AN EMPIRICAL ANALYSIS ON TRADE BETWEEN TURKEY AND THE
UNITED KINGDOM UNDER THE SHADOW OF BREXIT

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ABSTRACT

AN EMPIRICAL ANALYSIS ON TRADE BETWEEN TURKEY AND THE
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This thesis analyzes Turkey-the UK international trade by developing an empirical model from the sectoral point of view. While doing this, the potential impact of alternative Brexit scenarios on the Turkish trade with the UK is attempted to be investigated by using an econometric model that provides a quantitative perspective. It is concluded that Turkish export prices, the UK's value added, world export prices and general economic activity of the UK have more effect on the exports of Turkey to the UK market. On the other hand, Turkish import prices, Turkey's value added and general economic activities of Turkey are the most important factors in explaining Turkish import demand from the UK. Tariffs of the UK applied to Turkish exports and of Turkey applied to UK's exports have a limited influence on the export demand and import demand. Considering the alternative Brexit scenarios, it is found that the agricultural sectors will be affected primarily whereas the WTO Model has the highest negative impact on Turkey's exports to and imports from the UK.

ÖZ

BREXIT'İN GÖLGESİNDE TÜRKİYE VE BİRLEŞİK KRALLIK ARASINDAKİ TİCARET ÜZERİNE BİR AMPİRİK ANALİZ

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Bu tez Türkiye ile Birleşik Krallık (BK) arasındaki ticareti sektörel bir bakış açısıyla ampirik bir çalışma ile ele almaktadır. Aynı zamanda, Brexit'in Türkiye'nin BK ile olan ticaretine etkisini tahmin edilen ekonometrik model ile ölçmeye çalışmaktadır. Yapılan analiz sonucunda, Türkiye'nin ihracat fiyatlarının, BK'nin katma değerinin, Dünya ihracat fiyatlarının ve BK'nin genel ekonomik faaliyetlerinin Türkiye'nin BK'ye yaptığı ihracatının talebini açıklamada daha etkili olduğu tespit edilmiştir. Diğer taraftan, Türkiye'nin ithalat fiyatlarının, katma değerinin ve genel ekonomik faaliyetlerinin BK'den yaptığı ithalatı açıklamadaki en önemli faktörler olduğu görülmüştür. Ayrıca, hem BK tarafından Türkiye'nin ihracatına uygulanan hem de Türkiye tarafından BK'den yapılan ithalata uygulanan tarifelerin ihracat ve ithalat üzerindeki etkisinin sınırlı olduğu ortaya çıkmıştır. Farklı Brexit senaryoları dikkate alındığında, tarımsal sektörlerin temel olarak etkilenen sektörler olduğu bulunmuştur. Alternatif modeler kıyaslandığında Dünya Ticaret Örgütü Modelinin Türkiye'nin BK ile ticareti üzerinde en fazla olumsuz etkiye yol açabileceği sonucuna ulaşılmıştır.

Anahtar Kelimeler: Brexit, Türkiye'nin Birleşik Krallık ile ticareti, Uluslararası ticaret, Gümrük Birliği

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CHAPTER 1

INTRODUCTION

In a globalized and financially integrated world, international trade undertakes a significant role for the emerging market economies as well as the advanced economies. It could be seen as the engine of economic growth for some countries and as the main source of competition for some markets. For Turkey, international trade is an important component of the general economic activities. According to World Bank's World Development Indicators (WDI), the sum of exports and imports of goods and services constitutes to more than 60 percent of Turkish Gross Domestic Product (GDP). The product groups that are traded by Turkey include but not limited to vehicles, machinery, chemicals and mineral fuels according to the Trademap database. On the other hand, the United States of America (the US), the Russian Federation, China and the European Union (the EU) are the main trading partners of Turkey. In the process of exporting to and importing from these countries, different rules and regulations are applied and various requirements have to be satisfied.

Turkey has been trading with the EU according to the rules of the Customs Union Agreement since 1996. In this regard, Turkey has had access to the EU market without certain restrictions in trade. This includes zero tariffs for certain product groups such as industrial products and processed agricultural products, along with the eliminated quantitative restrictions and measures having similar impact on exports and imports. In this context, the goods produced in the Customs Union could be moved freely whereas goods from third countries can be transferred without facing any restrictions other than import formalities applied while entering the Union. Turkey has to comply with the obligation to impose the same tariffs as the EU to third countries due to the Common External Tariff Policy of the Customs Union. Thus, Turkey is expected to

sign a preferential trade agreement with the countries that already have a preferential trade agreement with the EU (European Commission, 2021).

According to the International Trade Centre's Trademap Database, the EU, as the biggest exporting partner of Turkey, constituted half of Turkish exports in 2018. Among the EU and non-EU countries, the United Kingdom (the UK) is the second largest exporting market with a value of 11.1 billion US Dollars for Turkey after Germany in this year. On the other hand, Turkish imports from the EU amounts to one third of total Turkish imports from the world. Imports from the UK is the seventh largest among all partners of Turkey with a value of 7.5 billion US Dollars in 2018. In this context, Turkish trade with the UK has the second higher trade surplus almost 3.6 billion US Dollars after Iraq.

Since 1973, the UK has been a part of the single market in the EU. Therefore, trade between Turkey and the UK has been subject to the Customs Union rules. The continuity of this relation was posed a considerable risk in 2016 when British people voted for leaving the EU in the referendum. This started a process popularly called Brexit which at the end Turkey and the UK could have trade according to a new set of rules.

According to the Article 50 of the EU Treaty, any member state should notify the Union about its decision to withdraw from the Union. After this, a withdrawal agreement should be negotiated. If the parties fail to reach an agreement, the withdrawal could be completed two years after the notification. In this context, notification of the UK dated 29 March 2017 triggered the negotiations. During negotiations, different alternatives for the future relationship between the UK and the EU came to the fore. Norwegian Model, Swiss Model, Turkish Model and WTO Model were among them. Every one of them has their own characteristics and implications for the UK. Therefore, they have the potential to affect Turkey and Turkey's trade with the UK differently. After a process consisting of a number of time extensions in the process, an amendment in the withdrawal agreement and a transition period, negotiations between the UK and the EU were finalized on 1 January 2021 and the New EU-UK Trade and Cooperation Agreement entered into force after that. This

agreement enables the UK and the EU to trade with zero tariffs and zero quotas for all goods including agricultural and fishery products. This implies the continuation of the current relation for Turkey and the UK. Therewith, the future relation of Turkey with the UK was determined with The Free Trade Agreement signed on 29 December 2020, as a follow-up agreement to previous Customs Union Agreement between Turkey and the UK.

In light of the reviewed literature, it is observed that the number of studies related to the effects of Brexit on Turkey and more specifically on the trade between Turkey and the UK are limited. Moreover, there is no study that discuss the effects of Brexit focusing only on Turkey in an analytical framework and assessing the possible effects quantitatively. Furthermore, even independent from Brexit process, there is no empirical research solely focusing on the trade between Turkey and the UK.

Since the UK is one of the most important trading partners of Turkey, it might be necessary to answer certain questions such as what is the sectoral structure of Turkey's trade with the UK and how do the major variables influence the trade between Turkey and the UK. In addition to those, Brexit process also raised a number of questions like what would be the potential impact of Brexit if an alternative agreement other than the current one is reached between the EU and the UK or what would be the possible effects of a structural change in the current agreement in a negative way on Turkey's trade with the UK.

Therefore, this thesis is an attempt to find answers to those questions. In other words, this thesis contributes to the existing literature in terms of analyzing the Turkey-UK international trade by developing an empirical model from the sectoral point of view. While doing this, the potential impact of alternative Brexit scenarios on the Turkish trade with the UK is attempted to be investigated by using an econometric model that provides a quantitative perspective.

In this context, the remaining parts of this thesis are structured as follows: Chapter 2 provides a historical background and a literature review of Brexit and Turkey's relation with the UK and the EU; Chapter 3 presents an overview of Turkey's trade with the UK; Chapter 4 describes the data, the econometric model and the statistical analysis

of the data; Chapter 5 presents the results of the econometric analysis and Chapter 6 concludes the dissertation.

CHAPTER 2

LITERATURE REVIEW

2.1. A Brief Overview of the Customs Union and the Brexit

Before elaborating on the literature review, it might be beneficial to provide a proper understanding about the Customs Union Agreement of Turkey and the Brexit. In this section, we first give a concise summary of Turkey's Customs Union journey. Then, we go through the Brexit process and its major outcomes.

2.1.1. The Customs Union

Turkey applied to join the European Economic Community (EEC), former organization of the EU, in 1959, which ended up in signing the Association Agreement in 1963. This agreement divided the participation process into three parts in terms of preparatory stage, transitional stage and final stage. In the first stage, Turkey was given one-sided concessions such as agricultural tariff quotas and secured financial assistance (Togan, 1997). In 1967, Turkey submit its application in order to start the negotiation of the second stage. In 1970, the additional protocol to Ankara Agreement, which aims to introduce a Customs Union between the EU and Turkey, was signed and it took effect in 1973 (Togan, 1997).

Following Turkey's application for the EU membership, its rejection by the EU, Turkey's re-application and its re-rejection, Turkey engaged in liberalization of its trade against the EU. In this regard, the decision to harmonize its tariff system with the EU was taken by Turkey in March 1995. After that, a Customs Union Agreement between Turkey and the EU was agreed to be implemented in 1996 (Mercenier and Yeldan, 1997).

The agreement provides the access for Turkey to the EU market without certain restrictions in trade. That is, tariffs for some product groups like industrial products and processed agricultural products are removed from both sides. This provided an opportunity for not only Turkish exporters to sell their products to the European Market without facing any tariff barrier but also Turkish importers to purchase goods from the EU without any tariffs. In addition, any quantitative restrictions and all other measures having similar effects for exports and imports were eliminated. According to this free movement of goods rules, certain goods that are produced in the Customs Union could be freely moved; third countries' goods can be moved freely if they are complied with the import formalities.

This agreement brought an obligation for Turkey in terms of applying the same tariff structure as the EU against third countries. By 2001, Turkey was expected to sign preferential trade agreements with the countries those the EU already has an agreement, as part of the common external tariff policy. Common external tariff policy was seen as the biggest gain from the Customs Union Agreement since it would allow improved access for Turkey to third countries' market according to Harrison et al. (1996). On the other hand, this required Turkey to sign an agreement whichever country the EU signs an agreement without having any control over that.

Furthermore, the Customs Union Agreement required Turkey to incorporate its regulatory environment related to the instruments associated with the elimination of the trade technical barriers. Aligned with this, cooperation needs to be accomplished in the standardization, quality and certification areas. In addition to the alignment of trade policy and preferential trade agreements with third countries and abolition of technical barriers to trade of certain products, the Customs Union Agreement introduced an alignment of competition policy and intellectual property law. In line with these, the customs legislation was also adjusted. Therefore, as Neyaptı et al. (2007) stated the Customs Union Agreement is not just a change in the tariff structure, but also a number of changes that impact total trade behavior and trade level of Turkey.

On the other hand, the Customs Union Agreement excludes four areas: the supply of services, establishments, capital movement and labor movement (Togan, 1997).

Moreover, certain product groups such as agricultural products are left out of the scope of the agreement. Nevertheless, the trade rules for some of these such as agricultural products and coal and steel products are determined by certain association council decisions (Directorate for EU Affairs, 2019).

In 2016, the modernization of the Customs Union Agreement in a way that includes these areas like services was proposed by European Commission (European Commission, 2020). A public consultation with stakeholders, impact assessment and external consultant study were conducted; however, this has not been adopted by European Council. Regardless of these efforts to revise the Customs Union Agreement, any concrete and agreed step has not been taken yet.

2.1.2. The Brexit

British people voted for leaving the EU in the referendum that took place on June 23, 2016, which could be considered a unique event since no other member country decided to leave the Union and a shock to the markets. On the economic side, British pound dropped against the US Dollar to 31-year low (Hobolt, 2016) and the value of British pound in terms of Turkish lira moved from 4.24 to 4.001 with a dramatic fall (Kol, 2021). On the political side, the resignation of the British Prime Minister David Cameron was announced and leaders of the opposing side admitted that there is no plan for how the exit from the EU could happen (Hobolt, 2016).

There was a division before the referendum between people who prefer to stay in the Union, this as a whole is called the "remain side" and people who want to exit the Union, those could be named as the "leave side". Both groups had their own motivation for their decisions. The "remain side" supported the idea that Brexit outcome would impact the UK adversely and therefore not leaving the Union would be better. On the other hand, the "leave side" advocated that if the UK leaves the Union, the UK could regain the self-control over its law-making and borders, which could assist in restricting the immigration (Hobolt, 2016). These two different strong campaigns were conducted by the leaders of different sides.

This referendum was not the first one in the UK's membership history in the Union. The first one was conducted in 1975 and 67 percent of the UK citizens voted for remaining. There were also several referendums on different aspects of the EU integration (Hobolt, 2009).

After the referendum on June 2016, a White Paper was released in February 2017 by the Her Majesty's Government. This white paper sets out the objectives of Brexit and new partnership of the UK with the EU. Moreover, this paper provided explanations for different areas such as laws and regulations, ties with Scotland, Wales and Ireland, immigration, workers' rights, trade with the EU and other countries, science and innovation, fight against crime and terrorism and smooth Brexit (HM Government, 2017). Areas that free market access is demanded and the objectives are most clearly defined such as tariff-free trade, customs arrangements, financial services; other market-related areas for which alternatives are under consideration but the objectives are not clear including technical standards, competition and consumer policy, data protection; and other areas that requires special treatments namely financial, EU budget, crime and terrorism, foreign and security policy were the main headings of the negotiations of the Brexit process (Emerson, 2017).

Withdrawal from the EU is regulated by Article 50 of the Treaty of the EU (EUR-Lex, 2012). According to the Article 50, any member state could make a decision to withdraw from the Union. It should notify the Union about its decision and reach an agreement defining the future relationship between the member state and the Union. Following the withdrawal agreement, the withdrawal could take place; or, if an agreement fails to be concluded, after two years of the notification, the withdrawal could occur.

The notification of the UK regarding the intention to leave the Union was received by the EU on 29 March 2017 (Sampson, 2017). This triggered the negotiations, which could last at most two years unless the parties unanimously extend it, between the UK and the EU on the withdrawal process according to the Article 50. After this period, the UK will no longer be a member of the Union. Different aspects such as the UK's financial liabilities to the EU, future standing of the EU citizens living in the UK and

the UK citizens living in the EU would be covered by the withdrawal agreement (European Council, 2017).

Following the notification of the UK on the intention of leaving the EU on 29 March 2017, the EU released the guidelines that set out the framework and core principles for the negotiations. According to the principles, the UK will continue to be a close partner when the exit happens; any agreement will be formed attributing to a balance of rights and obligations; the integrity of the Single Market will be maintained; in decision-making process and role of the Court of Justice, the EU autonomy should be preserved; all items should be settled altogether; EU Countries will negotiate in a unified position and individual countries should not carry out negotiations between themselves and the UK (European Council, 2017).

Different alternatives for the future relationship between the UK and the EU were on the table. These have been studied from different perspectives by different authors.

According to Dhingra and Sampson (2016), the Norwegian Model, the Swiss Model, the European Free Trade Area Model (EFTA) and the World Trade Organization (WTO) Model could be among the possible outcomes of these negotiations. In the first model, the UK could join the European Economic Area (EEA), which is also called the Norwegian Model. Goods, services, people and capital could freely move between them. Nonetheless, the countries in EEA[1] do not participate in the Customs Union which implies that these countries could determine their external tariff rates and make their own free trade agreements with non-EU countries. In the Swiss Model, the new relationship of the UK could be established similar to Switzerland, which conducted a number of negotiations to define its relationship with the EU in certain areas without being part of neither the EU nor the EEA. Participating in the EFTA, Switzerland has an opportunity to trade non-agricultural goods with the EU freely. Nevertheless, no agreement regarding the services trade has been reached. The third alternative could be the re-joining EFTA[2]. It is a free trade area which consists of goods other than

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[1] EEA was founded in 1994 and consists of Iceland, Liechtenstein and Norway.

[2] EFTA was founded by the UK in 1957 when the UK waived to join the EU.

agricultural ones and includes certain free trade agreements with the EU and some other countries. There would not be free movement of people or trade of services between the UK and the EU; however, in terms of non-agricultural goods, tariff-free access could be guaranteed. Since three of four EFTA members (Iceland, Liechtenstein and Norway) joined the EEA to further integrate with the EU where one member (Switzerland) carried out its own integration arrangements, re-joining the EFTA itself would not ensure the expected outcome for the UK. Another option for the UK to determine the future relationship with the EU and the rest of the world is the WTO rules. According to the WTO rules, all of the member countries should apply the "most favored nation (MFN)" market access to other members unless the members have some kind of special agreement such as free trade agreements or Customs Union Agreement (Dhingra and Sampson, 2016).

Sampson (2017) defined another alternative model namely Turkish Model for the future relationship between the EU and the UK. In this kind of model, the UK leaves the Union and signs an agreement similar to the Customs Union Agreement signed between the EU and Turkey. This enables the UK exporters and importers to export to and import from the EU without facing trade barriers in certain products. However, this requires the UK's external trade policy to be mostly determined by the EU in terms of free trade agreements and external tariff rates. Moreover, some product groups like agricultural products and services may not be covered by the agreement. However, the probability of the UK to adopt Turkish Model is considered as very small (Cappariello, 2017).

Similarly, Blanco (2018, pp. 181-196) discussed the effect of Brexit on Turkey's international trade and overall economy. 6 potential models resulting from the negotiations between the EU and the UK are presented by the author. The first alternative is named as "a privileged model" in which the free movement of goods and services together with the capital is allowed whereas the free movement of people is restricted. The second alternative is called "the Norwegian model" according to which the UK's participation in the single market is supplied with being part of the European Economic Area. The third alternative is presented as "going back to the EFTA" while the fourth one is to sign a customs union agreement with the EU similar to Turkey.

Another alternative is stated as "a Swiss integration model" in which the UK would have access to the EU's internal market and also maintain its independence. In the last model, the relationship between the EU and the UK is determined according to the WTO principles. The author stated that the Brexit could cause the EU to become more conservative in terms of the external relations which might complicate Turkey's EU membership process. On the other hand, it is possible for the EU to response to the Brexit in a more integration-driven way which could support the full membership of Turkey. However, the author asserted that the latter one is more likely to happen. Moreover, Brexit resulting from the UK's separation from the Customs Union might result in increasing costs and declining investment and commercial relations with the UK.

A two-phase approach was embraced in the negotiations process. The first phase started on June 19, 2017 and lasted for six rounds. On December 8, 2017, by going through sufficient progress, negotiators arrived at an important point in the negotiations. As a result of the initial phase, the EU and the UK explained their commitment to certain issues. Firstly, the rights of the UK citizens in the EU and the EU citizens in the UK is guaranteed. Secondly, existing financial obligations which arisen during the membership of the UK is settled. Lastly, the unique situation of Ireland and Northern Ireland is addressed. With the confirmation of the European Council on December 15, 2017, the second negotiation process elaborating on transitional arrangements and future relations began. The European Council approved the Withdrawal Agreement which provides the framework for the future relationship between the EU and the UK. Nonetheless, the necessary support for signature and approval of the agreement from the UK Parliament was not received. Therefore, the UK demanded an extension for the negotiation period stated in the Article 50. The time period firstly extended to April 12, 2019 and then further extended to October 31, 2019 (EUR-Lex, 2020).

Prime Minister of the UK, Theresa May, resigned on July 24, 2019 and Boris Johnson was elected instead. New government requested the amendment of the Withdrawal Agreement and negotiations restarted for that. When the negotiators concluded an agreement on the amended agreement on October 17, 2019, the European Council

granted approval of both the amended withdrawal agreement and amended political declaration. On the other hand, the UK requested a further time extension until January 31, 2020 to endorse the agreement and the declaration. The Withdrawal Agreement was signed on January 24, 2020 between the EU and the UK; and entered into force on February 1, 2020. This agreement allowed a transition period until December 31, 2020. During this period, the EU legislation continued to be implemented in the UK and the UK will be mostly treated as a member of the EU. Moreover, this transition period provided an opportunity for the EU and the UK to discuss the details of the future relationship (EUR-Lex, 2020).

In this regard, the negotiators of the parties reached an in principle agreement on December 24, 2020. New EU-UK Trade and Cooperation Agreement started to apply temporarily at the end of the transition period; that is, January 1, 2021 and entered into force on May 1, 2021. The New EU-UK Trade and Cooperation Agreement comprises free trade agreement; cooperation on environmental, social, fisheries and economic issues; security of the citizens' partnership and for cooperation between the EU and the UK, governance framework (European Commission, 2020).

Cease of free movement of persons, capital, goods and services is one of the fundamental changes of this process. This brought certain checks and controls to the exports of the UK while entering the EU and the requirement for the UK service providers to comply with the rules of each EU member while providing services in the EU. The free trade agreement enables the EU and the UK to trade without any restrictions on exports and imports; that is with zero tariffs and zero quotas for all goods including agricultural and fishery products. In this regard, this agreement moves the UK beyond the other third countries for the EU in terms of free trade agreements. Although the rules of origin requirements are still applicable for the products traded, the customs procedures are simpler under this agreement. On the other hand, there are certain areas that requires further negotiations between the parties such as the adequacy of the UK's data protection regime or equivalences for financial services (European Commission, 2020).

In line with the negotiation process between the EU and the UK, the process of signing free trade agreement between Turkey and the UK is completed. The terms and conditions of this agreement constituted a follow-up agreement to previous Customs Union between Turkey and the UK. The Free Trade Agreement was signed on 29 December 2020 and following its publication in the Official Gazette on 24 February 2021, its approval process is completed on the Turkish side (Republic of Turkey Ministry of Trade, 2021). Currently, the free trade agreement is in effect and the trade between the UK and Turkey is carried out according to these rules (GOV.UK, 2020). This agreement with Turkey is the fifth biggest free trade agreement of the UK after its agreements with Sweden, Japan, Canada and Norway (Deutsche Welle, 2020).

23 June 2016	29 March 2017	19 June 2017	October 2017	February 2018
• UK Referendum to leave the Union	• UK formally triggers Article 50 to leave the EU	• Start of negotiations between the EU and the UK	• Start of internal preparations on the transition and future relationship negotiations	• Draft Withdrawal Agreement

March 2019	April & October 2019	31 January 2020	1 February 2020	24 December 2020
• EU Council decision on the signing of the withdrawal agreement • Formal decision on Brexit extension	• Brexit time extensions	• Withdrawal agreement was enforced • The UK leaves the EU	• Start of transition period	• EU and UK agree a trade and coorporation agreement

29 December 2020	1 January 2021	20 April 2021	1 May 2021
• Free Trade Agreement between the UK and Turkey was signed	• End of transition period	• The Free Trade Agreement entered into force	• EU-UK Trade and Coorporation Agreement entered into force

Figure 2.1: The Brexit Process

Source: European Council's Website and the Authors' Illustration

2.2. Literature Review

This Section will provide the literature review of studies on Turkey's trade, Turkey's trade with the EU and the UK together with the Brexit. In the first part, studies on Turkey's trade that are conducted from different perspectives such as sectoral or regional basis will be presented whereas the second part will focus on the literature about Turkey's trade with the EU and the UK. In the last part, the research on the Brexit and its main effects on different areas like economic growth and trade will be summarized.

2.2.1. Literature on Turkey's Trade

In the existing literature, there are numerous studies on the trade performance, the main determinants of trade and the impact of exports and imports to other macroeconomic indicators. In this section, we review studies on Turkey's export and import demand after 2000.

Erdoğan Coşar (2002) calculated the income and price elasticities of Turkey's export demand in terms of different sectors and countries. The author found foreign income elasticity and real exchange inelasticity in aggregate export demand in the short and long-run. In the sectoral analysis, it is obtained that the real exchange rate elasticity of the export demand is inelastic for certain sectors such as machinery, textiles and chemicals. Moreover, the results revealed significant difference between the elasticities for aggregate export demand and sectoral export demand.

Aydın et al. (2004) used export prices, unit labor costs, real exchange rate and national income to estimate the export supply and import demand functions of the Turkish economy. Their analysis showed that the imports are significantly determined by the real exchange rate and national income while the exports are explained by the price of it, national income and unit labor costs. They claimed that the productivity improvement policies are crucial in terms of affecting unit labor costs and export prices; thus exports.

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In a similar study, Sarıkaya (2004) analyzed the export dynamics of Turkey for the period of 1989-2003 by elaborating on the role of unit wages. He used a structural vector autoregression and error correction models to investigate the effect of unit wages, real GDP and real exchange rate on the export growth. The author resulted that the real exchange rate is not the sole determinant of the competitiveness and therefore the export performance of Turkey. Sarıkaya finds that while the Turkish Lira is appreciating, the export growth could be maintained with the improvement in the labor productivity.

In a study carried out by Yavuz and Güriş (2006), Turkey's aggregate import demand behavior is investigated by utilizing bounds test procedure. The data for the period 1982-2002 is used and a long-run relation between import demand, Turkey's relative prices and real income is found. Relatively elastic income and inelastic prices is estimated for the import demand. That is, the results suggest that import demand is more sensitive to a change in income than a change in import prices.

Similarly, Aydın et al. (2007) examined the Turkish export performance after 2001 by using the main indicators such as foreign income, real effective exchange rate, import quantity index and estimated its export demand and supply functions. They found that the concentration of Turkish exported commodities rose especially after 2001, similar to the concentration of the countries to which Turkey exported the most. According to the authors, the high growth performance in the Turkish exports can be attributed to the change in the composition of exports towards low exchange rate commodities.

Turkey's long-run trade elasticities bilaterally with its major trading partners are investigated by Uz (2010). According to the author, a change in the value of the Turkish Lira could have a limited effect on trade balance of Turkey. Income is suggested to be inelastic in the short-run; however to be elastic and important determinant of Turkey's trade in the long-run. Only for Canada and the US export demand is estimated to be price elastic and it is inelastic for the EU.

Ketenci (2014) analyzed the negative impact of the global financial crisis on the trade elasticities of Turkey, Brazil, Russia, India, Indonesia, China and South Africa (BRIICS). The author resulted that commodity prices and the exchange rate do not

affect the export and import demand models significantly before and after the crisis. Nevertheless, significant and elastic impact of domestic and foreign income in the export and import demand functions is estimated.

Bozok et al. (2015) investigated the long-run income and price elasticity of Turkey's exports by using different country groups and Dynamic OLS, Common Correlated Effects Mean Group and Mean Group methods. It is found that the price and income elasticities differs across country groups. The estimation results revealed that the income elasticity is statistically significant for all country groups and its value changes between 1.82 and 3.35. On the other hand, the price elasticity, which is estimated as significant only for the exports to the EU27, the developing countries and the MENA region, ranges between -0.27 and -1.56.

In an analysis conducted by Özmen and Yolcu Karadam (2016), Turkey's exports and imports are examined in terms of major Classification by Broad Economic Categories (BEC) sectors. They concluded that Turkey's income and world output are significant in determining exports and imports of Turkey. Using the export and import demand equations suggested by Goldstein and Khan (1985), the elasticities of these variables are estimated as high. Small elasticity of the real exchange rate for both exports and imports are obtained in absolute value. The results revealed higher domestic demand elasticity for Turkey's imports and foreign demand elasticity for Turkey's exports.

Price and income elasticities for Turkey's import demand function is examined by Çulha et al. (2019). The authors employed Kalman Filter Method and quarterly data for the period 2003-2018. The results demonstrated that the relative price changes and the income is important factors affecting total imports. In this context, it is found that the elasticity of income is greater than the elasticity of relative price changes. Furthermore, the income elasticity is estimated to decrease throughout the period whereas the relative price elasticity to rise.

In an analysis on "Exports, Imported Inputs and Domestic Supply Networks" carried out by employing data from the Ministry of Industry and Technology, Akgündüz and Fendoğlu (2019) revealed that exporters that depend more on import intensive suppliers increase the prices of exports and grow their volume of exports to a

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significantly lesser extent in response to a depreciation in the domestic currency. They also found that exporters depending on one supplier have higher propensity to reflect the effect of a change in exchange rate in their export prices. Their analysis displayed that greater disruption in supply networks is experienced by the exporters that have reliance on imports and their suppliers.

2.2.2. The Literature on the Turkey's Trade with the European Union

Regarding the Customs Union and its effects on different areas, there are several empirical studies that use different models and approaches.

For instance, Utkulu and Seymen (2004) analyzed the export and import demand for Turkey's trade with the EU by using the cointegration method together with the error correction model and causality analysis. They found that Turkey's export boost depends not only on the exchange rate adjustments but also on the liberalization of the trade together with the rising demand from the EU. The authors displayed that the price elasticities are lower for agricultural products than the manufacturing products similar for the income elasticities.

By making use of Armington Model and the elasticities for the period of 1992-2003, Eruygur and Çakmak (2005) evaluated the trade implications of the enlargement of the Customs Union to the agricultural products. For Turkey, this means no-tariff trade conditions for the agricultural products with the EU countries whereas a common external tariff implementation for the Rest of the World. They focused on the imports from different county groups: EU15, EU10 (new members of the EU), the US, China, Latin America, MENA Region and the Rest of the World and 19 goods from 14 raw and 5 processed agro-food products. In the case of extending the Customs Union to the agricultural goods, the authors found out that the exports of EU10 Countries increase the most (27%) and this is resulting from these countries being the exporter of the raw agro-food products. Furthermore, it is obtained that the EU15 Counties mainly exporting the processed products to Turkey would experience an increment about 22.3 percent. On the other hand, the US and China are the two lowest beneficiaries of the full EU accession of Turkey. Therefore, their analysis showed that

the EU Countries would likely to benefit the most from the enlargement of the Customs Union while non-EU Countries will benefit with some degrees of substitution effects.

