

AVRUPA BİRLİĞİ TÜRKİYE İÇİN NE KADAR KARLI ?: BİR GENEL DENGE ANALİZİ

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Özet: Türkiye'nin tam üyeliği ile ilgili tartışmalar son yıllarda artarak devam etmektedir. Bunun nedeni Türkiye'nin AB üzerindeki ağır etkilerinin bekleniyor olmasıdır. Bizim çalışmamız, Türk üreticilerinin maliyet yapılarının ve karlılıklarının AB'ye üyelik sonucunda nasıl değişeceği üzerinde durmaktadır. Böyle bir analiz yapabilmek için de Hesaplanabilir Genel Denge Modeli yaklaşımı bir araç olarak kullanılmış ve değişik versiyondaki senaryoların simulasyon sonucu üretilen sonuçları tartışılmıştır. Modelimiz Türk sanayi sektöründeki eksik rekabet şartlarını dikkate almak ve emek sektöründeki vasıflı-vasıfsız ayırımına gitmek suretiyle daha etkin sonuçlar bulmayı hedeflemektedir. Simulasyon sonuçları, bazı bireysel sektörlerin negatif etkilenmesine rağmen genel olarak AB'nin Türk üreticisine olumlu katkılar sağlayacağı savımızı doğrulamaktadır.

Anahtar Kelimeler: Genel Denge, Avrupa Birliği, Ekonomik Entegrasyon, Türkiye Ekonomisi

Abstract: The arguments about full membership in the EU became a priority for Turkey in the last decade, because Turkey's joining the EU will have a strong impact on Turkey's and the EU's macroeconomic structure. This study analyzes how Turkish producers' profitability and cost of production will be affected by a full integration with EU. In order to analyze this, a computable general equilibrium (CGE) model has been developed and the results of various policy scenarios have been compared. The model developed considers the imperfect competition in the Turkish manufacturing sector, and distinguishes the labor into two different categories: skilled and unskilled labor force. Simulation results show that full membership appears to be the most beneficial scenario for the Turkish economy, even though some sectors are actually become worse off.

Keywords: General Equilibrium, European Union, Economic Integration, Turkish Economy

I.Introduction

Strengths or weaknesses of a country's economic development can be explained by its fiscal constraints, and the current account balances. Countries experiencing a current account balance deficit have difficulty attracting new foreign investments. The effects of financial deficits become even more important when economic integration is involved. Choosing economic integration with other countries affects the country's macroeconomic variables such as imports, exports, prices, investment level, wage rate, and even

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population. Since all these issues are closely related to fiscal independency of a country, pre-evaluation of such policy decisions should be made very carefully. Appropriate forecasting of such policy results will improve the current and future policy making capabilities of the countries.

The economic theory suggests that an instant integration may result in very extensive social and economic problems for the countries involved, especially if they have differing levels of economic development. Thus, it should include a preparation process. As is the case for most developing countries, Turkey is facing difficulties in maintaining these problems for several years, but the challenge became even more severe by joining the European customs union in 1996. Even before the customs union agreement, Turkey had a very close relationship with the European Union (EU) countries. Although 52 percent of Turkish external trade is conducted with the EU, and more than 60 percent of foreign investments in Turkey came from the EU countries, there are still major problems with complete integration. The inflation rate, increasing unemployment, large government and large internal and external debt are major problems to be dealt with by Turkish officials. By accepting the Common Custom Tariff (CCT) agreement, Turkey would lower its import tariffs on EU exports and adjust itself to the common commercial policy applied by member countries of the EU on third countries.

Even though Turkey is self-sufficient and may compete with the European Union countries in the services and manufacturing sectors, some empirical analyses such as Yeldan (1986), and Harrison et. al. (1996) show that Turkey's contribution to the EU will be less than the burden that the EU will experience. Also, the relatively low per capita GNP of Turkey will put more strains on the EU's budget. The impact of intra-community trade would likely be significant in the manufacturing sector, but limited in the agricultural sector (Musto, 1990).

