CONSEQUENCES OF ASYMMETRIC

DEEPER "EURASIAN" ECONOMIC INTEGRATION

This is a paper in progress

by

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Abstract

A period of new "Eurasian" Regional Integration has already begun in parts of the Former Soviet Union. Following the experience of European Union, the 'troika' (namely, Kazakhstan, Russia and Belarus) are working toward establishment of a Eurasian Union. The troika have taken serious steps, in a speedy manner, toward the formation of an "Eurasian" region (the Eurasian Customs Union, the CIS Free Trade Agreement, and the Single Economic Space, and the Eurasian Economic Union). However, whether all the members and the entire region will achieve the gains from fast EU like integration and the union will be marked as successful one is yet being questioned. Studies believe that the union has more of a political rather than an economic motivation, that could result in negative economic externalities rather then gains.

This study attempt to assess the impact of asymmetry and symmetry in bargaining in deeper Eurasian regional integration. The analysis carried out using the modern multi-country multi-sector CGE approach with suitable specifications with a number of trade costs measures using the gravity concept. The novelty in this study is the use of implicit trade costs obtained using "Overall Trade Cost Index" (Novy [69]) which then has been decomposed into policy (tariff and non-tariff), non-policy (markups and value added costs) and transport costs econometrically. We firstly performed "shallow" integration scenario simulation with actual changes in tariff rates from 2009 to (expected rates for) 2015 of the troika, rest of CIS and aggregate ROW multilaterally. Further we used Overall Trade Cost Indices for EU and CIS countries from the WB-ESCAP trade costs database to make assumptions regarding multilateral changes in NTBs, border, transport and other costs in two "deeper" integration scenarios of "equal" and "unequal" (bias toward Russia) treatment of members.

Based on the results of simulation work, we can conclude that if there will be equal treatment of members of the new integration, the members will likely benefit from the gains and positive externalities of deeper integration in the future. However, if we take account of the Russian bargaining power and future asymmetric treatment of members, smaller members Kazakhstan, Belarus, plus other joiners are less likely receive expected gains. This work does not take account of other changes in policies (Russia's WTO assessment, sanctions against Russia by the Western Bloc, impact of situations in Ukraine-Russian borders etc.) but changes in trade costs (NTBs, tariffs, transport and border costs and value added costs).

0.1 Introduction

A new period of Eurasian Regional Integration has already begun in some parts of the Former Soviet region. Following the experience and standards of the European Union, the post-Soviet 'troika', namely, Russia, Kazakhstan and Belarus, are working toward the establishment of the Eurasian Union that is aiming to foster economic ties not only of the Commonwealth of Independent States (CIS), but also of the other countries of the Eurasian continent. The troika have proven the seriousness of their intentions to form the Eurasian Economic Union in an EU-like stepwise fashion by, first, forming a customs union in 2010, by setting free trade zone covering the CIS region in 2011, by launching a common market space within the territory of the troika in 2012. The culminative step is the formation of the Eurasian Economic Union in 2015. However, there is still ongoing work that will continue to be considered even after the formation of the union. The important issues of our concern are the European Union (whose success the Eurasian Union is imitating) which is facing economic difficulties lately and, Russia which is once again acting as a Big Brother of the (re)union. Hence we ask questions – what would be the consequences of EU-like deeper integration and the impact of concentration of political and economical power in Moscow to the future of the Eurasian Union?

The theory of regionalism shows that the reforms that are being undertaken to form the Eurasian Union will have various types of economic impacts and externalities. The volume of literature analysing the further Eurasian integration, is increasing, but currently this literature still falls short in terms of bringing all possible economic effects from the new regional formation in the Former Soviet space. Moreover, we find that the empirical analysis suffers from a relatively weak methodological and theoretical base, especially those studies conducted in the CIS area[1]. Most studies use an unsuitable framework to analyse the new regional formation, and capture only part of the possible impacts and externalities. CGE studies quantify possible future benefits and fair distribution of gains from the union for separate member or non-members of the union only assuming that tariffs and other trade restricting measures will be reduced within the union and toward other countries without taking into account about how economic barriers will change in the rest of the World toward the union as a response. Thus, to assess costs and benefits from deeper Eurasian integration, it is necessary to assume multilateral policy changes as within the union and in the world which have not been reflected in the literature yet. By multilateral policy changes we mean changes in policies related to the regional deeper integration of the troika toward members and non-members, but also policies undertaken by the non-members of the union toward the union members in reaction. This is especially true in the light of growing tension between the West and Russia which is trying to form the Eurasian

[1] Libman [60] review relevant ot Eurasian Integration literature and draw similar conclusions

Bloc. Studies acknowledge that the troika's integration is based on the real example of the EU integration with some mimicking of the EU institutional framework and the process (stages) of integration but in a speedy manner, however we aren't aware of any study (to our best knowledge) that assesses the suitability of the EU integration model for the Eurasian region and no study we know that quantifying possible outcomes of such EU like integration of the Eurasian region so far. Taking into consideration the all those missing angles of the integration in the existing literature, in this study we attempt to find answers by quantifying the impact of the deeper Eurasian Economic Integration.

This study (we believe) is significant in terms of its contribution to the literature on regional integration on the economic modelling for policy studies. Firstly, the study attempts to assess the possible impacts and externalities of the "new regionalism" theory and "old regionalism" practice to analysis of the Deeper Eurasian Economic Integration for the entire region (i.e. not only the troika but CIS as a whole), including possibly gains from the externalities of the integration that are coming from trade linkages with production, consumer expenditure, spillovers etc. The analysis is carried out using an updated version of a multi-country, multi-sector CGE approach that has been used previously to study EU enlargement. The other contribution (which is also the novel part in this study) is, firstly, the use of implicit trade costs (estimated using the theoretical gravity equation) and, secondly, modelling techniques of the trade costs, which are econometrically decomposed into policy (tariff and non-tariff), non-policy (markups and value added costs) and geographic costs. The use of gravity-estimated costs in a CGE study is not novel (see, LeJour [58]). Trade costs measures used in the study are improved the overall trade cost measure popularized by Novy ([70, 71]) which first appeared in Head & Ries [42] paper. The desirable feature of the measure is theoretical consistency and support from empirical findings. The method of producing trade cost measures has been employed in a number of studies (Jacks et al. [48] Rudolph [84]).

We modelled several scenarios in this study, namely, (in *Scenario 1*) enlarging the Eurasian bloc to five members (so the core Russia, Kazakhstan and Belarus are joined by Kyrgyzstan and Armenia) and applying appropriate customs rate and border related changes which occurred due to the ECU and CIS FTA formation; (in *Scenarios 2a* and *2b*) we still assume that the Eurasian bloc has those 5 members and provides the major expected changes due to the Single Economic Space (SES) and EEU formation such as multilateral changes in trade cost structure, that includes policy restricting non-tariff, transport and value added measures (assuming that the framework and economic system of the EEU will eventually restructured and look like the current EU one, treating all the members equally (*Scenario 2a*) and unequally with bias toward Russia in *Scenario 2b*).

The results obtained from the simulations suggest that the FTA and the ECU formation had small economic impact (comparing to expected impact from the deeper integration) but

not all the members and not in many aspects of each region will have been net beneficiaries. Further inference is that the formation of the SES and the EEU, unless there will be "equal" treatment of members of the integration, the gains we quantified will not be worth the efforts put by the "smaller" members, and bring long run negative consequences for the entire region. Considering the issues related to bargaining power, asymmetry and aggressive political of Russia, the distribution of gains from integration is likely to be less fair to Kazakhstan, Belarus, Kyrgyzstan and Armenia (and other possible joiners) (considered in in *Scenario 2b*). Thus the important message is that the regional integration would be successful if members are treated and gains are distributed fairly: in other words that there is no political and economic power concentration occur only in one member.

The paper is organized as follows. *Section 0.2* is the overview of the trends of the occurred and the coming Eurasian Integration stages. *Section 0.3* is the theoretical framework based on predictions from the regionalism theory and the vision of the barriers that are expected to be overcame from international trade theory. *Section 0.4* discusses how we approach the research task and describe methodology. *Section 0.5* describes our CGE model, derivation of the trade costs, the econometric decomposition of trade costs. *Section 0.6* contains our assumption upon simulation scenarios and the outcomes, and final section draws conclusions.

0.2 The Eurasian Regional Integration

0.2.1 Economic motivations for the integration

Despite of the significant efforts of the FSU countries to liberalize their economies, the countries face obstacles in their way that can not be overcome by the efforts of separate countries in the region but all together. Those obstacles are linked to the policy barriers that restrict free movement of goods, services, labor and capital; linked to adoption of different standards and norms in production; linked to the poor organisation of institutions and infrastructure at regional level. All the barriers at the end negatively affect economic relations and need to be eliminated, as all of these obstacles incur some monetary costs.

Formal trade barriers

By formal trade barriers we mean direct actions taken with the aim to restricting free trade. Those barriers are still relatively high in trade with the CIS region. Elbourgh-Woytek (2003), by looking at actual and potential trade of CIS countries in the first decade of post-Soviet existence, concludes that the countries do not trade "enough" (comparing to other regions) and this is partially due to formal trade barriers exercised in those countries. In the same study, Elbourgh-Woytek showed that the average trade restrictiveness (using IMF measures) for the CIS region (3.8) was almost twice as high as the Central and

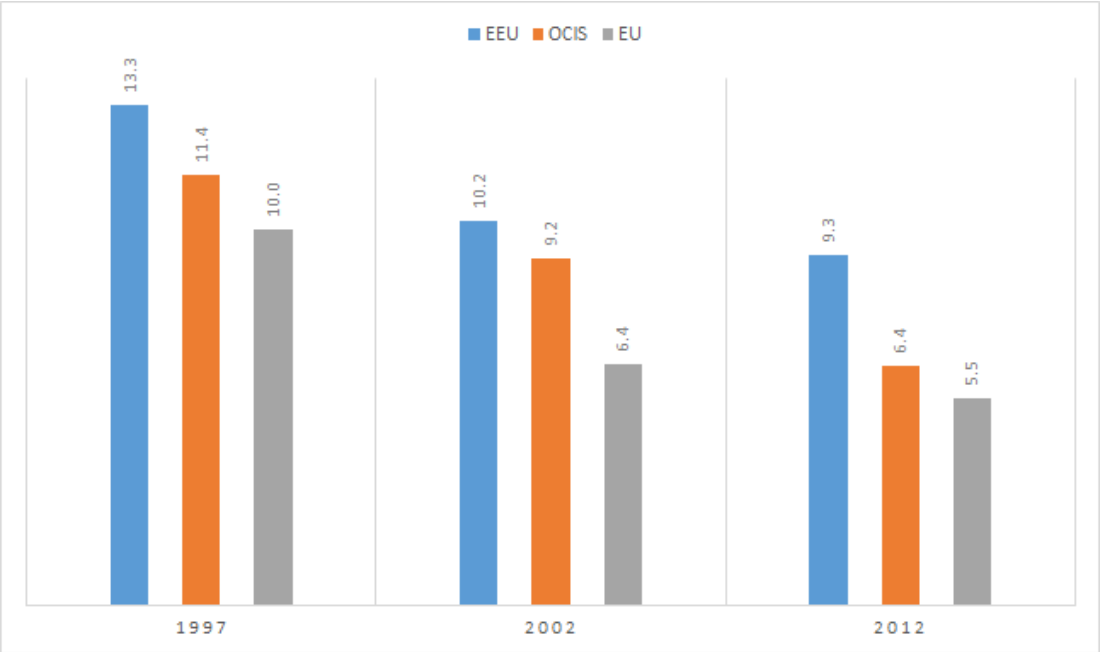
Table 1: The Average tariff rates of CIS countries (for 1997, 2002 & 2012)

	1997	2002	2012
Armenia	3.7	4.0	3.5
Azerbaijan	10.8	10.8	9.0
Belarus	**12.6**	**12.2**	**9.2**
Georgia	10.6	10.9	1.5
Kazakhstan	**13.3**	**7.8**	**9.1**
Kyrgyzstan	10.0	5.1	4.6
Moldova	9.4	6.9	4.6
Russia	**14.0**	**10.7**	**9.7**
Tajikistan	8.0	8.0	7.8
Turkmenistan	NA	NA	NA
Ukraine	10.0	12.7	4.5
Uzbekistan	29.0	15.3	15.4
EEU	13.3	10.2	9.3
OCIS	11.4	9.2	6.4
EU	10.0	6.4	5.5

Eastern European countries (2) in year 2002. We also find that an average tariff barriers of majority of CIS countries are still high, but have been falling over time. In *Table 1*, the average import tariff rates are presented for CIS countries. Among the CIS, Azerbaijan, Belarus, Kazakhstan, Russia, Uzbekistan still have high tariff entry barriers for imports. If to compare the rates with the EU ones (in *Figure 1*), the tariff rate of the CIS in average and of the EEU (i.e. the troika) is still higher than the rates for the EU by 25% and 50%, respectively.

The current regional integration commitments have increased formal trade barriers for some members, however, in the long run it is expected that the international integration commitments should lower the barriers. The tariff rates (in Table 1 for Central Asian countries) are similar to what Mogilevskii [67] reported prior to the ECU formation, except for Kazakhstan where the rate was 6.2% (which have gone to 9.1% after the ECU formation). Indeed, several studies highlight that Kazakhstan has almost doubled its tariff rates to meet the tariff rates of Russia and Belarus. Peyrouse, Boonstra and Laruelle [74] stress that due to increase of import tariffs of Kazakhstan in 2011, some neighbours who trade more with Kazakhstan were affected negatively, for instance, Kyrgyz wholesale trade fell 70-80%. Because of the losses, Kyrgyzstan chose to be in the ECU, and Armenia too, and the countries are negotiating their jointment currently but their joinment will increase their tariff rates at least twice which will also negatively impact on CIS regional trade. However, Pomfret [75] claims that, because Russia is now the member of the WTO, and will have commitments to make, it will reduce its formal barriers toward the ROW (so will

Figure 1: Comparison the means of MFN applied tariffs: EEU, OCIS & EU



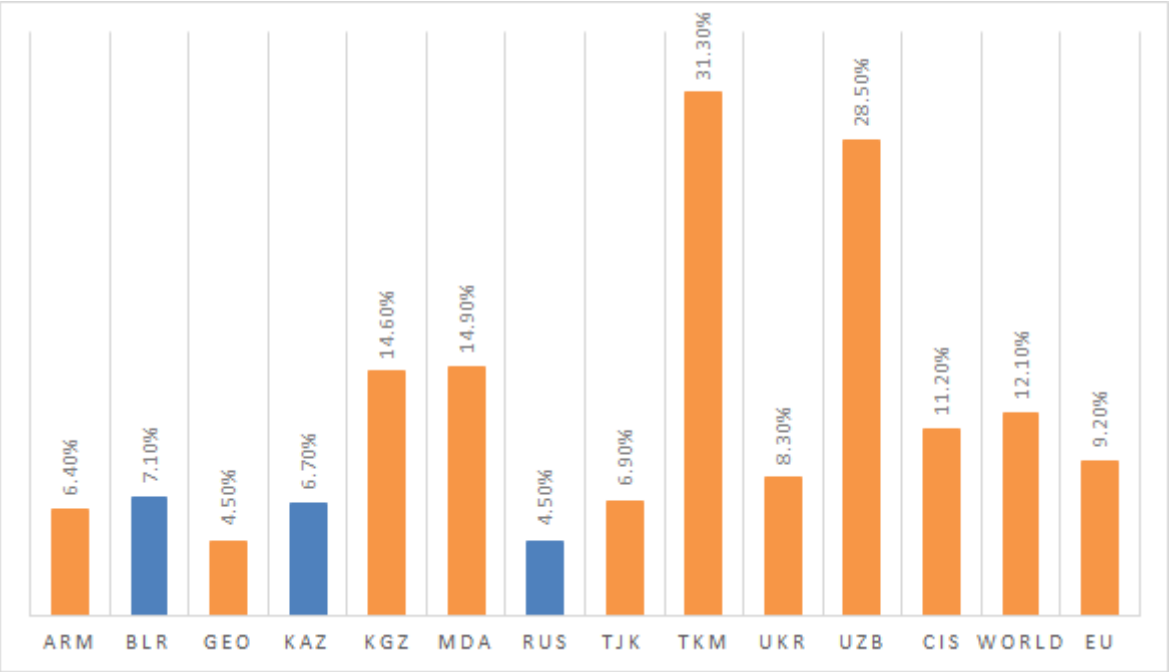
do Kazakhstan if the country joins WTO soon), and this eventually will have a positive effect on trade of the members with neighboring non-member countries. Shepotylo and Tarr [90] mention that Russian applied tariffs in average will reduce to 7.6% level by 2020 (implying that the rates of all the members of the Eurasian Bloc will be at similar level too).

Informal trade barriers

The role of informal trade barriers is much larger than the role of formal ones in the regional and international trade of CIS zone. UNCTAD define a range of the informal trade barriers such as sanitary and phyto-sanitary norms (SPS), technical barriers to trade (TBTs), price and quantity control, para-tariff, anti-competitive, finance, subsidies, various restrictive and discriminatory measures. According some studies[2], the majority of NTBs exercised in the CIS region are represented in the form of the licensing, import and export quotas and subsidies, SPS and TBT measures, protective and rent-seeking measures. Kee et al. [54] produce the Market Access Overall Trade Restrictiveness indices (MAOTRI) for over hundred countries covering CIS too in year 2009 that represent ad valorem cost of the informal trade policy barriers. In *Figure 2*, we provide with the MAOTRIs for CIS countries. From the given estimates, it is clear that informal trade barriers to access the market of some CIS countries is very high. For instance, to export to Uzbekistan or Turkmenistan will add an extra 28-30% trade costs which, to Russia or Georgia is only about 5%. Of course, those measures represent only known informal barriers.

[2]WB [106] and Maliszewka et al. [65]

Figure 2: The Market Access Overall Trade Restrictiveness Indexes



Non-tariff policy barriers exercised at the borders are also an important type of non-tariff obstacle. In the latest WB ranking of Trade Across Borders, Kazakhstan, Russia and Belarus are ranked respectively as 185, 155 and 145 out of 189 countries where the ranking starts from countries with the efficient cross border trading and finishes with the most inefficient ones (like Kazakhstan). As can be seen, the troika, but specifically Kazakhstan relative to the other members has the most inconvenient cross border trading in terms of transport costs, time spent in border and number of documents required. The WB [106] study adds also that this is due to the weak institutional base with very bureaucratic customs procedure, unnecessary bribe-seeking inspections and red tapes. Porto [76] finds that trade costs make up 24.6% of Moldovan trade where 63% is originated in the country and the rest (36.5%) caused by external formal and informal trade barriers. He also adds, in the example of Moldova which is trapped by Romania and Ukraine, that the landlockedness of Moldova imposes "unofficial" extra costs of about 1.3 in trade with CIS countries (comparing to 0.1% with the EU countries).

Standards

The existing standards of production and the recognition of each other's production standards and norms is also seen as an informal barrier. Most of the production standards are *GOSTs* (*GO*sudarstvennyi *ST*andart) in the troika (and in the other CIS counries) inherited from the Soviet era. The GOSTs are quite different from the international or EU standards as they only provide the technical instructions rather than sanitary and

phyto-sanitary norms. This is the part of the problem, the other issue is that the countries have been adopting or replacing the GOSTs with international/European standards independently. Due to the difference, getting official approval for the trade goods (that have been produced under the GOSTs or international standards), is not easy, especially in international trade of CIS countries with non-CIS regions, and goods are subject to examination and certification which are of course not free of charge. For instance, WB [106] reports that "Russia requires that many products imported into Russia have a certificate of conformity issued by its Federal Agency for Technical Regulation and Metrology. Russia does not recognize internationally accepted certified products and undertakes their testing and mandatory certification in accordance with Russian standards. Certificates of product conformity issued in Kazakhstan for Kazakhstani exporters will often not be recognized in Russia".

Transport costs

Transport related obstacles (which are surely explain main part of the trade costs) are nonetheless significant. In fact they explain the main part of trade barriers in ad valorem terms. Porto [76] provides estimated Transportation and Distribution costs for CIS countries. He finds that overall average T&D costs is 15.5% of the value of trade, which by 74% is explained by transportation cost (i.e., 11.6% of 15.5%). The territory of the members jointly is immense and internal trade occurs mainly via overland transportation (rail transport mostly). Some studies estimate that overland transport costs are ten or twenty times higher then the over sea transport costs in trading (Limao and Venables [59]). This is probably the main explanation why the Trade Across Border Indices are very high for the troika, especially for landlocked Kazakhstan (*Table 2*). Additional costs (especially for this region) occur due to inherited, outdated and costly Soviet built transport system and poor transport logistics. Over the years of independence, the countries have not been much concerned about modernising the transport and logistics infrastructures.

Besides the physical features that explain why transport costs are high, the other issue which might be pushing up costs is the ownership of transport infrastructure. The main transportation locomotives in the countries are state owned or passed to (monopolist) transport companies (with 100% government participation) of the countries that set up inefficient conditions, procedure and high costs for private users of containerized rail transportation and discourages development of small and medium business in the countries. lack of clarity and uncertainties regarding the transportation of physical goods, also discourages investors. If we take into account the finding of Raballand & Andresy [78] that 90% of all traded goods in the region are transported via railroads than transportation play a significant role in economic relations of the region.

