PANOECONOMICUS, 2019, Vol. 66, Issue 4, pp. 507-523
Received: 29 September 2016; Accepted: 15 April 2018.

UDC 339.564:629.113(560)
https://doi.org/10.2298/PAN160929019A
Original scientific paper

Abdullah Emre Akel
The Ministry of Economy,
Turkey
✉ emreakel@gmail.com

Aylin Ege
Corresponding author
Retired Professor
Middle East Technical University,
Department of Economics,
Turkey
✉ aege@metu.edu.tr

Potential Effects of the T-TIP on Turkey's Motor Vehicles and Parts Sector

Summary: The aim of this article is to quantify the possible effects of a potential T-TIP between the US and the EU on production and exports of Turkey's motor vehicles and parts sector. A partial equilibrium model is used to this end under two scenarios, the first one assuming only T-TIP, whereas the second one supposing a simultaneous free trade agreement between the US and Turkey. The simulations are based on the reductions in tariffs and non-tariff barriers between the T-TIP partners in the first scenario, and between the US and Turkey, as well in the second scenario. The simulation results indicate that the prospective effects on the sector's production and exports differ significantly depending on different levels of integration. The results also reflect decreasing net welfare for Turkey and that a free trade agreement with the United States does not offer a significant market access potential for Turkey because of its production structure.

Key words: T-TIP, Turkey, GSIM, Motor vehicles and parts sector.

JEL: F02, F15, F17, L62.

The prospective Transatlantic Trade and Investment Partnership (T-TIP) agreement between the United States (US) and the European Union (EU), which is said to be in deep freeze for the time being, is expected to have a substantial impact on the partners as well as the third counties if it ever is realized. T-TIP has a unique importance for Turkey because of its customs union with the EU. After the T-TIP, Turkey is expected to suffer from trade deflection because the goods imported from the US *via* the EU will pass through the customs of Turkey without any customs tariff. In addition, the US companies will advance their competitiveness in the EU market which is the main destination of Turkish companies. Besides, Turkish companies are also at risk of losing competitive advantage in the US market. Despite these risks, there are only a couple of studies that tried to quantify T-TIP's possible consequences for Turkey, and none of them focused on sector-specific implications. Motor vehicles and parts (MVP) is the leading export sector of Turkey and T-TIP may bring about counterproductive effects particularly on Turkey's MVP sector.

In this framework, the aim of this study is to quantify the possible effects of the T-TIP on the production and exports of Turkey's MVP sector, by dividing it into two parts, namely, the vehicle industry (VI) and the components industry (CI). To this end,

the Global Simulation Model (GSIM), which is a partial equilibrium model suggested by Joseph F. Francois and Keith H. Hall (2009) is used, considering the reductions in tariffs and non-tariff barriers (NTBs) under different scenarios. After describing the scope of T-TIP and referring to its possible consequences in Section 1, the literature review regarding its possible effects on Turkey is presented in Section 2 and recent trends in Turkey's MVP sector is provided in Section 3. Trade relations between EU, the US, and Turkey in the MVP sector is presented in Section 4, followed by data and methodology in Section 5. Results of the simulations take place in Section 6, and finally, the concluding remarks are provided.

1. T-TIP and Its Likely Consequences

The T-TIP negotiations which started in 2013 cover three main areas, which are "market access", "regulatory component" and "rules", whereas there are several chapters on a wide range of topics. The fourteenth round of negotiations took place in Brussels in July 2016, and the fifteenth round of negotiations took place in October 2016 in New York. Among the main chapters included in the negotiations so far are Trade in Goods, Non-Tariff Barriers and Regulatory Issues, Rules of Origin, Trade in Services, Investment Protection, Customs and Trade Facilitation, Public Procurement, Energy, Environment, Intellectual Property Rights, Small- and Medium-Sized Enterprises, Sanitary and Phytosanitary Issues and Dispute Settlement (European Commission 2016a, b).

The parties declared the main motivation behind the T-TIP as promoting international competitiveness, jobs, and growth in both of the regions while addressing global issues of common concern. Although not mentioned formally, the T-TIP had some other motivations for both parties. First, the competitiveness of industrialized countries relative to emerging economies, such as China and India, were eroding since the beginning of 2000s, a trend which has turned into a threat especially after the world financial crisis of 2008 (United Nations Conference on Trade and Development (UNCTAD) 2013, pp. 56-57). Second, the failure of the Doha Round negotiations of the World Trade Organization (WTO) lead both parties to seek bilateral solutions rather than pursuing multilateral efforts. In this context, both parties were aware of the fact that if they can find a comprehensive and a mutually beneficial solution for themselves, then the rest of the world would sooner or later need to converge to this new structure. Finally, taking advantage of the T-TIP process, the EU expected to realize necessary structural reforms to stimulate growth, which was still below the pre-crisis period.

After the election of Donald Trump, negotiations on the T-TIP have been paused, and the prospects for a future agreement under the Trump administration looked quite grim throughout 2017 (Britt Bolin 2017). Considering the economic gains which the US would obtain from such an agreement, President Trump would be expected to change his strategy over time regarding this issue. Thus, it is not surprising that US Commerce Secretary Wilbur Ross has recently said that President Donald Trump is willing to reopen negotiations with the European Union over the stalled Transatlantic Trade and Investment Partnership Agreement (Richard Bravo and Julia Chatterley 2018).