Nowak-Lehmann et al. (2007) investigated the impact of the Customs Union on Turkey's exports to the EU. They used the panel data composed of 16 different export sectors and the period of 1988-2002 together with an extended version of gravity model. They focused on the effect of the deepening the Customs Union in terms of applying Common Agricultural Policy to Turkey's exports to the EU. Nowak-Lehmann et al. analyzed the effects of tariff and subsidies in the real effective exchange rate variable, which revealed the better the price competitiveness of Turkey the improvement in exports of the almost all sectors. On the other hand, the more competitive the rivals (which are Greece, Spain, Portugal, Italy and France) of Turkey, the worse off the export performance of Turkey except for the rubber and plastics sector. It is found that the expansion of Customs Union to the vegetables and fruit sectors would lead to an increase of 21 percent in vegetables and 18.7 percent in fruit exports.

Neyaptı et al. (2007) attempted to analyze Turkey's international trade by considering the changes the Customs Union Agreement brings. By using the data for more than 150 countries for the period of 1980-2001, they modelled the export and import demand functions of Turkey. They obtained that the Customs Union has a significant positive impact on both the exports and imports of Turkey.

Adam and Moutos (2008) examined the trade effects of the Customs Union between EU-15 countries and Turkey. They estimated a gravity model for the period 1988-2004 by using the manufacturing trade data of 24 OECD countries. They showed that the trade between EU-15 countries contains asymmetric effects from Customs Union. However, what they found partially fulfills the expected effects resulting from Turkey's full accession to the EU.

By utilizing the gravity model, Bilici et al. (2008) found out the role of the EU in the trade flows of Turkey. More specifically, the authors attempted to test whether the Turkish trade flows displayed a deviation after the Customs Union or not by using the data for 1992-2006. Their analysis showed that the Customs Union strengthen the

EU's importance in Turkey's trade and it also revealed that before the Customs Union Agreement, the distance variable has a significant impact on Turkey's trade flows; however, after the agreement, it lost its importance.

Yılmaz (2010) elaborated on the effect of the Customs Union after 15 years of its implementation. According to the author, boosting the productivity in the manufacturing sector and increasing the competition in a number of industries are among the main effects of the Customs Union on the Turkish economy. In addition, he claimed that these effects helped the Turkish manufacturing sector to get over the 2001 economic crisis and the entry of Chinese firms to the exports markets. On the other hand, the fact that the EU often signs free trade agreements with the third part countries without consulting Turkey or considering the interests of Turkey had adversely affected the Turkish manufacturing industry in terms of bringing additional competition pressures.

Erdil and Akdi (2019) analyzed the effect of the Customs Union on Turkey's international trade in terms of periodicity for the period 1980:01-2017:12. By dividing the time period into two as 1980:01-1995:12 and 1996:01-2017:12, they compared the pre-Customs Union period with the Customs Union period. It is found that the long-run equilibrium is reached with the establishment of the Customs Union comparatively shorter time period to the pre-Customs Union period, which implies that the Customs Union benefited Turkey. The analysis showed that the periodicity in the data diminished with the introduction of the Customs Union, which is led by the transmission of the business cycle effects to Turkey from the EU. The authors claimed that the modernization of the Customs Union might provide additional welfare gains for Turkey in terms of transferring further business cycle effects to Turkey in the longer term.

Şakı and Eruygur (2021) investigated the static effects of an expansion in the Customs Union towards agricultural products by utilizing Armington Model. The study covered data of imports of Turkey for 30 products for the time period 1995-2012. The results showed that the import demand of Turkey for the agricultural products is anticipated to rise by 25.4 percent. It is found that Turkey's imports from the EU will increase

36.9 percent whereas its imports from the group of other countries will decrease 1.1 percent.

All in all, the studies elaborating on the trade between Turkey and the EU varies from gravity models to error corrections models considering different countries and country groups. The next section will focus more specifically on the literature on the UK's exit from the EU.

2.2.3. The Literature on the Turkey's Trade with the United Kingdom and the Brexit

The empirical literature that covers the impact of Brexit on different countries or sectors from different perspectives is extensive. However, the studies that analyze the impact of Brexit on Turkey or Turkish sectors or Turkey's trade with the UK is very limited. The empirical Brexit studies will be presented in this part.

Dhingra et al. (2016) investigated the consequences of Brexit for the UK in terms of trade and the living standards and they consistently find that the Brexit would reduce trade and in turn decrease the living standards of the UK. They utilized a modern quantitative trade model of the global economy and assumed an optimistic scenario where the trade costs would increase slightly and a pessimistic scenario where the rise in the trade costs would be large. They assumed that in the optimistic scenario the UK would sign an agreement which includes zero tariffs and some non-tariff barriers while in the pessimistic scenario the trade would be carried out according to the WTO rules. Their estimation showed that in the first scenario, the fall in the UK's income would be 1.28 percent due to existing non-tariff barriers. The loss would become 2.61 percent in the second case. They also assessed the effect of Brexit on the UK's trading partners. Ireland, Netherland and Belgium are the most badly influenced countries among the EU countries and the other trading partners. However, Turkey and Russia as non-EU countries could gain because the trade could be redirected towards them.

Kierzenkowski et al. (2016) investigated the economic consequences of Brexit from the tax perspective. They claimed that Brexit would increase the cost of finance together with the cost of trade with the EU in the short term. Moreover, the authors

asserted that the UK's GDP could decline by 3 percentage points by 2020 whereas the GDP of the EU without the UK would fall around 1 percentage point. According to the authors, in the longer term, the Foreign Direct Investments (FDI) inflows to the UK especially from the EU would be cut, which would affect the trade, innovation and capital stock accumulation adversely. In addition, by 2030 they expect the UK's GDP to be 5 percent lower because of Brexit.

The UK being India's most critical trading partner among the EU members, Roy and Mathur (2016) investigated the impact of the Brexit on India-EU free trade agreement negotiation process. Using the computable general equilibrium model namely, the Global Trade Analysis Project Model, the authors estimated the effects of the free trade agreement between the EU and India under two policy shocks. These are complete removal of import tariffs and complete removal of both import tariffs and export subsidies/taxes on all commodities for both trading partners on the EU and India in the case of the UK staying in the EU. Their analysis showed that the EU and India might experience a rise in the welfare but all regions including Turkey except for a few countries such as Hong Kong and Nepal, will encounter a significant fall in the welfare resulting from the both cases. In addition, considering three different scenarios of the free trade agreement under the Brexit, they estimated the welfare effect for both the EU and India and other trading partners. The first scenario includes that the EU and the UK decided to remove all trade barriers and to have common standards whereas the second scenario is the negotiation of a free trade agreement but having border movement 10 percent harder. The final scenario is that the trade between the EU and the UK will be carried out under the WTO rules but the border movements become 10 percent more difficult. They found that in all three cases, India will benefit from the free trade agreement (but less than when the UK is included) whereas the UK and some other countries will experience significant welfare losses. According to their analysis, Turkey will encounter a decline in the welfare and GDP growth (-0.1%) in the first case; however, it will experience different size of welfare gains and GDP growths (0.4% and 0.3%, respectively) in scenario two and three. The main result of this analysis is that since the UK is the most important trading partner for India, the free

trade agreement negotiation between India and the EU will lose its importance for India after the Brexit.

Holmes et al. (2016) reviewed the UK's post-Brexit trade arrangements by focusing on the EU's and WTO's positions and presented the trade relation with different group of countries that they think they are the best options for the UK. According to the authors, signing a free trade agreement is the best option for the UK to have trade enhancements so that the goods could be moved between the UK and EU-27 without tariffs but move between the UK and third parties with different tariffs. They argue that considering the export flows between them, the UK could suffer considerable disruption from the Brexit than the EU as a whole and therefore, would prefer to have an agreement with the EU to cover the possible losses. In addition to that, they asserted that the best approach for the UK in the WTO scenario is to adopt and implement current EU rules on tariffs and non-tariff barriers. Moreover, the authors advised that the UK should continue with the same conditions of the already existing free trade agreements with the third countries.

Oliver (2016) analyzed the potential changes that Brexit brings from the perspective of other EU and non-EU countries. The author argued that for the countries such as Denmark and Austria, Brexit might represent a reference point for their relation with the EU. Moreover, the Brexit could create the domino effect among the other EU member states. For Turkey, according to the author, Brexit could constitute an alternative model for its EU membership application.

Cappariello (2017) approximated average tariff rates that are applied to the UK by the 27 EU countries in the case of the UK leaving the EU. The author assumed that the UK will not be a part of the Customs Union and no free trade agreement will be reached between the EU and the UK; therefore, the trade between them will be conducted based on the WTO most-favored nation rules. According to the author, it is very likely that in the initial phases of exiting the EU and the Customs Union, the UK may adopt the EU tariff rates against the other countries. By using the MFN tariff rates of the EU and the weighted averages of the trade values, it is found that the average duty levied by

the UK to the exports of the EU-27 countries would be 5.2 percent whereas the exports of the UK to the EU-27 is estimated to be 3.9 percent.

Kee and Nicita (2017) studied the impact of Brexit on the exports of the UK in the short-term in terms of goods by using the Overall Trade Restrictiveness Index (OTRI) of the UK's main trading partners (the EU, the US and China). In other words, they attempted to measure the short term impact by focusing on the potential changes of the major trading partners' policies in response to the Brexit. The authors used import value, elasticities of trade, tariff and the ad valorem equivalent of non-tariff measures at 6-digit Harmonized System classification to calculate the OTRI. Assuming the worst-case scenario for Brexit, which is no new trade agreements case, the trade with the UK will be conducted based on the WTO MFN rules. In this case, since the UK trades with the US and China based on these rules, Brexit may not change anything. However, passing from no tariff-based trade to MFN-based trade, the OTRI will likely to increase to 0.93 percent implying that the UK's exports to the EU will fall almost 2 percent.

Sacerdoti (2017) discussed the UK-EU post-Brexit possible trade regimes together with the UK's trade with the countries that has a specific relation with the EU. The author claimed that leaving the Customs Union might give the UK the freedom of determining trade relations with other countries across the world. Moreover, following the date of Brexit being effective, the UK will not be represented within the EU but will become a separate member of the World Trade Organization. Therefore, the UK will be allowed to adopt its own current schedules which are applicable to other WTO members. According to the author, the UK may substitute its own trade network to the already existing one of the EU by negotiating and signing free trade agreements with countries around the world.

Borowski et al. (2018) conducted a study on the impact of hard Brexit on the Polish exports by presenting several scenarios for the future trade relations of the UK and Poland. They defined four alternative scenarios: i) the trade relations between the EU and the UK determined according to the WTO rules, ii) the conclusion of a new free trade agreement, iii) the continuity of the customs union with the EU, iv) the UK's

accession to the European Free Trade Area. By using the real exchange rate of the Polish zloty against the British Pound, Purchasing Managers Index (PMI), the Polish exports to the UK and a first-order autoregressive process, a regression model was formed and estimated with autoregressive moving-average (ARMA) maximum likelihood method for 2006-2016 period. They focused on the WTO scenario and resulted that Brexit will affect the Polish exports adversely in such a way that the Polish exports to the UK will decrease by 1.3 percentage points while total Polish exports fall by 0.1 percentage points compared to the current situation.

Campos and Timini estimated the effects of Brexit on trade and migration between the EU and the UK by using an augmented gravity model for 1997-2014 period data. They elaborated on two cases for Brexit. The first one is "no agreement with reversion to the WTO rules and no special treatment for migrants" whereas the second one is a possible free trade agreement between the EU and the UK. They resulted that the Brexit might affect the trade and the migration flows between the EU and the UK negatively, in the first scenario while signing a free trade agreement might diminish these negative impacts on trade but make no difference in terms of migration. That is, in the first scenario, it is predicted that the bilateral trade flows between rest of the world and the UK might decrease by 30 percent in terms of volume. In the latter scenario, the trade effect is relatively small. In both cases, the effect of Brexit might occur in terms of declining the migration up to 25 percent (Campos and Timini, 2019).

Smith et al. (2019) studied the potential economic impact of Brexit on the exports, production and GDP of Denmark by assuming the worst-case scenario: the WTO MFN rules. They utilized the METRO Model which is a Computable General Equilibrium model. Being an important export partner, Denmark's exports to the UK falls by 17 percent and its GDP decrease by 1.3 percent in the worst-case scenario. Under the sectoral point of view, agri-food, smaller manufacturing and machinery and equipment sectors are affected the most negatively. On the other hand, because of the increasing exports to the rest of the EU, the impact on the financial and insurance sectors are slightly positive.

Similarly, Smith et al. (2019) provided a computable general equilibrium model for measuring the effect of the Brexit on the economy of Netherlands by assuming the worst-case scenario. They obtained a result according to which the Dutch exports to the UK would decline by 17 percent and its GDP falls by 0.7 percent because of the increase both in tariff and non-tariff barriers in trade. In a sectoral exports point of view, the financial services sector together with the transportation sector might gain from Brexit in terms of creating export possibilities whereas the agri-food sector exports to the UK would face a 22 percent decrease.

Kol (2021) investigated the fundamental reasons behind the Brexit and presented an analysis of the Brexit process together with its effects on the Turkish and the UK's economies in terms of foreign trade. According to the author, the idea of "European Skepticism" was the main reason whereas budget problem and immigration problem were others. The author stated that despite the free trade agreement between Turkey and the UK, the certificate of origins of trade would be subject to bureaucratic procedures due to the UK not being part of the Customs Union.
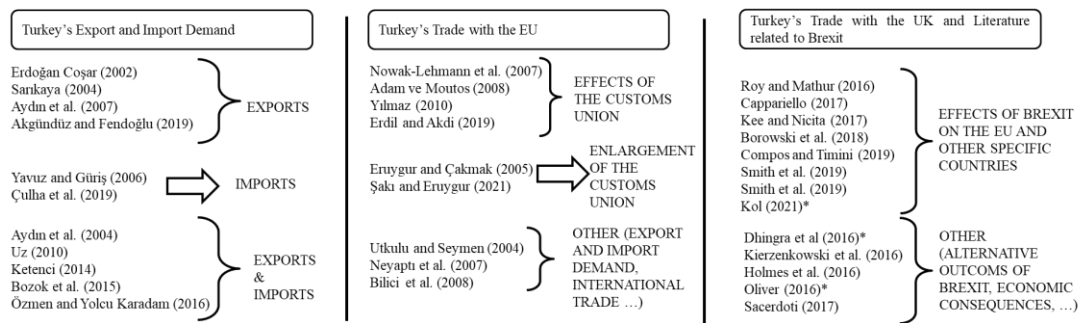
Figure 2.2: The Summary of Literature Review

Source: The Authors' Illustration

As can be seen from the studies mentioned previously, the literature of Brexit consists of various analysis. These includes different countries including the EU members and non-EU countries; countries currently trading freely with the UK and countries negotiating a free trade agreement with the EU and therefore the UK. The studies are

carried out from different perspectives such as sectoral trade point of view or general economy assessments or political stance.

There are very few studies that analyzes the impact of Brexit on Turkey and even in those works, the assessment of Turkey is conducted as part of a group of countries. In addition to that, it is seen that there are no studies that discuss the effect of Brexit focusing only on Turkey in an analytical framework and assess the possible effects quantitatively.

In summary, this Chapter presented a review of the existing literature on Turkey's trade in general and with the EU, as well as the literature on Brexit. It can be seen that the papers that analyze the Turkey's trade relations with the UK is limited. Considering the UK's position as an important trading partner of Turkey, there is a need for studying this relation and its future. Therefore, this thesis will analyze not only the Turkish exports to and imports from the UK but also the effect of Brexit on these by presenting quantitative measures.

CHAPTER 3

A PRIMER ON TURKEY'S TRADE

This Chapter will provide a brief review of the international trade flows of Turkey to and from the UK. In order to understand the dynamics of Turkish trade with the UK, it could be beneficial to determine its position among its major partners. To support that idea, it is seen important to focus on Turkey's general trade first and then, elaborate on the trade between Turkey and the UK. On the other hand, sectoral exports and imports may provide a comprehensive overview on Turkish trade with the UK. In this context, first, overall and sectoral exports to and then imports from the World and major trading partners will be examined, which will be followed by the exports to and imports from the UK specifically.

3.1.   Turkey's Trade with the World and Major Trading Partners

International trade has a critical place in the Turkish economy; Turkish trade (sum of exports and imports) in goods and services corresponds to 62.5 percent of Turkish GDP[3] in 2018. Turkish exports more than four thousand products to the World amounting to 168 billion US Dollars in 2018 whereas its imports from the World equal to 223 billion US Dollars, leading to a trade deficit of 56 billion US Dollars.

Using the exports and imports of all commodities from the UN Comtrade Database and World Development Indicators Database, the share of total exports and imports of goods in Turkish GDP is calculated and presented in Figure 3.1.

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[3] According to the World Bank World Development Indicators, the sum of Turkey's exports and imports of goods and services is calculated as a share of Turkish GDP.
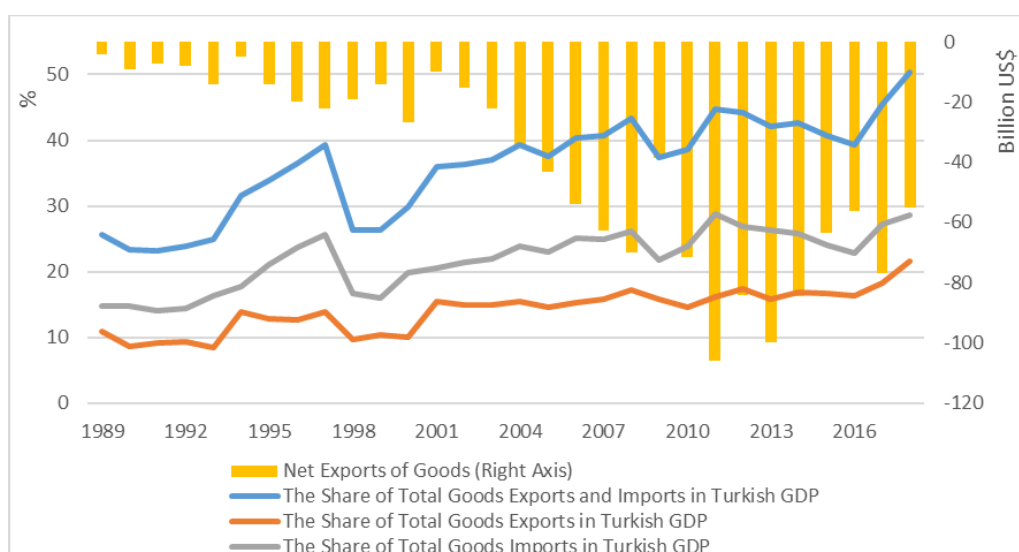
Figure 3.1: The Share of Turkey's Goods Exports to and Imports from the World in
Turkish GDP (1989-2018)

Source: UN Comtrade Database and World Development Indicators

The share of sum of goods exports and imports in Turkish GDP significantly increased
from 1989 to 2018. It was about 26 percent in 1989; the share of goods imports was
15 percent whereas the share of goods exports was 11 percent. These values almost
doubled in nearly 30 years and reached to 50 percent, 29 percent and 22 percent in
2018, respectively. Therefore, it is seen that the importance of trade in Turkish GDP
increased significantly in nearly 30 years. Simultaneously, the difference between
exports and imports of goods displayed a substantial growth in the form of a deficit.
This is more apparent in the second half of the 2000s and it arrived its maximum in
2011 with a value of 106 billion US Dollars (Figure 3.1).

3.1.1. Exports

Figure 3.2 displays Turkish exports to the World in a world map. The density of color
blue represents the amount of Turkish exports to the countries. The lighter the blue,
the higher the exports and the darker the blue the lower the exports. Ten major
exporting partners of Turkey are Germany, the UK, Italy, Iraq, the US, Spain, France,
Netherlands, Belgium and Israel in 2018. Most of them are the EU members. The
amount of exports are 16.1, 11.1, 9.5, 8.4, 8.3, 7.7, 7.3, 4.7, 4.0 and 3.9 billion US
Dollars, respectively. Total share of top ten highest exporting partners corresponds to

almost half of total exports, which shows the high concentration of Turkish exports in terms of countries.
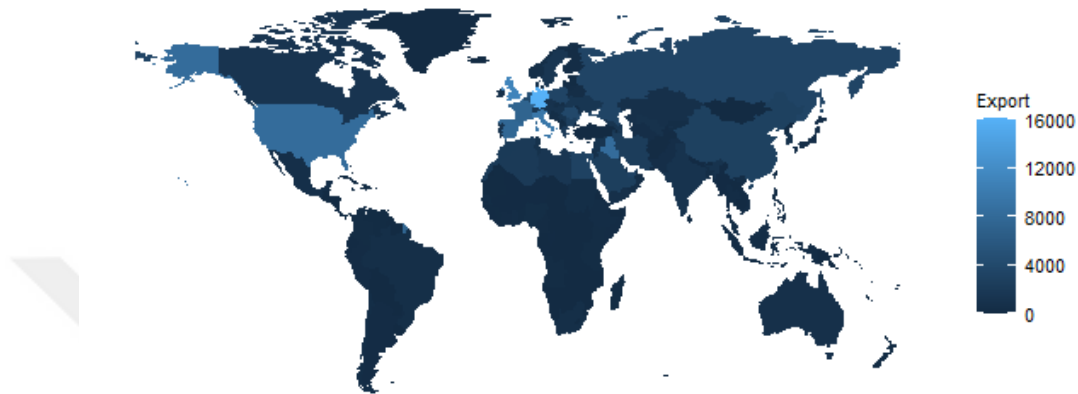
Figure 3.2: Exports of Turkey to the World (Million US Dollars, 2018)

Source: Trademap Database

In terms of neighboring countries, the highest share of exports belongs to Iraq with 5 percent, which is followed by Bulgaria (1.6%), Iran (1.4%) and Greece (1.2%). Total amount of exports to Iraq, Bulgaria, Iran, Greece (individually), Azerbaijan, Syria, Georgia and Armenia sums up to 20 billion US Dollars in 2018 (Figure 3.2).

Turkish exports in total was equal to 11.6 billion in 1989. Through time with globalization, the Customs Union and other free trade agreements, total exports reached 168 billion in 2018. Turkish exports to the EU constituted almost one third of its all exports in 1989 whereas in 2018, it amounts to half of its total exports. The exports to the EU demonstrated an increase after the Customs Union and especially after 2000. The effect of the 2008-2009 financial crisis can be seen clearly in terms of experiencing a sharp decline in the exports particularly to the EU, Russia and the US (Figure 3.3).
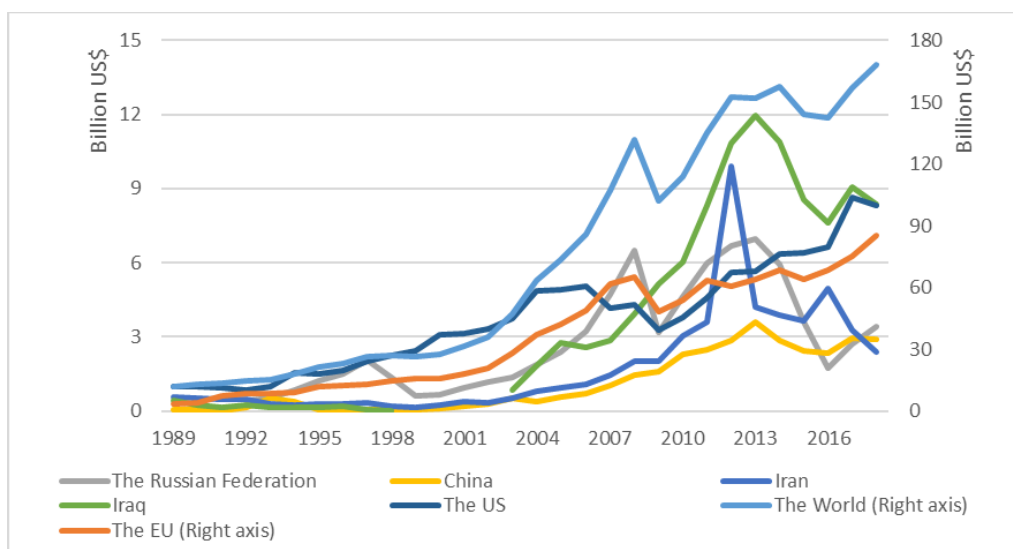
Figure 3.3: Export Destinations of Turkey for Selected Countries (1989-2018)

Source: UN Comtrade Database

During the period 1989-2018, the average growth rate of the exports to the World is 10.3 percent, which is greater than the exports to Iraq (1.7%) and to the US (8.8%) but smaller than the exports to the EU (12.8%), Russia (15%), China (42%) and Iran (12.5%).

The share of Turkey's exports to these countries is presented in Figure 3.4. The share of the EU is the greatest. Its share fluctuated between 30 and 59 percent during this period. The EU is followed by the US whose share reached its maximum in 2000 and after this year started to decrease. After 2008, Iraq have the highest share among these countries whereas the share of the US began to rise again. The shares of the US and Iraq are close in 2018. The shares of Russia and Iran become the third one interchangeably whereas China generally has the lowest share during the period. Finally, total share of Turkey's exports to these countries is 66 percent of aggregate exports to the World.
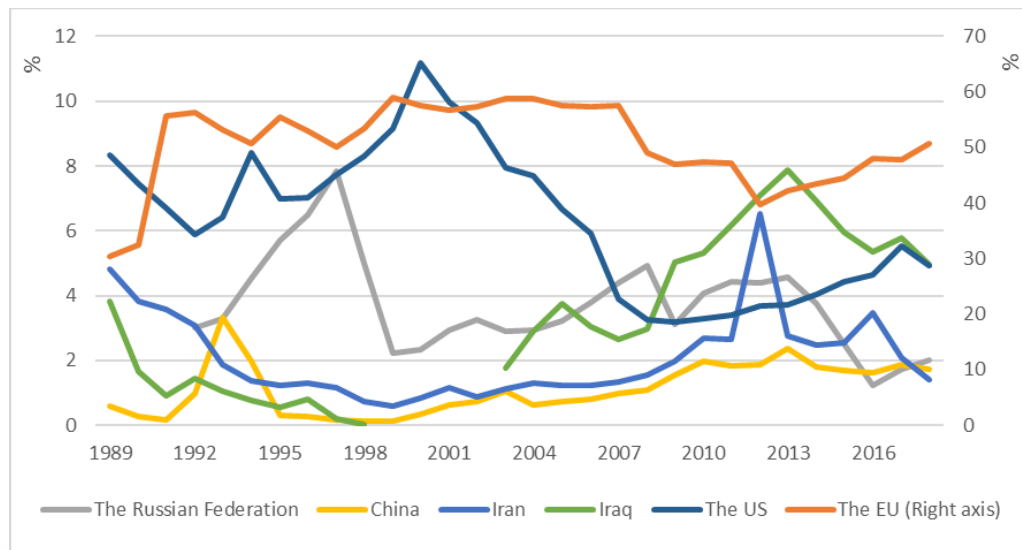
Figure 3.4: The Shares of Turkey's Exports to Selected Countries in Turkey's Total Exports to World (1989-2018)

Source: UN Comtrade Database

Currently, Turkey is the fifth major trade partner of the EU not only in terms of exports but also in terms of imports. Moreover, as the major exporting partner, it will be beneficial to investigate Turkish exports to the EU countries. The amount of Turkish exports to Germany, the UK, Italy, France and Spain as the main exporting partners increased significantly. The exports to the EU Countries except Germany moved close to each other until the beginning of 2000s. After that period, exporting amount demonstrated a great difference among the EU Countries. In other words, export growths to some EU countries were more pronounced after 2000, which resulted in major distinction of the export values. The export movements are almost similar throughout the period: the rise until the crisis together with the decline in the 2008-2009 crisis and 2011 can be seen in almost all exporting partners. Average export growth rate to the EU Countries as a whole equals to 13 percent during this period, leading to 3.5 billion US Dollars export value in 1989 boosting to 85 billion in 2018 (Figure 3.5).

Figure 3.5: Exports of Turkey to the Selected* EU Countries (1989-2018)

Source: UN Comtrade Database

* The countries with a higher export share than 5 percent in total exports of Turkey to the EU in 2018.

In the Figure 3.6, the share of the EU countries for which Turkey's exports have a share higher than 5 percent in total Turkey's exports to the EU is presented. In 1989, Italy has the highest share due to lack of data for Germany. The share of Turkey's exports to Germany has the highest share for almost all the period by far. The shares of Italy and the UK are interchangeably the second highest before 2000. However, the UK's share become the second highest in 2000s and more apparently after 2010. Turkey's exports shares for other countries moved closer to each other.
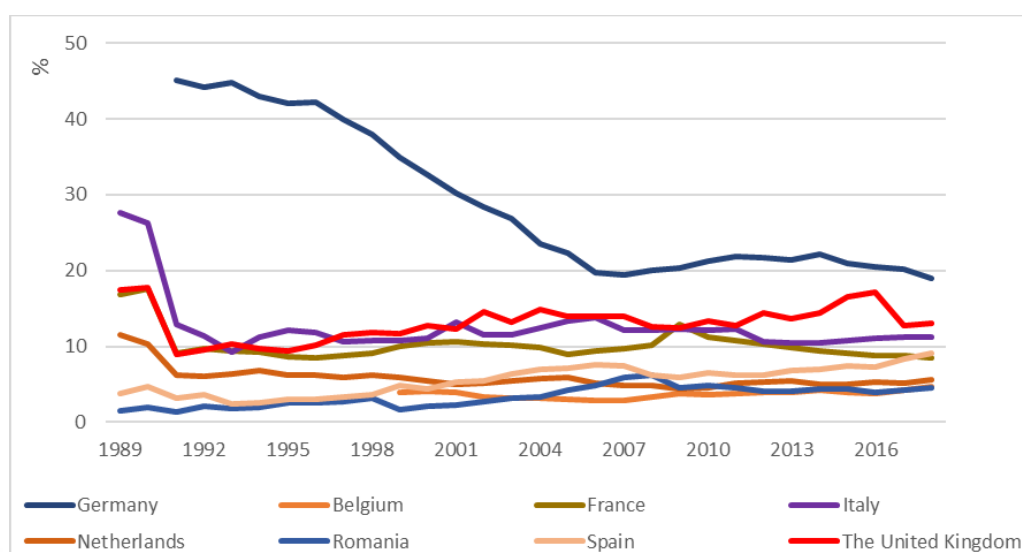
Figure 3.6: The Shares of Turkey's Exports to the Selected* EU Countries (1989-2018)

Source: UN Comtrade Database

* The countries with a higher export share than 5 percent in total exports of Turkey to the EU in 2018.

