

A COMPUTABLE GENERAL EQUILIBRIUM MODEL FOR THE ORGANIZED AND MARGINAL LABOR MARKETS IN TURKEY

Selahattin Bekmez, University of Idaho

Ismail Hakki Genc, University of Idaho

P. Lynn Kennedy, Louisiana State University

ABSTRACT

We consider several economic union scenarios between Turkey and the EU in relation to their impact on the marginal and organized labor markets. We simulate a general equilibrium model to obtain results. We show that wage rate and employment will be positively affected in almost all sectors of the economy with the access into European markets. Organized labor demand, however, tends to increase more than marginal labor demand in most sectors. This shows that the quality of Turkish labor tends to increase with integration. Thus, we propose Turkey should continue its efforts to seek full membership into the European Union.

INTRODUCTION

Turkey's entry into a customs union with the European Union (EU) in 1995 raised some important questions. What happens if Turkey's access to the EU is approved? What kind of policy changes should each country adopt? What are the losses and gains for the EU and Turkey? (For a political analysis, see [10] and [13]). And what kind of social problems will arise, specifically regarding labor issues? The impact of economic integration between Turkey and the EU is most likely to leave a powerful impact on the labor structure in Turkey. To better analyze the whole situation, the EU encouraged a transition period in which Turkey is obligated to lower its tariffs, quotas, and other import duties on products from EU countries.

Prior to analyzing labor issues, it is befitting to provide a background on Turkish efforts to achieve membership in the EU and other closely related topics. Although there are pros and cons for Turkey's accession into the EU, the effort of Turkish officials to join the EU will proceed. After major liberalization efforts by Turkey in the 1980s, the arguments about full membership in the EU has become a priority for Turkey, given that Turkey's joining the EU will have a strong impact on Turkey's and the EU's macroeconomic structure. Since the decisions are made politically, Turkish policy-makers need to know how to concentrate their efforts over the transition period, and produce policies accordingly.

As explained in [3], not only the transition economies such as Bulgaria, Romania, and the Slovak Republic, but also most market economies such as Greece, Turkey, Pakistan, and Egypt have very high fiscal deficits. The fragility of the economic development of a country can be determined by its fiscal constraints and the current account balance. Countries that are experiencing a current account balance

deficit have difficulty attracting new foreign investments. Such countries must offer higher interest rates to attract foreign capital or tax breaks or a combination thereof.

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, price and investment levels, wage rates, and population. Since all these issues are closely related to the budgetary and fiscal independence of a country, pre-evaluation of such policy decisions should be carefully made. Appropriate forecasting of such policy results will improve the current and future policy making capabilities of the countries. These decisions are also important characteristics in terms of achieving a fair inter-generational resource allocation problem.

[5] 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 policy. Since Turkey and the EU were interpreting harmonization differently, their analyses gave different results regarding tariff harmonization. In Turkey's interpretation, harmonization reduces tariffs to zero but still puts some import surcharges on EU products. However, the EU's interpretation is to reduce the tariffs and import surcharges to zero. In this case, the harmonization of tariffs is welfare enhancing for Turkey if its interpretation is followed, but welfare-reducing if the EU's interpretation is followed.

The acceptance of Turkey to the Customs Union 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. The question that must be asked is if this is really beneficial for Turkey? [7], [11] and [12] used two types of analyses to capture the welfare implication 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 arbitrage, and firms will be forced to use a single price. This price will be a common price for firms of both countries. In that case, the price will have a unique role to determine the welfare effects of integration. [5] claimed that the harmonization of tariffs will have very little beneficial effect on Turkey's economy. In order to be successful in its liberalization policy, it is important for Turkey to use an export subsidy reduction policy combined with 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 that [5], and [8] pointed out was the fragility of the first-best rule. In other words, 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 well-known second-best results.

A complete analysis which utilizes a multi-sector general equilibrium model of Turkey's fiscal harmonization process is conducted by [3]. The study focuses on the effects of fiscal debt and trade liberalization on foreign trade, capital accumulation, and the growth rate of Turkey. They use three different experiments. The first evaluates perfectly coordinated fiscal and trade policies, which means that all tariffs will be eliminated and income tax rates adjusted in order to compensate for tariff revenue losses. Thus, government revenue will be the same. Also, trade reform has no effect on government expenditure. The second experiment considers the 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 that the delay in the revenue enhancing policies is 40 years.