Obviously, if the parties sign a comprehensive agreement, then the T-TIP may become a game changer in the international trading system. Although the EU and the US take a concrete step toward increased partnership to advance mutual gains, other countries that currently export goods and services to the US and/or the EU are expected to face inevitable positive or negative spill-over effects, which will vary depending on the depth of the agreement and the country at stake. For example, Francois et al. (2013) claim that an ambitious and comprehensive agreement is estimated to bring significant economic gains to the EU (119 billion Euros a year) and the US (95 billion Euros a year), as well as positively affecting the third countries due to spill-over effects, increasing global income by almost 100 billion Euros. In addition, Arjan Lejour et al. (2014) claim that the "closest" neighbors of the EU and the US (North American Free Trade Agreement (NAFTA), European Economic Area (EEA), Switzerland and Turkey) exhibit powerful incentives to align so as to benefit from positive spill-overs. Concerning other countries, the study points to China as having the greatest interest in alignment in some selected sectors, followed by Israel, Japan, and South Korea. On the other hand, according to Gabriel J. Felbermayr and Rahel Aichele (2015), the three regions that will suffer from welfare losses due to T-TIP are China, Association of Southeast Asian Nations (ASEAN) countries, and East Asia (i.e. Japan, South Korea, Taiwan). Among all, Cambodia, Malaysia, Taiwan, and Thailand are expected to be the most affected in this region, with real income losses of 0.9%, 0.5%, 0.4%, and 0.3%, respectively. China and the Philippines are also predicted to face a reduction of real income of around 0.25%.

T-TIP is likely to have a substantial impact on the Turkish economy because of Turkey's customs union with the EU. Given Turkey's level of standards, regulations, and legislation with respect to the areas covered under the T-TIP, inclusion of Turkey in the T-TIP process seems to be unrealistic (Serap Zuvin and Aybala Kurtuldu 2015). However, in May 2015, Turkey and the EU decided to expand the customs union to include services, government procurement, and agricultural goods, which would move Turkey to a better position on its claims with respect to inclusion in the T-TIP (European Commission 2016c). On the other hand, the negotiations between the EU and Turkey in expanding the customs union would take quite a time to complete, thus some Turkish industries may be injured in the short-run. Consequently, Turkey needs to seek another option, such as an Free Trade Agreement (FTA) with the US, which would be a remarkable step to deal with Turkey's concerns toward the T-TIP.

2. Literature Review

Despite the potential risks that the T-TIP carries along for Turkey's economy, the literature that aims to quantify these risks is strikingly shallow, in which there are only three such studies at present. These are Felbermayr and Mario Larch (2013), Merve Mavuş, Didem Güneş, and Arif Oduncu (2013), and World Bank (2014) report on the evaluation of the EU-Turkey customs union, which actually aims at not only identifying possible effects of expanding the EU-Turkey customs union but also includes simulation results for changes in Turkish exports resulting under different levels of Turkish involvement in the T-TIP. All of these studies use a Computable General Equilibrium (CGE) framework and try to capture macroeconomic effects of the T-TIP on

related economies. However, owing to the different sets of assumptions, some of which are clearly unrealistic, the results of the studies vary considerably from each other.

Felbermayr and Larch (2013) used a CGE model with the Global Trade Analysis Project (GTAP) 8 Database, which has a reference year of 2008, to simulate possible effects of the T-TIP on a number of countries, including Turkey, where the possible effects of a shallow T-TIP (reductions in applied tariffs only) and a deep T-TIP (reductions in applied tariffs and NTBs) were presented. According to the study, Turkey would face a 0.27% decrease in real output in case of a shallow T-TIP, where the decline would be 2.5% in case of a deep T-TIP. One major criticism concerning this study would be the assumption it deploys while reducing NTBs. This study assumes that all of the NTBs can be abolished (which is not possible in practice) and runs simulations accordingly, which brings out unrealistic results in case of a deep T-TIP.

Mavuş, Güneş, and Oduncu (2013), on the other hand, used the GTAP model and the GTAP 7 Database, which has a reference year of 2004. Using deep and shallow T-TIP definitions of their own, Mavuş, Güneş, and Oduncu (2013) compare possible effects of the T-TIP on Turkey's economy with a situation where Turkey simultaneously signs an FTA with the US. The simulation results for a prospective change in Turkey's real gross domestic product (GDP) vary significantly from each other. The real GDP shows a 0.56% decrease in the worst case in which there exists a deep T-TIP, and Turkey does not sign an FTA with the US, whereas it shows a 4% increase in the best case in which there exists a deep T-TIP and Turkey signs an FTA with the US.

Although some qualitative studies referenced on the possible effects of the T-TIP on Turkey, such as Bozkurt Aran (2015) and Kamil Yılmaz (2015), there are several issues with the methodology used in the study of Mavuş, Güneş, and Oduncu (2013) that would create the basis for the big difference in the results of the simulations. First, the study neither provides sufficient information on the regional and sectoral breakdown that was used in the model nor shows any result on sectoral detail. Disaggregation choice is proved to have a large impact on simulation results, both at the sectoral and aggregate levels, where higher levels of disaggregation requires using higher elasticities for production and trade in the model, which affects the simulation results significantly (Angus Charteris and Niven Winchester 2010). Also, showing results with respect to sectoral changes are important to reveal the source of the total changes in the economy. However, the study seems to have ignored these essential aspects. Second, the study neither estimates *ad valorem* equivalents for NTBs nor uses pre-estimated values, but it simply assumes that 5% cost reduction in all sectors will cover the necessary effects. This simplification ignores the structural differences across sectors which would create a significant bias in the simulation results. Also, the study does not clearly explain the reason behind using "5%" ratio as a cost reduction unit. Third, the study assumes a 20% direct spill-over effect; however, there is neither an explanation for why a rate of 20% was used nor *via* which variable this reduction was implemented, because there exists no specific variable for spill-over effects in the GTAP model. Given all these drawbacks, the results for different scenarios imply that the main reason behind the significant differences in the simulation results is the assumption used for reduction on NTBs, whereas the other two arguments above would have created additional bias.

World Bank (2014) report on the evaluation of the EU-Turkey customs union uses the GTAP model and a 57-sector 21-region aggregation of the GTAP 8 Database. The simulation results imply that inclusion of Turkey to the T-TIP process will have a positive impact on Turkey's total exports, whereas results vary significantly across sectors. For example, in case of a T-TIP without any inclusion of Turkey in the process will result in 83.8 million USD decrease in Turkey's total exports, where the MVP suffers the most with 132.3 million USD decrease and "Machinery, Equipment n.e.c." sector benefits the most with 22.1 million USD increase in exports. On the other hand, inclusion of Turkey to the process will make a 257.3 million USD increase in Turkey's total exports, where "Textiles" (537.21 million USD) and "Wearing Apparel" (378.5 million USD) sectors benefit the most, whereas the MVP (-241.75 million USD) still suffers the most.

