

# THE POLITICAL ECONOMY OF TURKISH-EUROPEAN UNION RELATIONS AND THE MACROECONOMIC IMPACT OF FULL MEMBERSHIP\*

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*This research considers the effects of Turkish entry into the European Union by comparing the impacts of different scenarios. To model the impacts of these scenarios we made use of a general equilibrium modeling framework. The model considers the changes in different macroeconomic indicators and has two important specifications: imperfect competition in the Turkish manufacturing sector and differentiated factors in the production process. The results indicate that full membership appears to be the most beneficial scenario for the Turkish economy. However, the political sensitivities may complicate the efforts to employ appropriate economic policies suggested in this research. (JEL: F150)*

Key Words: Political Economy, General Equilibrium, European Union, Turkey

## 1. INTRODUCTION

A customs union agreement with the European Union (EU) in 1995 raised important questions about the impact of prospective economic integration between Turkey and the EU on the involved economies. Questions centered around the necessary changes both sides have to go through, such as adopting new rules and regulations on the part of Turkey to make Turkish legal and economic system more compatible with that of the EU. They also focused on creating flexibilities around certain regulations on the part of the EU to make the transition easier on Turkey. Equally important were issues regarding the gains and losses each side might incur because of the integration or forming a customs union.

There are the apparent macroeconomic impacts of such a move on the economies in question. Any interaction or a movement in that direction, however, would also require convergence in social and political matters as well. The decisions to join/grant participation carry an undeniable political component which politicians tend to exploit to further their own objectives.

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Even if the desire of the Turkish politicians is to join the union, their efforts during the period immediately preceding full membership has tremendous effects on the eventual decision of the EU in granting full membership status to Turkey. This makes interim period decision making rather crucial for politicians in Turkey as a way to gain access to the union.

The primary transition period adjustment the EU requires of candidate countries is the establishment of "fiscal discipline," the lack of which cripples not only transition economies such as Bulgaria, Romania, and the Slovak Republic, but also most market economies such as Turkey, Pakistan, and Egypt. High fiscal deficits are a primary difficulty (Diao et al., 1998) coupled with government budget deficits, creating the "twin deficits" phenomenon. In the case of an insufficient domestic savings pool, foreign capital must fund the investments. However, countries experiencing a current account balance deficit have difficulty attracting new foreign capital unless they offer higher interest rates or tax breaks or a combination thereof to attract it. Complications arise regarding the source of foreign capital when unification is an issue such as the requirement to stick to common monetary and fiscal policies between Turkey and the EU. Integration is likely to affect such macroeconomic variables as imports, exports, price and investment levels, wage rate, and population. The EU is progressing towards a common monetary policy for its members and expects candidate countries to be compatible with the current member economic standings by the time they are eligible for full membership; hence taking away one policy instrument from candidate countries to correct economic problems. Since fiscal policy is not an answer to all economic questions, especially the ones needing immediate attention, the EU would like to make sure candidate countries have sound fiscal policies before they surrender their monetary independence. Since all these issues are closely related to the budgetary and fiscal independence of a country, a pre-evaluation of such policy decisions should be carefully made. Appropriate forecasting of such policy consequences will improve current and future policy making capabilities of the countries involved. These decisions are also important characteristics in terms of achieving a fair inter-generational resource allocation.

Many of these issues are addressed in the theoretically constructed model of Diao et al. (1988). It is a complete analysis, utilizing a multi-sector general equilibrium model of Turkey's fiscal harmonization process. The study focused on the effects of fiscal debt and trade liberalization on foreign trade, capital accumulation, and the growth rate of Turkey. They used three different experiments. The first evaluated perfectly coordinated fiscal and trade policies, which means all tariffs are eliminated and income tax rates adjusted in order to compensate for tariff revenue losses. Thus, government revenue will be the same. In addition, it was assumed that trade reform has no effect on government expenditure. The second experiment considered reduction of tariff rates and increased wage rates, but delays revenue enhancing policies, such as an increase in the income tax rate for 20 years. The third experiment is the same as the second except the delay in revenue

enhancing policies is 40 years. The results indicate the longer the delay in fiscal policy adjustment, the more harmful tariff liberalization will be.

As part of the adjustment to full membership, the EU considered vital the economic liberalization and harmonization of the Turkish system with that of Europe, forcing Turkey to search for suitable policies. Harrison et al. (1993) defined three types of liberalization options for the Turkish government: across-the-board liberalization, sectoral liberalization, and tariff harmonization to the EU's common external tariff (CET) policy. Turkey went through a comprehensive liberalization process in 1980s (Genc and Sahin, 2001) to boost its chances to be perceived as a compatible candidate for eventual membership. However, problems emerged with respect to the definition of harmonization. Harrison et al. produced different results using different interpretations of harmonization, which is understood by Turkey to reduce tariffs to zero but still allow certain import surcharges on EU products. However, the EU's interpretation is to reduce both tariffs and import surcharges to zero. In this case, harmonization of tariffs is welfare enhancing for Turkey if its interpretation is followed, but welfare-reducing if the EU's interpretation is followed. Moreover, Harrison et al. (1993) claimed that harmonization of tariffs will have very little beneficial effect on Turkey's economy. In order to be successful in liberalization policy, it is important for Turkey to use an export subsidy reduction policy combined with a tariff harmonization policy. We might generalize this result and say that the success of the trade policy reforms depends crucially on reductions in both tariffs and export subsidies. The main conclusion of Harrison et al. (1993) was the fragility of the first-best rule. It is not the case that any partial movement toward the first-best trade policy for Turkey will result in some fraction of the welfare gains from that first-best package. Of course, this is a restatement of the well-known "second-best" rule.

The acceptance of Turkey to the Customs Union, a prelude to the full membership in the future, opened another discussion regarding tariff harmonization. By reducing tariff rates, Turkey will be losing its tariff revenues, but gaining the trust of the EU countries. Is this really beneficial for Turkey? Yeldan (1997) used two types of analyses to capture the welfare implications of a customs union: (i) the implementation of a tariff harmonization program for a customs union, and (ii) the impact of joining the single European market. When Turkey joins the EU, non-tariff barriers will automatically be removed as well as tariff barriers. This will prevent import and export arbitrages, and the firms in both sides of the aisle will be forced to use a single price, in which case, the exclusive role of determining the welfare effects of harmonization will be vested in the price system. It may be a concern to policy makers in situations where price system fails to distribute works the benefits of the integration perfectly across all participants of the market activity in both Turkey and the EU.

