Economic Impacts of Korea-Turkey FTA

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Abstract

The trade volume and diversity of the products traded between Korea and Turkey have been increasing since early 2000s. On top of this, the enthusiasm of the countries in exploring new opportunities led them to start the negotiations on signing a free trade agreement in 2010. The process was finalized in 2012. The agreement foresees that all of the trade tariffs on industrial products and most of the tariffs on agricultural products will be removed in seven and ten years, respectively. To the best of our knowledge, this study is the first one that investigates possible economic impacts of this agreement on Korean and Turkish economies. It employs a computable general equilibrium model and uses the Global Trade Analysis Project database. It finds that the agreement will benefit both parties in terms of GDP and export. In particular, total gains of Korea and Turkey would be as high as 0.129 and 0.054 percent of their respective GDPs. Finally, the exports of Korea might increase by up to 0.139 percent where that of Turkey might increase by 0.164 percent.

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1. Introduction

The diplomatic relationship between the Republic of Korea (Korea from so forth) and the Republic of Turkey (Turkey from so forth) dates back to 1949; however, the economic relationship has been steadily increasing only since the early 2000s. After hovering around one billion US dollars (USD), total trade volume reached a level above six billion USD in 2013. Despite the fact that most of the traded goods between the countries are classified under manufacturing goods, considerable increases in the agricultural, fishing and mining products trade have also been observed in recent years.

Both countries have been very enthusiastic about signing free trade agreements (FTAs). Currently, Korea has ten FTAs in effect and fifteen more are either under consideration or negotiation. Turkey has seventeen agreements in force. In addition to the fact that trade level and product diversification have been increasing, the enthusiasm of the countries on pursuing new trade agreement opportunities encouraged them to start on FTA negotiations in 2010. The negotiations were finalized in 2012 with two agreements, which are "Framework Agreement Establishing a Free Trade Area" and "Agreement on Trade in Goods between the Republic of Turkey and the Republic of Korea". Finally, the FTA has been put in force on May 1, 2013. In a nutshell, the FTA foresees the removal of the trade tariffs on industrial products within seven years after the date of entry into force of the Agreement. Moreover, except the agricultural goods that the countries have socio-economic sensitivities, almost all trade tariffs on all items will be eliminated within a decade.[1]

In the literature, the number of studies investigating the impacts of FTAs is increasing proportionate to the number of agreements established around the globe. These studies investigate the influences of FTAs on signing parties or on their other trading partners and identify two potential channels: trade creation and trade diversion. Since parties agree to eliminate the tariffs between themselves, consumers in these countries are expected to increase their demand, which leads to an increase in the volume of currently traded goods. The latter channel is more related to the parties' other trading partners that might lose trade due to the new agreement.[2] Most of the studies work with a computable general equilibrium (CGE) model and

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[1] In addition to the agreements above, the two countries have completed the negotiations on "Agreement on Trade in Services" and "Agreement on Investment" on February 26, 2015. Although possible impacts of these agreements could be subject to research, we only consider Agreement on Trade in Goods in this particular study.
[2] See Xiaotong et al. (2014) for a detailed discussion.

utilize from Global Trade Analysis Project (GTAP). With this methodology, it is possible to qualitatively and quantitatively compute the impacts of the FTAs that might occur through both channels. In this study, we aim at examining the possible impacts of the Korea-Turkey FTA on the economies of the parties and ignore its possible impacts on the third parties, therefore, following the literature, we employ a CGE model and use the GTAP database in the analysis.

In the empirical analysis, we consider two alternative scenarios. In each scenario, we employ reduction in tariff barriers. In the second one, reduction in non-tariff barriers is introduced as an additional shock. We find that Korea and Turkey might benefit from the agreement by 0.129 and 0.054 percent of their GDPs in cumulative, respectively. Moreover, the export of Korea would rise by 0.139 percent where that of Turkey would go up by 0.164 percent. In other words, both countries are expected to significantly benefit from the agreement. In bilateral trade flow among Korea and Turkey, the highest increases in terms of percentage deviation in Korean export to Turkey are observed in agricultural and food products where as that of Turkey to Korea occurs in extractive industry and light manufacturing.

Section 2 provides a discussion on the trade relationship of Korea and Turkey along with the details of the FTA. Section 3 discusses some examples from the literature that investigate similar agreements and Section 4 provides a brief discussion on the methodology used in the study. Section 5 lays out main results of the study before Section 6 concluding the paper.

2. The Road to the FTA

Some major macroeconomic indicators of Korea and Turkey as of 2013 are provided in table 1. According to the table, population of Turkey is significantly higher than Korea; however, it is vice versa in the case of GDP. When we compare the total trade volumes of the countries, Korea has much more trade relationship with the rest of the world compared to Turkey. Turkey has been chronically running current account deficit for almost two decades where Korea has been running a surplus. At the end of 2013 it is almost -8 percent and a little bit higher than 6 percent in Turkey and Korea, respectively.

The diplomatic relationship between the two countries has started with Turkey's recognition of Korea in 1949. Although bilateral relations have intensified after the participation of a Turkish brigade to the Korean War (1950-1953), the economic relationship was not commensurate with that. As shown in table 2, the trade volume hovered around one billion USD until the 2000s. During the last decade, however, the trade volume has shown a steady increasing

trend, mostly in favor of Korea, and reached above 6 billion USD in 2013. It is worthwhile to mention that 95 percent of the total trade is generated by exports from Korea.