Mercenier and Michel's (1994) inter-temporal computable general equilibrium (CGE) model results showed that the best policy for international integration is to remove non-tariff barriers as well as tariff barriers. Within this context, it has been suggested that Turkey should remove both tariff, and non-tariff barriers to improve social welfare. Failure to adopt this policy is much worse than the implementation of no policy at all (Yeldan, 1997), given that it opens new markets to Turkey including textiles, clothing, petroleum products, iron and steel.

Considering these explained facts, this paper analyzes the impacts of an economic integration with EU on the Turkish producers. In other words, how this integration might affect their profits and production costs. In order to achieve this objective a single country-multi sectoral general equilibrium model has been developed, and various integration scenarios have been analyzed.

II. The Model

This section explains the analytical framework and mathematical construction of a computable general equilibrium (CGE) model for the Turkish economy. The model is exactly taken from Bekmez (2002), and illustrates the impacts of Turkey's full accession into the European Union with different scenarios, and compares the results with customs union regarding sectoral profits and cost of production.

A) Theoretical Model:

The model is constructed under the neo-classical framework. A two-stage cooperative game is assumed to capture the impacts of integration. The first stage of the game determines the protection tools, and the second stage determines the level of the protection. Bargaining process starts in the second stage of the game. If anything fails in this stage, trade warfare occurs.

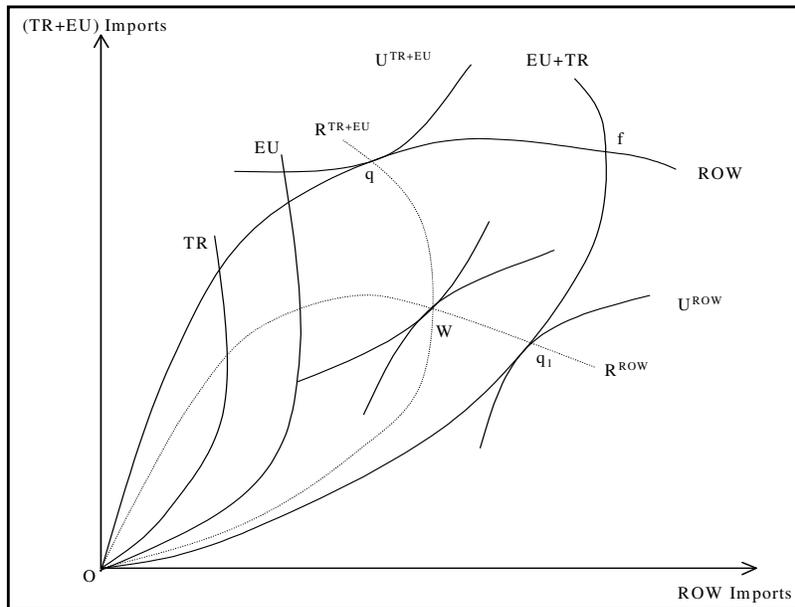


Figure 1: Economic Integration and Partnership Game

Figure 1 shows the implications of Turkish-EU integration and explains the rationale behind this integration. The analysis begins with a three-country, two-commodity economy, which can be expanded to the n commodity case. The offer curves of the rest of the world, Turkey, and the EU are denoted as ROW, TR, and EU, respectively. The offer curve of the EU with inclusion of

Turkey is also denoted by TR+EU. The trade indifference curves are denoted by U^{ROW} , and $U^{\text{TR+EU}}$ for the rest of the world and the EU with Turkey, respectively. Since the implications of an integration between Turkey and the EU is considered, individual trade indifference curves are combined for the sake of simplicity, and thus, the trade indifference curves of these countries are analyzed jointly. The free trade equilibrium will be point f . If ROW imposes its optimal tariff and the Expanded EU (EEU) trades freely, q will be the equilibrium point; and if the EEU imposes its optimal tariff and ROW trades freely, the equilibrium point will be q_1 .

If bargaining between ROW and the EEU fails in the second stage of the game, we need to determine the tariff reaction curves of each country. These curves are R^{ROW} and $R^{\text{TR+EU}}$. The intersection of these curves, W , will be the equilibrium point for tariff warfare. The quota warfare equilibrium is no trade at all (point O). In international trade, if there is no free trade agreement and/or integration, a protection imposed by a country is usually retaliated with an equivalent protection by other trading partners. As a result, the tariff warfare equilibrium point between ROW and the EEU will be point W .