In this paper, we analyze the effects of Turkey's accession into the European Union on the primary economic indicators of the Turkish economy. In the following section, we provide a comprehensive historical account of Turkish-EU relationship to establish the foundations of the

discussions to be found in the later parts of the paper. Second, the paper formulates a computable general equilibrium model for the Turkish economy where both imperfect competition in the Turkish manufacturing sector and differentiated factors in the production process are considered. Third, counterfactual equilibrium analyses for a range of policy scenarios are performed. These scenarios are: customs union with the EU, full membership to the EU, full membership with replacement tax, and free trade. Section 5 is the calibration of the analysis and a brief discussion on the data. The results are presented in Section 6, which is followed by a Sensitivity Analysis in Section 7. We conclude the paper in Section 8.

## 2. THE POLITICAL ECONOMY OF TURKISH-EU RELATIONS

### 2.1. A Historical Overview

Turkey's relationship with Europe is a long history of diplomacy, international trade, and culture. This relationship started before the modern Turkish Republic was formed. The Sultans of the Ottoman Empire used diplomatic relations with Europe to help balance power. The geographical location of the Ottoman Empire was very important for other countries, because its territories were a link between the continents of Asia and Europe. The Silk Road was very important for the Russian economy; they had to pass through Ottoman territories in order to go to warm seas. The Ottoman Empire's efforts to maintain good relations with Europe required restrictions of Russian expansion in terms of using the Silk Road, which strained Ottoman-Russian relations, pitting them against each other.

Full integration with Europe has always been the main policy target of Turkey, which was formed after the collapse of its more powerful predecessor, the Ottoman Empire, in 1923. Nevertheless, Turkey failed to secure to be part of the most prestigious political initiative of Europe, namely the EU. Mindful of impotence to impose itself on other countries of the region, Turkey has based its foreign policy on four principles: (i) non-interference in the Middle East, (ii) acceptance of European security systems, (iii) non-interference in the disputes among other countries, and (iv) good relationship with other nations (Muftuler, 1997).

Turkish-Russian relations were further strained as a result of Soviet claims to part of Turkey during World War II. This accelerated Turkish desire to integrate with the West faster, which itself was looking ways to contain the Soviet Union's expansionary policies. NATO accepted Turkey as a member, given its geographic location bordering the Soviet Union and its close proximity to the Middle East. This crucial position was very important for NATO, not only for defense of the Eastern Mediterranean, but also to prevent the Soviet Union's plan of invading Iranian Azerbaijan.

Turkish-Western relations, especially between Turkey and the US, reversed during the late 1960s and early 1970s, partly due to Turkish reaction against an arms embargo imposed by the US and its allies. The deterioration in relations between the two sides was further fueled by

President Johnson's stand on the Cyprus issue, perceived as tilted to the Greek side. Disagreement over the Cyprus issue worsened Turkish-Greek relations and Turkish-EU relations because Greece successfully converted the issue into a Turkish-EU problem. This all played to the hands of those wishing to forge stronger ties between Turkey and the Soviet Union.

Turkey's newly adopted path moved further away from the West following a military coup d'état in 1980, which brought about much closer ties between Turkey and its neighboring states in the Middle East, especially Iran and Iraq. The relatively short-lived friendship between Turkey and its neighbors plummeted to an all time low, thanks to Turkey's position in the Gulf War in 1990. Turkey was seen as a strategic ally by both opposing sides: Iraq and the United Nations (UN) to counteract the opponent's policies. By closing Iraqi oil pipelines, which passed through Turkish territory before Iraqi oil was shipped to the international markets, Turkey effectively supported the NATO attack and economic sanctions against Iraq. This crucial decision, mainly made by then Turkish President Turgut Ozal, was based on a hope its losses due to lost revenues with Iraq would be compensated by the UN. This cost Turkey dearly when the UN failed in its promise. The losses were estimated at sixteen billion dollars in 1990, nine billion dollars in 1991, and twenty billion dollars in 1992 (Muftuler, 1997).

## 2.2. *The Association Agreement: "The Ankara Treaty"*

Turkey and the European Union, then called the European Economic Community (EC), set the tone for the future place of Turkey in Europe with the signing of a treaty, viz. the Ankara Treaty, in 1963. Unfortunately, both Turkey and the EC signed the agreement for political rather than economic reasons. From the Turkish point of view, it was an opportunity to open EC markets; for the EC, it was to maintain balance between Greece and Turkey. The Ankara agreement specified three main stages: i) the preparatory stage, ii) the transitional stage, and iii) the final stage. The preparatory stage was to last between five and eleven years. It was designed as a transition for the Turkish economy without putting any obligation on Turkey. During this period, the EC assisted Turkey to improve its economic development under the agreement conditions. To this end, Community members decreased custom duties for certain import commodities from Turkey. This process led to a significant increase of Turkish trade with the EC in 1968, with more than half of Turkish exports finding their way to the EC (Yalcintas, 1990).

The second stage was a transitional period to try to develop a customs union. It involved harmonization of policies and liberalization of labor and capital movements. This period was designed to last between twelve and twenty-two years. According to the treaty, this stage was the most important step because both sides had to prepare for full membership of Turkey, and adopt a Common External Tariff.

The third and final stage was designed to establish a full customs union between the EC and Turkey. This required Turkey to harmonize its tax structure and accept the Common Agricultural Policy (CAP). Moving from

one stage to another was not automatic, but depended upon completion of requirements and new negotiations.

