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Economic Analysis of Georgia's Free Trade Agreements with EU and China

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Economic Analysis of Georgia's Free Trade Agreements with EU and China

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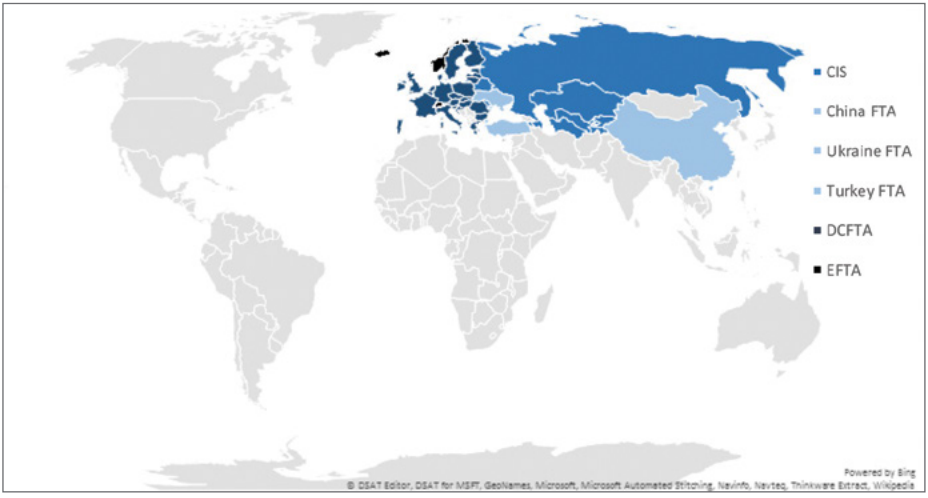
ABBREVIATIONS

AA	–	Association Agreement
ASEAN	–	Association of Southeast Asian Nations
BEC	–	Broader Economic Category
CACM	–	Central American Common Market
CEEC	–	Central and Eastern Europe Countries
CGE	–	Computable General Equilibrium
CIS	–	Commonwealth of Independent States
CPI	–	Consumer Price Index
DCFTA	–	Deep and Comprehensive Free Trade Agreement
EC	–	European Community
EEC	–	European Economic Community
EFTA	–	European Free Trade Association
EU	–	European Union
EUR	–	Euro
FDI	–	Foreign Direct Investment
FTA	–	Free Trade Agreement
GDP	–	Gross Domestic Product
GSP	–	Generalized System of Preferences
HS	–	Harmonized System
IMF	–	International Monetary Fund
ISET	–	International School of Economics at TSU
LAFTA	–	Latin American Free Trade Association
LAIA	–	Latin American Integration Association
MED	–	Mediterranean
NACE	–	Classification of economic activities
NAFTA	–	North America Free Trade Agreement
PE	–	Partial Equilibrium
PMCG	–	Policy and Management Consulting Group
PPML	–	Pseudo Poisson Maximum Likelihood
PWC	–	PricewaterhouseCoopers
RTA	–	Regional Trade Agreement
SITC	–	Standard International Trade Classification
SPS	–	Sanitary and Phytosanitary
UN	–	United Nation
UNCTAD	–	United Nations Conference on Trade and Development
WITS	–	World Integrated Trade System

1. INTRODUCTION

Since gaining independence, Georgia has been involved in international trade and the country based its trading policy mainly on the principles of liberal free trade. In recent decade, Georgia has been actively engaged with negotiations and has signed free trade agreements. Prior to 2014, Georgia had FTAs with CIS and neighboring countries in total of 11 countries (Ukraine, Belarus, Moldova, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan, Turkey, Azerbaijan and Armenia). On June 2014, Georgia signed the Association Agreement (AA) and the Deep and Comprehensive Free Trade Area (DCFTA) with EU. Georgia ratified the AA on the 18th of July, 2014. The AA/DCFTA have been provisionally applied since the 1st September, 2014[1]. On May 13, 2017 FTA with China was signed, after one-year (on June 27, 2018) FTA with Hong Kong had been implemented. After these FTAs, Georgia has gained access to markets which as of 2019 had total 40,2% share in global GDP. Since this time, Georgia continued working on free trade agreements. In 2018, feasibility study of FTA with Israel was launched. In January 2019, the joint feasibility study of FTA between Georgia and India was finished.

Figure 1. *Free trade agreements of Georgia*



Source: Ministry of Economy and Sustainable Development of Georgia

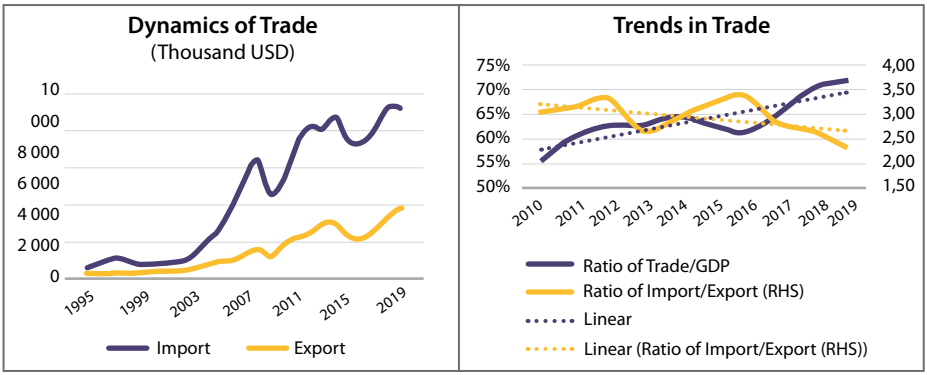
During the last decade, Georgia's foreign trade showed impressive dynamics. Georgia's total trade volume in goods increased by 228% in last 10 years mostly at the expense of imports (ratio of import/export on average was 3.11), but it should be mentioned that

[1] After this free trade agreement between Georgia and European Free Trade Association (EFTA) was signed on 27 June 2016. The agreement entered into force for Iceland and Norway from September 1st, with Switzerland and Liechtenstein from May 1, 2018.

the gap between export and import is narrowing (figure 2). Meanwhile trade openness[2] has shown robust growth and stood at 116,5% of GDP in 2019.

This raises a question that, perhaps such high dynamics of trade is related to foreign trade policy based on Georgia's active involvement in free trade agreements. To respond to this this issue, it is important to find out causality between FTAs and trade volume. This is the main aim of our research.

Figure 2. *Dynamics of merchandise trade of Georgia*



Source: GeoStat

1.1 Importance of Free Trade Agreements for Developing Economies

FTA can affect countries' welfare in two ways. First, based on Viner's theory, trade creation happens when inefficient domestic production or import is replaced by efficient imports from FTA partner. And second, trade diversion happens when non-FTA partner's efficient imports are replaced by inefficient imports from FTA partner (Viner & Olsington, 2014).

Common knowledge in international economics dictates that when FTA is signed between two countries, resources are allocated optimally and countries specialize in productions of goods in which they have comparative advantage. Latter can be observed from FTA between EU and Mexico (Serrano, Martínez, Rodríguez, & Salazar, 2015), where after FTA was signed, exports from Mexico to EU increased in numerous sectors where it had comparative advantage and vice versa. The paper also presents the fact that FDIs in Mexico's export-oriented manufacturing increased after FTA was signed, this rise was not only caused by increased FDIs from EU, but from the USA too. This means that FTA played a significant role in accelerating both trade volume and FDI.

[2] Ratio of imports plus exports (including trade in services) to GDP.

Literature on the effects of trade creation argues that FTA does not always results in considerable trade creation (Stevens, Irfan, Massa, & Kennan, 2015), while analyzing literature around FTAs between developed and developing countries, it was found that in case of Australia-Thailand FTA, trade creation was modest, similarly FTA between Chile and EU had a small economic effect. On the other hand, based on their research, clear trade creation effects occurred for:

- EU -Turkey custom union
- EU – MED (Mediterranean)
- Turkey – MED

The modest trade creation effect can be explained by difference in trading partners' development levels. Huijskens (2007) analyzed FTA between 31 developed and developing countries and found that trade dynamics after FTA depends on the development level of exporting and importing countries. When both countries are relatively at the same level of development, trade increases after FTA is signed. Trade also shows a rise for the exporter country if it is more developed than the country which works on imports. The latter was also the case for Mexico-EU FTA.

Even though trade diversion effect is not frequent, in their work Caporale, Rault, Sova & Sova, (2009) while analyzing FTA between EU-15 and the Central and Eastern European countries (CEEC) (Bulgaria, Hungary, Poland and Romania) suggested that the member countries were keen to trade more between them than to others. There are several additional ways in which especially developing country can benefit from FTA with developed countries.

- **Economies of scale.** Based on "new trade theory", proposed by Krugman, international trade patterns are determined by the scale of economies and network effects (Pettinger, 2017). This means that for small developing economies, access to large markets are crucial to gain from the economies of scale. FTAs give small developing countries opportunity to access large markets.

- **"Lock-In" of Structural Reform and Policy Adjustment.** To improve productivity and competitiveness of a country, structural reforms are needed. Structural reforms by their nature cannot give instant direct tangible economic effects. But during the reforms, there will be "losers" on sectoral level. This latter has drawbacks on the process of structural reforms. Signing FTAs can overcome this problem. First of all, FTAs, especially when signed between developed and developing countries, give some obligations to make changes (e.g. Sanitary and Phytosanitary (SPS) measures, intellectual property protection laws and etc.). Also, if country is already pursuing structural reforms, it can further benefit from technical assistance from developed country (Plummer, Cheong, & Hamanaka, 2010).

- **Transfer of technology and FDI.** When the launch of FTA opens access to developed country's market, it also attracts FDIs in developing country. First, it can come from FTA partner country due to low costs of production (Labor, taxation etc.). Also, FDI can come from other countries too, because developed countries' markets are

stable, predictable and large enough to absorb additional exports, domestic economy can play a role of an intermediary. FDIs also bring transfer of technologies and know-how (UNCTAD, 2010) (Lee, Lee, & Kim, 2011)).

- **Human and Institutional Capacity Building.** This effect comes with technical assistance during FTA negotiations, which includes training and transfer of know-how in the form of seminars and workshops, study visits, scholarships. Also, providing assistance in implementation of obligations and creating competition policy. (Plummer, Cheong, & Hamanaka, 2010)

1.2 Review of Ex-ante Analysis of DCFTA and FTA with China for Georgia

All above mentioned benefits may be directly applicable to DCFTA, and FTA with China. First of all, EU and China, together as of 2019, make up nearly 2 billion population[3] and a market of 32 trillion US Dollars[4] meaning that Georgia's export-oriented producers can benefit from the economies of scale.

Newly signed DCFTA, and FTA with China give Georgia a great opportunity to attract FDI and with-it new technologies and know-how. It is worth noting that only 7 countries[5] have FTAs with EU and China at the same time. This gives Georgia an opportunity to attract investments not only from the third countries, but also from China to export in EU and/or China and from EU to export in China and/or EU.

As for the "Lock-In" of Structural Reform and Policy Adjustment – the "DC" part of DCFTA is responsible for the structural reforms (ISET Policy Institute, 2016, p. 6) meaning that Georgia can benefit from it institutionally. During the implementation of DCFTA, human and institutional capacity building is inevitable.

All the above-mentioned expected outcomes and opportunities were analyzed for DCFTA and FTA with China at different stages of FTA negotiations or implementations. In 2013, before signing DCFTA, ex-ante study was conducted by Ecorys (2013). The paper analyzed potential results of DCFTA on Georgia and EU on macro and sectoral levels. Analysis was done using CGE (computable general equilibrium) model, which gives results for medium-to-long run. On macro level, total national income of Georgia was expected to increase by 297 mln EUR, while for EU effect, it was not significant. Moreover, increase in total exports (+12%) and imports (+7,5%) was expected together with reduction of CPI inflation (-0,6%) and increase in average real wages (+3,6%) over the long-run. This was indicating that after DCFTA, on a macro level, the gap between exports and imports would start closing down, and purchasing power of

[3] Data for population of EU and China was retrieved from Worldometer.