The integration between Turkey and the EU will allow us to combine their offer curves. Turkey and the EU will not use any trade protection tools against each other, but put restrictions for the other countries (ROW). As Gul (1989) mentioned, this situation can be called partnership game. In other words, the EU and Turkey will act cooperatively regarding restrictions on others, but not on each other. The theoretical implication of this partnership game is an expectation of an increase in welfare for both EU and Turkey.

B. The Empirical Model

The empirical model is an extended version of Kose (1996) and Yeldan (1997). The model has two important specifications. First of all, it considers imperfect competition in the Turkish manufacturing sector. With this important specification, the commodity market can be differentiated as perfect and imperfect competition, and highlights the policy implications in terms of these two criteria. Beverage, Tobacco, Petroleum, Glass, Iron/Steel/Metal, Non-electrical Machinery, and Transport Equipment sectors are considered as monopolistic sectors. The second important specification of the model is to consider differentiated factors in the production process. As we know, capital and labor are used in the production process as primal factors. Labor is differentiated as "formal labor" and "marginal/informal labor" (Kose, 1996). With this specification we can analyze the basic characteristics of two different labor markets, and show the linkages between them. This specification becomes even more important when the cost of production is analyzed.

The decision processes of the model are differentiated as public and private, and Armington and small country assumptions are recognized

throughout the model. The 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 the imports in terms of origin makes the analysis of full access of Turkey into the EU much easier. Since Turkey has to remove all import duties levied on the EU commodities and not on non-EU commodities, the custom taxes collected from the EU countries and non-EU countries will be put into different categories in order to capture the impacts of the accession to the EU. However, our model is a static formulation of the general equilibrium modeling, and thus, it may not capture medium term dynamics.

The production technology is assumed to have multi-level constant elasticity of substitution (MLCES), and the intermediate input demand is defined as Leontieff technology, where inputs should be used in a constant proportional way to produce a certain amount of output. This technology can be formulated as:

$$Q_i = A_i (\alpha_i V_i^{-\beta_i} + (1 - \alpha_i) N_i^{\beta_i})^{1/\beta_i} \quad (1)$$

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, α_i represents the distribution parameter, β_i represents substitution parameter, and $\xi_i = 1/(1 + \beta_i)$ represents the elasticity of substitution between factors and intermediates.

The value added factors in equation (1) can be expressed as follows:

$$V_i = AV_i \left\{ \sum_s \delta_{i,s} \cdot L_{i,s}^{-\rho_i} + (1 - \sum_s \delta_{i,s}) K_i^{-\rho_i} \right\}^{-1/\rho_i} \quad (2)$$

where AV_i represents the scale parameter, $L_{i,s}$ represents labor categories, K_i represents capital, $\delta_{i,s}$ represents share parameter, and $\varphi_i = 1/(1 + \rho_i)$ represents the elasticity of substitution between primal production factors (capital and labor).

The subsequent step of the model is to determine the optimal factor use. The model considers four types of inputs: non-mobile capital, Leontieff technology intermediate input, marginal labor, and organized (formal) labor. Labor supply is assumed constant for both labor categories. Wages in the organized labor market are elastic. If the wage rate in this sector is sufficiently high with respect to the equilibrium level, the remaining excess supply of labor

enters the marginal labor market and creates unemployment in this sector. As a result, the wage rate in the marginal labor market decreases (Kose, 1996).

The producers try to choose the optimal level of physical and intermediate inputs in order to minimize their production cost. If the prices and technological constraints are given, the optimum level of input choice of producers can be formulated as:

$$\text{Min } P_i \cdot Q_i (1 - \text{tax}) = PV_i \cdot V_i + PN_i \cdot N_i \quad (3)$$

subject to Equation 1 and 2. In equation 3, P_i represents the price of good i , PV_i represents price of primary inputs, and PN_i represents price of intermediate inputs, and tax is the rate of tax that government imposes on firms.