According to the Ankara Treaty, the preparatory stage might have been completed as early as 1967. Due to disagreements and misunderstandings, it did not end by this date. In 1970, both sides signed another protocol to establish a customs union by the end of 1995. Under this protocol, Turkey had to reduce tariffs on European imports. For tariff reductions, EC and Turkish officials established two lists of goods for Turkish imports from the EC. The duty reductions for the first group of goods were to be implemented within 12 years, with the second group's duty reductions to be implemented in 22 years. In 1973 and 1976, Turkey reduced its duties on EC goods by 10% each year. However, Turkish officials rejected the third reduction, as they felt the EC was not fulfilling its obligations. After this rejection, the EC accepted free accession of Turkish industrial products to the European markets, excluding textile and petroleum goods. They also granted Turkey a zero tariff for 37% of its agricultural exports to the EC. However, a number of problems arose when the protocol went into practice. Among these problems was the "meaning" of agricultural policy harmonization. The Community interpreted this as trade liberalization, but Turkey interpreted it as joining the CAP (Muftuler, 1997). This issue was ambiguous regarding the validity of the agreement. Even though Turkish officials announced Turkey would apply for full membership in 1980, the military takeover on September 12, 1980 froze the full membership application process.

The military ceded power to civilians in 1983, paving the way for full membership application on April 14, 1987. Citing its ongoing internal integration, EC turned down Turkey's application. Also included in the long list of reasons for rejection was the necessity of political pluralism, improvement of human rights, and Turkey's dispute with Greece both on Cyprus and on Aegean Island (Muftuler, 1997).

Commonly held beliefs regarding rejection were not in agreement with the list presented by the EC. Turkey's territorial size was almost equivalent to that of the original Community of Nine, but Turkey was considerably poorer than any other Mediterranean country that had joined the Community previously (Barchard, 1985). The Turkish population, which would be the fifth largest in the Community and was expected to be the largest in the near future, was thought to be another basis for rejection. Cultural and religious differences were also considered to have played a role in the Community's final decision. To stop further erosion of relations, the European Commission adopted a policy package in 1990, proposing a customs union with Turkey by December 31, 1995. At the thirty-fourth Association Council meeting in 1993, Turkey and the EC came to an agreement on a cooperation package. This package involved the free circulation of goods, adaptation of CAP, application for the Common External Tariff, and cooperation in trade related services. Finally, on March 6, 1995, Turkey and the EC signed a customs union agreement in Brussels, which went into operation on January 1, 1996. With this major development, the second stage of the Ankara Treaty officially ended and the final stage had begun.

### 2.3. *Joining the Customs Union*

The customs union agreement was an attempt to strengthen ties since Turkey had 52% of its external trade with the EU, and more than 60% of foreign investments in Turkey came from EU countries. However, both economic and non-economic impediments still stood in the way of Turkey's full membership. A high inflation rate, increasing unemployment, a large government debt and large internal and external debt are major problems to be dealt with by Turkish officials. Human rights violations and freedom of speech can be cited among the main non-economic problems.

In addition to these problems, the customs union agreement placed a number of obligations on Turkey, which can be summarized as: (i) the Turkish parliament must adopt new laws on copyright issues, (ii) import and export duties must be removed completely, and (iii) the tax system should be revised, i.e., indirect taxes, such as sales tax, should be removed and direct taxation should be adopted (Muftuler, 1997). The success of the Turkish government in dealing with these mandates will determine the success of the customs union. Without harmonization of policies between Turkey and the EU, the customs union cannot succeed.

Turkish officials adopted a series of new laws in order to harmonize foreign trade with the EU in joining the customs union. Through this new legislation, Turkey adopted the EU's external trade policies. The new laws dramatically lowered the average protection level from 10.97% to 5.8%, while all custom duties imposed on industrial products from the EU and the European Free Trade Area (EFTA) were abolished. For agricultural goods, trade laws were modified according to GATT regulations. Tariff reductions on agricultural imports were scheduled for completion by the year 2001, and the adoption of copyrights and patent laws were accelerated according to Uruguay Round regulations. In addition to these economic changes, the customs union helped Turkish society to move towards greater democracy. Although some laws concerning human rights were modified, there are still many steps the Turkish democracy must take. Even though the customs union brought a new phase in EU-Turkish relations, whether this will lead to eventual full membership remains a question. For the future, there are three potential scenarios for EU-Turkey relations: (i) implementation of the agreement and eventual membership, (ii) limiting Turkey to preferential agreements with more concessions on trade issues subject to review, but without the guarantee of a fully developed relationship, and (iii) a two-tiered agreement in which Turkey can be accepted for a full membership for certain policy areas, but not others (Muftuler, 1997).

### 3. The Model: A Computable General Equilibrium Approach

In this section, we turn to the analytical framework of a computable general equilibrium model for the Turkish economy (TRCGE). The model explains the impact of Turkey's accession into the European Union under a

neo-classical framework. Following the general rules of CGE modeling, production, foreign trade, income and expenditure relations are explained first, and then calibration and simulation strategies are analyzed. The mathematical formulation of the model is included in the appendix.

The model used in this article is an extension of Yeldan (1997) and Kose (1996). The TRCGE model consists of three different sectors and a differentiated rest of the world (ROW) account. The model has two important specifications. First, it considers imperfect competition in the Turkish manufacturing sector. With this specification, we can differentiate the commodity market into perfect and imperfect competition, and highlight policy implications in terms of these two criteria. Since the main objective of this study is to cover all impacts of membership, the ROW account is differentiated into two sub-accounts: EU countries and non-EU countries.

The second important specification considers differentiated factors in the production process. Labor is differentiated as "formal/organized labor" and "marginal/informal labor". With this specification we can analyze the basic characteristics of two different labor markets, and show linkages between them. The paper defines a distortion parameter as the ratio of wage rates in each sector to average wages in the economy, and calculates this as a parameter in the model. The model relaxes the traditional assumption of the neoclassical framework in terms of equal wage rates in all sectors, and considers wage rigidity in these markets. The labor force in the formal market is so qualified that they do not work for below a certain wage rate.

The decision processes of the model are differentiated as public and private sectors. The Armington assumption and small country perspectives are recognized throughout the model. Import demand for each sector is determined in two stages. In the first stage, domestic production and sectoral import demands are solved in terms of relative prices and exchange rates. In the second stage, the import demand found in the first stage is differentiated into two origins: EU and non-EU imports. This differentiation in imports in terms of origin makes the analysis of Turkish accession into the EU much easier. Because Turkey has to remove all import duties levied on EU commodities and not on non-EU commodities, the custom taxes collected from EU countries and non-EU countries will be put into different categories in order to capture the impacts of the accession to the EU.