3.1.2. Imports

Figure 3.7, similar to Figure 3.2, demonstrates the imports of Turkey from the World in 2018. This time color blue stands for imports and the density varies according to the value of imports. In this regard, the darker the blue the higher the imports and the lighter the blue the lower the imports. Although Turkey imports mainly from the EU Countries and its neighbors, most of the countries around the World exports to Turkey. Russia, China, Germany, the US, Italy, India, the UK, France, Iran and South Korea are encountered to be among the major exporters to Turkey. The amount of their imports to Turkey equaled to 22, 20.7, 20.4, 12.4, 10.2, 7.5, 7.5, 7.4, 6.9 and 6.3 billion US Dollars in 2018, respectively. The share of imports to top ten countries is almost equal to 60 percent, which implies that the exports are less concentrated on the top ten partners.
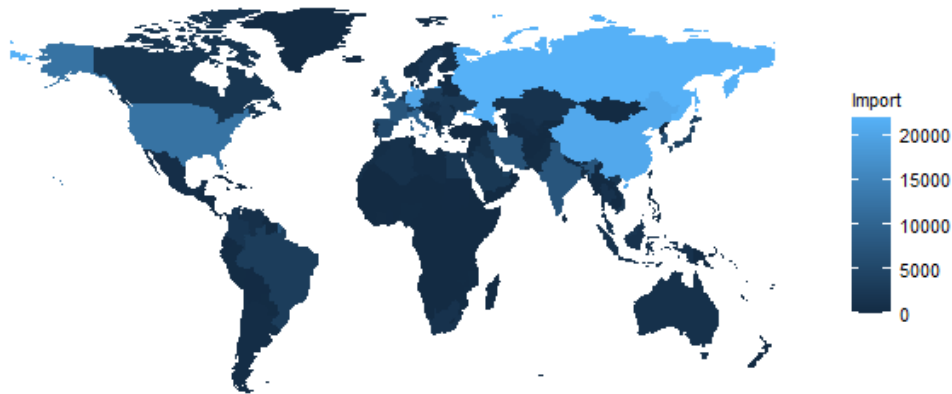
Figure 3.7: The Imports of Turkey from the World (Million US Dollars, 2018).

Source: Trademap Database

The imports of Turkey from its neighbors (Iran, Bulgaria, Greece, Iraq, Azerbaijan, Georgia, Syria and Armenia) amounted to 13.6 billion US Dollars in 2018, constituting a total share of 6.1 percent. If the EU is considered as one of the neighbors of Turkey due to the Customs Union Agreement, this amount multiplies by 7.

The value of Turkish imports which was 15.8 billion US Dollars in 1989 reached to 223 billion US Dollars in 2018, arriving at its peak in 2013. During this period, average growth rate of imports from the World equals to 12 percent, which is lower than imports from the given countries except the US (9%). The growth of imports both from the World as a whole and from single countries accelerated after 2000. Imports from the selected countries moved almost together throughout the period (Figure 3.8).
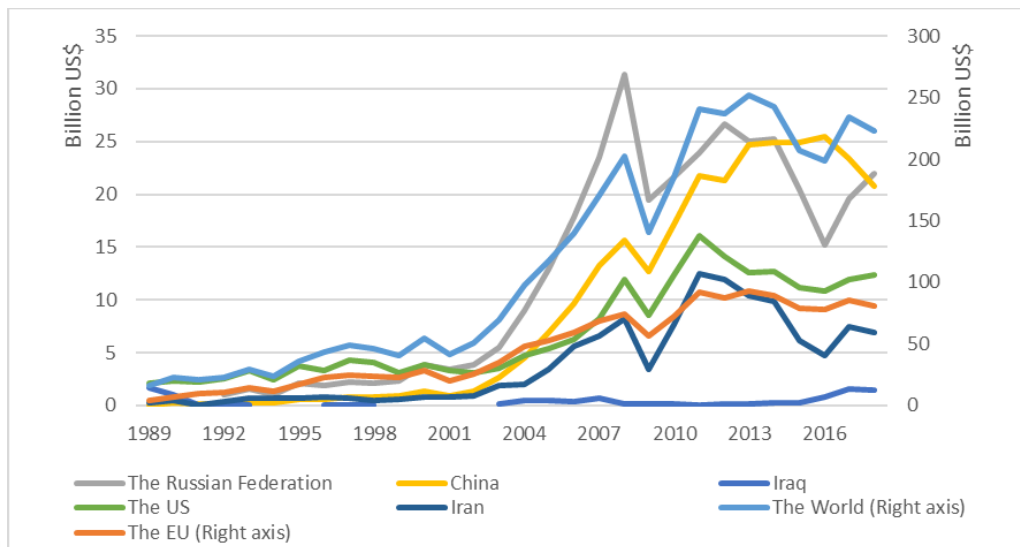
Figure 3.8: Imports of Turkey from Selected Countries

Source: UN Comtrade Database
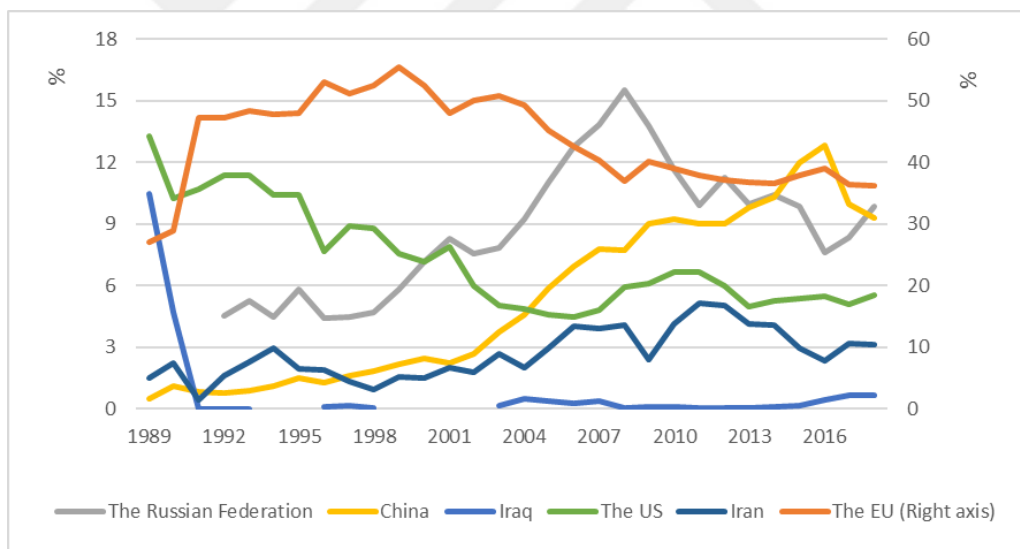
Figure 3.9: The Shares of Turkey's Imports from Selected Countries in Turkey's Total Imports from World (1989-2018)

Source: UN Comtrade Database

Figure 3.9 demonstrates the share of Turkey's imports from these countries. Similar to the exports, the share of the EU is the greatest. During this period, its share fluctuated between 27 and 55 percent, which is a rather narrower range than the exports and arrived at its maximum in 1999. Until 2000, the country that has the second highest

share is the US. The US is replaced with Russia after 2000 and Russia reached at its highest in 2008 with 16 percent. China becomes the second highest more recently, after 2014. Unlike the exports, the share of Turkey's imports from Iraq remained lower among the selected countries and the share of Iran moved slightly above it. Total share of Turkey's imports from these countries in its total imports from the World is calculated to be 65 percent in 2018.
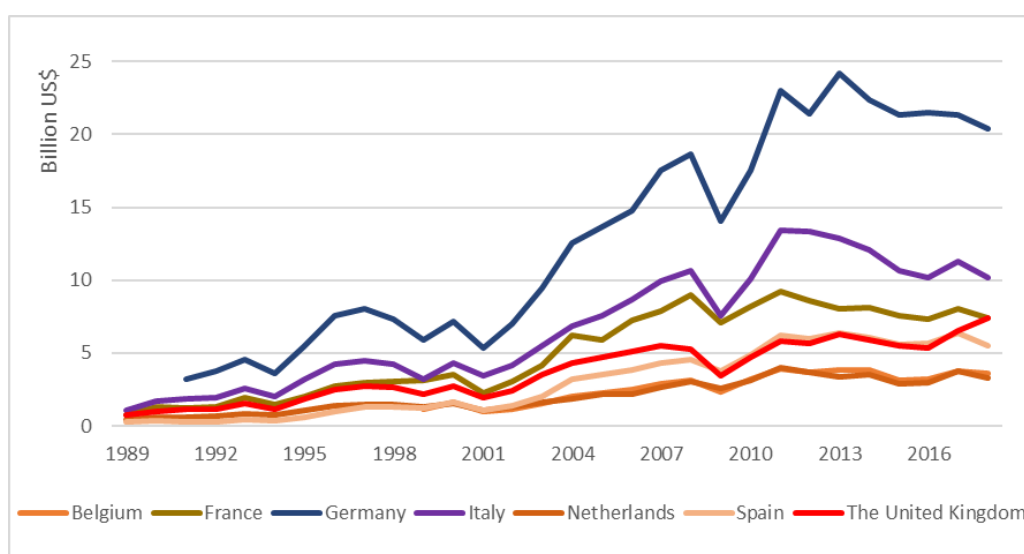
Figure 3.10: Imports of Turkey from the Selected* EU Countries

Source: UN Comtrade Database

* The countries with a higher import share than 4 percent in total imports of Turkey from the EU in 2018.

Turkish imports from the EU amounts 69 billion US Dollars, which is one third of total imports, making the EU one of the critical importing partners of Turkey. Among the 28 EU countries, Germany, Italy and France are the major importing partners. Imports from the EU have grown 13 percent annually on average from 1989 to 2018, which is surprisingly equal to the average growth rate of the exports to the EU. Imports from the EU experienced significant rise after the Customs Union especially after 2000, which raised the imports from some countries more than others. That is to say, Turkey's imports from the EU countries such as Denmark, Greece, Hungary, Spain and the United Kingdom increased more than whereas the growth of imports from

Belgium, Finland and Sweden remained lower than the average of all the EU countries after 2000. However, imports from all the EU countries display substantial falls in times of crises especially in 2001 and 2008-2009 (Figure 3.10).

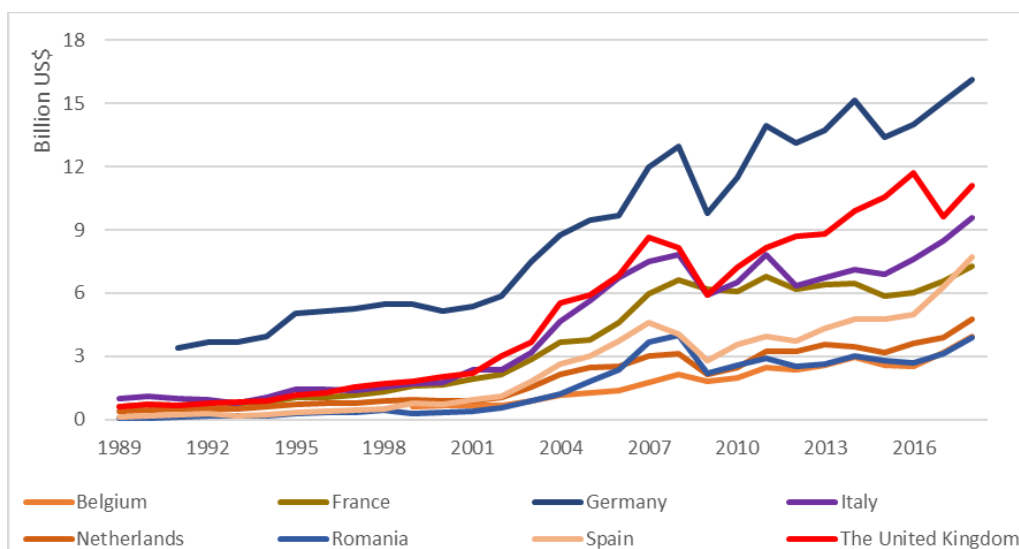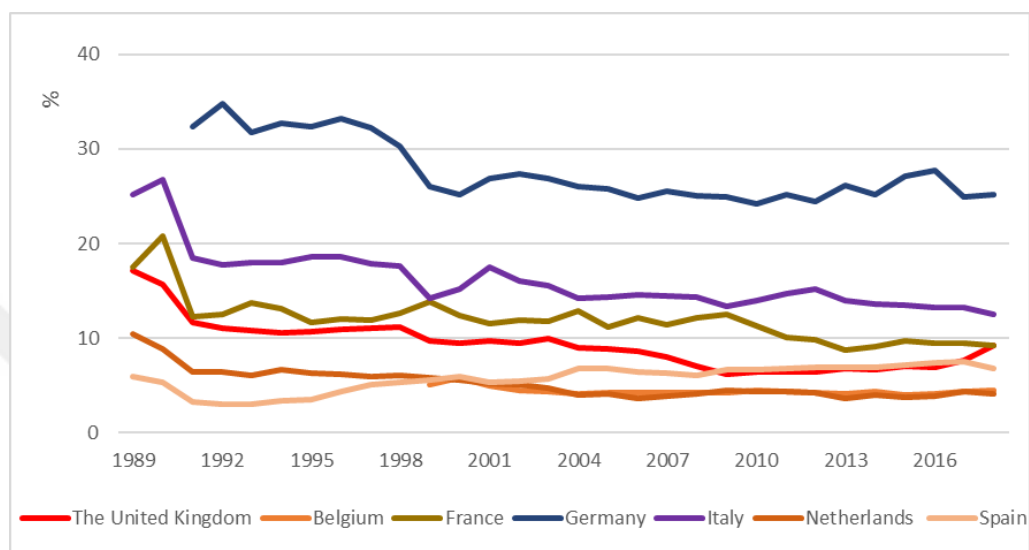Figure 3.11: The Shares of Turkey's Imports from the Selected* EU Countries (1989-2018)

Source: UN Comtrade Database

* The countries with a higher import share than 4 percent in total imports of Turkey from the EU in 2018.

Considering the shares of Turkey's imports from the selected EU countries, it is seen that Germany has the highest share in most of the years, similar to the exports. Italy follows Germany with an average share of 16 percent and Italy is pursued by France in all years. The UK has the fourth highest share in 1989 and experiences a gradual decline in its share until 2008. Its share started to rise again after 2016. Netherland and Belgium displayed relatively smaller changes in their shares among the EU countries demonstrated in Figure 3.11. Similar to the country shares in terms of exports, a decline is observed in the import shares.

3.2. Turkey's Trade in terms of Product Groups

Merchandise exports account for three fourth of the total whereas services represent the remaining one fourth. Significant portion of the goods exported are the consumer

goods such as clothes and fruits followed by the intermediate goods like iron and steel; and capital goods as machinery and equipment. On the other hand, intermediate goods are the primary import component whereas raw materials have the smallest share in imports. Tariffs applied to imports are differing according to the product categories in terms of capital goods having the smallest rates and raw materials having the highest share (Table 3.1).

Table 3.1: Exports and Import Values and Shares in terms of Product Groups (2018)

Product Categories	Exports		Imports		
	Exports (Billion US Dollars)	Product Share (%)	Imports (Billion US Dollars)	Product Share (%)	Weighted Average Applied Tariffs (%)
Raw Materials	11.6	6.93	24.0	10.78	3.85
Intermediate Goods	41.4	24.61	72.3	32.43	2.01
Consumer Goods	77.9	46.36	46.4	20.81	3.12
Capital Goods	34.6	20.57	54.4	24.38	0.70

Source: WITS - UN Comtrade Database

Table 3.2 shows the exports and imports of Turkey in terms of more detailed product groups namely in 1-digit of Standard International Trade Classification (SITC). Over the last nine years, Turkey's exports to and imports from World amounted approximately 147 and 224 billion US Dollars on average, leading to a trade deficit of 77 billion US Dollars. The product groups "Machinery and transport equipment", "Manufactured goods classified chiefly by material", "Miscellaneous manufactured articles" and "Food and live animals" are the most exported products by Turkey, respectively.

On the other hand, "Machinery and transport equipment", "Manufactured goods classified chiefly by material", "Commodities and transactions not classified elsewhere in the SITC" and "Chemicals and related products, n.e.s." are the most imported products by Turkey, respectively. Therefore, Turkey experienced a trade deficit in "Commodities and transactions not classified elsewhere in the SITC", "Machinery and transport equipment", "Chemicals and related products, n.e.s.", "Mineral fuels, lubricants and related materials", "Crude materials, inedible, except

fuels" and "Animal and vegetable oils, fats and waxes" and a trade surplus in "Miscellaneous manufactured articles", "Food and live animal", "Manufactured goods classified chiefly by material" and "Beverages and tobacco". In addition, the product groups "Machinery and transport equipment" and "Manufactured goods classified chiefly by material" have the biggest share in Turkey's total trade with World (Table 3.2).

Table 3.2: Turkey's Exports to and Imports from World (2010 - 2018 Average)

Product Group Code	Product Groups	Turkey's Exports to World (Billion US Dollars)	Turkey's Imports from World (Billion US Dollars)	Net Exports (Billion US Dollars)	Share in Total Trade (%)
0	Food and live animals	13.54	6.84	6.70	5.49
1	Beverages and tobacco	1.18	0.69	0.49	0.50
2	Crude materials, inedible, except fuels	4.21	16.06	-11.85	5.46
3	Mineral fuels, lubricants and related materials	5.13	17.62	-12.50	6.13
4	Animal and vegetable oils, fats and waxes	0.89	1.68	-0.80	0.69
5	Chemicals and related products, n.e.s.	8.17	29.82	-21.65	10.23
6	Manufactured goods classified chiefly by material	39.18	36.09	3.09	20.27
7	Machinery and transport equipment	41.26	64.93	-23.67	28.60
8	Miscellaneous manufactured articles	25.92	13.42	12.50	10.60
9	Commodities and transactions not classified elsewhere in the SITC	7.42	37.22	-29.80	12.02
	Total	146.90	224.38	-77.49	100

Source: UN Comtrade Database

The product groups that their export to World grew rapidly in 2010s are "Commodities and transactions not classified elsewhere in the SITC" and "Animal and vegetable oils, fats and waxes" while the product groups that their imports from the World boosted

considerably are "Food and live animals" and "Commodities and transactions not classified elsewhere in the SITC" (Table 3.3).

When taking a more detailed look at the "Commodities and transactions not classified elsewhere in the SITC", 2-digit product group named "Gold, non-monetary (excluding gold ores and concentrates)" amounts to approximately 66 percent of total exports this 1-digit product group whereas 2-digit product group "Special transactions and commodities not classified according to kind" comes almost up to the rest of it, its 33 percent. In terms of imports of "Commodities and transactions not classified elsewhere in the SITC", "Special transactions and commodities not classified according to kind" has the biggest share (76 percent), "Gold, non-monetary (excluding gold ores and concentrates)" has the second biggest share (23 percent) and "Coin (other than gold coin), not being legal tender" has the remaining small share.

Table 3.3: Annual Growth of Turkey's Exports to and from World (2011 - 2018 Average)

Product Group Code	Product Groups	Exports to World	Imports from World
0	Food and live animals	4.76	10.25
1	Beverages and tobacco	5.77	7.47
2	Crude materials, inedible, except fuels	5.18	2.62
3	Mineral fuels, lubricants and related materials	2.57	6.04
4	Animal and vegetable oils, fats and waxes	19.52	4.29
5	Chemicals and related products, n.e.s.	6.78	3.50
6	Manufactured goods classified chiefly by material	4.57	2.44
7	Machinery and transport equipment	6.74	2.02
8	Miscellaneous manufactured articles	5.50	1.20
9	Commodities and transactions not classified elsewhere in the SITC	34.78	8.06
	Total	5.30	3.15

Source: UN Comtrade Database

Although in 1989 top three product group that were exported by Turkey were, respectively, "Manufactured goods classified chiefly by material", "Miscellaneous

manufactured articles" and "Food and live animals", the latter product group is replaced with "Machinery and transport equipment" in 2018. Moreover, the ordering of the most exported products changed as "Machinery and transport equipment", "Manufactured goods classified chiefly by material" and "Miscellaneous manufactured articles". The main increase in the exports of most product groups is seen in the end of 1990s and in the beginning of 2000s. Indeed, the average growth rates of the export of product groups are higher in 2000s than both 1990s and 2010s. All of the product groups usually moved together except "Commodities and transactions not classified elsewhere in the SITC" that often demonstrated ups and downs in different periods than others (Figure 3.12).
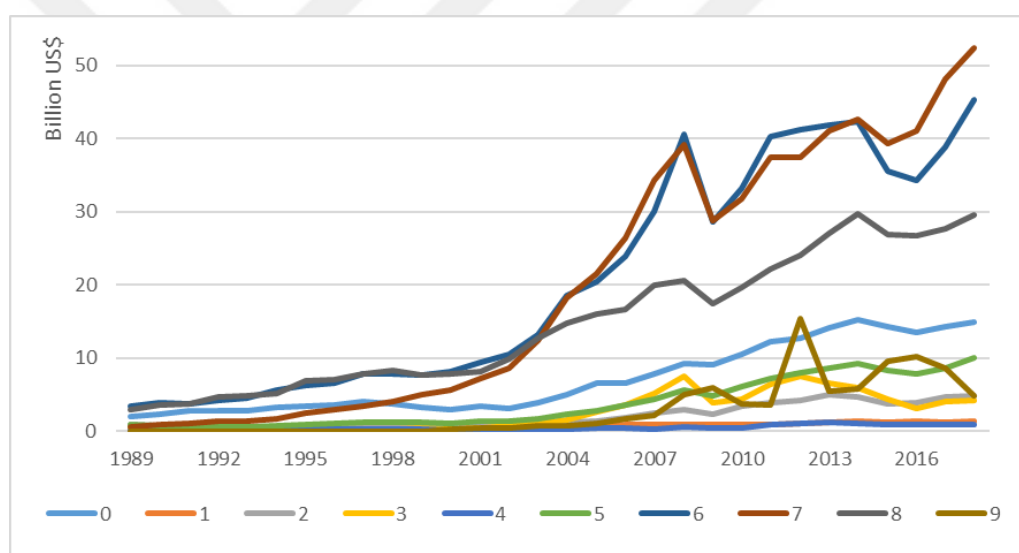
Figure 3.12: Exports of Turkey to World in terms of Product Groups* (1989-2018)

Source: UN Comtrade Database

*0: Food and live animals; 1: Beverages and tobacco; 2: Crude materials, inedible, except fuels; 3: Mineral fuels, lubricants and related materials; 4: Animal and vegetable oils, fats and waxes; 5: Chemicals and related products, n.e.s.; 6: Manufactured goods classified chiefly by material; 7: Machinery and transport equipment; 8: Miscellaneous manufactured articles; 9: Commodities and transactions not classified elsewhere in the SITC

Similar to the exports, imports of most of the product groups grew rapidly in 2000s. Moreover, in line with the previous findings, "Commodities and transactions not classified elsewhere in the SITC" displayed a significant increase, from 260 thousand US Dollars in 1989 to 34 billion US Dollars in 2018. Top three product groups

imported from the world were "Machinery and transport equipment", "Mineral fuels, lubricants and related materials" and "Manufactured goods classified chiefly by material" in 1989. Nevertheless, top three product groups became "Machinery and transport equipment", "Manufactured goods classified chiefly by material" and "Commodities and transactions not classified elsewhere in the SITC", as a result of a change in the imported product structure (Figure 3.13).

The Figure 3.13 reveals the effects of the declining demand in 1994, 1998, 1999, 2001, 2009, 2012, 2015, 2016 and 2018 many of which were contraction years of the Turkish economy.
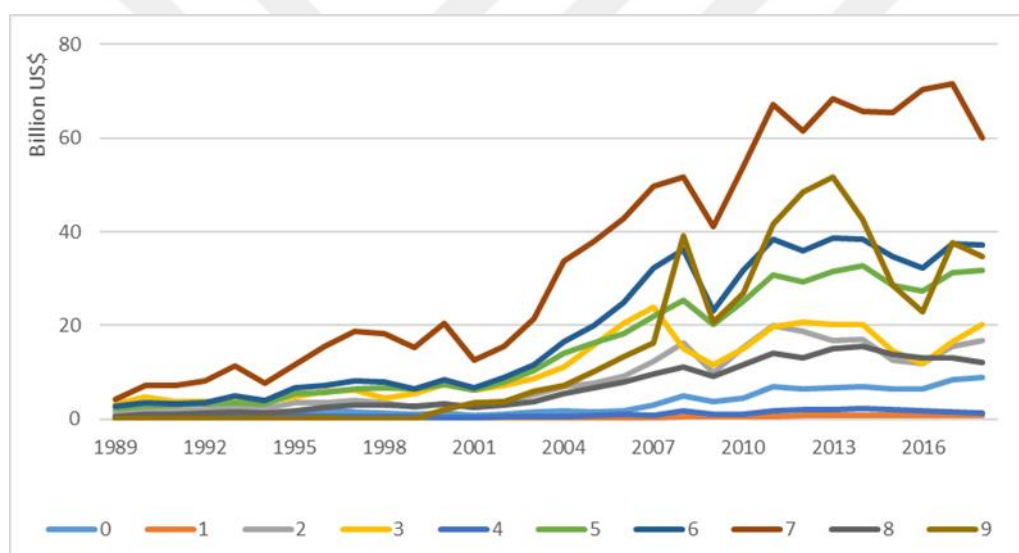
Figure 3.13: Imports of Turkey from World in terms of Product Groups* (1989-2018)

Source: UN Comtrade Database

*0: Food and live animals; 1: Beverages and tobacco; 2: Crude materials, inedible, except fuels; 3: Mineral fuels, lubricants and related materials; 4: Animal and vegetable oils, fats and waxes; 5: Chemicals and related products, n.e.s.; 6: Manufactured goods classified chiefly by material; 7: Machinery and transport equipment; 8: Miscellaneous manufactured articles; 9: Commodities and transactions not classified elsewhere in the SITC

3.3. Turkey's Trade with the UK

In this section, Turkey's international trade with the UK will be investigated. Turkey exported 11.1 billion US Dollars worth of products to the UK whereas it imported 7.5

billion US Dollars worth in 2018. The UK is the second largest export destination; hence, there was a trade surplus of 3.6 billion US Dollars. Both exports and imports experienced increases after the Customs Union agreement. The average annual export growth rate is calculated to be 12 percent while the average annual growth rate of the imports 10 percent between 1996-2000. A major change in the trade pattern occurred after 2001; until then, there was a trade deficit with the UK, which expanded after the CU agreement until 2001. However, after that year, the amount of exports became higher than the imports and trade surplus is started to be experienced. It is also seen that the trade surplus grew through time. In line with this change, in 2001, Turkey run a trade surplus with the UK in the amount of 261 million US Dollars, which amounted to only 6 percent of the sum of its exports to and imports from the UK. On the other hand, in 2018, the trade surplus equal to 3.6 billion US Dollars which is 20 percent of total Turkish trade with the UK. It is observed that the trade surplus with the UK is 13 times higher than the trade surplus in 2001 (Figure 3.14).

