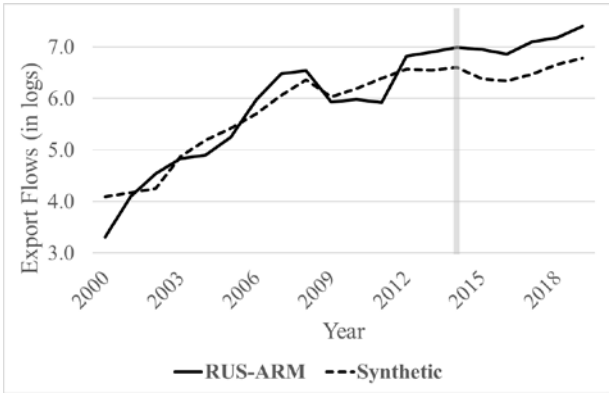
RUS-KAZ



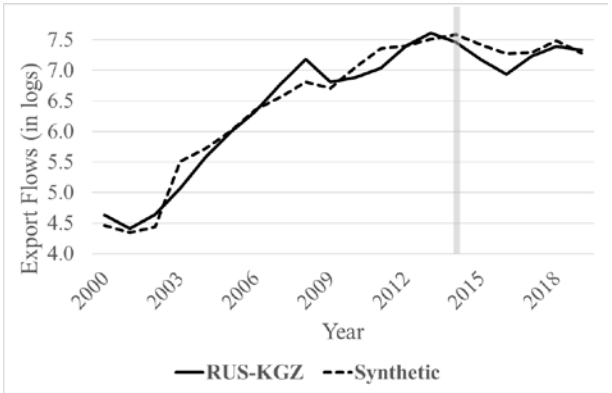
RUS-BLR



RUS-ARM

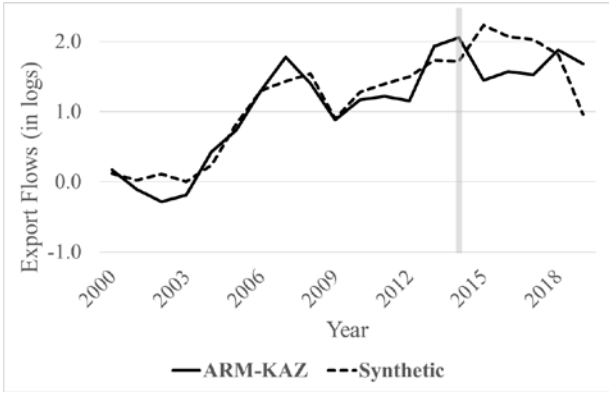


RUS-KGZ

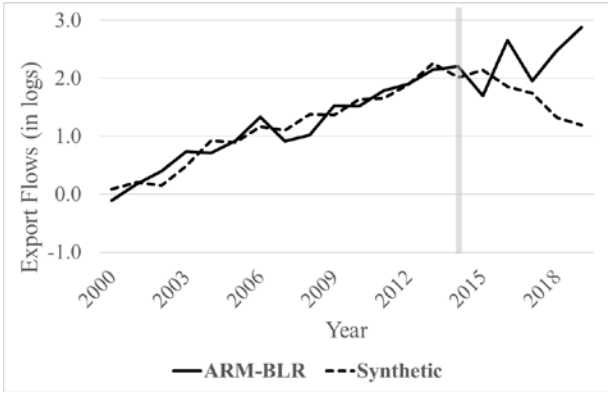


