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EFFECTS OF INTEGRATION OF ARMENIA TO THE EURASIAN ECONOMIC
UNION ON EXPORT VOLUMES AND STRUCTURE

Master's thesis

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Abstract

International trade has become the prerogative of the globalized world where Free Trade Agreements gain more importance and value. ‘Deep integration’ attracts attention for it goes beyond tariff barriers regulations up to the elimination of non-tariff barriers and their trade-impeding effects. In the pursuit of trade increase through ‘deep integration’, but also for geopolitical and security reasons, Armenia joined Eurasian Economic Union in 2015. The current paper investigates the effects of the integration on the Armenian exports to Russia. Synthetic Control Method is applied to compare the real Armenia case with a pool of post-Soviet countries for the period of 1996-2018. The paper finds that the Armenian integration had positive and significant effects on the export volumes and the number of exported HS 6-digit products. In addition, sector-level analysis showed that the positive effects were persistent sector wise, in particular for the sectors sensitive to non-tariff barriers.

1. INTRODUCTION

Trade liberalization has been long considered as accelerator of economic growth and development. The phenomenon of globalization happens with countries opening up their economies through the elimination of trade barriers and restrictions (Krugman (1979, 1980), Melitz (2003), Baier and Bergstrand (2002, 2007), Magee (2003), Baier et al. (2019)). The cornerstone for such opening was the establishment of international trade organizations and the increasing number of countries being affiliated to them. Last 3 decades marked unprecedented increase in the notified Regional Trade Agreements (RTAs) in goods and services given the positive implications on the trade flows (Baldwin and Gylfason 1995, Carrere 2006). Whalley (1998), Crawford and Fiorentino (2005) investigate the objectives of forming RTAs and summarize them into 3 major factors: economic, political, and security driven objectives. Although the motivations to conclude RTAs are various, Crawford and Fiorentino (2005) describe the necessity of an agreements as follows: “Smaller countries particularly would see RTAs as a defensive necessity, while even larger economies may turn to RTAs to avoid being left out in the cold” (p. 16).

Armenia joined the Eurasian Economic Union (EAEU) originally initiated and lead by Russia in 2015. The objective of the current study is to investigate the effects that the integration into EAEU has had on Armenian exports. The focus on exports is conditioned by the fact that integration had immediate effects in terms of facilitated regulations and non-tariff barriers eliminations. In order to leave time for Armenian authorities to prepare the economies for the foreseen changes, it was decided to postpone the increase of duties to conform to the common external tariffs on imports from the EAEU non-member states until January the 1st, 2020. This makes any post-factum estimations of the Armenia's integration effects in terms of imports non feasible. Although the period following the integration is short, to my best knowledge there is still no econometric analysis examining the implications for Armenia in terms of custom union (CU) adherence.

The study under question contributes in three main ways. First, it shows the effects that the integration to EAEU has had on Armenian export volumes towards its major trade partner – Russia. Second, the study analysis the implications of the integration through the sectoral composition of the Armenian exports. Third, the paper investigates the trade creation and trade diversion aspects when it comes to exports to Russia versus EU. Not only this study will be the first to investigate the integration effects on Armenia, it will also be the first to focus on new joiners of EAEU. Moreover, the analysis suggests policy implications and discussions particularly relevant for other post-Soviet countries who have been invited and may potentially join the EAEU. For instance, both Uzbekistan and Tajikistan have been offered to join EAEU. In April, 2020, the parliament of Uzbekistan approved the government's proposal to become EAEU observer country proving their interest in the regional integration.

After the collapse of the Soviet Union, the member states regained their independence and had to resettle relationships from the position of sovereign states with each other and with the rest of the world. For the post-Soviet economies, it was crucial to become part of integrated international trade network (Campos and Coricelli (2002)). A large number of RTAs have been signed between the CIS and non-CIS member states both on bilateral and multilateral basis. However, for larger economies reclaiming the leading position was an additional ultimate goal (Jenish 2013). As such, Russia has initiated various integration processes under different formats (Tarr 2016).

A major step in integration processes was the establishment of the first Eurasian Custom Union in 2010 between Belarus, Kazakhstan, and Russia. Inspired by the model of European Union, the Russian initiated integration processes aiming for deeper integration (Adarov 2018). The ultimate goal was to create a single market with free movements of goods, services, capital and labour. Aiming for deeper and larger-scale integrations, the Eurasian Economic Union (EAEU) - Eurasian Custom Union's successor - was established in 2015 (Tarr 2016, Vinokurov 2017). It was meant to bring the 'deep integration' through the coordinated economic policies, including macroeconomic policies, financial markets, taxes, competition and regulation of natural monopolies, energy, railway transport, public procurement, labor migration and other areas. It was agreed to let the CU determine the rules regarding sanitary and phytosanitary standards (SPS) and norms on goods and the CU attempted to reduce trade costs by eliminating internal customs posts. In this sense, the results of the paper give the possibility to understand the effects of non-tariff barriers (NTBs) eliminations and regulatory facilitations in specific sectors' export volumes changes. This allows to quantify the contribution of eased NTBs regulations – usually a challenging component of trade to be measured. The results confirm earlier findings regarding the trade-impeding effects of NTBs (Cadot and Gourdon 2016, Bratt 2017, Niu et al. 2017, Ghodsi et al. 2017). With the case study of Armenia's integration into EAEU – in a region with no considerable tariff barriers - the easing of NTBs proved to be efficient and beneficial on exports from Armenia to Russia.

Armenia adhered to EAEU during the negotiations of Armenia's signing the Deep and Comprehensive Free Trade Agreement (DCFTA) with EU and had to reject the agreements (Dragneva et al. 2017). Moreover, by that time, the trade with EU exceeded the trade with the Russia – historically the main trading partner of Armenia. This cancellation provoked public dissatisfaction and raised questions regarding the costs derived from the loss of opportunities from the DCFTA with EU. The integration to EAEU was a subject of tough discussions and criticism. Grigoryan (2014) described the decision as being made 'under the gun' (p. 98). It was largely perceived as a political move against the economic interests of the country. The current study investigates the effects that the integration to EAEU has had on Armenian export flows towards Russia

and partially covers the question regarding the benefits of the EAEU from the perspective of Armenian exports (Ter-Matevosyan et al. 2017).

To answer the raised questions, Synthetic Control method is applied according to Abadie and Gardeazabal (2003) specifications and extended in Abadie, Diamond, and Hainmueller (2010). The analysis is built on the aggregated level data covering the exports from Armenia to Russia in terms of export volumes in current US dollars and number of exported 6-digit Harmonized System (HS) products. In addition, disaggregate sector level analysis of export volumes is performed aiming to investigate deeper into the NTB elimination effects. The control pool for the SCM is constructed from the post-Soviet countries, including former Soviet Union (FSU) and Central and Eastern Europe and Baltics (CEEB) that at some extent shared the Soviet legacy. The study covers the period from 1996 to 2018. The observation period excludes the turbulent years following the collapse of Soviet Union. On the other hand, it allows sufficient time for the effects of the integration on the exports to materialize. In recent years this method has been gaining more interest in comparative case studies explained by its simplicity, transparency, and interpretability. How those advantages are exploited in this study are discussed in detail in the Section 4.

The next subsection describes in more details the evolution of post-Soviet area integration processes. It also presents the historical and contextual description of the major events that made the Armenia's integration into EAEU possible. In addition, it provides with the understanding of public perception of the integration and provides with better insights about the importance of the current study and the raised questions. Section 3 presents the literature review. Section 4 describes the Synthetic Approach method, in general, and the data used, in particular. The section provides argumentation for the choice of variables, control pool countries and period of the subject analysis. Section 5 discusses the results as well as the take offs of the study. Section 6 concludes.

2. BACKGROUND: POST-SOVIET EVOLUTION OF CIS COUNTRIES AND ARMENIA

The beginning of 1990s marked the collapse of the Soviet Union; former Soviet Union states gained independence and moved from central planning to market economy.

After the dissolution of Soviet Union, the Commonwealth of Independent States (CIS) was formed in 1991. 9 out of 15 states of former Soviet Union are currently members of CIS¹. Almost all the CIS countries had bilateral trade agreements with each other when the CIS Free Trade Agreement (CISFTA) was signed in 2011 and Free Trade Area was established in 2012 meant to replace the existing bilateral and multilateral trade agreements². Figure 1 illustrates the evolution of economic relations between CIS countries and the steps towards the creation of EAEU.

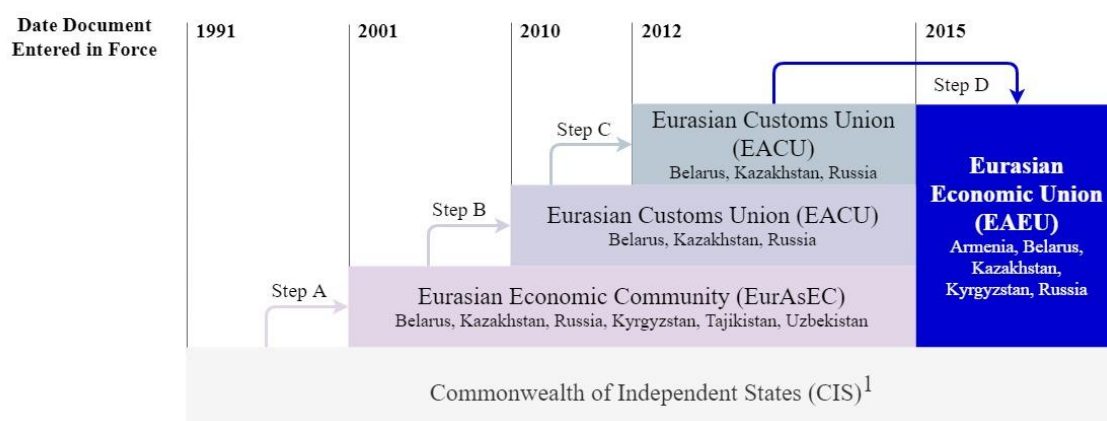


Figure 1: Evolution of Eurasian Economic Union

In order to achieve economic integration between CIS member states, Eurasian Economic Community (EurAsEC) was established in 2001³ (Step A). The main objective was the creation of a common market for member states. In 2010, Belarus, Kazakhstan, and Russia continued the economic integration processes with the establishment of the Customs Union – the predecessor of EAEU (Step B). A major move towards creation of a single market was the creation of Eurasian Economic Space in 2012 allowing the fully implementation of free movements for goods, services, capital, and labor (Step C). The culmination of the integration processes was the establishment of Eurasian Economic Union in 2015 aiming for further deepening of the integration with the improvements in

¹ The member states are: Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Uzbekistan. Georgia left CIS effective 2009 as a result of Russo-Georgian war of 2008. 3 Baltic countries do not participate in CIS as a reflection of the public political evaluation of the former regime as occupational.