Table 2: Trade Across Border Measures

	Kazakhstan	Ukraine	**Belarus**	**Russia**	Kyrgyzstan	Tajikistan	Uzbekistan	Armenia	Azerbaijan	Georgia	Moldova	OECD
Items in absolute value, 2009												
Cost to export (US$ per container)	**3005**	1560	**1772**	**1850**	3000	3350	3100	1816	3515	1380	1765	1109
Cost to import (US$ per container)	**3055**	1680	**1770**	**1850**	3250	4550	4600	2091	3420	1340	2090	1250
Documents to export (number)	**11**	6	**8**	**8**	13	10	7	6	9	8	7	4
Documents to import (number)	**13**	8	**8**	**13**	13	10	9	8	11	7	8	5
Time to export (days)	**89**	31	**18**	**36**	64	82	80	33	34	12	32	12
Time to import (days)	**76**	36	**25**	**36**	75	83	104	24	36	14	35	12
Items in absolute value, 2013												
Cost to export (US$ per container)	**4885**	1930	**1510**	**2615**	4360	8650	4785	1885	3540	1355	1545	1070
Cost to import (US$ per container)	**4865**	2505	**2315**	**2810**	5150	10250	5235	2175	3560	1595	1870	1090
Documents to export (number)	**10**	6	**9**	**9**	9	12	12	5	9	4	7	4
Documents to import (number)	**12**	8	**10**	**10**	11	12	14	8	11	4	8	4
Time to export (days)	**81**	29	**15**	**22**	63	71	79	16	28	9	32	10
Time to import (days)	**69**	28	**30**	**21**	75	71	95	18	25	10	35	11
2013-2009 (%)												
Cost to export (US$ per container)	**63%**	24%	**-15%**	**41%**	45%	158%	54%	4%	1%	-2%	-12%	-4%
Cost to import (US$ per container)	**59%**	49%	**31%**	**52%**	58%	125%	14%	4%	4%	19%	-11%	-13%
Documents to export (number)	**-9%**	0%	**13%**	**13%**	-31%	20%	71%	-17%	0%	-50%	0%	0%
Documents to import (number)	**-8%**	0%	**25%**	**-23%**	-15%	20%	56%	0%	0%	-43%	0%	-20%
Time to export (days)	**-9%**	-6%	**-17%**	**-39%**	-2%	-13%	-1%	-52%	-18%	-25%	0%	-17%
Time to import (days)	**-9%**	-22%	**20%**	**-42%**	0%	-14%	-9%	-25%	-31%	-29%	0%	-8%

0.2.2 Eurasian deeper integration

All the issues addressed above require the serious attention of the countries in the region. The IMF's *Regional Economic Outlook* [103] claim that regional integration among the FSU could facilitate economic growth, increase trade volumes and economic co-operation, improve market competition and consumer welfare if tariffs are eliminated, NTBs reduced and harmonized, and regional institutional framework improved. The CIS leaders looked at the EU experience in tackling similar obstacles via deeper regional economic integration, which is seen as a form of solution. Thus, the new wave of the regional integration in the Former Soviet space has already began to take place in the form of the Eurasian Union by adopting the model of EU integration. The 'troika' expect that through new "Eurasian" integration, they are able to foster economic ties among the members of the union and with other countries in the region and the continent. There are also some ambitious plans of this integration aimed, through improvement of institutional framework, adoption of international standards and reduction of trade barriers, to integrate with other neighboring regions in the continent (i.e., with the EU and China), and the rest of the World via the WTO membership. The integration is currently progressing in a rapid manner to achieve that goal, and has evolved from a free trade zone, further through a customs union and a common market to culminate as an economic union.

The Eurasian FTA

After the USSR dissolution, CIS countries were left with broken economic ties and were facing many problems for their further development that partially had to do with the establishment of new economic relations neighbors and with the rest of the world. They soon realized that they needed to negotiate the terms of economic and other relations. Number of attempts of negotiations, especially during 90s, had small practical impact (Acharya et al. [1]) and turned CIS trade relations into a complex system with "hub and spokes" agreements (Freinkman, Polyakov and Revenco [35]) and looked like a "spagetti bowl" (Kaminski and Mitra [52]). Evans et al. [27] argue that because of such complexity of regional trade relations cause trade diversion and there are limited gains and net welfare loss for the region.

The idea of forming an FTA covering the entire CIS was initiated in early 1990s to resolve such complexities in agreements. All 11 members of the CIS in 1994 formed the CIS Free Trade Area where they agreed not to impose tariff and other non-tariff restrictions on each others traded commodities. However, the agreement hasn't been officially ratified by the majority and has had no practical use. Further, throughout 1990s, there are large number of trade agreements among CIS countries (but they were mainly bilateral in their nature and they mostly were concerned about trade restrictions in some specific sectors).

As a result, there were over 100 bilateral and multilateral trade agreement in force, and such a number of agreements created more obstacles to trade rather than solving real problems. In 1999, another attempt was made by signing a protocol to establish a free trade regime covering entire CIS region, however, the outcome was similar to that of the CISFTA agreement.

Only after almost two decades since the first agreement has been made, the region was ready for practical work to solve the problems all together, and the free trade agreement reinforced (in October of 2011) but this time as a part of "Eurasian" integration with the WTO principles, and soon after ratification of the agreement was reached by the majority of the members. However, some CIS countries such as Georgia and Turkmenistan decided not to take a part of the Free Trade Zone this time, although in December 2013 Uzbekistan found the FTA convenient and also chose to be part of it. This agreement simplified the complex system of previous bilateral agreements and provided free movement of goods within the territory of the CIS by eliminating the import and export customs duties, quantitative restrictions (quotas), discriminatory and protective measures (e.g., sanitary) within the region. However, the area is not yet entirely ready to be a free trade zone as member-countries exclude some of the main traded commodities from FTA items that continue to be a subject for customes duties. For instance, Russia and Kazakhstan excluded respectively 100 and 40 commodity items from the FTA, on which customs duties apply on export. Sinitcina [93] argue that the exempted commodities are oil, electricity and natural gas, construction related materials (raw wood, metal and cement), and also some processed agricultural goods.

The Eurasian Customs Union

Establishment of the Eurasian Customs Union (ECU) can be viewed as the next step of economic integration but has been proceeding in parallel with the creation of the EFTA. In October of 2007, the agreement to form the ECU was signed by the leaders of Belarus, Kazakhstan and Russia. By the beginning of 2010 the legal framework for functioning of the union had been set and from July of 2011 the ECU started to function in practice. A common customs area was created with no customs duties or economic restrictions on reciprocal trade within the territory of the troika. To provide common customs policy a supranational body, the ECU Commission, had been established with a "weight based" voting system (where half of the total votes were Russian, and the rest of the votes split between the other two members evenly). With the launch of the ECU, import tariffs of the three countries were harmonized into a common tariff system by ratifying a customs code plus internal border control which have been removed. Revenues from import tariffs of all members will be summed and divided among members based on agreed shares (to Russia 88 %, to Belarus 5% and to Kazakhstan 7% but this is subject to periodical reviews).

Some documentary work and negotiations on the non-tariff measures was also put into the process. The WB [106] study state though that harmonization of tariffs is achieved by 70-80% and ful harmonization will be reached in 2015. According to the reports, while Russia and Belarus lowered their tariff lines, in Kazakhstan approximately 60 per cent of tariffs were increased.

The Single Economic Space

Further, the troika had began the creation of a common market covering its territory. By the end of 2009 the leaders of the troika had their plan already to create what they called the Single Economic Space (SES) of Belarus, Kazakhstan and Russia. By the end of 2012, the SES came into effect with the aim to achieve the so-called "four freedoms", i.e. the free movement of goods, capital, services and people within the SES zone and to establish core of institutional framework of the regional integrated area. To achieve "four freedoms", the members agreed to pursue coordinated macroeconomic policies in financial, transportation, energy, trade, industry, agribusiness and other key sectors. To perform the reforms the Eurasian Economic Commission had been established. Unlike in the case of the ECU Commission, key decisions will be taken based on the "one country one vote" principle. Dragneva and Wolczuk [20] see "one country one vote" feature of the institutional formations as one of the core elements for fair, just, and unbiased decision making process in the region.

The Eurasian Economic Union

The Formation of the Eurasian Union (EEU) is the final anticipated step that is in force from January 2015, and the agreement for creation of the EEU has been signed by the troika in May of this year, 2014, already. Expected reforms associated with the EEU will take a form of deeper integration of the economies of the troika and continue the work which hasn't been accomplished during ECU and SES stages. There is also expected enlargement of the union is as Armenia and Kyrgyzstan seen as the next likely joiners to the union in the near future (with their tariff and border related reforms at to be changed first). However, the main expected reforms will be related to the following areas:

- Continue to work on harmonisation of technical barriers, non-tariff measures, introduction of common production standards covering all the member countries;
- Elimination/reduction of non-tariff barriers by improvement of the legal framework of the union and by provision of the common macroeconomic fiscal and monetary policies;
- Improvements of communication, logistics and transportation infrastructure to facilitate trade and cooperative production, also labour and capital factor mobility;
- Further work on the institutional framework of the union to facilitate further integration and economic activity through regional development funds; establishment of new

regional institutions with specific functions at the supranal level to, for instance, provide competition and industrial policies, labor and migration relations, financial regulation etc.

0.2.3 The impact of the integration

The short-run performance of Eurasian integration appears to be not bad in the light of recovery from global crisis, although there are members who are earning the benefits and some members that are paying the costs. The statistics show that comparing to 2009, trade turnover in 2011 within the ECU rose by 3/4 (62$ bn.). Several studies find small (or temporary) trade creation/diversion effects for the members. Regarding the impact for separate members, some studies conclude that Kazakhstan is now paying more as the consumer prices increased, but that Belarus benefits from Russian FDI inflows, and Russia gains from additional exports and expansion of Russian companies into the markets of Kazakhstan and Belarus. The WB [106] study quantified possible costs and benefits for Kazakhstan in the Customs Union. In their "current" scenario, Kazakhstan would lose 0.2 % in real income per year plus the external tariffs doubles but main part of tariff revenues are going to Russia (as the revenues distributed based on agreed % shares, not what is coming to each member), the earnings of labour and capital also fell, and moreover, there was larger trade diversion from the EU and the ROW.

To illustrate the impact of the ECU policy we use tariff figures from Mkrtchyan's [68] study. In the *Table 3* we present the tariffs for the troika in year 2009 and 2010, in other words, for the year before and after the tariff harmonised policy occured. As can be seen, before the ECU formation, Kazakhstan had relatively half the tariff rates of its co-members of the union. As a result of the tariff hormanization, Russian and Belorussian tariffs have fallen by about 10% while Kazakhstani tariffs grew by 58%. While Russia reduced its specific tariffs (-19%) more than ad-valorem tariffs (-7%), Belarus and Kazakhstan made more or less similar commitments of each category of tariffs, respectively, -10% and +60% in average. Further to note, Kazakhstan also had almost three times more imported product types that are tariff free comparing to Russia and Belarus but after the policy had to oblige with tariffs another 452 line of products (taking into count that total number of the product lines is 5052).

Isakova & Plekhanov [47] argue that a sharp trade expansion and rapid growth may be a reflection of post-crisis recovery trends unrelated to policy. They also conclude that benefits of the policy to Kazakhstan (and likely other members of the union) have been limited comparing to the other two members. For Kazakhstan, imports from China saw a more significant decrease (from the EU, the CIS & the ROW were largely unaffected) in response to higher tariffs, and imports from Russia and Belarus increased, although the increase was relatively small. Interestingly, Isakova & Plekhanov [47] found that imports from non-member CIS countries for the ECU also declined, suggesting that despite the formation

Table 3: Comparing the MFN tariffs: pre and post-ECU case

	Russia	Belarus	Kazakhstan
Pre-ECU tariffs (2009)			
Mean of MFN tariff (all)	12.18	11.81	6.49
Mean of MFN tariff (Ad-valorem)	8.78	9.06	4.95
Mean of MFN tariff (specific)	29.19	25.52	14.22
N of zero tariffs out of total 5052 lines	445	373	1164
Post-ECU tariffs (2010)			
Mean of MFN tariff (all)	10.67	10.6	10.3
Mean of MFN tariff (Ad-valorem)	8.11	8.11	7.7
Mean of MFN tariff (specific)	23.46	23.03	23.29
N of zero tariffs out of total 5052 lines	554	554	712

of the EFTA, these countries cannot be seen as net beneficiaries of the trade diversion effect. The possible explanation for the evidence could be increase of non-tariff restrictions in trade between CIS countries based on the membership. Isakova & Plekhanov (2012) provide some evidence of them, for example, the time for trucks to clear in the Kazakh-Kyrgyz borders has lengthened significantly. Mkrtchyan [68] also mention that Kazakh-Kyrgyz border control tightened as there was a widespread smuggling of cheap Chinese products into the ECU zone. However, unlike Isakova & Plekhanov [47], Mkrtchyan [68] find that the overall impact of the non-tariff barriers of the ECU on non-ECU members (although by non-ECU members meant not only the CIS but the other trade partners) is positive.

Dragneva and Wolczuk [20] raise the issue of the asymmetry in bargaining power in the union. Russia, as the former Big Brother and the current undoubted leader of the integration, might be influencing of the other (smaller) members' decisions taken in the union for its own use. The smaller members won't be able to deviate from the Russian course as they will be concerned about their territorial safety (considering the case of Ukraine in the case of having disagreement with the Big Brother) or possible losses if Russia uses its economic means (sanctions, restrictions and other discriminatory policy) to accept its "*rules of the game*". Because during the negotiations on the common external tariffs, Kazakhstan mostly agreed to accept Russian tariff rates which weren't optimal for Kazakhstan, now as the WB [106] study confirms the country is paying the costs of the integration. Some studies suggest that Kazakhstan is seeking long run benefits and was ready for the commitments, while others suggest that the country had no choice but to accept to join under the given condition of *"Big Brother"*. If there will be no further reduction of expected non-tariff barriers, the WB study find that Kazakhstan will lose another 0.3 % in real income per year plus losses from further increase in external tariffs,

and larger trade diversion from the EU and the ROW. However, over the years, Russia has given up its influence on Former Soviet members to some degrees to the other world powers. On the west side, Moldova, Ukraine, Georgia and Azerbaijan have been increasing their economic ties with the EU countries. The presence of the EU but also China and the US has been growing in the Central Asian region since its independence from Soviet Russia. Besides, the new institutional framework of the EEU will also impose an obstacle to Russia exercising its bargaining power over smaller members. Dragneva and Wolczuk [20] argue that because of the "one country - one vote" feature of the "Eurasian" union, in taking major policy decisions in favor of Russian gains, smaller members can outvote Russia.

While some studies attempting to identify *pros* and *cons* of the integration based on what is done or expected, there is a body of growing literature which is concerned about the possible gains (or losses) for a certain country in the region from (not) joining to the Eurasian integration group. For example, Hartwell [40] claims that the EEU group will succeed even without Ukraine but only if all Former Soviet Central Asia becomes a part in the part of the union. Demidenko [17] agrees in the last point. Using the GLOBE CGE model, Demidenko finds that macroeconomic indicators of Tajikistan, Turkmenistan and Uzbekistan will improve if they join the EEU. Dragneva and Wolczuk [20] state that voluntarily from Central Asian countries (without taking Kazakhstan into account) only Kyrgyzstan and Tajikistan could join. However, both countries are economically weak and possibly less attractive for the current members of the union. Besides, from the recent activities, it has become clear that only Kyrgyzstan would be joining the union. Further, to note that Uzbekistan and Turkmenistan are now supplying their gas to China and Iran, and express no interest in returning to their Big brother, Russia. By looking at eastern parts of the CIS, Knobel [55] argues that Armenia and Moldova trade more with the ECU and therefore deep integration into the EEU would be beneficial for the civilised development of a unified labor market. Armenia is most likely to join unlike Moldova which like Ukraine is more biased toward integration with the EU.

0.3 Theoretical framework

0.3.1 The theory of Regionalism

The EEU integration is highly correlated with the concept of regionalism (rather than unilateralism or multilateralism). The clear sign of regionalism is when separate nation states of a particular geographic region unite with each other to pursue a collective goal to establish an area with "common" economic, and further social and political standards. In this regard, the EEU initiative can be seen as if it is in its first stage to establish a "common" economic platform by eliminating physical, protective, discriminatory barriers,

creating a system of supranational institutions, introducing common economic standards and norms (as if they are one large country made of smaller distinct states). There is a number of gains and productivity growth coming through trade-production linkages that include the transfer of production technologies, knowledge spillovers and "learning by doing"; segmentation and fragmentation of the production process among the member states; increasing returns, economies of scale, market expansion, redistribution and reallocation of labor at the regional level etc.

A good example of regionalism is the European Union. The EU as a highly integrated region that has gone through over half century of evolution. The first stage appeared as early as 1950s, when group of 6 countries established the European Coal and Steel Community (ECSC) with the purpose of prevention of possible war among the members in the future, but also to eliminate competition between the countries in coal and steel markets. They also established a set of supranational institutions to make optimal management, to take fair to all decisions, to solve any disputes in the region. The second stage of European integration was the evolution of the ECSC into the European Economic Union with the common external customs rates and a common market for all mmebers and further its expansion through the other 6 joiners. After rounds of enlargement, the next stage of deepening was the European Union in 1993 with establishment of the single economic space with "four freedoms" (free mobility of labour, capital, goods and services). At the current moment, the EU has 28 members, a body of supranational independent institutions (such as the European Commission, the Council of the EU, the Court of Justice of the EU, the European Central Bank, the European Parliament and other institutions).

The current regional integration of the Eurasian Bloc of countries mimics the EU regional integration. The troika also decided to take stepwise process of deeper integration (although not exactly in similar way) with formation of the regional free trade area, then a customs union, a single market and an economic union (for now) with gradual enlargement. Comparing the previous attempt of "Marxistic" regionalism in the Former Soviet space, which turned into a failure, the EU-like regionalism had been tested in practice and shown its effectiveness. To rely to the theory of the regionalism and EU practice, the the following set of reforms should be taken in the integration zone:

• Harmonisation of technical barriers, non-tariff measures, introduction of common production standards covering all the members;

• Reduction of non-tariff barriers by improvement of the legal framework of the union and by provision of common macroeconomic fiscal and monetary policies;

• Improvements of communication, logistics and transportation infrastructure to facilitate increased trade and production, also labour and capital factor mobility;

• Further work on the institutional framework of the union to facilitate further integration and economic activity through regional development funds; establishment of new

regional institutions with specific functions at the supranational level to, for instance, provide competition and industrial policies, labor and migration relations, financial regulation etc.

0.3.2 The barriers & Iceberg costs

Wouldn't it be great to buy Mattel's Barbie doll in the US for the same price as in China? This is an example provided in Feenstra [30] that illustrate how the price of the doll manufactured in China with the price of \$1 by the time arrived to the USA, its price shifts to \$10. Indeed, in practice, there are some costs are always added while a good produced in region i reaches final consumers in region j. If trade barriers are high than trade costs are also high, and at the end, it could drive exporting firms out of market due to uncompetitiveness of final price on their produce. This is one of the main reasons why countries negotiate with each other to bring those additional costs to the minimum and to engage into various types of regional formation, such as in our case, the Eurasian Economic integration.

The standard assumption is that the price of a commodity at the place (region i) it is produced cost p_i price, and while it arrives to region j, its price (p_j) increases for t_{ij} amount, where $t_{ij} > 1$:

$$p_j = t_{ij} p_i$$

This t_{ij} usually includes observable and unobservable costs incurred due to transportation, tariffs, quotas, restraints, TBT and SPS norms, various required documentations, inspections and other formalities, advertisement, distribution, etc. costs.

Another standard assumption that the trade costs (t_{ij}) are often viewed as "iceberg" costs, following Samuelson (1952). As an iceberg crossing the ocean losses its fraction similarly when a trade good shipped across countries it losses a fraction (i.e., trade cost). The smaller "barriers" on the way of the iceberg, the less it melts and vice versa. There are some other assumptions about trade costs exist (see Rudolph [84] for instance) however, for our theoretical framework, the "iceberg" cost assumption is suitable.

0.4 Methodology

0.4.1 The CGE approach

We previously mentioned that the deep regional integration associated not only with policy changes but also with externalities of integration coming from the technology transfer, productivity increases, and economies of scale with possible *Smithian* and *Ethierian* type gains. To reflect such aspects, the most convenient tool is the Computable General Equi-

librium (CGE) approach. The approach is quite a flexible tool to incorporate a body of theory (or several theories) also, and to model various specific features and dimensions needed to capture outcoming impacts and externalities of a specific deep integration process. Besides, the CGE approach has become a "workhorse" tool for prediction of possible consequences of a regional integration (or other policy change) if the development proceed in a certain scenario.

With respect to capturing the impacts of regional integration, the CGE studies of the last decade attempt to incorporate structures of the modern trade theory rather than standard trade theory. This is because, despite of having the elegant structure, the standard trade theories such as the Ricardo-Viner-Meade (RVM) or Heckscher-Ohlin-Samuelson (HOS) are found to be very simple, too stylized and limited to capture two-way trade, the discussed externalities and gains from the integration. Later appeared what is known as the Armington specification, which has the desirable feature of imperfect substution and product differentiation by the origin to allow to way trade plus include insights of the RVM and HOS (however cannot capture linkages with historical trends or establish link between trade and economic performance). Robinson et al. [82] argue that the Armington specification cannot adequately reflect trade share changes occured in the EU regionalisation as it misses production or expenditure effects on trade shares (because trade shares are determined by relative prices).

The recent trade theories such as the Melitz or the Dixit-Stiglitz (DS) formulations can capture above discussed externalities arriving from the deeper integration better than the standard trade models, and thus more suitable for analysis of regionalization. The DS structure assumes there is Chamberlinian monopolistic competition introduced by the number of identical firms and consumers marked with *'love-of-variety'* demand feature, thus two-way trade even in the presence of trade barriers with the gains from the variety and the economies of scale. The Melitz model incorporates firm productivity differences to the DS formulation. Further, there is a greater support from the empirical findings at a micro level in favor of the modern trade models (Falvey [29]).

0.4.2 The Overall Trade Cost Measure

The gravity of trade

Because the majority of existing trade costs are unobservable, various direct and indirect measurements are used in the literature, however, estimation of trade costs is not an easy task and the measures have some limitations. Anderson and van Wincoop [6] review various measures to estimate international policy barriers, transport costs and wholesale and retail distribution costs and they find that paucity of good data (on policy barriers), poor quality of existing measures and lack of theoretical base are some of the main reasons of inaccurate

measures of trade costs. Bagai and Wilson [8] add that the lack of harmonized definitions and measurement tools can lead to different measures of the same trade barriers. For instance, they argue that the World Business Environment Survey estimates an average clearance time of 11 days for Uzbekistan while UNESCAP reports 5 days. Further, they find aggregate various data sources are a very problematic task, and even impossible. A more recent study, Chen & Novy [13] finds *"mixed bag"* and stringency issues of direct trade cost measures (based on count, dummy, frequency or coverage ratios) and inconsistent use of them in several studies. They argue that notification data that is used, for example, in Disdier et al. [18] to compute coverage and frequency ratios to explain trade flows cannot tell which measures were applied and the duration of application and thus was too inconsistent to address heterogeneity across countries based on the measures.