From 1989 to 2018, average export growth rate equals to 11.6 whereas average import growth rate is 10.6 percent. This implies approximately 550 million worth of additional exports and 380 million worth of additional imports.
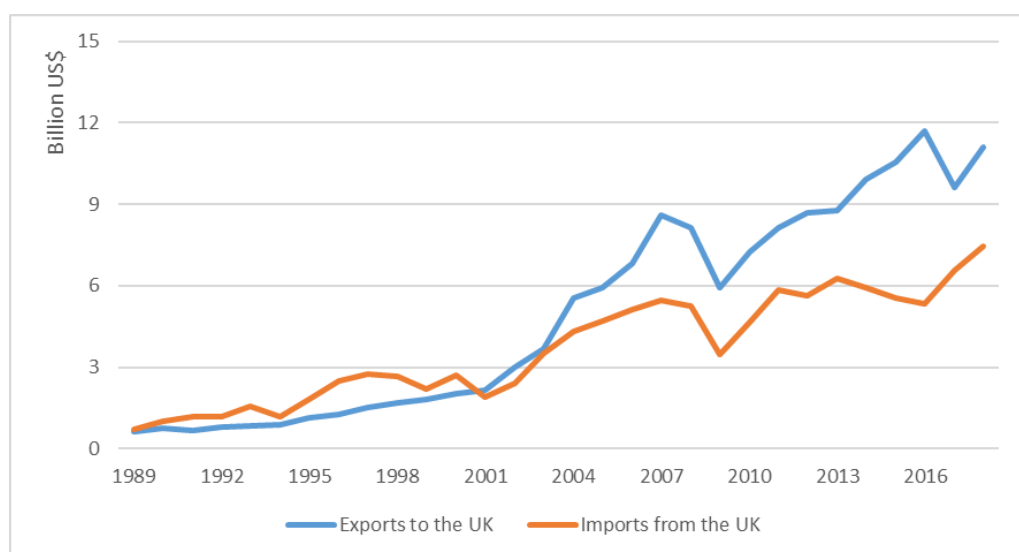
Figure 3.14: Exports to and Imports from the UK (1989-2018)

Source: UN Comtrade Database

Turkish economy is an emerging market prone to both political and economic crises. Effects of these crises can be observed from Figure 3.14 as well. First of all, the exports declined by 9 percent with the impact of Gulf War in 1991 although the imports continued to increase. Secondly, the imports from the UK decreased by almost 25 percent in 1994 crisis that resulted from a sudden stop in the capital flows (Boratav, 2016, p. 175) and led to a contraction in the Turkish economy by 6.1 percent (Boratav, 2016, p. 183). The third one is the 1998-1999 crisis that could be mainly explained by the East Asian crisis of 1997 and Russian Sovereign Debt Crisis of 1998. These caused imports to fall by 3 percent and 18 percent in 1998 and 1999, respectively. Similarly, 2001 crisis brought about almost 30 percent decline in the imports from the UK even though it did not lead to any contraction in the exports. With the further rise in the external debt, banks having difficulty to pay their debts recalled undue credits from their customers, this in turn led to significant reduction in the internal demand. Another period when the imports and exports declined sharply was the Global Financial Crisis of 2008-2009. Arising from the external factors, this crisis generated a worldwide recession, which caused a dramatic drop in Turkey's overall trade. In 2008 and 2009, Turkish exports to the UK shrank by 5.4 and 27.2 percent and imports from the UK by 4 and 34 percent respectively. In 2017, although Turkish exports to and imports from the World and Turkish imports from the UK grew, the exports to the UK experienced a decline by 17.8 percent. The reason behind this fall could be the uncertainty about the Brexit process. Indeed, from 2016 to 2017 the UK's imports from the World grew slightly (0.7%). While the UK's imports from some countries like Germany, the US and China experienced low growth rates, some countries such as Switzerland, Spain and Austria including Turkey encountered considerable decreases. After 2017, the exports started to increase; however, they have not reach to 2016 value.
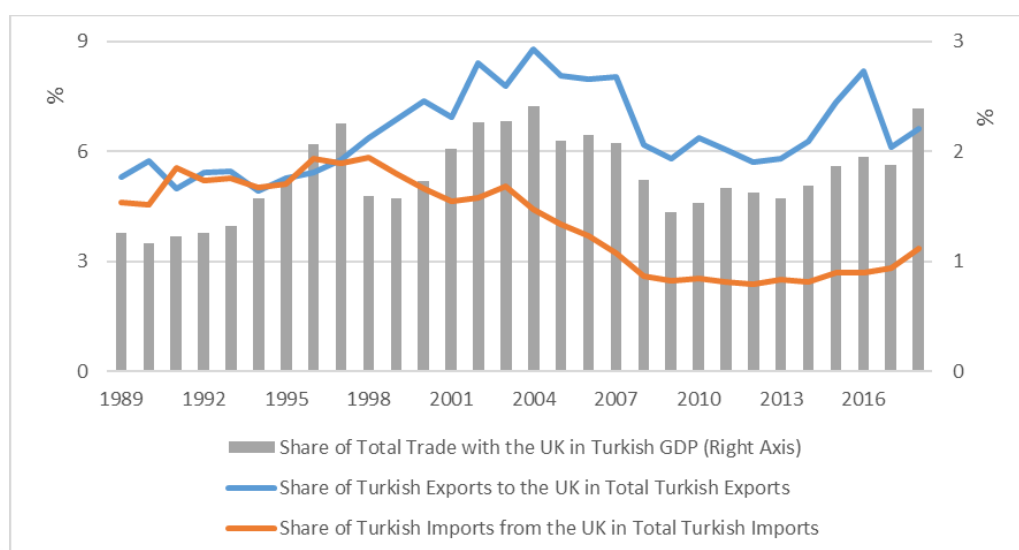
Figure 3.15: The Share of Turkish Trade with the UK in Turkey's Total Trade and GDP (1989-2018)

Source: UN Comtrade Database

Using the export and import data from UN Comtrade Database and GDP data from the World Development Indicators, the share of Turkey's trade with the UK in Turkey's total trade and GDP is demonstrated in Figure 3.15. The share of exports are always greater than the share of imports with the exception in 1991 and 1996. Furthermore, the share of exports improved from 5.3 percent in 1989 to 6.6 percent in 2018. This implies a 25 percent increase in the share of Turkey's exports to the UK in nearly 30 years. On the other hand, there was a fall from 4.6 percent in 1989 to 3.3 percent in 2018 in the share of Turkey's imports from the UK. That corresponds to a 38 percent decrease in almost 30 years. Finally, although the share of Turkey's total trade with the UK in Turkish GDP fluctuated during the period, it reached at 2.4 percent in 2018, which is the second highest value after 2004 (Figure 3.15).

3.3.1. Turkey's Exports to the UK

In terms of Standard International Trade Classification product groups, Turkey's largest exports to the UK are in "Machinery and transport equipment", "Miscellaneous manufactured articles" and "Manufactured goods classified chiefly material", similar to the exports to world. They constitute 40 percent, 26 percent and 16 percent respectively and more than 80 percent of the total exports to the UK. The individual

shares of these product groups in Turkey's exports to the world are almost 10 percent for the former two and 4 percent for the latter. The effectively applied tariff rates by the UK to these products equal to zero. The exports of "Machinery and transport equipment" mainly consists of "Road Vehicles" (50%), "Electrical machinery, apparatus and appliances, not elsewhere specified, and electrical parts thereof (including non-electrical counterparts, not elsewhere specified, of electrical household-type equipment)" (30%) and "Telecommunications and sound-recording and reproducing apparatus and equipment" (11%). Moreover, "Articles of apparel and clothing accessories" (80%) and "Prefabricated building; sanitary, plumbing, heating and lighting fixtures and fittings, not elsewhere specified" (8%) are the main sub product groups of "Miscellaneous manufactured articles" exported to the UK. The third product group is less concentrated compared to the former two. It is composed of "Textile yarn, fabrics, made-up articles, not elsewhere specified and related products" (30%), "Iron and steel" (18%), "Manufactures of metals, not elsewhere specified" (15%), "Non-metallic mineral manufactures, not elsewhere specified" (11%), "Non-ferrous metals" (10%) and "Paper, paperboard and articles of paper pulp, of paper or of paperboard" (9%).

Turkey's exports of "Miscellaneous manufactured articles" to the UK amounted to 2.55 percent of the UK's total imports from the world. "Commodities and transactions not classified elsewhere in the SITC" is the fourth product group exported to the UK. 95 percent of the exports of this product group consists of "Gold, non-monetary (excluding gold ores and concentrates)".

The product groups named "Animal and vegetable oils, fats and waxes" has the highest tariff levels followed by "Food and live animals", which are the main product groups that are considered outside of the Customs Union Agreement.

Table 3.4: Exports of Turkey to the UK by SITC Product Groups (2010 – 2018 Average)

Product Group Code	Product Groups	Turkey's Exports to the UK (Billion US Dollars)	Share of Turkey's Exports to the UK in Turkey's Exports to World (%)	Share of Turkey's Exports in the UK Imports from World (%)	The UK's Tariffs Applied to Turkey (%)
7	Machinery and transport equipment	3.86	9.86	1.76	0
8	Miscellaneous manufactured articles	2.51	9.68	2.56	0
6	Manufactured goods classified chiefly by material	1.53	3.71	2.1	0
9	Commodities and transactions not classified elsewhere in the SITC	0.73	9.78	1.40	0
0	Food and live animals	0.42	3.13	0.84	1.73
5	Chemicals and related products, n.e.s.	0.23	2.82	0.31	0.001
3	Mineral fuels, lubricants and related materials	0.15	3.01	0.22	0.025
2	Crude materials, inedible, except fuels	0.07	1.73	0.49	0
1	Beverages and tobacco	0.02	1.55	0.20	0.47
4	Animal and vegetable oils, fats and waxes	0.0008	0.09	0.04	4.72

Source: UN Comtrade Database and World Integrated Trade Solutions

Export of the product groups named "Machinery and transport equipment" and "Miscellaneous manufactured article" together with "Manufactured goods classified chiefly by material" displayed substantial growth in the 2000-2018 period, causing total exports to rise dramatically. During this period, exports in terms of other product groups expanded steadily. However, "Commodities and transactions not classified elsewhere in the SITC" increased dramatically after 2014 until 2016 and decreased enormously in 2017. Overall, exports to the UK experienced 11 percent growth annually on average (Figure 3.16).
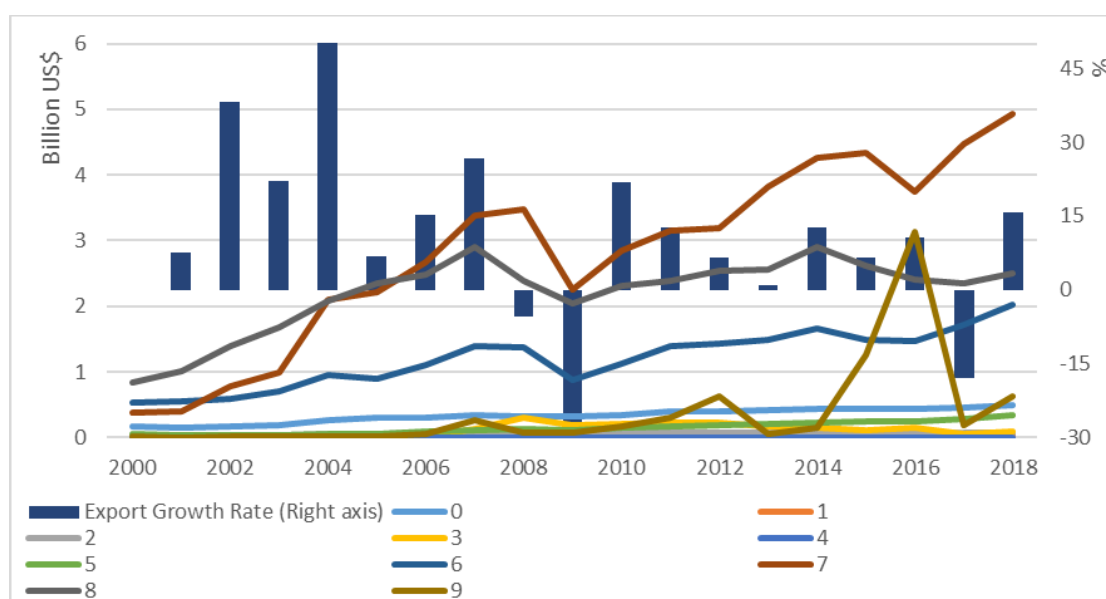
Figure 3.16: Turkish Exports to the UK in terms of SITC Product Groups* and
Export Growth Rate (1989-2018)

Source: UN Comtrade Database

*0: Food and live animals; 1: Beverages and tobacco; 2: Crude materials, inedible, except fuels; 3: Mineral fuels, lubricants and related materials; 4: Animal and vegetable oils, fats and waxes; 5: Chemicals and related products, n.e.s.; 6: Manufactured goods classified chiefly by material; 7: Machinery and transport equipment; 8: Miscellaneous manufactured articles; 9: Commodities and transactions not classified elsewhere in the SITC

3.3.2. Turkey's Imports from the UK

Turkey's highest import sectors from the UK are "Machinery and transport equipment", "Chemicals and related products, not elsewhere specified" and "Crude materials, inedible, except fuels". The share of the first group constitutes almost half (2.18 billion US Dollars) of the total imports from the UK. The 1-digit "Machinery and transport equipment" product group consists of, as the top three product groups, "Power-generating machinery and equipment" with a share of 35 percent, "Road vehicles (including air-cushion vehicles)" with a share of 30 percent and "General industrial machinery and equipment, not elsewhere specified, and machine parts, not elsewhere specified" with a share of 9 percent of 1-digit product group's imports. The second product group mostly composes of "Medicinal and pharmaceutical products" (38%), "Plastics in primary forms" (15%) and "Organic chemicals" (11%). The

biggest share (85%) of the latter product group belongs to "Metalliferous ores and metal scrap" (Table 3.5).

Table 3.5: Imports of Turkey from the UK by SITC Product Groups (2010 – 2018 Average)

Product Group Code	Product Groups	Turkey's Imports from the UK (Billion US Dollars)	Share of Turkey's Imports from the UK in Turkey's Imports from World (%)	Share of Turkey's Imports from the UK in the UK's Exports to World (%)	Turkish Tariffs Applied to the UK (%)
7	Machinery and transport equipment	2.188	3.37	1.38	0.000
5	Chemicals and related products, n.e.s.	0.842	2.82	1.14	0.001
2	Crude materials, inedible, except fuels	0.647	4.03	6.58	0.029
6	Manufactured goods classified chiefly by material	0.510	1.41	1.14	0.000
8	Miscellaneous manufactured articles	0.291	2.16	0.50	0.000
9	Commodities and transactions not classified elsewhere in the SITC	0.233	0.63	0.43	0.000
0	Food and live animals	0.052	0.76	0.29	24.927
3	Mineral fuels, lubricants and related materials	0.047	0.27	0.10	0.000
1	Beverages and tobacco	0.036	5.22	0.34	0.080
4	Animal and vegetable oils, fats and waxes	0.004	0.22	0.51	6.049

Source: UN Comtrade Database and World Integrated Trade Solutions

Among the 10 product groups cited in Table 3.5, "Beverages and tobacco" has the largest share in Turkey's total imports from the UK followed by "Crude materials, inedible, except fuels" and "Machinery and transport equipment". Imports of "Animal and vegetable oils, fats and waxes" from the UK is only 0.22 percent of total Turkish imports in that product group amounted 1.68 billion US Dollars. Additionally, the

product group that has the highest share in total the UK exports is "Crude materials, inedible, except fuels". Turkey has a very small share in the UK's exports in terms of "Mineral fuels, lubricants and related materials" and "Food and live animals" (Table 3.5).

Among these product groups, the highest tariff rate Turkey applies to is approximately 25 percent tariff rate to "Food and live animals" and the lowest tariff rate is 0 percent to most of the product groups such as "Machinery and transport equipment", "Manufactured goods classified chiefly by material" and "Mineral fuels, lubricants and related materials" as part of the Customs Union Agreement (Table 3.5).
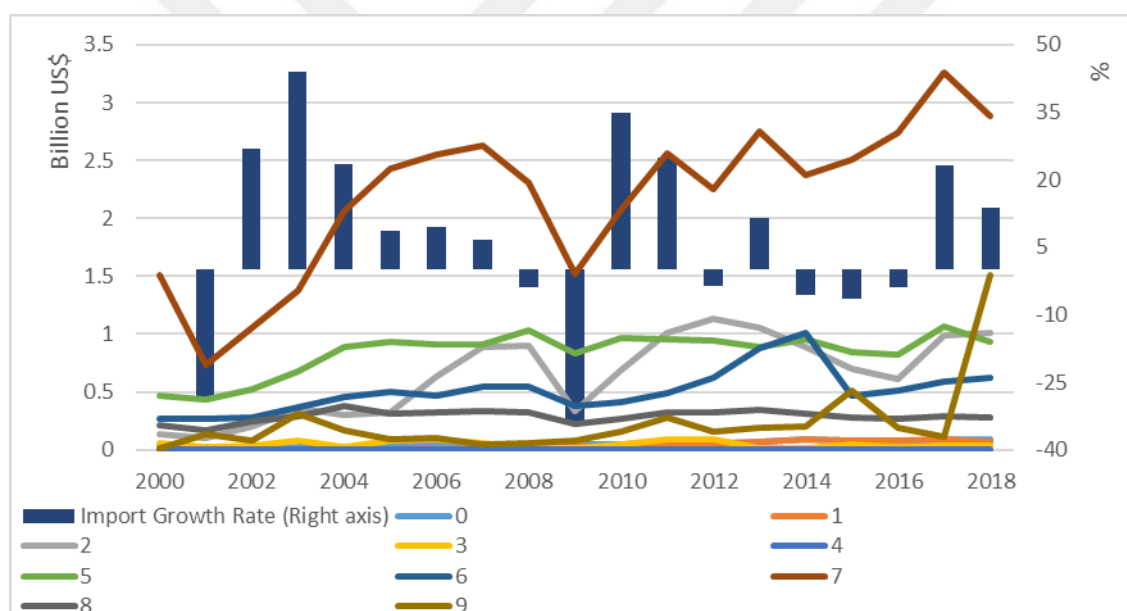
Figure 3.17: Turkish Imports from the UK in terms of SITC Product Groups* and Import Growth Rate (1989-2018)

Source: UN Comtrade Database

*0: Food and live animals; 1: Beverages and tobacco; 2: Crude materials, inedible, except fuels; 3: Mineral fuels, lubricants and related materials; 4: Animal and vegetable oils, fats and waxes; 5: Chemicals and related products, n.e.s.; 6: Manufactured goods classified chiefly by material; 7: Machinery and transport equipment; 8: Miscellaneous manufactured articles; 9: Commodities and transactions not classified elsewhere in the SITC

Imports of "Machinery and transport equipment" and "Crude materials, inedible, except fuels" displayed significant improvement after 2000s. On the other hand, although imports of "Chemicals and related products, not elsewhere specified" and

"Manufactured goods classified chiefly by material" did not rise substantially, they both are among the top importing product groups in 2018. Most of the product groups moved together with the total import growth rate in most of the years. However, imports of the product group called "Commodities and transactions not classified elsewhere in the SITC" grew rapidly especially after 2010 and reached to 1.5 billion US Dollars in 2018 (Figure 3.17).

Imports of this product group mainly composes of "Gold, non-monetary (excluding gold ores and concentrates)" and "Special transactions and commodities not classified according to kind". The distribution of imports between these two sub-product group changes in years. From 2001 to 2004, the first sub-product group was dominant with an average annual import value of 155 million US Dollars whereas after 2005 to 2017, the second sub-product group with an average annual import value of 159 million US Dollars was larger. Nevertheless, in 2018, 93 percent of the imports (1.5 billion US Dollars) in this product group was the "Gold, non-monetary (excluding gold ores and concentrates) and 7 percent (115 million US Dollars) was the "Special transactions and commodities not classified according to kind".

CHAPTER 4

METHODOLOGY AND DATA

In this Chapter, the methodology used to analyze the trade structure between Turkey and the UK as well as the dataset used in the empirical analysis will be discussed. In this regard, initially the theoretical framework and baseline econometric model will be presented. Following this, the dataset will be explained and finally, descriptive statistics and unit root test results will be presented.

4.1.   Theoretical Framework

Supply side models and demand side models are the two main approaches used in estimating exports. In supply side models, it is assumed that the demand for exported products will always be there; however, the production constraints will limit the ability to export. On the other hand, in the demand side models, production capacity is claimed to allow adjusting production according to the demand and the foreign demand will be the main determinant of the exports. The more common approach in the literature is the demand side models. Bozok et al (2015) states that for smaller countries, the supply side models are more appropriate and for Turkey, the effect of the supply-side determinants is questionable. Therefore, following this, the analysis in this thesis will be built on the demand side model.

In theory and in several studies in the literature, the demand side models include income and prices as the main determinants of the foreign trade. The work by Khan (1974) and Goldstein and Khan (1985) could be considered as initial models for the impact of macroeconomic variables in the demand and supply functions for exports

and imports. Goldstein and Khan (1985) used world income, price of foreign goods in the world market, export price and exchange rate to estimate the export demand assuming that exports and imports are not perfect substitutes for goods produced domestically whereas Khan investigated quantity of imports by using relative prices of exports and imports together with the income.

Similar to many studies such as Bozok et al (2015), Erdoğan Coşar (2002), Ketenci (2014), Çulha et al. (2019), Yavuz and Güriş (2006), Özmen and Yolcu Karadam (2016), Uz (2010), in this thesis the following of export demand and import demand functions will be used:

$$lnEXPT_{it} = \beta_1 + \beta_2 lnVAUK_{it} + \beta_3 lnEPT_{it} + \beta_4 ER_{it} + \beta_5 TRFUK_{it} + \beta_6 lnPPIUK_{it} + \beta_7 lnEPW_t + \beta_8 lnGDPUK_t + \in_{it}$$

where

$lnEXPT_{it}$: The real value of Turkish exports to the UK in terms of product group i in year t.

$lnVAUK_{it}$: The value added index of the UK in terms of product group i in year t.

$lnEPT_{it}$: The export price index of Turkey in terms of product group i in year t.

ER_{it}: The real exchange rate of Turkish Lira against US Dollar in terms of product group i in year t.

$TRFUK_{it}$: Effectively applied tariff rates of the UK to Turkey in terms of product group i in year t.

$lnPPIUK_{it}$: The producer price index of the UK in terms of product group i in year t.

$lnEPW_t$: The export price index of world in year t.

$lnGDPUK_t$: Real gross domestic product of the UK in year t.

$\in_{it}$: Error term.

According to the economic theory, an increase in the UK's value added in sector i might lower the Turkish exports from that sector, if exports are competing with the domestic production. In this case, a negative sign for β_2 is expected. However, because the sectoral aggregation level of the study is 2-digit, which is highly aggregated, it is possible that the products imported from Turkey might be intermediary products used in the UK's production which might imply a positive sign for β_2. As the price of the exports increases, the amount of exports will decline and therefore, β_3 is anticipated to be negative. Similarly, the sign of the coefficient of the exchange rate, β_4, is expected to be positive in stable markets since a depreciation in Turkish Lira implies the foreign price of Turkish goods to be lower given the domestic price, a rise in exports is anticipated. The coefficient of the effective tariff variable is β_5 and it is expected to be negative as the UK tariffs increase the exports from that sector will be deterred. Domestic price of the UK is anticipated to affect the exports positively, as the general price level increase in the UK; Turkish goods will be relatively cheaper implying higher exports. Thus, β_6 is expected to be positive. Export price of the world is used as a proxy for the alternative markets which Turkey competes with. An increase in world export prices makes Turkish goods relatively cheaper and increases the UK demand for Turkish exports, thus, β_7 could be positive. However, because the world export price index is an aggregate index, possible changes in the relative prices makes this analysis harder, and the sign of β_7 less determinate. Lastly, the sign of the UK's GDP variable β_8 is anticipated to be positive. An increase in the UK's GDP will generate higher demand for Turkish exports in general.

$$lnIMPT_{it} = \beta_1 + \beta_2 lnVAT_{it} + \beta_3 lnIPT_{it} + \beta_4 ER_{it} + \beta_5 TRFT_{it} + \beta_6 lnPPIT_{it} + \beta_7 lnIPW_t + \beta_8 lnGDPT_t + \in_{it}$$

where

$lnIMPT_{it}$: The real value of Turkish imports from the UK in terms of product group i in year t.

$lnVAT_{it}$: The value added of Turkey in terms of product group i in year t.

$lnIPT_{it}$: The import price index of Turkey in terms of product group i in year t.

ER_{it}: The real exchange rate of Turkish Lira against US Dollar in terms of product group i in year t.

$TRFT_{it}$: Effectively applied tariff rate of Turkey to the UK in terms of product group i in year t.

$lnPPIT_{it}$: The producer price index of Turkey in terms of product group i in year t.

$lnIPW_t$: The import price index of World in year t.

$lnGDPT_t$: Real gross domestic product of Turkey in year t.

$\in_{it}$: Error term.

The economic theory suggests that as the domestic value added increases, some of the domestic demand can be supplied domestically if they could compete with the importing products. In such a case, there would be a decline in the imports, leading to a negative β_2. Nonetheless, if the importing products are to be complements to the domestic ones, then an increase in the domestic value added may result in a increase in imports. Hence, a positive sign for β_2 is also possible. Since the sectoral aggregation level of the study is 2-digit, which is highly aggregated, it might be hard to form an expectation regarding the sign of the domestic value added. Price of imports will be inversely related with the import value due to the Law of Demand, leading to a negative sign for β_3. The value of imports could be affected negatively from an increase in the exchange rate as in stable markets, a depreciation in Turkish Lira implies higher domestic price of the foreign goods. Therefore, the sign of the exchange rate variable, β_4, is expected to be negative. An increase in the tariff of a product group will increase the cost of imports for that product group. This may decrease the demand for the import of that product group which implies a negative sign for β_5. Domestic

price is anticipated to impact the imports positively as the general price level increase in Turkish goods, imported goods might be relatively cheaper. This may imply higher imports and a positive sign for β_6. Similarly, it is possible to have a positive β_7 since the world import prices could be considered as a proxy for the alternative markets from which Turkey can import. Higher prices for these alternative markets might result in cheaper imports and increase the imports from the UK. However, because the world import price index is an aggregate index, possible changes in the relative prices makes this analysis harder, and the sign of β_7 less determinate. Finally, a rise in Turkey's GDP may generate higher demand for both domestic and foreign goods. Therefore, the sign of Turkey's GDP variable β_8 is anticipated to be positive.

4.2. Data

The data used in this analysis are taken from different databases including UN Comtrade Database, EUROSTAT and TURKSTAT. All data except world export and import prices and GDP are used in terms of 2-digit product groups of SITC Revision 3. Since data for some of the variables is not available in this classification, certain conversion methods are applied to obtain data in SITC Revision 3. The data in the export demand model cover 17 years between 2002 and 2018.

For the export demand, nominal export value, in terms of US Dollars, of Turkey to the UK is taken from the UN Comtrade Database. This data is converted to real export value by dividing export unit value index of Turkey.

The export unit value index of Turkey taken from TURKSTAT as an index based on 2010 is used as export prices variable in the model.

The value added of the UK is used as a proxy for production due to having sector breakdown. The data for value added of the UK is taken from EUROSTAT Database in the form of 2-digit Nomenclature générale des Activités économiques dans les Communautés Européennes (European Classification of Economic Activities, NACE) Revision 2 product groups. By using the correspondence tables of the EUROSTAT's

Reference and Management of Nomenclatures (RAMON), the data is converted respectively to first International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4, what is obtained is converted then second to ISIC Revision 3.1, then third to ISIC Revision 3 and last to SITC Revision 3 product groups. The method for conversion is such that if a product group in the former is directly corresponded to another one in the latter, then the direct value of it; if not the average of the all corresponding product groups in the former are taken to find the value of the product group in the latter. The value added of the UK is obtained as an index based on 2010.

Producer price index (PPI) of the UK is used as a proxy for the domestic prices. This data is derived from the Office for National Statistics (ONS) of the UK in the form of 4-digit Statistical Classification of Products by Activity in the EU (CPA), Version 2.1. This dataset is converted respectively, first to 2-digit Combined Nomenclature, 2021 product groups, which is then converted to 2-digit SITC Revision 4 product groups, which is finally to 2-digit SITC Revision 3 product groups. The conversion is carried out in a similar way of the conversion method of the UK's value added. This variable is used as an index based on 2010.

The world's export prices data is retrieved from the database of United Nations Conference on Trade and Development (UNCTAD) as an index based on 2010. This dataset do not include sector breakdown; therefore, this variable is used as a time series variable.

The nominal daily exchange rate of the USD/TRY, the value of US Dollar in terms of Turkish Lira, data taken from the Electronic Data Delivery System of the Central Bank of the Republic of Turkey (CBRT) and used as an average of the business days. The following formula below is used to obtain the real exchange rate:

$$Real\ Exchange\ Rate_{it} = Nominal\ Exchange\ Rate_{it} \times \frac{PPI_{it}^{UK}}{PPI_{it}^{Turkey}}$$

The World Integrated Trade Solutions Trains Database is utilized for the tariff data. Effectively applied tariff rates by the UK to Turkish exports is obtained. This data includes both specific duties, ad valorem ones and a combination of the two. The tariff data which is calculated in terms of percentage points as the weighted average of tariffs by using their corresponding trade value is used.

Finally, the GDP data of the UK is taken from the World Development Indicators Database without any sector breakdown, which is the real GDP in the form of constant US Dollars based on 2010.

Table 4.1: The Details of the Data Used in the Export Demand Model

Variable	Explanation	Unit	Source
$lnEXPT_{it}$	Real export value of Turkey to the UK	US\$	UN Comtrade Database and TURKSTAT
$lnEPT_{it}$	Export unit value index of Turkey	Index (2010=100)	TURKSTAT
$lnEPW_t$	Export unit value index of the World	Index (2010=100)	UNCTAD
$lnPPIUK_{it}$	Producer price index of the UK	Index (2010=100)	ONS
$lnVAUK_{it}$	Gross value added index of the UK	Index (2010=100)	EUROSTAT
ER_{it}	Real exchange rate of US \$ to TRY	1 US\$=…TRY	CBRT, TURKSTAT, ONS
$TRFUK_{it}$	Effectively applied tariff rate of the UK to Turkey	Percentage points	WITS Trains Database
$lnGDPUK_t$	Real Gross Domestic Product of the UK	Trillion (Constant 2010 US\$)	WDI

On the other hand, for the import demand, the nominal import value of Turkey from the UK data is acquired from the UN Comtrade Database in terms of US Dollars. This data is converted to real import value by dividing import unit value index of Turkey.

Import prices of Turkey is gathered as an index based on 2010 from TURKSTAT database.

Value added data, which is retrieved from TURKSTAT in the form of NACE Revision 2 2-digit product groups is used as proxy for production of Turkey. This data is converted to SITC Revision 3 2-digit product groups by following the same method as the value added of the UK in the export demand.

The Producer Price Index (PPI) of Turkey data is obtained from TURKSTAT in terms of 2-digit product groups of NACE Revision 2. This dataset is converted, respectively, first to 2-digit product groups of ISIC Revision 4, what is calculated is converted second to 2-digit product groups of ISIC Revision 3.1, then third to 2-digit product groups ISIC Revision 3 and finally to 2-digit product groups of SITC Revision 3. A similar method to the conversion carried out in the PPI of the UK and value added of the UK data is followed.

Import value index of the world based on 2010 acquired from UNCTAD Database without any sector breakdown and is used as a proxy to import price of world.

Real exchange rate data used in the export demand estimation is also fed in the import demand function.

Turkish tariff rates and GDP of Turkey are obtained in very similar ways from the same databases as the UK's tariffs and GDP.

Most of the data for the import demand is retrieved for the time period between 2002 and 2018 except for value added of Turkey for which the data is only available after 2003. Therefore, all data in the import demand model covers time period 2003-2018 and 2-digit products groups of the SITC Revision 3 classification.

Table 4.2: The Details of the Data Used in the Import Demand Model

Variable	Explanation	Unit	Source
$lnIMPT_{it}$	Real import value of Turkey from the UK	US$	UN Comtrade Database and TURKSTAT
$lnIPT_{it}$	Import unit value index of Turkey	Index (2010=100)	TURKSTAT
$lnIPW_t$	Import unit value index of the World	Index (2010=100)	UNCTAD
$lnPPIT_{it}$	Producer price index of Turkey	Index (2010=100)	TURKSTAT
$lnVAT_{it}$	Real gross value added of Turkey	Million TRY	TURKSTAT
ER_{it}	Real exchange rate of US $ to TRY	1 USD=…TRY	CBRT, TURKSTAT, ONS
$TRFT_{it}$	Effectively applied tariff rate of Turkey to the UK	Percentage points	WITS Trains Database
$lnGDPT_t$	Real Gross Domestic Product of Turkey	Billion (Constant 2010 US$)	WDI

The sectors used in the analysis are chosen according to their availability. In this regard, 39 sectors are used for the export demand model whereas 43 sectors are included in the import demand model. The export value of these 39 sectors equals to 92 percent of the total exports while the import value of 43 sectors amounts to 90 percent of total imports of all sectors in terms of nominal values between 2002 and 2018. These sectors consist of sub sectors from the main sectors of food and live animals; beverages and tobacco; crude material, inedible, except fuels; mineral fuels, lubricants and related materials; animal and vegetable oils, fats and waxes; chemicals and related products not elsewhere stated; manufactured goods classified chiefly by material; machinery and transport equipment; miscellaneous manufactured articles; commodities and transactions not classified elsewhere in the SITC. Table 4.3 provides a summary for the sectors covered in the analysis.