[4] Data for GDPs of China and EU was retrieved from IMF world economic outlook.

[5] Switzerland, Singapore, South Korea, Chile, Peru, Iceland and Georgia.

workers would increase. As for the third countries, impacts are not prominent, only Russia and Azerbaijan were expected to have small benefits. On a sectoral level, based on the research, there would be losers and winners. The most increase in output was expected to be in chemicals, rubber and plastic. Around 8-24% increase was expected in production of livestock and meat products, other processed foods, electronics and computers, and other manufacturing. Also, more than 5% increase was expected in sectors of other machinery and equipment and primary metals.

Another research was done by Economic Policy Research Center (2014) where the main focus was on elimination of tariffs and anti-circumvention mechanisms[6]. The paper suggested that Georgia was already benefiting from preferential tariffs (GSP+) (92,52% of products were off duties for 2010). As for anti-circumvention, the paper suggested that the upper limit of the volume of output produced (after which the country has to justify the changes in the process of production of these excess volumes) was quite high. So additional pressures are not expected on Georgia from anti-circumvention.

ISET Policy Institute together with Policy and Management Consulting Group (PMCG) and PricewaterhouseCoopers (PWC) conducted the research, where possible benefits and risks associated with DCFTA were analyzed ISET Policy Institute (2016). This paper also underlines that Georgia was already "enjoying low tariffs" (ISET Policy Institute, 2016, p. 7). In the paper, the main focus is on the ways of promoting exports and FDIs. As for the FDI, they identify potential sectors and countries for which Georgia could be attractive to invest due to lower tariffs. For export potential, it is noted that in the short-run, Georgia can't improve its export dramatically, because the main manufacturing exporters are already operating at the limits. Also, they note that sectors such as agriculture consist mainly of small producers, who in short-term cannot adjust their production for extended demand. Also, the production sector has several drawbacks such as: lack of innovation, lack of access to and high cost of finance, cost of transport, weak local government, lack of professional skills, lack of protection for domestic investors.

Adarov and Havlik (2016) in their paper stated that it is crucial for Georgia, Moldova and Ukraine to access large markets for sustained economic growth. They also note that effects from DCFTA will be evident in the medium and long run. They make the point that the implementation of DCFTA will be costly in the short-run and it may overshadow medium and long-run benefits, which may cause threats like Euroscepticism and populism. So, in their opinion, during the implementation, gradualism is important to reduce these risks.

For FTA with China joint feasibility study was done PMC research Center (2015) The paper included ex-ante analysis of trade and also possible benefits behind it. Ex-ante analysis was done with both Partial Equilibrium (PE) (Georgian side), and with

[6] Ceiling of import value after which exporter country is obligated to prove it can export more.

Computable General Equilibrium (CGE) (Chinese side) models. Expectations from PE analysis was that imports from China would increase by 1,69% and import revenue from tariffs would decrease by 0,5%, while exports to China would increase by 9%. On product level, a considerable increase was expected in wine products (+28,5%), waste and scrap of copper and aluminum (+3,3%), water, mineral water products, and other non-alcoholic beverages (+36,7%). Based on CGE model, Georgia's export would increase considerably by 28,9%, mostly at the expense of vegetable and fruits, metal products such as copper and aluminum, grape wine, textile and apparel products and machinery. On the other hand, imports from China were expected to increase by 6,7%, at the expense of pork and poultry products, vegetables and fruits, processed foods, metal products, chemical and rubber products, manufactured products and machinery to Georgia will also be increased. This study also suggested that FDIs could increase significantly, based on previous China FTAs with developing countries.

Another paper which analyzed FTA with China, before its implementation, is Fuenfzig (2016) who looked at the potential benefits of FTA with structural gravity models. Three scenarios were made. For Georgia all three scenarios were indicating large increase in bilateral exports (68,3-108%) as well as real GDP (1,1-1,6%), while small trade diversion was expected (4,5-8,4%).

1.3 Research objectives

It's been five years after DCFTA was implemented and two years have passed since FTA with China. It is interesting to conduct ex-post analysis to find out how these FTAs affected Georgia's economy. Goal of ex-post analysis will be to determine what qualitative and quantitative impacts are observed after Georgia signed DCFTA and FTA with China, on macro and sectoral levels. Also, the research paper will try to find if DCFTA and FTA with China resulted in welfare gains. To be more precise, the paper aims to determine whether the increase in trade was a result of trade creation or trade was diverted. Another aim is to analyze quantitative effects on imports and exports on different aggregation levels. For conclusion, research paper will analyze differences and similarities between DCFTA and FTA with China and based on these empirical findings, the research will identify possible threats and opportunities, which may come from future free trade agreements.

2. METHODOLOGY

Overview

Ex-post analysis can be done with several techniques. Some methods (such as Coverage Ratio, Utility Rate, Utilization Rate) are focusing on tariff lines and are called Preference Indicators (Plummer, Cheong, & Hamanaka, 2010). Despite the fact that they are good and easily computable indicators of effectiveness of preferences in an FTA, they cannot tell about the impact's FTA had on trade and welfare. Since our research is focused on trade and welfare gains, for ex-post analysis Viner's model and Gravity model of trade were chosen.

In his pioneering work, Jacob Viner was first to introduce the mixed effects of custom unions. In his work "The Customs Union Issues (1950)", he suggested theory of "trade creation" and "trade diversion" (Viner & Olsington, 2014). Based on theory, trade creation happens when inefficient domestic production or import is replaced by efficient imports from FTA partner. And trade diversion happens when, non-FTA partner's efficient imports are replaced by inefficient imports from FTA partner due to the discriminatory tariffs towards them[7].

Viner's (2014) theory can be seen as the basis of trade analysis. Based on this Plummer, Cheong and Hamanaka (2010) suggested that analysis can be done in two ways – qualitatively and quantitatively. Qualitative analysis can be done by simply using Viner's (2014) approach of trade creation and trade diversion, but it does not quantify welfare gains or losses, so it analyses FTA in descriptive way. Such analysis was done by Yacine, Haddoud & Newbery (2014) , they analyzed FTA between EU and Algeria on sectoral level (SITC[8] 1 digit) with Viner's (2014) model. They found that trade diversion was not evident and there was a clear trade creation. In the same manner, Hariyono (2015) analyzed Indonesia-Japan economic partnership agreement. Drabik, Pokrivcak, & Ciaian, (2007) investigated trade in agricultural sector between Slovakia and EU and found significant trade diversion, because tariff liberalization forced imports from EU-15 and CEEC to increase by 31,4%. Because Viner's (2014) theoretical model is descriptive, it can be used for ex-post as well for ex-ante analysis[9].

For quantitative ex-post analysis, Gravity model will be used. Gravity model is often referred as the workhorse of international trade analysis (Head & Mayer, 2013). Gravity model enables to quantify factors which are determining existing trade. One of the main advantages of this model is that, by using control variables, it can quantify direct effects

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7 But there can also be reversal of past diverted trade. (Wonnacott, 1996) showed the example of reversal of trade diversion, and stated that when Mexico was added in NAFTA in 1994, past diverted imports of Mexico, which was replaced by Canadian imports in USA, due to 1989 Canada-USA FTA, had to be reversed.

8 Standard International Trade Classification.

9 For example see (Lewis, Robinson, & Thierfelder, 2003)), also many papers partially include this type of analysis, because it is slightly improved descriptive analysis (see: (Clausing, 2001), (Sattayanuwat, 2015)).

of free trade agreements on trade volume. So, with gravity model, it is possible to find out by how much trade was increased due to DCFTA and FTA with China. This is possible by including a wide range of control variables, to measure specific effects on the country. The most popular control variables are common border, common language (which is a proxy of cultural similarities (Liu, 2007)), colonial linkages, also it is possible to analyze north-south, north-north, south-south[10] effects on international trade (Magennis & Gardner, 2009), which gives more precise estimates of parameters as a result.

Gravity model was first introduced by Jan Tinbergen in 1962 and was a pure econometric tool, because it was founded on intuition rather than on economic theory. Intuition stated that international trade develops in the way, which is in line with Newton's law of gravitation.

$$F = G \frac{m^1 m^2}{r^2}$$

In economic formulation of this equation mass of the object is proxied by GDPs of exporter and importer, while distance is a measure of trade costs. So, in economic formulation of gravity model, trade flows are positively correlated with the GDPs of exporter and importer countries and are negatively impacted by the distance between them.

Later on, theoretical grounds for gravity model were introduced by Anderson (1979), Bergstrand (1985, 1989) Deardorff (1998), Eaton and Kortum (2002), Chaney (2008) and Bacchetta, et al. (2012) Some economists think that every variable in gravity equation should be included only when its relevance comes out from structural (for example micro founded) theoretical model (Shepherd, 2008). But there is a rich empirical literature consisting with both theoretical (structural) gravity models and models consisting with variables based on economic intuition[11].

As for Georgia Tvalodze (2016) analyzed FTA agreement between Georgia and Turkey and found statistically significant but small effect of FTA on trade between countries. Earlier Gravity model for Georgia was constructed by Dilanchiev (2012) who analyzed trade patterns of Georgia.

[10] North-north – trade between developed countries, North-South – trade between developed and developing country, South-South – trade between developing countries.

[11] It includes earlier works done to analyze creation of European, American and Asian communities, such as analysis of EEC (European Economic Community) and EFTA impact on member states in the period of 1959-67 (Aitken, 1973), (Braga, Safdi, & Yeats, 1994) analyzed RTAs of European Community (EC), European Free Trade Area (EFTA), LAIA/ LAFTA, Association of South East Asian Nations (ASEAN) and CACM and found that all variables in Gravity model had expected signs, expect for LAFTA and ASEAN.

3. VINER'S MODEL: METHODOLOGY AND DATA

Qualitative analysis of DCFTA and FTA with China will be done by Viner's (2014) model proposed by Plummer, Cheong, & Hamanaka (2010). Based on their method, if there is an increase in imports from FTA partner, the following results are expected to emerge:

Table 1. *Trade creation and diversion*

TRADE CREATION	TRADE DIVERSION
1. Imports from the rest of the world and domestic output stay same. 2. Imports from the rest of the world and domestic output rise. 3. Imports from the rest of the world rise and domestic output stays same 4. Imports from the rest of the world stay same and domestic output rises or decreases 5. Imports from the rest of the world decrease but decrease in domestic output is larger. 6. Import for the rest of the world rise and domestic output decrease	1. A drop in imports from the rest of the world and increase/no changes in domestic output. 2. Imports from the rest of the world decrease together with domestic output, but decrease in domestic output is smaller

There is an import substitution effect, when total imports fall, while there is an increase in domestic output. And there is no clear effect of trade diversion or creation, when after FTA imports decrease from FTA partner or when share of their imports in total imports is trivial.

If only trade creation occurs while there is no trade diversion effect, it results in welfare gain. While if there is only trade diversion effect, it means that country lost in welfare. But if both effects occur at the same time and trade creation effect exceeds trade diversion, there will be welfare gain and if trade diversion exceeds trade creation effect, there will be welfare lose.

Our analysis using Vinerian approach will be done on sectoral level. Data on production of sectoral manufacturing is retrieved from GeoStat and data on imports for EU, World and China is obtained from UN Comtrade database for the period of 2006-2019. Data transformation is needed to match production and trade, for this purpose WITS[12] con-

[12] World Integrated Trade System.

cordance matrix is used and SITC 3 trade data is transformed to match NACE[13] 1 rev production. One of the problems of Viner's (2014) model is that, it looks on changes in trade compared to previous year of FTA.For example, if in 2014 there was some external shock and imports deteriorated out of its trend and amounted 1000USD instead of 1500USD (its trend value), and in 2019 imports reached 1100, based on Viner's model it will indicate trade creation, which will lead to wrong conclusions. To overcome this problem, during the analysis interval average changes of level of variables will be examined.