The rate of return for capital in each sector can be calculated as follow:

$$\bar{\omega}_i = PV_i \cdot Q_i - \sum_s L_{i,s} \lambda_{i,s} W_s \quad (4)$$

where $\bar{\omega}_i$ represents sectoral returns of capital, $L_{i,s}$ represents labor categories, $\lambda_{i,s}$ represents wage differences between sectors for the same kind of labor force and shows the distortions in the labor markets, and W_s wage rates in the two labor categories. Within this framework, the prices in monopolistic sectors can be formulated in the following way:

$$P_i = (1 + m_i) \cdot AVC_i \quad (5)$$

$$TVC_i = \left(\sum_s W_s \lambda_{i,s} L_{i,s} \right) + PN_i N_i \quad (6)$$

$$AVC_i = TVC_i / Q_i (1 - \text{tax}_i) \quad (7)$$

where AVC and TVC represent average and total variable costs respectively, and m stands for a constant that implies higher prices. This constant m implies that monopolistic sectors do produce under their full capacity and transmit the higher costs directly to consumers if the demand curve is sufficiently inelastic. Value added produced (V_i) in the monopolistic sectors is assumed 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:

$$V_i = U_i f(K, L_F, L_M) \quad (8)$$

where L_F is formal labor, L_M is marginal labor, and $U_i = \text{Capacity Used} / \text{Full Capacity}$.

Consumers attempt to minimize their cost, and this minimization process can be formulated as:

$$\text{Min } PC_i \cdot CC_i = PD_i \cdot DC_i + PM_i \cdot M_i \quad (9)$$

subject to

$$CC_i = C_i [\phi_i M_i^{-\phi_i} + (1 - \phi_i) DC_i^{-\phi}]^{-1/\phi_i} \quad (10)$$

where CC_i , M_i and DC_i represent composite commodity, imported commodity, and domestically produced commodity, respectively; C_i represents a shift

parameter, ϕ_i represents the share parameter and $1/(1+N_i) = \Phi_i$ represents the elasticity of substitutions between domestic and imported goods. PD and PM represent domestic and imported good prices, respectively.

As mentioned earlier, exports and imports are distinguished in terms of their source, and assumed that they are limited substitutes for each other. The formulation of this process for imported goods is:

$$M_i = \Omega_i \left[\gamma_i MEU_i^{-\tau_i} + (1 - \gamma_i) MRW_i^{-\tau_i} \right]^{-1/\tau_i} \quad (11)$$

where MEU and MRW represents imports from the EU and imports from ROW, respectively; and γ_i represents the share parameter, Ω_i represents the shift parameter, and $\varepsilon_i = 1/(1 + \tau_i)$ represents the elasticity of substitution between different origin imported goods.

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

$$\text{Min } PM_i \cdot M_i = PMEU_i \cdot MEU_i + PMRW_i \cdot MRW_i \quad (12)$$

subject to Equation 6. In Equation 12, PMRW and PMEU represent the import price of the rest of the world and the import price of the **EU, respectively**.

In the import side of the economy, a small country assumption and perfectly 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 follows:

$$PMEU_i = PW_{MEU_i} (1 + tmeu_i + tfeu_i) \cdot ER \quad (13)$$

$$PMRW_i = PW_{MRW_i} (1 + tmrw_i + tfrw_i) \cdot ER \quad (14)$$

where PMEU, PMRW and PW stand for domestic price of EU imports, domestic price of ROW imports, and world price, respectively. The terms *tmeu*, *tfeu*, *tmrw*, and *tfrw* represent the EU and non-EU custom taxes and funds, respectively. Fund rates in the model indicate non-tariff barriers on imports. These rates are considered as exogenous and used as policy parameters in the model.

The export supply side of the model can be formulated similar to the import supply function:

$$QS_i = D_i [\mu_i \cdot E_i^{-v_i} + (1 - \mu_i) DC_i^{-v_i}]^{-1/v_i} \quad (15)$$

where D_i represents the shift parameter, E_i represents the commodity exported, μ_i represents the share parameter, and $\zeta_i = 1/(1 + v_i)$ represents the transformation elasticity. The maximization problem becomes:

$$\text{Max } PQ_i \cdot QS_i = PD_i \cdot DC_i + PE_i \cdot E_i \quad (16)$$

subject to equation 10.