All data is used in logarithmic form except for the exchange rate and tariff variables in the export and import demand models. Since they have values lower than zero,

taking the natural logarithm would lead to negative values. Therefore, in the export demand model the variables of export value, export price of Turkey, export price of world, PPI of the UK, value added of the UK and the UK's GDP are used in logarithmic form whereas the variables of exchange rate and tariffs of the UK are used in levels. Similarly, in the import demand model the variables of import value, import price of Turkey, import price of world, PPI of Turkey, value added of Turkey and Turkey's GDP are used in logarithmic form while the rest, the exchange rate and Turkey's tariff variables, are used in levels. Lastly, all estimations are carried out in Stata 15.1.

Table 4.3: The Product Groups Used in the Export and Import Demand Models

SITC Rev 3 2-Digit Sector Number	SITC Rev 3 2-Digit Sector Name	Exports Demand Model	Imports Demand Model
00	Live animals	×	×
01	Meat and meat preparations	×	×
02	Dairy products and birds' eggs	×	√
03	Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof	√	×
04	Cereals and cereal preparations	√	×
05	Vegetables and fruit	√	√
06	Sugars, sugar preparations and honey	√	×
07	Coffee, tea, cocoa, spices, and manufactures thereof	√	√
08	Feeding stuff for animals (not including unmilled cereals)	×	√
09	Miscellaneous edible products and preparations	√	√
11	Beverages	√	×
12	Tobacco and tobacco manufactures	×	×
21	Hides, skins and furskins, raw	×	√
22	Oil-seeds and oleaginous fruits	×	×
23	Crude rubber (including synthetic and reclaimed)	×	√
24	Cork and wood	×	√
25	Pulp and waste paper	×	×
26	Textile fibres (other than wool taps and other combed wool) and their wastes (not manufactured into yarn or fabric)	√	√
27	Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)	√	√
28	Metalliferous ores and metal scrap	√	√
29	Crude animal and vegetable materials, n.e.s.	×	×
32	Coal, coke and briquettes	×	√
33	Petroleum, petroleum products and related materials	√	√
34	Gas, natural and manufactured	×	√
35	Electric current	×	×
41	Animal oils and fats	×	×
42	Fixed vegetable fats and oils, crude, refined or fractionated	√	√

Table 4.3: The Product Groups Used in the Export and Import Demand Models

SITC Rev 3 2-Digit Sector Number	SITC Rev 3 2-Digit Sector Name	Exports Demand Model	Imports Demand Model
43	Animal or vegatable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.	×	√
51	Amine-function compounds	√	√
52	Inorganic chemicals	√	√
53	Dyeing, tanning and colouring materials	√	√
54	Medicinal and pharmaceutical products	√	√
55	Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations	√	√
56	Fertizilers (other than those of group 272)	×	√
57	Plastics in primary forms	√	√
58	Plastics in non-primary forms	√	√
59	Chemical materials and products, n.e.s.	√	√
61	Leather, leather manufactures, n.e.s., and dressed furskins	×	×
62	Rubber manufactures, n.e.s.	√	√
63	Cork and wood manufactures (excluding furniture)	√	√
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	√	√
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	√	√
66	Non-metallic mineral manufactures, n.e.s.	√	√
67	Iron and steel	√	√
68	Non-ferrous metals	√	√
69	Manufactures of metals, n.e.s.	√	√
71	Power-generating machinery and equipment	√	√
72	Machinery specialized for particular industries	√	√
73	Metalworking machinery	√	×
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	√	√
75	Office machines and automatic data-processing machines	×	√
76	Telecommunications and sound-recording and reproducing apparatus and equipment	√	√

Table 4.3: The Product Groups Used in the Export and Import Demand Models

SITC Rev 3 2-Digit Sector Number	SITC Rev 3 2-Digit Sector Name	Exports Demand Model	Imports Demand Model
77	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	√	√
78	Road vehicles (including air-cushion vehicles)	√	√
79	Other transport equipment	×	×
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fitting, n.e.s.	√	×
82	Furniture, and parts thereof; bedding, mattress supports, cushions and similar stuffed furnishings	√	×
83	Travel goods, handbag and similar containers	×	×
84	Articles of apparel and clothing accessories	√	√
85	Footwear	×	√
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	×	×
88	Photografic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	×	×
89	Miscellaneous manufactured articles, n.e.s.	√	×
91	Postal packages not classified according to kind	×	×
93	Special transactions and commodities not classified according to kind	×	×
96	Coin (other than gold coin), not being legal tender	×	×
97	Gold, non-monetary (excluding gold ores and concentrates)	×	√

Source: United Nations

4.3.   Descriptive Statistics and Unit Root Tests

This part presents the descriptive statistics and unit root tests of the econometric models before carrying out the fundamental estimations and. In this regard, the descriptive statistics of the variables used in the export and import demand model analysis are given in the Table 4.4 and Table 4.5, respectively.

Table 4.4: Descriptive Statistics of the Variables Used in the Export Demand Model

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
$lnEXPT_{it}$ (US\$)	663	12.81	2.04	6.71	17.15
$lnEPT_{it}$ (Index)	663	4.52	0.23	3.36	5.17
$lnEPW_t$ (Index)	663	4.52	0.18	4.10	4.74
$lnPPIUK_{it}$ (Index)	663	4.59	0.11	4.35	4.78
$lnVAUK_{it}$ (Index)	663	4.65	0.06	4.39	4.83
ER_{it} (1 US\$=…TRY)	663	1.20	0.29	0.55	2.57
$TRFUK_{it}$ (Percentage points)	663	1.29	5.71	0.00	87.51
$lnGDPUK_t$ (Trillion US\$)	663	0.93	0.07	0.80	1.06

Source: Authors' calculations.

Accordingly, the number of observations are the same in each variable leading to a balanced panel. In addition, price variables have similar mean to each other and lower standard deviations than export values, implying a lower variation in the observations. The minimum value of the export value is 6.71 and the maximum of it is 17.15. This is due to the data set including different sectors with different magnitude and spanning to 17 year period that covers crises and booms. Tariff variable has the highest standard deviation because of different tariff rates between sectors including zero tariff sectors. The mean of the tariff variable, on the other hand, is lower since most of the sectors are within the scope of the Customs Union resulting in zero tariffs. (Table 4.4.).

Table 4.5: Descriptive Statistics of the Variables Used in the Import Demand Model

Variable	Number of Observation	Mean	Standard Deviation	Minimum	Maximum
$lnIMPT_{it}$ (US\$)	688	12.24	2.51	0.94	16.58
$lnIPT_{it}$ (Index)	688	4.54	0.23	3.37	5.16
$lnIPW_t$ (Index)	688	4.55	0.14	4.23	4.73
$lnPPIT_{it}$ (Index)	688	4.68	0.33	3.82	5.69
$lnVAT_{it}$ (Million TRY)	688	3.79	0.56	1.90	5.10
ER_{it} (1 US\$=…TRY)	688	1.18	0.31	0.55	3.08
$TRFT_{it}$ (Percentage points)	688	2.75	8.28	0.00	47.28
$lnGDPT_t$ (Billion US\$)	688	6.74	0.24	6.31	7.12

Source: Authors' calculations.

Similarly, the number of observations are the same for all variables used in the import demand model. The largest standard deviation belongs to the tariff variable due to similar reasons as the tariff variable used in the export demand model. The standard deviation of the Turkish tariffs is relatively higher than the UK's tariffs. Price variables in the import demand model have also lower standard deviations similar to the price variables used in the export demand model, implying limited change in prices through time and among different sectors (Table 4.5.).

Unit root tests are carried out to check the stationarity of the variables used in the export and import demand models. Both Fisher-type unit root tests (Choi, 2001) and unit root tests proposed by Pesaran (2003) that takes into the consideration the cross sectional dependence are utilized.

The null hypothesis of the Fisher-type unit root test is that all panels contain a unit root and the alternative assumes the stationarity for at least one panel in a finite number of panels. This test is run for all variables used in the export and import demand models for different alternatives such as including drift or trend and not including any of them.

Among the four test results, the "inverse normal Z statistics" is used as a base statistic following the recommendation of Choi's (2001) simulation results.

Similarly, Pesaran's unit root test which has the null hypothesis of all series being non-stationary is run. To account for cross section dependency, a CADF statistics is calculated with the standard Dickey Fuller regressions that are augmented by the cross section averages of the lagged levels and individual series' first differences (Eruygur, 2018). This test is also run by considering different alternatives such as including drift and including drift and trend. Results of all these unit root tests are presented in Table 4.6 and Table 4.7.

Most of the variables do not display a significant trend over the time period; however, existence of a drift is more common. Therefore, it is concluded that the export values do not have a unit root according to both of the unit root tests. Similarly, the export price of Turkey, PPI of the UK and exchange rate do not have unit roots when only constant is included in the unit root test. In addition to that, without any drift or trend, tariffs of the UK are stationary according to the Fisher Test. On the other hand, for export price of world, value added of the UK and the UK's GDP variables including only drift, Fisher Test shows no unit root; however, Pesaran Test results imply existence of unit root. Since the existence of cross section dependence is not considered as a problem when T is smaller than 20 (Baltagi, 2008), the Fisher Test results are taken as basis and it is concluded that export price of the world, value added of the UK and the UK's GDP are stationary (Table 4.6).

Similar to the variables used in the export demand model, all the variables used in the import demand model does not show an important trend over time; nonetheless, existence of a drift can be seen except the tariff variable. In this regard, all variables other than tariffs of Turkey are stationary according to the Fisher unit root test. Moreover, the tariff variable that does not demonstrate any significant drift or trend does not have a unit root (Table 4.7).

Table 4.6: Unit Root Test Results of the Variables in the Export Demand Model

Variables	Fisher*	Pesaran*	Drift/Trend Alternatives
$lnEXPT_{it}$	Z= -0.62 p=0.2694		No drift and no trend
$lnEXPT_{it}$	Z=-9.10 p=0.0000	Z=-1.68 p=0.047	Only drift
$lnEXPT_{it}$	Z=-2.58 p=0.0049		Only trend
$lnEXPT_{it}$		Z=1.68 p=0.954	Both drift and trend
$lnEPT_{it}$	Z=-7.17 p=0.0000		No drift and no trend
$lnEPT_{it}$	Z=-13.31 p=0.0000	Z=-2.65 p=0.004	Only drift
$lnEPT_{it}$	Z=-4.34 p=0.0000		Only trend
$lnEPT_{it}$		Z=0.02 p=0.510	Both drift and trend
$lnEPW_t$	Z=-6.73 p=0.0000		No drift and no trend
$lnEPW_t$	Z=-13.30 p=0.0000	Z=26.57 p=1.0000	Only drift
$lnEPW_t$	Z=2.98 p=0.9986		Only trend
$lnEPW_t$		Z=24.67 p=1.0000	Both drift and trend
$lnPPIUK_{it}$	Z=-5.16 p=0.0000		No drift and no trend
$lnPPIUK_{it}$	Z= -12.27 p=0.0000	Z=-1.62 p=0.052	Only drift
$lnPPIUK_{it}$	Z=-2.45 p=0.0071		Only trend
$lnPPIUK_{it}$		Z=-1.97 p=0.023	Both drift and trend
$lnVAUK_{it}$	Z=4.45 p=1.0000		No drift and no trend
$lnVAUK_{it}$	Z=-5.15 p=0.0000	Z=1.75 p=0.960	Only drift
$lnVAUK_{it}$	Z=-0.85 p=0.1958		Only trend
$lnVAUK_{it}$		Z=2.11 p=0.983	Both drift and trend
ER_{it}	Z=0.03 p=0.5111		No drift and no trend
ER_{it}	Z=-8.34 p=0.0000	Z=-2.40 p=0.008	Only drift
ER_{it}	Z=0.33 p=0.6298		Only trend
ER_{it}		Z=-1.95 p=0.025	Both drift and trend
$TRFUK_{it}$	Z=-5.25 p=0.0000		No drift and no trend
$TRFUK_{it}$	Z=-12.39 p=0.0000	Z=15.59 p=1.000	Only drift
$TRFUK_{it}$	Z=-9.36 p=0.0000		Only trend
$TRFUK_{it}$		Z=13.87 p=1.000	Both drift and trend
$lnGDPUK_t$	Z=7.45 p=1.0000		No drift and no trend
$lnGDPUK_t$	Z=-3.29 p=0.0005	Z=26.57 p=1.0000	Only drift
$lnGDPUK_t$	Z=-0.72 p=0.2350		Only trend
$lnGDPUK_t$		Z=24.67 p=1.0000	Both drift and trend

Source: Authors' calculations.

* Calculations are made with 2 lags obtained from the information criteria.

Table 4.7: Unit Root Test Results of the Variables in the Import Demand Model

Variables	Fisher*	Pesaran*	Drift/Trend Alternatives
$lnIMPT_{it}$	Z=-3.34 p=0.0004		No drift and no trend
$lnIMPT_{it}$	Z=-11.11 p=0.0000	Z=-0.11 p=0.457	Only drift
$lnIMPT_{it}$	Z=-1.45 p=0.0726		Only trend
$lnIMPT_{it}$		Z=-0.74 p=0.229	Both drift and trend
$lnIPT_{it}$	Z=-6.88 p=0.0000		No drift and no trend
$lnIPT_{it}$	Z=-13.52 p=0.0000	Z=-3.26 p=0.001	Only drift
$lnIPT_{it}$	Z=-2.13 p=0.0166		Only trend
$lnIPT_{it}$		Z=-0.04 p=0.517	Both drift and trend
$lnIPW_t$	Z=-5.60 p=0.0000		No drift and no trend
$lnIPW_t$	Z=-12.98 p=0.0000	Z=27.90 p=1.000	Only drift
$lnIPW_t$	Z=3.40 p=0.9997		Only trend
$lnIPW_t$		Z=25.91 p=1.000	Both drift and trend
$lnPPIT_{it}$	Z=-3.14 p=0.0009		No drift and no trend
$lnPPIT_{it}$	Z=-11.39 p=0.0000	Z=8.75 p=1.000	Only drift
$lnPPIT_{it}$	Z=3.65 p=0.9999		Only trend
$lnPPIT_{it}$		Z=13.50 p=1.000	Both drift and trend
$lnVAT_{it}$	Z=-5.40 p=0.0000		No drift and no trend
$lnVAT_{it}$	Z=-12.77 p=0.0000	Z=0.55 p=0.707	Only drift
$lnVAT_{it}$	Z=0.45 p=0.6741		Only trend
$lnVAT_{it}$		Z=-2.09 p=0.019	Both drift and trend
ER_{it}	Z=0.72 p=0.7636		No drift and no trend
ER_{it}	Z=-7.44 p=0.0000	Z=-0.86 p=0.194	Only drift
ER_{it}	Z=-1.15 p=0.1253		Only trend
ER_{it}		Z=-2.40 p=0.008	Both drift and trend
$TRFT_{it}$	Z=-4.34 p=0.0000		No drift and no trend
$TRFT_{it}$	Z=-12.19 p=0.0000	Z=21.75 p=1.000	Only drift
$TRFT_{it}$	Z=1.66 p=0.9520		Only trend
$TRFT_{it}$		Z=20.79 p=1.000	Both drift and trend
$lnGDPT_t$	Z=8.86 p=1.0000		No drift and no trend
$lnGDPT_t$	Z=-2.50 p=0.0062	Z=27.90 p=1.000	Only drift
$lnGDPT_t$	Z=-4.76 p=0.0000		Only trend
$lnGDPT_t$		Z=25.91 p=1.000	Both drift and trend

Source: Authors' calculations.

* Calculations are made with 2 lags obtained from the information criteria.

CHAPTER 5

ANALYSIS RESULTS

This Chapter will present the analysis results for econometric model building on the previous Chapter. In this context, initial estimation results and diagnostic test results will be given in the first section. Moreover, the estimation results of the baseline models will be given in the second section and then, in the last section inferences regarding the effect of Brexit on the trade between Turkey and the UK will be drawn.

5.1. Initial Estimation Results and Diagnostic Tests

Running fixed effects or random effects estimators are one of the main techniques of panel data model. Fixed effects estimator is generally used when one intends to analyze the effect of variables changing over time. In other words, the relation between the dependent variable and independent variables within an entity that might be a country or a company or within the context of this thesis, a sector can be explored by the fixed effects estimator. One of its main assumptions is that the effect of time-invariant characteristics can be removed from the model with the fixed effects estimator, which enables to estimate the net effect of the independent variables on the dependent variable. It is also assumed under the fixed effects estimator that individuals have unique time-invariant characteristics those are not correlated with their individual characteristics. In this regard, fixed effects estimator could be utilized to analyze the causes of the changes with an entity (Torres-Reyna, 2007).

On the other hand, random effects estimator allows for random variation among the entities. That is to say, the differences among the entities might have an impact on the

dependent variable in the random effects estimator. Additionally, the effect of time-invariant variable can be observed. One of the main assumptions of this estimator is that the independent variables and the error terms are not correlated. It is required in these estimators that the individual characteristics could affect the independent variables, which might result in omitted variable bias in the random effects estimator (Torres-Reyna, 2007).

Hausman Test developed by Hausman's (1978) is employed to determine whether to make use of fixed effect estimator or random effect estimator. The null hypothesis of this test is that the random effects are preferred whereas the alternative test is the fixed effects estimator (Green, 2008). In other words, the null hypothesis of whether the coefficients that are estimated with the fixed effects estimator are the same as the coefficients estimated by the random effects estimator is tested by the Hausman Test. Therefore, rejecting the null hypothesis implies using fixed effects estimator whereas obtaining an insignificant p value; that is the probability of the rejecting the null hypothesis is greater than 0.05, means that it is safe to make use of random effects.

This test is run for both the export and import demand models. The p value of 0.0000 is obtained for the export demand model, which implies the use of fixed effects estimator. Similarly, the null hypothesis of the Hausman Test is rejected with p value of 0.0000, signaling for the use of fixed effects estimator in the import demand model (Table 5.1).

Additionally, Breusch Pagan Lagrange Multiplier (LM) Test devised by Breusch and Pagan (1980) is employed in order to make a decision between the random effects estimator and simple Ordinary Least Square (OLS) model. The fact that variances across different entities is zero implying no panel effect is the null hypothesis of this model while the alternative hypothesis means that the random effects estimator is suitable for the estimation.

The test results for both the export and import demand models are calculated. The null hypothesis of the Breusch Pagan LM Test is rejected for both the export and import

demand models with the p value of 0.0000 leading to random effects estimator (Table 5.1).

Considering the Hausman Test results, fixed effects estimator for both the export and import demand models are used.

Table 5.1: Test Results of the Export and Import Demand Models

Test	The Export Demand Model	The Import Demand Model
Hausman Test	$\chi^2(6)=8240.41$ p=0.0000	$\chi^2(7)=32.74$ p=0.0000
Breusch Pagan Lagrangian Multiplier Effect	$\chi^2(01)=4078.43$ p=0.0000	$\chi^2(01)=3174.45$ p=0.0000
Wooldridge Autocorrelation Test	F(1, 38)=44.194 p=0.0000	F(1, 42)=54.999 p=0.0000
Panel Heteroscedasticity Test for Fixed Effects	$\chi^2(39)=13743.47$ p=0.0000	$\chi^2(43)=210000.00$ p=0.0000
Pesaran Cross Section Dependency Test	CD=3.039 p=0.0024	CD=2.962 p=0.0031

Source: Authors' calculations.

Wooldridge Autocorrelation Test developed by Wooldridge (2002) and revised by Drukker (2003) is used to test for serial correlation in the panel data models. The null hypothesis of this test assumes no first-order autocorrelation and the alternative hypothesis suggests the existence of autocorrelation. For both the export and import demand models, the Wooldridge Autocorrelation Test is estimated and the results propose existence of autocorrelation in both models since p values are both 0.0000 (Table 5.1).

On the other hand, Panel Heteroscedasticity Test for Fixed Effects following Greene (2000, Chapter 13) is utilized to test for the heteroscedasticity. In this context, Modified Wald test for group wise heteroscedasticity in fixed effects regression model is applied to the export and import demand models. The null hypothesis of the test assumes the homoscedasticity whereas the alternative one implies heteroscedasticity. Test results imply that heteroscedasticity exists for both the export and import demand models with p values of 0.0000 (Table 5.1).

Pesaran Cross Section Dependency Test (CD) proposed by Pesaran (2004) is employed in order to test for cross section dependency. This test for cross section dependency works well with small T and large N in which case the Breusch-Pagan Test (Breusch and Pagan, 1980) is not valid. The null hypothesis of Pesaran Test is no cross section dependency across the error terms. For both models, Pesaran Test results are calculated. P value of the export demand model is obtained as 0.0024, which implies there is cross section dependency at the 5 percent significance level. Similarly, for the import demand model, p value of the test result is found to be 0.0031, which signals existence of cross section dependency at the 5 percent significance level (Table 5.1).

5.2. Analysis Results of the Baseline Models

From the analysis of the previous section, it is found that heteroscedasticity, autocorrelation and cross-section dependency problems exist in our econometric models. Existence of heteroscedasticity, autocorrelation and cross-section dependency in a model, inconsistent but efficient estimation results are obtained. In this context, it is necessary to use robust standard errors or utilize relevant estimators accordingly. Under the assumption of independently distributed residuals, use of robust, heteroscedasticity-consistent standard errors proposed by Huber (1967), Eicker (1967) and White (1980) lead to consistent standard errors even if heteroscedasticity is present. Studies by Arellano (1987), Froot (1989) and Rogers (1993) relaxed this assumption and produced consistent standard errors even under independent between but correlated within clusters (Hoechle, n.d.). Therefore, the estimators that can be

used under heteroscedasticity and autocorrelation in the model are attained a place in the literature.

However these do not consider the existence of cross section correlation in a model Parks (1967) and Kmenta (1986) develops a feasible generalized least square based algorithm that helps to remove AR(1) autocorrelation within panels together with cross-sectional dependence and heteroscedasticity across panels.

In our empirical estimations, we utilized this method to eliminate heteroscedasticity and correlated error structure together with autocorrelation to estimate the export and import demand models. Two alternatives are run when considering autocorrelation; the first assumed autocorrelation parameter is common across panels and the second includes unique autocorrelation parameters for each panel.

Nevertheless, this method is known to be feasible for the dataset that consists of higher time dimension than cross-section dimension. However, in our data panel the time dimension is lower than the cross section dimension; therefore, two alternative methods will also be considered.

One alternative we can consider is the method proposed by Beck and Katz (1995) that implements the Ordinary Least Squares (OLS) or Prais-Winsten coefficient estimates with panel corrected standard errors. However, from the analysis of the previous section it is found that fixed effect estimation is more appropriate for our econometric models. As Hoechle (n.d.) argues that this method is used to estimate "pooled OLS regressions with panel corrected standard errors", Driscoll and Kraay (1998) standard errors for pooled OLS/Weighted Least Squares (WLS) or fixed effects estimator's coefficients are preferred instead. Therefore, in our analysis Driscoll-Kraay standard errors are utilized for both the export and import demand models.

5.2.1. Empirical Results for the Export Demand Model

Here the results from two alternatives using models Parks and Kmenta estimators using feasible GLS method and Driscoll and Kraay estimators using fixed effects are

presented in Table 5.2. An overview of the results show that there are conflicting results between alternative estimators for some coefficients.

Constant term is included in all the methods. Its effect is reported to be insignificant in Parks and Kmenta Methods and significant in Driscoll and Kraay Method. When it is significant, it has the second highest coefficient value after the coefficient of the GDP of the UK in the export demand model.

According to the Table 5.2, export prices of Turkey affect Turkish exports negatively, as expected, and their impact is significant at 1 percent significance level for all the methods and alternatives. The Law of Demand states that if the price of a good is higher, the demand will be lower, so our finding is consistent with the literature. When a decline of 1 percent in the export prices of Turkey is encountered, the export values are expected to increase 0.74 percent in alternative 1, 0.53 percent in alternative 2 and 0.80 percent in Driscoll and Kraay Method. Therefore, the price elasticity of the export demand is found to be less than one in all models implying an inelastic price elasticity of the export demand.

Similarly, all of the estimated models find that GDP of the UK is positive and significant, at 1 percent significance level. This implies that higher the income of the UK, higher the demand for both domestic and foreign goods, thus higher the Turkish exports to the UK. According to the estimation results, a 1 percent increase in the UK's GDP will lead to a 3.60 percent, 3.84 percent and 4.57 percent rise in Turkish exports to the UK, respectively. In this regard, the foreign income elasticity of the export demand is higher than 1, which means that Turkish exports are sensitive to a change in the income of the UK. This finding is in line with the results of Erdoğan Coşar (2002) where it is found that the export demand of Turkey is foreign income elastic not only in the short-run but also in the long term.

World export price influences the Turkish exports to the UK positively, as expected, in Parks and Kmenta method. However, they are not significant in Driscoll and Kraay Method. This variable is used to proxy the price of the competitors; therefore, we can

conclude that higher the price of the competitors of Turkey, higher the demand for Turkish exports. Parks and Kmenta method suggests that a 1 percent increase in the World export prices will result in 0.73 and 0.84 percent higher Turkish exports to the UK, respectively in alternative 1 and 2. Therefore, it could be possible to conclude that the world export prices, similar to Turkish export prices, affect the Turkish exports to the UK in an inelastic way.

Additionally, the coefficient of the UK's value added is found positive in Parks and Kmenta Method and insignificant in Driscoll and Kraay Method. Value added variable could be considered as a proxy for the production of the UK. As a result, this finding implies that the Turkish goods are not substitutes for the British goods, but rather used as intermediate goods in the same sector so that the demand for Turkish exports to the UK would increase when the UK value added increases.

On the other hand, according to OECD, the share of foreign content in Turkish exports is estimated to be 16.5 percent in 2016 and 19.4 percent in 2011. "Electrical equipment", "Coke and refined petroleum products" and "Motor vehicles" are the industries that have the most foreign value added content in Turkish exports while industries with the most domestic value added content in Turkish exports are "Wholesale and retail trade", "Textile and apparel" and "Transport and storage" (OECD, 2018). In this regard, considering that the UK's value added content could be used in Turkish exports, an increase in this may lead to an increase in exports of Turkey. From this perspective, Parks and Kmenta Method alternative 2 states that a 1 percent increase in the UK's value added might result in 0.67 percent rise in Turkish exports to the UK.

The UK's PPI is used as a proxy for the UK prices and its sign is expected to be positive. In other words, from a consumer's point of view the UK goods and imported goods are the alternatives to each other, it is rational to think that consumers would prefer the lower priced product. Therefore, higher PPI in the UK would mean higher demand for Turkish exports to the UK ceteris paribus. Driscoll and Kraay Method produced a significant positive coefficient at 1 percent significance level where Parks

and Kmenta Method estimated a significant positive coefficient only in the first alternative and at 10 percent significance level. Therefore, according to Driscoll and Kraay Method, a 1 percent increase in PPI in the UK would mean more expensive domestically produced products and as a result, 2.65 percent increase in Turkish exports to the UK, which implies that the foreign price elasticity of Turkish exports is elastic.

Table 5.2: Estimation Results of the Export Demand Model

Method	Parks and Kmenta		Driscoll and Kraay
	Alternative 1: Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation with Common Parameter	**Alternative 2: Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation with Unique Parameter**	**Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation**
$lnEPT_{it}$	-0.740*** (0.075)	-0.531*** (0.088)	-0.799*** (0.121)
$lnEPW_t$	0.763*** (0.277)	0.841*** (0.213)	-0.344 (0.371)
$lnVAUK_{it}$	0.562** (0.247)	0.667*** (0.184)	-0.401 (0.230)
$lnPPIUK_{it}$	0.934* (0.493)	0.439 (0.418)	2.650*** (0.589)
ER_{it}	-0.067 (0.106)	0.357*** (0.113)	-0.679*** (0.159)
$TRFUK_{it}$	-0.007*** (0.001)	-0.008*** (0.002)	-0.004 (0.005)
$lnGDPUK_t$	3.597*** (0.827)	3.839*** (0.434)	4.574*** (0.326)
$Constant$	2.603 (2.136)	1.911 (1.421)	4.229** (1.804)
N	663	663	663

Source: Authors' calculations
* $p<0.1$; ** $p<0.05$; *** $p<0.01$
Standard errors are represented in parenthesis.

Estimation results are contradictory between the methods in terms of the effect of exchange rate on the Turkish exports to the UK. Parks and Kmenta Method reports that an increase in the exchange rate would cause a rise in Turkish exports to the UK

whereas the reverse is found in Driscoll and Kraay Method. Both results are significant at 1 percent significance level.

Parks and Kmenta Method Alternative 2, indicates that a 1 unit depreciation of the Turkish Lira, would raise Turkish exports to the UK by 43 percent. Depreciation of TRY will lower the foreign price value of Turkish goods assuming TRY prices are constant, which is expected to increase the demand for Turkish goods in foreign markets. This may enable Turkish exporters not only to gain a competitive advantage in terms of foreign currency in the international arena but also to raise their export revenue in terms of Turkish Lira (CBRT, 2020).