In addition to table 2, which shows the historical progress of the trade between Korea and Turkey, we lay out the breakdown of the exports and imports between the two countries in tables 3 to 4. As laid out in table 3, in the seventies and eighties, the main items imported by Korea were agricultural, hunting and forestry products. Starting from early nineties, the manufacturing sector products have been her main import items. Meanwhile the exports of Korea as listed in table 4, steadily increased since mid-eighties. The manufacturing sector has always been the dominant one in her exports. In recent years, although their trade levels are still below the level of manufacturing products, the role played by agricultural, fishing and mining products in the total trade have increased significantly.

Both countries have been very enthusiastic about signing FTAs. Korea started the debates on negotiating FTAs initially as a response to the East Asia financial crisis of 1997. After signing her first FTA with Chile in 1998, Korea has signed nine more FTAs, which are with ASEAN[3], Colombia, EFTA[4], the European Union (EU), India, Peru, Singapore, Turkey, and the US. According to the Korean Ministry of Foreign Affairs, fifteen more FTAs are either under negotiation or consideration. In the meantime Turkey, starting from early nineties, signed several agreements. As of today, she has seventeen FTAs in effect.[5]

Along with the increasing trend of the trade volume between the two countries and its enriching content, FTA negotiations of Korea with the EU and Turkey's obligation to apply EU's commercial policy, Korea and Turkey started negotiations on signing an FTA in 2010. After more than two years, in August 2012, a couple of agreements constituting the FTA were signed, which were put into force on May 1, 2013. The agreements are "Framework Agreement Establishing a Free Trade Area" and "Agreement on Trade in Goods between the Republic of Turkey and the Republic of Korea". The main objectives of the FTA are listed in the Framework Agreement as follows:[6]

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[3] ASEAN stands for the Association of Southeast Asian Nations. The members are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.
[4] EFTA represents European Free Trade Association and its members are Iceland, Lichtenstein, Norway, and Switzerland.
[5] Although currently seventeen FTAs, which are with Albania, Bosnia-Herzegovina, Chile, EFTA, Egypt, Georgia, Israel, Jordan, Lebanon, Macedonia, Mauritius, Montenegro, Morocco, Palestine, Republic of Korea, Serbia, Syria and Tunisia, are in effect, the one with Syria has been suspended on December 6, 2011.
[6] The details of the FTA can be found at: http://www.economy.gov.tr.

a. to gradually liberalize and facilitate substantially all trade in goods,

b. to gradually liberalize and facilitate trade in services and investment,

c. to promote competition in their economies, particularly as it relates to economic relations,

d. to adequately and effectively protect intellectual property rights,

e. to contribute by removing the barriers to trade and by developing an environment conducive to increased investment flows, to the harmonious development and expansion of the world trade,

f. to commit, in the recognition that sustainable development is an overarching objective, to the development of international trade in such a way as to contribute to the objective of sustainable development and strive to ensure that this objective is integrated and reflected at every level of the countries' trade relationship,

g. to promote foreign direct investment without lowering or reducing environmental, labor, or occupational health and safety standards in the application and enforcement of environmental and labor laws of the countries.

Although the FTA envisages that trade tariffs on almost all trading items, except the agricultural goods that countries have socio-economic sensitivities, will be eliminated within a decade, it will take only seven years that the tariffs for the industrial products to be removed. For expositional purposes, we plot figure 1 to show the applied tariff rates of the countries as of 2013. According to the figure, the tariff rates of both countries are closed to each other where they are high for agricultural products. The tariff rates for non-agricultural products are relatively low; therefore, it can be claimed that especially the removal of tariffs on agricultural products and removal of non-tariff barriers in non-agricultural products might boost the trade volumes of both parties. In the FTA, both parties provide a detailed schedule for the removal of the tariffs for thousands of different products that belong to all categories.

3. The GTAP model

The number of studies examining the ex-ante impacts of FTAs has increased proportionately to the number of agreements being signed around the world. The methodology in

these studies is to employ a static, computable general equilibrium (CGE) model and use the Global Trade Analysis Project (GTAP) database.[7]

GTAP is a multi-regional model which covers 113 regions and 57 sectors. As explained in Brockmeier (2001), two main equation types are employed in the model. In the first type, income and expenditures are balanced for each agent where the second type covers behavioral equations of optimizing agents. Each region defined in the GTAP model includes a regional household that collects all income created within the economy. The collected income is used in different forms of final demand: private household expenditures, government expenditures and savings. Since the GTAP is a multi-region open economy model, agents have economic interaction with the rest of the world. Therefore, private household and government consume both domestic goods and services from domestic producers and foreign goods and services from the rest of the world. Savings and investments, which are other elements of final demand, are calculated on a global scale. In the model, global savings and global investment are equal to each other. Moreover, all markets clear and all producers obtain zero profit under perfect competition assumption.