Under the Nace 2. Rev, data for manufacturing was retrieved from GeoStat, which consisted of 32 sectors of manufacturing out of which six sectors (repair and installation of machinery and equipment, electricity, gas, steam and air conditioning supply, electric power generation, transmission and distribution, manufacture of gas; distribution of gaseous fuels through mains, steam and air conditioning supply) were dropped, because they are mainly services and no data on imports is available. For the remaining 26 sectors, the next transformation was done: SITC3- Nace 1.- Nace.2 to match trade flows to manufacturing output.

3.1 Results

This section will cover the following topics:

- Identification of sectors in which trade diversion or creation happened from DCFTA and FTA with China separately.
- Overall effects of DCFTA and FTA with China on trade creation and diversion
- Special emphasis on sectors in which trade creation and diversion effects were highlighted.
- Analysis of total welfare gains and losses

Trade creation and diversion

From our analysis DCFTA and FTA with China mostly had similar effects on trade creation and diversion. It is worth noting, that not all sectors were affected by these agreements. In some sectors imports decreased, even after signing FTA, which doesn't allow us to identify trade creation or diversion.

[13] Classification of Economic Activities.

Table 2. *Trade creation and diversion effects*

Sectors	**DCFTA**	**FTA with China**
Tobacco products	Trade creation	Trade diversion
Chemicals and chemical products	Trade creation	Trade creation
Machinery and equipment	Trade creation	Trade creation
Textiles	Trade creation	Trade creation
Electrical equipment	Trade creation	Trade creation
Furniture	Trade diversion	No clear effect
Food products	Trade diversion	Trade creation
Paper and paper products	Trade creation	Trade creation
Rubber and plastic products	Trade creation	Trade creation
Motor vehicles	No clear effect	Trade creation
Beverages	Trade diversion	Trade diversion
Other mining and quarrying	Trade creation	Trade diversion
Metal products	Trade creation	Trade creation
Computer, electronic and optical production	Trade diversion	Trade diversion
Wood and products of wood and cork	Trade creation	Trade creation
Basic pharmaceutical product	Trade creation	Trade creation
Leather and related products	Trade diversion	No clear effect
Other non-metallic mineral products	Trade creation	Trade creation
Wearing apparel	Trade creation	Trade creation
Other manufacturing	Trade creation	Trade diversion
Manufacture of coke and refined petroleum products	No clear effect	No clear effect
Extraction of crude petroleum and natural gas	No clear effect	No clear effect
Mining of coal and lignite	No clear effect	No clear effect
Mining of metal ores	No clear effect	No clear effect

In ***other mining, food products, other manufacturing, chemicals*** and ***tobacco*** it can be stated, that DCFTA and FTA with China resulted in completely opposite effects.

But for ***basic metals,*** and ***motor vehicles***, there is slightly different situation, because imports from EU decreased even from 2014. This fact does not enable us to make any conclusions about effects of DCFTA. This latter statement applies to FTA with China for ***furniture.***

Most importantly, analysis shows that, there is no trade diversion or creation bias towards DCFTA or FTA with China and mostly these effects offset each other.

Due to above-mentioned results, in most cases (15 out of 26), there is a trade creation effect, while only in five sectors, trade was diverted.

Table 3. *Total effect of DCFTA and FTA with China on trade creation and diversion*

SECTORS	TRADE CREATION	TRADE DIVERSION	NEUTRAL
Tobacco products	✓		
Chemicals and chemical products	✓		
Machinery and equipment	✓		
Textiles	✓		
Electrical equipment	✓		
Furniture	✓		
Food products		✓	
Paper and paper products	✓		
Rubber and plastic products	✓		
Motor vehicles	✓		
Beverages		✓	
Mining and quarrying	✓		
Metal products	✓		
Computer, electronic and optical production		✓	
Wood and of products of wood and cork	✓		
Basic pharmaceutical product	✓		
Leather and related products		✓	
Other non-metallic mineral products	✓		
Wearing apparel	✓		
Other manufacturing		✓	
Manufacture of coke and refined petroleum products			✓
Extraction of crude petroleum and natural gas			✓
Mining of coal and lignite			✓
Mining of metal ores			✓

Source: GeoStat, Un Comtrade, own calculations

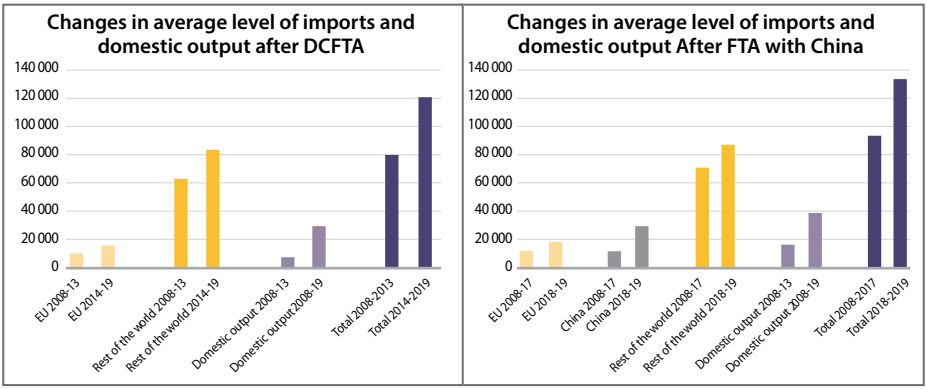
And in two sectors (basic metals, printing and reproduction of recorded media), import substitution effect was clear.

Not all sectors reacted to DCFTA and FTA with China similarly. There were sectors which benefited the most from these agreements, while some sectors showed clearer trade diversion effects than others. There was prominent overall trade creation from DCFTA

and FTA with China in sectors of ***textiles, tobacco and paper products, while manufacturing leather and related products*** together with ***other manufacturing*** showed significant trade diversion.

In ***textile*** sector, in the period of 2014-2019, there was a clear growth in imports from EU. Also, in this period, imports increased from the rest of the world together with domestic output growth. After FTA with China, its imports increased together with EU, the rest of the world and domestic output. This clearly indicates that there is a trade creation effect (figure 3).

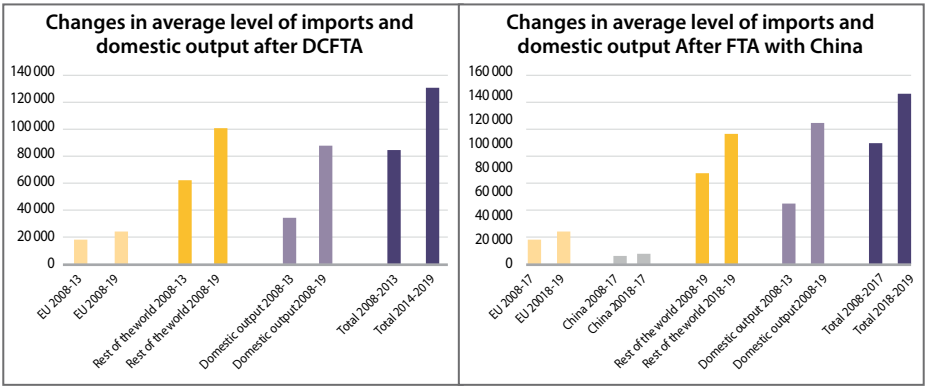
Figure 3. *Trade creation in textile sector*



Source: GeoStat, Un Comtrade, own calculations

Also, same picture is evident in ***paper product*** sector. After DCFTA, imports from EU accelerated, but this was not at the expense of diverted trade from the rest of the world. Imports from the rest of the world also increased. After FTA with China, imports from China also showed a rise, together with EU and rest of the world while domestic output also grew.

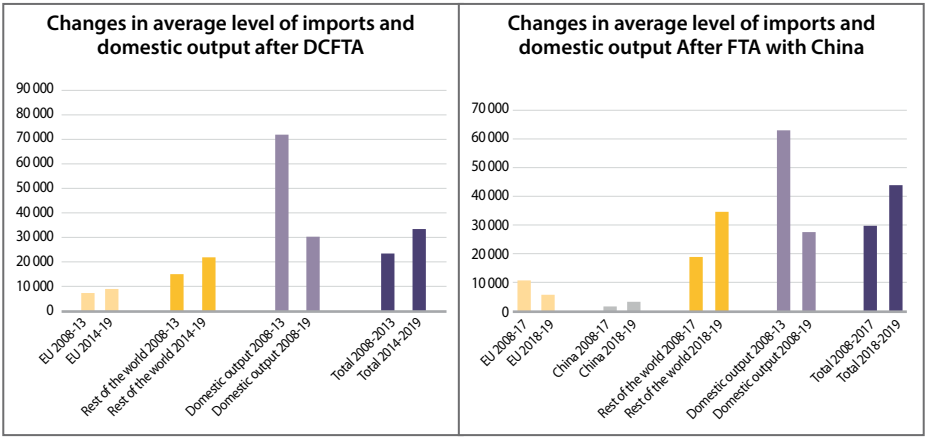
Figure 4. *Trade creation in paper products sector*



Source: GeoStat, Un Comtrade, own calculations

From the perspective of overall trade creation, ***tobacco*** sector also resulted in tangible effect. Main characteristic of ***tobacco*** sector is that, together with increased imports from FTA and the rest of the world, domestic output fell dramatically over this period of time. This could mean that, FTAs with EU and China without diverting efficient imports from the rest of the world, replaced inefficient domestic production of tobacco (figure 5).

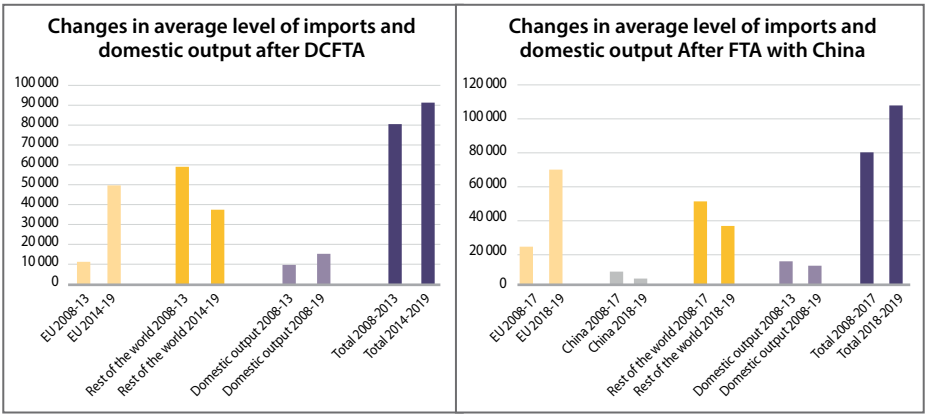
Figure 5. *Trade creation in tobacco sector*



Source: GeoStat, Un Comtrade, own calculations

Apart of the prominent trade creation, there is a clear trade diversion in ***manufacturing leather and related products.*** Imports from EU clearly diverted imports from other countries as well as from China, even signing FTA with China did not reverse the diverted trade. Drop in domestic output could not compensate the trade diversion effect (figure 6).

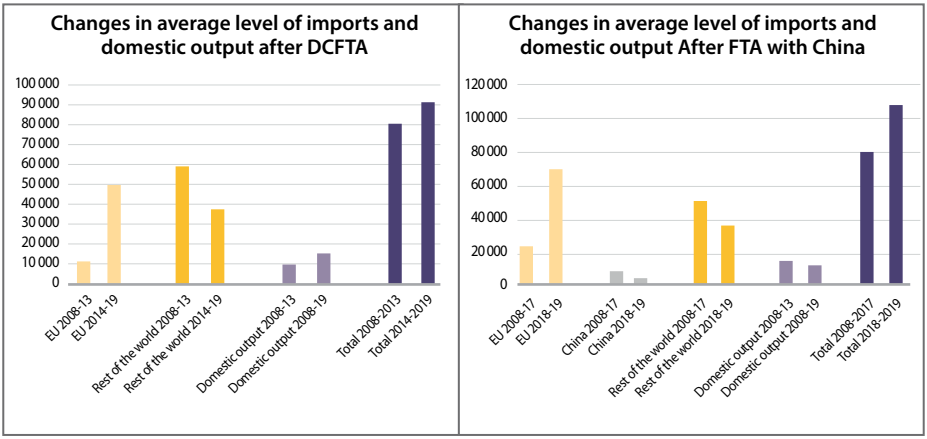
Figure 6. *Trade diversion in leather and related product sector*



Source: GeoStat, Un Comtrade, own calculations

Another clear trade diversion occurred in ***other manufacturing***, where EU together with China diverted imports from the rest of the world, accompanied by increase in domestic output. (figure 7.)