On the other hand, in Driscoll and Kraay Method, the coefficient of the exchange rate variable is negative which implies that in response to a depreciation of Turkish Lira, the Turkish exports to the UK will decrease. That is, 1 TRY increase in the value of US Dollar against TRY would cause Turkish exports to the UK to decline by 97 percent. It is possible to explain this by referring to the concept of "exchange rate pass through to export prices". If exporters are operating in imperfectly competitive international markets, they might have power to set export prices. Should the exchange rate pass through is less than one, it is possible that, in return for a depreciation, domestic prices of the export goods may not remain constant. If domestic price of exports increase, foreign price might increase leading to a decline in Turkish exports to the UK. For instance, if inputs are mostly imported, a depreciation might cause production costs to increase. As a result of this, export prices can increase. Akgündüz and Fendoğlu (2019) revealed that exporters that depend more on import intensive suppliers increase the prices of exports and grow their volume of exports to a significantly lesser extent in response to a depreciation in the domestic currency. Moreover, Aydın and Gül (2020) asserted that although Turkish Lira has been gradually depreciating since 2011, export prices in terms of foreign currency have been lowered relatively less and the reason for this is that exporters have mainly considered the world exports' price movements in setting their prices. Nevertheless, the exporters' revenues in Turkish Lira can still be affected by the "weak adjustment of export prices

measured in foreign currency" (Aydın and Gül, 2020). Therefore, it is possible that Turkish exporters selling to the UK market might be adjusting their prices in response to input costs and world prices. In this context, a negative relation between exchange rate and export values might be seen reasonable. However, conflicting results from alternative estimations leaves this issue open to further analysis.

Finally, tariffs applied by the UK to the Turkish exports affects Turkish exports to the UK adversely as expected. This effect is revealed to be significant in Parks and Kmenta Method while it is insignificant in Driscoll and Kraay Method. Accordingly, a 1 percentage point increase in the UK's tariffs would raise the cost of exports from Turkey; therefore, would lower the exports to the UK by 0.7 and 0.8 percent, in alternative 1 and 2 respectively and vice versa.

The export demand model consists of various types of sectors with different dynamics. These range from manufactures to chemicals, as well as from machinery to agriculture with diversified datasets. Therefore, taking the results of Parks and Kmenta Method Alternative 2 as the main results seems more reasonable since it is corrected for both heteroscedasticity, cross sectional dependence and autocorrelation with a unique parameter for each sector. Considering these results, our findings imply that tariffs of the UK applied to Turkish exports have a negative influence in terms of explaining the export demand. However, the coefficient of the tariff variable is small; therefore, this influence is rather limited. Exchange rate depreciation affects the UK export demand positively as expected. Moreover, the UK's value added, world export prices and general economic activity of the UK have positive impacts on the exports of Turkey to the UK. Export prices of Turkey negatively affects the demand for exports. Thus, the results of the export demand model revealed to be consistent with the economic theory. An interesting finding is the positive impact of value added of the UK on Turkish export demand.

The export demand model consists of 2-digit sectors for which zero tariff is applied by the UK and 2-digit sectors for which implemented tariffs are different than zero. In this regard, an alternative export demand model is run for only sectors that consist of

non-zero tariffs by the UK for any year between 2002 and 2018. That is, the analysis is repeated with 2-digit sectors for which the UK attempts to protect by imposing tariffs to Turkish exports. The main results of this model is given in Appendix B Table B.1.

In this new model, all variables are estimated to be significant at least 5 percent significance level. The coefficients of Turkish export prices, exchange rate and GDP of the UK increased significantly in terms magnitude. In this case, PPI of the UK turns out to be significantly influencing the export demand negatively, which was insignificant in the original model. In this regard, this finding might be interpreted as the UK's attempt to protect its sectors where PPI elasticity is relatively higher against Turkish exports with higher tariffs. On the other hand, magnitudes of the coefficients of world export prices, the UK tariffs and the UK's value added fall in this new model. Additionally, signs of the coefficients of world export prices and the UK's value added are estimated to be negative different from the original model. A negative sign of the world export prices can be explained by the behaviors of the exporters in determining export prices. If exporters consider world export prices in the process of setting their export prices as in line with the findings of Aydın and Gül (2020), an increase in world prices may lead to a rise in Turkish export prices associatively, which may decrease Turkish exports to the UK. Furthermore, a negative sign for the UK's value added implies that as domestic production increases, demand for imports from Turkey declines; thus, the tariffs are mainly applied to those sectors that are substitutes for the domestically produced goods. Therefore, it is possible to conclude that the results of this sub sample model supports the findings of the original full sample model.

5.2.2. Empirical Results for the Import Demand Model

The import demand model analysis results of both Parks and Kmenta Method and Driscoll and Kraay Method are summarized in Table 5.3. Accordingly, the coefficient of the import prices of Turkey are found to be negative and significant in all estimations. This imply that as the import prices increases, the demand for imports decline as expected. In this context, a 1 percent decline in the price of imports may

cause the import demand to rise by 0.69 percent, 0.81 percent and 1.31 percent, respectively in alternative models. Therefore, it is found that the price elasticity of the import demand is inelastic under the Parks and Kmenta Method, leading less responsive import demand to a price change, and elastic under Driscoll and Kraay Method, implying a more responsive import demand to a change in import prices.

Additionally, the value added of Turkey, as a proxy for the domestic production, affects Turkish imports from the UK significantly, at least at 5 percent significance level, and negatively as expected in all estimations. As domestic production grows, if local products are substitutes for the foreign ones, imports from the UK will shrink. In this regard, a 1 percent increase in value added of Turkey will result in 0.33 percent, 0.42 percent and 0.69 percent decline in the import demand, respectively. On the other hand, domestic value added elasticity of the import demand is relatively lower than foreign value added elasticity of the export demand.

Moreover, the coefficient of the GDP of Turkey is significant and positive in all methods. The results revealed that as income increases, the demand for imported products rises. The coefficients of the GDP of Turkey are the highest coefficients other than the constant term in the import demand model. That is, the boost in the import demand is estimated to be 1.59 percent, 1.54 percent and 1.63 percent, respectively in alternative models, in response to a 1 percent growth in the Turkish GDP. These coefficients can also be interpreted as the income elasticity of Turkish import demand from the UK. In this context, it is possible to claim that import demand is income elastic.

While considering both the export and income demand model, it is observed that foreign income elasticity of Turkish export demand is substantially higher than domestic income elasticity of Turkish import demand in all three methods, which is similar to the findings of Özmen and Yolcu Karadam (2016).

Coefficient of the World import prices is found to be insignificant in all estimations. This variable is used as a representation of the competition with the world. It was

expected that a decline in world import prices to discourage Turkish households from importing from the UK, directing the import demand to alternative markets. In this regard, insignificance of this variable shows that imports from the UK are not competing with alternative markets.

Similar to world import prices, the coefficient of the PPI of Turkey is estimated to be insignificant, in all methods. PPI can be treated as a proxy for the prices of the domestically produced goods. If the same good is domestically produced cheaper than imports, then domestic demand can be met from domestic production. However, finding domestic goods prices not significantly effecting the import demand implies that there is no significant domestic competition for the imported goods from the UK.

Table 5.3: Estimation Results of the Import Demand Model

Method	Parks and Kmenta		Driscoll and Kraay
	Alternative 1: Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation with Common Parameter	Alternative 2: Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation with Unique Parameter	Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation
$lnIPT_{it}$	-0.694*** (0.136)	-0.810*** (0.141)	-1.314*** (0.282)
$lnIPW_t$	0.056 (0.388)	0.329 (0.543)	-0.669 (0.475)
$lnVAT_{it}$	-0.325** (0.131)	-0.422*** (0.161)	-0.694** (0.289)
$lnPPIT_{it}$	-0.253 (0.204)	-0.024 (0.253)	0.466 (0.406)
ER_{it}	-0.270 (0.183)	0.131 (0.250)	-0.702*** (0.180)
$TRFT_{it}$	-0.023*** (0.007)	-0.035*** (0.007)	-0.016 (0.032)
$lnGDPT_t$	1.592*** (0.380)	1.537*** (0.437)	1.628** (0.650)
Constant	7.236*** (1.796)	5.341** (2.154)	11.600*** (2.599)
N	688	688	688

Source: Authors' calculations
* p<0.1; ** p<0.05; *** p<0.01
Standard errors are represented in parenthesis.

The coefficient of the exchange rate is found to be negative and significant at 1 percent level, according to Driscoll and Kraay Method and insignificant with Parks and Kmenta Method. That is, as Turkish Lira depreciates domestic price of imported goods will increase. This lowers the demand for imports, which is consistent with the economic theory. In this context, 1 TRY increase in the value of US Dollar would imply 101.8 percent decline in the import demand.

At this point, it could be possible to check whether Marshall-Lerner Condition holds for the Turkish trade with the UK to understand the effect of the exchange rate clearly. Marshall Lerner Condition states that if the sum of the absolute value of the price elasticity of the export demand (PED_X) and the absolute value of the price elasticity of the import demand (PED_M) times value of imports over value of exports (in foreign currency terms) is greater than one, a depreciation of the domestic currency may lead to an improvement in the trade balance.

$$|PED_X| + |PED_M| \frac{M}{X} > 1$$

In this regard, by using the estimated price elasticity of the export and import demand models, and the 2018 values for M/X as 0.67, the left hand side of the above inequality is found to be 1.207 for Parks and Kmenta Method Alternative 1, 1.076 for Parks and Kmenta Method Alternative 2 and 1.683 for Driscoll and Kraay Method. Therefore, these results reveal that in all estimations, the Marshall-Lerner Condition holds for the Turkish trade with the UK. This implies that a depreciation of Turkish Lira ceteris paribus would improve the trade balance of Turkey with the UK.

In Driscoll and Kraay Method where the effect of the exchange rate is estimated to be significant in both the export and import demand model, the export demand is expected to be affected negatively from a depreciation in Turkish Lira similar to the import demand. Nevertheless, the combined effect of these on trade balance is expected to be positive as our simple Marshall-Lerner analysis shows.

Finally, the coefficient of the Turkish tariffs that are applied to imports from the UK is significant only in Parks and Kmenta Method and its sign is negative. In this context, a 1 percentage point decrease in Turkish tariffs would decrease the cost of imports and lead to 2.33 percent and 3.56 percent rise in Turkish import demand from the UK respectively according to the alternative 1 and 2 estimation results.

These estimated coefficients are relatively higher than the coefficients of the UK's tariffs to Turkish exports. This means that a change in Turkish tariffs would affect the Turkish import demand more than the effect of a change in the UK's tariffs on the Turkish export demand. That is, in a possible situation where both Turkey and the UK increase or decrease their tariffs levied on the other one mutually, Turkish imports would be affected more than it exports to the UK.

Similar to the export demand model, due to different sectoral structures of the data panel, Parks and Kmenta Method Alternative 2 where heteroscedasticity and cross section dependence is removed and autocorrelation in the model is corrected with sector specific parameters could be taken as the primary results. Accordingly, our findings imply that the domestic import prices, the domestic value added and the domestic economic activity are the most important factors in explaining Turkish import demand from the UK. To a lesser extent, Turkish tariffs also influence the import demand. On the other hand, import prices of the world, domestic PPI and the exchange rate has no significant impact on the import demand. The finding that exchange rate has no significant effect on the import demand is an interesting one, which indicates that Turkey's imports are independent from changes in the external value of Turkish Lira. Furthermore, insignificant domestic PPI suggests that imports are not competing with domestic producers; thus, Turkey's imports from the UK most likely are intermediate goods that are used in the domestic production.

As in the case of the export demand, an alternative analysis is run with a sub sample of sectors for which non-zero tariffs are applied by Turkey to the UK's exports. The results are presented in Table B.2 in Appendix B. These results reveal that among the variables used to estimate the model coefficients, only tariffs of Turkey and the value

added of Turkey are significant in at least 5 percent significance level. The coefficient of tariffs declined significantly relative to the full sample model. This implies that the effect of a change in tariffs is much more limited for the most protected product groups of Turkey. Other variables such as import prices of Turkey or GDP of Turkey do not influence the import demand for this sub-sample. Therefore, it can be claimed that the import demand structure of the most protected product groups by Turkey is substantially different from the original sample.

In this part of this thesis, the empirical analysis results for the export and import demand models are presented and interpreted. Utilizing the information obtained from the econometric models, some inferences regarding the potential effects of Brexit on the trade of Turkey with the UK will be drawn in the following section.

5.3. Possible Effects of Brexit on Turkey's Trade

From the results obtained in the previous part, it is seen possible to draw some inferences about Brexit and its potential effects on Turkish exports to and imports from the UK. The agreement related to the Brexit resulted in the form of the continuation of the trade relations between the EU and the UK as it mostly was before Brexit. Therefore, in line with this, an agreement that would maintain the existing relation between the UK and Turkey has been reached. However, what would happen if the agreement would result in an alternative way is worth to be analyzed due to the UK being an important trading partner of Turkey, as well as the possibility of changes in the current trends in the global trade environment and the continuing negotiations on some subjects between the EU and the UK. In this regard, the alternative scenarios mentioned in the Chapter 2 can form the basis for the upcoming analysis.

As mentioned in Chapter 2, different scenarios for shaping the future trade conditions were on the table of Brexit negotiations such as the Norwegian Model, the Swiss Model and the WTO Model (Dhingra and Sampson, 2016). Each scenario has the potential to form a different type of trade relation between Turkey and the UK and affect Turkey in alternative ways from different perspectives. Approaching these

scenarios from the level of tariffs, they would yield in and what consequences these would have might provide us a valuable tool to draw inferences in the context of Turkish trade with the UK. To do this, the tariff data from WITS database and estimation results from the previous part of this Chapter is utilized.

5.3.1. Potential Inferences for Turkish Exports to the UK

Before Brexit, tariffs that are being applied to Turkish exports to the UK are determined mainly with the Customs Union. In this context, tariffs that are applied to Turkish exports from most sectors are zero. Some of these sectors are; "Metalliferous ores and metal scrap", "Petroleum, petroleum products and related materials", "Articles of apparel and clothing accessories", "Inorganic chemicals", "Plastic in non-primary forms", "Road vehicles (including air-cushion vehicles)", "Gold, non-monetary (excluding gold ores and concentrates" and "Textile yarn, fabrics, made-uo articles, n.e.s., and related products". On the other hand, certain sectors are applied a fair amount of tariffs. Examples of these include "Cereals and cereal preparations", "Sugars, sugar preparations and honey", "Feeding stuff for animals (not including unmilled cereals", "Fixed vegetable fats and oils, crude, refined or fractioned" and "Chemical materials and products, n.e.s.", which are mostly agriculture-related sectors that are not included in the Customs Union (Table 5.4).

Table 5.4: Tariffs Already Applied by the UK to Turkish Exports in Selected SITC Revision 3 Sectors*

Product Group Code	Product Group Name	The UK's Applied Trade-Weighted Tariffs in 2019 (Percentage Points)	Turkish Exports to the UK in 2019 (Million US Dollars)
04	Cereals and cereal preparations	20.96	45.3
06	Sugars, sugar preparations and honey	6.74	35.8
08	Feeding stuff for animals (not including unmilled cereals)	4.61	3.7
28	Metalliferous ores and metal scrap	0	5.1
33	Petroleum, petroleum products and related materials	0	123.4
42	Fixed vegetable fats and oils, crude, refined or fractionated	2.37	1.4
52	Inorganic chemicals	0	62.5
58	Plastics in non-primary forms	0	152.4
59	Chemical materials and products, n.e.s.	0.21	11.9
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0	578.3
78	Road vehicles (including air-cushion vehicles)	0	2,212.9
84	Articles of apparel and clothing accessories	0	1,869.7
97	Gold, non-monetary (excluding gold ores and concentrates)	0	1,120.5

Source: UN Comtrade Database and World Integrated Trade Solutions

* For an exhaustive list of all sectors for which the data is available, see Appendix B.

5.3.1.1. Potential Impact of Norwegian Model on Turkish Exports to the UK

Joining EEA, which is also called Norwegian Model, is the first alternative scenario that can be considered. In this model, the UK is expected to trade with the EU in similar conditions with Norway. As a result, it is probable for the UK to implement Turkish exports similar tariffs as Norway. In this context, tariffs imposed to certain exporting sectors such as "Meat and meat preparations", "Feeding stuff for animals (not including unmilled cereals)" and "Oil-seeds and oleaginous fruits" may increase

dramatically whereas "Dairy products and birds' eggs", "Sugars, sugar preparations and honey", "Beverages" and "Cereals and cereal preparations" may experience a decrease. Most of the 2-digit sectors like "Tobacco and tobacco products", "Medicinal and pharmaceutical products" and "Power-generating machinery and equipment" would stay the same as zero[4].

Overall, the rise in tariffs applied by the UK might be 6.04 percentage points higher in terms of the arithmetic average and 0.51 percentage points higher in terms of the trade-weighted average than the currently applied ones. Since most of the sectors are already zero tariff levied sectors, the change in tariff rates calculated will be small.

In order to estimate this potential impact, the tariff coefficient estimated by Parks and Kmenta Method Alternative 2 in the previous part; which is, 0.008, is used. By using the latest available tariff data and 2018 values of Turkish exports to the UK, total impact, on the 10 affected sectors[5], is calculated to be about 301 thousand US Dollars in real terms. It is clear that this number is not a significant effect as it is only 0.26 percent of total Turkish exports to the UK in 2018.

5.3.1.2. Potential Impact of Swiss Model on Turkish Exports to the UK

In the Swiss Model, less integration of the UK with the EU can be achieved while providing an opportunity for the UK to trade agricultural goods freely. In such a case, the UK may apply tariffs similar to the ones implemented by Switzerland to Turkey. Similar to the previous scenario, most of the 2-digit sectors are remained unaffected in this scenario due to zero tariff imposition. On the other hand, this might lead to a substantial rise in the tariffs of "Dairy products and birds' eggs", "Beverages" and "Animal oils and fats" whereas a dramatic fall in "Meat and meat preparations" and a

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[4] See Appendix C for sectoral tariffs.

[5] See Appendix D for sectoral impacts.

modest decline in "Cereals and cereal preparations", "Sugars, sugar preparations and honey" and "Feeding stuff for animals (not including unmilled cereals"[6].

Total of 4.79 percentage points in terms of the arithmetic average and 0.60 percentage points in terms of the trade-weighted average increase in tariffs is likely to occur. With a similar calculation, it is seen that slightly higher number of sectors are affected. The net total decrease in real exports of Turkey to the UK is calculated to be 313 thousand[7] US Dollars analogous to Norwegian Model.

5.3.1.3. Potential Impact of WTO Model on Turkish Exports to the UK

Conducting trade according to WTO rules and in this regard, applying WTO tariffs is considered as the worst-case scenario for the UK after Brexit. This model will bring significant changes in the applied tariffs. In this regard, most of 2-digit sectors encounters with raised tariffs such as "Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof", "Sugars, sugar preparations and honey", "Tobacco and tobacco manufactures" and "Telecommunications and sound-recording and reproducing apparatus and equipment". Nonetheless, the data revealed that tariff of only a limited number of 2-digit sectors remained unchanged[8].

Using arithmetic average, imposed tariffs raised by 4.03 percentage points while by using trade weighted average, the increment is calculated as 6.00 percentage points, leading to greater impact than both the Norwegian and Swiss Models. In line with this, the real amount of decline in Turkish exports to the UK is reported to be 6.5 million US Dollars. The potential impact of the WTO Model is significantly higher than the

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[6] See Appendix C for sectoral tariffs.

[7] See Appendix D for sectoral impacts.

[8] See Appendix C for sectoral tariffs.

previous two models and this amount corresponds to 5.7 percent of total annual export of Turkey to the UK[9] in 2018.

Therefore, considering all of the models, it is seen that agricultural sectors are the commonly affected sectors. Different from the former two models, according to the WTO Model, machinery and transport equipment together with the manufactured products are the most impacted sectors. However, the potential effects of these Models, except the WTO Model, on the Turkish exports to the UK are limited. One of the reasons for this is the considered change in tariffs are very small. That is, tariffs applied by Norway, Switzerland and the UK to Turkey are already small and zero in most of the sectors. Therefore, switching among these models does not result in significant change in imposed tariffs. On the other hand, although the change in tariffs might be significant in the WTO Model, the reason why the impact is calculated to be limited is the relatively small coefficient of tariff variable obtained in the export demand model in the previous part.

5.3.2. Potential Inferences for Turkish Imports from the UK

Imports of Turkey from the UK's face relatively higher tariffs than the ones that are implemented to Turkish exports by the UK before Brexit. Of course due to the Customs Union, higher tariffs could only be applied to certain sectors such as "Meat and meat preparations", "Dairy products and birds' eggs", "Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof" and "Vegetables and fruits". The sectors "Beverages", "Tobacco and tobacco manufactures", "Animal oils and fats" and "Amine-function compounds" encounters relatively lower but not zero tariffs. On the other hand, zero tariffs are imposed to "Paper, paperboard and articles of paper pulp, of paper or of paperboard", "Iron and steels", "Furniture, and parts thereof; bedding mattress supports, cushions and similar

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[9] See Appendix D for sectoral impacts.

stuffed furnishings" and "Gold, non-monetary (excluding gold ores and concentrates)" (Table 5.5).

Table 5.5: Tariffs Already Applied by Turkey to Turkish Imports in Selected SITC Revision 3 Sectors*

Product Group Code	Product Group Name	The UK's Applied Trade-Weighted Tariffs in 2019 (Percentage Points)	Turkish Exports to the UK in 2019 (Million US Dollars)
01	Meat and meat preparations	126.2	0.06
02	Dairy products and birds' eggs	27.98	28.7
03	Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof	34.99	0.57
05	Vegetables and fruits	34.17	3.2
11	Beverages	0.02	40.3
12	Tobacco and tobacco manufactures	0.01	23.3
41	Animal oils and fats	1.81	2.3
51	Amine-function compounds	0.76	71.1
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	0	67.7
67	Iron and steels	0	213.6
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	0	225.2
82	Furniture, and parts thereof; bedding mattress supports, cushions and similar stuffed furnishings	0	9.8
97	Gold, non-monetary (excluding gold ores and concentrates)	0	1,506.4

Source: WITS TRAINS and United Nations Comtrade Database

* For an exhaustive list of all sectors for which the data is available, see Appendix B.

5.3.2.1. Potential Impact of Norwegian Model on Turkish Imports from the UK

After Brexit, if the UK and the EU would agree on the Norwegian Model, it is possible for Turkey to apply tariffs to imports from the UK that are similar to the ones applied to Norway. Although there are lack of Turkish tariffs to Norway data, what can be drawn from the available data is a decrease in tariffs implemented to the UK's exports. In other words, it can be expected that if Turkey introduce similar tariffs to the UK as it applies to Norwegian exports, the tariffs the UK's exporters face would decline in most of the sectors. For instance, Turkey applied 34.99 percentage point tariff to the imports of "Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof" from the UK in 2019 and this would fall to 0 if Turkey imposes Norwegian tariffs to the UK. Similarly, "Cereals and cereal preparations", "Feeding stuff for animals (not including unmilled cereals)" and "Fixed vegetable fats and oils, crude, refined or fractionated" are among other sectors where tariff declines can be seen. On the other hand, there would be a raise of 112.02 percentage points and 15.3 percentage points in the applied tariffs to "Dairy products and birds' eggs" and "Vegetables and fruits", respectively. Finally, tariffs would remain the same, which is 0, for large number of sectors[10].

On arithmetic average, the change in the imposed tariffs is calculated as 1.08 percentage points whereas considering a trade weighted average, this falls to -3.11 percentage points. By using 2018 values of Turkish imports from the UK and the coefficient of tariff variable in the import demand model estimated by Parks and Kmenta Method Alternative 2, 0.035, the impact of this change to Turkish imports from the UK might be calculated. For some sectors, the imports from the UK increased and for others a fall in imports is seen. Therefore, net change in real imports from the UK is calculated to be -1.2 million US Dollars for 13 sectors only for which necessary

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[10] See Appendix C for sectoral tariffs.

data is available. This corresponds to 1.63 percent of total Turkish imports from the UK in 2018[11].

When compared with the tariffs and their effects on exports and imports of Turkey to and from the UK, it is seen that Turkish imports have the potential to be affected by the implementation of Norwegian Model more than its exports. Additionally, most of the change in tariffs applied to Turkish exports by the UK under this model is upwards whereas the change in tariffs applied to imports are both upwards and downwards.

5.3.2.2. Potential Impact of Swiss Model on Turkish Imports from the UK

After Brexit, in the case of Swiss Model, Turkey would implement same tariffs that are applied to Switzerland to the imports from the UK. Therefore, it is probable that there could be a fall relative to the current values in the tariffs of "Dairy products and birds' eggs", "Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof" and "Sugar, sugar preparations and honey". On the other hand, "Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s." is expected to experience a significant rise in the tariffs. Moreover, tariffs imposed to 44 sectors will most probably not change as zero tariffs were applied before Brexit. Examples of these are "Metalworking machinery", "Travel goods, handbag and similar containers" and "Photografic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks"[12].

Tariff values are expected to decrease by 1.31 percentage points on arithmetic average and 0.08 percentage points on trade weighted average. Effects of these tariff changes are calculated by using the latest available tariff data, Turkish imports from the UK in 2018 and the tariff variable's coefficient, 0.035 for all available sectors[13]. These

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[11] See Appendix D for sectoral impacts.

[12] See Appendix C for sectoral tariffs.

[13] See Appendix D for sectoral impacts.

changes generate 304 thousand US Dollars increase and 102 thousand US Dollars decrease in real imports. Net change corresponds to 0.28 percent of 2018 value of Turkish imports from the UK. This is the only scenario among the three models that increases the total imports of Turkey from the UK because of tariff decreases.

5.3.2.3. Potential Impact of WTO Model on Turkish Imports from the UK

In the worst-case scenario, Turkey could apply the MFN tariffs to the UK's exports. Different from Norwegian Model and Swiss Model in the WTO Model, tariffs implemented to agricultural sectors mostly do not experience any changes since in some of these sectors tariffs already levied by Turkey are very close to MFN levels. These include but not limited to "Live animals", "Meat and meat preparations", "Vegetables and fruit" and "Beverages". On the other hand, a sharp increase, 31.23 percentage point, in "Tobacco and tobacco manufactures" and relatively substantial rise in "Iron and steel", "Articles of apparel and clothing accessories" and "Footwear" are expected in the WTO Model. 12 sectors may not be affected from any tariff change due to the implementation of either MFN tariffs or zero tariffs[14].

An arithmetic average of 3.36 percentage points and a trade-weighted average of 2.98 percentage points of additional tariffs can be applied by Turkey to the UK in this Model. This is the biggest change in the tariffs levied by Turkey among all models. With a similar calculation to previous ones, the highest impact is calculated as a 6.9 million US Dollars decline in real terms for more than 40 sectors[15]. This amounts to 9.44 percent of total Turkish imports from the UK in 2018.

Comparing all models, it can be claimed that WTO Model has the highest and significant negative impact on Turkish imports from the UK whereas Swiss Model may lead to an improvement in imports from the UK as the only one resulting in net positive impact. Imports from sectors that are commonly influenced in all three models

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[14] See Appendix C for sectoral tariffs.

[15] See Appendix D for sectoral impacts.

are the agricultural sectors, similar to Turkish exports which are more specifically animal and vegetable oils, fats and waxes together with certain chemical sectors. On the other hand, certain manufacture products, machinery and transport equipment and some types of chemicals are not very much impacted in the Norwegian and Swiss Models. Analogous to Turkish exports to the UK, in the WTO Model, machinery and transport equipment sectors are the mostly affected sectors followed by manufactures and then chemicals in terms of imports from the UK.

Apart from these sectoral effects, total effects are estimated as a minor share of total Turkish imports from the UK except the WTO Model. This implies that from the tariffs perspective, changes in tariffs may not have substantial influence on imports in the Norwegian and the Swiss Model. The reasons for this very similar to the ones mentioned above for the exports of Turkey. That is, the changes in tariffs are not that high for sectors that have larger share in imports and higher changes are expected to occur in Turkish tariffs are in sectors with smaller share in total imports. As a result, the response of Turkish imports from the UK to tariff changes remained limited. This is further supported with a small tariff coefficient estimated by the econometric import demand model.

In conclusion, results of the Norwegian and Swiss Models revealed that even big changes in the tariffs applied to Turkey by the UK or levied on the UK by Turkey may not have substantial impact on the export and import demand of Turkey. In other words, Turkish trade with the UK might not respond sensitively to possible changes in tariffs to some extent. Nevertheless, a shift to WTO Model would influence both Turkey's exports to and imports from the UK significantly and adversely.

This can be treated as a drawback in terms of limiting the effect of favorable improvements in tariffs. That is, substantial tariff promotion is required to be able to benefit considerably from its positive impact. On the other hand, this result could be characterized as a desirable outcome. In this context, the results may support the continuity of the exports to and imports from the UK even if the tariffs are increased to some extent because of a damage to trade relations or a political problem between

Turkey and the UK for some reason. Should the changes in tariffs are closer to WTO Model, then the adverse effects might be experienced.

CHAPTER 6

CONCLUSION

The EU, as the biggest exporting partner of Turkey, constituted half of Turkish exports in 2018. Among the EU and non-EU countries, the UK is the second largest exporting market with a value of 11.1 billion US Dollars for Turkey after Germany. On the other hand, Turkish imports from the EU amounts to one third of total Turkish imports from the world. Imports from the UK is the seventh largest among all partners of Turkey with a value of 7.5 billion US Dollars in 2018. In this context, Turkish trade with the UK has the second higher trade surplus almost 3.6 billion US Dollars after Iraq. The UK market for Turkey could be considered as dynamic and growing since Turkish export and import average growth rates between 1989 and 2018 equals to 11.6 percent and 10.6 percent, respectively.

Turkey has been trading with the EU and the UK according to the rules of the Customs Union since 1996. In this regard, Turkey has had access to the EU market without certain restrictions in trade. The continuity of the trade relation between Turkey and the UK was posed a considerable risk in 2016 when British people voted for leaving the EU in a referendum. Negotiations between the UK and the EU are finalized in 2021, and the New EU-UK Trade and Cooperation Agreement entered into force. This agreement enables the UK and the EU to trade with zero tariffs and zero quotas for all goods including agricultural and fishery products. Furthermore, the future relation of Turkey with the UK was determined with The Free Trade Agreement signed on December 29, 2020. This constituted a follow-up agreement to previous Customs

Union between Turkey and the UK. That is, this agreement enables Turkey to trade with the UK in terms of similar tariffs and quotas to the ones applied before the Brexit.