Producers earn income by selling consumption goods to private households (Private Household's Domestic Consumption) and to the government (Government's Domestic Consumption). They also sell intermediate inputs to other producers (Firms' Domestic Consumption) and investment goods to the global savings sector (Net Investment). Regarding the multi-region open economy model, producers export their final goods and services to the rest of the world and import intermediate inputs. Therefore, receipts of producers are net investment, domestic consumption of private households, government and firms, and export to the rest of the world. Under zero profit assumption, total revenue of the producers should be equals to total expenditures which are sum of taxes, firms' domestic and foreign consumption to intermediate inputs, and value of endowments paid by the producers to the regional household for the use of endowment commodities which are non-tradable goods including agricultural land, labor and capital.

In addition, GTAP model incorporates government via taxes and subsidies. The private household and the government use their revenues not only for expenditure but also for transferring tax to the regional households. Producers transfer tax to the regional household,

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[7] The GTAP is a global database that contains macroeconomic, bilateral trade flows and regional input-output data. The coordination of the GTAP database is made by the Center for Global Trade Analysis in the Department of Agricultural Economics of Purdue University. For details, one can visit https://www.gtapiagecon.purdue.edu.

where taxes are considered in terms of net value due to the subsidies. Regional household's income is comprised of tax revenues both from domestic agents and rest of the world and flows from producers due to consumption of endowments. Finally, private households, government and producers consume not only domestic products but also imported products and thus, both the regional household has an export and import tax revenues from the rest of the world.

For expositional purposes we provide the transmission mechanism summarized above in figure 2, where the mechanism is reflected only from one-country and one-sector perspective. In a wider perspective, different transmission mechanisms and parameter values are available for each region and sector. With this methodology it is possible to quantify the impacts of an FTA on national income, industrial production and welfare of the partner countries as well as on the third parties.

4. Literature review

In this section, we provide some examples from the literature that employ the strategy described above. However, one should keep this in mind that since the model applies several assumptions and restrictions, the numbers should not be taken at their face values. It is possible to examine the impacts of an FTA on the parties of the agreement as well as its impacts on the third parties. Although in our study we solely focus on the impacts of an FTA on the signing parties of the agreement, below we consider studies that examine the impacts of FTAs on the third parties as well.

A couple of earlier studies that employ CGE with GTAP are Hertel et al. (2001) and Lee et al. (2005). The former study, which examines the agreement between Japan and Singapore, is particularly important because the authors claim that the agreement would be a template for other agreements. It includes bilateral liberalization and trade facilitation via reducing tariff and non-tariff barriers as well as the mutual recognition of national standards, streamlining customs procedures, facilitation of increased services trade, and collaboration on intellectual property, education and training, media and broadcasting and tourism.[8] The study finds that the agreement would increase foreign investment along with domestic investment and GDP. The combined annual gain of the countries from the FTA is expected to be more than 9 billion USD in the long-run. The latter study examines the economic effects of a possible FTA between Korea and China,

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[8] The agreement was signed and became effective in 2002.

in particular on foreign direct investment.[9] It estimates an additional growth on average 2.7 percent and 0.5 percent for the GDP of Korea and China, respectively. Regarding the foreign direct investment, the paper envisages a boost into both countries as a result of the FTA.

Yoon et al. (2009), examine the impacts of possible FTAs among China, Japan and Korea within a CGE analysis. The main results of the study indicate that the best outcome for Korea is to establish an FTA with China where China and Japan should sign trilateral FTAs with the other two countries. Breuss and Francois (2011) investigate the economic impacts of the FTA between the EU and Korea on the signing parties and on the Austrian economy.[10] According to the results of the study, welfare gains of the EU and Korea in terms of GDP will be 0.05 and 1.56, respectively. Possible welfare gain of Austria from the FTA is expected to be around as 0.4 percent of her GDP.

Estrada et al. (2012) provide a qualitative and quantitative assessment on the impacts of China establishing FTAs with ASEAN, Japan, and Korea which is ASEAN+3.[11] The analysis shows that China will be better off establishing an FTA with ASEAN+3 compared to establishing bilateral FTAs with the others. In case of signing an FTA with ASEAN, China would gain 0.57 percent of her GDP where it would be 0.03 and 0.32 percent in case of establishing an FTA with Japan and Korea, respectively. Finally, the study suggests that it is better for China to pursue a region-wide FTA.[12] Kinnman and Hagberg (2012) compute potential effects of an FTA between European Union and the United States, i.e. Transatlantic Trade and Investment Partnership (TTIP)[13], on the parties and on Swedish economy. The calculations show that additional growth for the US would be as high as 0.51 percent, where for the EU it would be at most 0.22 percent. Swedish economy, in the meantime, would benefit from the TTIP up to 0.18 percent of her GDP. In addition to the impacts of the TTIP, Petri et al. (2012) and Xiaotong et al. (2013) consider the

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[9] Although the feasibility studies on an FTA between China and Korea had started in late 2004 and was signed in 2014, it has not been effective yet.

[10] The agreement was signed in 2009 and has been provisionally in force since mid-2011.

[11] ASEAN+3 is a forum that coordinates the relationships between ASEAN and the three East Asia countries, i.e. China, Japan and Korea.

[12] China signed with ASEAN a series of agreements that altogether constitute the FTA. These agreements are the Framework Agreement on China-ASEAN Comprehensive Economic Cooperation (2002), Agreement on Trade in Goods (2004), Agreement on Trade in Services (2005) and Agreement on Investment (2009). The FTA with Japan and Korea is under negotiation.