Because of the difficulties with obtaining direct measures of trade costs and some other limitations addressed above, we choose to go with the theoretical framework that can allow us to obtain implicit measures of the overall "iceberg" trade cost measures. The theoretical framework is the concept of the gravitational nature of trade that works in a similar way to Newton's law in physics. In the recent decades the gravity model has been grounded well using various theoretical frameworks (offered by Anderson and van Wincoop [5], Bergstrand [11], Deardorff [15], Eaton and Kortum [21], Chaney [12]). Irrespective of what theoretical foundation is chosen they seem to all agree with the following expression of gravity model:

$$x_{ij} = G_w M_i M_j D_{ij}, \tag{1}$$

where x_{ij} is nominal exports from country i to country j, G_w is global component, M_i and M_j are, respectively, exporter (i) and importer (j) specific monadic components, D_{ij} is ij specific dyadic component.

In a gravity framework, the trade costs are often viewed as "iceberg" costs previously discussed. Using the AvW [5] type of expression, we can present the trade costs as

$$t_{ij} = D_{ij}^{\frac{1}{(1-\sigma)}}, \tag{2}$$

where σ is the Armington substitution elasticity between the products of different nations. HM (2014) point out two important features of expression of gravity as above. The most obvious one is the insistence that each term enter multiplicatively. A second important feature is that this definition requires that third-country effects, if there are any, must be mediated via the i and j multilateral terms. This form of the gravity equations is consistent with Anderson and van Wincoop's [5] theory and overcomes the common *"gold medal mistakes"* - omission/ignorance of inner and outer multilateral resistances (that are part of Ms) in intuitive/naive gravity equations (Baldwin and Taglioni [9]).

The Head-Ries-Novy "Overall Trade Cost" index

There is a number of trade cost estimation tools born from the gravity structure and some of the most common ones are discussed well in HM [43], although, we proceed with introduction of the particular method of our interest. The method first used in Head and Ries' [42] study which showed how it is possible to separate out dyads by cancel all the terms out in eq (1) except D by taking a ratio of *"outer"* trade flows over *"inner"* trade flows of any i and j trading pair:

$$\hat{D}_{ij} = \left(\frac{X_{ij}X_{ji}}{X_{ii}X_{jj}}\right)^{\frac{1}{2}} = \left(\frac{(d_{ii}\cancel{G_w M_i M_j})\,(d_{jj}\cancel{G_w M_i M_j})}{(d_{ij}\cancel{G_w M_i M_j})\,(d_{ji}\cancel{G_w M_i M_j})}\right)^{\frac{1}{2}} = \left(\frac{D_{ii}D_{jj}}{D_{ij}D_{ji}}\right)^{\frac{1}{2}} \tag{3}$$

This term gives theoretical approximation of bilateral dyads if one is ready to assume symmetry in dyads ($D_{ij} = D_{ji}$), and frictionless *inner* dyads inside the countries ($D_{ii} = D_{jj} = 1$). Eaton et al. (2011b) call it the HRI (Head-Mayer Index) which can be used to assess the overall level of trade integration between any two countries. The problem with the HRI is that it cannot be calculated without a measure of *inner* trade (X_{ii} and X_{jj}) . In principle, this can be proxied using production minus total exports of a country or an industry.

Using the AvW [5] expression of dyadic term, $D_{ij} = t_{ij}^{1-\sigma}$, and making small change in (3), Novy [69] re-expresses the HRI as

$$\hat{t}_{ij} = \left(\frac{X_{ii}X_{jj}}{X_{ij}X_{ji}}\right)^{\frac{1}{2(\sigma-1)}} = \left(\frac{D_{ii}D_{jj}}{D_{ij}D_{ji}}\right)^{\frac{1}{2(\sigma-1)}} = \hat{t}_{ji}. \tag{4}$$

By making an assumption about elasticity of substitution, σ, and still as HM [42] relying on gravity assumptions on trade costs - *inner* trade costs are equal to unity and bilateral trade costs in either direction are the same - the index above gives a geometric mean of overall trade costs involved in any particular i and j country pair. Novy calls this the *Overall Trade Cost Index* (OTCI) and not the actual trade costs as it is only gives simple but theoretically sound measure of all the trade costs for a given pair of trading regions, i and j. Further, Novy [71] derives the OTCI from gravity equations of other theoretical frameworks. The intuition is that the higher the trade volume inside the respective countries relative to the trade volume between the two countries, the higher is the bilateral trade cost, and vice verse. OTCI can be turned into ad valorem tariff equivalent for trade costs. With this measure, Novy [71] addresses a solution to some drawbacks of various existing trade cost measures noted in several studies related to theoretical consistency (AvW [6]), the possibility of aggregation of various trade costs (Bagai and Wilson [8]) and the possibility of obtaining trade cost measure from available data (WB [106]).

Modifying the Overall Trade Cost Index

To get the proofs, in the AvW gravity theory, it is simply assumed that "outer" trade costs are equal to each other (i.e., $t_{ij} = t_{ji}$) and "inner" trade costs are equal to one (i.e., $t_{jj} = t_{ii} = 1$). The assumption of "outer" trade costs equity imply that the ratios of the "outer" trade costs is equal to one:

$$\left(\frac{X_{ji}}{X_{ij}}\right)^{\frac{1}{1-\sigma}} = \left(\frac{\cancel{G_w M_j M_i} D_{ji}}{\cancel{G_w M_i M_j} D_{ij}}\right)^{\frac{1}{1-\sigma}} = \left(\frac{D_{ji}}{D_{ij}}\right)^{\frac{1}{1-\sigma}} = \left(\frac{t_{ji}}{t_{ij}}\right) = 1 \tag{5}$$

The same implication can be made about the "inner" trade cost ratio:

$$\left(\frac{X_{ii}}{X_{jj}}\right)^{\frac{1}{1-\sigma}} = \left(\frac{\cancel{G_w M_i M_i} D_{ii}}{\cancel{G_w M_j M_j} D_{jj}}\right)^{\frac{1}{1-\sigma}} = \left(\frac{D_{ii}}{D_{jj}}\right)^{\frac{1}{1-\sigma}} = \left(\frac{t_{ii}}{t_{jj}}\right) = 1 \tag{6}$$

How true are the assumptions in practice? Using real bilateral trade data from the TRAINS, we calculate the trade cost ratios (based on eq. 6). The database in use contain bilateral trade flows between 37 countries for the period of 1995-2011 (total number of observations is 23273). Because of the unreported trade flows in the database, 6442 (out of expected 23273) trade cost ratios are zeroes. In *Figure 3*, we have frequency distribution and summary of the trade cost ratios which show that most of trade cost ratios are close to one which is in agreement with the assumption that "outer" trade costs between any country pair are the same. Due to the large number of ratios obtained (16831), in *Table 4*, we present trade cost ratios only for the troika. In part 4a of the table, bilateral trade cost ratios for Russia (where Russia is country i on one side, and CIS/ROW countries are country js). The same logic applied for 4b (Kazakhstan=i) and 4c (Belarus=i). The implications from the given trade costs ratios is that if any trade cost ratio is bigger than 1 then importing to country i is relatively costly then exporting from it, and vice versa. So, for instance, in part 4a, we observe that export of Kazakhstan to Russia was relatively cheaper in 1990s (for 1996, the ratio is 0.88) which is over time increased and exporting to Russia become costly (the ratio in 2009 is 1.12).

As can be seen from the ratios, they are not equal to one in all cases. Some of them are as low as 0.29 and some as high as 3.35 but might be some level of bias due to the data which might not represent the exact values of trade or incorrectly aggregated. Still, there is a possibility that the theoretical assumption of equal trade costs between any two regions might not be correct, and therefore we obtain the trade cost ratios which are different then one meaning that

$$\left(\frac{X_{ij}}{X_{ji}}\right)^{\frac{1}{1-\sigma}} = \left(\frac{\cancel{G_w M_i M_j} D_{ij}}{\cancel{G_w M_j M_i} D_{ji}}\right)^{\frac{1}{1-\sigma}} = \left(\frac{D_{ij}}{D_{ji}}\right)^{\frac{1}{1-\sigma}} = \left(\frac{t_{ij}}{t_{ji}}\right) \neq 1 \tag{7}$$

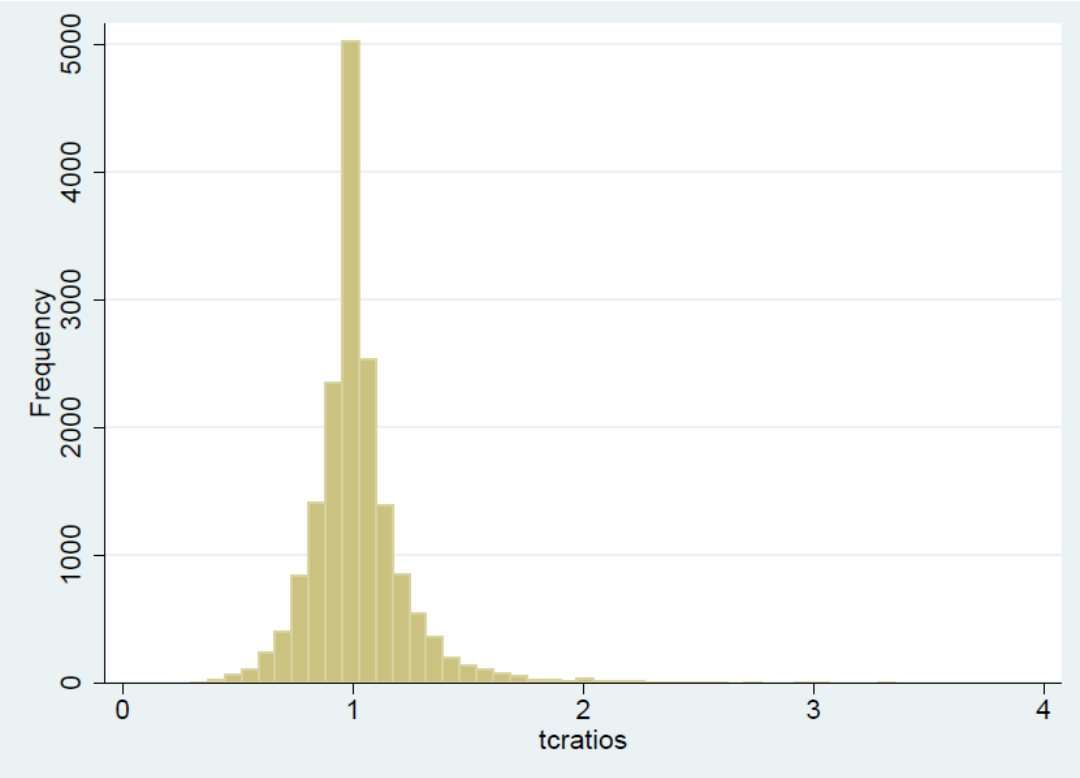
Table 4: Ratio of the trade cost measures

RUS=i	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995						1.00				
1996		0.79	1.13	0.88	0.88	1.00	0.95			
1997		0.77	1.11	0.91	0.89	1.00	1.01			
1998		0.77	1.11	0.94	0.93	1.00	1.01	1.51		
1999	0.99	0.78	1.16	0.99	0.98	1.00	1.03	1.55		0.93
2000	1.13	0.78	1.29	1.04	1.04	1.00	1.04	1.65		1.00
2001	0.94	0.94	1.42	1.11	1.15	1.00	1.06			1.10
2002	1.04	1.01	1.35	1.13	1.13	1.00	1.10		1.23	1.15
2003	1.09	1.01	1.28	1.10	1.15	1.00	1.10		1.21	1.14
2004	1.12	1.01	1.27	1.09	1.25	1.00	1.09		1.20	1.17
2005	1.13	1.01	1.28	1.15	1.30	1.00	1.09		1.20	1.25
2006	1.08	1.01	1.24	1.14	1.23	1.00	1.03		1.27	1.36
2007	1.10	1.01	1.25	1.14	1.23	1.00	1.12		1.30	1.53
2008	1.03	0.89	1.08	1.01	1.20	1.00	1.05		1.09	1.38
2009	1.06	0.92	1.02	1.12	1.21	1.00	0.94		1.09	1.33
2010		1.01	1.13		1.23	1.00	1.13		1.26	1.23
2011			1.10		1.29	1.00	1.07		1.16	

KAZ=i	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995				1.00						
1996		0.86	1.27	1.00	1.01	1.14	1.15			
1997		0.84	1.38	1.00	1.02	1.10	1.10			
1998		0.83	1.20	1.00	1.04	1.06	1.07	1.10		
1999	0.94	0.82	1.21	1.00	1.05	1.01	1.06	1.00		0.78
2000	0.91	0.81	1.28	1.00	1.06	0.96	1.05	0.92		0.94
2001	1.01	0.88	1.19	1.00	1.08	0.90	1.05	0.71		1.00
2002	1.27	0.88	1.20	1.00	1.09	0.89	0.95	0.75	1.38	1.04
2003	1.35	0.89	1.13	1.00	1.15	0.91	0.97	0.89	1.35	1.11
2004	1.39	0.89	1.21	1.00	1.18	0.92	0.99	0.94	1.32	1.23
2005	1.50	0.94	1.16	1.00	1.25	0.87	1.07	0.93	0.97	1.33
2006	1.63	1.01	1.15	1.00	1.35	0.88	1.16	0.92	1.03	1.44
2007	1.75	1.01	1.23	1.00	1.58	0.88	1.63	0.91	1.05	1.95
2008			1.12	1.00		0.99		0.91	0.94	
2009	1.32	0.78	0.99	1.00	1.00	0.89	0.93	0.74	0.80	1.20
2010				1.00						
2011				1.00						

BLR=i	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995								1.00		
1996								1.00		
1997								1.00		
1998		0.89	0.89	0.91	0.86	0.66	0.83	1.00		
1999	1.30	0.92	0.97	1.00	0.90	0.64	0.89	1.00		0.91
2000	1.86	0.99	1.07	1.09	0.96	0.61	1.03	1.00		0.97
2001	0.99	1.06	1.09	1.40	1.02		1.06	1.00		0.90
2002	1.11	1.08	1.11	1.33	1.15		0.99	1.00	1.05	0.85
2003	1.12	1.05	1.04	1.13	1.13		0.98	1.00	1.14	0.92
2004	1.12	1.04	1.03	1.06	1.19		0.98	1.00	1.17	0.92
2005	1.12	1.03	1.00	1.08	1.22		0.98	1.00	1.18	1.14
2006	1.14	1.02	0.99	1.09	1.24		0.98	1.00	1.43	1.20
2007	1.23	1.11	1.01	1.09	1.27		1.13	1.00	1.52	1.31
2008	1.27	1.16	1.02	1.10	1.49		1.20	1.00	1.47	1.31
2009	1.14	1.12	0.97	1.35	1.59		1.05	1.00	1.55	1.22
2010		1.11	0.97		1.38		1.16	1.00	1.51	1.16
2011			0.97		1.46		1.16	1.00	0.69	

Figure 3: Frequency distribution of trade cost ratios



For the same reason, using (4), we won't be able to understand which of the "outer" trade costs between any i and j country pair is larger or smaller as we calculating the geometric mean of the trade costs. Thus, considering the fact that trade costs between any region pair aren't the same, we modify (4) to

$$\hat{t}_{ij} = \left(\frac{X_{ii}X_{jj}}{X_{ij}X_{ij}}\right)^{\frac{1}{2(1-\sigma)}} = ... = \left(\frac{D_{ii}D_{jj}}{D_{ij}D_{ij}}\right)^{\frac{1}{2(1-\sigma)}}. \tag{8}$$

The main difference of this trade cost measure from HMN measure of trade costs is that we take ratio of "outer" trade flows of ij direction only leaving the rest the same. This allow us to obtain (if to yet assume that "inner" trade costs are equal to unity) ij trade cost only (not the geometric mean of ij and ji trade costs). Similarly trade costs of opposite direction can be obtained by replacing trade flows of ij set to ji set, but because we have balanced trade database, this is unnecessary to do.

Using the original and modified versions of the HMN method, (8), we calculate bilateral overall trade cost measures for the troika. In *Figure 4*, we plot OTCI of the troika that show that variation of their bilateral trade costs over time. Now using modified version of OTCI, we can see that trade costs between either pair of troika are not the same. Trade costs for imports from Kazakhstan to Russia (0.6) were lower relative to imports from Russia to Kazakhstan (0.8) in 1996, however over time the cost of Kazakh exports to

Russia grew by 1.4/0.6% (1.4) while exporting to Kazakhstan for Russia fell by 0.7/0.8 (0.7). In Kazakh-Belarus trade, exporting to Belarus become costly for Kazakhstan, while trade barriers for Belarus to export to Kazakhstan reduced over time. With being able to obtain OTCIs for a few years in Belarus-Russia trade, we still can observe that trade costs are much higher for Belarus to export its commodities to Russia. OTCIs (grey lines) obtained using original HRN method are the same for each presented pair (and for all the pairs we calculated) which are showing general trend of trade costs between the pair countries, but not the difference between trade costs. Besides, from the HRN-OCTIs in the plots, they represent the "geometric mean" of trade costs obtained using modified method. However, when we look at the trade costs by aggregating and average out for each separate country, we observe that the measures obtained using two methods are not the same (see *Table 5*). Further difference between the method in measuring trade costs can be seen in *Table 6* and *Table 7* where we provide bilateral OTCI for the troika with each CIS country.

0.5 Models and Data

0.5.1 The CGE model

Policy simulations are carried out using a multi-country multi-sector static CGE model. The model has been previously used in Edwards [23] for assessment of the EU enlargement. In the model we have 11 regions, 10 aggregate sectors and 2 factors of production (*Table 8*).

Production is nested where bottom level production is a Leontief function for intermediate goods, and the top level producion is the Cobb-Douglas aggregate function for final goods. Regarding the factors of production, both, labour and capital, are fixed for each country, mobile between sectors, but not internationally (however, in the long-run, capital is mobile internationally). Firms are of identical size, imperfectly competitive, earn supra normal profit (by adding markups into the price). The number of the firms different for each region and in each industry from each region. The number of the firms, introduced exogenously, kept fixed. This is done because the number of firms that vary

Figure 4: OTCIs of the troika

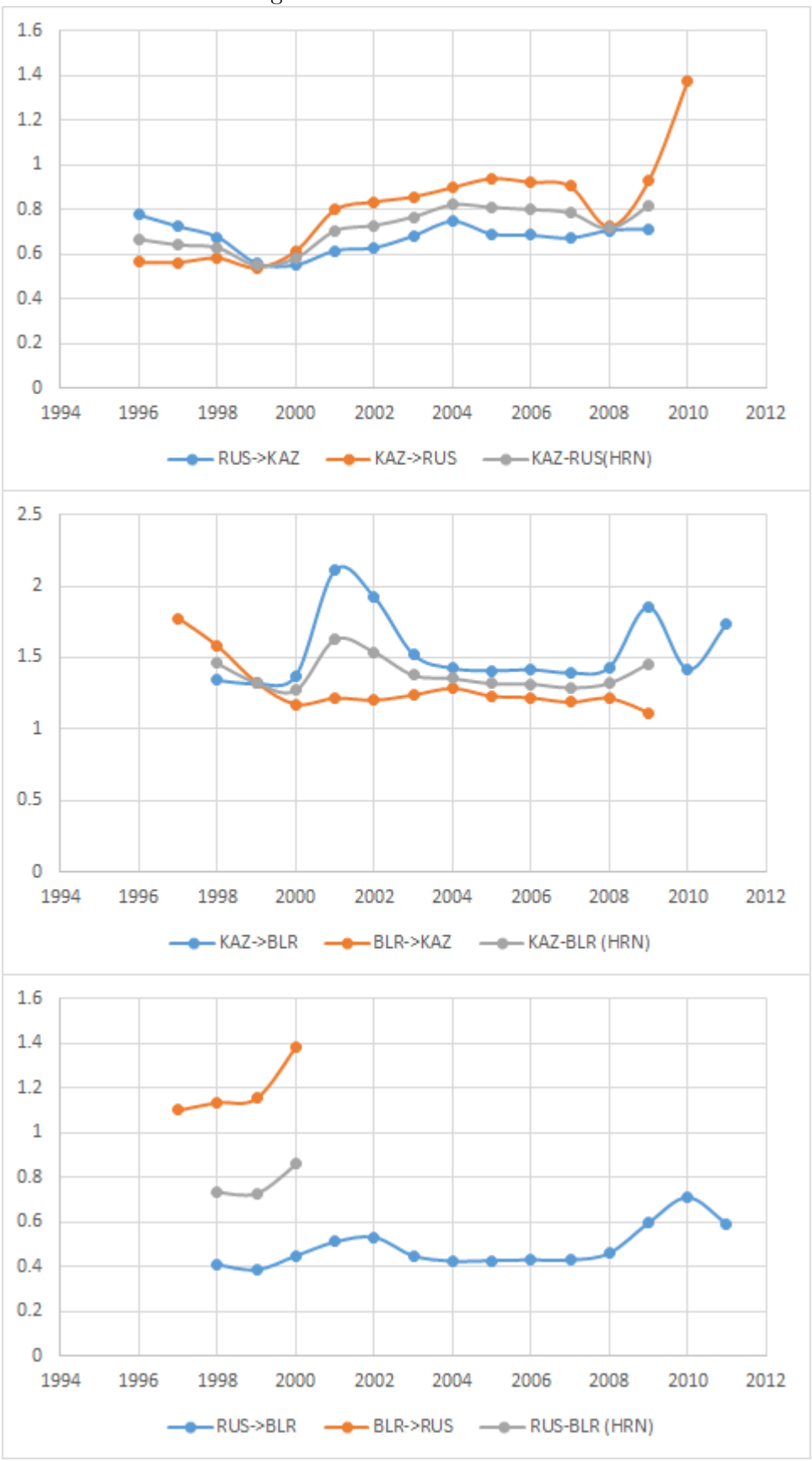


Table 5: Average OTCIs for each CIS: OHRN vs MHRN

HRN-OTCI

Row Labels	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995			1.49		2.49					
1996		2.03	1.53	1.82	2.44	1.24	1.52			
1997		2.00	1.49	1.62	2.48	1.21	1.61			
1998		1.88	1.51	1.69	2.31	1.18	1.51	1.72		
1999	2.06	1.56	1.55	1.55	2.20	1.13	1.41	1.84		2.36
2000	2.00	1.75	1.52	1.44	2.16	1.19	1.41	1.92		2.40
2001	2.08	1.99	1.58	1.57	2.13	1.35	1.49	1.91		2.36
2002	2.22	2.05	1.63	1.55	2.29	1.34	1.49	2.04	2.03	2.30
2003	2.20	2.06	1.65	1.78	2.31	1.36	1.49	2.01	1.91	2.26
2004	2.14	1.94	1.63	1.77	2.22	1.30	1.42	1.87	2.15	2.25
2005	2.23	2.04	1.63	1.67	2.29	1.36	1.45	1.87	2.07	2.21
2006	2.26	2.06	1.62	1.75	2.32	1.31	1.48	1.89	1.88	2.07
2007	2.20	2.09	1.57	1.75	2.44	1.28	1.25	1.82	2.06	1.93
2008	2.21	1.88	1.55	1.55	2.32	1.18	1.21	1.81	1.90	1.79
2009	2.52	2.18	1.67	1.60	2.45	1.25	1.51	1.96	2.18	1.99
2010		2.12	1.62		2.60	1.38	1.47	1.97	2.15	2.08
2011			1.48		2.51	1.28	1.42	1.84	2.08	
Grand Total	2.13	1.97	1.58	1.64	2.34	1.27	1.44	1.88	2.00	2.14