Exporter = Armenia

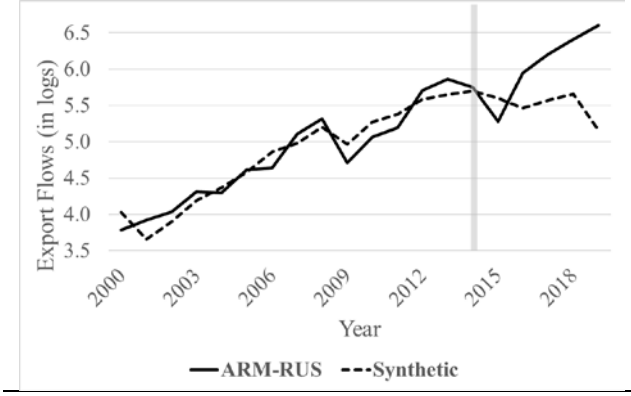
ARM-KAZ



ARM-BLR



ARM-RUS



ARM-KGZ

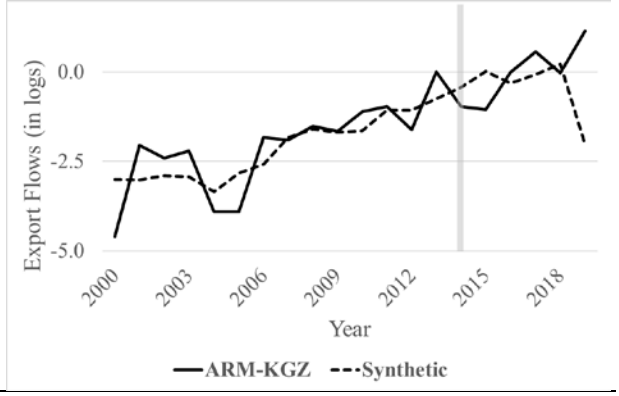
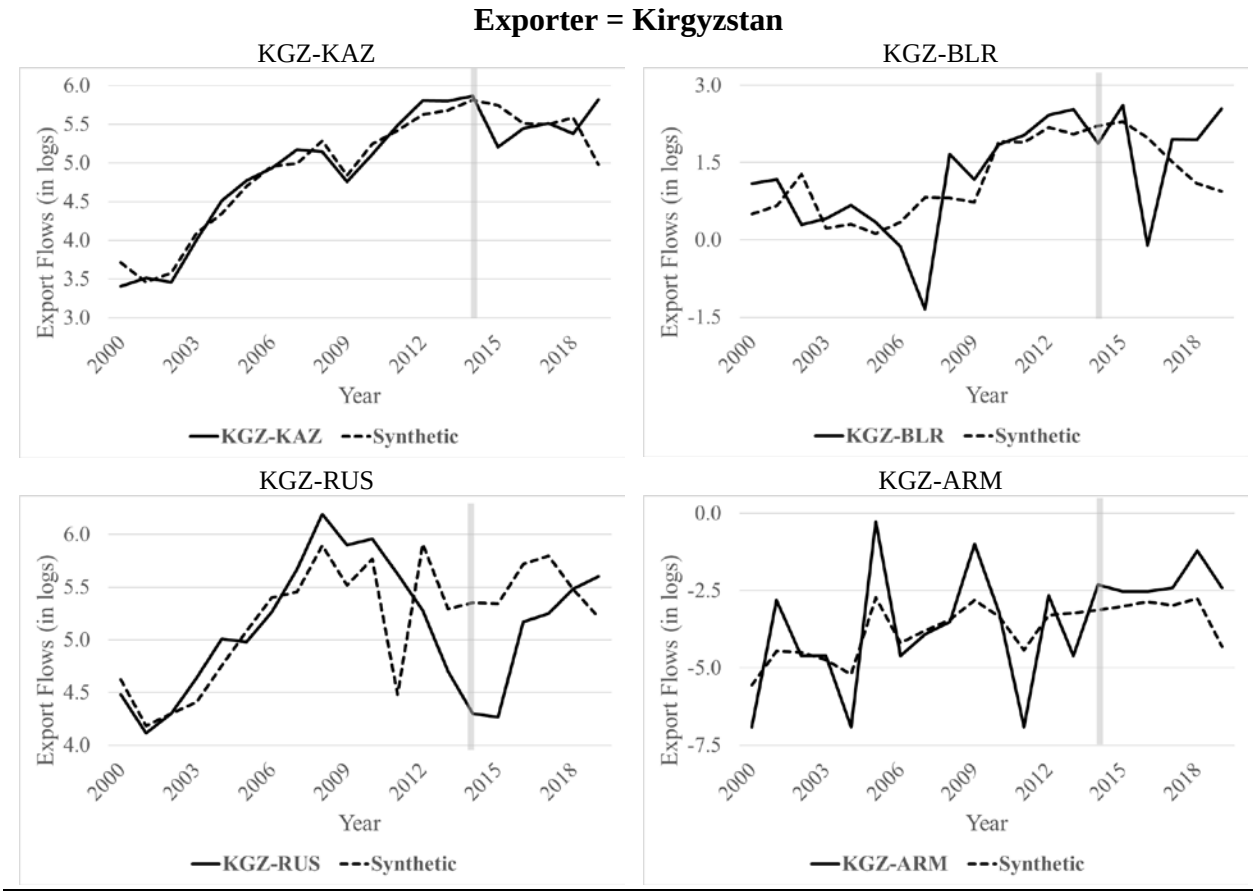