Following the specification of the maximization problem, the origin of the exports must be determined. Since we have specified two different origins as exports to the EU and exports to the ROW, the Armington function for this problem can be formulated as:

$$E_i = \psi_i [a_i EEU_i^{-\eta_i} + (1 - a_i) ERW_i^{-\eta_i}]^{-1/\eta_i} \quad (17)$$

where EEU_i and ERW_i represent exports to the EU and ROW, respectively; a_i represents the share parameter; ψ_i represents the shift parameter, and $\omega_i = 1/(1 + \eta_i)$ represents the elasticity of substitution between exported goods to different origins.

The private income (YH) consists of gains from value added production from the private sector, transfers from government and the rest of the world, and factor incomes. The private sector value added can be obtained by subtracting government factor income and corporation tax.

$$YH = [(PVA \cdot V) - FI_G - TAX_{CAP}] + T + (FI_P - PT_{ROW}) ER \quad (18)$$

where FI_G , and FI_P represents factor income of the government and private sector, respectively, TAX_{CAP} represents corporation tax ratio, T represents transfers to the private sector, PT_{ROW} represents private income transfers to the ROW.

The public sector is another independent component of the economy. That is why the public sector should be considered carefully in order to make a model complete. Mis-specification of the public sector income creates serious drawbacks in the model. Public income is shown as:

$$GREV = \text{TARIFF} + TAX_{IND} + TAX_{HH} + TAX_{CAP} + FI_G + GFI_{ROW} \cdot E \quad (19)$$

where GREV represents government revenue; TAX_{IND} and TAX_{HH} represent indirect tax and income tax, respectively. Here TAX_{IND} is the total tax in the amount of $PQ \cdot Q \cdot \text{tax}$, and TAX_{HH} is directly proportional to YH. GFI_{ROW} represents the government's factor income from the rest of the world. TARIFF is an advalorem type tax imposed on all goods and services imported into the country, and is an exogenous variable for our modeling purposes since they are determined by the international agreements.

III- Calibration and Data

The model calibration and benchmark equilibrium was obtained by using De Santis and Ozhan's (1995) social accounting matrix (SAM) with certain modifications. 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 a balanced Social Accounting matrix, which is considered as a reference equilibrium point of the model. The

elasticities needed for model calibration have been obtained from the available empirical studies such as Harrison et. al., (1996, 1993) and de Santis and Ozhan (1997).

Since the data used for the base year (1990) do not include quantities, only monetary data are used in the process. For that reason the most common method used is to assume that 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 estimations.

In the first step of the calibration the matrix collects the quantities appearing in the equations. In the second step, relative prices in that year fix the slope of the isoquant at that point. The elasticities, which show the curvature of the isoquant are used in the last step of the calibration.

IV- Policy Scenarios

The simulation analysis has been conducted under the following four scenarios, through which changes in production cost and profitability in the Turkish economy can be investigated.

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 rate for the 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 loss due to tariff reduction is compensated with an increase in the rate of indirect tax. By increasing indirect tax rate, the government can finance the budget deficit.

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 in non-tariff barriers such as funds should be eliminated completely under this scenario.

The customs union scenario assumes that import tariff rates on EU manufacturing goods are reduced completely, but the manufacturing and services sectors remained the same. However, import tariffs on non-EU goods are reduced by 30% in the agricultural sector and 40% in the 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.

V. Sectoral Profit Rates and Cost Structure

This section analyzes both changes in profit rates and production costs under different integration policy scenarios. Two criteria have been used for sectoral profit analyses: profit-capital ratio for each individual sector and the change in sectoral profits with respect to base year. The reason a profit-capital ratio is used along with the change in sectoral profits is because it is easier to analyze real changes in profits with this ratio. Changes in average variable cost have been used to investigate the impacts of sectoral production costs under mentioned scenario assumption. This analysis has been done, because changes in cost structure will change the distribution of trade and affect domestic levels of production.

A. Customs Union Scenario:

A customs union will have impacts on all sectors. The following sectors will experience a decrease in profits: tobacco (-17.3%), transportation equipment (-8.2%), petroleum products (-4.1%), paper and publishing (-3.2%), services (-3%), and electrical machinery (-2.6%). Profit rates decreases in these sectors due to the high current protection levels in these sectors. Elimination of tariffs in the manufacturing sector results in an increase in the demand for imported goods. The domestic price of EU imported goods will be relatively lower than that of domestic goods. This situation causes a shift from domestic products to EU products in these sectors. However, domestic sectors experience profit increases with respect to their base year values. These profit increases take place for two reasons: i) increase in domestic demand and ii) increase in exports. Exports in all sectors increase with the customs union. Among these sectors, the highest profit increase can be seen in wearing apparel (11.8%), textiles (10.1%), mining (8.8%), leather and fur products (9.6%), and the metal industry (4.9%). The remaining sectors also experience profit increases, but the magnitude will be relatively smaller. The sectors experiencing higher profits are already very competitive in the international markets.