MOD-OTCI

Row Labels	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995			1.68		2.54					
1996		2.08	1.69	2.17	2.54	1.38	1.70			
1997		2.19	1.67	2.10	2.42	1.31	1.81			
1998		2.13	1.72	2.00	2.32	1.31	1.76	1.70		
1999	2.05	1.88	1.66	1.80	2.18	1.31	1.68	1.87		2.42
2000	2.04	2.08	1.60	1.70	2.16	1.47	1.68	2.02		2.36
2001	2.17	2.06	1.65	1.75	2.15	1.82	1.78	2.05		2.29
2002	2.34	2.04	1.64	1.74	2.24	1.73	1.80	2.23	2.21	2.30
2003	2.28	2.00	1.68	1.93	2.28	1.67	1.67	2.06	2.11	2.25
2004	2.32	2.00	1.66	2.00	2.26	1.66	1.63	1.98	2.13	2.09
2005	2.25	2.03	1.68	1.85	2.22	1.67	1.64	1.96	2.11	1.99
2006	2.33	2.04	1.67	1.95	2.24	1.60	1.65	1.94	1.99	1.90
2007	2.23	2.18	1.64	2.10	2.22	1.57	1.24	1.92	1.95	1.63
2008	2.22	1.79	1.63	1.66	1.86	1.34	1.16	1.95	2.22	1.60
2009	2.58	2.34	1.78	1.80	2.14	1.49	1.72	2.11	2.46	1.83
2010		2.32	1.77		2.31	1.71	1.57	2.13	2.49	2.08
2011			1.78		2.31	1.75	1.53	2.06	2.52	
Grand Total	2.19	2.07	1.68	1.89	2.26	1.55	1.62	1.99	2.18	2.03

DIFFERENCE

Row Labels	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995			12.9%		2.1%					
1996		2.6%	10.6%	19.1%	4.2%	10.7%	11.8%			
1997		9.6%	11.9%	29.6%	-2.5%	8.7%	12.8%			
1998		13.5%	14.2%	17.9%	0.4%	11.0%	16.0%	-1.1%		
1999	-0.7%	20.8%	7.0%	16.3%	-0.9%	15.9%	19.0%	1.7%		2.4%
2000	2.3%	18.8%	4.8%	18.1%	0.0%	23.2%	19.2%	5.6%		-1.6%
2001	4.5%	3.6%	4.3%	11.5%	1.3%	34.7%	19.8%	7.8%		-2.9%
2002	5.5%	-0.4%	0.7%	12.2%	-2.2%	28.9%	20.8%	9.6%	8.7%	0.3%
2003	3.8%	-2.9%	2.0%	8.4%	-1.5%	22.4%	12.5%	2.7%	10.3%	-0.3%
2004	8.7%	2.9%	2.1%	13.0%	1.7%	27.9%	14.4%	5.8%	-0.7%	-7.1%
2005	0.8%	-0.7%	3.1%	10.7%	-3.2%	22.7%	13.1%	4.4%	1.9%	-9.9%
2006	3.0%	-1.1%	3.5%	11.7%	-3.5%	22.0%	11.5%	2.7%	5.8%	-8.4%
2007	1.6%	4.2%	4.8%	20.1%	-8.8%	23.4%	-1.2%	5.2%	-5.3%	-15.2%
2008	0.5%	-4.8%	5.1%	6.8%	-19.7%	14.2%	-4.2%	7.9%	16.7%	-10.6%
2009	2.4%	7.3%	6.5%	12.7%	-12.4%	18.8%	13.9%	7.7%	12.6%	-8.1%
2010		9.3%	8.9%		-11.2%	24.1%	6.5%	8.4%	15.6%	0.0%
2011			20.1%		-7.8%	36.0%	7.7%	12.1%	21.3%	

Table 6: OCTIs using original HRN method

RUS=I

Years	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995						0.00				
1996		0.64	1.38	0.67	1.15	0.00	0.51			
1997		0.71	1.34	0.64	1.15	0.00	0.60			
1998		0.67	1.33	0.63	1.08	0.00	0.54	0.73		
1999	1.13	0.54	1.28	0.55	1.00	0.00	0.49	0.73		1.18
2000	1.24	0.78	1.33	0.58	1.10	0.00	0.54	0.86		1.25
2001	1.13	0.92	1.49	0.70	1.23	0.00	0.64			1.35
2002	1.27	0.96	1.47	0.73	1.27	0.00	0.68		1.39	1.40
2003	1.19	0.94	1.50	0.77	1.22	0.00	0.65		1.30	1.36
2004	1.18	0.95	1.43	0.82	1.12	0.00	0.65		1.30	1.34
2005	1.19	0.98	1.50	0.81	1.09	0.00	0.67		1.35	1.28
2006	1.15	0.99	1.45	0.80	1.02	0.00	0.65		1.25	1.34
2007	1.09	1.02	1.41	0.78	0.99	0.00	0.55		1.23	1.39
2008	1.02	0.96	1.29	0.71	0.77	0.00	0.48		1.24	1.49
2009	1.34	1.19	1.34	0.82	0.95	0.00	0.72		1.49	1.64
2010		1.49	1.44		1.25	0.00	0.79		1.64	1.85
2011			1.37		1.21	0.00	0.68		1.51	
Grand Total	1.10	1.00	1.19	0.67	1.00	0.00	0.58	0.49	1.17	1.19

KAZ=I

Years	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995				0.00						
1996		1.72	2.04	0.00	0.85	0.67	1.23			
1997		1.73	1.79	0.00	0.82	0.64	1.09			
1998		1.70	1.90	0.00	0.83	0.63	1.00	1.46		
1999	1.36	1.38	1.72	0.00	0.73	0.55	0.83	1.32		2.40
2000	1.34	1.52	1.58	0.00	0.72	0.58	0.76	1.27		2.02
2001	1.06	1.61	1.74	0.00	0.78	0.70	0.82	1.63		1.99
2002	1.26	1.64	1.72	0.00	0.82	0.73	0.90	1.54	1.27	1.93
2003	1.23	1.70	2.03	0.00	0.84	0.77	0.91	1.38	1.37	1.88
2004	1.24	1.76	2.00	0.00	0.88	0.82	0.94	1.35	1.51	1.82
2005	1.32	1.92	1.86	0.00	0.96	0.81	1.04	1.32	1.33	1.95
2006	1.45	2.09	1.94	0.00	1.09	0.80	1.17	1.32	1.19	2.13
2007	1.70	2.50	1.91	0.00	1.21	0.78	1.07	1.29	1.14	2.06
2008			1.69	0.00		0.71		1.32	1.30	
2009	1.45	1.94	1.76	0.00	1.10	0.82	0.85	1.46	1.69	1.67
2010				0.00						
2011				0.00						
Grand Total	1.04	1.97	1.70	0.00	0.80	0.80	0.89	1.55	1.35	1.73

BLR=I

Years	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995								0.00		
1996								0.00		
1997								0.00		
1998		0.84	1.96	1.46	1.56	0.73	0.75	0.00		
1999	1.85	0.73	2.09	1.32	1.50	0.73	0.73	0.00		2.43
2000	1.88	0.95	2.15	1.27	1.53	0.86	0.82	0.00		2.54
2001	1.73	0.97	2.08	1.63	1.64		0.92	0.00		2.50
2002	1.93	1.00	2.21	1.54	1.88		1.01	0.00	2.38	2.51
2003	1.78	0.98	2.20	1.38	1.86		0.82	0.00	2.14	2.19
2004	1.73	0.98	2.04	1.35	1.74		0.75	0.00	2.09	2.13
2005	1.72	1.02	2.06	1.32	1.71		0.75	0.00	2.15	1.82
2006	1.70	1.02	2.09	1.32	1.70		0.74	0.00	1.91	1.74
2007	1.60	0.95	2.03	1.29	1.71		0.61	0.00	1.86	1.63
2008	1.59	0.94	2.01	1.32	1.54		0.59	0.00	2.00	1.68
2009	1.84	1.13	2.16	1.46	1.85		0.91	0.00	2.30	1.76
2010		1.33	2.13		1.88		0.84	0.00	2.40	1.88
2011			2.02		1.67		0.75	0.00	1.39	
Grand Total	1.53	0.94	2.17	1.29	1.54	1.19	0.79	0.00	1.75	2.02

Table 7: OCTIs using modified HRN method

RUS=I

Years	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995			1.23		1.25	0.00				
1996		0.84	1.24	0.77	1.29	0.00	0.55			
1997		0.94	1.21	0.72	1.27	0.00	0.60			
1998		0.90	1.21	0.68	1.16	0.00	0.53	0.41		
1999	1.14	0.75	1.12	0.56	1.03	0.00	0.47	0.39		1.25
2000	1.11	1.02	1.05	0.55	1.06	0.00	0.51	0.45		1.25
2001	1.20	0.98	1.09	0.62	1.08	0.00	0.59	0.51		1.24
2002	1.22	0.94	1.13	0.63	1.13	0.00	0.60	0.53	1.16	1.24
2003	1.10	0.93	1.21	0.68	1.07	0.00	0.58	0.45	1.10	1.21
2004	1.07	0.94	1.16	0.75	0.90	0.00	0.58	0.42	1.10	1.16
2005	1.05	0.97	1.21	0.69	0.84	0.00	0.60	0.43	1.15	1.05
2006	1.07	0.98	1.20	0.68	0.82	0.00	0.62	0.43	1.00	1.00
2007	0.99	1.01	1.17	0.67	0.79	0.00	0.47	0.43	0.96	0.93
2008	1.00	1.07	1.21	0.71	0.61	0.00	0.44	0.46	1.15	1.11
2009	1.27	1.28	1.33	0.71	0.77	0.00	0.77	0.60	1.38	1.29
2010		1.48	1.30		1.03	0.00	0.68	0.71	1.35	1.57
2011			1.26		0.95	0.00	0.62	0.59	1.33	
Grand Total	1.10	1.00	1.19	0.67	1.00	0.00	0.58	0.49	1.17	1.19

KAZ=I

Years	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995			1.62	0.00	0.82					
1996		1.94	1.73	0.00	0.84	0.56	1.08			
1997		1.97	1.41	0.00	0.80	0.56	0.99			
1998		1.95	1.67	0.00	0.80	0.58	0.93	1.34		
1999	1.43	1.63	1.50	0.00	0.69	0.54	0.78	1.32		2.86
2000	1.45	1.79	1.50	0.00	0.67	0.61	0.72	1.37		2.12
2001	1.06	1.79	1.72	0.00	0.71	0.80	0.78	2.11		1.99
2002	1.01	1.81	1.53	0.00	0.75	0.83	0.95	1.92	0.93	1.87
2003	0.93	1.86	1.89	0.00	0.71	0.86	0.94	1.52	1.04	1.72
2004	0.92	1.92	1.79	0.00	0.73	0.90	0.94	1.43	1.18	1.54
2005	0.92	2.00	1.84	0.00	0.75	0.94	0.98	1.41	1.37	1.56
2006	0.93	2.07	1.99	0.00	0.80	0.92	1.02	1.42	1.15	1.60
2007	1.08	2.48	1.75	0.00	0.76	0.90	0.62	1.39	1.08	1.19
2008	1.07		1.67	0.00		0.72	0.56	1.43	1.38	1.35
2009	1.13	2.34	1.81	0.00	1.10	0.93	0.92	1.85	2.01	1.43
2010		2.10	1.78	0.00	0.96	1.37	0.97	1.42	1.76	1.51
2011			1.67	0.00	0.93		1.00	1.74	1.64	
Grand Total	1.04	1.97	1.70	0.00	0.80	0.80	0.89	1.55	1.35	1.73

BLR=I

Years	10XCA	11MDA	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	8AZE	9GEO
1995			2.26		1.76			0.00		
1996		0.87	2.35		1.84		0.92	0.00		
1997		0.94	2.34	1.78	1.80	1.10	0.94	0.00		
1998		0.95	2.23	1.58	1.77	1.13	0.92	0.00		
1999	1.50	0.80	2.21	1.32	1.63	1.15	0.83	0.00		2.59
2000	1.11	0.96	2.13	1.17	1.59	1.38	0.80	0.00		2.60
2001	1.75	0.92	2.06	1.22	1.61		0.86	0.00		2.70
2002	1.77	0.92	2.19	1.20	1.68		1.02	0.00	2.29	2.82
2003	1.63	0.93	2.17	1.24	1.70		0.84	0.00	1.95	2.34
2004	1.58	0.95	2.04	1.28	1.51		0.77	0.00	1.86	2.27
2005	1.57	0.99	2.10	1.23	1.45		0.77	0.00	1.90	1.65
2006	1.53	1.00	2.14	1.22	1.43		0.76	0.00	1.43	1.50
2007	1.36	0.85	2.04	1.19	1.40		0.51	0.00	1.32	1.29
2008	1.32	0.81	2.02	1.21	1.08		0.46	0.00	1.47	1.34
2009	1.67	1.01	2.25	1.11	1.26		0.86	0.00	1.65	1.50
2010		1.21	2.22		1.45		0.71	0.00	1.77	1.66
2011			2.10		1.21		0.62	0.00	1.87	
Grand Total	1.53	0.94	2.17	1.29	1.54	1.19	0.79	0.00	1.75	2.02

Table 8: The list of regions and sectors in the model

Regions	Abbrev.
Kazakhstan	KAZ
Kyrgyzstan	KRG
Russia	RUS
Ukraine	UKR
Belarus	BLR
Armenia	ARM
Azerbaijan	AZE
Georgia	GEO
Moldova	MDA
Rest of Central Asia	XCA
Rest of the World	ROW
Sectors	Abbrev.
Grain & Crop	1GC
Meat & Livestock	2ML
Extraction	3EX
Processed Food	4PF
Textile & Wearing Apparel	5TW
Light Manufacture	6LM
Heavy Manufacture	7HM
Utility consumption	8UC
Transportation and Communication	9TC
Other Services	10OS

endogenously is the long run assumption (as fixed costs are unavoidable in the short run). The consumption of domestic and imported final goods and intermediate goods is the CES aggregate function. The elasticity of substitution is also introduced exogenously and is equal to 5. It is a reasonable level of elasticity of substitution based as many studies find its range somewhere between 4-12 (Anderson and van Wincoop [5]). Further, we have tariffs and some trade costs. Trade costs are of two types, rent-seeking and resource costs. Rent-seeking costs are the costs associated with non-tariff policy barriers (such as licensing cost) and because they bring revenue they are modelled as tariffs. The resource costs are transportation costs (not the transport margins but gravity estimates of distance related costs including transportation), non-tariff policy barriers (different from rent-seeking ones) and value added trade costs (associated with what resellers' addings).

0.5.2 The decomposition of trade costs

The trade cost equation

The majority of trade costs is known to us, and has been revealed and discussed in depth in many papers previously. Even with having the implicit trade cost measure (like OTCI), its practical use is limited to tell us about its make up due to "all inclusive" nature. Without knowing its make up (major components), its tariff equivalent components, especially policy related costs in regional and international trade of CIS countries, it is difficult to perform analysis of policy changes in the region due to deeper integration. Thus we were further tasked with identifying trade cost components, their proxies and a decomposition of procedure. Novy [69] calculates the OTCIs based on (4), and estimates them using three groups of explanatory variables such as "geographical" (i.e., distance, border adjacency, landlockedness and island factors), "historical" (common language and colonial history factors) and "institutional" (tariffs, FTA and Exchange rate volatility factors). We also perceive three major groups of trade cost factors: geographic, policy and value added.

The first source of trade costs is transport related costs, that very depending on the type of transportation used, geographic features of transportation channel and the quality of transport related infrastructure. According to USCC [105], air is twice more costly as overland transportation, and overland transportation is four times more costly than sea transportation in the case of China-EU trade. In the CIS or Eurasian Bloc of countries context, sea is not an option as countries of the region are located on one continent with no sea/ocean separating them. Russia share common borders with Kazakhstan and Belarus. Most of their trade (by 90%) occurs via rail transport and thus their trade more costsly, comparing if trade would occur over sea. Of course, geographic features would less affect trade of services in the light of development of electronic and internet based technologies and means of communication in economic relations, but it still matters, that

is also depends on specifics of each service though. Further, landlockedness is the issue for landlocked members of the union as it adds extra costs in international trade. Kazakhstan is landlocked, and to trade with the EU, the country has to use transport by means of Russia, for instance, and pay transit costs, and usually needs to use other associated services for transit of its goods via the Russian transport system. This explains mainly why containerized cost to Kazakhstan is over 3000$ compared to Russia where it is 1800$. Another issue related to transportation system in Eurasian region is that it is based on Soviet transportation system. Even after over two decades, the transport system still based on rail tracks from Soviet era partially modernized but outdated, inefficient, and costly (comparing to existing similar transport means in the developed world). Further, due to the use of different gauges, it causes problems with rail transportation of commodities say from China or the EU, meaning that there are further costs at the places where Soviet gauge meets international gauge based railroads.

Another category of trade costs relates to trade policies and measures used in trade (that have less to do with the physical obstacles but still hard to make clear cut). According to the WTO, there are technical and non-technical categories of policy barriers associated with trade costs. Technical policy barriers are SPS, TBT and pre-shipment inspections and formalities. Based on a survey (Racine [79]), SPS and TBT are indeed the main policy barriers in the Eurasian region. The non-technical policy barriers are licensing, tariffs, quotas, protective, prohibitive measures, price-control, financial and investment, restrictive, dicriminative, anti-dumping and other measures which are also in practice of Eurasian trade relations.

The final category of trade costs, which is less covered by existing studies, is the costs occuring by adding extra value on top of commodities purchased somewhere on the way from manufacturer to final consumer by resellers, redistributors, refiners, repackagers and other, lets call, "middle men". In their famous study, Anderson and van Wincoop [6] provide approximations of trade cost composition, in the context of industrialized countries. They report that trade costs are on average 170 % which include 55% costs for distribution and retail sales (transportation, 22% and border costs, 44%). This is 1/3 of all trade costs or 1/5 of part of final consumer price. These costs, of course, include the revenues of middlemen (or companies) specialising on distributing and retailing of traded goods. Possible there are more issues involved, such as market structure and competition issue, type of sector or traded product, government regulations etc. Those costs exist in all market systems, and the Eurasian region is not an exception. This costs also needs to be approximated and taken into count in policy analysis. Thus we arrive to our trade cost model. We express our trade cost model in log form as

$$\hat{lnt_{ij}} = \beta_0 + \beta_1 lndist_{ij} + \beta_2 landx_{ij} + \beta_3 lock_j + \beta_4 ln1tr_{ij} + \beta_5 RTA_{ij} + \beta_6 NTB_{ij} + \beta_7 I_i + \beta_8 I_j + e_{ij}, \tag{9}$$

where on the LHS, $\hat{lnt_{ij}}$ is the ad-valorem of the overall trade cost measure (based on eq. 8); on the RHS, transport related costs are proxied with geographic distances ($lndist_{ij}$), dummy for overland trade only ($landx_{ij}$) and a dummy for landlockness ($lock_j$); policy related costs are proxied with log of weighted tariffs ($ln1tr_{ij}$[3]) and a dummy for membership in the same RTA_{ij}, and a dummy for NTB_{ij}; other trade costs occurred due to exporter or import captured with fixed effect dummies (I_i and I_j), and e_{ij} is error terms. Inclusion of fixed effect dummies has become normal practice in gravity analysis to capture unobservable heterogeneity involved with importers, exporters, time period or pairwise. To also note that we have no time dimension in this model (which is desirable) as we have data to obtain NTBs dummies for one year only.