The results indicate that the longer the delay in fiscal policy adjustment, the more harmful the tariff liberalization will be. Under the first experiment, tax adjustment neutralizes the effects of tariff liberalization, but investment and imports are stimulated, due to decreases in tariff rates. As a result, the level of consumption increases. This expands the trade deficit and, thus, foreign capital inflows increase. Since Turkey has comparative advantage in the manufacturing and service sectors, the net exports of Turkey in these two sectors tend to increase. This growth in exports will be faster than its imports after the eighteenth period. As a result, under the first experiment, the economy as a whole will enjoy welfare gains from liberalization. The steady state capital stock increases by 14.5%, and consumption by 2.2% with respect to the pre-reform equilibrium. The welfare gain in the first 10 periods is 0.16%, and reaches 0.71% by the end of the thirtieth period. However, in the second and the third experiments, the results differ. Turkey suffers from fiscal problems due to the absence of compensating revenue sources. In the second experiment welfare losses will be seen in the first ten periods, but these losses disappear over time. However, in the third experiment, the welfare losses resulting from tariff harmonization become worse over time.

Although there are very important changes in the Turkish economy as a whole due to European accession, this paper will focus on the labor market. Our main objective is to investigate the impact of such a structural change in the Turkish economy on the demand for labor, which we classify into two categories. To capture the impact of the heterogeneity in the labor market, we distinguished skilled and unskilled labor as organized and marginal labor, respectively. This is because the labor market and wage rates show very different characteristics in Turkey. Skilled and unskilled labor are completely separable in many sectors and mobility of labor between two classification is limited. Huge wage differences between labor markets create non-optimal input use in some sectors.

As described in [2], the Social Accounting Matrix of the Turkish economy includes eight types of labor category. These categories are (i) scientific, technical, professional and related workers, (ii) administrative, executive and managerial workers, (iii) clerical and related workers, (iv) sales workers (v) services workers, (vi) agricultural, animal husbandry and forestry workers, fishermen and hunters, (vii) non-agricultural production and related workers, transport equipment operators and laborers, and (viii) workers not classified by occupation. The first three of categories above are considered organized labor while the remaining categories are considered marginal labor.

The model presented below considers the production and consumption sides of the economy, first with EU accession. It then explains the characteristics of the labor market in 22 different sectors under various policy scenarios using simulation within a general equilibrium model context. Our paper adds to the relevant literature in several perspectives. First of all, we collect the data from [1] into two categories of labor, i.e. marginal and organized. We also add three new scenarios to evaluate the policy implications of economic integration of Turkey with Europe, specifically the case studies mentioned below except the customs union analysis.

GENERAL EQUILIBRIUM MODEL FOR THE TURKISH ECONOMY

The purpose of this section is to explain the analytical framework and mathematical construction of a computable general equilibrium model for the Turkish economy (TRCGE). This model seeks to illustrate the impacts of Turkey's full accession into the European Union on the labor sector in Turkey, and compares the results with customs union. The model used here is an extended version of [6] and [12]. The TRCGE model consists of three different sectors and a differentiated ROW account. The model has two important specifications. First of all, it considers imperfect competition in the Turkish manufacturing sector. With this important specification, we can differentiate the commodity market as perfect and imperfect competition, and highlight the policy implications in terms of these two criteria.

The second important specification of the model is to consider differentiated factors in the production process. Capital and labor are used in the production process as primal factors. Labor is differentiated as "formal labor" and "marginal/informal labor" [6]. With this specification we can analyze the basic characteristics of two different labor markets, and show the linkages between the two. The decision processes of the model are differentiated as public and private, and the Armington assumption and small country perspectives are recognized throughout the model. The import demand for each sector is determined in a way in which the domestic production and sectoral import demands are solved in terms of relative prices and exchange rates.

This study expands the data set used in [6] by utilizing [2] disaggregated SAM categorization. This disaggregation in the data allows for more flexibility and more accurate results. Another extension of this model to [6] is in the agricultural sector. [6]'s analysis considered the agricultural sector as a whole with no sub-categorization. However, this study separates the agricultural sector into two different categories: basic agriculture and agribusiness. The last extension of the model concerns the full membership into the EU. [6]'s model considers only the customs union, not full membership; this model will extend the perspective of [6]'s model to the full membership.