From literature review conducted on Brexit and its effects on Turkey, it is found that the number of work is limited. Moreover, it is seen that there are no studies that discuss the effect of Brexit focusing only on Turkey in an analytical framework and assess the possible effects quantitatively. Furthermore, there is no empirical research solely focusing on the trade between Turkey and the UK. In this regard, this thesis investigates the sectoral structure of Turkey's trade with the UK, the factors that influence the trade between Turkey and the UK and the potential impact of Brexit if an alternative agreement other than the current one were used between the EU and the UK on Turkey's trade with the UK.

In this study, a detailed analysis on the factors that affect Turkish trade with the UK is developed. More specifically, econometric models of the export and and import demand are estimated by using 2-digit SITC Revision 3 sectors for the period of 2002-2018. Value added of Turkey and the UK, the export and import price indices of Turkey and the world, exchange rates, domestic PPIs, GDPs and tariff values are used as explanatory variables in the export and import demand models. The panel analysis covers 92 percent of total exports with 39 sectors and 90 percent of total imports with 43 sectors. Fixed effects estimation methods, more specifically Parks and Kmenta and Driscoll and Kraay Methods, are used for both the export and import demand models.

The export and import demand models consist of various types of sectors with different dynamics. These range from manufactures to chemicals or machinery to agriculture with diversified datasets. Therefore, the econometric model is corrected for both heteroscedasticity, cross sectional dependence and autocorrelation with a unique parameter for each sector.

Findings of the analysis show that tariffs of the UK applied to Turkish exports have a limited influence on the export demand. Similarly, the effect of exchange rate is somewhat restricted. Moreover, Turkish export prices, the UK's value added, world

export prices and general economic activity of the UK have more effect on the exports of Turkey to the UK market. Export prices of Turkey negatively affect the demand for exports. Similarly, world export prices used as a proxy for the prices of the competitors of Turkey influence the Turkish exports positively. Additionally, PPI of the UK used as a proxy for the domestic prices has a positive but insignificant impact on Turkey's exports. Thus, the results of the export demand model are in line with the economic theory. It is somehow interesting to see a positive sign for the UK's value added, which can be treated as a proxy for the production in the UK. This implies that the Turkish goods are not substitutes for the British goods, but rather used as intermediate goods in the same sector so that the demand for Turkish exports to the UK would increase when the UK value added increases.

On the other hand, import prices of Turkey, value added of Turkey and general economic activities of Turkey are the most important factors in explaining Turkish import demand from the UK. Domestic value added elasticity of the import demand is relatively lower than foreign value added elasticity of the export demand. Although to a lesser extent, Turkish tariffs also influence the import demand. On the other hand, import prices of world, domestic PPI and exchange rate has no significant impact in the import demand. It was expected that a decline in world import prices to discourage Turkish households from importing from the UK, directing the import demand to alternative markets. In this regard, insignificance of this variable shows that imports from the UK are not competing with alternative markets. An interesting finding is that the exchange rate has no significant effect on the import demand, which implies that Turkey continues to import independent from the external value of the Turkish Lira. In Driscoll and Kraay Method where the effect of the exchange rate is estimated to be significant in both the export and import demand models, the export demand is expected to be affected negatively from a depreciation in Turkish Lira similar to the import demand. Nevertheless, the combined effect of these on trade balance is expected to be positive as our simple Marshall-Lerner analysis shows. Furthermore, insignificant domestic PPI suggests that there is no significant domestic competition for the imported goods from the UK.

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In order to find an answer to the question of what would be the potential effect of an alternative scenario for Brexit on Turkey's trade with the EU, the analysis is taken to one step further. In this context, the impact of tariffs on exports and imports are elaborated by considering alternative scenarios namely the Norwegian Model, the Swiss Model and the WTO Model. The common finding of these alternative models is that the agricultural sectors will be affected primarily. Different from the former two models, according to the WTO Model, machinery and transport equipment together with the manufactured products are the most impacted sectors. It is found that the WTO Model has the highest negative impact on exports and imports whereas the Swiss Model may lead to an improvement in imports from the UK as the only one resulting in a net positive impact. However, the potential effects of these Models, except the WTO Model, on the Turkish trade with the UK is limited in this basic framework established in the analysis.

To conclude, total real effects of the Norwegian Model and the Swiss Model are calculated as a minor share (around 1 percent) of total Turkish exports to the UK and imports from the UK. Nevertheless, a shift to WTO Model would influence both Turkey's exports (about 5 percent of 2018 values) to and imports (almost 10 percent of 2018 values) from the UK significantly and adversely. Therefore, although the UK is considered to be an important trade partner for Turkey, the potential impact of Brexit on Turkish trade with the UK regarding the alternative scenarios could be limited depending on the alternative models in terms of changing tariffs. Nonetheless, this does not imply that Brexit would have no impact on Turkish economy or potential changes in the tariffs would have no significant impact on the trade between Turkey and the UK at all. Evidently, there are specific sectors which these effects will be concentrated. Sector or product specific analyses as well as studies focusing on indirect effects of possible scenarios is required for further analysis.

This paper contributes to the existing literature in terms of analyzing the international trade of Turkey with the UK by developing an empirical model. At the same time, the effect of Brexit on the Turkish economy and international trade is studied by using an

econometric model that provides a quantitative perspective. However, a number of shortcomings are present, which can be handled in the future work. Firstly, the lack of data availability is one of the main challenges in this thesis. More specifically, collecting sectoral data for all necessary variables were not always possible. This issue attempted to be solved by using proxy variables or data conversions from one classification to another. In this context, the current study focuses on data which is only available for 39 sectors for the export demand model and 43 sectors for the import demand model. Although these covered more than 90 percent of total exports and imports to increase coverage a more aggregated sector breakdown is used in the current study. Aggregation is known to mask certain details and makes it harder to see the sources of certain developments clearly. Further studies could concentrate on more detailed sectoral breakdown.

Finally, considering the importance of the UK as Turkey's trade partner, future research on how Turkey's trade with the UK is affected by current developments such as trade wars, COVID 19 pandemic and climate change is likely to lead to further insights in order to develop a better comprehension of Turkey's international trade structure.

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APPENDICES

A. DATA RESTRICTIONS AND RELEVANT EXPLANATIONS

Exchange Rate: Although the data for Turkish exports and imports are not available, according to EUROSTAT, the share of US Dollar by invoicing currency in the UK's exports to extra-EU countries is 44.7 percent in 2018. The share of Euro equals to 3.6 percent; the share of national currency of the EU member states not belonging to Euro area 43.9 percent and the share of other currencies 7.7 percent. For the UK's imports the share of US Dollar by invoicing currency is 66.3 percent; the share of Euro is 5.4 percent; the share of national currency of the EU member states not belonging to Euro area is 21.9 percent and the share of other currencies 6.5 percent. Therefore, since the share of US Dollar is the highest among them, the exchange rate of US Dollar against Turkish Lira is used in the analysis.

Turkish Value Added: Since the data have missing values for the years 2010 and 2013 and for the sectors "27", "28", "33" and "34", the previous year's data are used as a proxy for them.

Turkish Tariffs: Since the Turkish tariff rates data have missing values for the year 2012 and 2014 in the data source, while the data is downloading, 2011 and 2013 values are used for these years for all sectors, respectively.

B. ADDITIONAL ESTIMATION RESULTS

Table B.1: The Estimation Result for the Export Demand Model with Non-Zero Tariff Sectors Included only

Method	Parks and Kmenta		Driscoll and Kraay
	Alternative 1: Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation with Common Parameter	Alternative 2: Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation with Unique Parameter	Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation
$lnEPT_{it}$	-1.469*** (0.064)	-1.416*** (0.077)	-1.697*** (0.255)
$lnEPW_t$	-0.594*** (0.195)	-0.593*** (0.209)	0.418 (0.859)
$lnVAUK_{it}$	0.107 (0.170)	-0.457** (0.211)	-0.107 (0.376)
$lnPPIUK_{it}$	4.300*** (0.367)	3.743*** (0.348)	3.363*** (0.935)
ER_{it}	-0.906*** (0.082)	-0.951*** (0.100)	-0.529* (0.285)
$TRFUK_{it}$	-0.004** (0.002)	-0.005** (0.002)	-0.001 (0.003)
$lnGDPUK_t$	4.997*** (0.505)	5.556*** (0.449)	4.644*** (0.440)
$Constant$	-2.440* (1.396)	1.779 (1.366)	-0.827 (2.654)
N	238	238	238

Source: Authors' calculations
* p<0.1; ** p<0.05; *** p<0.01
Standard errors are represented in parenthesis.

Table B.2: The Estimation Result for the Import Demand Model with Non-Zero Tariff Sectors Included only

Method	Parks and Kmenta		Driscoll and Kraay
	Alternative 1: Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation with Common Parameter	Alternative 2: Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation with Unique Parameter	Corrected for Heteroscedasticity & Cross Sectional Dependence & Autocorrelation
$lnIPT_{it}$	-0.219 (0.246)	0.305 (0.205)	-0.244 (0.412)
$lnIPW_t$	-0.899 (0.661)	-1.910* (1.103)	-1.958 (1.462)
$lnVAT_{it}$	-0.624* (0.326)	-1.065** (0.486)	-0.968* (0.536)
$lnPPIT_{it}$	-1.110* (0.588)	0.216 (0.847)	-0.136 (1.642)
ER_{it}	-0.179 (0.349)	0.818 (0.593)	-0.450 (0.602)
$TRFT_{it}$	-0.012** (0.005)	-0.019*** (0.004)	-0.007 (0.032)
$lnGDPT_t$	3.669*** (0.676)	1.460 (1.009)	3.667*** (0.937)
Constant	-0.410 (2.838)	10.363** (4.071)	1.572 (6.799)
N	144	144	144

Source: Authors' calculations
* p<0.1; ** p<0.05; *** p<0.01
Standard errors are represented in parenthesis.

C. APPLIED TARIFFS FOR ALL SITC REVISION 3 2-DIGIT SECTORS

Table C.1: Potential Tariffs Applied to Turkish Exports to the UK in Selected Models

Product Group Code	Product Group Name	The UK's Tariffs Applied to Turkish Exports	Norwegian Tariffs Applied to Turkish Exports	Swiss Tariffs Applied to Turkish Exports	The UK's MFN Tariffs Applicable to Turkish Exports
00	Live animals	0	4.09**	0	0
01	Meat and meat preparations	22.84*	253.33**	0.95	27.97****
02	Dairy products and birds' eggs	77.79*	70.29	160.03***	77.79****
03	Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof	0	0	0	14.28
04	Cereals and cereal preparations	20.96	20.81	17.22	23.94
05	Vegetables and fruit	1.02	10.3	6.04	8.06
06	Sugars, sugar preparations and honey	6.74	5.29	2.03	20.24
07	Coffee, tea, cocoa, spices, and manufactures thereof	0.01	12.43	1.08	3.21
08	Feeding stuff for animals (not including unmilled cereals)	4.61	91.46	2.66	4.85
09	Miscellaneous edible products and preparations	1.77	10.81	15.28	7.97
11	Beverages	0.09	0	80.33	1.41
12	Tobacco and tobacco manufactures	0	0**	12.41	33.77

Table C.1: Potential Tariffs Applied to Turkish Exports to the UK in Selected Models

Product Group Code	Product Group Name	The UK's Tariffs Applied to Turkish Exports	Norwegian Tariffs Applied to Turkish Exports	Swiss Tariffs Applied to Turkish Exports	The UK's MFN Tariffs Applicable to Turkish Exports
21	Hides, skins and furskins, raw	0	0	0***	0
22	Oil-seeds and oleaginous fruits	0	20.88	12.37	0
23	Crude rubber (including synthetic and reclaimed)	0	0	0	1.19
24	Cork and wood	0	0	0	0.06
25	Pulp and waste paper	0	0**	0	0
26	Textile fibres (other than wool taps and other combed wool) and their wastes (not manufactured into yarn or fabric)	0	0	0	0.97
27	Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)	0	0	0	0.68
28	Metalliferous ores and metal scrap	0	0	0	0
29	Crude animal and vegetable materials, n.e.s.	0	2.8	3.44	6.11
32	Coal, coke and briquettes	0		0***	0
33	Petroleum, petroleum products and related materials	0	0	0***	0
34	Gas, natural and manufactured	0	0	0***	0
35	Electric current				
41	Animal oils and fats	0	0	59.01***	3.6

Table C.1: Potential Tariffs Applied to Turkish Exports to the UK in Selected Models

Product Group Code	Product Group Name	The UK's Tariffs Applied to Turkish Exports	Norwegian Tariffs Applied to Turkish Exports	Swiss Tariffs Applied to Turkish Exports	The UK's MFN Tariffs Applicable to Turkish Exports
42	Fixed vegetable fats and oils, crude, refined or fractionated	2.37	13	33.11	9.14
43	Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.	0	0	38.73	3.07
51	Amine-function compounds	0	0	0	6.17
52	Inorganic chemicals	0	0	0	4.88
53	Dyeing, tanning and colouring materials	0	0	0	5.27
54	Medicinal and pharmaceutical products	0	0	0	0
55	Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations	0	0	0	1.16
56	Fertizilers (other than those of group 272)	0	0	0	6.5
57	Plastics in primary forms	0	0	0	6.2
58	Plastics in non-primary forms	0	0	0	6.15
59	Chemical materials and products, n.e.s.	0.21	3.25	0.02	4.35
61	Leather, leather manufactures, n.e.s., and dressed furskins	0	0	0	2.67
62	Rubber manufactures, n.e.s.	0	0	0	3.99

Table C.1: Potential Tariffs Applied to Turkish Exports to the UK in Selected Models

Product Group Code	Product Group Name	The UK's Tariffs Applied to Turkish Exports	Norwegian Tariffs Applied to Turkish Exports	Swiss Tariffs Applied to Turkish Exports	The UK's MFN Tariffs Applicable to Turkish Exports
63	Cork and wood manufactures (excluding furniture)	0	0	0	3.63
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	0	0	0	0.06
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0	0	0	7.1
66	Non-metallic mineral manufactures, n.e.s.	0	0	0	4.51
67	Iron and steel	0	0	0	0.08
68	Non-ferrous metals	0	0	0	6.85
69	Manufactures of metals, n.e.s.	0	0	0	3.13
71	Power-generating machinery and equipment	0	0	0	1.87
72	Machinery specialized for particular industries	0	0	0	1.37
73	Metalworking machinery	0	0	0	1.92
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	0	0	0	1.77
75	Office machines and automatic data-processing machines	0	0	0	0
76	Telecommunications and sound-recording and reproducing apparatus and equipment	0	0	0	13.85

Table C.1: Potential Tariffs Applied to Turkish Exports to the UK in Selected Models

Product Group Code	Product Group Name	The UK's Tariffs Applied to Turkish Exports	Norwegian Tariffs Applied to Turkish Exports	Swiss Tariffs Applied to Turkish Exports	The UK's MFN Tariffs Applicable to Turkish Exports
77	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	0	0	0	2.82
78	Road vehicles (including air-cushion vehicles)	0	0	0	10.21
79	Other transport equipment	0	0	0	1.36
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fitting, n.e.s.	0	0	0	3.44
82	Furniture, and parts thereof; bedding, mattress supports, cushions and similar stuffed furnishings	0	0	0	1.33
83	Travel goods, handbag and similar containers	0	0	0	3.58
84	Articles of apparel and clothing accessories	0	0	0	11.89
85	Footwear	0	0	0	10.8
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	0	0	0	0.56
88	Photografic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	0	0	0	3.8

Table C.1: Potential Tariffs Applied to Turkish Exports to the UK in Selected Models

Product Group Code	Product Group Name	The UK's Tariffs Applied to Turkish Exports	Norwegian Tariffs Applied to Turkish Exports	Swiss Tariffs Applied to Turkish Exports	The UK's MFN Tariffs Applicable to Turkish Exports
89	Miscellaneous manufactured articles, n.e.s.	0	0	0	4.96
96	Coin (other than gold coin), not being legal tender	0*	0**	0***	0****
97	Gold, non-monetary (excluding gold ores and concentrates)	0	0	0	0

Source: World Integrated Trade Solution

* The latest available tariff data for "01"=2007; "02"=2018; "96"=2017.
** The latest available tariff data for "00"=2016; "01"=2018; "12"=2008; "25"=2018; "96"=2014.
*** The latest available tariff data for "02"=2018; "21"=2017; "32"=2017; "33"=2018; "34"=2017; "41"=2012; "96"=2018.
**** The latest available tariff data for "01"=2007; "02"=2017; "96"=2017.

Table C.2: Potential Tariffs Applied to Turkish Imports from the UK in Selected Models

Product Group Code	Product Group Name	Turkey's Tariffs Applied to the UK's Exports	Turkey's Tariffs Applied to Norwegian Exports	Turkey's Tariffs Applied to Swiss Exports	Turkey's MFN Tariffs Applicable to the UK's Exports
00	Live animals	22.53		11.5	22.53
01	Meat and meat preparations	126.2		106.99	126.2
02	Dairy products and birds' eggs	27.98	140**	3.32	28.22
03	Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof	34.99	0	0	35.35
04	Cereals and cereal preparations	6.39	0.88	1.41	13.44
05	Vegetables and fruit	34.17	49.47	47.17	34.19
06	Sugars, sugar preparations and honey	23.44	0**	1.6	32.54
07	Coffee, tea, cocoa, spices, and manufactures thereof	7.48	11**	2.26	12.98
08	Feeding stuff for animals (not including unmilled cereals)	6.81	0	7.56	7.16
09	Miscellaneous edible products and preparations	25.52	31.53	30.05	31.29
11	Beverages	0.02	0	0.03	0.04
12	Tobacco and tobacco manufactures	0.01		0	31.24
21	Hides, skins and furskins, raw	0	0	0	0
22	Oil-seeds and oleaginous fruits	5*		4***	5****
23	Crude rubber (including synthetic and reclaimed)	0	0	0	0.01
24	Cork and wood	0	0**	0	0.01
25	Pulp and waste paper	0	0	0***	0

Table C.2: Potential Tariffs Applied to Turkish Imports from the UK in Selected Models

Product Group Code	Product Group Name	Turkey's Tariffs Applied to the UK's Exports	Turkey's Tariffs Applied to Norwegian Exports	Turkey's Tariffs Applied to Swiss Exports	Turkey's MFN Tariffs Applicable to the UK's Exports
26	Textile fibres (other than wool taps and other combed wool) and their wastes (not manufactured into yarn or fabric)	0	0**	0	3.86
27	Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)	0	0	0	0.02
28	Metalliferous ores and metal scrap	0	0	0	0
29	Crude animal and vegetable materials, n.e.s.	4.05	9.88	6.36	4.67
32	Coal, coke and briquettes	0	0**	0***	0
33	Petroleum, petroleum products and related materials	0	0**	0	1.17
34	Gas, natural and manufactured	0	0	0	0
35	Electric current				
41	Animal oils and fats	1.81	0	0	2.7
42	Fixed vegetable fats and oils, crude, refined or fractionated	21.04	12**	14.38	21.04

Table C.2: Potential Tariffs Applied to Turkish Imports from the UK in Selected Models

Product Group Code	Product Group Name	Turkey's Tariffs Applied to the UK's Exports	Turkey's Tariffs Applied to Norwegian Exports	Turkey's Tariffs Applied to Swiss Exports	Turkey's MFN Tariffs Applicable to the UK's Exports
43	Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.	6.01	8.46	35.09	9.8
51	Amine-function compounds	0.76	0	0	6.23
52	Inorganic chemicals	0	0	0	5.11
53	Dyeing, tanning and colouring materials	0	0	0	5.9
54	Medicinal and pharmaceutical products	0	0	0	0
55	Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations	0	0	0	2.3
56	Fertizilers (other than those of group 272)	0	0	0	5.9
57	Plastics in primary forms	0	0	0	5.54
58	Plastics in non-primary forms	0	0	0	6.23
59	Chemical materials and products, n.e.s.	0.14	0	0	5.01
61	Leather, leather manufactures, n.e.s., and dressed furskins	0	0	0	3.99
62	Rubber manufactures, n.e.s.	0	0	0	2.89

Table C.2: Potential Tariffs Applied to Turkish Imports from the UK in Selected Models

Product Group Code	Product Group Name	Turkey's Tariffs Applied to the UK's Exports	Turkey's Tariffs Applied to Norwegian Exports	Turkey's Tariffs Applied to Swiss Exports	Turkey's MFN Tariffs Applicable to the UK's Exports
63	Cork and wood manufactures (excluding furniture)	0	0	0	4.04
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	0	0	0	0.03
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0	0	0	5.7
66	Non-metallic mineral manufactures, n.e.s.	0	0	0	1.9
67	Iron and steel	0	0	0	13.48
68	Non-ferrous metals	0	0	0	4.65
69	Manufactures of metals, n.e.s.	0	0	0	3.08
71	Power-generating machinery and equipment	0	0	0	3.56
72	Machinery specialized for particular industries	0	0	0	0.59
73	Metalworking machinery	0	0	0	2.59
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	0	0	0	2.24
75	Office machines and automatic data-processing machines	0	0	0	0.19
76	Telecommunications and sound-recording and reproducing apparatus and equipment	0	0	0	3.25

Table C.2: Potential Tariffs Applied to Turkish Imports from the UK in Selected Models

Product Group Code	Product Group Name	Turkey's Tariffs Applied to the UK's Exports	Turkey's Tariffs Applied to Norwegian Exports	Turkey's Tariffs Applied to Swiss Exports	Turkey's MFN Tariffs Applicable to the UK's Exports
77	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	0	0	0	1.92
78	Road vehicles (including air-cushion vehicles)	0	0	0	6.51
79	Other transport equipment	0	0	0	2.48
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fitting, n.e.s.	0	0	0	2.94
82	Furniture, and parts thereof; bedding, mattress supports, cushions and similar stuffed furnishings	0	0	0	1.77
83	Travel goods, handbag and similar containers	0	0	0	4.9
84	Articles of apparel and clothing accessories	0	0	0	11.41
85	Footwear	0	0**	0	10.01
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	0	0	0	1.7

Table C.2: Potential Tariffs Applied to Turkish Imports from the UK in Selected Models

Product Group Code	Product Group Name	Turkey's Tariffs Applied to the UK's Exports	Turkey's Tariffs Applied to Norwegian Exports	Turkey's Tariffs Applied to Swiss Exports	Turkey's MFN Tariffs Applicable to the UK's Exports
88	Photografic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	0	0	0	4.45
89	Miscellaneous manufactured articles, n.e.s.	0	0	0	3.55
96	Coin (other than gold coin), not being legal tender	0*			0****
97	Gold, non-monetary (excluding gold ores and concentrates)	0			0

Source: World Integrated Trade Solution

* The latest available tariff data for "22"=2016; "96"=2018.

** The latest available tariff data for "02"=2010; "06"=2004; "07"=2018; "24"=2017; "26"=2018; "32"=2017; "33"=2017; "42"=2000; "85"=2018.

*** The latest available tariff data for "22"=2010; "25"=2018; "32"=2009.

**** The latest available tariff data for "22"=2016; "96"=2018.

D. ESTIMATED IMPACTS OF POTENTIAL SCENARIOS IN TERMS OF SITC REVISION 3 2-DIGIT SECTORS

Table D.1: Potential Effects of the Tariff Changes on Turkish Exports to the UK in Selected Models in real terms (US Dollars)

Product Group Code	Product Group Name*	Norwegian Model	Swiss Model	WTO Model
01	Meat and meat preparations	-2,916	277	-65
02	Dairy products and birds' eggs	78	-860	0
03	Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof	0	0	-75,535
04	Cereals and cereal preparations	369	9,209	-7,338
05	Vegetables and fruit	-273,768	-148,094	-207,686
06	Sugars, sugar preparations and honey	4,018	13,053	-37,413
07	Coffee, tea, cocoa, spices, and manufactures thereof	-11,646	-1,003	-3,001
09	Miscellaneous edible products and preparations	-13,589	-	-9,320
11	Beverages	177	-20,309	-2,589
12	Tobacco and tobacco manufactures	0	-157,398	-16,565
26	Textile fibres (other than wool taps and other combed wool) and their wastes (not manufactured into yarn or fabric)	0	0	-1,499
27	Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)	0	0	-770
28	Metalliferous ores and metal scrap	0	0	0
33	Petroleum, petroleum products and related materials	0	0	0

Table D.1: Potential Effects of the Tariff Changes on Turkish Exports to the UK in Selected Models in real terms (US Dollars)

Product Group Code	Product Group Name*	Norwegian Model	Swiss Model	WTO Model
42	Fixed vegetable fats and oils, crude, refined or fractionated	-6214	-1,794	-395
43	Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.	0	-535	-42
51	Amine-function compounds	0	0	-5,570
52	Inorganic chemicals	0	0	-17,441
53	Dyeing, tanning and colouring materials	0	0	-6,556
54	Medicinal and pharmaceutical products	0	0	0
55	Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations	0	0	-6,865
56	Fertizilers (other than those of group 272)	0	0	-13
57	Plastics in primary forms	0	0	-7,200
58	Plastics in non-primary forms	0	0	-73,216
59	Chemical materials and products, n.e.s.	-2,883	180	-3,927
62	Rubber manufactures, n.e.s.	0	0	-32,472
63	Cork and wood manufactures (excluding furniture)	0	0	-1,464
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	0	0	-1,135
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0	0	-314,520
66	Non-metallic mineral manufactures, n.e.s.	0	0	-60,574
67	Iron and steel	0	0	-3,089
68	Non-ferrous metals	0	0	-112,374
69	Manufactures of metals, n.e.s.	0	0	-91,330

Table D.1: Potential Effects of the Tariff Changes on Turkish Exports to the UK in Selected Models in real terms (US Dollars)

Product Group Code	Product Group Name*	Norwegian Model	Swiss Model	WTO Model
71	Power-generating machinery and equipment	0	0	-19,243
72	Machinery specialized for particular industries	0	0	-8,267
73	Metalworking machinery	0	0	-2,178
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	0	0	-22,317
76	Telecommunications and sound-recording and reproducing apparatus and equipment	0	0	-554,762
77	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	0	0	-323,408
78	Road vehicles (including air-cushion vehicles)	0	0	-2,282,859
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fitting, n.e.s.	0	0	-58,887
82	Furniture, and parts thereof; bedding, mattress supports, cushions and similar stuffed furnishings	0	0	-10,721
84	Articles of apparel and clothing accessories	0	0	-2,025,285
89	Miscellaneous manufactured articles, n.e.s.	0	0	-77,533
97	Gold, non-monetary (excluding gold ores and concentrates)	0	0	0
	Total	-300,780	-313,362	-6,485,423

Source: UN Comtrade Database, World Integrated Trade Solution and Authors' Calculations

* The rest of SITC Revision 3 2-Digit Product Groups cannot be calculated due to lack of data.

Table D.2: Potential Effects of the Tariff Changes on Turkish Imports from the UK in Selected Models in real terms (US Dollars)

Product Group Code	Product Group Name*	Norwegian Model	Swiss Model	WTO Model
02	Dairy products and birds' eggs	-1,124,235	247,488	-2,409
03	Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof	6,235	6,235	-64
04	Cereals and cereal preparations	8,904	8,048	-11,393
05	Vegetables and fruit	-20,985	-17,831	-27
07	Coffee, tea, cocoa, spices, and manufactures thereof	-9,332	13,839	-14,581
08	Feeding stuff for animals (not including unmilled cereals)	11,612	-1,279	-597
09	Miscellaneous edible products and preparations	-99,366	-74,896	-95,398
11	Beverages	375	-187	-375
12	Tobacco and tobacco manufactures	0	84	-262,121
21	Hides, skins and furskins, raw	0	0	0
23	Crude rubber (including synthetic and reclaimed)	0	0	-89
24	Cork and wood	0	0	-0
25	Pulp and waste paper	0	0	0
26	Textile fibres (other than wool taps and other combed wool) and their wastes (not manufactured into yarn or fabric)	0	0	-8,683
27	Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)	0	0	-154
28	Metalliferous ores and metal scrap	0	0	0
32	Coal, coke and briquettes	0	0	0
33	Petroleum, petroleum products and related materials	0	0	-10,042
34	Gas, natural and manufactured	0	0	0
41	Animal oils and fats	1,314	1,314	-646
42	Fixed vegetable fats and oils, crude, refined or fractionated	995	733	0

Table D.2: Potential Effects of the Tariff Changes on Turkish Imports from the UK
in Selected Models in real terms (US Dollars)

Product Group Code	Product Group Name*	Norwegian Model	Swiss Model	WTO Model
43	Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.	-617	-7,319	-954
51	Amine-function compounds	20,604	20,604	-148,292
52	Inorganic chemicals	0	0	-10,877
53	Dyeing, tanning and colouring materials	0	0	-153,192
54	Medicinal and pharmaceutical products	0	0	0
55	Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations	0	0	-74,908
56	Fertizilers (other than those of group 272)	0	0	-3,921
57	Plastics in primary forms	0	0	-247,687
58	Plastics in non-primary forms	0	0	-130,805
59	Chemical materials and products, n.e.s.	5,373	5,373	-186,907
62	Rubber manufactures, n.e.s.	0	0	-46,822
63	Cork and wood manufactures (excluding furniture)	0	0	-639
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	0	0	-752
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0	0	-192,087
66	Non-metallic mineral manufactures, n.e.s.	0	0	-35,003
67	Iron and steel	0	0	-1,079,761
68	Non-ferrous metals	0	0	-75,715
69	Manufactures of metals, n.e.s.	0	0	-115,582
71	Power-generating machinery and equipment	0	0	-1,951,955
72	Machinery specialized for particular industries	0	0	-23,675

Table D.2: Potential Effects of the Tariff Changes on Turkish Imports from the UK
in Selected Models in real terms (US Dollars)

Product Group Code	Product Group Name*	Norwegian Model	Swiss Model	WTO Model
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	0	0	-178,506
75	Office machines and automatic data-processing machines	0	0	-1,087
76	Telecommunications and sound-recording and reproducing apparatus and equipment	0	0	-27,810
77	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	0	0	-126,293
78	Road vehicles (including air-cushion vehicles)	0	0	-1,678,969
83	Travel goods, handbag and similar containers	0	0	-602
84	Articles of apparel and clothing accessories	0	0	-28,161
85	Footwear	0	0	-2,563
97	Gold, non-monetary (excluding gold ores and concentrates)	0	0	0
	Total	-1,199,124	202,204	-6,930,104

Source:UN Comtrade Database, World Integrated Trade Solution and Authors'
Calculations

* The rest of SITC Revision 3 2-Digit Product Groups cannot be calculated due to lack of data.