Figure 7. *Trade diversion in other manufacturing*



Source: UN Comtrade, own calculations

There are also less evident trade diversion effects in sectors of ***food products*** and ***beverages***. In ***food products*** sector, there was a small trade diversion effect (level of imports from the rest of the world dropped by 0,09%), accompanied by a significant increase of imports from EU and China by 46,8% and 55,9% respectively. Clearer picture is in sector of ***beverages***, where imports from China increased dramatically after the FTA and there was the strong growth from EU through all time period, while share of the rest of the world became negative in the periods of 2014-2019 and 2018-2019.

Total welfare gain

To summarize overall effects of DCFTA and FTA with China, it is important to look at total welfare gain. As it was mentioned above, when trade creation exceeds trade diversion effect, there is a positive welfare gain. As our analysis showed, in most cases there was trade creation effect and different results from DCFTA and FTA with China mostly offset each other. Overall impact on welfare is summarized in welfare gain and loss matrix (Table 4.), where all above-mentioned sectors are classified as sectors where positive, negative, neutral welfare gain occurred and sectors where domestic output replaced imports.

Table 4. *Overall welfare gain and loss matrix*[14]

Tobacco products	Textiles	Paper and paper products		High Probability of welfare gain
Other mining and quarrying and Mining support service activities	Wood and of products of wood and cork, except furniture	Chemicals and chemical products	Wearing apparel	Medium probability of welfare gain
Fabricated metal products, except machinery	Basic pharmaceutical products	Rubber and plastic products	Electrical equipment	
Other non-metallic mineral products	Motor vehicles		Machinery and equipment	low probability of welfare gain
coke and refined petroleum products	Extraction of crude petroleum and natural gas	Mining of coal and lignite	Mining of metal ores	Neutral
Computer, electronic	Beverages	Furniture	Food products	low probability of welfare loss
Leather and related products		Other manufacturing		Hight probability of welfare loss
Basic metals		Printing and reproduction of recorded media		Import substitution

Source: Un Comtrade, GeoStat, own calculations

[14] See appendix for separate welfare gain and loss matrixes for DCFTA and FTA with China

4. GRAVITY MODEL: METHODOLOGY AND DATA

For our research goals it is important to analyze trade on sectoral level and also to look at import and export flows separately. This type of analysis with gravity model is called one-way gravity model. In this relative manner Liu (2007) analyzed FTA between China and Australia, and separated these flows. Same type of analysis was done by Martínez-Zarzoso, D., Klasen, & Johannsen (2013) for Germany, Tham, Goh, Wong, & Fadhli (2017) analyzed Trade of Malaysia and Šimáková & Stavárek (2015) looked at trade for Hungary.

General one-way log-linear Gravity model takes the form:

$$T_{ijkt} = a + \beta \ln ln(X_{ijkt}) + \gamma Z_{ij} + e_{ijt}$$

Where T_{ijkt} is trade (export or import) from source country i (in our case Georgia) to country j, in sector k for time t. X is vector of independent explanatory variables, and Z vector of control variables to control for unobserved effects, e_{ijt} is white noise error term. β and γ are coefficients to be estimated.

Gravity model estimation is related to several problems. First of all, to get better estimates of coefficients, panel data is used. This approach makes available more data points, which results in more degrees of freedom. But Pooling countries together leaves some country specific[15] effects behind. For overcoming this problem, most widely used method is fixed effect estimation of panel data, which removes all unobserved country specific effects. This method is efficient but all-time invariant variables are omitted, while using this method. This means that variables like distance are removed from equation, resulting in the loss of "gravitiness" of the model. Also, popular method is random effect model. Unlike fixed effect model, it allows for time invariant variables (Wooldridge, 2001). One of the main problems in estimation of gravity model is zero trade flows. Popular methods for dealing with zero trade flows are:

1. Ad hoc approach – by adding small positive number to zero trade flows, so it can be used in matrix for coefficient estimation.
2. Econometric fixes that allow the zero entries to be included in the estimation sample, such as the Tobit or Poisson estimators.
3. Theoretical and econometric fixes that provide a rationale for the existence of zeros, and correct for their presence, for instance through a modified version of the Heckman sample. (Shepherd, 2008)
4. 2 stage estimation of model, proposed by Helpman, Melitz, and Rubinstein, (2008)

[15] Heterogeneity of countries

Last but not the least problem of estimating gravity model is logarithmic formulation of gravity model (Silva & Tenreyro, 2006). They suggest that Pseudo Poisson Maximum Likelihood Estimation (PPML) should be used. This method also deals with zero trade flows. So, our empirical estimation on gravity model will be based on PPML estimation of gravity model. Robustness of estimated parameters will be checked by comparison of fixed effect, random effect and pooled data estimates. PPML is nonlinear method of estimation and one of the characteristics of this approach is that when estimating panel data with large number of observations, fixed and random effect method estimates converge. Our empirical model for total export/import, as well as for sectoral level will take the form:

$$Export_j = exp(a + \beta_1 LnGDP\ per\ capita_g + \beta_2 LnGDP\ per\ capita_j + \beta_3 LnDistance_{gj} + \beta_1 LnArea_j + \beta_4 common\ border_{gj} + \beta_5 landlocked_j + \beta_6 CIS_j + \beta_7 2008\ recession + \beta_8 2015\ export/import\ fall + \beta_9 Advanced_j)$$

Where j stands for destination country. Dummy variables which control for country specific effects are: $Distance$, which is calculated as Distance between Tbilisi and Destination countries Capital, weighted by their share in respective country's GDP. $Area$ – the total area of country. Dummy variables: $common\ border$ – takes value 1 if Georgia and country j share common border 0 otherwise, $landlocked$ – takes 1 if country j is landlocked and 0 otherwise, CIS takes value 1 if country j was member of CIS in any period of time, $advanced$ takes value 1 if country j belongs to advanced economies based on IMF economic outlook 2019. And ***dummy variables*** to control for time specific effects, like 2008 and 2015, when Georgia's export/import dropped down due to external shocks. Model is specified for import and export separately. Data range span is 2000-2019 years for 45 countries, consisting of EU-28 countries and countries whose trade share is above 1% in Georgia's exports. Trade data is collected on HS[16] 2-digit levels for products, of which share is above 0,5% in total trade. Also, data includes Top 20 HS 4-digit products in exports/imports, and BEC[17] 1 digit for both exports and imports. Trade data is collected from Un Comtrade database and data for control variables from CEPII database.

4.1 Results of gravity model for EU

Gravity model was estimated separately for export and import on different levels of aggregation with Pseudo Poisson Maximum likelihood (PPML) estimation of model. Due to the above-mentioned fact that with PPML fixed and random effect model estimates converge (meaning that they give similar estimates of coefficients),only random effect and pooled panel data estimates will be displayed.

[16] Harmonized System

[17] Broader Economic Category

Table 5. *Gravity estimates for total exports and imports – EU*[18]

	EXPORT		IMPORT	
Variables	Pooled PPML	PPML RE	Pooled PPML	PPML RE
lnGDPgeo	1.716***	1.211***	1.797***	1.364***
lnGDPj	0.028	0.604***	-0.128	0.402***
lnDistance	-0.788***	0.803	-0.504***	-1.240***
lnArea	0.315***	0.460***	0.318***	0.673***
DCFTA	-0.284	0.099***	-0.564***	-0.253***
*** p<0.01, ** p<0.05, * p<0.1				

For total exports, PPML and PPML with RE yield slightly different results. PPML estimates suggest negative but not statistically significant effect on total exports, while RE model suggest statistically, but not economically[19] significant increase in exports to EU. As for total imports from EU results are robust. DCFTA resulted in moderate drop of imports from EU by 0,75 – 0,28%.

Gravity model specification for BEC classification of trade indicates similar results for DCFTA.

Table 6. *Gravity estimates of exports for BEC classification of trade-EU*

% change	DCFTA	
	PPML	PPML RE
	Import	
food and beverage	-0,10	0,40***
industrial supply	-0,55***	-0,24***
fuels and lubricants	0,56	-0,25***
capital goods	-0,34***	-0,29***
transport and equipment	-0,71***	-0,49***
consumption goods	-0,32***	-0,12***
other goods	0,13	0,98***
	Export	
food and beverage	0,3	-0,01*
industrial supply	-0,21	0,24***
fuels and lubricants	0,52	-0,02***
capital goods	-0,40***	-0,22***
transport and equipment	-0,51**	-0,06***
consumption goods	-0,69***	-0,24***
other goods	0,66	2,34***
*** p<0,01, ** p<0,05, * p<0,1		

[18] For detailed regression results for BEC 1-digit, HS 2-digi and HS 4-digit for both EU and China see appendix.

[19] e0,099-1=0,104%

Gravity model specification for BEC classification of exports, indicate that DCFTA mostly had negative significant effects on exports, while only positive effect is for ***other goods***, where PPML shows statistically insignificant rise of exports by 0,66% and RE statistically significant 2,33% increase of exports. There are no robust positive effects on imports for DCFTA.

As for HS 2-digit level, after analyzing almost 50 products with share more than 0,5% in total export, only few products showed positive robust estimates. For DCFTA economically significant results were in products such as: edible ***vegetables and certain roots and tubers*** (0,23-3,14%); ***Wood and articles of wood, wood charcoal*** (0,56-1,54%); and ***aircraft, spacecraft and parts thereof*** showed dramatical increase with range of 36-6322%, also DCFTA resulted in modest growth in ***Beverages***, ***spirits and vinegar*** with 0,06-0,48%.

For the imports, DCFTA only had positive robust significant effect on ***coffee, tea, mate and spices*** (0,63-1,35%).

Only 4 products were significantly positive for exports while analyzing trade on HS 4-digit level. ***Wine of fresh grapes and undenatured ethyl alcohol*** showed a modest growth, while ***new pneumatic tyres of rubber, Turbo-jets, turbo-propellers and other gas turbines*** showed a significant growth.

Table 7. *Effects of DCFA on HS 4-digit level exports*

% change	DCFTA	
	PPML	PPML RE
New pneumatic tyres of rubber	82,76	19,80
Undenatured ethyl alcohol, spirits, liqueurs and other spirituous beverages	1,83	1,40
Wine of fresh grapes	2,48	1,17
Turbo-jets, turbo-propellers and other gas turbines	59,16	113,09

DCFTA had effect only on imports of meat from EU.

After the analysis of DCFTA on different aggregation levels, there are some clear results. There are no tangible results on aggregated level of trade. Also, on disaggregated level except some products, DCFTA did not affect exports. Some interesting feature is that, DCFTA resulted in small decrease of imports from EU. This was evident from Viner's (2014) model too, when in numerous sectors EU's share in imports decreased. This maybe be result of several factors. First of all, from Viner's approach it was evident, that Georgia is on the way of import substitution, and since gravity model is econometric tool and it is impossible to control for all impacts, maybe this policy went out of sight. Also, another explanation is related to technical aspects of gravity model, even though most optimal model specification was used to deal with zero trade flows, Georgia's imports (as well as export), especially from EU is highly "randomized", which could lead in slight result bias.

But apart from this, these results rise some interesting questions and room for further, more specific analysis of this problem. These results are indicating that Georgia is still on the way of integration in EU market.

4.2 Results of gravity model for FTA with China

Some appealing results occurred while analyzing FTA with China. Even though, that only 2 years have passes since signing FTA, there are already tangible results. FTA with China yielded statistically and economically significant results for exports (0,69-2,1%). As for imports gravity model estimates indicate statistically significant results. But since pooled data and random effect estimates yield different sign of coefficients, results are not robust.