² The member states are: Armenia, Belarus, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Ukraine, Uzbekistan. Azerbaijan is the only full CIS member that does not participate in the free trade area.

³ The member states were: Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan

the functioning of the single market (Step D). Year 2015 market the CU expansion with Armenia and Kyrgyzstan joining the three founding members (Figure 1).

After Armenia reclaimed its independence, it entered a war conflict with neighboring Azerbaijan over Nagorno-Karabakh. With the Russian political intervention, a ceasefire was signed in 1994. However, no final peace resolution has been put in place so far and the tensions on frontline have regular basis. In this context, Russia has been a major strategic partner for Armenia. The latter is a member of Collective Security Treaty Organization signed in 1992. The military alliance is led by Russian Federation and has high importance for the Armenian side. In addition, Russia has since independence been the main trading partner of Armenia. The socio-political ties between the two countries have been strong and Russia has historically had extensive negotiating power over Armenia. At the initial stages of negotiations Armenia was more inclined towards staying away from the EAEU. However, after a meeting between two countries' presidents, Armenia unexpectedly decided to enter the Union. The level of pressure from Russia assumed either full integration or disintegration to/from EAEU, leaving the Armenian side with no alternatives apart from entering into EAEU. Hence, it is important to investigate the true economic effects the integration to EAEU has had for Armenia.

3. LITERATURE REVIEW

International trade theory has largely supported the positive contributions of trade openness and trade liberalization on growth and welfare. The neoclassical trade theory with Ricardian and Heckscher-Ohlin models stresses out the differences in technology and factor endowments to explain the interest and benefits for opening up the economies and engaging into trade. Based on the comparative advantage, welfare gains are achieved when countries export products for which they have comparative advantage, be that in relatively abundant factor endowments or better technologies. New Trade theory builds the models on more realistic and closer to reality grounds. Krugman (1979, 1980) pioneered the monopolistic competition trade model with intra-industry trade implications on trade. He advanced the theory of economies of scale as an alternative to the assumptions stipulated by the neoclassical theory. As such, trade may take place and

ensure gains between countries with similar technologies and factor endowments. Krugman (1979) highlighted the need for companies to expand and exploit the economies of scale. Companies may succeed by specializing on lower number of products while the consumers will gain by having larger choice of varieties thanks to the trade.

There is extensive empirical literature investigating the effects of trade liberalization and various trade agreements on trade flows. The majority of studies that examine the effects of free trade agreements (FTAs) on trade use gravity model as the ground for analysis. The cornerstone of the model is the seminal work of Tinbergen (1962). The baseline model was later developed and enhanced in multiple ways to strengthen the theoretical frameworks and to reflect the complexity of real life into the model. Among the main enhancements are the contributions by Anderson (1979), Bergstrand (1985), Baier and Bergstrand (2001), and Anderson and van Wincoop (2003). FTAs are considered to largely contribute to the international trade. With the application of more complex econometrics methodologies and tools as well as more detailed analysis, the recent empirical research discussed next finds more evidence for the positive and significant effects of FTAs that are in realistic ranges in contrast to some excessive positive results found in earlier studies (i.e. trade increase of 420% thanks to FTAs found by Subramanian and Wei 2007).

Baier and Bergstrand (2002) and Magee (2003) tackle the econometric issues originating from the endogeneity of FTAs. Countries self-select into the FTAs by signing agreements that reflect the best their anticipations regarding the trade and welfare increases. Both papers find that including FTA endogeneity considerations into the analysis considerably increases the FTA effects on trade. Overall, the increasing interest towards the ‘deep integration’ through FTA formation, where the NTBs and domestic regulations are essential components of the negotiations but unobserved from the perspective of an econometric evaluation, affect largely the trade flows. In the context of Armenian integration into EAEU, the ‘political-economy’ factors, traditionally outside the scope of pure econometric model, should be considered as well (Grossman and Helpman 1995), although it makes the endogeneity issues even harder to tackle.

In their influential study Baier and Bergstrand (2007) suggest panel dimension (with five year tranches) to address the problem of FTA endogeneity. For econometric accuracy and based on data specification (large longitudinal dataset) the preference is

given to fixed-effects model, with first difference specification used as robustness check. The paper finds that the bilateral trade between two FTA member states doubles over the period of 10 years.

Baier et al. (2019) dive deeper into the previous research to disaggregate the effects and present their heterogeneity arising from three main specifications:

- FTA effects from agreement to agreement - ‘across agreement’ effects;
- FTA effects within an agreement - ‘within agreement’ effects;
- FTA effects depending on the trade direction between a country pair of FTA.

The paper finds that each source accounts for about one third of total heterogeneity of FTA effects. In addition, it demonstrates considerable deviations from average FTA effects when heterogeneity is considered. The analysis of the heterogeneity in FTA partial effects allows predictions regarding the future effects of a potential FTA taking into account the historical performance of existing FTA based on their member states’ characteristics such as bilateral trade intensity prior to the agreement.

A significant amount of various trade agreements happen to be geographically consolidated. That follows from the gravity model where ‘natural’ trading partners happen to be geographically close to each other and have already settled active mutual trade relations. Baldwin and Gylfason (1995) stress that regional trade agreements (RTAs) gain more and more importance both in essence and in size. They suggest that local exporters deal with more ease with regional trade blocs. The authors compare the spreading of regionalism to domino effect: with the deepening and strengthening of regional trade, non-members gain more interest in entering the agreement. Local exporters of non-member states become advocates for the integration in order to avoid losses incurred because of their exclusion.

Crawford and Fiorentino (2005) also point out the increase in RTAs numbers and complexity. In many cases those agreements are preferred to and go beyond multilateral trade. The authors highlight that only a minor share of total RTAs are formed under Customs Unions conditioned by the complexity of their establishment, duration of negotiations, predominant geographical and geopolitical considerations, as well as potential loss of economic independence and flexibility. In this sense, taking into account the historical and geopolitical relationships between Armenia and Russia and the context

and circumstances preceding Armenian integration into EAEU, the two main factors for FTA formation suggested by Crawford and Fiorentino (2005) gain even more weight:

- economic: the access to larger markets can be realized through RTA, in particular when multilateral trade liberalization does not seem exploitable. Deep integration is another strong argument supporting the RTAs.
- political and security: this can be as a response to geopolitical interests and search for regional integrity and security. When RTA formation is politically motivated, it usually happens at the cost of economic logic.

Summarizing the presented literature, FTAs formation is beneficial for trade liberalization. At the same time, RTAs gain more attention. CU as a way of forming RTA is more restrictive and complicated in terms of regulations, specification, authorizations, etc. At the same time, it is not always that the countries seek only economic gains when forming or adhering to RTA. In this sense, Eurasian Economic Union (EAEU), which is a CU, is an example to consider in order to estimate its economic implications and to discuss the literature that highlights the development paths to avoid strong geopolitical orientation.

Traditionally the main literature about the CUs cover the topics regarding tariffs and external common tariff effects. The latter is related to trade creation and trade diversion estimations. According to Viner (1950) trade creation is the increase in trade among members of an integration bloc as a result of lower prices of traded goods after tariffs and non-tariffs barriers have been reduced or eliminated; trade diversion refers to the shift of imports from a more efficient exporter outside the bloc to a less efficient exporter within the bloc as a result of higher tariffs and non-tariffs protection measures applied to non-bloc trading partners. What the paper investigates are the export flows on which ‘deep integration’ has extensive implications with underlying reduction/elimination of non-tariff barriers (NTBs) and other policy regulations. In parallel with the continuous tariff decreases, which can be partly explained by the growing number of RTAs and bilateral and multilateral trade agreements, NTBs become more influential trade protectionism mechanism. The studies highlight the detrimental effects that NTBs have on trade (Bratt 2017, Niu et al. 2017, Ghodsi et al. 2017). According to the estimates of Andriamananjara et al. (2004) the removal of a limited set

of NTBs non-tariff measures would contribute to global welfare gains in the range of USD 90 billion.

The elimination of NTBs and facilitated regulations are central ideas for ‘deep integration’. From this perspective, the main contribution of EAEU adherence is the elimination of trade barriers, through establishment of a single market with free movements of goods, services, capital and labour. Moreover, the overwhelming majority of FSU countries have already bilateral and multilateral trade agreements in place and the elimination of NTBs can be considered as a promising opportunity to further grow the trade flows within the FSU region. According to Cadot and Gourdon (2016) findings, the deep integration clauses in regional trade agreements reduce the prices on HS6 products by an average of 8% originated from the NTB via compliance costs. On the other hand, Vicard (2011) suggests that the efficiency of trade agreements is connected to the member countries’ characteristics: countries more similar in terms of size and distance increase the trade flows as a result of RTA formation regardless the depth of the agreement.