[13] The Transatlantic Trade and Investment Partnership is still being negotiated between the EU and the US.

FTA between EU and Japan[14] on the Chinese economy and report that due to these agreements, China's GDP would reduce by 0.3 percent in the long-run.

Finally, Gunes et al. (2013) scrutinizes the possible impacts of TTIP on the Turkish economy under alternative scenarios. They report that inclusion of Turkey would increase the gains of the EU and the US but more significantly Turkey would benefit from inclusion by up to 4.6 percent of her GDP. In addition, Oduncu et al. (2014) compute potential impacts of the Trans-Pacific Partnership (TPP) on Turkish economy. The study suggests that Turkey's GDP loss could be 1 percent if TTP is signed with current members where the loss in GDP can increase up to 2.4 percent in the case of TPP with the inclusion of members of Asia-Pacific Economic Cooperation (APEC) that are not included in TPP yet[15].

5. Impacts of the FTA

In order to analyze the impacts of the FTA signed between Korea and Turkey, we use GTAP database and a CGE model with the assumptions of perfect competition and constant returns to scale. The parameter values are obtained from standard model and shocks are applied on import tax and international trade costs. The dataset is obtained from the GTAP-7 database covering 113 regions and 57 sectors and also related bilateral trade information, transport and protection linkages with reference year of 2004. The regions are aggregated as Korea, Turkey and rest of the world. For sectoral aggregation as provided in table 5, seven categories, i.e. agricultural products, food products, extractive industry, light manufacturing, heavy manufacturing, technology-intensive manufacturing and services, are used. In order to measure quantitative impacts of the FTA, two different scenarios in line with the provisions of the agreement are applied. In each scenario, the scopes of the agreement have been deepened by differentiating simulations using particular shocks. Due to the fact that the FTA covers only merchandise trade, trade liberalization shocks are not applied in services sector. Details related to shocks applied in each simulation are provided in table 6 and the related results for these scenario analyses are provided in table 7.

In the first scenario, custom tariffs including tariff equivalents and quotas in all sectors except services between the two countries are reduced. 90 percent of the tariff barriers are eliminated in agricultural and food products; however, whole tariff barriers are removed in the

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[14] The negotiations over the agreement have officially been launched in 2013.
[15] There are twenty one countries in APEC and twelve of them are also members of TPP. The remaining countries are China, Hong Kong, Indonesia, Korea, Papua New Guinea, Philippines, Russia, Taiwan and Thailand.

other sectors. The reason behind this limited reduction in agricultural and food products is the exclusion of socio-economically sensitive agricultural products in the FTA. Under this scenario, Turkey's GDP might decline up to 0.01 percent compared to the base scenario where that of Korea might increase by 0.066 percent. The trade flows of both parties increase but it is more significant in imports compared to the exports. The exports and imports of Korea increase by 0.094 and 0.074 percent, respectively, thereby increasing the trade surplus. Turkey's trade balance, meanwhile, worsens since her imports increase more than her exports.

The FTA includes provisions of reducing not only tariffs barriers but also of non-tariff barriers; therefore, in the second scenario we include reduction in non-tariff barriers along with reduction in tariff barriers. Similar to the first scenario, reduction in non-tariff barriers are applied at a lower rate in sensitive sectors compared to the extractive and manufacturing sectors. In this case, the increase in the Korea's GDP is doubled, i.e. 0.129 percent, relative to the previous scenario. The possible increase in Turkey's GDP in the meantime is calculated as 0.054 percent. In other words, it is increasing as opposed to the case in the first scenario. It is also worth to mention that Korea would benefit more than Turkey from the agreement in terms of GDP. Similarly, trade flows in both countries increase at a higher rate compared to the first scenario. Export and import gains of Korea are 0.139 and 0.177 respectively. On the contrary to the case with GDP, Turkey benefits more from the FTA in terms of trade flows. Total export and import of Turkey could rise up by 0.164 and 0.323 percent, respectively.

Impact of the Korea-Turkey FTA on their total exports and imports are provided on columns 2 and 3 of table 7. Additional export gains among parties are also illustrated in figure 3. Panel 1 shows the deviations in export sales of Korea (Turkey) to Turkey (Korea) within six sectors under the first scenario. Relatively higher reactions in Turkey's export to Korea are observed in light manufacturing, agriculture and food products. Reduction in non-tariff barriers creates a big jump in trade flows in non-agricultural sectors due to lower tariff rates applied in both countries (Panel 2). Although Korean exports in agricultural and food products increase at a higher rate compared to the other sectors, Turkey's exports to Korea perform better in non-agricultural sectors. However, due to the fact that the share of the agricultural and food products in the exports of Korea is low, the total export of Korea is less affected by the increases in these sectors. The highest increase among the sectors is observed in Turkey's light manufacturing sector, which is around 96 percent. Extractive industry and technology-intensive manufacturing

becomes other important sectors for Turkey since her exports to Korea categorized under these sectors are boosted after the FTA.

6. Conclusion

Although Korea and Turkey have had a diplomatic relationship since 1949, their economic relationship has gained momentum only within the last two decades. The total trade volume in 2013 increased sixfold compared to its level in early 2000s. Along with the increase in the volume, the diversity of the trade has been widening since then. Besides these increases in the trade volume and diversity, the enthusiasm of both countries on signing free trade agreements paved their ways to start negotiations on signing one. As a result, they started the negotiations in 2010 and finalized these in 2012 with signing two agreements that constitute the Korea-Turkey Free Trade Agreement.