Taking into account the studies mentioned above, this study is expected to contribute to the related literature in two ways. First, this study is the first sector-specific quantitative analysis on the possible effects of the T-TIP on Turkey's economy. Second, this study uses a partial equilibrium model based on a commodity-level (Harmonized System (HS) 6 digit) data set, which has a reference year of 2014. Hence, this study aims to give more detailed results with more recent data on the subject. Such a detailed analysis with most recent data is essential to capture the true dynamics of the MVP sector, recent trends in which is provided in the following section.

3. Production and Export Structure of the MVP Sector in Turkey

The MVP sector is one of the leading sectors in Turkey's economy, which has an increasing trend mostly due to the foreign direct investment (FDI) inflows in the early 2000s. As of 2015, well-known global brands, such as Ford, Toyota, Hyundai, Fiat, Renault, Mercedes, and MAN, have investments in "personal cars", "commercial vehicles" and "buses" segments in Turkey. As a result, Turkey's MVP sector production and exports reached record high levels in 2015. Total production of the MVP sector increased from 879,000 units in 2005 to 1,359,000 units in 2015, whereas total exports of the MVP sector increased from 553,000 units in 2005 to 992,000 units in 2015. The leading segment of the MVP sector has been "personal cars", production of which increased from 454,000 units in 2005 to 791,000 units in 2015 (Otomotiv Sanayii Derneği (OSD) 2010, 2015a). Since 2010, the period which implies the post-world financial crises era, almost 75% of personal cars produced in Turkey each year were exported (OSD 2010, 2015a).

In the same period, total export value of the MVP sector in Turkey increased from 17.5 billion USD in 2010 to 21.6 billion USD in 2015, whereas it reached its maximum level in 2014 with 22.8 billion USD. Almost 60% of total exports of the total MVP sector in each year were composed of the VI exports, which amounted to nearly 13 billion USD in 2015. Among the VI segments, "personal cars" and "commercial vehicles" stand out as the main driving forces of the VI exports, having almost 87% share each year since 2010. On the other hand, the CI exports had a 40% share in the total MVP sector exports throughout the period, which was realized as 8.6 billion USD in 2015. Because the products exported under the CI are more diversified, the shares they got from the total exports of the CI are not concentrated to a limited number

of products. Among all, exports of "tyres" have the lead with 961 million USD in 2015, whereas its share in the CI exports declined from 15% in 2010 to 11% in 2015. "safety glasses", "engines" and "batteries" are the other main CI export products of Turkey (OSD 2014, 2015b).

According to OSD (2014, 2015b), the main destination markets of the VI were the EU countries, where exports to the United Kingdom (UK) reached 1.9 billion USD in 2014, followed by France (1.7 billion USD) and Germany (1.3 billion USD). The top 10 destination markets of the VI, eight of which were the EU members, constituted almost 70% of Turkey's VI exports each year since 2010. Similarly, the EU countries are the main destinations for the CI exports of Turkey. OSD (2014, 2015b) reveal that 2.4 billion USD of the CI exports in 2014 were directed to Germany, which constitutes 25% of the total CI exports of Turkey in 2014 alone. In addition, the top 10 destination markets of the CI, eight of which were the EU members, constituted almost 66% of Turkey's CI exports each year since 2010. These figures clearly imply that the EU market is crucial for Turkey's MVP sector, and an adverse shock in the EU market would create a remarkable loss for Turkey's economy.

4. Trade Relations between the EU, the US and Turkey in the MVP Sector

Understanding the main pillars of the current trade structure of the MVP sector between the EU, the US and Turkey have utmost importance in analyzing the possible effects of the T-TIP. Considering the size of the markets, the MVP demand of the EU is larger than the summation of that of the US and Turkey, because of its massive intra trade. According to our calculations using data from International Trade Center (ITC 2016a)[1] and Uludağ Automotive Industry Exporters' Association (OIB 2016)[2], in 2014, Turkey's total MVP imports amounted to 23.5 billion USD (10.5 billion USD in the VI and 12.9 billion USD in the CI), whereas the same figure was 355.8 billion in the US (190 billion USD in the VI and 165.8 billion in the CI). On the other hand, total imports of the EU amounted to 714.2 billion USD (324 billion USD in the VI and 390.2 billion USD in the CI), where the extra EU imports amounted to 242.6 billion USD (52.8 in the VI and 188.8 in the CI).

Trade relations in the MVP sector between the EU, the US, and Turkey reveal the importance of the EU for both Turkey and the US. 83% of Turkey's imports in the VI (8.7 billion USD) and 68% of Turkey's imports in the CI (8.8 billion USD) have originated from the EU in 2014. Considering the US, 22% of the imports in the VI (42.6 billion USD) and 14.3% of the imports in the CI (23.8 billion USD) have originated from the EU. On the other hand, bilateral relations between Turkey and the US in the MVP sector are rather limited. The share of the imports from the US in Turkey's total MVP imports is around 2%, whereas Turkey's share in the US MVP market is

[1] **International Trade Center (ITC).** 2016a. TradeMap Database. www.trademap.org (accessed July 25, 2016).
[2] **Uludağ Automotive Industry Exporters' Association (OIB).** 2016. HS Codes Key for the Motor Vehicles and Parts Sector. http://www.uib.org.tr/files/downloads/otomotiv_istigal.xls (accessed July 30, 2016).

0.12%. Finally, we can observe that both Turkey and the US have similar shares in the EU market (around 3% in the VI and 2% in the CI) as of 2014.