Table 8. *Gravity estimates for China*

	Export		Import	
Variables	Pooled PPML	PPML RE	Pooled PPML	PPML RE
lnGDPgeo	1.716***	1.211***	1.797***	1.364***
lnGDPj	0.028	0.604***	-0.128	0.402***
lnDistance	-0.788***	0.803	-0.504***	-1.240***
lnArea	0.315***	0.460***	0.318***	0.673***
FTA with China	1.156***	0.529***	0.643***	-0.013***
*** p<0.01, ** p<0.05, * p<0.1				

For BEC 1-digit classification of trade, China shows robust and positive growths over the numerous sectors, including ***food and beverages*** (1,19-4,35%), ***industrial supply*** (0,63-1,34%), ***capital goods*** (2,43-4,26%) and negative effects on ***other goods*** (-0,99%). There are no robust positive effects on imports for China.

Table 9. *Gravity results for BEC 1-digit level – China*

% change	FTA with China	
	PPML	PPML RE
	Import	
Food and beverage	-0,45***	-0,49***
Industrial supply	1,59***	-0,16***
Fuels and lubricants	-0,93***	0,09
Capital goods	1,80***	-0,03***
Transport and equipment	-0,01	0,45***
Consumption goods	0,50***	-0,26***
Other goods	-0,95***	-0,85***

	Export	
Food and beverage	4,85***	1,20***
Industrial supply	1,35***	0,63***
Fuels and lubricants	-0,98	
Capital goods	2,43***	4,27***
Transport and equipment	0,97	-0,47***
Consumption goods	-0,82***	37,63***
Other goods	-1,00***	-1,00***
*** p<0,01, ** p<0,05, * p<0,1		

For HS 2-digit level of trade FTA with China produced significant results. Export increased in products such as: ***Coffee, tea, maté and spices*** (8,96-131,95%); ***Beverages, spirits and vinegar*** (0,39-5,75%) and ***Plastics and articles thereof*** (5,52-26,41%). Even though that range of impact is wide, it is possible to conclude that above-mentioned products benefited from free trade agreements. But it should be noticed that, those products are just small fraction of total analyzed products. As for imports unlike DCFTA, FTA with China had significant positive effects on a wide range of products.

Table 10. *Effects of FTA with China on imports for HS 2-digit level*

% Change	PPML	PPML RE
Coffee, tea, maté and spices	1,57	8,97
Tobacco and manufactured tobacco substitutes	0,54	8,36
Organic chemicals	4,52	13,94
Plastics and articles thereof	0,84	2,30
Rubber and articles thereof	0,17	2,52
Paper and paperboard; articles of paper pulp, of paper or of paperboard	0,53	1,48
Articles of apparel and clothing accessories, knitted or crocheted	0,19	1,55
Iron and steel	0,07	7,17
Aluminum and articles thereof	0,63	2,32
Electrical machinery	0,24	1,98

This once more underlines the fact that FTA with China affected more products across different sectors, than DCFTA. Also, these results strengthen the conclusions of Viner's (2014) model, because above-mentioned products form main part of sectors in which there was clear trade creation and thus positive welfare gain.

Alike to DCFTA on HS 4-digit level, exports to China increased almost in all similar four products.

Table 11. *Effects of FTA with China on HS 4-digit level exports*

% change	FTA with China	
	PPML	PPML RE
New pneumatic tyres, of rubber	1045,28	31633,39
Undenatured ethyl alcohol, spirits, liqueurs and other spirituous beverages	7,95	0,78
Wine of fresh grapes	0,98	0,78
Women's or girls' overcoats, car-coats and similar articles	327,32	57813,80

This dramatical increase in ***women's or girl's overcoats*** can be explained by low-base effect. But this fact does not mean, that FTA with China did not boost exports.

For HS 4-digit level of trade unlike DCFTA, FTA with China pushed imports for several products. But once again, these products are just small fraction of total imports.

Table 12. *Gravity estimates of imports on HS 4-digit level for China*

% Change	PPML	PPML RE
Cigars, cheroots, cigarillos and cigarettes	9,44	0,80
Automatic data processing machines and units thereof	10,17	0,06
Self-propelled bulldozers, graders, levellers, scrapers, tamping machines	4,83	0,03
Insulated wire, cable and other insulated electric conductors	4,25	0,72
Other tubes, pipes and hollow profiles, of iron or steel	12,54	0,48

5. CONCLUSION

From our analysis several interesting results emerged.

Viner's (2014) model showed some interesting results. First of all, from this analysis it became clear, that not all sectors were affected[20] by DCFTA and FTA with China, that once more underlines the fact that Georgia is not yet significantly integrated in EU and China markets. Also, results from Viner's (2014) model indicate, that DCFTA and FTA with China behave in similar ways, there is no fundamental differences between their effects on trade creation or diversion. We can conclude from this analysis, that Georgia's imports are well balanced, and no significant trade diversion threats are expected from future free trade agreements.

For overall effects Vinerian approach suggested, that Georgia gained in welfare from DCFTA and FTA with China, because total trade creation exceed trade diversion effect. In some cases, it was not possible to identify trade creation or diversion effects, because import flows from EU or China is decreasing even after DCFTA and FTA with China. This comes in line with gravity model results, where in some cases there was statistically significant decrease of imports due to DCFTA and FTA with China.

The results from gravity model showed that for DCFTA, even though 5 years have already passed since signing it, most of the traded products were not affected by it. It may not be surprising, because before signing DCFTA and after it was freshly implemented, researchers from different sources pointed out that it was a gradual process, which would have tangible effects in long-run. Our research partly found that above-mentioned is the case.

Apart of above-mentioned statistics, some appealing results occurred, beside the fact that some Georgia's traditional products had benefited from DCFTA, such as ***wine and spirits***, radically different product such as ***aircraft, spacecraft, and parts thereof*** on HS 2-Digit[21] level classification showed dramatic increase in exports, meaning that this kind of product which is high-tech can be produced and exported with success in markets such as EU.

One more interesting fact about DCFTA it that, even though past experiences of other countries showed that after FTA with EU imports from it increased more than exports to it, in case of Georgia this is not case not only on disaggregate level but on aggregate level too. There was a decrease of imports to various sectors and products. Even when trying different specification of models was indicating that results are not robust (or statistically significant) or are not economically significant or both at same time.

Another feature from our research is, that FTA with China had statistically and economically significant effects on export. This indicates that in very short-run, Georgia gained tangible effects, which can lead to noteworthy conclusions.

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[20] In some sectors share of EU and China in total imports is trivial, so these sectors did not get affected by these agreements

[21] HS 4-digit level – 8411 – Turbo-jets, turbo-propellers and other gas turbines

First of all, these differences between impacts of DCFTA and FTA with China can be explained by "easiness" of accessing markets, while EU is stricter in terms of regulations, China maybe is more "open handed" to exporters[22]. Or perhaps during the first years of DCFTA, Georgia's exporters were not yet ready, and because of it, they reacted to it with some delay, while in 2018 these exporters already had experience on how to access new markets, so it decreased time of impact. It raises some noteworthy questions, especially about impacts of the structural reform as part of DCFTA. These questions are out of scope of our research. Moreover, answering these questions requires more time to pass after implementation of DCFTA. Based on this it will be interesting to conduct another research on DCFTA few year later, with more emphasis on effects of structural reforms. Also, it will be appealing to once again analyze DCFTA's impacts on economic variables such as FDI, unemployment (on macro and sectoral level) and on trade.

This kind of success story of FTA with China gives much hopes to further FTAs which are currently being negotiated. First of all, high hopes can be placed on FTA with India, because India is highly comparable with China, and FTA with them can boost Georgia's export without any prolonged time lag.

In general, DCFTA and FTA with China showed, that in terms of welfare, Georgia benefited from these agreements, as for quantitative effects, just very small portion of potential is yet utilized, which leaves high hopes and room for the future.

[22] Even though that China will remove its tariffs to all imports in 5-year period.

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APPENDIX

Table 13. *Welfare gain and loss matrix for EU*

Tobacco products	Textiles	Paper and paper products	Wearing apparel	Hight Probability of welfare gain
Other mining and quarrying and Mining support service activities	Wood and of products of wood and cork, except furniture	Chemicals and chemical products	Machinery and equipment	Medium probability of welfare gain
Fabricated metal products, except machinery	Basic pharmaceutical products	Rubber and plastic products	Electrical equipment	
coke and refined petroleum products		Motor vehicles		Neutral
Extraction of crude petroleum and natural gas		Mining of coal and lignite	Mining of metal ores	
Food products	Beverages	Furniture		low probability of welfare lose
Leather and related products	Computer, electronic	Other manufacturing		Hight probability of welfare lose
Basic metals		Printing and reproduction of recorded media		Import substitution

Table 14. *Welfare gain and loss matrix for China*

Textiles		Paper and paper products		Hight Probability of welfare gain
Wood and of products of wood and cork, except furniture		Chemicals and chemical products	Wearing apparel	Medium probability of welfare gain
Fabricated metal products, except machinery	Basic pharmaceutical products	Rubber and plastic products	Electrical equipment	
Other non-metallic mineral products	Motor vehicles	Food products	Machinery and equipment	low probability of welfare gain
coke and refined petroleum products		Furniture		Neutral
Extraction of crude petroleum and natural gas		Mining of coal and lignite	Mining of metal ores	
Beverages		Other mining and quarrying and Mining support service activities		low probability of welfare lose
Other manufacturing	Computer, electronic	Tobacco products		Hight probability of welfare lose
Basic metals		Printing and reproduction of recorded media		Import substitution

Table 15. *Gravity estimates of total import and export*

VARIABLES	Export		Import	
	PPML	PPM with RE	PPML	PPM with RE
lnGDPgeo	1.716***	1.211***	1.797***	1.364***
	(0.125)	(0.001)	(0.104)	(0.001)
lnGDPj	0.028	0.604***	-0.128	0.402***
	(0.096)	(0.001)	(0.089)	(0.001)
lnDistance	-0.788***	-0.803	-0.504***	-1.240***
	(0.092)	(0.498)	(0.109)	(0.428)
lnArea	0.315***	0.460***	0.318***	0.673***
	(0.030)	(0.103)	(0.027)	(0.103)
DCFTA	-0.284	0.099***	-0.564***	-0.253***
	(0.181)	(0.001)	(0.106)	(0.000)
FTA with China	1.156***	0.529***	0.643***	-0.013***
	(0.171)	(0.002)	(0.138)	(0.001)
CIS	-0.084	1.118*	-0.787***	-0.844*
	(0.142)	(0.633)	(0.149)	(0.490)
Commonborder	1.033***	1.349	1.270***	0.974
	(0.148)	(0.920)	(0.169)	(0.690)
Landlocked	0.076	-1.036*	-0.465***	-0.596*
	(0.144)	(0.575)	(0.155)	(0.358)
Crisis	0.019	0.009***	0.325*	0.337***
	(0.239)	(0.001)	(0.176)	(0.000)
Dummy_2015	-0.154	-0.192***	0.028	-0.024***
	(0.169)	(0.001)	(0.141)	(0.000)
Advanced	0.240	-0.295	0.296***	0.420
	(0.159)	(0.495)	(0.100)	(0.395)
Constant	8.609***	6.148*	8.221***	8.596***
	(0.691)	(3.157)	(0.695)	(2.803)
Observations	900	900	900	900
Number of id		45		45
R-squared	0.571		0.677	
Standard errors in parentheses				
*** p<0.01, **p<0.05, *p<0.1				