The agreement was put in force as of May 2013. In a nutshell the agreement foresees that the trade tariffs on industrial products will be removed within seven years. Moreover, except the agricultural products that the countries have socio-economic sensitivities, almost all trade tariffs on products items will be eliminated within a decade. Therefore, it can be said that this agreement might have significant impacts on the two parties' economies. This study qualitatively and quantitatively analyzes the possible impacts of the agreement on the Korean and Turkish economy. It employs Global Trade Analysis Project database along with a computable general equilibrium model. It is also worthwhile to mention that the number of agreements being signed around the globe has been rising recently and thus the number of studies on the impacts of these agreements has been increasing. Therefore, this study aims at contributing to this growing literature by providing another empirical work. To the best of our knowledge, this study is the first one that examines the Korea-Turkey free trade agreement.

In the empirical part two alternative scenarios are considered. In the first scenario, the tariff barriers in agriculture and food products are reduced by ninety percent and those in the other sectors but services are removed. It is found that under this scenario, Korea might gain as high as 0.066 percent of her GDP where that of Turkey would go down by 0.010 percent. In the second scenario, as an addition to the adjustments in the first scenario e a reduction in the non-tariff barriers is introduced. Under the second scenario, the gain in Korea's GDP would be doubled compared to the first scenario and Turkey, as opposed to the first scenario, would gain by 0.054 percent of her GDP. Meanwhile the exports of Korea would go up by 0.139 percent and

exports of Turkey would increase by 0.164 percent. Along with the increase in GDPs would be reflected in the trade flows and increase both exports and imports of the countries.

In short, the results of this study suggest that both countries will benefit from the agreement in terms of GDP where Korea might benefit relatively more. Regarding the trade flows, however, Turkey's exports seem to be affected more.

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Tables

Table 1: The economic indicators of Turkey and Korea as of 2013

	Korea	Turkey
Area (thousands of sq.km.)	99,900	783,560
Population (millions)	50.220	74.933
GDP (millions of USD)	1,304,554	822,135
GDP rank	18th	14th
GDP per capita (USD)	25,977	10,972
Merchandise exports (billions of USD)	559.632	151.787
Merchandise imports (billions of USD)	515.586	251.650
Total trade volume (billions of USD)	1,075.218	403.437
Current account to GDP ratio (percent)	6.12	-7.92

Source: World Development Indicators of the World Bank

Table 2: The historical progress of the trade relationship between Turkey and Korea. The export (import) is collected from (to) Turkey to (from) Korea. Unit is US dollars.

Year	Export	Import	Trade deficit	Year	Export	Import	Trade deficit
1977	11,396,319	19,685,386	-8,289,067	1998	37,493,975	1,124,194,960	-1,086,700,985
1978	9,818,172	46,012,535	-36,194,363	1999	101,566,783	871,071,144	-769,504,361
1979	13,307,643	63,745,604	-50,437,961	2000	130,105,904	1,180,942,140	-1,050,836,236
1980	13,708,539	18,785,512	-5,076,973	2001	62,364,456	759,498,588	-697,134,132
1981	14,921,843	12,889,621	2,032,222	2002	54,829,934	900,418,622	-845,588,688
1982	2,314,377	5,511,480	-3,197,103	2003	57,928,027	1,312,442,226	-1,254,514,199
1983	7,539,704	11,623,546	-4,083,842	2004	79,623,159	2,572,537,061	-2,492,913,902
1984	5,280,447	18,534,180	-13,253,733	2005	99,770,845	3,485,388,789	-3,385,617,944
1985	3,556,137	28,850,926	-25,294,789	2006	155,965,841	3,556,269,130	-3,400,303,289
1986	7,370,241	54,164,736	-46,794,495	2007	152,310,769	4,369,903,381	-4,217,592,612
1987	5,992,276	70,580,148	-64,587,872	2008	271,254,336	4,091,711,184	-3,820,456,848
1988	31,147,797	91,577,832	-60,430,035	2009	234,609,466	3,118,213,745	-2,883,604,279
1989	24,082,805	142,930,649	-118,847,844	2010	304,300,609	4,764,056,727	-4,459,756,118
1990	108,850,003	301,612,259	-192,762,256	2011	528,506,894	6,298,482,762	-5,769,975,868
1991	315,771,537	360,540,980	-44,769,443	2012	527,993,444	5,660,093,072	-5,132,099,628
				2013	460,050,419	6,088,317,621	-5,628,267,202

Source: Turkish Statistical Institute

Table 3: The breakdown of imports of Korea from Turkey. Unit is percentage.