Taking into account the structure of the trade relations summarized so far and potential market access opportunities of the EU, the US, and Turkey in each other's market, it can be claimed that the T-TIP brings more risks than opportunities for Turkey's MVP sector. Because of the customs' union between the Turkey and the EU, bilateral tariff rates between Turkey and the EU are already zero. In other words, the EU has already reached its limits with respect to providing market access to Turkey in the MVP sector. However, according to our calculations using data from ITC (2016b)[3] and OIB (2016), the T-TIP would provide significant opportunities to the US in the EU market, where the US faces 6.7% average tariff rate in the VI (the maximum rate reaches 17.4%) and 3% average tariff rate in the CI (the maximum rate reaches 4.9%). Moreover, concerning the VI, the trade-weighted average tariff rate that the US currently faces in the EU is 9.3%, whereas that of the CI is 3%.

In light of the information provided in this section, it can be claimed that the current trade structure of the MVP sector in the EU, the US, and Turkey would be significantly affected once the T-TIP is put into force. The barriers against the MVP trade are considerably high, and the asymmetric structure with respect to the market shares and market access opportunities puts Turkey in a disadvantaged position, quantifying which is the very aim of this study and takes place in the following sections.

5. Data and Methodology

To quantify the possible effects of the T-TIP on production and exports of Turkey's MVP sector, we used the GSIM suggested by Francois and Hall (2009). The GSIM is a partial equilibrium model that is industry-focused but global in scope. It was first developed by Francois and Hall (1997) and extended by later versions. Mario Holzner (2008) used the 2003 version of GSIM for measuring the effects of EU accession of the Balkans and Turkey on agricultural trade. Holzner and Valentina Ivanić (2012) used the 2009 version of GSIM for measuring and analyzing the effects of Serbian accession to the EU.

The 2009 version of the model works with a log-linearized representation of import-demand, combined with generic export supply equations. The system is firstly solved for the set of world prices, then moves on to the calculation of national prices. Francois and Hall (2009, p. 2) summarize the main assumptions of the model as follows:

"… A basic assumption is national product differentiation… this means that imports are imperfect substitutes for each other. The elasticity of substitution is held to be equal and constant across products from different sources… The elasticity of demand in aggregate is also constant. Finally, global supply from each country is also characterized by constant (supply) elasticities...".

Therefore, a necessary data set to work with the GSIM should include multilateral trade flows and tariff rates, export supply elasticities, aggregate import-demand

[3] **International Trade Center (ITC).** 2016b. MacMap Database. www.macmap.org (accessed July 25, 2016).

elasticities, and elasticity of substitution. Although the required data set is not intense, the model results provide useful insight about the impact of trade policy changes on trade flows, welfare aspects of trade, and changes in prices.

In this study, simulations are based on 4 regions (Turkey, the EU, the US and the rest of the world (ROW)), whereas there are 2 industries (the VI and the CI) at the core of the analysis. The source of the multilateral import flow data is the ITC (2016a) TradeMap Database, whereas multilateral tariff rates are gathered from the ITC (2016b) MacMap Database. Both of these data sets have the reference year of 2014. This study uses the export values for 2014 to eliminate the significant effects of the falling commodity prices since June 2014, which resulted in falling export values in 2015 while production was increasing. World motor vehicle production increased from 90.5 million units in 2014 to 91.5 million units in 2015. Contrary to the increase in world production, due to the significant decrease in commodity prices, global export values of motor vehicles and parts have shown a dramatic decrease in 2015. Global export values of both the VI and the CI experienced a steady increase after the world financial crises until 2015. However, the global exports of the VI sector showed a 5.3% decrease in 2015 compared with 2014 (from 968.2 billion USD to 903.4 billion USD), whereas the global exports of the CI sector declined by 6.7% (from 945.4 billion USD to 895.1 billion USD) in the same period. Therefore, the values for 2014, which are not affected from a negative commodity price shock, are preferred in our calculations.

The data set is composed of HS 6 digit products, which are used to construct aggregate trade and tariff values for the VI and the CI. To capture the current dynamics in the VI and the CI, tariff reduction simulations are based on trade-weighted tariff rates and NTBs estimates, whereas initial tariff rates for each region are assumed to be the summation of tariffs and NTBs. The only exception in calculation of the trade-weighted tariffs is the data used for the ROW, source of which is the GTAP 9 Database (Purdue University 2016)[4] with a reference year of 2011, whereas the trade and tariffs are provided in an aggregated form for the motor vehicles industry. In addition, NTBs equivalents for ROW are assumed to be the average of that of the EU and the US.

With respect to the NTBs, we used the *ad valorem* equivalents of NTBs estimated by Francois et al. (2013). Using the outputs of the Koen G. Berden et al. (2009), which identified regulatory differences between the EU and the US in sectoral detail and revealed related costs on trade and investment *via* literature reviews, business surveys, econometric analyses, consultations with regulators and businesses as well as inputs by sector experts, Francois et al. (2013) conducted a gravity-based econometric analysis to figure out sector-specific *ad valorem* equivalents of NTBs for the trade between the US and the EU. According to the results concerning the MVP sector, the NTBs that the EU implements against the US exports account for 25.5% tariff equivalent, whereas the NTBs that the US implements against the EU exports account for 26.8% tariff equivalent (Francois et al. 2013, p. 20). Because there is no such a detailed analysis concerning NTBs estimates for Turkey, taking into account the customs union between Turkey and the EU and for the sake of comparability, we assumed that the same rates apply for Turkey and the EU in the context of NTBs with respect to the

[4] **Purdue University.** 2016. Global Trade Analysis Project 9 Database. http://www.gtap.agecon.purdue.edu (accessed July 27, 2016).

trade with the US, whereas there exists no NTBs between Turkey and the EU. Hence, this study assumes that the NTBs that Turkey implements against the US exports account for 25.5% tariff equivalent, whereas the NTBs that the US implements against Turkey's exports account for 26.8% tariff equivalent; however, the same rate is 0 for the trade between Turkey and the EU. Because there is no study that calculates the NTBs equivalents in the MVP sector for ROW, the ROW is assumed to impose the average NTBs equivalent value of the EU and the US (26.15%) to all parties.