The estimates of OTCI components

Previous empirical studies[4] employ a variety of econometric methods to estimate trade costs, however, we concentrate only on the estimation methods that are frequently used in estimation of gravity-based trade cost measures. Novy ([69, 71]) uses OLS with fixed effect dummies to estimate OTCIs mainly. Head, Mayer and Ries [43] - along with DVLS - use PPML to estimate tetraded trade flows (which represent time varying dyadic components, i.e., trade cost measure). Indeed, DVLS is, in a sense, a fixed effects estimator which is proven to be the most reliable estimator (Feenstra [32], Redding and Venables [80], Head & Mayer [44]). The use of fixed effect dummies allow to control for unobserved heterogeneity of exporters and importers during econometric estimation procedure[5]. However, as we shall see further, DVLS provides some inconsistent estimates due to the presence of zero trade costs. In such cases, PPML is found to be the most suitable tool for estimation in the presence of large number of missing or zero explained variables (Martin & Pham [64], Head, Mayer and Ries [43]). Also, PPML produces unbiased estimates even in the presence of heteroscedasticity, however, Martin and Pham [64] and some other studies find that PPML results stand out from the other methods with relatively higher coefficient estimates. Moreover, like DVLS, PPML also takes fixed effect dummies and thus control for unobserved heterogeneity issues. However, trade costs cannot be zero. Due to the missing/unreported trade values, using the HRNI there is always the case of getting zero

[3] We included 1 to the tariffs as most of them is zero)

[4] Herrera (2011) review various estimation methods and compare their estimates. He draw a list major types of estimation methods in the gravity literature, namely, truncated OLS, OLS plus one, Tobit, Panel fixed effects, Heckman two step, PPML, NLS, FGLS, GPML and Helpman, Melitz and Rubinstein method.

[5] This is also gives theoretical consistency to trade cost estimation procedure as the dummies stand for the multilateral resistances terms.

trade cost measures. Thus, PPML that naturally accepts zero dependent values could provide with misleading estimates too. DVLS instead ignores zero trade costs estimates based on positive trade costs measures in estimation procedure. Shepherd [89] explain this as the violation to the first assumption of OLS and as a result estimates could also be misleading. He state that when the sample (left after dropping zero explained variable) is not drawn randomly, and probability of being selected is an omitted variable bias (since explained variable correlated with the other explanatory variables). Thus there is a need for a method that corrects for selection bias (without assuming zero trade costs are real zero trade costs or ignoring them). Such method is the two step Heckman sample selection procedure[6]. The Heckman sample selection method corrects for, as the name implies, the non-random selected sample bias through introduction of additional selection equation (besides our trade model) where based on set of explanatory variables on the RHS explains possibility of LHS of the equation to be positive (if OTCI is missing). This is done in two steps.

In the first step, a probit estimator is used, which calculates the inverse Mills ratio (λ) to estimate the probability of selection variable omission form the trade cost model, and inserts an extra variable that solve the omitted variable bias.

$$Prob(I = 1 \mid Z) = \Phi(Z\kappa), \tag{10}$$

where $I = 1$ if $t_{ij} > 0$, and $I = 0$ otherwise; Φ is the cumulative distribution function of the standard normal distribution, Z is explanatory variables on the RHS of the trade cost model, κ is a vector of undefined parameters. Based on probit estimation, there is a probability of zero/undefined t_{ij} of being positive or not predicted.

In the second step, using predicted probabilities (from the first step) of t_{ij} is being a positive value as an additional explanatory variable, the self-selection bias of the trade cost model will be corrected. Assuming simply that $t_{ij} = \beta X_{ij} + e_{ij}$, missing trade cost can be estimated by using Probit estimates from the first step:

$$E\left[\hat{lnt_{ij}} \mid X, I = 1\right] = \beta X + \rho\sigma_e\lambda(Z\kappa), \tag{11}$$

where ρ is the correlation between unobserved factors of trade costs e and unobserved propensity to trade ϵ; σ_e is the standard deviation of e. In this case testing $H_0 : \beta_\lambda = 0 \mid H_1 : \beta_\lambda > 0$ becomes testing for sample selectivity as $\sigma_e > 0$, and $\rho > 0$ then $\beta_\lambda > 0$.

It is important to make sure that error terms are jointly normal when the Heckman sample selection method is used. Goldberger [37] argue that if the errors are jointly abnormal, then HSSM estimated coefficients are inconsistent. As can be see from the studies, all methods of estimation have their advantages over the other methods and some limitations.

[6] in Stata it is *Heckman* command with the option *twostep*

Table 9: Estimation results

Variables	DVLS	PPML	HSSM
Distance (log)	0.23***	0.36***	0.26***
	(-0.014)	(-0.024)	(-0.016)
Land trade (dummy)	0.43***	0.40***	0.27***
	(-0.084)	(-0.07)	(-0.061)
Landlocked partner (dummy)	0.73***	0.62***	0.41**
	(-0.166)	(-0.14)	(-0.126)
Same RTA member (dummy)	-0.23***	-0.34***	-0.32***
	(-0.045)	(-0.073)	(-0.063)
Tariffs (log)	0.05***	0.09***	0.05*
	(-0.013)	(-0.019)	(-0.021)
NTB (dummy)	-0.15	0.42***	0.41***
	(-0.083)	(-0.076)	(-0.064)
Constant	-1.29***	-3.14***	-2.16***
	(-0.113)	(-0.249)	(-0.176)
Observations	1,131	1,125	1,369
R-squared	0.73	0.66	-
Adj. R-squared	0.708	0.65634	-

Notes: Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Thus, estimation of the model has been provided with all the methods. Estimation results are presented in *Table 9*.

Estimated coefficients across chosen different estimation options are relatively similar. The chosen variables explain 70% on average of the trade cost measure. The resulting coefficient estimates for the variables have expected magnitude and correlation with the trade cost measure. Trade costs increase with distance, overland trade, landlockedness factor, and with NTBs, while the costs reduce with the membership of trading countries in the same RTA. All of the variables statistically significant determinants of trade cost measures at 1% level in PPML column, and the other methods confirm that most of the variables are very significant statistically. However, NTB isn't significant in DVLS estimation, plus it has negative sign which in contradiction with the coefficient estimates of other methods. HSSM find that tariffs are significant at 5% level only. As can be seen from the coefficient values, NTBs, distance and landlockedness are more important determinants of trade costs. The impact of distance on trade costs can be compensated with the RTA membership.

Bilateral trade data to calculate the OTCIs comes from the COMTRADE database for 2009 covering 37 countries with 1369 observations. Because some of trade data is zero or missing, we obtained only 1101 trade cost measures (meaning that 1/5 of the trade cost measures is zero). Further data to proxy variables on the RHS of the model comes from various sources. The weighted tariff rates comes from the TRAINS database. The geographic distances are from CEPII. Dummies for overland trade, landlockedness and NTBs are constructed by us. In construction of dummies for NTBs, Kee et al. [54] Market Access Overall Trade Restrictiveness (MAOTRI) measures used, excluding tariffs (MAOTRI_t). In their study, MAOTRI are ad valorem estimates of trade policy distortions that faced by exporters, and in estimation of MAOTRI over 29 different NTB measured presented in TRAINS database is used. To note that MAOTRIs are consistent with the theory of Trade Restrictiveness developed by Anderson and Neary ([2, 3, 4]).

Comparing estimated measures

In *columns 1-6* of *Table 10*, we present our estimates of trade cost components for CIS countries. In column (1), we have mean of ad-valorem level of MOCTIs (based on eq. 8), and, in columns 2-6, separate components of the OTCIs (eq. 4), namely, policy related tariff (2) and non-tariff (4) costs, geography related costs (5) and value added costs (6). Column (3) includes all MOTCI components except tariffs. Decomposed components of each OTCIs are based on the Heckman method estimates. In further columns (7-13), we present trade cost measures provided by other studies. The OTCIs in column (7) with its decomposition into tariff (8) and NTB (9) parts are for the same country group from the WB-ESCAP database[7]. Since they use the HRN method, the WB-ESCAP estimates are the most closest estimates we can compare with. The WB-ESCAP OTCIs are relatively higher than our MOTCIs. This could be the result of assuming that trade costs aren't the same between any country-pair (i.e., $t_{ij} \neq t_{ji}$) in our measures, unlike WB-ESCAP assume that $t_{ij} \neq t_{ji}$. Besides, they use much larger data[8] to construct OTCIs. For the same reason their aggregate NTB measure (9) is larger in average from our aggregate NTB (3). However, tariff measures are lower than our tariff measures. In further columns (10-13), we have policy related trade cost measures for CIS countries from study by Kee et al. [54]. Those policy cost measures are so-called the Overall Trade Restrictiveness Index (OTRI representing policy trade costs on imports) and the Market Access Overall Trade Restrictiveness Index (MAOTRI represent policy trade costs applied on exports) which are theoretically consistent measures with justifications from Anderson & Neary ([2, 3, 4]). Unlike our method that could be viewed as "top-down" method of measuring trade costs implicitly from trade, the OTRI and MAOTRIs measures based on directly observable data

[7] publicly available at http://artnet.unescap.org/databases.html
[8] Their database cover OTCIs for 178 countries between 2005-2011.

on different trade cost measures, thus can be viewed as "bottom-up" measures. Kee and his team have estimated tariff and non-tariff components of OTRIs (10-11) and MAOTRIs (12-13), and they can be viewed as equivalents of our tariff (2) and non-tariff policy barrier (4) costs. Their tariff and non-tariff measures are in average lower then our respective estimates. In case places, components of OTRI are zero or unreported. Such differences of course expected as different methods and theoretical concepts are used. Although there is possibility that measures of (MA)OTRIs are undermined in Kee et al. [54] study due to using available data on trade restricting measures. That there are some shortcomings in the existing measures of trade restriction has been signified in a number of studies[9]. Further, papers that review existing trade cost measures like Anderson and van Wincoop [6] or Bagai et al. [8] find that available trade restriction measures are limited in the number of countries, years or sectors they cover. Fugazza et al. [36] also argue that OTRIs estimated by Kee et al. [54] are only capturing part of NTBs, namely, prices, quantity measures, monopolistic measures and technical regulations.

0.6 Simulations and results

0.6.1 Simulation scenarios

We have three scenarios of possible development of EEU integration. The first scenario represent the ECU/CISFTA formation case with introduction of appropriate changes in the tariff rates and elimination of internal border barriers within the territory of the troika (and two other possible joiners, Kyzgystan and Armenia). In two further scenarios, which are seen as the SES/EEU formation cases, we provide changes in the structure of non-tariff policy barriers, and also changes in transport related and value added costs based on the EU experience.

Scenario 1

In *Scenario 1*, we consider tariff and border changes due to the EEU formation. The benchmark custom rates for each region in the model are in weighted tariff rate forms for the year 2009 (i.e., for pre-ECU/CISFTA period) and the counterfactual tariff rate are for

[9]Count based measures suffer from a "mixed bag" issue when standards added up to each other with matter of their importance (Swann, 2010). Notification data that is used to compute coverage and frequency ratios to explain trade flows (e.g., Disdier et al. [18]) is inconsistently measuring heterogeneity accross countries in terms of what measures applied and the duration of application. A five-point scale based measures of standards and regulations used in European Commission [102]) to study the overall effectiveness of EU policies in removal of TBTs does not indicate how many standards or regulations, nor how stringent they are. Implicit measures to capture the presence of the amount of standards and regulations by using dummy or countr variable, frequency, or coverage ratios, but their stringency remains hard to evaluate.

Table 10: Comparing estimated trade cost measures

	Our "top down" estimates						WB-ESCAP "top-down" estimates			Kee et al. (2009) "bottom up" estimates			
		MOTCI						OTCI		OTRI		MAOTRI	
Regions	MOTCI	tariff	NTB	PNTB	transport	va cost	OTCI	tariff	NTB	tariff	PNTB	tariff	PNTB
columns	1	2	3	4	5	6	7	8	9	10	11	12	13
2KAZ	114%	6.1%	114%	12%	79%	23%	140%	2%	140%	N/A	N/A	3%	5%
3KRG	195%	6.3%	195%	25%	127%	43%	228%	2%	228%	2%	0%	3%	16%
4RUS	89%	1.2%	89%	10%	59%	20%	125%	2%	125%	5%	12%	3%	6%
5UKR	102%	0.0%	102%	10%	68%	24%	144%	2%	144%	3%	13%	4%	7%
6BLR	132%	3.1%	132%	15%	87%	30%	202%	5%	202%	3%	9%	4%	5%
7ARM	191%	2.3%	191%	40%	115%	36%	252%	2%	252%	N/A	N/A	2%	6%
8AZE	189%	4.2%	189%	50%	112%	27%	183%	2%	183%	3%	0%	0%	14%
9GEO	155%	0.0%	155%	22%	96%	37%	184%	1%	184%	1%	0%	1%	6%
10XCA	186%	4.1%	186%	34%	117%	34%	205%	2%	205%	N/A	N/A	2%	17%
11MDA	233%	3.1%	233%	55%	134%	45%	201%	2%	201%	N/A	N/A	3%	13%
1ROW	199%	5.5%	122%	38%	38%	45%	319%	7%	319%	7%	7%	4%	12%

the year 2012 (i.e., post-ECU/CISFTA period). The tariff data is taken from the WITS database (with the use of the GTAP classification option). Because by the year 2012 harmonization of the tariffs among troika is done by about 80% (but full harmonization is expected to be reached before 2015), and because in this scenario we want to have full tariff impact, we applied further slight changes in the tariff rate for the members. The WB [106] study reported expected full changes in the tariff rates by 2015 for Kazakhstan which we used to adjust tariff rate for Kazakhstan in our counterfactual case. Further, we have another two regions in the model (Armenia and Kyrgyzstan) which will be also joining the union soon, and their tariff structure will go through the harmonization stage. However, since we are using weighted tariff rates, their post-ECU tariffs will not be the same as of the troika. We approximate % change in weighted tariffs of Armenia and Kyrgyzstan based on the % change for Kazakhstan as pre-ECU tariff rates of the two countries were more or less close to the rates of Kazakhstan. The benchmark and counterfactual aggregate weighted import tariffs of CIS and ROW are given *Table 11-12*.

Scenario 2a

In *Scenario 2a*, we assume that mainly the institutional, transport and communication developments, and harmonization of NTMs and the standards occur. Firstly, we introduce trade costs (other than costs arising from the tariffs) which are tariff equivalents of the decomposed OCTIs (non-tariff policy costs, transportation costs and the value added costs).

Regarding the non-tariff policy related costs, most of CGE studies model them as resource costs that will dissipate, however, part of the non-tariff policies are in the form rent-seeking measures, thus it is convenient to assume that only some part of the non-tariff policy costs will dissipate. To proxy the share of rent-seeking non-tariff policy costs, we used Fugaza et al. [36]. In their study, they provide the proportion of rent-seeking of non-tariff policy barriers by industry types (although the industrial split introduced in their paper is not entirely the same as ours). The proxied non-tariff policy (with the split into rent-seeking and resource costs), transportation and value added costs for each region in the model are presented in the *Table 13* which are assumed as the benchmark trade costs. However, we model the costs related to rent-seeking non-tariff policy barriers as tariffs meaning that they bring revenues, while the other type of costs are modelled as resource costs.

Table 11: CIS trade weighted import tariff changes

PRE-CU TARIFF RATES IMPOSED BY CIS TO ROW (2009)

Row Label	1GC.	2ML.	3EX.	4PF.	5TW.	6LM.	7HM.	8UC.	9TC.	10OS.
2KAZ	1.9%	4.4%	3.6%	10.0%	10.3%	2.8%	5.0%	2.5%	4.0%	1.9%
3KRG	2.4%	5.8%	4.4%	8.3%	8.1%	5.2%	1.2%	0.0%	8.1%	2.4%
4RUS	4.9%	4.6%	6.2%	10.1%	11.1%	9.3%	9.6%	0.0%	11.9%	4.9%
5UKR	3.1%	4.5%	4.1%	6.9%	7.1%	9.5%	3.4%	0.0%	6.3%	3.1%
6BLR	5.7%	6.0%	7.0%	10.7%	10.5%	7.8%	10.5%	0.0%	15.3%	5.7%
7ARM	2.5%	6.0%	5.3%	8.6%	7.3%	5.1%	2.4%	0.0%	7.1%	2.5%
8AZE	5.5%	11.9%	4.6%	12.4%	13.7%	7.7%	8.2%	0.0%	10.7%	5.5%
9GEO	0.0%	7.5%	8.6%	5.8%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
10XCA	8.5%	15.7%	11.8%	17.6%	25.5%	14.5%	10.7%	0.0%	18.1%	8.5%
11MDA	1.8%	8.2%	4.7%	8.2%	6.9%	3.3%	3.0%	0.0%	6.2%	1.8%

POST-CU TARIFF RATES IMPOSED BY CIS TO ROW (EXPECTED BY 2015)

Row Label	1GC.	2ML.	3EX.	4PF.	5TW.	6LM.	7HM.	8UC.	9TC.	10OS.
2KAZ	4.4%	6.3%	5.2%	10.3%	18.2%	7.8%	12.5%	0.0%	10.6%	4.0%
3KRG	4.4%	6.3%	5.2%	10.3%	18.2%	7.8%	12.5%	0.0%	10.6%	4.0%
4RUS	4.4%	6.3%	5.2%	10.3%	18.2%	7.8%	12.5%	0.0%	10.6%	4.0%
5UKR	3.5%	4.3%	3.2%	7.6%	6.6%	4.4%	3.1%	2.0%	6.1%	2.2%
6BLR	4.4%	6.3%	5.2%	10.3%	18.2%	7.8%	12.5%	0.0%	10.6%	4.0%
7ARM	4.4%	6.3%	5.2%	10.3%	18.2%	7.8%	12.5%	0.0%	10.6%	4.0%
8AZE	11.8%	10.0%	5.5%	12.6%	13.9%	8.0%	7.4%	0.3%	10.2%	4.7%
9GEO	7.0%	7.6%	7.9%	6.2%	1.1%	0.0%	1.6%	0.0%	1.6%	0.5%
10XCA	11.8%	11.8%	9.7%	13.6%	17.0%	9.5%	7.6%	0.0%	13.5%	6.1%
11MDA	8.0%	9.7%	6.0%	7.3%	8.7%	4.5%	2.9%	0.0%	6.5%	1.9%

CHANGE IN THE TARIFF RATES (POST-ECU RATES MINUS PRE-ECU RATES)

Row Label	1GC.	2ML.	3EX.	4PF.	5TW.	6LM.	7HM.	8UC.	9TC.	10OS.
2KAZ	2.5%	1.9%	1.6%	0.3%	7.9%	5.0%	7.5%	-2.5%	6.6%	2.2%
3KRG	2.1%	0.6%	0.8%	2.0%	10.1%	2.6%	11.3%	0.0%	2.5%	1.7%
4RUS	-0.5%	1.7%	-1.0%	0.3%	7.1%	-1.5%	2.9%	0.0%	-1.2%	-0.9%
5UKR	0.4%	-0.2%	-1.0%	0.7%	-0.4%	-5.1%	-0.2%	2.0%	-0.2%	-0.9%
6BLR	-1.3%	0.4%	-1.9%	-0.4%	7.7%	0.1%	2.0%	0.0%	-4.7%	-1.7%
7ARM	1.9%	0.3%	-0.1%	1.7%	10.9%	2.7%	10.1%	0.0%	3.5%	1.5%
8AZE	6.3%	-1.9%	1.0%	0.1%	0.2%	0.2%	-0.8%	0.3%	-0.5%	-0.8%
9GEO	7.0%	0.2%	-0.7%	0.4%	1.1%	0.0%	1.4%	0.0%	1.6%	0.5%
10XCA	3.2%	-3.8%	-2.1%	-4.0%	-8.5%	-5.0%	-3.1%	0.0%	-4.7%	-2.4%
11MDA	6.3%	1.6%	1.4%	-0.9%	1.8%	1.2%	-0.1%	0.0%	0.3%	0.2%

Table 12: ROW trade weighted import tariff changes

PRE-CU TARIFF RATES IMPOSED BY ROW TO CIS (2009)

	1GC.	2ML.	3EX.	4PF.	5TW.	6LM.	7HM.	8UC.	9TC.	10OS.
2KAZ	12.3%	13.2%	0.0%	6.7%	15.7%	10.4%	2.0%	0.0%	3.0%	12.3%
3KRG	5.2%	7.2%	0.0%	17.4%	6.3%	10.5%	0.4%	0.0%	20.0%	5.2%
4RUS	1.4%	3.0%	0.0%	4.0%	1.0%	3.1%	2.6%	0.0%	0.8%	1.4%
5UKR	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6BLR	2.5%	0.0%	1.3%	6.2%	4.8%	3.8%	3.2%	0.0%	6.3%	2.5%
7ARM	4.7%	0.0%	0.0%	11.1%	9.7%	0.0%	0.3%	0.0%	1.4%	4.7%
8AZE	0.4%	2.8%	0.0%	0.3%	6.7%	0.1%	2.4%	0.0%	18.0%	0.4%
9GEO	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10XCA	3.9%	5.3%	0.0%	2.7%	9.4%	7.9%	3.7%	0.0%	4.6%	3.9%
11MDA	0.1%	0.0%	0.0%	7.4%	13.3%	0.0%	11.0%	0.0%	0.0%	0.1%

POST-CU TARIFF RATES IMPOSED BY ROW TO CIS (EXPECTED BY 2015)

Row Labe	1GC.	2ML.	3EX.	4PF.	5TW.	6LM.	7HM.	8UC.	9TC.	10OS.
2KAZ	28.1%	15.3%	0.1%	3.6%	12.7%	3.0%	4.0%	0.0%	19.7%	2.5%
3KRG	29.2%	7.8%	0.4%	10.0%	8.4%	10.6%	0.4%	0.0%	13.1%	5.1%
4RUS	6.8%	3.8%	0.0%	5.0%	1.0%	0.3%	4.1%	0.0%	1.4%	2.9%
5UKR	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6BLR	8.5%	38.0%	3.3%	8.3%	6.8%	3.9%	4.6%	0.0%	4.7%	3.9%
7ARM	12.5%	0.0%	0.0%	7.4%	12.3%	3.5%	0.3%	0.0%	15.9%	6.0%
8AZE	5.8%	2.8%	0.0%	5.5%	11.2%	3.8%	2.8%	0.0%	0.0%	4.8%
9GEO	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10XCA	7.8%	6.7%	1.5%	3.3%	7.6%	6.5%	3.7%	0.0%	14.9%	1.1%
11MDA	0.0%	0.0%	0.0%	5.8%	12.7%	0.0%	3.7%	0.0%	22.0%	1.1%

CHANGE IN THE TARIFF RATES (POST-ECU RATES MINUS PRE-ECU RATES)