The intermediate input demand function is considered as a Leontieff structure, and the production technology is assumed to have multi-level constant elasticity of substitution (MLCES). There are several advantages in working with this function. The main advantage of the CES function is that the elasticity of substitution is constant, but not equal to unity. This condition is a desirable one, because the restriction of unit elasticity of substitution is relaxed, making the function more flexible to work with.

### 4. Policy Scenarios

1) *Customs Union with the EU*: This scenario considers the obligations that Turkey and the EU have made, and assumes both sides fulfill their

obligations. These obligations are determined by the European Council and Common External Tariff rules.

2) *Full Membership to the EU*: This scenario considers Turkey's full accession into the EU. According to the agreement between Turkey and the EU, Turkey will lower tariff rates for EU imports, but continue to impose higher tariff rates for non-EU countries. This reduction in tariff rates causes the Turkish government to lose tariff revenues coming from the EU. However, the EU will compensate the Turkish government for a portion of these losses.

3) *Full Membership plus Replacement Tax*: This scenario analyzes the impacts of full membership with the assumption of an increase in the domestic indirect tax rate. Under this scenario, government losses due to tariff reduction are compensated with an indirect tax rate increase.

4) *Free Trade*: This scenario analyzes the option of free trade. Under this scenario, Turkey will reduce tariff rates for all countries. This reduction in tariff rates does not necessarily mean that tariff rates for all countries should be zero. Tariff rates on average should be asymptotically zero. The reductions are made not only in the tariff rates but also non-tariff barriers such as funds, which should be eliminated completely under this scenario.

Under the customs union scenario, import tariff rates on EU manufacturing goods are reduced completely, and no change is made on the agricultural and services sectors. However, import tariffs on non-EU goods are reduced by 25% in the agricultural sector and 40% in both manufacturing and services sectors. The full membership scenario requires complete elimination of tariffs on EU goods for all sectors. However, only 50% of tariffs will be reduced on non-EU goods. As can be expected, all tariffs are removed under the free trade scenario.

## 5. Calibration and Data

The model has been calibrated using the social accounting matrix prepared by de Santis (1995), representing the benchmark equilibrium of the model. When calibrating the scale and share parameters we make use of Rutherford's (1999) method implemented with GAMS/MINOS5 non-linear solver package. The model starts with the balanced equilibrium for the social accounting matrix as the reference equilibrium, with a set of elasticities taken from available empirical studies such as Harrison et. al., (1993, 1996) and de Santis (1997).

Since data used for the base year does not include quantities, only monetary data are used in the process. For that reason the most common method used is to assume all prices are equal to one. In other words, physical quantities in the base solution are obtained by assuming the price level for each category is equal to unity. After determining the functional forms to be used in the model, the calibration process begins. Although there are different techniques to determine parameter values, the calibration method is the most appropriate technique, because it is much simpler and does not require econometric knowledge.

In the first step of the calibration the matrix collects the quantities appearing in the equations. This is the first reference point in the isoquant of the calibrated. In the second step, relative prices in that year fix the slope of the isoquant in that point. The elasticities showing the curvature of the isoquant are used in the last step of the calibration.

## 6. Results and Discussion

From the beginning of the 1990s, the Turkish economy continuously suffered from macroeconomic problems. One of the main reasons for these problems was the government sector deficit, which was increasing every year. The ratio of government deficit to GDP was 3.5% in 1987. However, this ratio increased to 5.3% in 1991 and 6.7% in 1994, and continued to increase in the following years. During these years, the Turkish economy experienced a decrease in government revenue and import duties became a major component of government revenue. In 1990, for example, 15% of total budget revenue was from these taxes. Although this rate continued to decrease in the following years, it is still high compared to European countries. After the customs union, this ratio dramatically decreased due to the Common External Tariff of the EU, and the Turkish economy experienced problems financing government expenditures (Kose, 1996).

In this section of the paper, the comparison of the scenarios is discussed. Macroeconomic indicators of an economy under different scenarios should be compared to see the impacts of the various policies. The impact of the customs union and full EU membership on the Turkish economy with different policy assumptions is presented in Table 1 and Table 2. The Turkish economy experiences a 2% decrease in GDP under the customs union scenario. This decrease becomes nearly 2.7% under the full access scenario, and 3.4% under the free trade scenario. However, the loss in GDP will almost disappear in the replacement tax scenario. Government revenue also decreases under all scenarios. The reason for this decrease is the elimination of tariffs and tariff-related taxes on imports. The losses in import taxes by origin are shown in Table 2. Under the customs union scenario, almost 99% of tariff revenues from the EU and 63% of fund revenue from the EU will be lost. Also, 25% of tariff revenues from the ROW and 61% of the fund revenues from the ROW will be lost. As explained earlier, however, tariff and fund rates on EU imports will be completely eliminated under the other scenarios, and 40% of tariff revenue, and 63% of fund revenue from the ROW will be lost under the second and third scenarios. All revenues due to tariff and fund, of course, will be lost under the free trade scenario. Public consumption also decreases under all scenarios. This decrease is dramatic under the free trade scenario (34%). Government savings also decrease under all scenario assumptions between 2.7% and 3.4% of the base year value.