The resulting summary data set is shown below in Table 1 and Table 2. In the matrix, a destination region is the one that imports from the origin region. In this context, the import value which is at the intersection of the first row and the second column of Table 1 (10.4 billion USD) implies the VI imports of the EU from Turkey. Similarly, the tariff value which is at the intersection of the third row and the second column of Table 1 (34.8%) implies the total tariff equivalent (trade-weighted tariff and NTBs) of the current barriers that the EU imposes to the US.

Table 1 Imports and Tariff Matrix for the Vehicle Industry

Imports (million USD)		Destination			
		Turkey	EU	US	ROW
Origin	Turkey	0.0	10404.0	86.6	2429.3
	EU	8728.8	269300.0	42555.5	147345.8
	US	226.4	8769.3	0.0	76177.3
	ROW	1570.4	34696.7	147364.9	706247.6
Tariffs (%)		**Destination**			
		Turkey	EU	US	ROW
Origin	Turkey	0.0	0.0	27.4	38.6
	EU	0.0	0.0	28.2	38.1
	US	33.7	34.8	0.0	30.4
	ROW	31.4	29.9	27.2	37.5

Source: Authors' calculations using ITC (2016a, b).

Table 2 Imports and Tariff Matrix for the Components Industry

Imports (million USD)		Destination			
		Turkey	EU	US	ROW
Origin	Turkey	0.0	8192.1	351.5	1029.3
	EU	8847.2	200684.2	23763.3	192110.3
	US	256.3	9399.4	0.0	86169.3
	ROW	3823.4	171214.2	141687.9	679773.3
Tariffs (%)		**Destination**			
		Turkey	EU	US	ROW
Origin	Turkey	0.0	0.0	26.8	38.6
	EU	0.0	0.0	27.9	38.1
	US	28.5	28.5	0.0	30.4
	ROW	31.4	29.9	27.2	37.5

Source: Authors' calculations using ITC (2016a, b).

Considering the elasticities used in the simulations, which are presented in Table 3 and Table 4, the import-demand elasticities are provided from the World Bank

(2016)[5] WITS Database at HS 6-digit breakdown, whereas basic average of the product level elasticities is used to bring out the import-demand elasticities for the VI and the CI for each region. In addition, because there exists no MVP sector-specific export supply elasticity estimations for each region in the literature, aggregate export supply elasticities for each region which were calculated in Stephen Tokarick (2010) are used. With respect to the elasticity of substitution ratios for the VI and the CI, the ratio in GTAP 9 Database (Purdue University 2016) for motor vehicles is used and assumed to be the same for the VI and the CI.

Table 3 Elasticities for the Vehicle Industry

	Turkey	EU	US	ROW
Composite demand (import elasticity)	-4.0	-9.7	-8.3	-4.7
Industry supply (export elasticity)	0.9	2.3	2.1	1.2
Elasticity of substitution	5.6	5.6	5.6	5.6

Source: Authors' calculations using Tokarick (2010), Purdue University (2016), and World Bank (2016).

Table 4 Elasticities for the Components Industry

	Turkey	EU	US	ROW
Composite demand (import elasticity)	-1.2	-1.6	-3.7	-1.4
Industry supply (export elasticity)	0.9	2.3	2.1	1.2
Elasticity of substitution	5.6	5.6	5.6	5.6

Source: Authors' calculations using Tokarick (2010), Purdue University (2016), and World Bank (2016).

There are 6 scenarios in the simulations, which can be categorized into two main groups with three subcategories, as shown in Table 5. The two main groups indicate the agreements, where in the first group, trade liberalization is just limited to the reductions in protection due to the T-TIP, and in the second group, in addition to the T-TIP, Turkey is assumed to sign a simultaneous FTA with the US. Meanwhile, the three subcategories indicate the depth of the agreements, where trade liberalization simulations are based on elimination of tariffs only (shallow integration), 25% reduction

Table 5 Liberalization Scenarios

Agreement	Liberalization scenario	
T-TIP only	Shallow (tariffs only)	S1
	Moderate (tariffs + 25% of NTBs)	S2
	Deep (tariffs + 50% of NTBs)	S3
T-TIP + TR and US FTA	Shallow (tariffs only)	S4
	Moderate (tariffs + 25% of NTBs)	S5
	Deep (tariffs + 50% of NTBs)	S6

Source: Authors' liberalization scenarios.

[5] **World Bank.** 2016. World Integrated Trade Solution (WITS). http://wits.worldbank.org (accessed July 26, 2016).

in NTBs in addition to elimination of tariffs (moderate integration), and 50% reduction in NTBs in addition to elimination of tariffs (deep integration). Hence, analyzing different levels of inclusion to T-TIP and depth of agreements for Turkey give useful insights about the prospective changes in the VI and the CI due to the T-TIP.

6. Simulation Results

In this section, simulation results concerning Turkey with respect to changes in the VI and the CI are presented. The partial equilibrium analysis, which is used in this study, is considerably helpful while examining the effects of a policy in creating equilibrium only in a particular market or industry. It is also a powerful tool of static welfare analysis, which enables us to distinguish between price and quantity effects, as well as gains and losses for producers and consumers. In addition, the data set it requires consists of a small number of variables. However, to some extent, these advantages can also be seen as weaknesses. For example, the partial equilibrium analysis ignores possible effects in any other market or industry, assuming that they are small and thus will have ignorable impact if any. Similarly, it inherently assumes no limit for factors of production. Besides, the outcomes can be sensitive to the elasticities for which the empirical literature is still limited (WTO and UNCTAD 2012, p. 140). To this end, this article considers the direction that the simulation results imply more important than the absolute values calculated, and thus focuses on the structure of the prospective changes.