Year	Agriculture, hunting and forestry	Fishing	Mining and quarrying	Manufacturing	Wholesale and retail trade	Real estate, renting and business activities	Other community, social and personal service activities
1977	100.00	0.00	0.00	0.00	0.00	0.00	0.00
1978	100.00	0.00	0.00	0.00	0.00	0.00	0.00
1979	96.07	0.00	0.00	3.93	0.00	0.00	0.00
1980	99.90	0.00	0.00	0.10	0.00	0.00	0.00
1981	99.76	0.00	0.00	0.24	0.00	0.00	0.00
1982	89.81	0.00	0.00	10.19	0.00	0.00	0.00
1983	77.35	0.00	0.00	22.65	0.00	0.00	0.00
1984	99.93	0.00	0.00	0.07	0.00	0.00	0.00
1985	97.02	0.00	0.00	2.98	0.00	0.00	0.00
1986	51.05	0.00	2.84	46.04	0.00	0.00	0.07
1987	41.17	0.00	2.94	55.89	0.00	0.00	0.00
1988	51.36	0.04	0.00	48.55	0.00	0.00	0.05
1989	23.05	0.00	0.00	76.12	0.81	0.00	0.02
1990	4.28	0.00	1.20	94.52	0.00	0.00	0.00
1991	10.64	0.00	0.89	88.43	0.04	0.00	0.00
1992	9.83	0.09	0.02	90.06	0.00	0.00	0.00
1993	0.19	0.00	3.93	95.88	0.00	0.00	0.00
1994	12.67	0.00	0.23	87.09	0.01	0.00	0.00
1995	12.52	0.00	10.90	76.57	0.01	0.00	0.00
1996	13.66	0.10	6.95	79.29	0.00	0.00	0.00
1997	21.93	0.00	11.18	66.83	0.07	0.00	0.00
1998	64.82	0.00	10.11	25.04	0.04	0.00	0.00
1999	22.12	0.00	6.95	70.13	0.79	0.00	0.00
2000	8.72	0.00	1.47	88.59	1.21	0.00	0.00
2001	24.78	0.04	5.80	67.58	1.81	0.00	0.00
2002	19.43	0.04	4.51	72.51	3.52	0.00	0.00
2003	8.12	0.89	5.54	84.61	0.85	0.00	0.00
2004	6.82	1.13	3.68	86.34	2.03	0.00	0.00
2005	5.77	0.99	4.52	88.35	0.37	0.00	0.00
2006	8.03	0.46	2.10	88.81	0.59	0.00	0.00
2007	5.83	0.56	11.19	82.01	0.40	0.00	0.00
2008	3.55	0.25	6.42	89.23	0.54	0.00	0.00
2009	5.43	0.31	3.57	90.31	0.38	0.00	0.00
2010	2.25	0.25	5.00	91.41	1.09	0.00	0.00
2011	2.88	0.20	3.55	92.85	0.52	0.00	0.00
2012	1.97	0.21	2.40	95.14	0.28	0.00	0.00
2013	4.43	0.27	7.74	86.31	1.24	0.00	0.00

Source: Turkish Statistical Institute
Note: This table is prepared according to the International Standard Classification of All Economic Activities of the United Nations

Table 4: The breakdown of exports of Korea to Turkey. Unit is percentage.

Year	Agriculture, hunting and forestry	Fishing	Mining and quarrying	Manufacturing	Wholesale and retail trade	Real estate, renting and business activities	Other community, social and personal service activities
1977	0.04	0.00	0.00	99.96	0.00	0.00	0.00
1978	0.00	0.00	12.01	87.99	0.00	0.00	0.00
1979	0.00	0.00	11.75	88.25	0.00	0.00	0.00
1980	0.00	0.00	0.00	100.00	0.00	0.00	0.00
1981	0.00	0.00	12.69	87.31	0.00	0.00	0.00
1982	0.00	0.00	0.00	100.00	0.00	0.00	0.00
1983	0.03	0.00	0.00	99.97	0.00	0.00	0.00
1984	0.60	0.00	0.00	99.40	0.00	0.00	0.00
1985	0.05	0.00	0.08	99.87	0.00	0.00	0.00
1986	0.03	0.00	0.00	99.97	0.00	0.00	0.00
1987	0.03	0.00	0.00	99.97	0.00	0.00	0.00
1988	0.05	0.00	0.00	99.95	0.00	0.00	0.00
1989	0.03	0.00	0.06	99.88	0.03	0.00	0.00
1990	0.20	0.00	0.04	99.76	0.00	0.00	0.00
1991	0.05	0.00	0.01	99.94	0.00	0.00	0.00
1992	0.09	0.00	0.00	99.90	0.01	0.00	0.00
1993	0.01	0.00	0.86	99.11	0.02	0.00	0.00
1994	0.05	0.00	0.05	99.85	0.04	0.00	0.00
1995	0.00	0.00	0.24	99.76	0.00	0.00	0.00
1996	0.01	0.00	0.00	99.98	0.00	0.00	0.00
1997	0.03	0.00	0.00	99.97	0.00	0.00	0.00
1998	0.01	0.00	0.00	99.98	0.00	0.00	0.00
1999	1.99	0.00	0.00	98.00	0.00	0.00	0.00
2000	1.91	0.00	0.00	98.09	0.00	0.00	0.00
2001	0.43	0.00	0.00	99.57	0.00	0.00	0.00
2002	1.02	0.00	0.11	98.87	0.00	0.00	0.00
2003	0.01	0.00	0.01	99.99	0.00	0.00	0.00
2004	0.01	0.00	0.00	99.95	0.03	0.00	0.00
2005	0.01	0.00	0.00	99.97	0.01	0.00	0.00
2006	0.01	0.00	0.00	99.99	0.00	0.00	0.00
2007	0.01	0.00	0.03	99.96	0.00	0.00	0.00
2008	0.05	0.00	0.02	99.93	0.00	0.00	0.00
2009	0.07	0.00	0.02	99.90	0.01	0.00	0.00
2010	0.03	0.00	0.00	99.96	0.00	0.00	0.00
2011	0.03	0.00	0.00	99.95	0.02	0.00	0.00
2012	0.06	0.00	0.01	99.93	0.00	0.00	0.00
2013	0.06	0.00	0.00	99.93	0.00	0.00	0.00