Figure 3 (Continue)



5. Robustness

Our estimates were subjected to a broad set of robustness checks, the results of which are given in Figure C.1 in Appendix C. Specifically, we propose a set of checks apt to eradicate the most common concerns regarding the robustness of our empirical investigation. First, we extended the number of covariates for improving balancing and, specifically, we added per capita GDP to match country pairs characterized by a similar relative income net of other components of the common support. Second, we tested for potential anticipatory effects by moving the pre-treatment year from 2010 to 2008 and from 2015 to 2013, respectively. Third, we tested an alternative algorithm to compute weights, the kernel balancing estimator, which also achieves balance on the high-order 'trajectory' of pre-treatment outcomes (see Hazlett and Xu, 2018). Lastly, in light of the detected trade diversion towards CIS countries that did not join the EACU/EAEU, we checked whether other countries might have suffered from trade diversion, which would bias our estimates. To this end, we tested whether the removal of all exporter-importer pairs involving the country having the largest trade flows with EACU/EAEU countries (China) might affect the estimates. For the analysis involving the onset of EACU, we also used a pre-treatment period, starting in the year 2000 instead of 1995. The shorter pre-treatment period allows an estimate of a more stable

counterfactual scenario, as the years from 1995 to 1999 were characterized by a high variability in bilateral trade flows.

Overall, these checks backed the robustness of our analysis, apart from the possible presence of mild anticipatory effects.

6. Conclusions

After a decade of progressive economic integration, a sound ex-post assessment of the trade benefits of the Eurasian trade integration process for participating countries is still lacking, with particular reference to the most recent steps of single market integration.

This article reports on the efforts we have made to overcome the well-known limits of current empirical analyses on the impact of preferential trade on bilateral trade by pairs of countries – such as the issue of tariff and non-tariff aggregation, the log-linearity of the gravity approach and the likely self-selection of member countries – by using an up-to-date methodology, namely the mean balancing approach. We used MB to compare member countries' trade flows in the Eurasian agreement with 754 exporter-importer pairs located in the Eurasian continent having similar pre-treatment features. Our results confirm the previous literature about the lack of a significant impact of the EACU on aggregate and a negative impact for Kazakhstan. Net effects were however more positive for the EAEU for which, on aggregate, internal bilateral trade flows appear to have gained momentum in recent years for all countries, including Kazakhstan and the newcomers, albeit with a degree of heterogeneity. These results have passed several robustness tests, and take into consideration the trade diversion towards other CIS countries that did not join the EACU/EAEU. They suggest that further integration within the Eurasian single market has provided additional benefits to EACU original member countries and that these positive effects also extend to the smaller newcomer economies. Overall, they support the original intentions of member governments regarding the importance of such an ambitious process of integration and the need for a "deep" Eurasian integration, beyond the reduction in tariffs.

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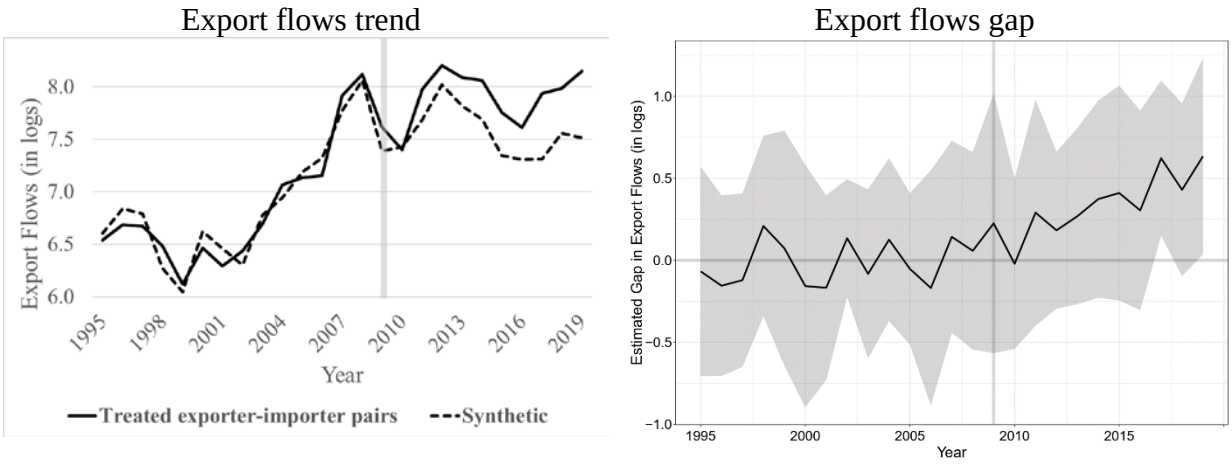
Appendix