In this context, as presented in Table 6, simulation results concerning Turkey with respect to changes in the VI imply that the level of integration significantly affects prospective outcomes. For example, if Turkey does not sign a simultaneous FTA with the US once the T-TIP gets into force, a shallow T-TIP (S1) may positively affect the production and exports of the VI in Turkey. However, increasing the level of integration in the T-TIP is expected to bring along increasing negative effects (S2 and S3). On the other hand, signing an FTA with the US may help turn the negative effects on production into positive (S5); however, increasing the level of integration in the FTA is more likely to bring out negative effects (S6) both on production and total exports of Turkey. Concerning the EU and the US as exports markets, it can be claimed that the increasing level of integration in the T-TIP is likely to divert the EU's demand from Turkey and ROW to the US, unless the T-TIP has a shallow structure. Meanwhile, Turkey's exports to the US may help to minimize the prospective loss in the EU market, especially in case of a deep FTA with the US (S6).

Table 6 Simulation Results: Change in Turkey's Vehicle Industry Production and Exports

Agreement	Liberalization scenario		Change in output (%)	Change in Turkey's exports to (million USD)		
				EU	US	ROW
T-TIP only	Tariffs only	S1	0.054	18.6	0.2	-4.5
	Tariffs + 25% of NTBs	S2	-0.020	-16.5	3.0	8.0
	Tariffs + 50% of NTBs	S3	-0.095	-51.7	5.8	20.5
T-TIP + TR and US FTA	Tariffs only	S4	0.056	17.2	2.6	-4.8
	Tariffs + 25% of NTBs	S5	0.010	-32.5	30.8	4.4
	Tariffs + 50% of NTBs	S6	-0.037	-82.3	58.9	13.6

Source: Simulation results.

Regarding the prospective changes in prices and welfare, we can observe from Table 7 that in five of six scenarios, consumer prices of the VI in Turkey show a tendency to increase due to the T-TIP, where deeper integration in the T-TIP triggers higher increase in consumer prices in Turkey. In addition, because of the significant changes in the consumer surplus arising from the increase in consumer prices, the net welfare effect turns out to be negative in five of six scenarios. Besides, Turkey faces tariff revenue losses in all scenarios, which is likely to significantly increase with a deeper FTA with the US.

Table 7 Simulation Results: Price and Welfare Changes in Turkey with Respect to Vehicle Industry

Agreement	Liberalization scenario		Change in overall consumer prices (%)	Change in producer price for home good (%)	Change in market price for home good (%)	Change in welfare (million USD)			
						Net welfare effect	Producer surplus	Consumer surplus	Tariff revenue
T-TIP only	Tariffs only	S1	0.128	0.058	0.058	-8.5	7.4	-14.3	-1.7
	Tariffs + 25% of NTBs	S2	0.468	-0.222	-0.022	-57.4	-2.8	-52.4	-2.2
	Tariffs + 50% of NTBs	S3	0.810	-0.102	-0.102	-107.2	-13.2	-91.3	-2.7
T-TIP + TR and US FTA	Tariffs only	S4	-0.040	0.061	0.061	11.1	7.8	4.4	-1.1
	Tariffs + 25% of NTBs	S5	0.167	0.011	0.011	-26.5	1.4	-18.6	-9.3
	Tariffs + 50% of NTBs	S6	0.375	-0.040	-0.040	-71.9	-5.1	-42.0	-24.8

Source: Simulation results.

On the other hand, simulation results regarding the CI in Turkey tell somewhat a different story. The results for production and exports in Table 8 imply that the CI production in Turkey is more likely to decrease due to the T-TIP (S1 to S3). However, an FTA with the US, which is not shallow, can turn the prospective negative effect into positive, whereas more integration with the US may bring more production in the CI (S5 and S6). If Turkey does not sign an FTA with the US, Turkey's exports to the US may experience a decrease, where the level of decrease is correlated to the level of depth in the T-TIP (S1 to S3). On the other hand, Turkey's exports to the US can increase significantly in case of signing an FTA with the US. In such a case, Turkey's exports can experience a shift from the EU market to the US market (S5 and S6). In other words, a deep FTA with the US can increase production of the CI in Turkey while creating a shift in exports from the EU to the US.

Table 8 Simulation Results: Change in Turkey's Component Industry Production and Exports

Agreement	Liberalization scenario		Change in output (%)	Change in Turkey's exports to (million USD)		
				EU	US	ROW
T-TIP only	Tariffs only	S1	-0.033	0.2	-9.6	2.9
	Tariffs + 25% of NTBs	S2	-0.024	2.2	-14.5	7.5
	Tariffs + 50% of NTBs	S3	-0.016	4.1	-19.4	12.1
T-TIP + TR and US FTA	Tariffs only	S4	-0.032	-0.1	-9.1	2.8
	Tariffs + 25% of NTBs	S5	0.133	-60.5	87.4	-0.5
	Tariffs + 50% of NTBs	S6	0.312	-127.3	194.0	-4.5

Source: Simulation results.

According to Table 9, which shows the simulation results on prices and welfare concerning Turkey with respect to the CI, the consumer prices of the CI in Turkey

experience an increase in all scenarios. In other words, regardless of an FTA with the US, consumer prices of the CI can increase in Turkey because of the T-TIP. Producer prices, on the other hand, may decrease if Turkey does not sign an FTA with the US (S1 to S3), whereas an FTA with the US, which is not shallow, may lead to an increase in producer prices, where the level of increase is correlated to the level of depth (S5 and S6). Yet, because the negative change in the consumer surplus is very strong in all scenarios, net welfare faces a decrease in all scenarios, despite increasing tariff revenues in four of six scenarios.