In Billmeier and Nannicini (2011) the authors introduce synthetic control following Abadie and Gardeazabal (2010) construction and estimate the impact of trade openness⁴ on a sample that is constructed from transition countries of Central and Eastern Europe and Baltics (CEEB) and Former Soviet Union (FSU) regions plus any other transition economy that has SWWW indicator available and that is at least partially closed in 1990s (mostly African and East-Asian countries). The authors show that both in Armenia and Georgia per capita GDP increased significantly 5 years and 10 years after opening up the economies, whereas Azerbaijan does not particularly increase per capita income. At the same time, Tajikistan is excluded from the analysis given that there is no good match. Interesting case is Uzbekistan, which was the main control for Armenia and Georgia. In the reverse treatment for Uzbekistan the authors demonstrate the benefits that the country could have materialized would it have opened the economy.

Interesting contradicting view on further growth development in both CEEB and FSU is proposed by Aslund and Jenish (2006). The authors find that the further FSU countries are located from Western Europe markets, the higher the growth in the period from 1999 to 2004. Although CEEB economies were the top performers in the first years

⁴ Measured by Sachs-Warner-Wacziarg-Welch (SWWW) indicator of openness developed by Sachs and Warner (1995), extended, updated, and revised by Wacziarg and Welch (2003).

of transition, FSU demonstrated considerably higher growth in later years. The authors give the main credits to the government expenditures and energy exports. The authors interpret the contractions in government expenditures as a positive sign of improved measures in anti-corruption regulations.

A larger coverage of FSU countries with more recent data is found at Jenish (2013) who constructed a panel data for 11 FSU countries for the period of 2000-2010 (Georgia left CIS in 2009 and is excluded from the panel). If for CEEB region EU integration and trade with western partners is the preferable orientations, then for FSU countries Russian Federation is the key partner. Hence, the author examines the trade with and without Russia. His conclusions do not differ much from the findings in the previous paper: the trade with Russia has positive and significant impact on growth, although with small magnitude. The finding is in line with the claim that for FSU economies the distance from EU has a negative relationship on growth. At the same time, the author confirms the findings about positive impact of energy exports as well as negative impact of higher government expenditures.

Adarov (2018) conducted the empirical analysis of Eurasian Custom Union (EACU) for the period of 2010-2015 (for the predecessors of EAEU) applying gravity model and synthetic control on top of it for additional robustness. The paper finds that there has been considerable increase in trade between member states, on the one hand, and trade diversion due to increase external tariff application (in case of Belarus and Kazakhstan), on the other hand. The positive effects of EACU integration on trade consequently was also smaller due to challenging macroeconomic environment. The paper points out to the importance of elimination of NTBs as well as application of internationally accepted standard and regulations to achieve 'deep integration'.

When discussing the achievements and failures within EAEU, Blockmans et al. (2012), Vinokurov (2017), Tarr (2016), EBRD (2012), EDB (2015a), EDB (2015b), Adarov (2018) suggested that positive effects can be achieved if additional efforts are applied to reduce non-trade barriers and bring into life the trade facilitation processes presented in the literature. The current paper follows closely the synthetic control approach that Adarov (2018) applied in the investigation of Eurasian Custom Union effects on its founding members, Russia, Belarus, and Kazakhstan, for the period of 2010 to 2015. Additionally, it follows the Billmeier and Nannicini (2011) setup of independent

variables to construct the synthetic control model applied in the study of trade liberalization effects on post-Soviet transition economies. The next section presents the synthetic control method used to estimate the EAEU integration effects on the volumes and structure of exports for Armenia.

4. METHODOLOGY AND DATA

The current study is constructed over the Abadie and Gardeazabal (2003) synthetic control (SC) approach that was extended in Abadie, Diamond, and Hainmueller (2010). This approach is developed for comparative studies: it builds hypothetical control group to compare with the real treatment group. Synthetic control method (SCM) is a workhorse for evaluating the economic policy effects and implications. In the scope of the current study, the economic event under question is the integration of Armenia to EAEU. The SCM makes it possible to compare the current reality with the hypothetical situation should Armenia have refused joining the CU. In particular, it makes the comparison possible through the construction of a synthetic control group similar as much as possible to the actual treated groups. Therefore, the choice of variables upon which the control groups should be built is crucial. In addition, the pre-intervention outcome should be at equal levels between control and treatment groups. The chosen variables are estimated upon a number of countries that have not been treated. The more the countries share similar patterns with the treated group, the more weight they gain. All the weights should sum up to 1. Detailed description of SC method can be found in Appendix 1.

The method has both advantages and challenges. The main advantage is the ‘transparency’ and ‘flexibility’. No restrictions are put on the choice of the control countries as long as they share similarities with the treated country. The weights are explicitly allocated to countries that have the highest explanatory power. When it comes to the challenges, SC is sensitive to the choice of countries to enter the control pool as well as to the variable that should explain the dependent variable. The characteristics should be as close as possible between control and treatment groups before the treatment, but no event should have happened to them during the pre-treatment period. Another

limitation of the study is the political component present in the decision regarding EAEU integration for Armenia (Dragneva et al. 2017, ahram Ter-Matevosyan et al. 2017).

The subject study focuses on Armenia. The pool of control group is limited to the former Soviet Union block transition countries and extended also to some of Central European countries that have in some extent shared the Soviet legacy.

The control pool consists of the following countries:

- 13 countries from the CEEB region: Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, North Macedonia, Moldova, Poland, Romania, Slovak Republic, Slovenia. Two countries of former Yugoslavia, Montenegro and Serbia, had to be dropped because they gained independence only after 2006. Albania and Bosnia and Herzegovina are excluded from the analysis conditioned by negligible exports to Russia during the observed period.
- 5 countries from the FSU block: Azerbaijan, Georgia, Turkmenistan, Ukraine, Uzbekistan. Tajikistan is excluded from the analysis reasoned by the negligible exports to Russia during the observed period.

The choice of independent variables is based on Billmeier and Nannicini (2011) approach. Several other variables are added according to their relevance to the set problem. The predictors are presented below with the corresponding argumentation for their relevance.

- a. GDP annual growth rates:** GDP is one of the main macroeconomic indicators. After the collapse of the Soviet Union, countries in the subject study experienced drastic decline in welfare. However, the depth and the duration of the recession was different from country to country. GDP annual growth rate serves as a measure of economic prosperity, wealth, and pace of recovery after the transition.
- b. Population density (people per sq. km of land area):** Population density indicator can be considered as a proxy for the economy's factor endowment, progress in production and manufacturing vs agricultural economy, mining, and exploitation of natural resources. According to Keesing and Sherk (1971), higher population density shifts the comparative advantage towards the manufactured goods whereas lightly populated countries are more land and labor oriented. The labor- and capital-intensive production patterns are indeed clearly distinguished between CEEB and FSU countries where the latter accounts for considerably higher share of mining and exploitation of natural resources as % of GDP.

- c. Unemployment, total (% of total labor force) (ILO estimate):** Another remarkable indicator that was common for the economies under question after the collapse of the Soviet Union was the unemployment rate. Dutt et al. (2009) and Felbermayr et al. (2011) argue that international trade reduces the unemployment in the long-run. According to Felbermayr et al. (2011), 10 percentage point increase in trade reduces the unemployment by 0.75 percentage points in the long-run accounting for the effects of business cycles.
- d. Personal remittances, received (% of GDP):** Some of the control countries, similar to Armenia, for example Albania, Moldova, Tajikistan, Uzbekistan, heavily depend on personal inward remittances. Personal remittances have historically constituted around one fifth on the GDP for Armenia. The share of personal inward remittances for the mentioned control countries are in the similar ranges, reaching in some cases up to around 45% of GDP (Tajikistan in 2008). Although there is limited empirical literature investigating the effects of personal inward remittances and exports, Fayad (2011) argues that remittances contribute to the relative growth of exporting industries within the manufacturing sector of recipient economies. On the other hand, Jena and Sethi (2019) find that for five South Asian countries (Bangladesh, India, Nepal, Sri Lanka and Pakistan) for the period of 1993-2017 the personal inward remittances had negatively affected the export performance. Despite the controversial empirical findings, the importance of remittances for recipient economies is an indicator to take into consideration.
- e. Foreign direct investments (FDI), net inflow (% of GDP):** As argued by Billmeier and Nannicini (2011), CEEB and FSU countries had higher share of investments than other economies at the same level of development. In their analysis of FDI impact on exports and growth for the subject transition economies after their independence Bevan and Estrin (2000), Nath (2005), Campos and Kinoshita (2002), Campos and Kinoshita (2003) find that FDI has positive and significant effects on exports for CEEB region and limited impact on the FSU region explained by fact that the main attractiveness of the latter are natural resources that are extracted and for which no specific technological innovation is required.

- f. Exports (% GDP):** Trade openness is another indicator to measure similarities between countries. Although there are various indicators for measuring trade openness, the ratio of total trade to GDP is probably the most used metric. Taking into consideration that the focus of current study is specifically on exports, trade openness in this context is expressed as the ratio of exports to GDP.
- g. World Governance Indicator, percentile rank:** The indicator is the average value of the 6 components that make up the indicator. Those components are: control of corruption, government effectiveness, political stability and absence of violence/terrorism, regulatory quality, rule of law, voice and accountability. Each component is evaluated within the range of 0-100, where 0 is the worst and 100 is the best extreme. Percentile rank of all the components is averaged and reported under the world governance indicator.

The described covariates were used in the analysis of effects of the integration on export volumes, export products varieties, and sector-level export volumes from Armenia to Russia as well as on Armenia's exports to EU. The study covers the period from 1996 to 2018. The observation period provides sufficient time for the effects of the integration on the exports to materialize. At the same time, it excludes the turbulent years following the collapse of Soviet Union.

All the data covering independent variables are derived from the World Bank's World Development Indicators database. The world governance indicator is derived from the World Bank's World Governance Indicators database.

In the first stage of the estimation exports to Russia is chosen as dependent variable. The indicator measures the absolute export volumes in current US dollars from the given country to Russian Federation, which is considered the central and the most influential trading partner within the EAEU, in general, and for Armenia, in particular. Next, the number of exported Harmonized System (HS) 6-digit products is considered as the dependent variable in order to investigate the product-level changes of exports from Armenia to Russia. The source of the data is the World Bank's World Integrated Trade Solutions (WITS) database.