Table 1: Economic Indicators of the Turkish Economy Under Different Policy Scenarios

	Base Year Values (Billion TL)	Policy Scenarios (% Change)*			
		Customs Union	Full Membership	Full Membership + Tax	Free Trade
GDP	390,796.6	-2.1	-2.7	-2.8	-3.4
Public Consumption	43,127.6	-20.7	-26.4	-16.5	-33.5
Private Consumption	262,140.5	1.6	1.9	-1.2	2.5
Public Savings	13,692.7	-2.1	-2.7	-2.8	-3.4
Private Savings	76,141.1	0.5	0.5	-9.2	0.7
Public Investment	34,228.8	0.0	0.0	0.0	0.0
Private Investment	68,458.6	2.3	2.7	1.0	3.6
Exports to the EU	24,706.6	11.0	13.7	3.6	15.2
Exports to the ROW	27,457.4	2.2	3.5	-4.2	5.6
Imports from the EU	34,392.8	5.9	14.6	1.8	9.4
Imports from the ROW	48,095.3	2.2	-1.5	-4.1	4.0
Exchange Rate (TL/\$)	2630.0	11.6	14.4	13.0	18.7

\* Please refer to the Section 4 for detailed explanation of the Policy Scenarios

Table 2: Government Income and Expense Balance Under Different Policy Scenarios

	Base Year Values (Billion TL)	Policy Scenarios (% Change)*			
		Customs Union	Full Membership	Full Membership + Tax	Free Trade
<b>Incomes:</b>					
Indirect taxes	20,525.805	-0.85	-1.03	22.80	-1.44
Corporate taxes	5,093.022	0.55	0.57	-1.14	0.80
Income taxes	26,486.100	0.50	0.54	-0.82	0.71
Tariff income:					
From EU	582.002	-99.11	-	-	-
From ROW	515.501	-24.97	-40.08	-40.53	-
Funds:					
From EU	5,673.611	-62.24	-	-	-
From ROW	6,630.828	-60.66	-62.22	-62.44	-
Factor incomes	13,462.894	-2.04	-2.69	-2.76	-3.40
<b>Expenses:</b>					
Consumption	43,127.656	-20.64	-26.46	-14.37	-33.55
Transfers	16,980.748	0.00	0.00	0.00	0.00
Interest payments	9,023.531	11.99	13.91	13.59	19.04
Savings	13,692.731	-2.04	-2.68	-2.75	-3.39
Investment	34,228.780	0.00	0.00	0.00	0.00

\* Please refer to the Section 4 for detailed explanation of the Policy Scenarios

Private income increases 0.5% under a customs union, 1.5% under full membership, and 0.7% under free trade. However, it decreases by 0.8% of

the base value under the third scenario in which a replacement tax is levied. Private consumption also increases in the range of 1.6 % to 2.6% of its base value under the customs union, full membership, and free trade scenarios. It decreases by 1.2% of the base value under the replacement tax. Private savings increase under the all scenarios except the replacement tax. The increase is 0.5% under customs union and full membership scenarios, and 0.7% under free trade. Under a replacement tax, however, it decreases 9.2%.

The comparison of revenue, consumption, savings, and investment changes in government and private sectors indicates that the economic crisis in the Turkish economy is the result of the unbalanced structure of the government sector. For this reason, cutting public expenditures is a good policy to eliminate the negative impact of the public sector on the economy.

Turkey's accession into the EU will have a trade creating impact between the EU and Turkey under all scenarios. Despite a slight increase in the wage rate, elimination of tariff and tariff-related taxes will decrease the domestic price level. The lower price level and changes in the exchange rate in favor of the EU cause an increase in exports between the EU and Turkey.

With a reciprocal decrease in tariff rates, Turkish imports from the EU will increase as seen from Table 1. Turkish exports to the EU increase by 11% under a customs union, 13.7% under full membership, 15.2% under free trade, and 3.6% under a replacement tax. Turkish imports from the EU increase by 5.9% under a customs union, 14.7% under full membership, 9.5% under free trade, and 1.8% under the replacement tax.

Exports to the ROW increase due to reciprocal elimination of tariffs and changes in the exchange rate in favor of the ROW. According to Common External Tariff, Turkey is required to decrease import taxes on the third countries as well. This results in an increase in trade volume between Turkey and the ROW. Exports to the ROW increased by 2.2% under a customs union, 3.5% under full membership and 5.6% under free trade. However, ROW exports decreased by 4.2% of the base value under a replacement tax. Imports from the ROW increased by 2.3% under a customs union, and 4% under free trade. There will be trade diversion under the full membership and replacement tax scenarios, with Turkish imports from the ROW decreased by 1.4% under full membership, and 4.1% under a replacement tax.

Table 2 shows the changes in government balance under the proposed policy scenarios. Total indirect tax collected is 20,525 billion TL in the base year. There are no significant changes in indirect taxes under the customs union, full membership or free trade scenarios. However, a 22.8% increase will be experienced under a replacement tax. This shows that indirect taxes should be increased by 22.8% to compensate for the losses due to tariff reduction. This can be called a "compensation tax rate". Changes in corporate and income taxes are too small to be considered. Government factor income will show a decrease by 3% of the base value, and experience almost equal changes under all policy scenarios.

Government interest payments are a major problem for Turkey as almost 10% of total government revenue went to interest payments in 1990 and this

rate is increasing every year. This is a real burden for an already in-debt Turkish budget. Increases in interest payments will be 12% under the customs union scenario, 14% under the full membership scenario, 13% under the replacement tax scenario, and 19% under the free trade scenario. Government debt should be reduced to cut down interest payments.

### 7. Sensitivity Analysis

A sensitivity analysis was performed for this model. All elasticities in the base year are assigned a priori to values, which indicate the best estimates. Since elasticity estimates include a margin of error, the remedy for this problem is to perform a sensitivity analysis. The elasticity values are obtained from Kose (1996), de Santis (1995) and Harrison et. al. (1996), and adjusted according to sectoral aggregation of this study.

The results obtained are not fragile to the assumptions made regarding elasticities, and variations are in an acceptable range. For example, GDP variations are in the range of -1% and 2.8%, government revenue variations are in the range of -2.3% and 1.9%, and replacement tax rate variations are in the range of -2.4% to 3.2%. The highest variations are seen in domestic sales and EU imports. However, these are not large variations considering the scope of the study and the number of sectors involved.

### 8. Conclusions

In this paper, we analyze the effects of Turkey's accession into the European Union on the main economic indicators of the Turkish economy with a CGE model under various scenarios. By the very nature of the CGE models, base values are reproduced by the calibration process. These analogous results assure the validity of calibration procedure and SAM constructed. Thus, instead of giving full magnitudes of the results, only percentage changes in each variable are given so that policy makers have much clearer vision about the policies adopted.