Row Labe	1GC.	2ML.	3EX.	4PF.	5TW.	6LM.	7HM.	8UC.	9TC.	10OS.
2KAZ	15.8%	2.1%	0.1%	-3.1%	-3.0%	-7.4%	1.9%	0.0%	16.7%	-9.8%
3KRG	24.0%	0.6%	0.4%	-7.4%	2.1%	0.1%	0.0%	0.0%	-6.9%	-0.1%
4RUS	5.4%	0.8%	0.0%	1.1%	0.0%	-2.8%	1.6%	0.0%	0.7%	1.5%
5UKR	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6BLR	6.0%	38.0%	2.0%	2.2%	2.0%	0.1%	1.4%	0.0%	-1.5%	1.4%
7ARM	7.8%	0.0%	0.0%	-3.7%	2.6%	3.5%	0.0%	0.0%	14.5%	1.3%
8AZE	5.4%	0.0%	0.0%	5.2%	4.5%	3.7%	0.5%	0.0%	-18.0%	4.4%
9GEO	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
10XCA	3.9%	1.4%	1.5%	0.7%	-1.8%	-1.4%	-0.1%	0.0%	10.2%	-2.8%
11MDA	-0.1%	0.0%	0.0%	-1.6%	-0.5%	0.0%	-7.3%	0.0%	22.0%	0.9%

Table 13: Benchmark transport, policy and value added trade costs

Overall Trade Cost Indexes (excluding tariffs)

	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	7ARM	8AZE	9GEO	10XCA	11MDA
1ROW	156.1	182.8	233.9	145.4	170.5	232.6	212.6	260.2	197.6	181.8	210.9
2KAZ	179.5	42.3	64.1	57.2	70.6	92.0	149.6	198.4	80.8	75.2	244.1
3KRG	315.9	84.1	62.7	106.9	139.8	167.6	252.9	334.5	141.3	109.0	426.7
4RUS	125.6	57.6	82.6	38.8	44.5	50.8	116.5	174.2	63.7	80.8	147.3
5UKR	158.4	73.9	102.6	42.2	35.3	52.3	130.9	203.0	73.2	97.8	149.5
6BLR	193.4	92.3	128.9	50.4	58.2	48.5	175.1	261.3	97.9	123.8	217.4
7ARM	239.5	159.3	205.4	137.2	157.1	207.5	198.4	224.5	143.7	159.2	266.1
8AZE	211.5	170.7	220.8	169.4	191.7	255.5	171.2	116.9	139.9	157.5	270.7
9GEO	262.0	106.0	141.6	83.4	108.2	128.2	175.4	212.1	47.0	127.0	315.4
10XCA	264.6	114.7	129.7	128.6	150.4	197.4	211.4	252.2	144.4	99.6	349.3
11MDA	219.8	245.9	329.6	167.5	178.0	248.7	235.5	316.8	243.4	252.5	129.2

Transportation costs (part of OTCI)

	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	7ARM	8AZE	9GEO	10XCA	11MDA
1ROW	98.2	122.1	159.8	48.6	60.4	82.7	138.4	161.0	139.7	129.9	123.2
2KAZ	125.2	30.4	45.4	30.5	39.1	50.8	109.0	144.9	61.3	56.8	172.9
3KRG	205.8	58.6	35.3	56.8	70.9	91.5	175.6	232.6	102.5	75.2	292.2
4RUS	80.7	44.4	62.3	18.7	18.6	22.4	81.5	124.8	46.6	62.4	92.0
5UKR	99.0	58.3	78.9	19.3	14.6	22.4	90.7	146.8	53.8	76.5	85.9
6BLR	115.1	71.7	97.8	22.3	21.6	17.7	121.9	188.0	71.7	95.7	132.2
7ARM	152.2	118.7	147.5	53.4	57.7	82.8	130.1	144.2	96.0	114.1	166.1
8AZE	142.6	129.8	161.5	62.6	71.6	98.6	112.2	63.5	91.6	114.1	179.6
9GEO	168.6	79.2	102.4	41.1	46.5	64.9	111.6	129.8	25.5	92.0	199.4
10XCA	170.9	84.4	88.6	58.4	69.9	92.8	145.5	171.9	103.2	67.2	239.5
11MDA	126.9	181.5	237.4	51.4	43.0	74.9	151.1	211.5	163.8	182.9	45.9

Rent seeking non-tariff policy costs (part of OTCI)

	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	7ARM	8AZE	9GEO	10XCA	11MDA
1ROW	3.7	4.2	3.7	13.5	16.4	21.5	3.2	5.9	1.4	0.1	3.3
2KAZ	1.9	1.4	1.5	3.6	4.4	5.5	1.5	1.5	1.4	1.4	1.5
3KRG	6.0	3.0	2.8	6.4	9.4	9.3	2.8	3.0	2.9	3.1	2.9
4RUS	2.5	1.2	1.2	2.6	3.9	3.8	1.2	1.2	1.1	1.1	1.2
5UKR	4.4	1.3	1.3	3.2	2.6	4.1	0.1	1.4	1.3	1.3	0.2
6BLR	5.7	1.7	1.8	3.7	5.5	3.7	1.9	1.8	1.8	1.7	1.7
7ARM	4.9	4.4	4.4	12.8	15.6	19.4	4.4	4.7	4.8	4.4	4.6
8AZE	3.2	5.6	6.0	16.5	20.1	24.3	5.8	5.5	6.2	6.0	5.8
9GEO	5.3	2.3	2.5	5.1	8.8	7.9	2.6	2.7	2.4	2.4	2.4
10XCA	6.1	3.7	4.2	9.7	11.7	14.4	3.8	4.0	3.8	3.7	3.7
11MDA	4.9	6.3	6.3	17.7	20.9	25.6	6.4	6.1	6.1	5.9	6.0

Non-rent non-tariff policy costs (part of OTCI)

	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	7ARM	8AZE	9GEO	10XCA	11MDA
1ROW	17.2	19.0	16.2	62.4	72.3	95.1	13.7	26.0	6.4	0.4	14.9
2KAZ	8.5	6.6	6.5	15.5	18.4	22.7	6.5	6.5	6.6	6.6	6.5
3KRG	26.1	12.5	12.7	26.5	39.9	38.9	12.7	12.5	12.6	12.4	12.6
4RUS	11.2	5.1	5.0	11.7	15.6	15.6	5.0	5.1	5.1	5.1	5.0
5UKR	19.5	5.6	5.6	13.0	12.0	16.2	0.2	5.6	5.6	5.6	0.9
6BLR	25.0	7.5	7.4	15.6	21.6	16.7	7.3	7.4	7.4	7.5	7.5
7ARM	21.2	20.2	20.1	52.8	64.4	75.7	20.1	19.8	19.8	20.2	19.9
8AZE	14.1	24.9	24.6	71.8	80.1	102.6	24.7	25.1	24.3	24.6	24.8
9GEO	24.5	10.8	10.7	22.9	37.5	32.7	10.6	10.5	10.8	10.7	10.7
10XCA	26.9	17.2	16.7	43.8	50.2	63.0	17.1	16.6	17.0	17.1	17.2
11MDA	22.2	27.3	27.3	74.8	90.7	109.9	27.2	26.2	27.5	27.7	27.6

Value added costs (part of OTCI)

	1ROW	2KAZ	3KRG	4RUS	5UKR	6BLR	7ARM	8AZE	9GEO	10XCA	11MDA
1ROW	37.1	37.5	54.2	20.8	21.3	33.3	57.4	67.2	50.1	51.3	69.5
2KAZ	43.9	3.9	10.7	7.7	8.8	13.0	32.6	45.4	11.5	10.4	63.2
3KRG	78.1	10.0	12.0	17.2	19.5	27.8	61.8	86.4	23.4	18.4	119.0
4RUS	31.2	6.9	14.0	5.9	6.4	9.0	28.8	43.2	10.9	12.2	49.0
5UKR	35.4	8.7	16.8	6.7	6.0	9.5	39.8	49.2	12.5	14.4	62.5
6BLR	47.6	11.5	21.9	8.8	9.6	10.4	44.0	64.1	16.9	19.0	76.0
7ARM	61.1	16.1	33.4	18.3	19.4	29.6	43.7	55.8	23.1	20.6	75.5
8AZE	51.5	10.4	28.7	18.4	19.9	30.0	28.5	22.9	17.7	12.9	60.5
9GEO	63.6	13.6	26.0	14.2	15.4	22.8	50.5	69.1	8.4	21.9	102.8
10XCA	60.7	9.5	20.2	16.8	18.6	27.2	45.0	59.7	20.3	11.5	88.8
11MDA	65.8	30.8	58.6	23.6	23.5	38.4	50.8	72.9	45.9	36.0	49.7

Table 14: Trade cost structure: EEU vs EU (based on the WB-ESCAP data)

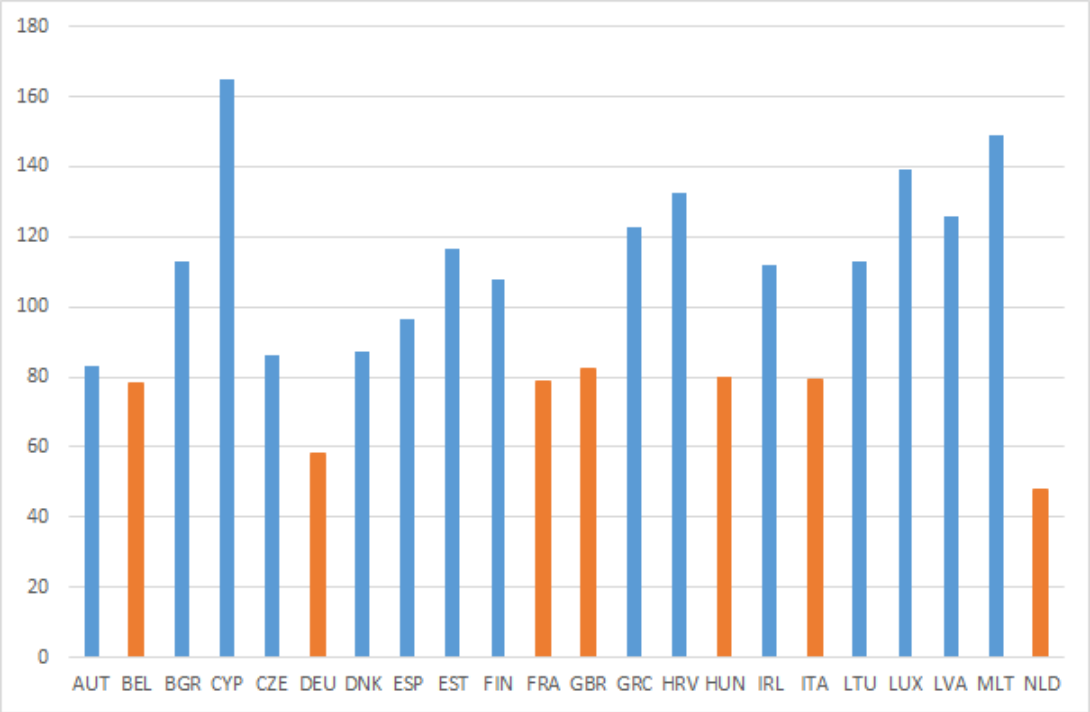
Agriculture			Manufacture			All		
EU-EU	EAU-EAU	% diff.	EU-EU	EAU-EAU	% diff.	EU-EU	EAU-EAU	% diff.
191.3	247.7	-22.8	95.9	136.7	-29.9	100.2	158.9	-37.0
EU-REU	EAU-CIS		EU-REU	EAU-CIS		EU-REU	EAU-CIS	
250.4	217.1	15.3	154.7	129.3	19.7	167.2	142.1	17.7
EU-ROW	EAU-ROW		EU-ROW	EAU-ROW		EU-ROW	EAU-ROW	
298.8	320.2	-6.7	229.6	301.3	-23.8	239.7	320.1	-25.1
REU-REU	CIS-CIS		REU-REU	CIS-CIS		REU-REU	CIS-CIS	
245.3	235.2	4.3	153.5	156.0	-1.6	170.7	163.2	4.6
REU-EU	CIS-EAU		REU-EU	CIS-EAU		REU-EU	CIS-EAU	
250.4	217.1	15.3	154.7	129.3	19.7	167.2	142.1	17.7
REU-ROW	CIS-ROW		REU-ROW	CIS-ROW		REU-ROW	CIS-ROW	
318.9	308.8	3.3	265.1	305.5	-13.2	277.4	324.4	-14.5
ROW-REU	ROW-CIS		ROW-REU	ROW-CIS		ROW-REU	ROW-CIS	
318.9	308.8	3.3	265.1	305.5	-13.2	277.4	324.4	-14.5
ROW-EU	ROW-EAU		ROW-EU	ROW-EAU		ROW-EU	ROW-EAU	
298.8	320.2	-6.7	301.3	229.6	31.2	320.1	239.7	33.5

To capture the impact of deeper integration, we introduce changes in trade costs. To identify in what way and by how much the costs change, we used the WB-ESCAP trade costs database. The database cover trade costs for year 2009 (pre-ECU period) for EU and CIS countries separately, and also include the OTCIs decomposition into tariff and non-tariff components. To note that this measures are the geometric means of NTBs between each country pair which is not what we want. Further, the NTBs from the database contain all the other costs (leaving tariffs out) and includes policy, transport, border and other possible trade costs. In *Table 14*, we have the NTBs measures from the database for the EU and the CIS countries for the year 2009 from the database. As can be seen, the mean of NTBs of the EU and the EEU group are different in many ways. We assume in this scenario that due to further deeper integration the NTB structure of the EEU will be restructured in the way we observe for the EU. This assumption is possible as the EEU integration is based on the EU integration experience. We use only % differences between the NTBs of the EU and the EEU to reflect possible changes in the policy related NTB costs of the EEU. Because WB-ESCAP NTBs contain transport, policy and value added costs, the changes will be evenly over our benchmark NTBs related to transport, policy and value added costs.

Scenario 2b

Costs and barriers in trade will be lower for bigger members compared to smaller members of a union. In *Figure 5*, we present the level of OTCIs for EU countries averaged for period of 2005-2011 (based on WB-ESCAP trade cost database). It can be seen that some EU

Figure 5: OTCIs of EU countries (for 2005-2011 period)



countries (such as Germany, UK, Netherlands, Italy, France and Belgium) have lower trade cost relative to the other EU countries. For instance, trade costs added on top of import or export commodity from/to Germany (58%) are almost three times lower than respective trade costs to Cyprus (160%).

In *Scenario 2b*, we apply percentage differences between the NTBs of the EU from the EEU (like in the *Scenario 2a*). The important difference (from *Scenario 2a*) is that members of the union will not be treated equally this time. In the previous case, we use the means of EU and EEU NTBs without differentiating members with the groups in other words treating all the members the same way, however, this time we do.

By looking at country pair trade costs of separate EU states (from the WB-ESCAP database), instead of region-pair trade cost measures of aggregate EU region as in *Scenario 2a*, we noticed that the NTBs for "bigger" EU countries (namely, UK, Germany, Italy and France) are smaller than "smaller" EU members (the other EU states). Considering the asymmetry of sizes of the EEU members, it is reasonable to assume that the structure of the Russian NTBs will change to (or become like) that of the "bigger" EU members while the structure of the NTBs of the other members of the union (which are treated as smaller ones) will become relatively similar of the NTBs of the "smaller" EU states. We think that such a scenario is realistic one, as Russia, indeed, has bigger bargaining power thus its NTBs will be lower than its level for smaller members of the union. In *Table 15*,

we provide with NTB structure of "bigger" and "smaller" EU states along NTB structure of the "bigger" (Russia only) and "smaller" EEU states. Similarly as in *Scenario 2a*, we consider that NTB structure of "bigger" EEU NTB structure will become like of "bigger" EU NTB one, and of "smaller" EEU members like of "smaller" EU. Similarly to *Scenario 2a*, in this scenario the changes in NTBs will be evenly over our benchmark NTBs related to transport, policy and value added costs.

0.6.2 The results

The outcomes of the Scenario 1

Table 16 presents the simulation results for *Scenario 1.* The introduction of common external tariffs will be beneficial for the union members in terms of revenues associated with tariffs. Due to the larger increases in tariff rates for Armenia, Kyrgyzstan and Kazakhstan, we find that approximate respective increases in their tariff revenues by 41%, 56% and 43% in respective order. Russia and Belarus are the winners in this case. Because, it is decided to collect all the tariff revenues from all the members into one pool and redistribute them among members based on their weights (% share of each members, not by what each country collects) then it is clear that Russia (and at slightly lesser degree but still Belarus also) is better off in this situation.

In terms of the impacts on trade, there is trade creation for Russia (0.52%) and a trade diversion effect for the other members. Overall exports of Kazakhstan, Kyrgyzstan and Armenia, and overall imports of Belarus, Armenia and Russian will reduce by 2-5% implying that net trade is now negative, and trade creation within the union didn't compensated the losses from the loss of trade with the ROW for smaller members of the union. The reductions are mainly due to increase of trade barriers in tariffs toward non-member regions. Also to note that the changes in tariffs occur not only for the members but in a multilateral manner in our scenario – the non-members regions tariffs will be restructured which impacts of the results of trade also. Further, even if for some members which experienced larger change in tariff levels, yet their decision to trade depend on relative overall trade barriers (that include non-tariff costs) via the multilateral resistances. Net change in trade (including trade with non-member regions) only for Russia is positive although imports have reduced.

Despite the losses in trade with non-member regions and gains in tariff revenues, the results for consumer gains show that Belorussian and Kyrgyz consumers' welfare improves.

Table 15: Trade cost structure: "Bigger" vs "Smaller" states

	Bigger				**Smaller**		
	LEU-LEU	EAU-EAU	% diff.		SEU-SEU	EAU-EAU	% diff.
ARG	86.6	247.7	-65.0	ARG	194.3	247.7	-21.5
MNF	49.7	136.7	-63.7	MNF	95.9	136.7	-29.9
ALL	50.8	158.9	-68.0	ALL	100.2	158.9	-37.0
	LEU-REU	EAU-CIS			SEU-REU	EAU-CIS	
ARG	234.2	217.1	7.9	ARG	265.8	217.1	22.4
MNF	119.6	129.3	-7.5	MNF	162.0	129.3	25.3
SRV	127.7	142.1	-10.1	SRV	174.8	142.1	23.0
	LEU-ROW	EAU-ROW			SEU-ROW	EAU-ROW	
ARG	127.6	320.2	-60.2	ARG	343.8	320.2	7.4
MNF	81.8	301.3	-72.9	MNF	258.2	301.3	-14.3
SRV	72.7	320.1	-77.3	SRV	266.2	320.1	-16.8
	REU-REU	CIS-CIS			REU-REU	CIS-CIS	
ARG	245.3	235.2	4.3	ARG	245.3	235.2	4.3
MNF	153.5	156.0	-1.6	MNF	153.5	156.0	-1.6
SRV	170.7	163.2	4.6	SRV	170.7	163.2	4.6
	REU-LEU	CIS-EAU			REU-SEU	CIS-EAU	
ARG	234.2	217.1	7.9	ARG	265.8	217.1	22.4
MNF	119.6	129.3	-7.5	MNF	162.0	129.3	25.3
SRV	127.7	142.1	-10.1	SRV	174.8	142.1	23.0
	REU-ROW	CIS-ROW			REU-ROW	CIS-ROW	
ARG	318.9	308.8	3.3	ARG	318.9	308.8	3.3
MNF	265.1	305.5	-13.2	MNF	265.1	305.5	-13.2
SRV	277.4	324.4	-14.5	SRV	277.4	324.4	-14.5
	ROW-REU	ROW-CIS			ROW-REU	ROW-CIS	
ARG	318.9	308.8	3.3	ARG	318.9	308.8	3.3
MNF	265.1	305.5	-13.2	MNF	265.1	305.5	-13.2
SRV	277.4	324.4	-14.5	SRV	277.4	324.4	-14.5
	ROW-LEU	ROW-EAU			ROW-SEU	ROW-EAU	
ARG	253.0	320.2	-21.0	ARG	343.8	320.2	7.4
MNF	167.6	229.6	-27.0	MNF	244.0	229.6	6.3
SRV	172.4	239.7	-28.1	SRV	255.8	239.7	6.7

Table 16: The simulation results (scenario 1)