Table 16. *Gravity estimates of BEC for exports*

VARIABLES	food and beverage		industrial supply		fuels and lubricants		capital goods		transport and equipment		consumption goods		other goods	
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE
lnGDPgeo	1.031***	1.175***	1.828***	0.763***	1.295***	1.932***	0.870***	1.033***	1.019***	2.009***	3.552***	3.367***	2.295***	0.798***
	(0.136)	(0.002)	(0.166)	(0.002)	(0.429)	(0.008)	(0.189)	(0.006)	(0.305)	(0.003)	(0.244)	(0.007)	(0.857)	(0.011)
lnGDPj	0.538***	0.436***	-0.403***	0.991***	-0.812***	-1.502***	0.976***	0.555***	1.247***	-0.143***	-0.407***	-0.473***	0.318	2.491***
	(0.089)	(0.003)	(0.098)	(0.002)	(0.224)	(0.010)	(0.137)	(0.007)	(0.272)	(0.003)	(0.114)	(0.008)	(0.580)	(0.017)
lnDistance	-1.363***	-1.403**	-0.394***	-1.934**	-1.086***	-1.554	-1.490***	-1.770**	-0.990***	-0.202	-0.228	-1.268	-0.400	-0.712
	(0.115)	(0.687)	(0.108)	(0.767)	(0.292)	(1.471)	(0.166)	(0.692)	(0.267)	(0.937)	(0.150)	(1.056)	(0.543)	(0.852)
lnArea	0.415***	0.533***	0.404***	1.028***	0.093	0.192	0.380***	0.563***	-0.029	-0.024	0.246***	0.540**	-0.178	-0.002
	(0.034)	(0.155)	(0.045)	(0.204)	(0.137)	(0.240)	(0.049)	(0.148)	(0.071)	(0.220)	(0.050)	(0.210)	(0.142)	(0.144)
DCFTA	0.263	-0.006***	-0.235	0.212***	0.423	-0.020***	-0.511**	-0.250***	-0.709**	-0.057***	-1.171***	-0.272***	0.507	1.205***
	(0.173)	(0.002)	(0.310)	(0.001)	(0.664)	(0.004)	(0.204)	(0.005)	(0.334)	(0.003)	(0.242)	(0.004)	(0.399)	(0.008)
FTA with China	1.767***	0.788***	0.854***	0.490***	-3.730***	57.989	1.233***	1.662***	0.676	-0.631***	-1.695***	3.654***	-6.108***	-5.966***
	(0.178)	(0.006)	(0.225)	(0.002)	(0.860)	(0.000)	(0.208)	(0.027)	(0.492)	(0.024)	(0.238)	(0.059)	(1.159)	(2.087)
CIS	1.996***	0.817	-1.532***	-0.670	-1.140***	-0.954	0.328*	0.562	2.179***	2.607*	-0.806***	1.156	2.142***	7.916***
	(0.148)	(0.699)	(0.172)	(0.954)	(0.402)	(2.760)	(0.188)	(0.782)	(0.307)	(1.424)	(0.217)	(1.124)	(0.671)	(2.069)
Commonborder	-0.305*	-0.181	1.655***	0.776	2.059***	3.291	0.482**	0.473	0.681*	2.000	1.829***	0.999	1.733**	0.678
	(0.173)	(1.086)	(0.194)	(1.405)	(0.572)	(2.740)	(0.232)	(1.056)	(0.392)	(1.530)	(0.246)	(1.465)	(0.688)	(1.325)
Landlocked	-0.856***	-0.476	0.129	-0.778	-1.471***	-4.675*	0.505***	-0.270	0.478*	-1.525	1.264***	-0.766	-0.532	-2.519
	(0.124)	(0.528)	(0.251)	(0.875)	(0.326)	(2.524)	(0.131)	(0.680)	(0.249)	(1.225)	(0.200)	(1.017)	(0.462)	(2.113)

2008 year rececesion	-0.364	-0.379***	0.393	0.395***	0.189	0.177***	-0.343	-0.293***	-0.488**	-0.337***	-0.039	-0.026***	-6.573***	-6.653***
	(0.377)	(0.002)	(0.262)	(0.001)	(0.489)	(0.006)	(0.266)	(0.006)	(0.216)	(0.003)	(0.257)	(0.004)	(0.882)	(0.251)
2015 year external shock	-0.096	-0.079***	-0.166	-0.212***	0.858	0.925***	-0.245	-0.280***	-0.715***	-0.726***	0.231	0.201***	-1.202***	-1.250***
	(0.156)	(0.001)	(0.296)	(0.001)	(0.523)	(0.003)	(0.220)	(0.005)	(0.217)	(0.002)	(0.359)	(0.002)	(0.419)	(0.010)
Advanced economies	0.755***	0.304	0.375	-0.465	1.379*	2.089	0.523***	1.122**	-0.352	-0.028	-0.361	0.239	1.152***	-0.268
	(0.168)	(0.532)	(0.264)	(0.725)	(0.773)	(1.480)	(0.165)	(0.526)	(0.346)	(0.844)	(0.235)	(0.614)	(0.421)	(1.144)
Constant	9.475***	8.891**	4.872***	6.967	12.927***	16.236*	8.125***	8.798*	9.178***	5.586	-0.066	4.436	3.707	0.305
	(0.676)	(4.507)	(1.149)	(4.267)	(1.877)	(9.550)	(0.896)	(4.702)	(1.461)	(6.023)	(1.047)	(7.234)	(3.039)	(6.087)
Observation	900	900	900	900	900	900	900	900	900	900	900	900	900	900
R-squared	0.663		0.378		0.123		0.569		0.611		0.554		0.226	

*** p<0.01, ** p<0.05, * p<0.1

Table 17. *Gravity estimates of BEC for imports*

VARIABLES	food and beverage		industrial supply		fuels and lubricants		capital goods		transport and equipment		consumption goods		other goods	
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE	PPML	Poissoin RE
lnGDPgeo	1.440 ***	0.658 ***	2.642 ***	1.248 ***	0.255	1.230 ***	1.403 ***	1.287 **	2.957 ***	1.836 ***	2.063 ***	1.325 ***	3.048 ***	2.728 ***
	(0.150)	(0.002)	(0.141)	(0.001)	(0.215)	(0.002)	(0.154)	(0.001)	(0.176)	(0.002)	(0.174)	(0.001)	(0.468)	(0.004)
lnGDPj	-0.104	1.049***	-1.087 ***	0.858 ***	1.142 ***	0.016 ***	0.396 **	0.639 ***	0.181	-0.079 ***	-0.358 **	0.710 ***	0.560 **	0.696 ***
	(0.125)	(0.003)	(0.125)	(0.002)	(0.150)	(0.002)	(0.177)	(0.002)	(0.169)	(0.003)	(0.150)	(0.002)	(0.235)	(0.006)
lnDistance	-0.996 ***	-1.748 **	-0.994 ***	-1.844 ***	-1.058 ***	-5.073 ***	-0.181	-1.092	0.730 ***	0.019	-0.209	1.951 ***	-0.878 ***	-2.285 ***
	(0.129)	(0.704)	(0.117)	(0.641)	(0.199)	(0.996)	(0.158)	(0.670)	(0.479)	(0.736)	(0.146)	(0.697)	(0.229)	(0.749)
lnArea	0.481 ***	0.854***	0.361 ***	0.849 ***	0.230 ***	1.060 ***	0.304 ***	0.533 ***	0.166 ***	0.628 ***	0.290 ***	0.787 ***	0.490 ***	1.161 ***
	(0.037)	(0.167)	(0.031)	(0.141)	(0.054)	(0.278)	(0.034)	(0.129)	(0.056)	(0.218)	(0.035)	(0.148)	(0.070)	(0.215)
DCFTA	-0.100	0.334 ***	-0.803 ***	-0.278 ***	0.446	-0.297 ***	-0.429 ***	-0.347 ***	-1.256 ***	-0.677 ***	-0.393 ***	-0.131 ***	0.128	0.685 ***
	(0.133)	(0.001)	(0.124)	(0.001)	(0.382)	(0.001)	(0.156)	(0.001)	(0.229)	(0.001)	(0.135)	(0.001)	(0.428)	(0.003)_
FTA with China	-0.595 ***	-0.664 ***	0.953 ***	-0.182 ***	-2.755 ***	0.090	1.033 ***	-0.033 ***	-0.020	0.378 ***	0.408 **	-0.309 ***	-3.140 ***	-1.932 ***
	(0.140)	(0.006)	(0.181)	(0.002)	(0.418)	(0.062)	(0.273)	(0.002)	(0.225)	(0.003)	(0.165)	(0.002)	(0.518)	(0.029)
CIS	0.640 ***	0.965	-1.358 ***	-0.308	1.664 ***	0.560	-1.777 ***	-1.984 ***	-0.884 ***	-1.058	-1.581 ***	-1.979 ***	0.411	-0.380
	(0.192)	(0.642)	(0.191)	(0.679)	(0.260)	(1.709)	(0.184)	(0.743)	(0.237)	(0.825)	(0.231)	(0.711)	(0.365)	(1.234)

Commonborder	0.543 **	-0.018	1.672 ***	0.780	0.891 ***	-1.610	1.208 ***	0.433	1.739 ***	1.197	1.402 ***	-0.793	0.539	0.251
	(0.251)	(1.021)	(0.165)	(1.063)	(0.256)	(1.429)	(0.186)	(0.953)	(0.336)	(1.127)	(0.222)	(1.001)	(0.423)	(1.179)
Landlocked	-1.315 ***	-0.521	-1.509 ***	-0.998 **	0.314 *	-2.251 *	-0.402 ***	-0.811 *	-0.782 ***	-0.569	-0.983 ***	-0.926 *	0.414	-0.268
	(0.253)	(0.465)	(0.264)	(0.457)	(0.186)	(1.355)	(0.144)	(0.484)	(0.180)	(0.584)	(0.253)	(0.475)	(0.296)	(1.011)
2008 year rececesion	0.362	0.319 ***	0.344	0.320 ***	0.502	0.574 ***	0.378 *	0.395 ***	0.227	0.295 ***	0.289	0.307 ***	-3.595 ***	-3.583 ***
	(0.237)	(0.001)	(0.213)	(0.001)	(0.384)	(0.001)	(0.201)	(0.001)	(0.266)	(0.001)	(0.179)	(0.001)	(0.926)	(0.019)
2015 year external shock	-0.044	-0.052 ***	0.028	-0.29 ***	-0.125	0.162 ***	0.065	0.006 ***	-0.055	-.0159 ***	0.026	-0.029 ***	0.264	0.226 ***
	(0.160)	(0.001)	(0.159)	(0.001)	(0.311)	(0.001)	(0.201)	(0.001)	(0.259)	(0.001)	(0.182)	(0.001)	(0.362)	(0.001)
Advanced economies	0.632 ***	0.601	1.048 ***	0.433	-0.684 **	1.866 *	-0.108	0.177	0.864 ***	1.131 *	-0.299 *	-0.480	0.372	0.862
	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)	(0.152)
Constant	7.899 ***	6.662	10.977 ***	8.170 *	9.409 ***	31.308 ***	3.524 ***	7.239	-3.352 ***	-2.410	5.132 ***	-2.410	0.205	10.834 **
Observation	900		900		900		900		900		900		900	
R-squared	0.705		0.790		0.547		0.514		0.532		0.721		0.342	