Based on our simulation results, under the customs union scenario, a 2% decrease in GDP and a 8% decrease in government revenue will be experienced. As a result of this revenue loss, government consumption also decreases by 20%. However, private income, consumption, and savings increase. This result seems to lead policy-makers of Turkey in a direction allowing them to follow the best policy. In reality, it is very hard to rely on such strong conclusions, as there is no "best" policy with political decisions. There are "better" policies, however, in certain cases, and these "better" policies may change depending on the perspective of policy-makers, current conditions of the country, and the power of lobbyists in each sector. Thus, knowing this is a political process rather than completely economic, appropriate cautions should be taken to utilize the results of this study.

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## APPENDIX MATHEMATICAL FORMULATION OF THE MODEL

### *Production Technology and Factor Markets*

Production technology is assumed to have multi-level constant elasticity of substitution (MLCES). This technology can be expressed as:

$$Q_i = A_i \left[ \mathbf{a}_i V_i^{-b} + (1 - \mathbf{a}) N_i^{-b} \right]^{1/b} \quad (1)$$

where  $A_i$  represents the scale parameter showing the returns to scale,  $V_i$  represents value added factors (capital and labor),  $N_i$  represents composite intermediate commodities,  $\mathbf{a}_i$  represents the distribution parameter,  $\mathbf{b}_i$  represents the substitution parameter, and  $\mathbf{x}_i = 1/(1 + \mathbf{b}_i)$  represents elasticity of substitution between factors and intermediates.

The value added factors in the equation can be expressed as:

$$V_i = AV_i \left[ \sum_s \mathbf{d}_{i,s} L_{i,s}^{-r_i} + \left( 1 - \sum_s \mathbf{d}_{i,s} \right) K_i^{-r_i} \right]^{-1/r_i} \quad (2)$$

where  $AV_i$  represents the scale parameter,  $L_{i,s}$  represents labor categories,  $K_i$  represents capital,  $\mathbf{d}_{i,s}$  represents the share parameter, and  $\mathbf{j}_i = 1/(1 + r_i)$  represents the elasticity of substitution between primal production factors (capital and labor).

The intermediate input demand is defined as Leontieff technology:

$$N_i = \sum_j a_{ij} Q_j \quad (3)$$

where  $a_{ij}$  is a constant, and cannot be changed in short term.

If the prices and technological constraints are given, the choices of producers can be mathematically expressed as:

$$\text{Min} PQ_i QS_i (1 - tax) = PVA_i V_i + PN_i N_i \quad (4)$$

subject to

$$V_i = AV_i \left[ \sum_s \mathbf{d}_{i,s} L_{i,s}^{-r_i} + \left( 1 - \sum_s \mathbf{d}_{i,s} \right) K_i^{-r_i} \right]^{-1/r_i} \quad (5)$$

where  $PQ_i$  represents price of good  $i$ ,  $PVA_i$  represents the price of primary inputs, and  $PN_i$  represents price of intermediate inputs. The first order condition:

$$\frac{V_i}{N_i} = \left( \frac{PN_i}{PVA_i} \frac{\mathbf{q}_i}{1 - \mathbf{q}_i} \right)^{x_i} \quad (6)$$

The composite price of intermediate inputs can be calculated using a weighted average price of all intermediate commodities.

$$PVA_i = [PQ_i QS_i (1 - tax) - PN_i N_i] / V_i \quad (7)$$

$$PN_i = \sum_j a_{ij} PC_j N_i \quad (8)$$

where  $PC_i$  represents price of the composite good.

The following equation implies this basic assumption of the profit maximization criteria:

$$Max \mathbf{p}_i = PVA_i V_i - \sum_s W_s L_s \quad (9)$$

where  $W_s$  represents wage rates in the two labor categories. The first order condition:

$$\frac{L_{i,s}}{V_i} = \left( \frac{\mathbf{d}_{i,s}}{AV_i^{r_i}} \frac{PVA_i}{W_k \mathbf{I}_{i,s}} \right)^{j_i} \quad (10)$$

where  $\mathbf{I}_{i,s}$  represents wage differences between sectors for the same kind of labor force, and shows the distortions in the labor markets. This distortion can be defined as ratio of wage rate in each sector and average wage in the economy, and calculated as a parameter in the model.

Wage and employment rate in the formal labor market:

$$W_f = \underline{W}_f \quad (11)$$

$$\underline{L}_{S_f} = LD_f + Unemp \quad (12)$$

Wage and employment rate in the marginal labor market:

$$\mathbf{I}_{i,M} W_M = PVA_i (\partial V_i / \partial LD_M) \quad (13)$$

$$LD_M = LS_M + Unemp \quad (14)$$

where  $LD$  represents labor demand and  $LS$  represents labor supply.

The balance in the labor market is:

$$LS_f + LS_M = LD_f + LD_M \quad (15)$$

The rate of return for capital in each sector can be easily calculated within this framework as:

$$P_i = PVA_i QS_i - \sum_i L_{i,s} \mathbf{I}_{i,s} W_s \quad (16)$$

where  $P_i$  represents sectoral returns of capital. Within this framework the prices in the monopolistic sectors can be formed in this way:

$$PQ_i = (1 + m) AVC_i \quad (17)$$

$$TVC_i = \left( \sum W_s \mathbf{I}_{ik} L_{i,s} \right) + PN_i N_i \quad (18)$$

$$AVC_i = TVC_i / QS_i (1 - tax_i) \quad (19)$$

where  $AVC$  and  $TVC$  represent average and total variable costs, respectively, and  $m$  represents a constant that implies higher prices. This constant  $m$  implies that monopolistic sectors do not produce under their full capacity and transmit higher costs directly to consumers if the demand curve is sufficiently inelastic. This higher price alters the income distribution and encourages the "rent economics" against labor (Kose, 1996).

Value added produced in the monopolistic sector ( $V_i$ ) is assumed as a function of "capacity used ratio" ( $U_i$ ). The capacity can be interpreted as the relationship between the changes in the market demands and value added produced in the market. This relationship can be expressed as:

$$V_i = U_i \cdot f(K, L_F, L_M) \quad (20)$$

where  $U_i$  = Capacity used / Full capacity.