Table 9 Simulation Results: Price and Welfare Changes in Turkey with Respect to Components Industry

Agreement	Liberalization scenario		Change in overall consumer prices (%)	Change in producer price for home good (%)	Change in market price for home good (%)	Change in welfare (million USD)			
						Net welfare effect	Producer surplus	Consumer surplus	Tariff revenue
T-TIP only	Tariffs only	S1	0.124	-0.0353	-0.0353	-21.4	-3.4	-17.7	-0.4
	Tariffs + 25% of NTBs	S2	0.320	-0.0261	-0.0261	-40.9	-2.5	-45.5	7.2
	Tariffs + 50% of NTBs	S3	0.517	-0.0172	-0.0172	-60.6	-1.6	-73.6	14.7
T-TIP + TR and US FTA	Tariffs only	S4	0.070	-0.0346	-0.0346	-12.3	-3.3	-10.0	1.0
	Tariffs + 25% of NTBs	S5	0.150	0.143	0.143	-2.1	13.7	-21.3	5.5
	Tariffs + 50% of NTBs	S6	0.134	0.336	0.336	-1.6	32.2	-19.0	-14.8

Source: Simulation results.

The results of the simulations give a number of clues about what Turkey would face concerning its MVP sector after the T-TIP. The scenarios revealed that the prospective effects on the VI and the CI with respect to production and exports diversify significantly, which is a clear indication of the structural differences between these industries and an obvious need to pursue a diversified set of policies once the T-TIP gets into force. Although Turkey is not able to determine the depth of the T-TIP, it can still pursue a policy of forming an FTA with the US to minimize prospective costs. Despite the fact that the net welfare effect turned out to be negative in 11 of 12 cases, it seems that there are some options in which some of the agents in the economy can benefit from the situation. Table 10 summarizes the winners and losers in Turkey's economy based on the simulation results, where shaded areas reflect winners and white areas account for losers in each scenario.

Table 10 clearly reveals the consequences of T-TIP on Turkey with respect to the VI and the CI. First of all, consumers in Turkey may be negatively affected by the T-TIP. Besides, an FTA with the US is not likely to have significant positive effect on consumers. Second, producers may be damaged if Turkey does not sign an FTA with the US. In case of an FTA with the US, a deep integration seems to harm producers in VI; on the contrary, a shallow FTA seems to harm producers in the CI. On the other hand, in S5, which implies a moderate T-TIP and FTA between Turkey and the US, producers in both the VI and the CI experience increase in gains. Third, production and exports in the VI can increase in case of a shallow T-TIP. On the other hand, an FTA with the US, which is not shallow, seems to be necessary for the CI to increase its production and exports. Hence, in S5, production and exports of both the VI and the CI benefit from the agreements. Fourth, government revenues are more likely to

be worse because of T-TIP, especially with respect to the changes in the VI. Finally, net welfare seems to be negative in all scenarios with respect to the changes in the CI, which is the same in five of six scenarios concerning the VI.

Table 10 Winners and Losers: Effects of T-TIP on Vehicle Industry and Components Industry of Turkey

Agreement	Liberalization scenario		Effects due to changes in vehicles industry					
			Output	Exports	Net welfare	Producers	Consumers	Government
T-TIP only	Tariffs only	S1	■	■		■		
	Tariffs + 25% of NTBs	S2						
	Tariffs + 50% of NTBs	S3						
T-TIP + TR and US FTA	Tariffs only	S4	■	■	■	■	■	
	Tariffs + 25% of NTBs	S5	■	■		■		
	Tariffs + 50% of NTBs	S6						

Agreement	Liberalization scenario		Effects due to changes in components industry					
			Output	Exports	Net welfare	Producers	Consumers	Government
T-TIP only	Tariffs only	S1						
	Tariffs + 25% of NTBs	S2						■
	Tariffs + 50% of NTBs	S3						■
T-TIP + TR and US FTA	Tariffs only	S4						■
	Tariffs + 25% of NTBs	S5	■	■		■		■
	Tariffs + 50% of NTBs	S6	■	■		■		

Source: Simulation results.

These figures imply that the prospective loss of the consumers is more likely to outweigh the potential gains of the producers. Thus, because of the consequences of the T-TIP, it seems that prospective changes in the MVP sector will negatively affect Turkey's economy as a whole.

7. Conclusions

Using the GSIM model, which enables a multiregion analysis at industry level, prospective effects of the T-TIP on Turkey's MVP sector is analyzed in this article *via* six scenarios that take into account a shallow, a moderate, and a deep T-TIPs, as well as a simultaneous Turkey-US FTA with different levels of integration. The results show that the depth of the T-TIP and a Turkey-US FTA significantly affect the results for both VI and CI industries.

The prospective effects on the VI and the CI with respect to production and exports significantly diversify, which is a clear indication of the structural differences between these industries and the necessity for a diversified set of policies once the T-TIP gets into force. On the other hand, simulation results also point to a single common ground for both industries. In case of a moderate T-TIP and a simultaneous moderate Turkey-US FTA, production and exports of both industries seem to be positively affected. In terms of welfare, the results for both industries point at decreasing net welfare for Turkey, mostly due to the decrease in consumer surplus as a result of increasing consumer prices, to which an FTA with the US seems not to be a solution.

This study also revealed that the current trade structure of the MVP sector between the EU, the US, and Turkey would be significantly affected once the T-TIP is put into force. The simulation results already suggest shifts in favor of the US and the EU in each other's market. All in all, this study concludes that the T-TIP brings along more risks than opportunities for Turkey's MVP sector, whereas an FTA with the US does not offer a significant market access potential for Turkey unless a structural change occurs in the product scope that Turkey can export to the US in the MVP sector.

References

Aran, Bozkurt. 2015. "Türkiye: Transatlantik Ticaret ve Yatırım Ortaklığının Sonuçları." Türkiye Ekonomi Politikaları Araştırma Vakfı Değerlendirme Notu N201510.

Bravo, Richard, and Julia Chatterley. 2018. "Trump Is Willing to Reopen TTIP amid EU-U.S. Trade Dispute, Ross Says." *Bloomberg*, March 29. http://www.bloomberg.com/news/articles/2018-03-29/trump-willing-to-reopen-ttip-amid-eu-u-s-trade-spat-ross-says.

Bolin, Britt. 2017. "Europe Feels the Trump Effect." *Fair Observer*, December 13. http://www.fairobserver.com/region/europe/donald-trump-nato-european-union-trade-climate-europe-news-15555/.