Table 1: Sectoral Average Variable Cost Structure

Sectors	Base Year (Billion TL)	CU (% Change)	EU (% Change)	EU+Tax (% Change)	FT (% Change)
Basic Agriculture	702.77	0.34	0.45	-0.48	0.55
Agribusiness	882.04	0.15	0.21	-0.27	0.29
Mining	583.32	2.53	3.17	2.74	3.98
Beverage Industry	560.11	-0.59	-0.92	1.13	-0.76
Tobacco Industry	672.38	-3.36	-3.41	-2.22	-5.70
Textile	792.23	1.31	1.70	1.52	2.25
Wearing Apparel	830.74	1.63	2.04	1.87	2.68
Leather & Fur Products	799.90	5.58	1.90	1.54	2.62
Wood & Furniture	1719.79	0.00	-0.04	-0.55	-0.02
Paper & Publishing ind.	819.57	-1.73	-2.00	-1.54	-2.47
Chemical Products	748.95	-1.26	-1.63	-1.58	-1.67
Petroleum Products	736.93	5.13	6.50	13.79	8.15
Glass & Glass Products	661.07	-0.47	-0.74	-0.67	-0.60
Non-Metallic Products	1500.12	0.93	1.11	1.30	1.62
Metal Industry	2491.00	2.51	3.11	2.82	4.13
Non-electrical	725.72	0.44	0.39	0.00	1.01
Machinery	778.82	0.52	0.64	0.80	1.24
Electrical Machinery	842.93	-3.16	-4.26	-3.09	-4.53
Transport Equipment	544.21	0.91	1.08	1.90	1.46
Electricity-Gas-Water	866.57	0.31	0.34	0.37	0.51
Construction	482.23	0.24	0.33	0.91	0.34
Transportation- Commun.	679.95	-1.32	-1.74	-0.94	-2.20
Other Services					

CU: Customs Union, EU: Full Membership, EU+Tax: Revenue Replacement Tax, and FT: Free Trade. The percentage changes are with respect to the base year values.

Under the customs union scenario, there will be a decrease in average variable cost (AVC) in a few sectors. However, this decrease is very small and can be ignored in most of the sectors. The largest decrease in the AVC is in the tobacco industry with 3.3% of its base value. The remaining sectors will experience either a very small decrease or increase in the average variable cost. The model considers capital as fixed so that the only variable cost for the producers is the labor payments. As can be seen in the Table 1, marginal labor using sectors such as mining (2.5%), metal (2.5%), and agriculture (0.34%) will have increases in the average variable cost due to wage rate increases in the marginal labor market. In addition, the cost structure of the same sectors that rely extensively on organized labor will change in a negative way. Although the average wage rate does not change in the organized labor market, the increases in the average costs of some sectors such as leather and fur products (5.5%) can be explained by an increased demand for marginal labor. The wage rate in the marginal labor market will increase with the custom union scenario. This will also be one of the reasons for increased cost because some of marginal labor

will be trained and move to the higher wage organized labor market. Moreover, due to an increased demand for organized labor in some sectors, producers might provide additional non-wage opportunities such as fewer and more flexible working hours, vacation opportunities and a better environment for qualified laborers. This may also be one of the reasons for average variable cost increases.