Source: Turkish Statistical Institute
Note: This table is prepared according to the International Standard Classification of All Economic Activities of the United Nations

Table 5: Sectoral Aggregation in the GTAP-7 Data Base

Agricultural products	paddy rice; wheat; cereal grains nec; vegetables, fruit, nuts; oil seeds; sugar cane, sugar beet; plant-based fibers; crops nec; bovine cattle, sheep and goats, horses; animal products nec; raw milk; wool, silk-worm cocoons; bovine meat products
Food products	meat products nec; vegetable oils and fats; dairy products; processed rice; sugar; food products nec; beverages and tobacco products
Extractive industry	forestry; fishing; coal; oil; gas; minerals nec; petroleum, coal products
Light manufacturing	textiles; wearing apparel; leather products; wood products
Heavy manufacturing	paper products, publishing; petroleum, coal products; chemical, rubber, plastic products; mineral products nec; ferrous metals; metals nec
Technology-intensive manufacturing	metal products; motor vehicles and parts; transport equipment nec; electronic equipment; machinery and equipment nec; manufactures nec
Services	electricity; gas manufacture, distribution; water; construction; trade; transport nec; water transport; air transport; communication; financial services nec; insurance; business services nec; recreational and other services; public administration, defense, education, health; dwellings

Source: Park et al. (2009)

Table 6: Applied shocks in simulation

	Simulations	Applied shocks
(1)	Reduction in tariffs barriers	All custom tariffs including tariff equivalents and quotas in between Korea and Turkey have been removed in extractive industry, light manufacturing, heavy manufacturing and technology-intensive manufacturing. However, 90 percent of custom tariffs including tariff equivalents and quotas in agricultural and food products.
(2)	Reduction in tariffs and non-tariff barriers	In addition to previous shocks applied in (1), reduction in non-tariff barriers trough decline in international trade costs is applied. Lower reduction in non-tariff barriers in agricultural and food products is applied compared to extractive industry, light manufacturing, heavy manufacturing and technology-intensive manufacturing.

Table 7: Impacts of the Korea-Turkey FTA (Deviation from base year as percentage change)

		(1)		(2)		(3)	
		GDP		Export		Import	
		Korea	Turkey	Korea	Turkey	Korea	Turkey
(1)	Reduction in tariffs barriers	0.066	-0.010	0.074	0. 149	0. 094	0.212
(2)	Reduction in tariffs and non-tariff barriers	0.129	0.054	0.139	0.164	0.177	0. 323

Figures

Figure 1: Applied Tariff Rates as of 2013 (percentage)
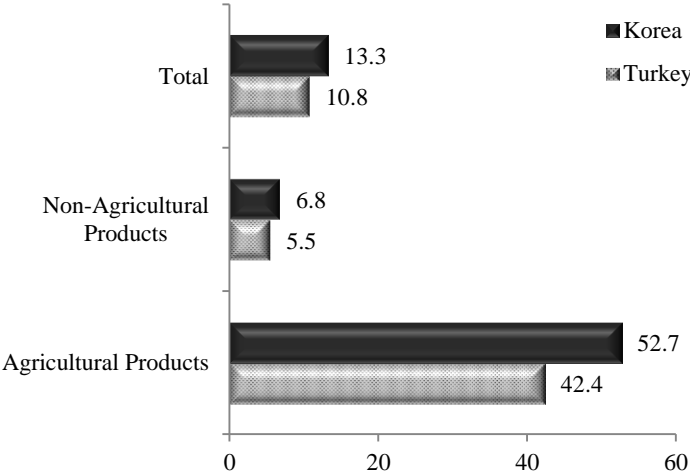
Source: World Trade Organization