Standard errors in parentshes es

*** p<0.01, ** p<0.05, * p<0.1

Table 18. *Gravity estimates on HS 2-digit level for exports*

VARIABLES	Edible vegetables and certain roots and tubers		Coffee, tea, maté and spices		Beverages, spirits and vinegar		Plastics and articles thereof		Wood and articles of wood; wood charcoal		Aircraft, speecraft, and parts thereof	
	(1)		(2)		(3)		(4)		(5)		(6)	
	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE
lnGDPgeo	1.623***	1.859 ***	0.671 ***	0.018	1.177 ***	0.534 ***	3.018 ***	4.881 ***	1.341 ***	1.301 ***	-2.367 ***	-7.029 ***
	(0.426)	(0.030)	(0.205)	(0.019)	(0.187)	(0.004)	(0.319)	(0.028)	(0.307)	(0.010)	(0.427)	(0.024)
lnGDPj	1.996 ***	1.801 ***	-0.056	0.812 *	0.516 ***	1.686 ***	0.355 *	-2.039 ***	-0.505	-0.550 ***	0.890 **	4.069 ***
	(0.342)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)
lnDistance	-1.792	-3.106"	-0.964	-1.075	-1.010	0.725	-1.862	-1.199	-2.912	-3.432	-2.002'	-5.188
	(0.396)	(1.107)	(0.134)	(1.084)	(0.156)	(0.801)	(0.224)	(0.832)	(0.184)	(1.317)	(0.983)	(3.857)
lnArea	0.116	0.522 **	0.454	0.865 *	0.426 ***	0.152	0.328 ***	0.525 ***	0.726 ***	0.848 ***	0.260	1.518 **
	(0.118)	(0.229)	(0.050)	(0.260)	(0.044)	(0.187)	(0.069)	(0.150)	(0.075)	(0.299)	(0.213)	(0.638)
DCFTA	1.421 ***	0.212 ***	-1.495 ***	-1.062	0.395*	0.059 ***	-0.543	0.611***	0.448 *	0.933 ***	3.619 ***	8.752 ***
	(0.465)	(0.031)	(0.300)	(0.024)	(0.226)	(0.003)	(0.564)	(0.033)	(0.270)	(0.008)	(0.741)	(0.032)
FTA with China		-22.757	2.299 ***	4.890 *	1.910 ***	0.336 ***	1.876 ***	3.311 ***	-6.436 ***	-7.462 ***		-22.146
		(141,335)	(0.604)	(0.085)	(0.281)	(0.006)	(0.547)	(0.123)	(0.768)	(1.352)		(3707072.244)
CIS	4.968 ***	4.614 **	1.176 ***	2.332 *	2.884 ***	5.272***	0.156	-0.789	-2.941 ***	-2.454	5.625 ***	10.587 ***
	(0.640)	(1.848)	(0.298)	(1.050)	(0.201)	(0.896)	(0.297)	(1.206)	(0.310)	(2.157)	(1.218)	(3.735)
commonborder	-0.247	0.052	0.193	0.108	-0.594 ***	1.760	0.578	2.350 *	0.601 **	-0.291	-2.797	0.734
	(0.496)	(1.976)	(0.276)	(1.659)	(0.205)	(1.678)	(0.366)	(1.376)	(0.273)	(2.009)	(2.089)	(3.961)

landlocked	-1.940 ***	-5.398 ***	-1.163 ***	-1.215	-1.441 ***	-2.762 ***	0.511 *	-0.474	0.330	-1.106	2.235 ***	0.622
	(0.383)	(1.633)	(0.161)	(0.900)	(0.128)	(0.778)	(0.293)	(1.010)	(0.222)	(1.938)	(0.560)	(2.596)
crisis	-0.735	-0.740 ***	-0.698	-0.735	-0.297	-0.413 ***	-1.063 ***	-0.773 ***	0.272	0.294 ***	-2.403 ***	-2.450 ***
	(0.802)	(0.027)	(0.460)	(0.018)	(0.520)	(0.003)	(0.389)	(0.029)	(0.224)	(0.007)	(0.751)	(0.024)
dummy_2015	-0.197	-0.198 ***	0.280	0.281 *	-0.281 **	-0.243 ***	-0.160	-0.142 ***	-0.500 **	-0.529 ***	-0.278	-0.298 ***
	(0.402)	(0.012)	(0.303)	(0.011)	(0.139)	(0.002)	(0.185)	(0.010)	(0.239)	(0.008)	(0.973)	(0.010)
advanced	-2.417 ***	-2.120 **	0.044	-1.065	0.137	-1.450 **	-0.261	0.563	1.599 ***	1.555 *	1.596 *	4.167 *
	(0.424)	(0.831)	(0.271)	(0.721)	(0.236)	(0.568)	(0.497)	(0.780)	(0.347)	(0.891)	(0.905)	(2.401)
Constant	4.662 **		4.973 ***		5.594 ***		6.472 ***		17.074 ***		14.112 **	
	(2.216)		(0.765)		(0.898)		(1.503)		(1.077)		(6.804)	
Observation	898	10.971	900	-0.743	900	-6.471	900	2.204	900	20.261"	898	17.623
R squared	0.541	(7.550)	0.517	(7.210	0.715	(5.042)	0.707	(5.398)	0.572	(8.325)	0.128	(24.700)
Number of id												
Standard errors in parentheses												
*** p<0.01, ** p<0.05, * p<0.1												

Table 19. *Gravity estimates on HS 2-digit level for imports*

VARIABLES	Edible vegetables and certain roots and tubers		Tobacco and manufactured tobacco substitutes		Organic chemicals		Plastics and articles thereof		Rubber and articles thereof	
	(1)		(2)		(3)		(4)		(5)	
	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE
lnGDPgeo	0.133	0.738 ***	1.868 ***	0.679 ***	1.339 ***	1.347 ***	1.583 ***	0.898 ***	1.516 ***	0.096 ***
	(0.273)	(0.015)	(0.213)	(0.006)	(0.308)	(0.020)	(0.283)	(0.005)	(0.243)	(0.006)
lnGDPj	0.794 ***	0.019	-0.781 ***	1.798 ***	-0.531 ***	-0.308 ***	-0.797 ***	0.069 ***	-0.449 ***	1.636 ***
	(0.256)	(0.018)	(0.193)	(0.013)	(0.147)	(0.022)	(0.149)	(0.005)	(0.143)	(0.009)
lnDistance	-1.916 ***	-3.024 **	-2.615 ***	-4.124 ***	0.060	-1.992	-0.312 **	-1.494 **	0.511 **	-0.316
	(0.200)	(1.198)	(0.281)	(1.217)	(0.156)	(1.239)	(0.147)	(0.755)	(0.234)	(0.671)
lnArea	0.384 ***	0.771 **	0.980 ***	1.242 ***	0.385 ***	0.833 ***	0.367 ***	0.740 ***	0.272 ***	0.776 ***
	(0.054)	(0.308)	(0.084)	(0.350)	(0.049)	(0.261)	(0.043)	(0.156)	(0.058)	(0.165)
DCFTA	0.492 *	0.307 ***	-0.888 **	-1.501 ***	-0.122	-0.353 ***	-0.516 **	-0.129 ***	-0.488	0.012 **
	(0.292)	(0.013)	(0.402)	(0.007)	(0.245)	(0.013)	(0.229)	(0.004)	(0.305)	(0.005)
FTA with China	2.300 ***	0.942 ***	2.236 ***	0.429 ***	2.704 ***	1.709 ***	1.194 ***	0.612 ***	1.259 ***	0.161 ***
	(0.358)	(0.070)	(0.556)	(0.015)	(0.628)	(0.014)	(0.245)	(0.004)	(0.334)	(0.006)
CIS	1.125 ***	-1.234	3.114 ***	0.526	-0.972 ***	-3.141 **	-2.368	-1.793 **	-0.456	0.315
	(0.189)	(1.307)	(0.347)	(1.247)	(0.301)	(1.259)	(0.311)	(0.759)	(0.289)	(0.816)
commonborder	0.878 ***	0.316	-3.098 ***	-5.055 ***	2.167 ***	2.769 *	2.210 ***	0.573	1.336 ***	0.345
	(0.203)	(1.728)	(0.354)	(1.723)	(0.271)	(1.510)	(0.332)	(1.090)	(0.376)	(1.129)

landlocked	-0.504 **	-0.492	-3.605 ***	-1.478 *	-0.079	-1.332 *	-0.364	-0.236	-2.091 ***	-1.408 **
	(0.205)	(0.918)	(0.251)	(0.894)	(0.383)	(0.748)	(0.289)	(0.508)	(0.247)	(0.556)
crisis	0.654 **	0.723 ***	0.302	-0.028 ***	0.759 *	0.718 ***	0.587 ***	0.601 ***	0.393 *	0.426 ***
	(0.283)	(0.009)	(0.297)	(0.004)	(0.433)	(0.011)	(0.257)	(0.003)	(0.233)	(0.005)
dummy_2015	-0.426	-0.425 ***	-0.053	0.160 ***	-0.360	-0.364 ***	-0.534	-0.590 ***	-0.191	-0.312 ***
	(0.442)	(0.013)	(0.183)	(0.003)	(0.423)	(0.015)	(0.541)	(0.004)	(0.415)	(0.005)
advanced	1.077 ***	1.367 *	3.104 ***	0.041	0.681 ***	1.619 **	-0.158	-0.015	-0.085	-0.411
	(0.358)	(0.813)	(0.545)	(1.098)	(0.223)	(0/96)	(0.205)	(0.575)	(0.291)	(0.611)
Constant	10.611 ***	16.229 **	10.868	16.437 **	-2.144	7.680	4.779 ***	7.868	-2.155	-5.857
	(1.326)	(7.425)	(1.932)	(6.486)	(1.326)	(7.745)	(1.154)	(5.097)	(1.539)	(4.491)
Observation	900		900		900		900		900	
R squared	0.488		0.899		0.505		0.425		0.480	
Number of id	45		45		45		45		45	

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 20. *Gravity estimates on HS 2-digit level for imports (2)*

VARIABLES	Paper and paperboard; articles of paper pulp, of paper or of paperboard		Articles of apparel and clothing accessories, knitted or crocheted		Iron and steel		Aluminium and articles thereof		Electrical machinery and equipment and parts thereof; sound recorders and reproducers	
	(1)		(2)		(3)		(4)		(5)	
	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE
lnGDPgeo	1.290 ***	0.624 ***	1.770 ***	1.042 *	2.302 ***	0.003	2.265 ***	1.633 *	0.652 ***	0.517 ***
	(0.261)	(0.006)	(0.300)	(0.008)	(0.358)	(0.005)	(0.364)	(0.011)	(0.495)	(0.002)
lnGDPj	-0.817 ***	0.151 ***	-0.972 ***	0.078 *	-1.857 ***	1.915 *	-1.632 ***	-0.614	0.554 ***	0.815 ***
	(0.183)	(0.009)	(0.195)	(0.009)	(0.417)	(0.007)	(0269)	(0.013)	(0219)	(0.003)
lnDistance	-0.570 ***	-2.175 **	0.149	-0.645	-1.798 ***	-1.597	-0.675 ***	-2.263	0.099	-L074
	(0.167)	(0.914)	(0.176)	(0.824)	(0.300)	(1.073)	(0207)	(0.859)	(0.471)	(0.679)
lnArea	0.335 ***	0.892 ***	0.438 ***	0.692 *	0.753 ***	1.150 *	0.397 ***	1.046 *	0.302 ***	0.644 ***
	(0.040)	(0.210)	(0.051)	(0.148)	(0.089)	(0.296)	(0.052)	(0.192)	(0.036)	(0.146)
DCFTA	-0.255	-0.142 **	-0.330	-0.277	-1.199 ***	-0.375	-0.912 **	-0.945	-0.592 ***	-0.455 ***
	(0.218)	(0.004)	(0.285)	(0.007)	(0.318)	(0.008)	(0.354)	(0.008)	(0204)	(0.002)
FTA with China	0.910 ***	0.422 ***	0.935 ***	0.175 *	2.100 ***	0.063 *	1.200 ***	0.489 *	1.091 ***	0.213 ***
	(0.217)	(0.008)	(0.297)	(0.007)	(0.522)	(0.005)	(0.333)	(0.011)	(0278)	(0.003)
CIS	-1.207 ***	-2.091 **	-3.579 ***	-3.661	0.572	2.295 *	-1.892 ***	-3.037	-1.120 ***	-1.603 **
	(0.300)	(0.901)	(0.307)	(0.774)	(0.549)	(1.349)	(0.352)	(0/94)	(0288)	(0.711)

commonborder	L707 ***	-0.942	2.593 ***	3.572 *	-0.441	-0.222	2.063 ***	-0.834	0.585 *	-0.603
	(0.342)	(1.175)	(0.315)	(1.293)	(0.839)	(1.653)	(0.410)	(1.112)	(0.325)	(0.968)
landlocked	-1.641 ***	-0.397	0.229	-0.613	-3.849 ***	-1.896	-2.715 ***	-0.390	-0.474 **	-0408
	(0.462)	(0.645)	(0.264)	(0567)	(0.696)	(0.985)	(0.597)	(0.605)	(0205)	(0485)
crisis	0.646 ***	0.627 ***	0.501 **	0.499 *	1.162 ***	0.824 *	0.738 ***	0.695 *	0.680 **	0.707 ***
	(0.247)	(0.003)	(0.214)	(0.005)	(0441)	(0.002)	(0.273)	(0.005)	(0269)	(0.002)
dummy_2015	-0.321	-0.334 **	-0.355	-0.417	-0.224	-0.105	-0.334	-0.344	-0.043	-0.122 ***
	(0.385)	(0.005)	(0.544)	(0.007)	(0.339)	(0.003)	(0.563)	(0.008)	(0.344)	(0.002)
advanced	0.294	-0.051	0.403	0.095	1.121 **	-0.526	1.546 ***	1.106 *	-1.091 ***	-0.622
	(0.227)	(0.677)	(0.370)	(0.518)	(0.531)	(1.212)	(0.387)	(0.613)	(0288)	(0511)
Constant	7.190 ***	11.383 *	-1.109	0.161	11.749 ***	-1.530	6.378 ***	9.061	1.708	5.949
	(1.267)	(6.407)	(1.304)	(5.663)	(2/98)	(7.260)	(1.588)	(6.174)	(1249)	(4.564)
Observation	900		900		900		900		900	
R squared	0.391		0.455		0.539		0.311			0.339
Number of id	45		45		45		45		45	