The second stage investigates the disaggregated sectoral patterns of the exports towards Russia. For that, the 2-digit HS commodities' data from the UN Comtrade database were regrouped between 9 sectors. Table 1 presents the description of the sectors.

Table 1: Description of 2-digit HS commodity sectors

Sector	HS2 codes	Sector description
S1	01-05	Live animals and animal products
S2	06-10	Vegetable products
S3	11-21	Miscellaneous food products
S4	22-24	Beverage and tobacco
S5	25-40	Mineral, chemical and plastic products
S6	41-67	Textile and footwear
S7	68-71	Stone and glass products
S8	72-89	Metals, machinery, transportation
S9	90-99	Miscellaneous

The underlying logic for the grouping was to ensure that

- i) the products for which Armenia has comparative advantage are not mixed (e.g. vegetables, hard liqueur, mineral and chemical products)
- ii) the products sensitive to NTB facilitations have their standalone sector (e.g. animal products, vegetables, other food products)

Second stage analysis is tightly connected to the first stage analysis when the patterns of exported product varieties from Armenia to Russia is investigated. The data are considered as proxy to the integration effects from the perspective of non-tariff barriers. The products that are more sensitive to NTB and domestic regulations would shift more towards Russia as a result of the NTB and regulatory facilitations.

The third stage of the analysis investigates the exports' destinations and changes in export volumes towards the main trade partners before and after the treatment. As such, the export volumes towards EU and Russia are evaluated. In this scenario, exports toward EU becomes the dependent variable while the covariates remain unchanged. The data covering export volumes from Armenia to EU are derived from the International Monetary Fund's (IMF) Direction of Trade Statistics (DOTS) database.

One of the SCM main challenges is the robustness check which cannot be performed by traditional inferential techniques. The issue was tackled by Abadie, Diamond, and Hainmueller (2010) who suggested to conduct placebo tests by replacing the real treatment group (in their study case it was the state of California that applied anti-tobacco law) by the 'fake' treatment groups - all the other states. For the current study total of 17 countries (including Armenia) were consecutively estimated for the results would they be the treated unit. Next, the actually treated Armenia is compared to the

‘fake’ treated units. The significance of treatment effects is confirmed if real treated unit (hereby Armenia) outperforms the ‘fake’ treated countries. In addition, placebo time tests are incorporated to check for the treatment effect explained by the policy changed at treatment period. Analogically to creating ‘fake’ treatment groups, the time placebo displays a ‘fake’ period other than the treatment date. In the current paper Y2012 is chosen. The aim of both country and time placebo tests is to check whether the results from the synthetic control approach have solid ground or are obtained by luck. In the current study placebo tests built on the Abadie, Diamond, and Hainmueller (2010) approach are applied.

Next section reports the results of the SCM for the described 3 stage analysis.

5. RESULTS

5.1 EXPORT VOLUMES AND VARIETIES AGGREGATE LEVEL RESULTS

This section investigates the effects of the Armenian integration on the disaggregate level exports. In particular, export volumes and exported product varieties are analyzed and visualization of real versus synthetic Armenia is presented.

The SC approach applied for analyzing the impact of Armenian integration into EAEU suggests positive effect on exports for both absolute export volumes and number of exported product varieties. Real Armenia and its synthetic control versions are compared and from the figures 2 and 3 it becomes clear that the exports volumes and varieties from Armenia to Russia have increased significantly after the integration.

Figure 2: Export volumes in USD ‘000

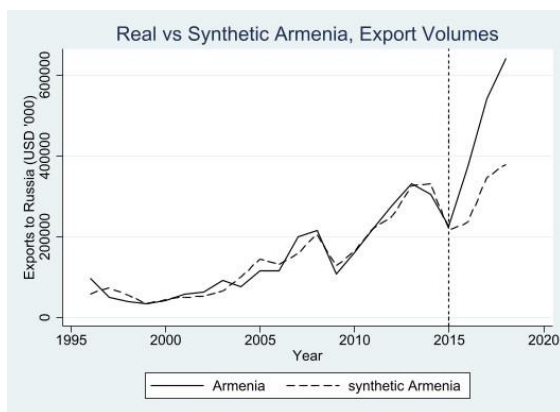
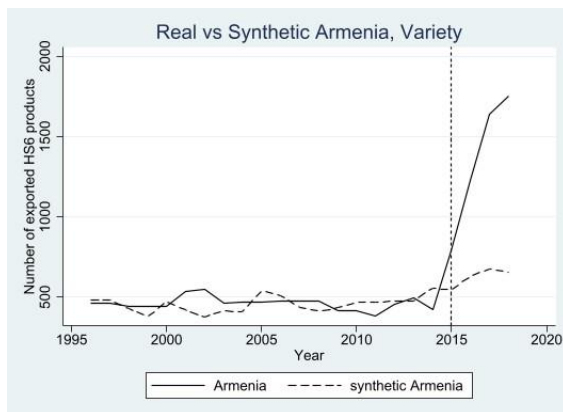


Figure 3: Number of exported HS6 products



The real Armenia continuously increased the export volumes and the number of export varieties to Russia starting from 2015. However, the analysis of exported products varieties (figure 3) revealed a challenge for the current study: year 2014 mark the beginning of deterioration of economic relationships between Russia and EU conditioned by the Crimea crisis⁵. In response to sanctions imposed by the international community on Russia as a result of military allegations, Russia, in its turn, imposed ban on imports of livestock, animal and vegetable products, dairy products from EU, USA, Canada Norway, and Australia (Larrabee et al. 2017). The ban initially effective for one year was later prolonged and covered the whole post-treatment observation period. Some countries of the current study used the opportunity to increase their exports towards Russia for the mentioned product groups. Along the study results, year 2014 would see export volumes and varieties increase from some of control pool countries. Armenia also increased the export varieties in 2014, but the trend accelerated even further after 2015 up to the end of the observation period. Although it is difficult to distinguish whether the results derive from the integration itself or from the import ban on EU, Armenia still outperformed its counterparts that were not subject to analogical import ban. In addition, root mean square predictor error (RMSPE) (Table 2) is the lowest for exported product variety indicator and proves its importance for the model.

Table 2 shows the treatment effects for export volumes and number of export varieties, as well as the corresponding RMSPE; increase composition per year following the integration year is presented. The difference is reported based on real and synthetic Armenia.

Table 2: Treatment effects and RMSPE

Treatment effects	Volumes	Number of Varieties
2015	11,086.55	241.88
2016	136,835.35	599.96
2017	194,583.44	960.22
2018	262,459.32	1,096.61
Total	604,964.66	2,898.68
RMSPE	21,111.36	71.12

Note: Reported are the export volumes in USD ‘000 and variety as number of exported HS6 products, respectively.

⁵ The annexation of Crimea by Russian Federation took place in February 2014. It resulted in harsh reaction by international community and imposing sanctions on Russia ((Larrabee et al. 2017).

Overall, the estimations show that the export volumes were increased by around c. 605,000 thousand USD for the four years following the integration as a result of the integration. The amount of the 4-year treatment effect equals almost the 2-year cumulative export volumes of pre-treatment period (years 2013-2014). In real terms, the cumulative post-treatment export volumes for the four observed years almost equaled pre-treatment cumulative export volumes for eight years (1.78 billion USD vs 1.81 billion USD, respectively); that said for the last eight years before the integration when the export volumes were at their historical high level. Considerably stronger effect was observed for the exported variety. As of the end of 2018, total of 1,751 HS 6-digit products were exported from Armenia to Russia, 3.8 times higher compared to the average of pre-treatment export variety for the entire observed period (1,751 vs 460, respectively). Real Armenia continuously increased the exported product palette and the treatment effect in 2018 was twice as much as the real exported variety during pre-treatment year of 2014 (1,097 vs 424, respectively). The aggregate level analysis for export volumes and number of export varieties shows positive and significant treatment effects for the exports from Armenia to Russia.

Table 3: Description of country weights per export volumes, variety, and sectors

	Export Volumes	Variety	S1	S2	S3	S4	S5	S6	S7	S8	S9
Azerbaijan	.015	.143	-	.008	-	.369	-	.051	.065	.025	-
Bulgaria	.589	-	-	-	-	-	-	-	-	-	-
Croatia	-	-	-	-	-	.001	.004	-	-	-	-
Czechia	-	-	-	-	-	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	-	-	-	-	-
Georgia	-	.602	.931	-	.801	.017	.996	.947	.566	-	.937
Hungary	.371	-	-	-	-	-	-	-	-	.003	-
Latvia	-	-	-	-	-	.233	-	-	-	-	-
Lithuania	-	.083	-	-	.042	-	-	-	.243	-	-
Macedonia	-	-	-	.057	-	.114	-	-	-	.969	-
Moldova	-	-	-	.068	-	-	-	-	-	-	-
Poland	.005	-	.069	-	-	.107	-	.002	.062	-	-
Romania	.020	-	-	.367	.100	-	-	-	.064	.003	-
Slovakia	-	-	-	.500	-	-	-	-	-	-	-
Slovenia	-	-	-	-	.057	-	-	-	-	-	.060
Turkmenistan	-	-	-	-	-	-	-	-	-	-	-
Ukraine	-	-	-	-	-	.159	-	-	-	-	.003
Uzbekistan	-	.173	-	-	-	-	-	-	-	-	-