B. European Union Scenario (Full Access):

Full membership into the EU has similar, but much stronger impacts on the Turkish economy, because protection levels will be completely eliminated on EU products, and Common External Tariffs will be adopted for the ROW. This results in trade creating impacts on the Turkish economy, but the impact will be stronger on EU products. With this reality, profit rates increase in the competitive sectors, and decrease in the highly protected sectors. Profit losses can be seen in tobacco (-17.5%), transportation equipment (-11%), petroleum (-4.7%), and paper and publishing (-3.2%). The highest profit increases will be experienced in wearing apparel (14.6%), textiles (12.8%), leather and fur products (11.8%), and mining (11.1%). Table 2 shows sectoral profit rates and the results are consistent with sectoral profit-capital ratios shown in Table 3. Profit rate increasing sectors experience an increase in the profit-capital ratio, and profit decreasing sectors experience a decrease in the profit-capital ratio under all experiments. Thus, both tables indicate very similar results.

The full accession scenario implies that no trade barriers exist between Turkey and the EU. The average variable cost under this scenario will increase in many sectors. The reason for this is explained in the customs union scenario. Changes in the labor demand and wage rate affect the cost structure of the sectors. Under the full accession scenario, the average variable cost (AVC) will increase in all competitive sectors. However, previously monopolistic sectors (beverage, tobacco, glass products, and transportation equipment) experience a small decrease in average variable cost. The highest AVC increase can be seen in petroleum, with a rate of 6.5%; mining, and metal, with a rate of 3.1%; and metal, with a rate of 2.5%. The reason for the increase in average variable cost in the monopolistic sectors is because they don't operate at their optimal point. Thus, when full membership exists, these sectors must become competitive in order to enter European markets.

Table 2: Sectoral Profits

Sectors	Base Year (Billion TL)	CU (% Change)	EU (% Change)	EU+Tax (% Change)	FT (% Change)
Basic Agriculture	28889.46	1.55	2.05	-0.17	2.52
Agribusiness	4274.20	4.14	5.09	3.37	6.85
Mining	3148.34	8.86	11.11	5.74	14.08
Beverage Industry	1353.20	0.22	-0.42	-6.97	0.85
Tobacco Industry	1425.67	-17.26	-17.47	-23.44	-28.77
Textile	5717.65	10.07	12.83	9.40	16.83
Wearing Apparel	1755.56	11.82	14.63	12.27	19.00
Leather & Fur Products	817.40	9.58	11.81	9.38	15.64
Wood & Furniture	2182.72	1.11	1.26	-2.97	1.42
Paper & Publishing ind.	1429.70	-3.22	-3.59	-6.18	-4.54
Chemical Products	4575.21	0.55	0.38	-2.85	1.38
Petroleum Products	4605.71	-4.07	-4.73	-14.68	-6.75
Glass & Glass Products	776.36	1.06	0.71	-2.24	1.77
Non-Metallic Products	4728.28	0.24	0.11	-2.60	0.35
Metal Industry	4354.45	4.91	5.94	2.02	7.93
Non-electrical	2579.88	3.30	3.62	0.80	5.52
Machinery	1956.39	-2.51	-3.24	-6.18	-3.58
Electrical Machinery	1723.23	-8.24	-10.97	-15.46	-11.94
Transport. Equipment	5148.68	-0.58	-0.87	-2.02	-1.02
Electricity-Gas-Water	7562.06	1.23	1.55	0.66	1.71
Construction	42688.84	3.31	3.97	1.87	5.10
Transportation- Commun.	54850.24	-2.96	-3.90	-3.50	-4.96
Other Services					

CU: Customs Union, EU: Full Membership, EU+Tax: Revenue Replacement Tax, and FT: Free Trade. The percentage changes are with respect to the base year values.

C. European Union plus Revenue Replacement Tax Scenario

The revenue replacement tax scenario will create a reduction in both profit rates and profit-capital ratios for all sectors compared to full membership assumptions. However, some sectors such as wearing apparel (12.2%), textiles (9.4%), mining (5.7%), and agribusiness (3.4%) still have profit increases compared to base year numbers. Again, these sectors already have a highly competitive structure in the world market. The remainder of the sectors experience profit decreases. The highest profit losses will be in the tobacco industry, with a rate of 23.5%; transportation equipment, with a rate of 15.5%; petroleum products, with a rate of 14.7%; electrical machinery, and paper, with a rate of 6.2%, and chemical products, with a rate of 3%. Other sectors experience small decreases in their profit rates.