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 21. *Gravity estimates on HS 4-digit level for exports*

VARIABLES	New pneumatic tyres, of rubber		Undenatured ethyl alcohol, spirits, liqueurs and other spirituous beverages		Wine of fresh grapes		Turbo-jets, turbo-propellers and other gas turbines		Women's or girls' overcoats, car-coats and similar articles	
	(1)		(2)		(3)		(4)		(5)	
	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE
lnGDPgeo	0.040	5.087 ***	1.217 ***	0.660 ***	0.993 ***	0.751 ***	-1.566 ***	-1.580 ***	3.677 **	8.476 ***
	(0.994)	(0.059)	(0.222)	(0.008)	(0.248)	(0.007)	(0.503)	(0.070)	(1.532)	(0.105)
lnGDPj	1.818 **	-3.910 ***	0.302 *	1.349 ***	0.563 ***	1.055 ***	0.880 *	0.803 ***	1.756	-9.642 ***
	(0.780)	(0.066)	(0.161)	(0.013)	(0.104)	(0.010)	(0.472)	(0.070)	(1.829)	(0.191)
lnDistance	-0.682 *	0.056	-1.543 ***	-0.946 **	-0.074	-0.915 ***	0.630	-2.919	-4.446 ***	-1.494
	(0.410)	(1.043)	(0.216)	(0.464)	(0.165)	(0.281)	(1.149)	(3.165)	(0.903)	(2.648)
lnArea	-0.148 **	-0.293	0.512 ***	0.456 ***	0.757 ***	0.713 ***	0.578 ***	2.498 ***	1.117 ***	2.059 ***
	(0.058)	(0.308)	(0.070)	(0.139)	(0.054)	(0.101)	(0.115)	(0.802)	(0.207)	(0.606)
DCFTA	4.428 ***	3.035 ***	1.042 **	0.875 ***	1.246 ***	0.155 ***	4.097 ***	4.737 ***	-6.527 ***	-6.658 ***
	(1.146)	(0.029)	(0.474)	(0.005)	(0.256)	(0.005)	(0.723)	(0.063)	(1.034)	(0.146)
FTA with China	6.953 ***	10.362 ***	2.192 ***	0.155 ***	0.682 ***	0.577 ***		-22.332	5.794 ***	10.965 ***
	(1.791)	(3.611)	(0.452)	(0.027)	(0.255)	(0.007)		(780,512.	(1.508)	(3.182)
CIS	5.366 ***	5.129	4.598 ***	5.483 ***	3.077 ***	2.288 ***	1.082 *	1.056	4.444 ***	-6.496 **
	(1.536)	(3.699)	(0.303)	(1.118)	(0.196)	(0.800)	(0.653)	(3.357)	(1.321)	(3.143)

commonborder	1.324 *	-0.112	-1.695 ***	-1.968	-1.712 ***	-2.000 **	0.981	-3.019	-3.547 **	-1.351
	(0.766)	(2.697)	(0.284)	(1.548)	(0.267)	(0.989)	(1.372)	(3.662)	(1.462)	(3.246)
landlocked	-2.436 ***	-7.992 **	-1.949 ***	-1.681	-2.297 ***	-1.812 ***	2.866 ***	6.598 ***	-1.355 **	2.984
	(0.762)	(3.304)	(0.171)	(1.042)	(0.161)	(0.641)	(0.654)	(1.962)	(0.595)	(2.177)
2008 year reccesion	0.077	0.538 ***	0.350	0.239 ***	-0.686	-0.746 ***	-1.266	-1.251 ***	0.100	0.538 ***
	(1.113)	(0.043)	(0.355)	(0.004)	(0.689)	(0.005)	(1.041)	(0.096)	(0.979)	(0.037)
2015 year external shock	-0.554	-0.404 ***	-0.643 ***	-0.598 ***	-0.343 **	-0.311 ***	-7.274 ***	-7.291 ***	-4.859 ***	-3.471 ***
	(1.006)	(0.012)	(0.248)	(0.005)	(0.164)	(0.003)	(1.155)	(0.955)	(1.147)	(0.983)
advanced	1.800 **	2.401 *	2.227 ***	0.920	-2.422 ***	-2.032 ***	-2.441 ***	1.236	9.926 ***	12.904 ***
	(0.819)	(1.369)	(0.344)	(0.796)	(0.244)	(0.518)	(0.824)	(2.323)	(1.961)	(1.619)
Constant	0.641	7.652	6.099 ***	0.738	-6.446 ***	0.264	-11.859	-11.248	2.199	-3.499
Observation	900		900		900		898		900	
R squared	0.090		0.654		0.722		0.149		0.114	
Number of id		45		45		45		45		45

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 22. *Gravity estimates on HS 4-digit level for imports*

VARIABLES	Meat and edible offal, of the poultry, fresh, chilled or frozen		Cigars, cheroots, cigarillos and cigarettes		Automatic data processing machines and units thereof		Self-propelled bulldozers, graders, levellers, scrapers, tamping machines		Insulated wire, cable and other insulated electric conductors		Other tubes, pipes and hollow profiles, of iron or steel	
	(1)		(2)		(3)		(4)		(5)		(6)	
	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE	PPML	PPML RE
lnGDP-geo	0.825 ***	-0.196 ***	2.040 ***	0.799 ***	0.552	-1.668 ***	1.612 ***	0.371 ***	0.767 ***	0.350 ***	2.437 ***	0.283 ***
	(0.325)	(0.000)	(0.225)	(0.000)	(0.450)	(0.001)	(0.260)	(0.000)	(0.234)	(0.000)	(0.338)	(0.000)
lnGDPj	0.239	2242 ***	-0.824 ***	1.948 ***	-1.033 ***	2.640 ***	-0.519 **	1.608 ***	-0.480 **	1.215 ***	-2.952 ***	0.415 ***
	(0.214)	(0.001)	(0.213)	(0.000)	(0.365)	(0.002)	(0.217)	(0.000)	(0.190)	(0.000)	(0.435)	(0.001)
lnDis-tance	0.606 ***	-2.104 *	-2.702 ***	-5.4804 ***	-1.080 **	-5.711 *	0.088	-2.115 ***	-0.591***	-1.850 *	-2.348 ***	-3.194 **
	(0.199)	(1.083)	(0.365)	(1.770)	(0.530)	(3.173)	(0.167)	(0.434)	(0.199)	(1.009)	(0.468)	(1.346)
lnArea	0.670 ***	1.098 ***	1.052 ***	1.712 ***	0.484 ***	1.919 ***	0.091 *	0.472 ***	0.359 ***	0.968 ***	0.715 ***	1.163 ***
	(0.094)	(0.246)	(0.100)	(0.533)	(0.090)	(0.641)	(0.049)	(0.107)	(0.044)	(0.195)	(0.087)	(0.234)
DCFTA	0.670 **	1.259 ***	-0.900	-1.8764 ***	-1.723 **	-1.0634 ***	-0.798 ***	-0.731 ***	-1.112 ***	-0.920 ***	-1.016 **	-0.394 ***
	(0.341)	(0.000)	(0.584)	(0.000)	(0.689)	(0.002)	(0.278)	(0.000)	(0.248)	(0.000)	(0.432)	(0.001)
FTA with China	0.515 *	-0.324 ***	2.346 ***	0.587 ***	2.413 *	0.062 ***	1.763 ***	0.025 ***	1.659 ***	0.543 ***	2.606 ***	0.393 ***
	(0.295)	(0.000)	(0.718)	(0.001)	(1.258)	(0.002)	(0.561)	(0.000)	(0.332)	(0.000)	(0.864)	(0.001)
CIS	2.823 ***	0.480	3.311 ***	-0.247	-0.500	-3.859	-1.411 ***	-0.633	-0.311	-0.313	-0.540	-1.451
	(0.476)	(1.951)	(0.387)	(1.859)	(0.529)	(3.733)	(0.353)	(1.491)	(0.334)	(0.948)	(0.396)	(1.587)

common-border	-4.341 ***	-2.142	-3.431 ***	-7.1014 ***	1.071 *	-3.303	1.532 ***	-1.071	0.502	-1.270	1.406 **	-1.656
	(1.043)	(2.201)	(0.432)	(2.617)	(0.584)	(3.357)	(0.423)	(1.398)	(0.407)	(1.388)	(0.581)	(1.734)
land-locked	-5.892 ***	-4.374 ***	-3.916 ***	-0.979	-4.711 ***	-3.445 *	-1.005 ***	-2.126	-1.207 ***	0.100	-6.887 ***	-1.404
	(0.486)	(1.558)	(0.320)	(1.312)	(0.985)	(1.788)	(0.361)	(1.404)	(0.419)	(0.627)	(1.102)	(0.862)
2008 year reccesion	0.310	0.300 ***	0.230	-0.1364 ***	0.747	0.746 ***	1.0204 ***	1.022 ***	0.755 **	0.707 ***	1.406 ***	1.181 ***
	(0.546)	(0.000)	(0.271)	(0.000)	(0.732)	(0.001)	(0.361)	(0.000)	(0.305)	(0.000)	(0.424)	(0.000)
2015 year external shock	-0.278	-0.306 ***	-0.044	0.192 ***	-0.127	-0.300 ***	-0.016	-0.112 ***	-0.062	-0.094 ***	-0.537	-0.442 ***
	(0.531)	(0.000)	(0.199)	(0.000)	(0.614)	(0.001)	(0.511)	(0.000)	(0.529)	(0.000)	(0.440)	(0.000)
advanced	0.611 **	0.143	2.972 ***	-0.238	1.991 **	-0.343	0.501 **	0.192	0.074	-0.499	3.077 ***	0.315
	(0.307)	(1.518)	(0.665)	(1.484)	(0.898)	(1.812)	(0.219)	(1.188)	(0.297)	(0.723)	(0.779)	(0.975)
Constant	-3.596 *	8.864	16.951 ***	27.155 ***	13.695 ***	26.565	9.536 ***	18.733 ***	13.179 ***	12.384 *	23.3594 ***	19.984 ***
	(1.932)	(9.204)	(2.755)	(9.228)	(4.154)	(19.814)	(1.106)	(5.047)	(1.473)	(6.915)	(3.246)	(9.631)
Observa-tion	900		900		900		900		900		900	
R squared	0.319		0.900		0.079		0.200		0.245		0.386	
Number of id		45		45		45		45		45		45

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Research