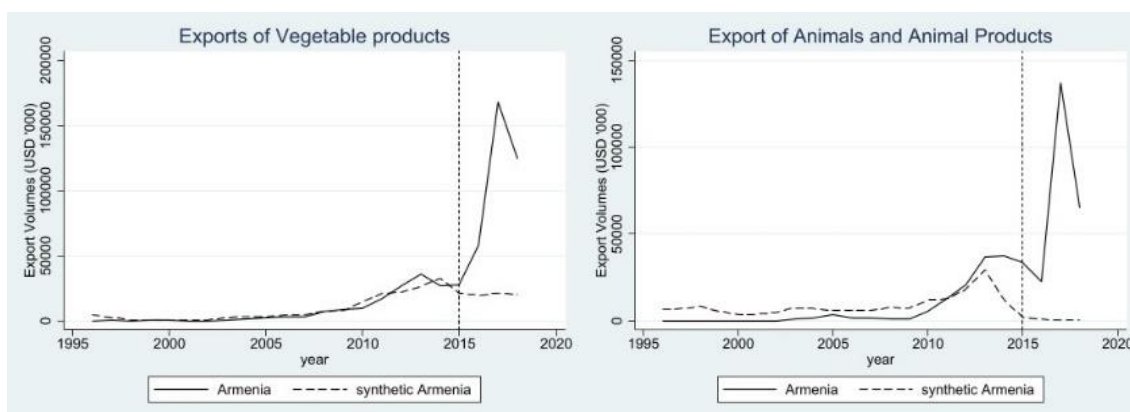
Table 3 presents the description of country weights. In general, when describing the unit weight, higher weights originate from the control countries that share the higher similarities between the covariates. In this sense, Georgia would be expected to have the highest weight given the regional, cultural, and socio-economic similarities with Armenia. However, in some cases, it had limited implications. The main explanation is

the Russo-Georgian War of 2008 which was followed by trade restrictions imposed by Russia on Georgian agricultural products and beverages. It is noteworthy that although the sanctions hit the Georgian export volumes, the number of HS 6-digit products was affected in much lesser extent, i.e. most of the adjustment occurred on the intensive margin (exports per HS 6-digit products) rather than on the extensive margin (number of HS 6-digit products). For instance, if the export volumes dropped by 3 times from 2008 to 2009, then the number of varieties increased from 228 to 275 for the same period. This patterns explain why Georgia is allocated 0 weight when constructing the synthetic Armenia based of export volumes, but has the highest weight when it comes to the export varieties. The same is true when the sector-level country weights are generated.

5.2 SECTOR-LEVEL DISAGGREGATE ANALYSIS RESULTS

The second stage analysis investigates further to find the sectors that contributed the most to this increase, hence, the sector that gained the most as a result of Armenia's integration into EAEU. Two more countries, Turkmenistan and Uzbekistan, were excluded from the sectoral analysis conditioned by the absence of disaggregate export data. The same covariates were applied in both first and second stages. Figure 4 depicts the real vs synthetic Armenia exports to Russia in thousand USD for 9 sectors disaggregated according HS2 codes (see Table 1).

Figure 4: Sector-level export volumes, real vs synthetic Armenia



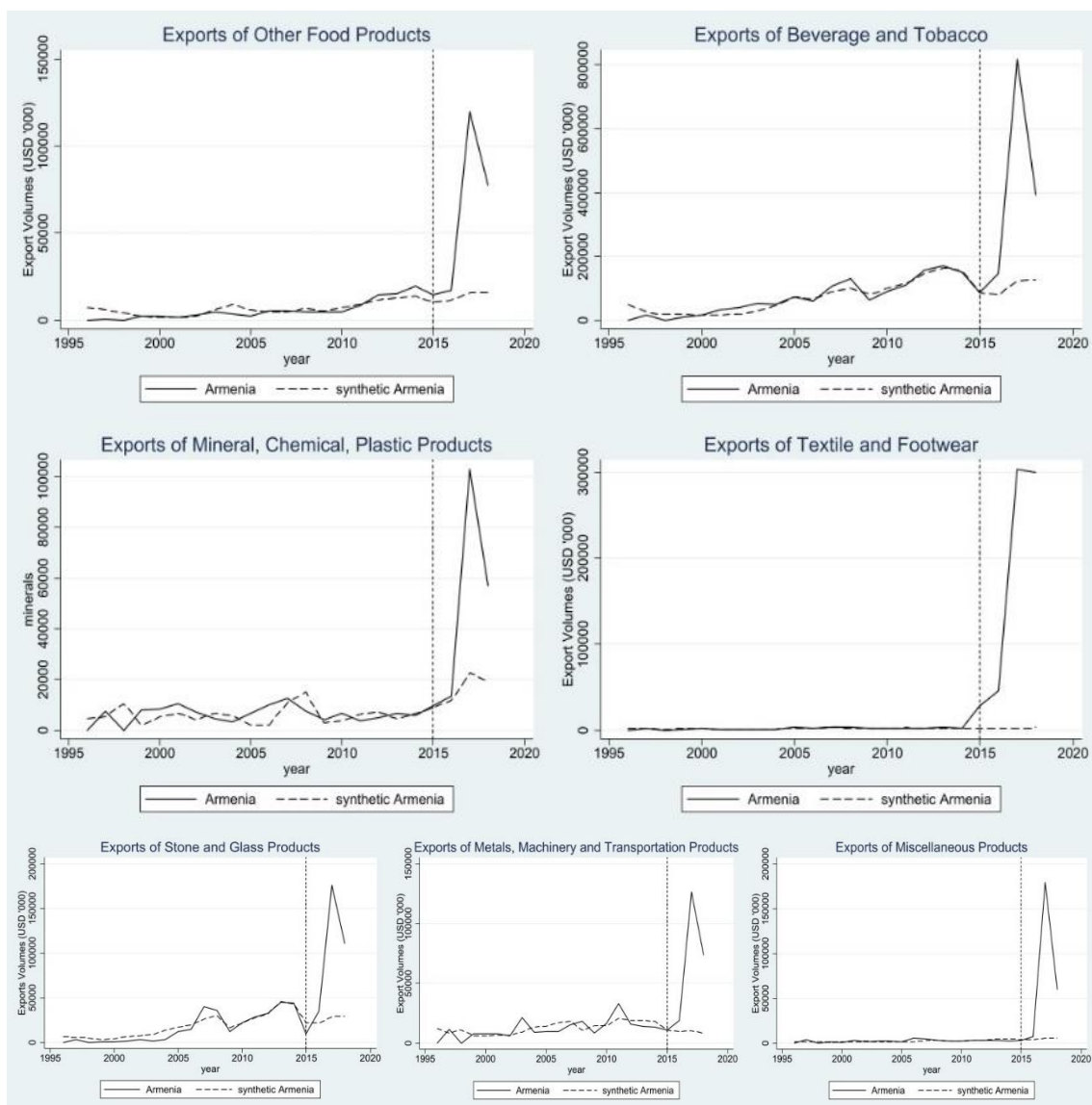


Table 4: Sector-level treatment effects

Treatment effects (USD '000)	2015	2016	2017	2018	RMSPE
Live animals and animal products	31,672.91	21,596.43	136,254.02	64,559.10	7,803.22
Vegetable products	6,123.36	37,955.45	146,601.50	104,568.28	3,461.43
Miscellaneous food products	4,108.37	5,642.52	103,890.95	61,390.27	3,281.93
Beverage and tobacco	515.55	69,886.29	695,706.41	263,392.26	17,651.96
Mineral, chemical, plastic products	810.85	1,518.83	80,224.86	37,543.28	4,459.38
Textile and footwear	26,884.77	43,864.92	301,052.26	296,334.57	697.70
Stone and glass products	(12,664.96)	13,394.50	147,001.48	80,274.12	5,609.02
Metals, machinery, transportation	(66.58)	9,797.74	115,832.65	65,431.75	6,676.36
Miscellaneous	(1,028.20)	3,320.98	173,395.55	54,117.60	1,528.58

Note: sector-level export volumes increase composition per year following the integration year. The difference is reported based on real and synthetic Armenia. The numbers in parentheses for Y2015 stand for negative treatment effects, i.e. export volumes for the given sectors in 2015 were smaller for real Armenia compared to its constructed counterpart.

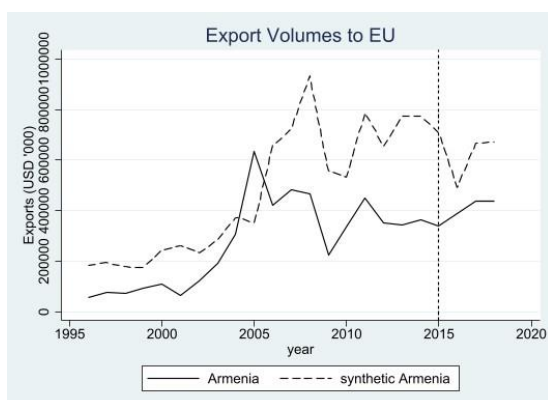
In the discussion of country weights allocation in section 5.1 (see Table 3 for country eights), the impact of Russian ban on Georgian agricultural and beverage sectors was described. The implications can be noticed for the sector-level country weight allocation as well. For instance, no weight is allocated for vegetable products and beverage & tobacco products. Nonetheless, for six out of the nine sectors Georgia counted for the highest weight.

The results of the aggregate and sector-level analysis suggest strong policy implications. First, post-Soviet countries, in general, and the FSU region, in particular, can benefit from increased export market as a result of ‘deep integration’. The region historically based on labor-intensive economy with strong comparative advantage in agriculture and textile can see their exports increase considerable. For instance, Tajikistan and Uzbekistan, two countries that were invited to join the CU, could potentially consider the contributions that the integration has had on export volumes and variety for Armenia.

5.3 TRADE CREATION AND DIVERSION ANALYSIS OVERVIEW

Stage 3 analysis investigates the effects that Armenia’s integration has had on the exports towards EU. An additional variable, exports to Russia, is added to the predictors. The dependent variable is now ‘export volumes to EU’ in current US dollars. The changing EU country composition is taken into account as export destination⁶.

Figure 5: Export Volumes from Armenia to EU



⁶ This refers to the changes in the composition of the EU to reflect its enlargement and new member states. The exports to EU new member states is taken into consideration starting from their membership.

Figure 5 shows the impossibility of solid estimations based on the real and constructed Armenia comparison as the pre-treatment period goodness of synthetic control country fit is very weak. The visual incompatibility between real and synthetic Armenia is proved by high mean square error (RMSPE of 256578). A theoretical solution could be adding more outcome lags (currently two outcome lags for Y2010 and Y2005 are applied). However, even if that would somewhat decrease the gap between real and synthetic Armenia, the biased outcome path would put the results under question.