### Foreign Trade and Balance of Payments

The model assumes five different commodities: (i) domestic, (ii) exported to the EU (iii) exported to the ROW, (iv) imported from the EU, and (v) imported from ROW.

According to the specifications above, the domestic sectoral commodities ( $DC_i$ ) and composite import commodities ( $M_i$ ) together produce a composite commodity such that:

$$CC_i = C_i \left[ \mathbf{f}_i M_i^{-\mathbf{f}_i} + (1 - \mathbf{f}_i) DC_i^{-\mathbf{f}_i} \right]^{1/\mathbf{f}_i} \quad (21)$$

where  $CC_i$ ,  $M_i$  and  $DC_i$  represent composite commodity, imported commodity, and domestically produced commodity, respectively;  $C_i$  represents the shift parameter;  $\mathbf{f}_i$  represents the share parameter; and  $1/(1+\mathbf{f}_i) = \mathbf{s}_i$  represents the elasticity of substitution between domestic and imported goods.

The problem in this process for consumers is to minimize the cost of commodities consumed. This problem can be expressed as:

$$\text{Min} PC_i CC_i = PD_i DC_i + PM_i M_i \quad (22)$$

subject to:

$$CC_i = C_i \left[ \mathbf{f}_i M_i^{-\mathbf{f}_i} + (1 - \mathbf{f}_i) DC_i^{-\mathbf{f}_i} \right]^{1/\mathbf{f}_i} \quad (23)$$

In this optimization problem, import and domestic commodity demands can be found by solutions of the first order conditions. That is:

$$\frac{M_i}{DC_i} = \left( \frac{PD_i}{PM_i} \frac{\mathbf{f}_i}{1 - \mathbf{f}_i} \right)^{\mathbf{s}_i} \quad (24)$$

The imported goods from different origins are assumed to be limited substitutes for each other and are expressed as an Armington function:

$$M_i = \Omega_i \left[ \mathbf{g}_i MEU_i^{-\mathbf{t}_i} + (1 - \mathbf{g}_i) MRW_i^{-\mathbf{t}_i} \right]^{1/\mathbf{t}_i} \quad (25)$$

where  $MEU$  and  $MRW$  represent imports from the EU and imports from ROW, respectively;  $\mathbf{g}_i$  and  $\Omega_i$  represent the share and the shift

parameters, respectively; and  $V_i = U_i \cdot f(K, L_F, L_M)$  represents the elasticity of substitution between imported goods from different origins.

Given different originated imported good prices and the degree of elasticity of substitution, the optimization problem of the consumers becomes:

$$\text{Min} PM_i M_i = PMEU_i MEU_i + PMRW_i MRW_i \quad (26)$$

subject to:

$$M_i = \Omega_i \left[ \mathbf{g}_i MEU_i^{-\mathbf{t}_i} + (1 - \mathbf{g}_i) MRW_i^{-\mathbf{t}_i} \right]^{1/\mathbf{t}_i} \quad (27)$$

The first order condition for this problem becomes:

$$\frac{MEU_i}{MRW_i} = \left( \frac{PMRW_i}{PMEU_i} \frac{\mathbf{g}_i}{1 - \mathbf{g}_i} \right)^{\mathbf{e}_i} \quad (28)$$

where  $PMRW$ , and  $PMEU$  represents the price of rest of the world and price of the EU, respectively.

In the import side of the model, small country assumptions and infinitely elastic EU and non-EU import supply assumptions are made. If the exchange rate (ER) and foreign trade taxes are known, the domestic market price of the commodities can be determined as:

$$PMEU_i = PW_{MEU_i} (1 + tmeu_i + tfeu_i) ER \quad (29)$$

$$PMRW_i = PW_{MRW_i} (1 + tmrw_i + tfrw_i) ER \quad (30)$$

where  $PMEU$ ,  $PMRW$  and  $PW$  indicate domestic price of EU imports and domestic price of ROW imports, and the world price, respectively;  $tmeu$ ,  $tfeu$  and  $tmrw$ ,  $tfrw$  represent the EU and non-EU custom taxes and funds, respectively. The export supply equation is expressed as:

$$QS_i = D_i \left[ \mathbf{m} E_i^{-\mathbf{n}_i} + (1 + \mathbf{m}) DC_i^{-\mathbf{n}_i} \right]^{1/\mathbf{n}_i} \quad (31)$$

where  $D_i$  represents the shift parameter, and  $\mathbf{m}_i$  represents the share parameter.

The maximization problem becomes:

$$\text{Max} PQ_i \cdot QS_i = PD_i DC_i + PE_i \cdot E_i \quad (32)$$

subject to:

$$QS_i = D_i \left[ m E_i^{-n_i} + (1 + m) DC_i^{-n_i} \right]^{-1/n_i} \quad (33)$$

where  $D_i$  represents the shift parameter,  $E_i$  represents commodity exported,  $m$  represents the share parameter, and  $V_i = 1/(1 + n_i)$  represents the transformation elasticity.

The optimal market combinations between domestic and exported commodities can be found by solving the first order condition:

$$\frac{E_i}{DC_i} = \left( \frac{PE_i}{PDC_i} \frac{1 - m}{m} \right)^{V_i} \quad (34)$$

The next step of the model is to identify the exported commodities in terms of their origins. The sectoral exports ( $E_i$ ) are sent to the EU and the ROW. Exports to the different origins are assumed to be limited substitutes for each other and expressed as an Armington function:

$$E_i = Y_i \left[ a_i EEU_i^{-h_i} + (1 + a_i) ERW_i^{-h_i} \right]^{1/h_i} \quad (35)$$

where  $EEU$  and  $ERW$  represent exports to the EU and exports to the ROW, respectively;  $a_i$  represents the share parameter;  $Y_i$  represents the shift parameter, and  $w_i = 1/(1 + h_i)$  represents the elasticity of substitution between exported goods of different origins.

The price relationship in the model can be expressed as:

$$PE_i = \underline{PWE}_i \cdot ER \quad (36)$$

where  $PE$ ,  $\underline{PWE}$  and  $ER$  represent domestic price of exported goods, world price of exported goods, and exchange rate, respectively.