Appendix A – Trade diversion

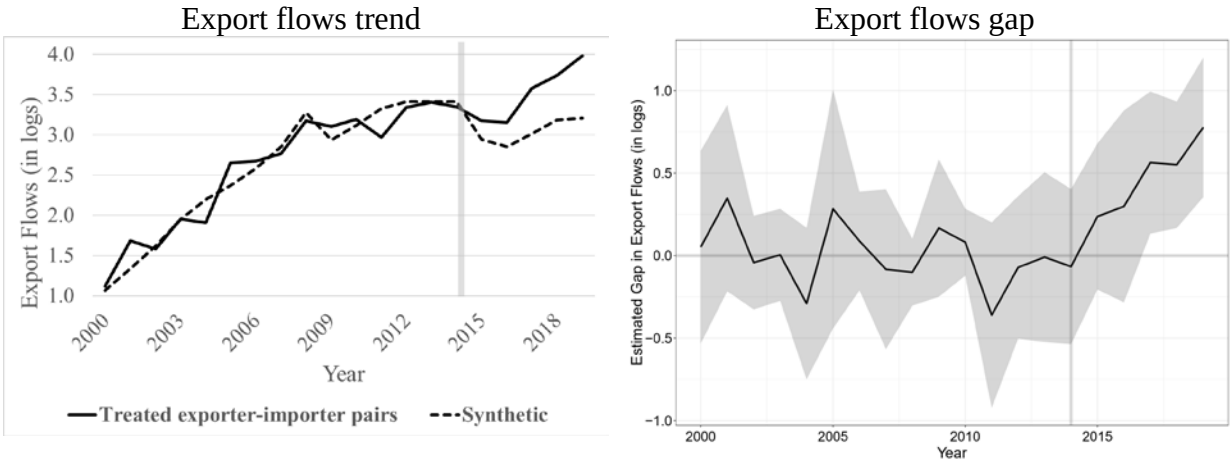
In view of the likely presence of spill-over effects engendered by trade agreements, we focused in particular on the validity of the Stable Unit Treatment Value Assumption (SUTVA) in our empirical analysis. SUTVA implies two separate issues: i) the 'unique treatment assumption', which is ensured in this case by the standardization of the Eurasian integration process for all member countries; and ii) the 'non-interference assumption', which implies the absence of spill-over effects between treated countries and the countries included in the donor pool. In our case, the countries most likely affected by EACU/EAEU are those CIS countries not involved in the Eurasian integration process, i.e. Azerbaijan, Georgia, Moldova, Tajikistan, Ukraine, Uzbekistan and Turkmenistan.

Figure A.1 – Testing for the potential presence of trade diversion towards other CIS countries

Panel A – Treatment starts in 2010 (EACU) for the 6 exporter-importer pairs of Russia, Kazakhstan and Belarus



Panel B – Treatment start in 2015 (EAEU) for the remaining 14 exporter-importer pairs



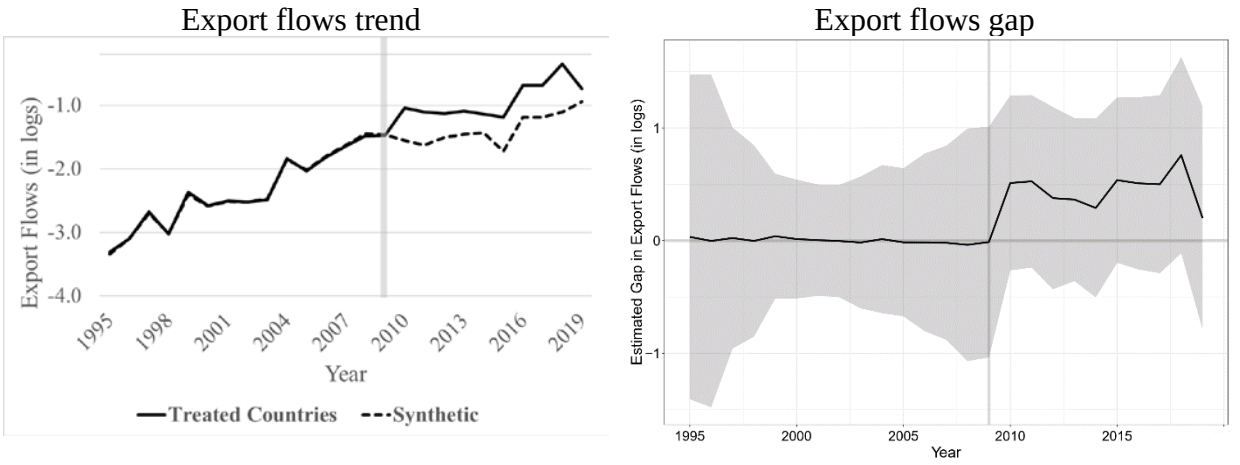
Notes: Standard errors are estimated via a bootstrap procedure. 95% confidence bands are displayed.