	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
Utility	-0.95%	0.15%	-0.87%	0.50%	-0.82%	-2.03%	-0.11%	1.03%	-1.11%	1.30%	0.19%
Capital earnings	-1.28%	-1.19%	0.54%	0.11%	-0.50%	-0.06%	-0.20%	0.30%	-2.29%	-0.34%	0.21%
Labour earnings	-2.05%	-2.08%	-1.08%	-1.04%	1.61%	-0.45%	-1.03%	11.93%	0.62%	0.00%	-0.14%
Tariff revenue	43.69%	56.58%	4.77%	2.80%	41.45%	4.71%	-0.67%	19.29%	-20.60%	2.99%	6.13%
Production	0.53%	-0.61%	0.40%	-0.72%	0.14%	1.79%	0.43%	-0.88%	1.90%	-1.08%	-0.61%
Imports	-1.09%	0.99%	-2.29%	-4.16%	-5.00%	-4.06%	-3.95%	-2.96%	-4.46%	-1.31%	4.30%
Exports	-7.75%	-4.88%	9.30%	-1.97%	-7.76%	6.47%	1.06%	-6.93%	1.77%	-3.04%	-2.88%
Sectoral Production	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
1GC	1.1%	-0.1%	-1.6%	-11.5%	-1.7%	2.6%	2.9%	4.9%	4.9%	5.6%	5.9%
2ML	1.4%	-1.4%	-0.1%	2.9%	-1.3%	3.3%	-0.1%	-0.9%	7.3%	1.8%	11.4%
3EX	-6.5%	-3.5%	8.6%	-0.1%	-2.4%	2.6%	-0.9%	-13.5%	-8.1%	-1.3%	-5.6%
4PF	-0.4%	-0.9%	-0.6%	0.7%	-0.4%	6.2%	0.0%	-1.0%	0.9%	-2.8%	-4.1%
5TW	5.5%	1.6%	4.2%	2.7%	8.9%	3.8%	-0.4%	1.8%	-3.6%	0.6%	-1.6%
6LM	-1.3%	0.4%	-1.7%	0.1%	2.3%	1.1%	0.8%	0.3%	-5.0%	-5.8%	0.2%
7HM	-0.3%	2.2%	-1.6%	-1.4%	1.4%	1.8%	0.9%	3.3%	-2.0%	-0.4%	-2.3%
8UC	6.5%	-0.5%	-0.2%	-1.0%	2.6%	1.0%	3.9%	0.0%	-6.8%	-2.3%	-0.1%
9TC	3.2%	-1.2%	-0.2%	1.5%	-2.7%	2.2%	-0.2%	-1.8%	28.1%	-0.3%	5.2%
10OS	-1.3%	-3.3%	-2.1%	-2.2%	-1.3%	-0.3%	1.2%	-2.6%	17.4%	-2.3%	-2.9%
Sectoral Imports	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
1GC	-3.6%	-7.1%	3.1%	1.7%	0.9%	9.5%	0.8%	7.0%	3.7%	5.4%	0.6%
2ML	13.4%	15.1%	11.5%	-1.1%	13.0%	8.0%	15.3%	16.0%	13.6%	12.1%	-1.3%
3EX	-7.0%	6.9%	-11.0%	-4.9%	-12.2%	-7.0%	-12.7%	-12.5%	-5.3%	-4.2%	11.5%
4PF	-2.1%	0.4%	-3.3%	-1.5%	-0.5%	-2.3%	-3.2%	0.1%	-3.2%	0.3%	0.6%
5TW	2.6%	-4.1%	4.0%	-4.5%	-1.0%	-2.5%	-5.6%	-1.9%	-2.6%	-1.5%	-9.5%
6LM	9.0%	0.0%	2.5%	-0.7%	-2.2%	-2.3%	-4.0%	0.6%	-4.5%	0.7%	1.2%
7HM	-7.4%	-3.6%	-8.3%	-5.9%	-5.3%	-5.9%	-8.3%	-6.6%	-7.3%	-1.1%	-3.1%
8UC	-0.6%	-7.5%	-0.4%	-1.2%	-0.3%	-1.7%	-0.9%	-0.3%	-0.5%	0.0%	3.6%
9TC	-9.3%	18.2%	9.1%	11.8%	-6.8%	9.8%	35.3%	9.8%	-2.2%	-14.1%	2.2%
10OS	8.2%	-3.6%	-5.7%	-5.2%	-5.1%	-3.8%	-9.0%	-3.8%	-0.7%	-4.9%	1.4%
Sectoral Exports	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
1GC	0.4%	2.1%	1.0%	-16.7%	-1.6%	3.2%	-0.1%	3.8%	-0.3%	1.7%	4.2%
2ML	1.2%	-1.1%	-1.7%	-1.0%	-1.7%	4.1%	-0.2%	-0.5%	12.3%	-0.1%	14.9%
3EX	-10.3%	-0.6%	23.8%	0.2%	-2.1%	-0.1%	0.4%	-24.2%	-1.6%	0.1%	-12.7%
4PF	-0.5%	-0.2%	-0.7%	0.0%	-1.1%	7.1%	-0.3%	-1.7%	-2.8%	-3.0%	-4.4%
5TW	-10.2%	-6.3%	-12.7%	2.2%	-16.6%	7.9%	-2.1%	-3.9%	5.9%	-2.2%	-1.9%
6LM	-9.4%	-1.3%	-1.1%	-1.2%	-2.4%	12.7%	-0.2%	-0.9%	10.6%	-13.0%	3.5%
7HM	-6.0%	-9.5%	-4.6%	-2.9%	-17.6%	6.2%	4.6%	-8.0%	5.8%	-2.8%	-9.7%
8UC	13.4%	-0.8%	-0.6%	-2.1%	7.7%	2.4%	6.5%	-7.7%	-10.2%	-5.9%	-0.5%
9TC	-0.3%	-6.3%	0.5%	7.6%	-5.3%	4.8%	-0.8%	-5.8%	42.5%	-1.1%	8.6%
10OS	-2.9%	-5.4%	0.3%	-2.7%	0.0%	5.9%	2.3%	-0.4%	26.3%	-5.8%	-4.5%

Due to the increases in consumer prices for Kazakhstan and Armenia, and aggregate reductions of labour earnings in Russia reduces consumer utility by about 0.8% annually in those countries.

Aggregate production will be positive for Kazakhstan, Russia and Armenia at the rate of 0.43-0.78% annually. Growth in Kazakh production is mainly due to TW and UC sector, for Russia in TW and EX sectors, and for Armenia in TW and LM sectors. Belarussian production fell by 0.83% and this is mainly because of the reduction of its exports of agricultural products to non-member regions. Kyrgyz production will suffer with reductions of demand for goods of EX and OS sectors.

Regarding the net changes for non-member regions, the tariff revenues of Georgia enlarge by about 20 % while XCA revenues will drop by the similar rate. The ROW also increases its tariffs to the ECU members and receives some revenue (6.13%). Except AZE and XCA, the rest of the regions will reduce their trade with the EEU countries. The welfare of the majority of the non-member CIS countries will be reduced.

The outcomes of the Scenario 2a "even"

Further EU like restructuring of the NTBs will bring (relative to *Scenario 1*) bigger changes (see *Table 17*). Net import increase by 1-3 % for all the members, while net exports reduce for Belarus, Armenia and Kyrgyzstan significantly by 34%, 17% and 9% respectively .

With further reduction of NTBs, the revenues associated with rent-seeking NTBs also reduce and relative reductions are larger for Russia (-10%), Belarus (-29%) and Armenia (-21%).

Despite the losses in trade and the NTB revenues, the results for consumer gains are positive for all the members. Larger utility gains are for Kyrgyz and Belorussian consumers (by 6-7% in average), and at about 2% level for the other members. We record an increase in labor earnings for Armenia but in Kazakhstan wages will drop by 2.8%.

Aggregate production will be positive only for Armenia at 0.45% rate annually. Russian production will drop by average of 2% for all the sectors except EX sector. Larger production reductions in LM for Kazakhstan (-11%), in EX sector for Belarus and Armenia (-12%). Although Armenia manages to improve its production in LM and HM sectors, while Kyrgyzstan in UC (10.6%) sector.

Regarding the net changes for non-members, the tariff revenues will improve for Azerbaijan by 10.6% and Ukraine by almost 3%. All non-member CIS regions experience trade creation with the ROW.

Table 17: The simulation results (scenario 2a)

	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
Utility	3.2%	7.3%	2.3%	6.2%	2.4%	-0.8%	-3.3%	0.7%	-0.8%	-3.2%	3.3%
Capital earnings	0.1%	1.3%	0.4%	0.1%	1.2%	0.0%	-5.4%	-0.6%	0.1%	1.7%	0.8%
Labour earnings	-2.8%	0.8%	-0.6%	-0.9%	24.6%	2.5%	0.8%	-0.7%	-5.8%	0.0%	0.4%
Tariff revenue	-6.5%	-8.9%	-10.4%	-29.3%	-21.3%	2.9%	10.6%	2.6%	1.8%	2.1%	-3.1%
Production	-3.1%	-4.0%	-1.0%	-4.4%	0.5%	0.6%	-3.3%	-1.4%	1.4%	7.4%	-1.8%
Imports	1.2%	3.6%	2.6%	1.8%	2.1%	-5.0%	-3.4%	-1.7%	-4.5%	-5.6%	-7.0%
Exports	3.6%	-9.0%	0.9%	-34.2%	-17.0%	4.4%	-7.4%	-0.3%	-0.3%	4.4%	1.5%
Sectoral Production	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
1GC	-4.8%	-4.0%	-2.2%	0.3%	0.3%	3.1%	26.2%	1.8%	0.9%	2.4%	-0.5%
2ML	-3.6%	-3.1%	-2.1%	-2.2%	0.4%	2.6%	31.1%	-0.9%	0.4%	2.0%	-1.0%
3EX	1.4%	4.3%	2.0%	-13.8%	-11.8%	3.7%	-16.8%	-0.4%	3.3%	42.6%	-3.2%
4PF	-6.3%	-5.6%	-4.2%	1.3%	-0.3%	2.9%	15.9%	2.9%	3.3%	4.7%	-0.5%
5TW	2.0%	1.9%	-1.1%	2.5%	3.5%	-1.9%	-5.8%	-2.9%	-1.5%	3.2%	-2.5%
6LM	-11.5%	-3.2%	-2.3%	-2.7%	17.2%	-4.0%	0.0%	0.2%	4.4%	-1.8%	-3.4%
7HM	-3.7%	-6.6%	-4.2%	-21.7%	14.4%	-1.3%	-1.1%	-2.6%	0.2%	-1.6%	2.0%
8UC	-5.6%	10.6%	3.1%	8.3%	-0.8%	-5.3%	9.3%	0.7%	0.5%	23.6%	-3.4%
9TC	-0.4%	-7.5%	-2.7%	5.9%	-7.7%	6.5%	12.8%	-8.9%	0.5%	8.4%	-4.0%
10OS	-5.4%	-40.7%	-0.6%	-0.6%	3.9%	2.7%	9.5%	0.8%	1.2%	-3.8%	-2.1%
Sectoral Imports	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
1GC	0.7%	3.5%	0.9%	3.2%	1.7%	-1.8%	-9.8%	-2.5%	-4.5%	-3.2%	-0.2%
2ML	1.0%	1.2%	2.5%	3.0%	-0.6%	-5.0%	-1.6%	-1.4%	-1.6%	-3.5%	-1.2%
3EX	2.8%	10.5%	1.2%	2.0%	-4.3%	-1.2%	-2.6%	-2.3%	-3.9%	-0.7%	-2.2%
4PF	-4.3%	3.2%	1.7%	1.1%	2.3%	-3.9%	-6.7%	-1.5%	-5.7%	-4.4%	-2.3%
5TW	5.4%	4.7%	11.3%	0.2%	4.9%	-2.9%	-17.6%	-0.1%	-4.0%	-1.9%	-13.6%
6LM	-0.7%	1.6%	3.3%	0.1%	0.8%	-10.5%	-5.0%	-2.4%	-14.3%	-5.2%	-12.1%
7HM	1.3%	3.7%	1.6%	2.3%	6.5%	-5.4%	-0.7%	-1.1%	-1.3%	-9.3%	-12.4%
8UC	3.8%	-0.1%	2.2%	2.3%	1.0%	11.7%	-2.0%	-1.3%	-1.3%	-2.2%	-6.1%
9TC	1.3%	1.2%	0.8%	1.6%	-0.3%	-2.6%	-2.8%	-3.0%	-3.0%	-3.2%	-10.4%
10OS	1.5%	1.2%	1.0%	1.7%	-0.3%	-2.5%	-2.7%	-2.9%	-2.9%	-3.1%	-11.7%
Sectoral Exports	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
1GC	0.1%	-2.4%	-1.7%	2.3%	4.1%	3.6%	-10.7%	0.1%	-3.6%	3.7%	0.0%
2ML	0.9%	-7.8%	-1.6%	-0.1%	-0.1%	2.5%	17.0%	0.0%	0.3%	-0.3%	0.2%
3EX	7.9%	-2.5%	18.4%	18.7%	17.0%	-7.7%	-13.2%	-3.0%	-1.6%	-6.5%	-0.4%
4PF	0.5%	2.7%	-4.2%	4.0%	0.3%	2.6%	-0.4%	1.9%	-8.9%	2.7%	0.5%
5TW	-8.2%	-3.3%	-19.7%	3.8%	-13.5%	11.3%	30.3%	13.4%	4.3%	12.1%	1.7%
6LM	-1.1%	12.1%	-16.8%	-6.5%	20.8%	1.1%	9.9%	15.5%	6.3%	-1.2%	1.1%
7HM	0.0%	6.6%	-15.1%	-51.3%	-54.1%	4.0%	16.2%	3.7%	-2.7%	-4.9%	2.8%
8UC	-17.9%	-3.2%	-6.0%	-3.1%	2.2%	-0.1%	23.3%	1.1%	4.5%	65.6%	1.4%
9TC	-18.1%	-26.3%	-16.6%	1.1%	-17.4%	15.7%	27.9%	-13.0%	6.5%	22.5%	-0.2%
10OS	-23.1%	-66.1%	-15.5%	-16.7%	-0.6%	9.6%	2.5%	-1.3%	8.3%	3.4%	0.1%

Table 18: The simulation results (scenario 2b)

	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
Utility	0.1%	0.4%	4.4%	0.2%	1.3%	-2.1%	1.1%	0.9%	-1.8%	1.1%	2.7%
Capital earnings	-1.4%	-1.7%	-0.2%	0.2%	-0.5%	-0.1%	-1.2%	0.3%	-2.3%	-0.3%	0.8%
Labour earnings	-1.1%	1.6%	-1.3%	-1.1%	8.8%	-0.5%	-1.2%	11.6%	-0.1%	0.0%	0.2%
Tariff revenue	42.8%	61.9%	-7.7%	1.3%	42.0%	6.1%	3.7%	22.5%	-18.6%	7.3%	4.2%
Production	-2.01%	-3.50%	-3.58%	-0.81%	-1.08%	1.43%	0.09%	-0.98%	2.33%	-1.44%	-2.06%
Imports	-2.64%	0.77%	5.59%	-5.93%	-6.84%	-7.54%	-6.07%	-4.71%	-6.81%	-4.59%	1.66%
Exports	0.56%	-2.57%	8.05%	-1.82%	-7.63%	8.14%	-0.47%	-4.81%	0.56%	0.42%	1.34%
Sectoral production	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
1GC	-0.1%	-3.4%	-6.0%	-10.4%	-2.1%	3.2%	11.0%	6.4%	6.2%	5.5%	4.5%
2ML	-1.4%	-6.4%	-6.0%	2.0%	-1.7%	3.5%	4.6%	-1.0%	8.3%	2.5%	9.2%
3EX	-5.9%	-1.2%	2.2%	-0.4%	-12.3%	3.0%	-5.1%	-14.5%	-7.6%	-5.4%	-8.6%
4PF	-4.4%	-5.6%	-8.0%	1.0%	3.0%	7.5%	1.5%	0.3%	1.7%	-1.5%	-7.3%
5TW	1.4%	-1.7%	-6.1%	5.3%	9.6%	1.4%	-0.1%	0.4%	-4.8%	2.2%	-3.6%
6LM	-9.7%	-1.0%	-8.0%	0.1%	2.6%	0.2%	-8.0%	1.0%	-3.5%	-5.0%	-1.1%
7HM	-3.2%	-9.1%	-7.3%	-1.4%	8.8%	1.0%	0.0%	4.5%	-1.9%	1.9%	-1.1%
8UC	0.4%	3.2%	-7.8%	-0.8%	-2.1%	1.0%	9.7%	0.3%	-5.7%	-4.1%	-2.5%
9TC	-3.7%	-6.3%	-5.2%	0.8%	-5.1%	2.5%	2.9%	-3.0%	28.2%	-0.5%	3.1%
10OS	3.9%	-8.1%	3.6%	-3.4%	-2.1%	-2.2%	5.4%	-3.4%	16.2%	-4.6%	-5.0%
Sectoral Imports	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
1GC	-4.7%	-6.8%	11.2%	0.2%	-0.8%	6.9%	-3.7%	4.1%	0.2%	2.6%	-2.7%
2ML	10.4%	12.5%	20.7%	-1.9%	9.7%	2.9%	12.8%	12.8%	10.3%	8.8%	-4.9%
3EX	-8.7%	6.6%	-5.5%	-8.0%	-16.7%	-11.0%	-15.4%	-15.4%	-4.6%	-6.6%	8.5%
4PF	-7.2%	2.5%	2.3%	-3.5%	-2.1%	-7.3%	-7.1%	-2.4%	-8.8%	-3.7%	-2.7%
5TW	3.8%	9.1%	9.2%	-1.0%	-1.5%	-3.8%	-5.8%	-3.0%	-3.7%	-3.1%	-5.1%
6LM	8.2%	0.6%	11.9%	1.3%	-2.1%	-5.9%	-7.0%	-0.6%	-7.7%	-1.1%	2.8%
7HM	-9.0%	-4.4%	-0.5%	-7.5%	-6.4%	-9.2%	-9.2%	-7.7%	-8.8%	-5.4%	-5.0%
8UC	-1.2%	-7.9%	8.4%	-3.0%	-2.2%	-5.3%	-2.9%	-3.0%	-2.1%	-3.2%	-2.8%
9TC	-10.0%	16.7%	18.6%	9.8%	-8.7%	7.6%	33.0%	7.5%	-4.3%	-16.2%	-4.9%
10OS	4.9%	-6.7%	0.2%	-8.8%	-8.9%	-7.7%	-12.5%	-7.8%	-4.7%	-9.1%	1.7%
Sectoral Exports	2KAZ	3KRG	4RUS	6BLR	7ARM	5UKR	8AZE	9GEO	10XCA	11MDA	1ROW
1GC	4.2%	-0.9%	-3.1%	-16.5%	0.9%	4.4%	0.4%	4.4%	-3.1%	0.8%	7.1%
2ML	4.4%	-10.0%	-5.7%	-1.0%	-4.5%	5.0%	-0.6%	-0.2%	13.5%	-0.5%	17.3%
3EX	0.0%	16.1%	25.9%	3.0%	-0.6%	1.3%	-2.4%	-23.7%	-6.8%	-0.1%	-8.8%
4PF	8.5%	6.5%	-5.6%	1.0%	1.4%	9.0%	2.7%	-1.0%	-6.5%	-0.4%	-4.5%
5TW	-12.4%	-12.4%	-7.7%	5.3%	-15.8%	8.5%	37.7%	0.1%	6.5%	4.4%	-2.3%
6LM	0.8%	52.5%	-0.8%	-0.9%	-1.4%	15.8%	2.2%	5.9%	22.7%	-7.1%	9.2%
7HM	2.2%	2.3%	-8.7%	-3.1%	-15.4%	7.9%	8.8%	-4.2%	7.7%	2.1%	-4.8%
8UC	3.1%	-3.3%	-7.6%	-2.1%	-5.7%	4.1%	6.9%	-6.8%	-6.6%	-13.1%	5.7%
9TC	-16.5%	-15.4%	-9.0%	7.1%	-9.1%	7.5%	2.2%	-4.8%	48.3%	1.9%	13.8%
10OS	0.0%	-15.4%	0.7%	-3.8%	-0.9%	3.1%	3.1%	-0.4%	29.2%	-6.1%	-2.0%

The outcomes of the Scenario 2b "uneven"

In this scenario, asymmetry is assumed with a bias of net gains in favor of Russia. Thus, Russia declines its NTBs slightly and receives the revenue from rent-seeking NTBs by 7% less; while for Kyrgyzstan, Kazakhstan and Armenia those barriers will be reduced significantly and their revenues therefore increases by 42-61%. If the revenues from rent-seeking NTBs will be distributed in the bases of the "weights" then Russia and, at lesser degree, Belarus are the winners (see *Table 18*).

In terms of impact on trade, Russia gains as its export volume increases (by 8%) as in its imports (by 5.5%). Except slight improvement in Kazakh export and Kyrgyz imports, the net trade for smaller members is negative. Trade of Armenia reduces by 6-7 %, Belorussian

import by 5.9%, Kazakh import and Kyrgyz export by average of 2%.

Despite losses in trade , welfare of consumers of member regions will improve, however mainly Russian. Utility for Russia increases by 4.4%, Armenian by 1.3% and at level of 0.1-0.3% for the rest of the members.

Negative aggregate changes in production side of the member regions in several sectors. For Kazakhstan, reductions are in almost all sectors except UC and TW. Armenia will experience output expansion in PF, TW, LM and HM, and Belarus in sector of ML (2%) and TW (5%). 5-8% reductions for Russia industries excepts EX (+2.2%) and OS (3.6%) sectors.

The net changes for non member regions, the tariff revenues changes are at similar level as they were in *Scenario 2a* where now Georgia enlarge by about 22 % while XCA revenues will drop by -18%, the ROW also increases its tariffs to the ECU members and receives some revenue (4.2%). The regional non-member countries will experience reductions in their trade but export and import of the ROW will improve by 1.3-1.6%.

0.7 Conclusion

From the study we draw two main conclusions that, firstly, the impact of deeper integration (future coming policy changes) will be larger than the impact of shallow integration (policy changes until the current period), and, secondly, the gains from the integration shrink for smaller members if bigger member(Russia) exercise its bargaining power.

The impact of *"deeper"* integration of the Eurasian Bloc of countries will have a larger impact compared to *"shallow"* integration. The changes throughout major indicators are much higher in *Scenario 2a* and *2b* (i.e. deeper integration scenarios) compared to the respective changes in indicators of *Scenario 1* (i.e. shallow integration). Technically speaking, this is due to (1) the larger share of non-tariff barriers in the trade costs, relative to tariff ones; (2) the assumption that in scenario 1 only tariff changes occur, while in further scenarios non-tariff barrier changes.

The gains from integration shrink for smaller members if bigger member(s) exercise its bargaining power. This can be observed from comparison of outcomes of *Scenario 2a* (equal treatment of members and no bias toward Russia) and *Scenario 2b* (unequal treatment of members with bias toward Russia). The results of *Scenario 2b* show that the indicators for Russia improve while the indicators for smaller members become worse, comparing to the respective indicators for the members in *Scenario 2a*. This suggests that if Russia will exercise its bargaining power and influence decisions of supranal institutions/smaller members for its own use then this will cause an unequal distribution of gains in favor of Russia. The EEU is a modern and far-reaching attempt at economic integration, but one that is weakened by internal and conceptual contradictions. What was designed as a

geo-economic framework is increasingly becoming a geopolitical issue. In attempting to counter the influence of the EU's alternative integration regime (the Eastern Partnership), Russia has shifted its diplomacy from persuasion to coercion, and Moscow is increasingly resorting to using the EEU as a foreign policy tool. The countries of the *entredeux* – literally, something placed between two things – are being forced to face to a geopolitical choice they had been trying to avoid, or at least to defuse. Divisive domestic politics, separatism, structural dependencies and the economic and political calculations of internal actors are key factors mediating and complicating their choice.