Charteris, Angus, and Niven Winchester. 2010. "Dairy Disaggregation and Joint Production in an Economy-Wide Model." *Australian Journal of Agricultural and Resource Economics*, 54(4): 491-507. http://dx.doi.org/10.1111/j.1467-8489.2010.00508.x

Berden, Koen G., Joseph F. Francois, Saara Tamminen, Martin Thelle, and Paul Wymenga. 2009. *Non-Tariff Measures in EU-US Trade and Investment: An Economic Analysis*. Rotterdam: Ecorys.

European Commission. 2016a. "Report of the 14th Round of Negotiations for the Transatlantic Trade and Investment Partnership." http://trade.ec.europa.eu/doclib/docs/2016/august/tradoc_154837.pdf.

European Commission. 2016b. "Report of the 15th Round of Negotiations for the Transatlantic Trade and Investment Partnership." http://trade.ec.europa.eu/doclib/docs/2016/october/tradoc_155027.pdf.

European Commission. 2016c. Roadmap / Inception Impact Assessments. http://ec.europa.eu/smart-regulation/roadmaps/index_en.htm (accessed July 25, 2016).

Felbermayr, Gabriel J., and Mario Larch. 2013. "The Transatlantic Trade and Investment Partnership (TTIP): Potentials, Problems and Perspectives." *CESifo Forum*, 2/2013: 49-60.

Felbermayr, Gabriel J., and Rahel Aichele. 2015. "How to Make TTIP Inclusive for All? Potential Economic Impacts of the Transatlantic Trade and Investment Partnership (TTIP) on Developing Countries." http://www.bertelsmann-stiftung.de/fileadmin/files/BSt/Publikationen/GrauePublikationen/How_to_make_TTIP_inclusive.pdf.

Francois, Joseph F., and Keith H. Hall. 1997. "Partial Equilibrium Modeling." In *Applied Methods for Trade Policy Analysis: A Handbook*, ed. Joseph F. Francois and Kenneth A. Reinert, 122-155. Cambridge: Cambridge University Press. http://dx.doi.org/10.1017/CBO9781139174824.007

Francois, Joseph F., and Keith H. Hall. 2009. "Global Simulation Analysis of Industry-Level Trade Policy: The GSIM Model." Institute for International and Development Economics Discussion Technical Report 20090803.

Francois, Joseph F., Miriam Manchin, Hanna Norberg, Olga Pindyuk, and Patrick Tomberger. 2013. "Reducing Transatlantic Barriers to Trade and Investment: An Economic Assessment." Institute for International and Development Economics Discussion Paper 20130401.

Holzner, Mario. 2008. "GSIM Measurement of the Effects of the EU Accession of the Balkans and Turkey on Agricultural Trade." *South East European Journal of Economics and Business*, 3(1): 7-14. http://dx.doi.org/10.2478/v10033-008-0001-0

Holzner, Mario, and Valentina Ivanić. 2012. "Effects of Serbian Accession to the European Union." *Panoeconomicus*, 59(3): 355-367. http://dx.doi.org/10.2298/PAN1203355H

Lejour, Arjan, Federica Mustilli, Jacques Pelkmans, and Jacopo Timini. 2014. "Economic Incentives for Indirect TTIP Spillovers." Centre for European Policy Studies Special Report 94.

Mavuş, Merve, Didem Güneş, and Arif Oduncu. 2013. "AB-ABD Serbest Ticaret Anlaşması ve Türkiye Üzerine Etkileri." Türkiye Cumhuriyet Merkez Bankası Ekonomi Notları 13/30.

Otomotiv Sanayii Derneği. 2010. "Aylik Rapor: Automotive Industry Monthly Report." http://www.osd.org.tr/sites/1/upload/files/Rapor2010-12-75.pdf.

Otomotiv Sanayii Derneği. 2014. "Otomotiv Sanayiinde Dış Ticaret (1992-2013)." http://www.osd.org.tr/sites/1/upload/files/OSD_Dis_Ticaret_Raporu_1992-2013-49.pdf.

Otomotiv Sanayii Derneği. 2015a. "Aylik Rapor: Automotive Industry Monthly Report." http://www.osd.org.tr/sites/1/upload/files/Rapor2015-12-70.pdf.

Otomotiv Sanayii Derneği. 2015b. "Otomotiv Sanayii Dış Ticaret Raporu." http://www.osd.org.tr/sites/1/upload/files/2015-12_OSD_Dis_Ticaret_Raporu-47.pdf.

Tokarick, Stephen. 2010. "A Method for Calculating Export Supply and Import Demand Elasticities." International Monetary Fund Working Paper WP/10/180. http://dx.doi.org/10.5089/9781455202140.001

United Nations Conference on Trade and Development. 2013. *Trade and Development Report, 2013*. Geneva: United Nations.

World Bank. 2014. "Evaluation of the EU-Turkey Customs Union." World Bank Report 85830-TR.

World Trade Organization, and United Nations Conference on Trade and Development. 2012. *A Practical Guide to Trade Policy Analysis*. Geneva: World Trade Organization.

Yılmaz, Kamil. 2015. "TTIP and EU-Turkish Economic Relations: Deepening the Customs Union." In *Global Turkey in Europe III: Democracy, Trade, and the Kurdish Question in Turkey-EU Relations*, ed. Senem Aydın-Düzgit, Daniela Huber, Meltem Müftüler-Baç, E. Fuat Keyman, and Nathalie Tocci, 185-197. Rome: Edizioni Nuova Cultura.

Zuvin, Serap, and Aybala Kurtuldu. 2015. "Turkey: Economic Impact of TTIP on the US, EU and Turkey." *Mondaq*, February 20. http://www.mondaq.com/turkey/x/376266/international+trade+investment/Economical+Impacts+Of+TTIP+On+The+US+EU+And+Turkey.

THIS PAGE INTENTIONALLY LEFT BLANK