To test for the potential presence of further spill-over effects of EACU/EAEU on the above CIS countries, we used two approaches based on the evaluation strategy described in Section 3. First, we compared EACU/EAEU exporter-importer trade flows within EACU/EAEU with EACU/EAEU exporter-importer trade flows with the rest of CIS. Results are reported in Figure A.1. This figure also gives the confidence intervals of the log gap in export flows between treated and untreated exporter-importer pairs. For both panels, the estimates are statistically significant in 2019 at the 5% level. We interpret these estimates as compelling evidence of EACU/EAEU-engendered trade diversion towards the other CIS countries. Second, we compare untreated CIS exporter-importer flows outside CIS with untreated CIS exporter-importer trade flows with EACU countries. Figure A.2 gives the estimates, which reinforce the likely presence of trade diversion as

untreated CIS countries increase their trade flows with countries outside CIS more than would have happened in the absence of the EACU/EAEU.

In light of these findings, we have not included non-treated CIS countries in the donor pool in order to avoid any bias due to trade diversion with these countries.

Figure A.2 – Additional test for the potential presence of trade diversion towards other CIS countries



Notes: Standard errors are estimated via a bootstrap procedure. 95% confidence bands are displayed.

Appendix B

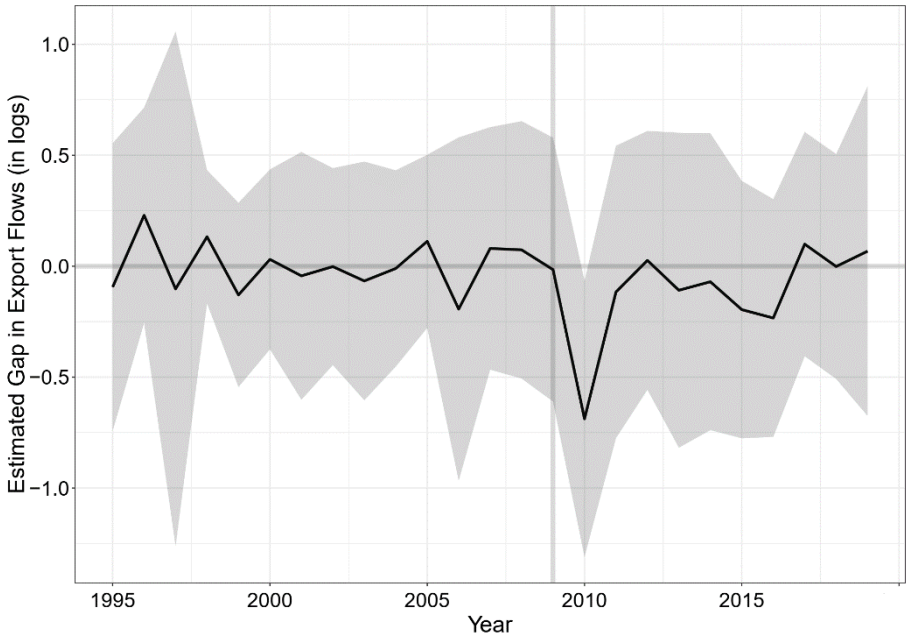
Table B.1 – Exporter-importer weights for the aggregate estimates