Most importantly, the core differences lie in the composition of the control pool. Year 2004 marked the accession of as many as 8 CEEB countries into EU⁷. On the other hand, integration processes started in 2000s accelerated during the second decade of 2000s as described in Section 2. According to Aslund and Jenish (2006) and Jenish (2013), CEEB countries are Western markets oriented whereas FSU countries have Russia as their main trading partner.

5.4 ROBUSTNESS CHECK

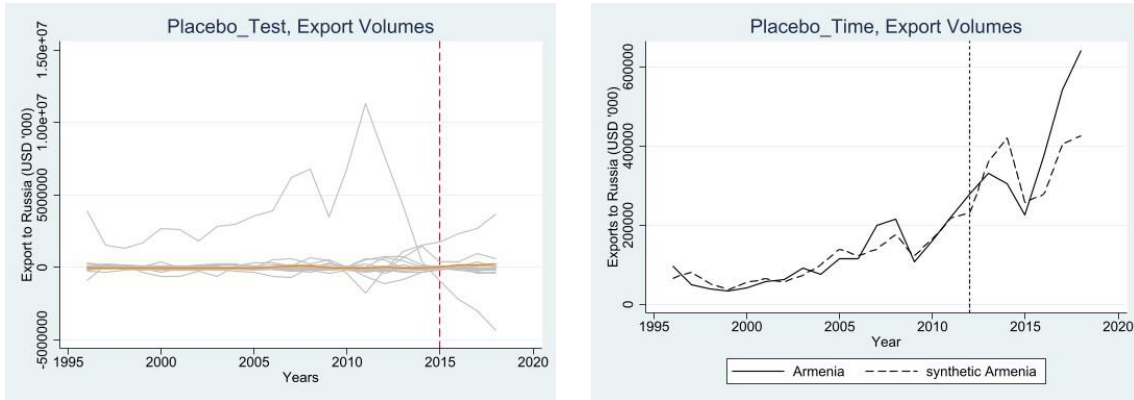
The SCM does not allow traditional inferential techniques for robustness check. To face the challenge, country and time placebo tests were performed in accordance to the specifications presented in the methodology section (see Section 4). Overall, 13 placebo test were performed: two country and two time placebo tests for the robustness check of the results related to the export volumes as well as the export product varieties. In addition, nine sector-level country placebo tests were performed.

Figure 6A depicts the country placebo and figure 6B depicts time placebo tests for Stage 1 analysis covering the export volumes from Armenia to Russia. The country placebo test (figure 6A) shows that only three countries increased their export volumes towards Russia more significantly than Armenia did. The main outperformers were Poland and Ukraine, who increased the export volume much earlier prior to the treatment, thus making it inaccurate to compare the treatment effects with the ones for Armenian. For time placebo year 2012 is assumed to be the treatment year. The same covariates are

⁷ Those countries were: Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia. Bulgaria and Romania joined later in 2007.

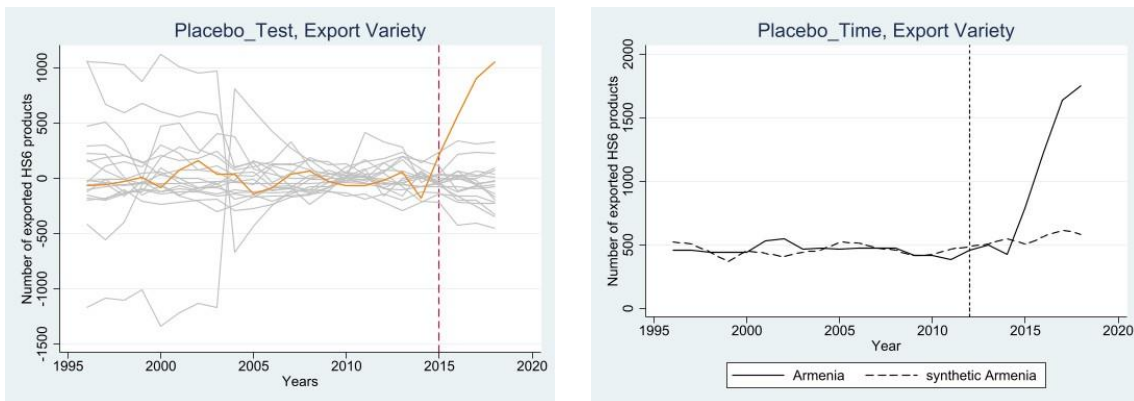
applied for shortened observation period of 1996-2011. The same logic applies for all the time placebo test. Figure 6B shows no divergence between real and constructed Armenia.

Figure 6A: country placebo, export volumes Figure 6B: time placebo, export volumes



Similarly, figure 7A depicts the country placebo and figure 7B depicts time placebo tests for export products varieties. The country placebo test shows the significance of the treatment in what it concerns the number of 6-digit HS commodities exported from Armenia to Russia. In addition, the time placebo test conforms the finding, demonstrating that no any diverging patterns were recorded in 2012. The reasons for diverging trend started to accumulate in 2014 explained partly by the import ban from Russia (details discussed in section 5.1).

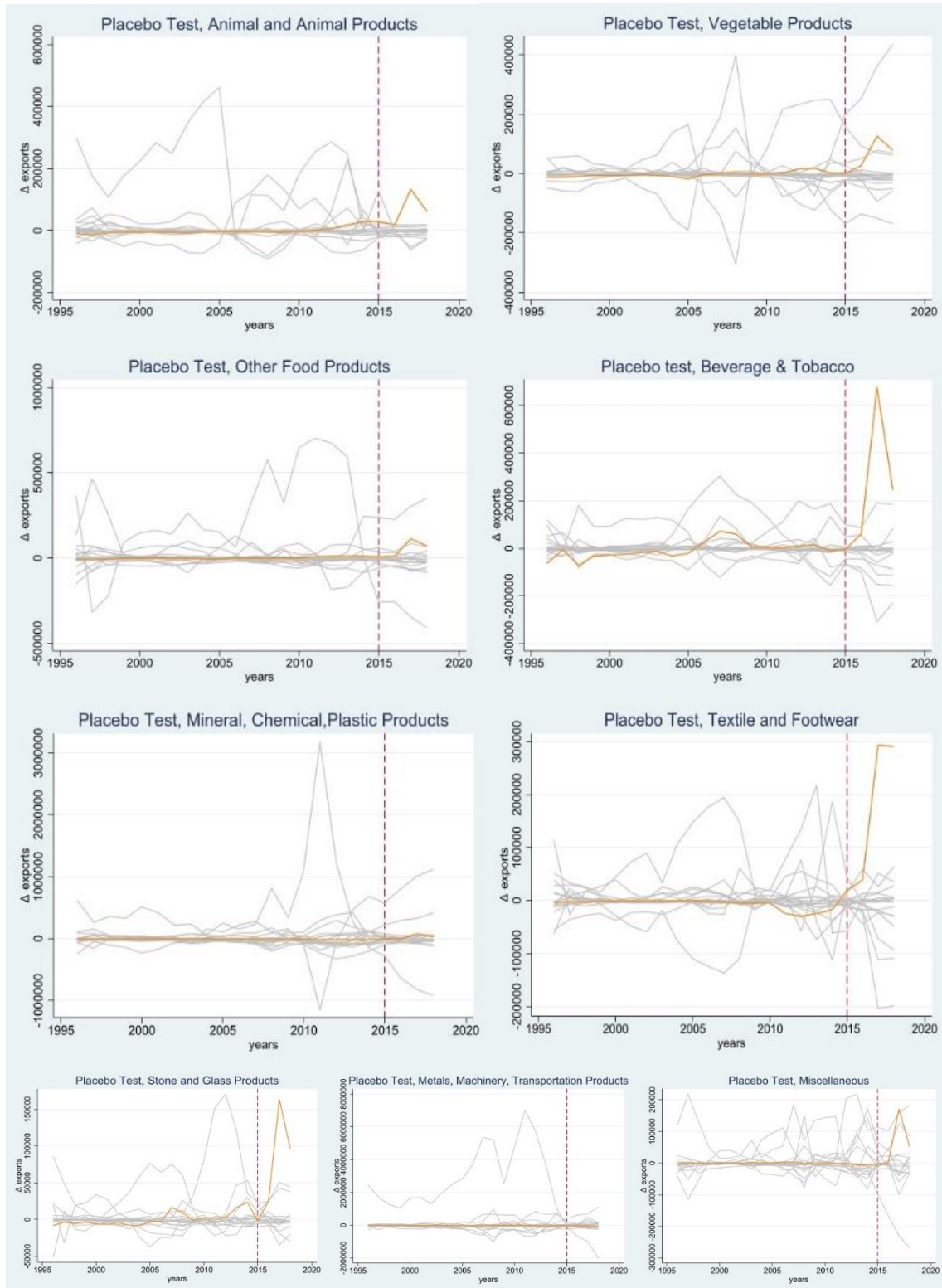
Figure 7A: country placebo, export variety Figure 7B: time placebo, export variety



The country and time placebo tests performed for the export volumes and export products varieties confirm the significance of findings in previous subsections, namely, the Armenian integration had positive effects on both export volumes and the export products varieties.

Sector-level placebo tests were conducted similar to export volumes and variety specifications. The same covariates were applied. The dependent variable was one of the nine sectors each time. Hence, nine country placebo tests were constructed (figure 8).

Figure 8: Sector-level country placebo tests



Overall, the results show positive and significant effects. In particular, animal and vegetable products, and beverage and tobacco products recorded the highest treatment effects for Armenia, far above compared to the same sectors of other countries. In case of exports of vegetable products, Azerbaijan recorded the highest positive change in export volumes. However, the change started to accumulate before the treatment period. It may be conditioned by Russian sanctions EU imports. For other food products exports, Poland recorded higher positive change compared to Armenia. However, Polish other food product exports too started to gain force already in 2013. Textile and footwear as well as stone and glass sector exports increase significantly, and although 2018 market decline for almost all sectors, the positive effects are still prevailing.