There are some limitations and caveats that this study consider as areas for the future research. Firstly, this study doesn't take into account all the possible policy changes which is partially explained by the fact that there is yet uncertainty about what specific policies will be undertaken during deeper integration of EEU region. Moreover, this study doesn't consider the impact of Russian WTO assessment in 2012, or the impact of Western sanctions toward Russia, which impact on the wellbeing of Russia and the existing EEU members as at macro and at micro level negatively. Although our results capture the impact of enlargement of the union with Kyrgyzstan and Armenia as the next joiners.

In this study, unlike previous studies we find, we introduce two assumption related to modelling non-tariff barriers and multilateral changes in trade costs. CGE studies we find normally assume that non-tariff barriers are protective measures, and there is no revenue is received by official bodies of countries that impose the measures and thus, any revenue from non-tariff measures will be dissipate. However, some non-tariff barriers are imposed for rent seeking purposes too like licensing cost, for instance. Some studies (Racine [79], Maliszewska et al. [65]) also argue that some part of NTBs is imposed for rent-seeking purposes in the CIS region. Besides, tariffs and NTBs are seen as substitutes rather than complements meaning that NTBs can be also viewed as tariffs, though perhaps not all NTBs. Kee et al. [54] run regressions by controlling for country and product fixed effects, and results shown that tariffs and NTBs are substitutes to each other. For this reasons, unlike previous CGE studies, in our simulations we assumed that part of NTBs are rent-seeking. However, our split of NTBs into rent-seeking and non-rent parts based on proxies from Fugaza et al. [36]. We haven't exclusively dealing with introducing measuring techniques of the parts of NTBs, and besides there is no clear data exist for appropriate further decomposition into the rent and non-rent parts of the costs. It will be interesting to see new studies that could offer new methods or databases with the measures.

Another distinguishing point of this study is that the assumption about policy change considered in simulations not only of the EEU region or in all regions in the model. This is possibly a new feature, too, of this study. Usually, the CGE studies to analyse the impact of a certain policy change in a certain region no assumptions made about policy changes in all other regions. However, any economic relations (export, import etc.) in a CGE model

are bilateral (if only two regions) or multilateral (if more than two regions), therefore, policy changes also occur in bilateral/multilateral manner too. While, for instance, region A changes its policy toward regions B and C, as a response, the B and C regions also change their policies toward region A as each country consider optimal position which can change due to the course of policy development in other regions too. Of course, CGE is a "forward looking" method, it is usually difficult to make assumptions about "responses" of other regions toward region which is undertaking a certain reform. However, in all of our scenarios, we provide multilateral policy changes, not only in the EEU region. This was possibly for us to do as we had actual data on changes in tariff structure not only of EEU members, but also of other regions in the model. Unlike the studies that provided a "pure" impact of external tariff changes, by taking into account tariff changes in non EEU regions, our scenario 1 provide with more realistic impact of "shallow" integration. In scenarios of deeper integration, non-tariff trade cost structure also change in multilateral manner based on results of current trade cost structure of the EU. Possibly, there no guarantee that EEU integration would proceed in the same way the EU developed, and changes in the course of deeper integration might go in some other way.

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Appendix: CGE model structure

The CGE model we use for this study has been developed by Dr Huw Edwards and previously employed in Edwards ([22, 24]). In this study we modify the CGE model by aggregation and classification of regions, sectors and factors. This model based on an imperfectly competitive market structure of a Dixit-Stiglitz style. Based on Dixit and Stiglitz [19], in this model, we assume that a sector, i, contains a large number of goods

produced by firms competing in the same market in the various regions. Each commodity, g, is produced in one country, c, only. *Section* 3.3 outlines the theoretical framework of this type of model. The assumption is that various types of commodities produced within each region and sector, $n_{c,i}$, is immobile. The advantage of the framework of the model is that it allows us to model monopolistic markups which is impossible in Armington setup. There are two types of factors of production in the model, namely, capital and labor. Capital is mobile between regions but labor only within each region. The produce price of each commodity contain production costs and a markup, but before each commodity will be used for the final consumption, it will also constant some trade costs. Therefore, we introduce trade costs (proxied with the method previously described in *Section 3.4*) in a "price-wedge" form, instead of traditional transport margins. There are three types of trade costs, namely, transportation, policy and value added costs where part of policy costs are distinguished as "rent-seeking" costs that generate revenue for official bodies of each region in the model (i.e., import tariffs, licensing etc.) and the rest of the costs are modelled as "resource" costs meaning that any revenue from such costs will dissipate. The rest of this section provide with mathematical description of our model.

Notation used to denote dimension of each variable in the structure below: $c(g)$ for commodities (there is 10 aggregate type of commodities), $s(i)$ sectors (same number as commodities, i.e., 10 sectors), and $r(c)$ stand for regions (there is 11 regions).

Commodity Production. The value added production function of each firm is formed from labor and capital inputs and modelled in a standard Cobb-Douglas function:

$$VA_c = \theta_{r,s} L_c^{(1-\beta_{r,s})} K_c^{\beta_{r,s}}, \tag{12}$$

where VA is value added (quantity), L is labor and K is capital. θ is a scale parameter and β is a share parameter. We do not provide further distinction between types of labor and capital for simplification purposes of our analysis. The cost of all inputs is, as normally for a benchmark, assumed to equal to 1 for any firm of any region. To obtain an equation for the whole sector s in region r, we assume all firms commodity c within s in a given region, r, are identical in terms of cost, inputs, output and market share. We also choose units so that $\theta_{r,s} = 1$. Differentiating (12) with respect to K and L and setting value of marginal products equal to the wage rate and capital return rate gives

$$L_{r,s} = VA_{r,c} PV_{r,s} \beta_{c,i} (1 - \beta_{c,i}) / W_r, \tag{13}$$

$$K_{r,s} = VA_{r,s} PV_{r,s} \beta_{r,s} / R_{r,s}, \tag{14}$$

where W denote the wage rates for labour, and R denotes return on capital. Labour is assumed to be mobile between sectors, but not between regions, so that wage rates are equal across sectors. Land is sectorally immobile, while capital is mobile between sectors in each region (for benchmark case) and internationally between regions (in counterfactual case). Hence, we fix R within each region:

$$R_{r,s} = RB_r. \tag{15}$$

The price of value added is given by

$$PV_{r,s} = (W_r L_{r,s} + R_r K_{r,s})/VA_{r,s}. \tag{16}$$

At the top nest of production, the output of commodity of sector s is produced by a combination of other sectors' commodities ss, and value added, VA. This is done again using a Cobb-Douglas production function

$$Y_{r,s} = \Omega_{r,s} VA_{r,s}^{\alpha v_{r,s}} \prod\nolimits_{ss} II_{r,ss,s}^{\alpha I_{r,ss,s}}, \tag{17}$$

where Y is top level output, II is the input of commodity of other sectors ss into the commodity of sector s and the α coefficients are input shares which sum to unity. Cost-minimisation exercises gives inputs:

$$II_{r,ss,s} = \alpha I_{r,s} Y_{r,s} PY_{r,s}/PU_{r,ss,s}, \tag{18}$$

where PY is the unit output price and PU is the unit input price, and

$$VA_{r,s} = \alpha v_{r,s} Y_{r,s} PY_{r,s}/PV_{r,s}. \tag{19}$$

The marginal cost, PPY, of producing output, Y, is derived from the input costs per unit output:

$$PPY_{r,ss} = (VA_{r,ss} PV_{r,ss} + \sum\nolimits_s II_{r,s,ss} PU_{r,s})/Y_{r,ss}. \tag{20}$$

Trade and the commodity aggregation. We assume that in each region we have one aggregate consumer,who obtains utility by aggregate consumption of commodities using a two-level nested utility function: lower nest consumption, the different varieties of commodities within sector s are aggregated using a Dixit-Stiglitz utility function. Then at the top nest consumption, the aggregate commodities bundle for each sector, s, are combined to provide aggregate utility using a Cobb-Douglas utility function. The total demand in region r for produce of sector s is denoted as $TU_{r,s}$. This is an aggregate bundle of all the commodities, c, which belong to sector s, using a Dixit-Stiglitz demand

function:

$$TU_{r,s} = (\sum_{c} \gamma_{c,r} U_{c,r}^{\rho})^{1/\rho}, \tag{21}$$

where $U_{c,r}$ is use of commodity c in region r and γ is a parameter reflecting qualitative factors (e.g. compatibility of standards) and home bias in consumption. ρ is a substitution parameter, where $\rho = (\sigma - 1)/\sigma$, where σ is the elasticity of substitution between commodities c in sector s (assumed to be the same in all regions and across sectors).

If we assume there are $n_{rr,s}$ firms in region rr making commodity in sector s, and that the γ preference parameter depends only on region of origin, rr, region of use, r, and sector, s, then we can rewrite (21) in order to sum, first, the different commodity varieties of sector s, $c \in (rr \bigcap s)$, which are produced in region ss (which all carry the same γ preference parameter), and then to sum across regions:

$$TU_{r,s} = (\sum_{rr} \sum_{c \in (rr \bigcap s)} \gamma_{cc,c,i} U_{g,c,i}^{\rho})^{1/\rho}. \tag{22}$$

The assumption that all firms within an industry/country are identical in size allows us to rewrite (22) in terms of the total purchases of goods class i by country cc from country c, $QU_{i,c,cc}$ and the total number of firms in that industry in producing country i:

$$TU_{cc,i} = (\sum_{c} n_{ci} \gamma_{i,c,cc} (QU_{i,c,cc}/n_{c,i})^{\rho})^{1/\rho}, \tag{23}$$

where c is a CES share parameter, and ρ is an elasticity-related parameter, related to the elasticity of substitution σ by the formula:

$$\rho = (\sigma - 1)/\sigma. \tag{24}$$

Total expenditure in region rr on commodity in sector s (by final consumers and intermediate users) is calculated by summing final user price multiplied by the volume for all commodity c in sector s.

$$VU_{rr,s} = \sum_{r} QU_{s,r,rr} PUU_{s,r,rr} \tag{25}$$

This is then used to compute the price of PU of the aggregate bundle TU:

$$PU_{rr,s} = VU_{rr,s}/TU_{rr,s}. \tag{26}$$

Top nest of Consumption. Consumers' earnings are divided between the different sectors s in order to maximise their utility which represented with a Cobb-Douglas utility function

$$UT_r = \prod_s CN_{s,r}^{\beta c_{s,r}}, \tag{27}$$

where UT is utility and CN is consumption of produce of sector s in region r by final consumers (in other words, after deducting intermediates use). The βc coefficients are expenditure shares, and sum to 1. Consumers' expenditure on each sector, s, $CN_{s,r}$ can be computed relatively easily from the Cobb-Douglas property that $\beta c_{s,r}$ is the share of expenditure on i in total consumers' expenditure in region r, CE_r. Hence:

$$CN_{s,r} = \beta c_{s,r} CE_r / PU_{r,s}. \tag{28}$$

The derivation of total consumers' expenditure is explained below.

Competition and pricing. In a Dixit-Stiglitz model, firms are monopolistic competitors. We assume in this model that each firm produces one commodity, and the commodities are symmetrically competitive, with a constant elasticity of substitution between all commodities in a sector consumed in one region. The own-price elasticity of demand facing a firm is derived as follows: (1) If the own price elasticity for the aggregate produce of a sector s is η_s, and if competitors do not change their prices in response to firm, c, changing its price (Bertrand-Nash equilibrium), then the own-price elasticity facing company c would be $\sigma + S_c(\eta_s - \sigma)$, where η_s is the top-level elasticity of substitution between commodities c, and S_c is the value share of firm c in demand for sector s. If S_c is small (i.e., n is large) the own price elasticity would be approximately equal to σ; (2) Within export markets, it is assumed that a firm has a very small market share and so its own-price elasticity is σ; (3) By contrast, in the home market region r, the firm's market share $S_{c,r}$ is assumed to be significant. It is computed as $S_{c,r} = (1/n_{r,s})(1 - SM_{r,s})$, where $SM_{r,s}$ is the share of imports in consumption of commodity of sector s in region r. Since the top level of the consumption function (where different sectors' products are aggregated) is a Cobb-Douglas function in our model, the own price elasticity for the aggregate product of sector s, $\eta_s = 1$. Consequently, the firm's own price elasticity in the home market:

$$\eta h_{r,s} = \sigma + (1/n_{r,s})(1 - SM_{r,s})(1 - \sigma), \tag{29}$$

where, if HU denotes consumption from domestic suppliers and $PT_{s,r,rr}$ is the price at which it sells (including taxes), then

$$SM_{r,s} = 1 - HU_{r,s} PT_{s,r,rr} / VU_{r,s}. \tag{30}$$

4) The overall own price elasticity for a firm's sales is taken as a weighted average (by sales) of its own-price elasticity in the home and export markets.

$$\eta o_{r,s} = \eta h_{r,s}(HU_{r,s}/Y_{r,s}) + \sigma(Y_{r,s} - HU_{r,s}/Y_{r,s}) \tag{31}$$

5) We assume that the number of firms is fixed, we fix the value of ηo_{ci} too. Monopolistic competition markups: it is assumed that the firm marks up its production costs by a proportion $MM_{r,s}$, where

$$MM_{r,s} = 1/(1 - (1/\eta o_{r,s})) - 1 \tag{32}$$

The price of commodity c including monopoly markups is therefore:

$$PM_{r,s} = PY_{r,s}(1 + MM_{r,s}) \tag{33}$$

It is assumed that no monopoly margin is charged on import tariffs (the justification being that importer-region can buy the commodity in another region if the manufacturer starts price discrimination between markets).

Resource costs. There are three type of resource costs in the model, namely, transport, policy and value added costs. By resource costs it meant the costs that are dissipate and bring no revenue to official bodies of each region. The costs are measured using actual bilateral trade flows with inverted gravity method, and introduced exogenously. Thus, the output price in international trade enlarge by some value of resource costs that associate with transportation, policy restrictions and value addings on commodity of sector s from region r to sell in region rr is

$$PTR_{s,r,rr} = PM_{r,s}(1 + Trans_{s,r,rr} + SNTB_{s,r,rr} + VAC_{s,r,rr}), \tag{34}$$

where $Trans_{s,r,rr}$ is the transport and other distance related cost, $SNTB_{s,r,rr}$ are non-tariff policy barrier related resource costs, $VAC_{s,r,rr}$ is value added cost (that occur through reselling, distribution, advertising and other work by other firms that provide additional work and add extra value on top of the cost of traded commodities.

Rent-seeking costs. We have two types of rent-seeking costs: tariff and non-tariff policy costs. By rent seeking costs we mean the costs associated with policies used by the official bodies of each region to restrict or motivate trade but at the same time those costs are paid costs by traders and bring some real revenue to the budget of each region that import the policies. Tariffs on imports of sector s from region r into region rr are expressed as a percentage rate. Consequently, the price including resource and rent-seeking costs is

$$PT_{s,r,rr} = PTR_{s,r,rr}((1 + trf_{s,r,rr} + RNTB_{s,r,rr})/100). \tag{35}$$

The price above is also the price of produce of sector s from region r consumed in region rr, $PUU_{s,r,rr}$, that include taxes on use of s in rr, which applies to both domestically-produced and imported varieties. Hence, the price facing consumers is

$$PUU_{s,r,rr} = PT_{s,r,rr}. \tag{36}$$

Exports. We define consumption (final and intermediate) in region rr of commodity of sector s produced in region r as

$$QU_{s,r,rr} = X_{s,r,rr}/(1 + Trans_{s,r,rr} + NTPB_{s,r,rr} + VAC_{s,r,rr}) \; if \; rr \neq r \; or \; HU_{s,r} \; if \; rr = r, \tag{37}$$

where $X_{s,r,rr}$ is the corresponding volume of exports, and $(Trans_{s,r,rr} + NTPB_{s,r,rr} + VAC_{s,r,rr})$ is the proportion which 'melts' (to use the iceberg analogy) en route between the regions. The equation for aggregating QU within each sector, equation (23), has already been explained.

Total Use and Sales shares. We then differentiate (23), setting price equal to marginal utility, to calculate $QU_{s,r,rr}$ as a function of total use of products of sector s in region rr, $TU_{cc,i}$ and the relative price of input of s from region rr, $PUU_{s,r,rr}$ compared to that of aggregate use of s in region rr, $PU_{rr,s}$. Hence, taking

$$TU_{rr,s} = (\sum\nolimits_r n_{r,s}\gamma_{s,r,rr}(QU_{s,r,rr}/n_{c,i})^{\rho})^{1/\rho}, \tag{38}$$

we differentiate with respect to QU, and set the resulting marginal product equal to PUU/PU, giving

$$dTU_{rr,s}/dQU_{s,r,rr} = n_{r,s}^{1-\rho}\gamma_{s,r,rr}QU_{s,r,rr}^{\rho-1}(\sum\nolimits_r n_{r,s}\gamma_{s,r,rr}(QU_{s,r,rr}/n_{r,s})^{\rho})^{(1-\rho)/\rho}, \tag{39}$$

$$= n_{r,s}^{1-\rho}\gamma_{s,r,rr}(TU_{rr,s}/QU_{s,r,rr})^{1-\rho} = PU_{rr,s}/PUU_{s,r,rr}. \tag{40}$$

.

This is easily rearranged:

$$QU_{s,r,rr} = TU_{rr,s}n_{r,s}(\gamma_{s,r,rr}PU_{rr,s}/PUU_{s,r,rr})^{1/(1-\rho)}. \tag{41}$$

Aggregate consumer price. The total value of expenditure on commodity s in region r is given by

$$VU_{rr,s} = \sum_r QU_{s,r,rr} PUU_{s,r,rr}. \tag{42}$$

The aggregate consumer price ofr s in rr,

$$PU_{rr,s} = VU_{rr,s}/TU_{rr,s}. \tag{43}$$

Factor markets. Labor is immobile between regions, but mobile between sectors within each region. The wage is assumed to clear each labor market, so that total labor use by all sectors equals the labor endowment of region r

$$LU_r = \sum_s LU_{r,s}. \tag{44}$$

Capital is fully mobile between sectors. A further assumption is that capital is fixed to each region for short run period (i.e., when shallow integration such as formation of the customs union) and mobile internationally in the long run period (i.e., when deeper integration occur with formation of the Eurasian Economic Union and harmonization of non-tariff barriers occur). Hence

$$K_r = \sum_s Ki_{r,s}. \tag{45}$$

Where K_r is allowed to be zero in the short run and non-zero (so that there are international transfers of capital) the global total of K is set to zero.

$$\sum_r K_r = 0. \tag{46}$$

The rate of return on capital in each sector is equated to the national rate of return, RB_r:

$$R_{r,s} = RB_r. \tag{47}$$

Variety of goods. The model assumes that all commodities within a sector are produced by separate firms. Each firm within a region is of identical size, though the average company size may vary between regions. For sensitivity analysis, the fixed firm numbers version of the model assumes the total number of firms in each country is fixed,

$$n_{r,s} = n_{r,s}. \tag{48}$$

National accounts. Home use of commodities from sector s in region r, $HU_{r,s}$, is defined as total production in region r less exports.

$$HU_{r,s} = Y_{r,s} - \sum_{rr} X_{s,r,rr}. \tag{49}$$

Imports of s from region rr to region r are equal to exports from rr to r deflated to take account of resource costs. Where $r = rr$ (i.e., the variable $IDEN_{r,rr}$ equals 1), total use of commodity s in region r produced in region rr equals home use. Otherwise (when $IDEN_{r,rr}$ equals 0), total use equals imports from rr to r. As mentioned earlier, there are two sources of rent via policy: use tariffs and non-tariff measures used by exporter-region and importer-region in international trade. Revenue from the sources is given by

$$TUY_r = (\sum_s HU_{r,s} PT_{s,rr} + (\sum_{rr} PT_{s,rr,r} EX_{s,rr,r}/(1 + Trans_{s,r,rr} + \tag{50}$$

$$+SNTB_{s,r,rr} + VAC_{s,r,rr}))(1 + trf_{s,r,rr} + RNTB_{s,r,rr}).$$

Total consumer expenditure in region r, CE_r, is taken as equaling value added from all sectors in C

+ monopoly profits from all sectors in region r

+ total revenue from imposement of "rent-seeking" measures in region r

- total subsidies

- the trade balance of region r (assumed to be constant and exogenous)

- interest on net capital imports paid at the world rate.

Hence,

$$CE_r = \sum_s VA_{r,s} PV_{r,s} +$$

$$+\sum_{ss} \sum_s II_{r,s,ss} PII_{r,s,ss}$$

$$\sum_s \sum_{rr} EX_{s,rr,r} PT_{s,rr,r} \, (trf_{s,r,rr} + RNTB_{s,r,rr})$$

$$-BOT_r - \sum_s \sum_{ss} II_{r,s,ss} PII_{r,s,ss}. \tag{51}$$

The Balance of Trade, BOT_r, (including long-term net capital payments) is represented as

$$BOT_r = \sum_s \sum_{rr} EX_{s,r,rr} PM_{r,s} - \sum_{rr} EX_{s,rr,r} PM_{rr,s} - K_r RB_r. \tag{52}$$

We include long-term net capital payments because capital is internationally mobile in the long run case: we would expect interest to be paid at rate RB_r on net capital imported

from abroad, K_r, and one would expect this to involve region r either exporting more or importing less.

Key assumed parameter values. Demand side: The top level utility function is Cobb-Douglas in functional form (so the elasticity of substitution between consumption of the produce of each industry, i, is unity). Share parameters for each product class are calibrated from value shares in total expenditure. The lower level utility function has an elasticity of substitution between commodity type of c in sector s of σ. This is assumed to equal 5 in all sectors.

Supply side: production technology is assumed to be Cobb-Douglas, so elasticities of substitution between inputs are unity, and share parameters can be directly calibrated from shares in total costs (once monopoly profit has been subtracted from costs). Using WB BEEPS survey data, firm sizes have been proxied and differentiated across regions but same within sectors in each region. Larger markets (like the ROW or RUS) have more firms, and so are more competitive. The main reason for these assumptions is to simulate the pro-competitive effects of trade liberalisation in reducing monopolistic mark-ups in smaller, more sheltered economies.