Under this scenario, the average variable cost increases by 13.8% in the petroleum industry; 2.8% in the metal industry; 2.7% in the mining industry, 1.9% in the energy sector, 1.8% in wearing apparel, and 1.5% in the textile industry. Some of the sectors also experience a decrease in the average variable

cost. This shows that the tax burden imposed by the government is transmitted to the consumers in some sectors such as in the transportation equipment, tobacco, chemical products, and paper and publishing.

Table 3: *Profit/Capital Ratio*

Sectors	Base Year	CU	EU	EU+Tax	FT
Basic Agriculture	0.2964	0.3010	0.3024	0.2959	0.3038
Agribusiness	0.1897	0.1974	0.1992	0.1960	0.2026
Mining	0.0715	0.0778	0.0794	0.0756	0.0815
Beverage Industry	0.3316	0.3323	0.3302	0.2839	0.3345
Tobacco Industry	1.5394	1.2713	1.2691	1.1769	0.0951
Textile	0.2311	0.2606	0.2671	0.2590	0.2766
Wearing Apparel	0.1868	0.2104	0.2161	0.2115	0.2242
Leather & Fur Products	0.6163	0.6780	0.6919	0.6768	0.7152
Wood & Furniture	0.3804	0.5697	0.5707	0.5575	0.5716
Paper & Publishing ind.	0.1098	0.1063	0.1058	0.1030	0.1048
Chemical Products	0.1032	0.1037	0.1035	0.1002	0.1045
Petroleum Products	0.2507	0.2404	0.2387	0.2138	0.2337
Glass & Glass Products	0.1574	0.1590	0.1586	0.1538	0.1601
Non-Metallic Products	0.1454	0.1471	0.1469	0.1430	0.1473
Metal Industry	0.1343	0.0934	0.0944	0.0909	0.0965
Non-electrical Machinery	0.2382	0.2460	0.2469	0.2401	0.2514
Electrical Machinery	0.2610	0.2541	0.2525	0.2449	0.2516
Transport. Equipment	0.1271	0.1166	0.1131	0.1074	0.1119
Electricity-Gas-Water	0.0582	0.0580	0.0578	0.0571	0.0577
Construction	0.2255	0.2284	0.2292	0.2272	0.2295
Transportation-Commun.	0.2530	0.2613	0.2630	0.2577	0.2659
Other Services	0.1371	0.1331	0.1314	0.1324	0.1303

CU: Customs Union, EU: Full Membership, EU+Tax: Revenue Replacement Tax, and FT: Free Trade.

D. The Free Trade Scenario

The free trade scenario will create an increase in profit rates and profit-capital ratio for most of the sectors. However, due to elimination of all trade barriers, previously protected sectors will have profit losses. Higher profit losses will be seen in tobacco (28.8%), transportation equipment (11.9%), petroleum products (6.7%), services (5.0%), and paper and publishing (4.6%). Also, domestic production for these sectors decreases due to the higher quality of the EU products and lower prices of imported goods. The sectors experiencing profit increase are wearing apparel (19%), the textile industry (16.8%), leather and fur products (15.6%), mining (14.1%), and agribusiness (6.8%). The changes in the remaining sectors will be relatively small.

The free trade scenario and the full access scenario provide similar logical information for average variable cost structure of the Turkish economy. Fluctuations in the average variable cost are in the same direction with the full

membership scenario. However, the free trade scenario will have a greater impact on the cost of production.

VI- Conclusions

This paper examined the effect of full membership of Turkey to the EU in terms of cost of production and profitability. Since the full membership decisions are made politically, Turkish policy makers need to know how to concentrate their efforts over the transition period, and produce policies accordingly. In order to obtain the results sought, under the lights of neoclassical macroeconomic closure, a single country multi sectoral CGE model with implicit inclusion of the EU and ROW has been developed, and various policy scenarios were adopted.

With the different change rates, all competitive sectors will increase their profits shares, while monopolistic sectors will lose their profits. Although increased rates in sectoral average variable cost is higher under full membership scenario, sectoral profits increase as well. This is not a contradictory result, because increases in total production will allow Turkish producers to earn more on average. Turkish consumers, also, will enjoy buying various new and higher quality products at cheaper prices. The government will compensate its losses by receiving revenue assistance from the EU. Thus, the Turkish economy as a whole will be better off with a full membership, even though some sectors individually lose a portion of their profits.

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