For miscellaneous products, Poland and Lithuania outperformed Armenia. However, Armenia does not have comparative advantage in this sector and historically has have modest export volumes. Moreover, the products within this sector are not sensitive to SPS regulations, neither the increase coincided with the treatment period.

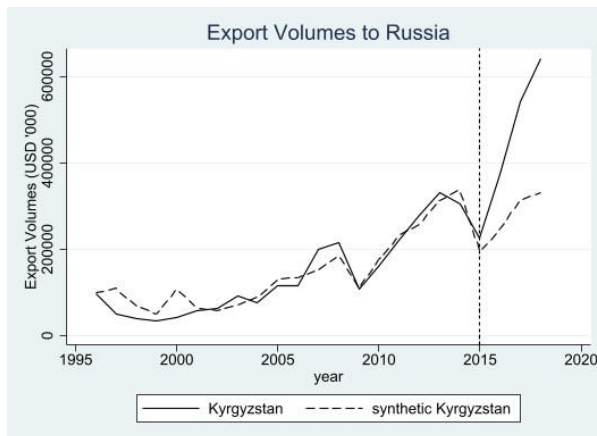
Hence, sector-level country placebo tests demonstrate that sectors particularly sensitive to SPS regulations facilitations and other NTB easing have significant implications resulting from the Armenian integration to EAEU.

5.6 ADDITIONAL ROBUSTNESS CHECK: CASE OF KYRGYZSTAN

In order to additionally confirm the robustness of the positive effects, export volumes from Kyrgyzstan to Russia are investigated. The integration of Kyrgyzstan to EAEU resembles a lot to that of Armenia. Kyrgyzstan joined the EAEU 6 months later compared to Armenia, on the August 6, 2015. Similar to Armenia, the public opinion in Kyrgyzstan was sceptic about the success of the Customs Union. Negative effects on welfare were expected related to the re-export from China. Prior to the crisis in 2008, the re-exports from China were as high as twice the country's GDP. In 2010, after being hit by the crisis, re-exports still generated revenues of about 13% of GDP. In absolute terms, the volumes of re-exports were twice as high as the exports. In 2008, around 35% of all Chinese exports with destination to Russia and Central Asia were passing through Kyrgyz Republic. After the crisis of 2008, this share halved to 17.3%.

As was the case for Armenia, Kyrgyz Republic had more liberal tariffs and had to increase them in order to comply with the common external tariff set for EAEU non-member states (exemption was given until January 1, 2020). Both countries were anticipating losses due to the economic asymmetries compared to the founding states of EAEU. The pressure from the Russian side was felt also on Kyrgyz side: during a speech in 2014 President Atambaev confessed that “we are choosing the lesser of two evils. We have no other option”⁸.

Figure 9: Export Volumes from Kyrgyzstan to Russia



The same covariate and observation period that were applied for Armenia, were also applied for Kyrgyzstan. The independent variable was changed from Armenian exports to Kyrgyz exports towards Russia. The finding of positive effects for Kyrgyzstan (figure 9) highlights the important role that the integration played in terms of increasing export volumes toward Russia, and that the effects have consistent and systematic nature and prevail over other economic incentives to increase exports to Russia.

6. CONCLUSION

The current paper investigates the effects that Armenia’s integration to EAEU has had on the exports to Russia. Synthetic control method is applied taking into account the interpretability, transparency and flexibility of the method. A threefold analysis was

⁸ Atambayev, Alamzbek: Speech at the National Council for Sustainable Development. Bishkek, 2014. <http://tass.ru/mezhdunarodnaya-panorama/1534233> (translated from Russian).

conducted to find the implications of Armenian integration. First, the analysis found positive and significant results regarding the exports in terms of volumes. During the four years after the integration, Armenia increased the exports by c. 605 million USD compared to its synthetic counterpart. This estimated treatment effect almost equals the cumulative real export volumes recorded for 2 years before the integration. In real terms, post-treatment export volumes for four years almost equaled the same volumes that were recorded for the eight years (with the historically highest export volumes) before the integration.

Moreover, positive and significant effects were found for the number of exported HS6 products. In 2018, the treatment effect alone (estimated to be 1,096 HS6 products) was more than twice as much as the real number of exported product varieties before the treatment year (424 HS6 products). This result is central for the current analysis as it shows the importance of the NTB elimination and phyto-sanitary facilitation. The finding was further investigated in the second stage analysis of disaggregated sector-level data. The results demonstrated that sectors that are more sensitive to NTB and phyto-sanitary regulations were largely affected by the integration. Animal and vegetable products, beverages and tobacco, as well as stone and glass, and textile and footwear sectors recorded positive and significant results due to the integration.

The findings suggest strong policy implications, particularly for the FSU countries that have historically had economies based on labor-intensive sectors and were continuously strengthening their relationship with Russia (Aslund and Jenish 2016, Jenish 2013).

Although the study found positive and significant effects, it should be noted that only export flows to Russia were analyzed. Investigation on integration effects of imports could be an important addition to the current study. Armenia, who had more liberal trade policies, had to increase the import tariffs in order to comply with higher common external import tariffs applied by the CU. The changes came into force effective January 1st, 2020. Upon data availability, integration effects on imports could be studied from the trade diversion and trade creation perspective. It would be possible to gain a more complete understanding of the EAEU integration effects on Armenia after counterposing the gains from exports and potentially negative effects from imports due to higher import tariffs.

Inclusion of firm heterogeneity into the analysis could be a crucial addition to the current study. The findings regarding the increased export volumes and export products varieties highlight the importance of firm-level analysis as suggested by Melitz and Trefler (2012).

Although additional puzzles are needed to thoroughly study the Armenian integration effects, the current paper showed that the negative perception of EAEU oppose to the finding based on econometric analysis. Moreover, the results demonstrated positive and significant effects on exports to Russia resulting from the integration of Armenia to EAEU.

REFERENCES

- Abadie, A. and Gardeazabal, J. (2003). The Economic Costs of Conflict: A Case Study of the Basque Country. *American Economic Review*, Vol. 93(1), pp. 113–132.
- Abadie, A., Diamond, A. and Hainmueller, J., (2010). Synthetic control methods for comparative case studies: Estimating the effect of California’s tobacco control program. *Journal of the American statistical Association*, 105(490), pp. 493-505.
- Adarov, A. (2018), Eurasian Economic Integration: Impact Evaluation Using the Gravity Model and the Synthetic Control Methods. *wiiw Working Paper*, No. 150, Vienna, September.
- Åslund, A. and Jenish, N. (2006). "The Eurasian Growth Paradox," *Institute for International Economics Working Paper*, No. 06-5.
- Anderson, J.E. (1979). A theoretical foundation for the gravity equation. *American Economic Review* 69 (1), 106–116.
- Anderson, J.E. and van Wincoop, E. (2003). Gravity With Gravititas: a Solution to the Border Puzzle. *American Economic Review* 93[1], 170-192.
- Andriamananjara, S., Dean, J.M., Ferrantino, M.J., Feinberg, R.M., Ludema, R.D., Tsigas and M.E. (2004). The Effects of Non-Tariff Measures on Prices, Trade, and Welfare: CGE Implementation of Policy-Based Price Comparisons. Available at SSRN: <https://ssrn.com/abstract=539705> or <http://dx.doi.org/10.2139/ssrn.539705>
- Baier, S.L. and Bergstrand, J.H. (2001). The growth of world trade: Tariffs, transport costs, and income similarity. *Journal of International Economics* 53, 1–27.
- Baier, S.L. and Bergstrand, J.H. (2002). On the endogeneity of international trade flows and free trade agreements. *American Economic Association annual meeting*.
- Baier, S.L. and Bergstrand, J.H. (2007). Do free trade agreements actually increase members' international trade? *Journal of International Economics* 71 (1), 72–95.
- Baier, S.L., Yotov Y.V. and Zylkin T. (2019). On the widely differing effects of free trade agreements: Lessons from twenty years of trade integration. *Journal of International Economics* 116, 206-226.
- Baldwin, R. and Gylfason, T. (1995). A domino theory of regionalism. In R. Baldwin, P. Haaparanta, and J. Kiander (Eds.), *Expanding Membership of the European Union* (pp. 25-53). *Cambridge: Cambridge University Press*. doi:10.1017/CBO9780511983368.003

- Bergstrand, J.H. (1985). The gravity equation in international trade: some microeconomic foundations and empirical evidence. *The Review of Economics and Statistics* 67(3): 474-481.
- Bergstrand, J.H. (1989). The generalized gravity equation, monopolistic competition and the factor-proportions theory in international trade. *The Review of Economics and Statistics* 71(1): 143-153.
- Billmeier, A. and Nannicini, T. (2011). Economies in Transition: How Important Is Trade Openness for Growth? *Oxford Bulletin of Economics and Statistics*, Vol. 73, No. 3, 287-314.
- Blockmans, S., Kostanyan, H. and Vorobiov I. (2012). Towards a Eurasian Economic Union: the challenge of integration and unity. *CEPS Special Report No. 75/December*.
- Brander, J.A. (1981). Intra-industry trade in identical commodities. *Journal of International Economics*, Elsevier, vol. 11(1), pages 1-14, February.
- Brander, J. and Krugman, P.R. (1980). A "Reciprocal Dumping" Model of International Trade. *Queen's Institute for Economic Research Discussion Papers 275170*, Queen's University - Department of Economics.
- Bratt, M. (2017). Estimating the bilateral impact of non-tariff measures on trade. *Review of International Economics*, 1, 1–25.
- Campos, N.F. and Coricelli, A. (2002). Growth in Transition: What We Know, What We Don't, and What We Should. *Journal of Economic Literature*, 40 (3): 793-836.
- Cadot, O. and Gourdon, J. (2016). Non-tariff measures, preferential trade agreements, and prices: new evidence. *Review of World Economics* 152, 227–249.
<https://doi.org/10.1007/s10290-015-0242-9>
- Carrere, C. (2006). Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model. *European Economic Review*, 50(2), pp. 223-247.
- Crawford, J.A. and Fiorentino, R.V. (2005). The changing landscape of regional trade agreements. *WTO Discussion Paper*, No. 8, ISBN 9287033269, World Trade Organization (WTO), Geneva. Available at: <http://hdl.handle.net/10419/107043>
- Dragneva, R., Delcour, L. and Jonavicius, L. (2017): Assessing Legal and Political Compatibility between the European Union Engagement Strategies and Membership of

the Eurasian Economic Union, *EU-STRAT Working Paper No. 07*, The EU and Eastern Partnership Countries – An Inside-Out Analysis and Strategic Assessment’ (EU-STRAT).