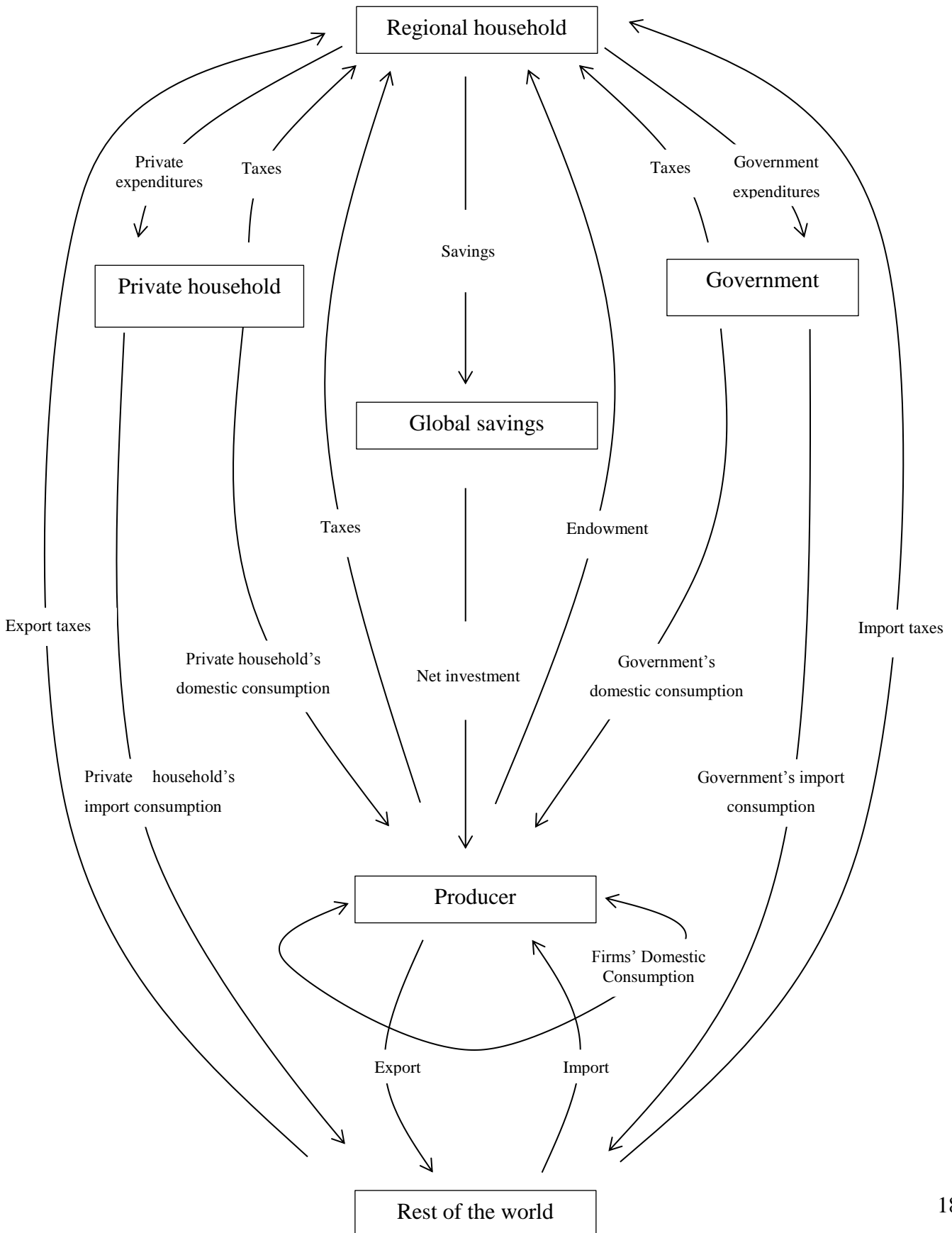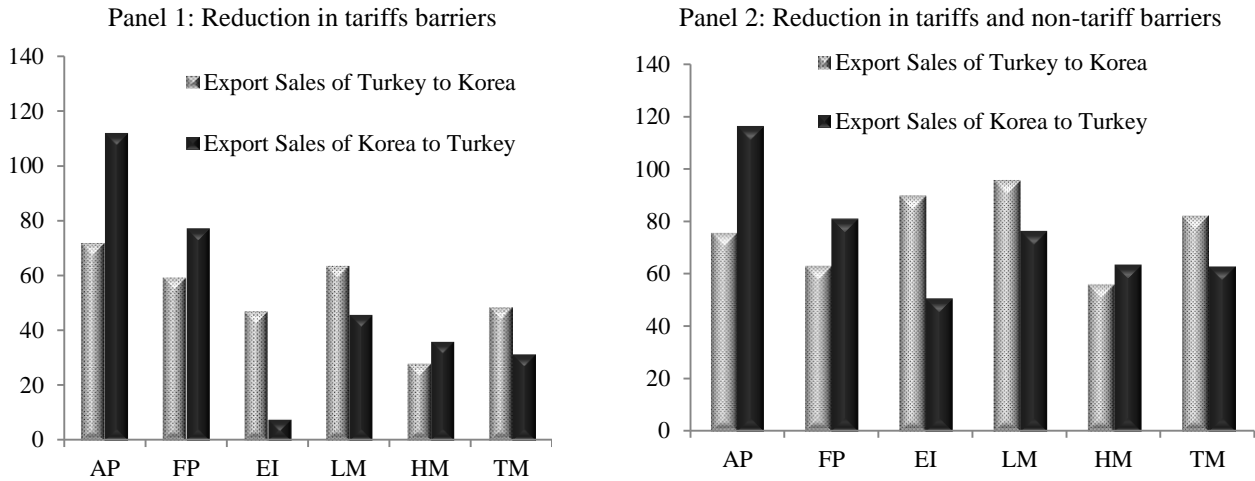**Figure 2:** A graphical exposition of a standard GTAP general equilibrium model

Figure 3: Impacts of the FTA on bilateral export sales (Deviation from base year as percentage change)

Panel 1: Reduction in tariffs barriers

Panel 2: Reduction in tariffs and non-tariff barriers

AP: Agricultural products, FP: Food products, EI: Extractive industry, LM: Light manufacturing, HM: Heavy manufacturing, TM: Technology-intensive manufacturing