Exporter-importer pairs treated in 2010		Exporter-importer pairs treated in 2015	
Exporter-importer pair	**Weight**	**Exporter-importer pair**	**Weight**
Malaysia-Singapore	22.4%	Singapore-Jordan	12.8%
Jordan-India	18.1%	Cambodia-Laos	9.2%
Singapore-Jordan	13.9%	Cambodia-Vietnam	8.8%
Jordan-Singapore	10.4%	Laos-Vietnam	8.6%
India-Jordan	9.7%	Jordan-Singapore	7.9%
Singapore-Malaysia	7.1%	Jordan-Mongolia	6.9%
Korea-North Korea	5.3%	Israel-Singapore	6.7%
India-Singapore	1.7%	Vietnam-Laos	6.2%
Israel-Bangladesh	1.5%	Vietnam-Cambodia	5.8%
Lebanon-Pakistan	1.4%	Macedonia-North Korea	4.7%

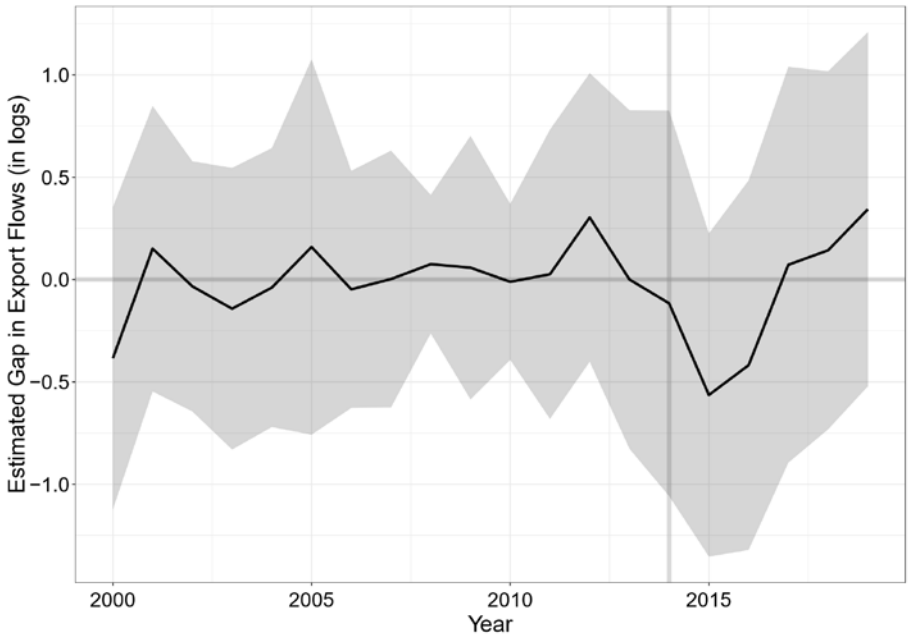
Note: We report the 10 exporter-importer pairs that received the most weight. Weights sum up to 1. The weights refer to the aggregate estimates, while the weights for each individual exporter-importer analysis are not reported (available upon request).

Figure B.1 – Export flows gap between treated and synthetic exporter-importer pairs with confidence intervals

Panel A – Treatment starts in 2010 (EACU) for the 6 exporter-importer pairs of Russia, Kazakhstan and Belarus



Panel B – Treatment starts in 2015 (EAEU) for the remaining 14 exporter-importer pairs



Appendix C

Figure C.1 – Robustness tests

Panel A – Treatment starts in 2010 (EACU) for the 6 exporter-importer pairs of Russia, Kazakhstan and Belarus

Adding per capita GDP

Potential anticipatory effects

Kernel balancing

Removal of exporter-importer pairs involving China

Shorter pre-treatment period

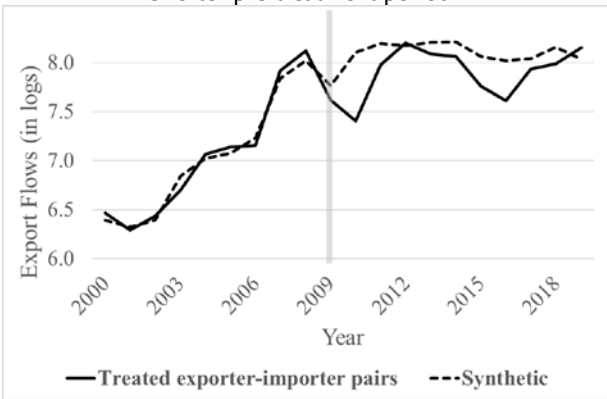


Figure C.1 (Continue)

Panel B – Treatment starts in 2015 (EAEU) for the remaining 14 exporter-importer pairs

Adding per capita GDP

Potential anticipatory effects

Kernel balancing

Removal of exporter-importer pairs involving China