Dutt, P., Mitra, D. and Ranjan, P. (2009). International trade and unemployment: Theory and cross-national evidence. *Journal of International Economics*, 78(1), pp.32-44.

EBRD (2012). *EBRD Transition Report 2012*.
Available at: <http://www.ebrd.com/pages/research/publications/agships/transition.shtml>

EDB (2015a). An Assessment of the Impact of Non-Tariff Barriers in the EAEU: the Results of the Survey of Exporters. *Eurasian Development Bank*, 2015.

EDB (2015b). Estimating the Economic Effects of Reducing Non-Tariff Barriers in the EAEU. *Eurasian Development Bank*, 2015.

Fayad, G. (2011). Remittances: Dutch disease or export-led growth. *OxCarre Research Paper No. 57*, Oxford, pp. 1-31.

Felbermayr, G., Prat, J. and Schmerer, H.J. (2011). Trade and unemployment: What do the data say? *European Economic Review*, 55(6), pp.741-758.

Ghodsi, M., Grübler, J., Reiter, O. and Stehrer, R. (2017). The evolution of non-tariff measures and their diverse effects on trade. *Technical Report 419*, Vienna Institute for International Economic Studies, Vienna.

Grigoryan, A. (2014). Armenia: Joining Under the Gun’ in: S. F. Starr and S. Cornell (eds) *Putin's Grand Strategy: the Eurasian Union and its Discontents*, Washington: *Central Asia-Caucasus Institute and Silk Road Studies Program*, pp. 98-108.

Grossman, G.M. and Helpman, E. (1995). The Politics of Free-Trade Agreements. *American Economic Review*, 85(4), 667-690.

Jena, N.R. and Sethi, N. (2019). Does inward remittance lead to export performance in South Asian countries? *International Journal of Social Economics*, 47(2), 145-172.

Jenish, N. (2013). Regional Trade and Economic Growth in the CIS Region. *Institute of Public Policy and Administration*, Working Paper No. 13.
<http://dx.doi.org/10.2139/ssrn.2943872>

Keesing, D. and Sherk, D. (1971). Population Density in Patterns of Trade and Development. *American Economic Review*, 61(5), 956-961.

Krugman, P.R. (1979). Increasing returns, monopolistic competition, and international trade. *Journal of International Economics*, Elsevier, vol. 9(4), pages 469-479, November.

- Krugman, P.R. (1980). Scale economies, product differentiation and the pattern of trade. *American Economic Review*, vol. 70(5), 950-959, December.
- Larrabee, F.S., Pezard, S., Radin, A., Chandler, N., Crane, K. and Szayna T.S. (2017). Trade and Financial Vulnerabilities. *Russia and the West After the Ukrainian Crisis: European Vulnerabilities to Russian Pressures*, RAND Corporation, pp: 17-27.
- Magee, C. (2003). Endogenous preferential trade agreements: An empirical analysis. *Contributions to Economic Analysis & Policy*, 2(1), 1–19.
- Melitz, M.J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. *Econometrica* 71(6), 1695-1725.
- Melitz, M.J. and Trefler, D. (2012). Gains from Trade when Firms Matter. *Journal of Economic Perspectives*. 26(2), 91-118.
- Niu, Z., Liu, C., Gunessee, S. and Milner, C. (2017). Non-tariff and overall protection: Evidence from across countries and over time. University of Nottingham Research Paper Series Political Economy of Globalisation, 08.
- Subramanian, A. and Wei, S.J. (2007). The WTO promotes trade, strongly but unevenly. *Journal of International Economics*, 72(1), 151–175.
- Tarr, D.G. (2016). The Eurasian Economic Union of Russia, Belarus, Kazakhstan, Armenia, and the Kyrgyz Republic: Can It Succeed Where Its Predecessor Failed? *Eastern European, Economics* 54(1).
- Ter-Matevosyan, V., Drnoian, A., Mkrtchyan, N. and Yepremyan, T. (2017). Armenia in the Eurasian Economic Union: reasons for joining and its consequences. *Eurasian Geography and Economics*, 58:3, 340-360. DOI: 10.1080/15387216.2017.1360193
- Tinbergen, J. (1962). Shaping the World Economy: Suggestions for an International Economic Policy. *Twentieth Century Fund*, New York.
- Vicard, V. (2011). Determinants of successful RTAs. *Economics Letters*, 111(3):188-190.
- Viner J. (1950). The Customs Union Issue. *Carnegie Endowment for International Peace*, New York
- Vinokurov, E., Demidenko, M., Korshunov, D., Pereboev, V., Tsukarev, T., Gubenko, R. and Khmarenko, E. (2017). Eurasian economic integration. *EDB Centre for Integration Studies Report* no. 43. St Petersburg: Eurasian Development Bank.

Whalley, J. (1998). Why Do Countries Seek Regional Trade Agreements? *NBER Chapters, in: The Regionalization of the World Economy*, 63-90

World Bank (2012). Kazakhstan: Assessment of Costs and Benefits of the Customs Union for Kazakhstan. First Report under the Study of International Practice of Integration/Customs Union. Report No. 65977-KZ. 2012.

APPENDICES

Appendix 1: Technical description of synthetic control method

Following Abadie and Gardeazabal (2003) and extended Abadie, Diamond, and Hainmueller (2010) set up for the synthetic control method, let's assume that we observe $C + 1$ countries across T periods of time. Only one country undergoes treatment - in our case integration into EAEU. Although the current study investigates the integration effects for Armenia and Kyrgyzstan, two models are constructed separately but follow the same algorithm, one for Armenia and one for Kyrgyzstan. The treatment period is denoted by T_0 , and $T_0 < T$. None of the control pool countries is subject to integration into EAEU. The treatment effect for the treated unit (in the current study Armenia/Kyrgyzstan) at time t is define as:

$$\tau_{it} = Y_{it}(1) - Y_{it}(0) = Y_{it} - Y_{it}(0) \quad (1)$$

where $Y_{it}(T)$ is the potential outcome associated with $T \in [0, 1]$ with 0 if the country is not treated and 1 if it is. We are interested in the vector of treatment effect for the period from T_{0+1} to T . As it can be observed from the equation (1), the main challenge in estimating the treatment effect for all $t > T_0$ is $Y_{it}(0)$, i.e. the counterfactual that cannot be realized in the real world setup.

Abadie, Diamond, and Hainmueller (2010) suggested solution identifies the treatment effects for the potential outcome as follows:

$$Y_{jt}(0) = \delta_t + U_{jt} \quad (2)$$

$$Y_{jt}(1) = \delta_t + \tau_{jt} + U_{jt} \quad (3)$$

$$U_{jt} = Z_j \theta_t + \lambda_t \mu_j + \epsilon_{jt} \quad (4)$$

where δ_t is the unknown common factor;

Z_j is the vector of observed predictors that are not affected by the treatment; as it can be noted, the time t is not important for the observed predictors in case there is no treatment;

θ_t is the $(r \times 1)$ vector of unobserved parameters;

λ_t is the $(1 \times F)$ unobserved common factor;

μ_j is the $(F \times 1)$ vector of country-specific unobservable;

ϵ_{jt} is the transitory shocks with zero mean.

Now let's define the $W = (\omega_1, \dots, \omega_C)'$ as a generic $(C \times 1)$ vector of weights such that $\omega_j \geq 0$ and $\sum \omega_j = 1$. Each possible choice of W corresponds to a potential synthetic control for country i . In addition, let's define

$$\bar{Y}_j^k = \sum_{s=1}^{T_0} k_s Y_{js}$$

as a generic linear combination of pre-treatment outcomes.

As long as there is W^* such that

$$\sum_{j=1}^C \omega_j^* \bar{Y}_j^k = \bar{Y}_i^k \quad \text{and} \quad \sum_{j=1}^C \omega_j^* Z_j = Z_i \quad (5)$$

$$\text{then } \tilde{\tau}_{it} = Y_{it} - \sum_{j=1}^C \omega_j^* Y_{jt} \quad (6)$$

is an unbiased estimator of τ_{it} from (1). Condition (5) can hold exactly only if (\bar{Y}_i^k, Z_i) belongs to the convex hull of $[(\bar{Y}_1^k, Z_1), \dots, (\bar{Y}_C^k, Z_C)]$. Therefore, synthetic control W^* is selected so that condition (5) holds approximately: the distance (or pseudo-distance) between the vector of pre-treatment characteristics of the treated country and the vector of the pre-treatment characteristics of the potential synthetic control is minimized with respect to W^* and according to a specified metric. In particular, let X_1 be the vector of pre-treatment characteristics for the treated country, and X_0 the matrix collecting the vectors of pre-treatment characteristics of the untreated countries. The vector W^* is then chosen to minimize the distance $\|X_1 - X_0 W\|_V = \sqrt{(X_1 - X_0 W)' V (X_1 - X_0 W)}$, where V is a $(k \times k)$ symmetric and positive semidefinite matrix. To assign larger weights to pre-treatment variables that have larger predictive power on the outcome, one possibility is to choose V so that the mean squared prediction error of the outcome variable is minimized in the pre-treatment period (see Abadie and Gardeazabal, 2003). The deviation from condition (5) imposed by this implementation process, however, can be assessed, and it should be shown as a complementary output of the analysis.

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