E. TURKISH SUMMARY / TÜRKÇE ÖZET

Avrupa Birliği (AB), Türkiye'nin en büyük ticaret partnerlerinden birisi olarak Türkiye'nin 2018 toplam ihracatının yarısının gerçekleştirildiği ülke/ülke gruplarından birisi olarak karşımıza çıkmaktadır. AB ve AB üyesi olmayan ülkeler arasında Türkiye'nin en büyük ikinci ihracat partneri 11,1 milyar Amerikan Dolarına (Dolar) eşdeğer ihracat ile Birleşik Krallık'tır (BK). Diğer taraftan, Türkiye'nin AB'den ithalatı, dünyadan toplam ithalatının üçte birine denk gelmektedir. 2018 yılında Türkiye'nin BK'den 7,5 milyar Dolar değerindeki ithalatı BK'yi Türkiye'nin en büyük yedinci ithalat partneri haline getirmiştir. Bu hususlar çerçevesinde, Türkiye'nin BK ile yaptığı ticaret sonucunda ülke bazında (2018 yılı için 3,6 milyar Dolar değerinde) en yüksek ikinci ticaret fazlası ortaya çıkmıştır. Dolayısıyla, BK marketi Türkiye için dinamik ve büyüyen bir market olarak nitelendirilebilecektir. Nitekim, 1989 ve 2018 yılları arasında Türkiye'nin BK'ye ihracatı yıllık olarak ortalama yüzde 11,6; ithalatı ise yüzde 10,6 ile büyümüştür.

Türkiye 1996 yılından bu yana AB ile Gümrük Birliği Anlaşmasının koşullarına göre ticaret yapmaktadır. Bu kapsamda, Türkiye'nin AB piyasasına ticaret ile ilgili herhangi bir kısıtlamaya tabi olmadan erişimi bulunmaktadır. Bu durum, Türkiye'nin sanayi ürünleri ve işlenmiş tarım ürünleri gibi birçok mal grubunda herhangi bir tarifeye tabi olmadan AB ile ticaret yapması anlamına gelmektedir. Tarım ürünleri gibi bazı ürün grupları için her iki tarafça belirli miktarda tarife uygulanabilmektedir. Diğer taraftan, Gümrük Birliği'nin bir parçası olması ve bu kapsamda Ortak Dış Tarife Politikası uygulanması nedeniyle Türkiye'nin AB dışındaki üçüncü taraflar ile ticaret yaparken AB ile ortak bir tarife yapısının mevcut olması gerekmektedir.

BK 1973 yılından bu yana AB'nin bir üyesi olması dolayısıyla Türkiye'nin BK ile olan ticareti de Gümrük Birliği Anlaşmasının koşullarına göre gerçekleştirilmektedir.

Söz konusu ticaret ilişkisinin devamlılığı 2016 yılında BK'de gerçekleştirilen bir referendum sonucunda riske girmiştir. Bu referandumda Birleşik Krallık halkı AB'den ayrılmak istediklerine dair oy vermis ve bu durum çoğunlukla Brexit olarak da bilinen BK'nin AB'den ayrılma sürecini başlatmıştır. Bu sürecin sonunda Türkiye ile BK farklı koşullar altında ticaret yapmak zorunda kalabilecekti.

Bir üyenin AB'den ayrılması AB Anlaşmasının 50 inci maddesi ile düzenlenmektedir. Bu madde çerçevesinde, bir üyenin AB'den ayrılmaya dair kararını AB'ye bildirimesi ve buna istinaden AB ile ayrılmak isteyen üye arasında ayrılmadan sonraki ilişkinin nasıl olacağına dair müzakerelerin gerçekleştirilmesi gerekmektedir. Müzakereler sonunda bir anlaşmaya varılması halinde anlaşma ile; anlaşmaya varılamaması halinde ise bildirim tarihinden 2 yıl sonrasında AB'den ayrılma gerçekleşmektedir.

AB ile BK arasındaki müzakereler BK'nin Mart 2017'deki bildirimine istinaden başlamıştır. Müzakerelerde iki aşamalı bir yaklaşım benimsenmiştir. İlk aşamada bir ayrılma anlaşması imzalanacak ve sonrasında bir geçiş süreci ile ayrılma tamamlanacaktı. Müzakereler esnasında AB ile BK arasında taslak bir Ayrılma Anlaşması hazırlanmış ancak BK tarafında yeteri destek sağlanamadığı için imzalanamamıştır. Sonrasında birtakım süre uzatımları, anlaşma metninde çeşitli değişiklikler ve BK tarafında yönetim değişikleri sonucunda bu süreç 31 Ocak 2021 tarihinde sonlandırılmıştır. 1 Şubat 2021 itibarıyla tarafların gelecek ilişkilerinin detayları üzerinde müzakere yürütecekleri geçiş süreci başlamıştır. Bu süreç sonucunda da AB ile BK arasında insanların, sermayenin, mal ve hizmetlerin serbest dolaşımını durduran AB ve BK Ticaret ve İş Birliği Anlaşması imzalanarak yürürlüğe girmiştir. Ancak bahse konu anlaşma, AB ile BK arasında herhangi bir tarife ya da kotaya tabi olmadan mal ticareti yapılmasına olanak sağlamaktadır. Ayrıca, veri koruma rejimi ve finansal hizmetler gibi üzerinde tartışılmaya devam eden birtakım konular da bulunmaktadır. Söz konusu anlaşma paralelinde BK ile Türkiye arasında da koşulları Gümrük Birliği Anlaşmasının devamı niteliğinde olan bir serbest ticaret anlaşması imzalanarak yürürlüğe girmiştir.

Brexit sürecinde, AB ile BK'nin gelecek ilişkisini belirleyecek farklı senaryolar gündeme gelmiştir. Norveç Modeli, İsviçre Modeli, Dünya Ticaret Örgütü (DTÖ) Modeli ve Türkiye Modeli bu modellerin arasında yer almaktadır. Her bir modelin AB ile BK için farklı çıkarımları bulunmaktadır. Örneğin, Norveç Modelinde insanların, sermayenin, mal ve hizmetlerin AB ile BK arasında serbest bir şekilde dolaşması mümkün olabilecekken BK, AB dışındaki ülkelere karşı tarifelerini belirleme konusunda yetkili olabilecekti. İsviçre Modelinde AB ile BK arasında konu bazlı anlaşmalarla gelecek ilişkiler belirlenebilecekti. DTÖ Modelinde AB ile BK arasındaki ticarette uygulanacak koşullar DTÖ'nün En Çok Kayrılan Ülke Kurallarına göre belirlenecekti. Ayrıca, Türkiye Modelinde AB ile BK arasında Türkiye ile AB arasındakine benzer bir gümrük birliği anlaşmasının imzalanması ve bunun sonucunda da AB ile BK'nin tarımsal ürünler dışındaki ürün gruplarında herhangi bir tarifeye tabi olmadan ticaret yapması mümkün olabilecekti. Dolayısıyla bu alternatiflerden Türkiye'nin BK ile ticaretinin farklı şekillerde etkilenmesi oldukça muhtemeldir.

Türkiye'nin dış ticaretine yönelik olarak yapılan literatür taraması sonucunda bu kapsamdaki çalışmalar üç grupta sınıflandırılmıştır. İlk grupta Türkiye'nin ticaretinde ihracat ve ithalat fonksiyonlarının tahminine yönelik olarak 2000 yılı sonrasında yapılan çalışmalara odaklanılmıştır. Bu çalışmaların bazılarının sadece ihracat ya da ithalat fonksiyonunu tahmin ettiği; bazılarının ise her ikisini analiz ettiği görülmüştür. İkinci grupta Türkiye'nin AB ile ticaretini analiz etmeye yönelik olan çalışmalar ele alınmıştır. Bu gruptaki çalışmaların çoğunluğunun odak noktasında Gümrük Birliği Anlaşması olmasına rağmen, farklı bakış açıları hakimdir. Bazı çalışmaların Gümrük Birliğinin Türkiye'nin AB ya da üçüncü taraflar ile olan ticaretine etkisini ve bazı çalışmaların Gümrük Birliği Anlaşmasının tarımsal ürünleri de kapsayacak şekilde genişletilmesi halinde ne olacağını ele aldığı görülmüştür Son grupta ise Türkiye'nin BK ile olan ticareti ve Brexit süreci ile ilişkili çalışmalar bulunmaktadır. Bu çalışmaların bazı durumlarda Brexit'in BK ile başka bir ülke arasındaki ticarete odaklandığı ve bazı durumlarda Brexit'in başka bir ülkenin genel ekonomisine yönelik etkileri analiz etmeye çalıştığı anlaşılmıştır. Yapılan çalışmalarda Türkiye'ye de yer veren birtakım çalışmaların olduğu tespit edilmiştir. Dhingra et al. (2016) tarafından

yapılan çalışmada Türkiye'nin AB üyesi olmayan ülkelerden birisi olarak Brexit'ten fayda sağlayabileceği öne sürülmüştür. Oliver (2016) tarafından AB ile BK arasında Brexit sürecinden ortaya çıkacak durumun Türkiye için AB ile ilişkilerinde yeni bir alternatif oluşturacağı iddia edilmiştir. Son olarak, Kol (2021) tarafından Türkiye ile BK arasında imzalanan serbest ticaret anlaşmasına ragmen, Türkiye'nin BK ile olan ticaretinde uygulanacak bürokratik süreçler dolayısıyla Brexit'in ilave maliyetler getirdiği belirtilmiştir.

Dolayısıyla, Brexit ve Brexit'in Türkiye'ye etkisine yönelik yapılan literatür taraması sonucunda, bu konudaki çalışmaların sınırlı sayıda olduğu görülmüştür. Hatta, Brexit'in etkileri açısından analitik bir çerçevede Türkiye'ye odaklanmış ve Brexit'İn potansiyel etkilerini sayısal bir bakış açısı ile değerlendiren herhangi bir çalışma olmadığı tespit edilmiştir. Buna ilave olarak, Türkiye'nin BK ile ticaretine odaklanmış herhangi bir ampirik çalışmaya da denk gelinmemiştir.

BK'nin Türkiye'nin ticaret partnerleri arasındaki önemi dikkate alındığında, birtakım soruların cevaplanmasının önemli olabileceği değerlendirilmiştir: Türkiye'nin BK ile olan ticaretinin sektörel yapısı nasıldır?, Ticaretin temel belirleyicileri olarak nitelendirilen birtakım değişkenler Türkiye ile BK arasındaki ticareti nasıl etkileyecektir? Bunlara ilave olarak Brexit süreci de birtakım yeni soruları ortaya çıkarmıştır: AB ile BK arasında mevcut anlaşmadan farklı bir anlaşmaya ulaşılmış olması halinde Türkiye'nin BK ile olan ticareti bu durumdan nasıl etkilenecekti?, Söz konusu anlaşmada olumsuz yönde meydana gelebilecek muhtemel bir değişiklik Türkiye ile BK arasındaki ticareti nasıl etkileyebilecektir? Bu tez sayılan sorulara cevap bulunabilmesine yönelik bir çalışmadır. Diğer bir ifadeyle, bu tez, Türkiye'nin BK ile olan ticaretinin sektörel yapısını, söz konusu ticareti etkileyen faktörleri ve Brexit müzakereleri sonucunda farklı bir sonuç çıktığında, bu durumun Türkiye'nin BK ile ticaretini nasıl etkileyebileceğini incelemeye yönelik bir çalışmadır.

Bu çalışmada öncelikli olarak Türkiye'nin BK ile olan ticareti yıllar ve ürün grupları bazında incelenmiştir. Buna göre, Gümrük Birliği Anlaşması ile birlikte Türkiye'nin BK ile ticaretinin artış gösterdiği görülmektedir. 1996-2000 yılları arasında,

Türkiye'nin BK'ye olan ihracatının ortalama yıllık büyüme oranı yüzde 12; Türkiye'nin BK'den olan ithalatının ortalama yıllık büyüme oranı ise yüzde 10 olarak hesaplanmıştır. 2000 yılı sonrasında Türkiye'nin BK ile ticaret yapısında bir değişiklik meydana gelmiştir. Nitekim, 2000 yılı öncesinde Türkiye BK karşısında dış ticaret açığı verirken 2000 yılı sonrasında bu durum tersine dönmüştür. Hatta yıllar içerisinde verilen fazla miktarının arttığı görülmüştür. 2001 yılında Türkiye BK ile ticaretinde 261 milyon Dolar değerinde fazla vermiş ve bu tutar Türkiye'nin BK ile ticaret miktarının yüzde 6'sına denk gelmiştir. 2018 yılına gelindiğinde ise Türkiye'nin BK ile ticaretinde 3,6 milyar Dolar değerinde fazla verdiği ve bu fazla miktarının da BK ile ticaretinin yüzde 20'sine denk geldiği görülmektedir. Dolayısıyla, 2018 yılındaki dış ticaret fazlasının 2001 yılındaki dış ticaret fazlasının 13 katı olduğu söylenebilecektir. Ayrıca, BK'ye yapılan ihracatın 1989 yılından 2018 yılına kadar yaklaşık 30 yılda yüzde 25 oranında bir artış; BK'den yapılan ithalatın ise söz konusu periyotta yüzde 38'lik bir azalış gösterdiği ortaya çıkmıştır. Son olarak, Türkiye'nin BK ile toplam ticaretinin Türkiye'nin GSYİH'si içerisindeki payının yıllar içerisinde değişiklik gösterdiği; ancak 2018 yılında en yüksek ikinci değerine, yüzde 2.4'e, ulaştığı görülmektedir.

Sektörel açıdan bakıldığında, Türkiye'nin BK'ye yaptığı ihracat içerisindeki en büyük payın makine ve ulaşım ekipmanları ve imalat ürünlerine ait olduğu tespit edilmiştir. Bu sektörlerin toplam BK'ye yapılan toplam ihracat içerisindeki payı yüzde 80'den fazlaya denk gelmektedir. BK'ye yapılan ihracat tutarı, Türkiye'nin dünyaya yaptığı toplam ihracatın yaklaşık yüzde 10'u kadardır. Ayrıca, bu ürün gruplarının ihracatı 2000 yılından sonra önemli miktarda artış gösterirken diğer ürün gruplarında daha ılımlı artışlar yaşanmıştır. Diğer taraftan, Türkiye'nin BK'den yaptığı ithalatta sektörel yapı incelendiğinde, en fazla ithalatı yapılan ürün grupları arasında yine makine ve ulaşım ekipmanlarının, kimsayallar ve yakıt dışındaki ham maddelerin olduğu görülmektedir. Anılan ürün gruplarından ilk grubu BK'den yapılan toplam ithalatın neredeyse yarısına denk gelmektedir. Son olarak Türkiye tarafından BK'den yapılan ithalata uygulanan tarifelerin en yüksek olduğu ürün grubu yüzde 25 ile gıda ve canlı hayvanlar olduğu tespit edilmiştir.

Ayrıca, Türkiye'nin BK ile olan ticaretini etkileyen faktörlere yönelik bir analiz yapılmıştır. Analiz esnasında ilk modelleri Goldstein ve Khan tarafından ortaya çıkarılan talep fonksiyonları kullanılmıştır. Bu kapsamda, Türkiye'nin ihracat ve ithalatına dair talep fonksiyonları, 2 basamaklı SITC 3. Revizyon ürün grupları için 2002[16]-2018 periyodu yıllık verileri kullanılarak tahmin edilmiştir. Türkiye'nin ve BK'nin katma değerleri, Türkiye'nin ve Dünya'nın ihracat ve ithalat fiyat endeksleri, döviz kuru, yerel PPI'lar, GDP'ler ve tarifeler açıklayıcı değişken olarak ihracat ve ithalat fonksiyonlarında kullanılmıştır.

Söz konusu değişkenlere yönelik veriler farklı veritabanlarından temin edilmiştir. Bu veritabanlarının arasında TÜRKSTAT, EUROSTAT, UNCTAD, WITS, WDI gibi ulusal ve uluslararası veritabanları bulunmaktadır. Elde edilen verilerden dünya ihracat ve ithalat fiyatları, Türkiye ve BK'nin GDP'si dışındaki verilerin tamamı sektörel kırılımda kullanılmıştır. Türkiye'nin ve BK'nin PPI ve katma değer gibi bazı değişkenlerine yönelik veriler farklı sınıflandırmalarda erişilebilmiş olup bu değişkenlerin verilerinin SITC 3. Revizyon ürün grupları bazında elde edebilmesi amacıyla çeşitli dönüşüm yöntemleri uygulanmıştır. Ayrıca, döviz kuru ve tarifeler dışındaki tüm değişkenler logaritmik halde kullanılırken döviz kuru ve tarife değişkenleri seviyesi formunda kullanılmıştır. Analizin tamamı Stata 15.1 yazılımı kullanılarak gerçekleştirilmiştir.

Panel veri analizi ihracat fonksiyonunda kullanılan 39 ürün grubu Türkiye'nin BK'ye ihracatının yüzde 92'sini ve ithalat fonksiyonunda kullanılan 43 ürün grubu ise Türkiye'nin BK'den ithalatının yüzde 90'nını kapsamaktadır. Tahmin esnasında her iki fonksiyon için de sabit etkiler tahmin yöntemi esas alınmıştır. Söz konusu modeller otokorelasyon, heteroskedastisite ve panel yatay kesit bağımlılık açısından çeşitli testlere tabi tutulmuştur. Yapılan testler sonucunda hem ihracat hem de ithalat talep fonksiyonunda otokorelasyon, heteroskedastisite ve panel yatay kesit bağımlılığının

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[16] İthalat talep fonksiyonunun tahmin edilmesinde kullanılan verilerde yaşanan eksiklikler nedeniyle analiz 2003-2018 yılları arasını kapsamaktadır.

mevcut olduğu sonucuna ulaşılmıştır. Buna istinaden, tahmin yapılırken Parks ve Kmenta ile Driscoll ve Kraay yaklaşımları baz alınmıştır.

Tablo E.1: İhracat Talep Fonksiyonu için Tahmin Sonuçları

Metot	Parks ve Kmenta		Driscoll ve Kraay
	Alternatif 1: Heteroskedastisite & Yatay Kesit Bağımlılığı & Ortak Otokorelasyon Parametresi ile Düzeltilmiş	**Alternatif 2:** Heteroskedastisite & Yatay Kesit Bağımlılığı & Yatay Kesite Özgü Otokorelasyon Parametresi ile Düzeltilmiş	Heteroskedastisite & Yatay Kesit Bağımlılığı & Otokorelasyon için Düzeltilmiş
$lnEPT_{it}$	-0,740*** (0,075)	-0,531*** (0,088)	-0,799*** (0,121)
$lnEPW_t$	0,763*** (0,277)	0,841*** (0,213)	-0,344 (0,371)
$lnVAUK_{it}$	0,562** (0,247)	0,667*** (0,184)	-0,401 (0,230)
$lnPPIUK_{it}$	0,934* (0,493)	0,439 (0,418)	2,650*** (0,589)
ER_{it}	-0,067 (0,106)	0,357*** (0,113)	-0,679*** (0,159)
$TRFUK_{it}$	-0,007*** (0,001)	-0,008*** (0,002)	-0,004 (0,005)
$lnGDPUK_t$	3,597*** (0,827)	3,839*** (0,434)	4,574*** (0,326)
Sabit	2,603 (2,136)	1,911 (1,421)	4,229** (1,804)
N	663	663	663

Kaynak: Yazarın hesaplamaları
* p<0,1; ** p<0,05; *** p<0,01
Standart sapmalar parantez içerisinde gösterilmiştir.

Detayları Tablo E.1.'de gösterilen analiz sonuçlarına göre; BK'nin Türkiye'ye uyguladığı tarifeler Türkiye'nin ihracat talebinde sınırlı bir etkiye sahiptir. Benzer şekilde, döviz kurunun etkisi de sınırlı olarak ölçülmüştür. Ayrıca, Türkiye'nin ihracat fiyatları, BK'nin katma değer değişkeni, Dünya ihracat fiyatları ve BK'nin genel ekonomik faaliyetlerinin Türkiye'nin BK'ye ihracat talebi üzerinde daha etkili olduğu görülmüştür. Türkiye'nin ihracat fiyatları ihracat talebini beklendiği şekilde negatif etkilemektedir. İlaveten, Türkiye'nin ihracat açısından rakiplerinin fiyatlarını temsilen

kullanılan Dünya ihracat fiyatları Türkiye'nin ihracat talebini olumlu bir şekilde etkilemektedir. Ayrıca, yerel fiyat seviyesini temsilen kullanılan BK'nin PPI'sının, pozitif ancak anlamlı olmayan bir şekilde Türkiye'nin ihracat talebini etkilediği görülmüştür. Dolayısıyla, Türkiye'nin BK'ye yaptığı ihracat talep fonksiyonunun tahmininde elde edilen sonuçların ekonomik teori paralelinde olduğu ortaya çıkmıştır. İlginç bir şekilde, BK'deki üretimi temsilen kullanılan BK'nin katma değer değişkeninde pozitif bir katsayı elde edilmiştir. Buna istinaden, Türkiye tarafından BK'ye ihraç edilen ürünlerin BK'nin ürünlerinin ikamesi yerine, bu ürünlere yönelik olarak ara malı niteliğinde olduğu söylenebilecektir. Böylece, BK'deki üretimin artması halinde Türkiye'nin BK'ye ihracatı talebi de artış gösterebilecektir.

Tablo E.2: İthalat Talep Fonksiyonu için Tahmin Sonuçları

Metot	Parks ve Kmenta		Driscoll ve Kraay
	Alternatif 1: Heteroskedastisite & Yatay Kesit Bağımlılığı & Ortak Otokorelasyon Parametresi ile Düzeltilmiş	Alternatif 2: Heteroskedastisite & Yatay Kesit Bağımlılığı & Yatay Kesite Özgü Otokorelasyon Parametresi ile Düzeltilmiş	Heteroskedastisite & Yatay Kesit Bağımlılığı & Otokorelasyon için Düzeltilmiş
$lnIPT_{it}$	-0,694*** (0,136)	-0,810*** (0,141)	-1,314*** (0,282)
$lnIPW_t$	0,056 (0,388)	0,329 (0,543)	-0,669 (0,475)
$lnVAT_{it}$	-0,325** (0,131)	-0,422*** (0,161)	-0,694** (0,289)
$lnPPIT_{it}$	-0,253 (0,204)	-0,024 (0,253)	0,466 (0,406)
ER_{it}	-0,270 (0,183)	0,131 (0,250)	-0,702*** (0,180)
$TRFT_{it}$	-0,023*** (0,007)	-0,035*** (0,007)	-0,016 (0,032)
$lnGDPT_t$	1,592*** (0,380)	1,537*** (0,437)	1,628** (0,650)
Sabit	7,236*** (1,796)	5,341** (2,154)	11,600*** (2,599)
N	688	688	688

Kaynak: Yazarın hesaplamaları
* p<0,1; ** p<0,05; *** p<0,01
Standart sapmalar parantez içerisinde gösterilmiştir.

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Diğer taraftan Tablo E.2'ye göre, Türkiye'nin ithalat fiyatları, katma değer değişkeni ve genel ekonomik faaliyetleri, Türkiye'nin BK'den yaptığı ithalat talebini açıklayan en önemli değişkenlerdir. Ayrıca, her ne kadar daha az bir miktar da olsa Türkiye'nin BK'den ithalatına uyguladığı tarifelerin Türkiye'nin BK'den ithalat talebini etkilediği görülmektedir. Diğer taraftan, Dünya'nın ithalat fiyatları, Türkiye'nin PPI'sı ve döviz kuru değişkenlerinin Türkiye'nin BK'den ithalat talep fonksiyonu üzerinde herhangi bir etkisi olmadığı ortaya çıkmıştır. Dünya ithalat fiyatlarında yaşanan bir düşüşün Türk hanehalklarını alternatif marketlere yönlendirerek, BK'den ithalat yapmaktan caydırabilmesi beklenmektedir. Ancak bu değişkenin anlamlı çıkmaması, Türkiye'nin BK'den ithalatının alternatif marketler ile rekabet halinde olmadığı sonucuna yol açabilecektir. Ayrıca, döviz kurunun Türkiye'nin BK'den ithalat talebinin üzerinde herhangi bir etkisinin olmaması ilginç bir sonuç olabilecektir. Nitekim bu durum, Türk Lirasının dış değerinden bağımsız bir şekilde, Türkiye'nin BK'den ithalat yapmaya devam edebileceği anlamına gelmektedir. Benzer şekilde, Türkiye'nin PPI değişkeninin anlamlı olmaması Türkiye'nin BK'den ithalat yaptığı ürün grupları için önemli bir yerel rekabet olmayabileceğine işaret edebilecektir. Son olarak, Türkiye'nin BK'ye ihracat talebinin yabancı gelir esnekliği, Türkiye'nin BK'den ithalat talebinin yerel gelir esnekliğinden daha yüksek olarak hesaplanmıştır.

Çalışma kapsamında Türkiye'nin BK ile ticaretinin alternatif bir Brexit senaryosunda nasıl etkilenebileceği sorusuna bir cevap bulabilmek adına, analiz bir adım öteye taşınmıştır. Bu çerçevede, tarifelerin ihracat ve ithalat üzerine etkileri, Brexit müzakereleri esnasında öne çıkan Norveç Modeli, İsviçre Modeli ve DTÖ Modeli kapsamında alternatif senaryolar özelinde ele alınmıştır. Bu modellere yönelik yapılan değerlendirmelerin ortak bir sonucu, farklı modellerin ortaya çıkmış olması halinde bu durumdan en çok tarımsal sektörlerin etkilenecek olmasıdır. Adı geçen ilk iki modelden farklı olarak DTÖ Modelinde, makine ve ulaşım ekipmanları ile imalat ürünleri, bu durumdan en çok ürün grupları arasında yer almaktadır. Ayrıca, DTÖ Modelinin hem Türkiye'nin BK'ye ihracatı hem de Türkiye'nin BK'den ithalatı açısından en olumsuz etkiyi ortaya çıkardığı görülmektedir. Diğer taraftan, İsviçre Modelinin Türkiye'nin BK'den ithalatında (ele alınan Modeller arasındaki tek) pozitif

bir etkiye yol açabileceği ortaya çıkmıştır. Ancak, DTÖ Modeli dışındaki modellerin Türkiye'nin BK ile ticaretine potansiyel etkilerinin, kurgulanan temel çerçevede sınırlı olduğu anlaşılmaktadır.

Sonuç olarak, Norveç Modeli ve İsviçre Modeli sonucunda ortaya çıkan durumlarda hesaplanan toplam etkinin, Türkiye'nin BK ile olan ticaretinin küçük bir kısmına (yaklaşık yüzde 1'ine) denk geldiği görülmektedir. Ancak, DTÖ Modeline muhtemel bir geçişin, hem Türkiye'nin BK'ye olan ihracatını (2018 değerleri ile yaklaşık yüzde 5'i kadar) hem de Türkiye'nin BK'den yapılan ithalatını (2018 değerleri ile yaklaşık yüzde 10'u kadar) olumsuz etkileyebileceği sonucuna ulaşılmıştır. Dolayısıyla, her ne kadar BK Türkiye'nin önemli bir ticaret partneri olarak nitelendirilse de, değişen tarifeler dikkate alınarak, Brexit'in alternatif senaryolarının etkilerinin Türkiye ile BK arasındaki ticarete sınırlı bir etkisi olabileceği çıkarılabilecektir. Ancak bu durum, Brexit'in Türkiye ile BK arasındaki ticarete herhangi bir etkisinin olmayacağı ya da değişen tarifelerin Türkiye ile BK arasındaki ticaret üzerinde önemli bir etkisi olmayacağı anlamına gelmemektedir. Belirli sektörler üzerinde bu etkiler daha yoğunlaşmış bir şekilde görülebilecektir. Dolayısıyla, bu konunun ürün ya da sektör bazında analizler ile gelecekte başka çalışmalar ile daha detaylı ele alınmasının faydalı olabileceği düşünülmektedir.

Bu tez, mevcut literature Türkiye'nin BK ile ticareti konusunda ampirik bir model geliştirerek katkı sağlamaktadır. Aynı zamanda, Brexit'in Türkiye'nin BK ile olan ticaretine etkisi de kurgulanan bir ekonometrik model ile ölçülmeye çalışılmıştır. Ancak bu çalışmanın gelecekteki çalışmalar ile daha ileriye taşınmasına yönelik bazı alanlar tespit edilmiştir. Öncelikle, bu çalışma esnasında karşılaşılan en büyük zorluklardan birisi, sektörel bazda farklı değişkenler için veri temin edilmesidir. Bu durum, kullanılan temsili değişkenler ya da ürün grubu sınıflandırmaları arasında dönüşüm yapılması gibi çeşitli girişimler ile çözümlenmeye çalışılmıştır. Bu kapsamda, mevcut çalışma ihracat talep fonksiyonu için 39 ürün grubu ve ithalat talep fonksiyonu için ise 43 ürün grubu ile Türkiye'nin BK ile toplam ticaretinin yüzde 90'nından fazlasını kapsamaktadır. Bu, her ne kadar topluğaştırılmış ürün grupları

kullanılarak sağlanmış olsa da ürün gruplarında toplulaştırmanın yapılmasının belirli detayları maskelediği ve bazı gelişmelerin tespit edilmesini zorlaştırdığı bilinmektedir. Dolayısıyla, gelecekte bu konuda yürütülecek çalışmaların daha detaylı ürün gruplarına odaklanması mümkün olabilecektir.

Son olarak, BK'nin Türkiye'nin ticaret partnerleri arasındaki önemi dikkate alınarak Türkiye'nin BK ile olan ticaretini COVİD 19 pandemisinin, dünya genelindeki ticaret savaşlarının ya da iklim değişikliğinin nasıl etkileyebileceğine dair çalışmaların Türkiye'nin BK ile olan ticaretinin ve uluslararası ticaretinin yapısının daha iyi anlaşılmasına ışık tutabileceği düşünülmektedir.

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