Domestic average prices can be calculated as the weighted average of domestic and exported commodity prices:

$$PQ_i = (PD_i DC_i + PE_i E_i) / QS_i \quad (37)$$

The foreign trade equations of the model are explained above. The balance of payments equations must be explained in order to complete the model.

Flexible exchange rates are assumed rather than fixed exchange rates. The balance of payments can be shown in the following way:

$$(\underline{PM}_w M) + \underline{PT}_{ROW} + \underline{GT}_{ROW} = (\underline{PE}_w E + \underline{REMIT} + \underline{PF}_{ROW} + \underline{GF}_{ROW} + \underline{FSAV}) \quad (38)$$

where  $\underline{PM}_w$  and  $\underline{PE}_w$  represent world price of imports and exports, respectively;  $\underline{PT}_{ROW}$  and  $\underline{GT}_{ROW}$  represent private and government income transfers to the ROW, respectively;  $\underline{PF}_{ROW}$  and  $\underline{GF}_{ROW}$  represent private and government factor incomes from ROW respectively;  $\underline{REMIT}$  represents private capital income (investment, interest incomes, etc.); and  $\underline{FSAV}$  represents foreign savings in Turkey.

### *Income and Demand Equations*

The private sector value added can be obtained by subtracting government factor income and corporate tax.

$$YH = [(PVA \cdot V) - FI_G - TAX_{CAP}] + T + (FI_P - \underline{PT}_{ROW}) \cdot ER \quad (39)$$

where  $FI_G$ , and  $FI_P$  represents factor income of government and private sector, respectively;  $TAX_{CAP}$  represents corporate tax;  $T$  represents transfers to the private sector; and  $\underline{PT}_{ROW}$  represents private income transfers to the ROW.  $FI_G$  and  $TAX_{CAP}$  are determined as follows:

$$FI_G = rfg \cdot GDP \quad (40)$$

$$TAX_{CAP} = ctx \Sigma_i RP_i \quad (41)$$

where  $rfg$  represents a fixed proportion,  $ctx$  represents corporate tax rate in the current economy, and  $RP$  represents sectoral profits.

Household savings, consumption and tax are determined as:

$$TAX_{HH} = tax_h \cdot YH \quad (42)$$

$$SAV_{HH} = s_h [YH (1 - tax_h)] \quad (43)$$

$$CON_{HH} = (1 - s_h) [YH (1 - tax_h)] \quad (44)$$

where  $TAX_{HH}$ ,  $SAV_{HH}$ , and  $CON_{HH}$  represent income tax, household savings, and household consumption, respectively;  $tax_h$  represents income tax rate; and  $s_h$  represents the marginal saving rate of the households. Another thing considered in the model is the question of how much of the total domestic production is consumed by the private sector. This question can be answered by using a classical linear expenditure system equation:

$$PC_i \cdot CD_i = cles_i \cdot CON_{HH} \quad (45)$$

where  $CD_i$  represents sectoral distribution of private total consumption, and  $cles_i$  represents a distribution parameter.

Another participant in the model is the public sector. The following equation shows that the public income consists of tariffs, indirect taxes, direct taxes, corporation tax, factor income of the government, and government's foreign factor incomes:

$$GREV = TARIFF + TAX_{IND} + TAX_{HH} + TAX_{CAP} + FI_G + \underline{GFI}_{ROW} \cdot ER \quad (46)$$

where GREV represents government revenue,  $TAX_{IND}$ ,  $TAX_{HH}$ , and  $TAX_{CAP}$  represent indirect tax, income tax, and corporation tax, respectively; and  $GFI_{ROW}$  represents government's factor income from the rest of the world.

Since the rest of the world is differentiated as EU and non-EU countries, the tariff incomes to the Turkish economy can be expressed as:

$$TTR = CT_{EU} + CT_{ROW} + FUN_{EU} + FUN_{ROW} \quad (47)$$

where TTR, CT, and FUN represent total tariff revenue, total customs tax collected, and funds collected, respectively. The subscripts show the origin of tariff revenue.

The gross domestic production (GDP) and government expenditure (GEXP) equations can be written as:

$$GDP = (\sum_i PVA_i V_i) + TAX_{IND} + TTR \quad (48)$$

$$GEXP = \underline{INV}_G + CON_G + \underline{T} + \underline{GT}_{ROW} \cdot ER \quad (49)$$

where  $INV_G$  and  $CON_G$  represent government investment and government consumption.

In addition to these equations, government savings (GSAV) and government consumption sectoral distribution can be specified as:

$$GSAV = J \text{ GDP} \quad (50)$$

$$PC_i \cdot GD_i = gles_i \text{ CON}_G \quad (51)$$

where  $gles_i$  represents a sectoral share parameter, and  $\sum gles_i = 1$ .

Investments in the economy are in one of two different categories: (i) changes in stocks, and (ii) physical capital investments.

Total investment is converted into the investment by sector of origin by using the capital composition matrix. This relationship can be explained as:

$$SI_i = \sum b_{ij} TPI_j \quad (52)$$

where SI represents sectoral investment, TPI represents total private investment in each sector, and  $b_{ij}$  is a constant coming from the capital composition matrix and represents investments from sector i to sector j.

The balance requirement in the goods market assumes further that demand and supply of composite commodity (CC) in each sector must be in equilibrium:

$$CC = INT + CD + GD + ID + (DST^p + DST^g) \quad (53)$$

where INT, CD, GD and ID represent intermediate demand, private consumption demand, government consumption demand, and investment demand, respectively.  $DST^p$  and  $DST^g$  represent private inventory investment and government inventory investment, respectively.

The TRCGE model includes three macroeconomic balances: the government deficit, savings-investment balance of the private sector, and the trade balance. These balances are not independent of one another (Kose, 1996). Considering this, investment, and savings can be expressed as:

$$INVEST = INV_p + INV_G \quad (54)$$

$$SAVING = SAV_{HH} + GSAV + \underline{FSAV} \cdot ER \quad (55)$$

where FSAV represents foreign savings.

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