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:

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

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, represents the distribution parameter, where AV_i represents the scale parameter, $L_{i,s}$ represents labor categories, K_i represents capital, represents share parameter, and

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

$$\varphi_i = 1/(1 + \rho)_i$$

represents the elasticity of substitution between primal production factors (capital and labor).

The producers choose the optimal level of physical and intermediate inputs in order to minimize their production cost. In this regard, the optimum level of input choice can be formulated as:

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

subject to 1-2. In equation 3, PQ_i represents the price of good i , PVA_i represents price of primary inputs, and PN_i represents price of intermediate inputs. The term tax is the rate of tax the government imposes on the firm.

The first order condition obtained from this optimization process produces the optimal level of primary and intermediate input use:

$$\frac{V_i}{N_i} = \left[\frac{PN_i}{PVA_i} \frac{\theta_i}{1 - \theta_i} \right]^{\frac{1}{\varphi_i}} \quad (4)$$

The subsequent step 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 the marginal labor market, but it is perfectly elastic for the formal labor category. Wages in the organized labor market are perfectly elastic. Even a subtle disturbance in the formal labor market wage rate causes a substantial shift in the labor supply from formal to the marginal market. As a result, the wage rate in the marginal labor market decreases [6].

The next step of the process is to determine the optimal factor combination in the production process. The producers' basic problem is to maximize profits. The following equation implies this basic assumption of the profit maximization criteria:

$$\text{Max} \pi_i = PVA_i \cdot V_i - \sum_s W_s \cdot L_{i,s} \quad (5)$$

where W_s represents wage rates in the two labor categories. When the first order condition for this problem is solved, we obtain labor demand for each category, shown as:

$$\frac{L_{i,s}}{V_i} = \left[\frac{\delta_{i,s}}{AV_i^{\rho_i}} \frac{PVA_i}{W_s \lambda_{i,s}} \right]^{\varphi_i} \quad (6)$$

where $\lambda_{i,s}$ 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 the ratio of the wage rate in each sector and the average wage in the economy, calculated as a parameter in the model. With this specification, the model leaves the traditional assumption of the neoclassical framework in terms of equal wage rates in all sectors, and considers the rigidity of wages in these markets in a specific sector does not work for less than a certain wage rate.

Wage and employment rates in the formal labor market are shown as:

$$W_f = \underline{W}_f \tag{7}$$

$$\underline{LS}_f = LD_f + Unemp \tag{8}$$

while wage and employment rates in the marginal labor market are shown as:

$$\lambda_{i,M} \cdot W_M = PVA_i (\partial V_i / \partial LD_M) \tag{9}$$

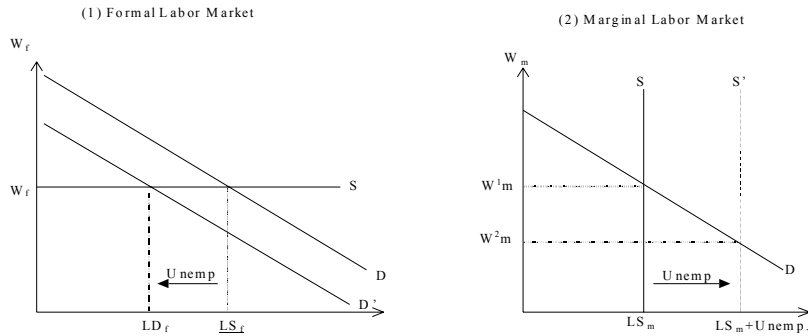
$$LS_M = LD_M + Unemp \tag{10}$$

where LD represents labor demand and LS represents labor supply.

The balance in the labor market is:

$$LS_f + LS_M = LD_f + LD_M \tag{11}$$

In order to understand the explained conditions of the labor markets, the following diagrams are adapted from [6]. The first diagram represents the formal labor market, and the second diagram represents the marginal labor market. The formal labor supply is infinitely elastic on the wage rate of \underline{W}_f . If this infinitely elastic wage rate is higher than the actual wage rate in the formal labor market, demand for the formal labor will decrease. Thus, there will be unemployment in this market ($\underline{LS}_f - LD_f$). This excess supply in the formal labor market will go to marginal labor market. This flow in labor from formal market to marginal market will increase the unemployment rate in the marginal sector and, due to the increase in the level of unemployment in the marginal labor sector, the wage rate in this sector will decrease. This issue is presented in Figure 1.



Consumers attempt to minimize their expenditures. This minimization process can be formulated as a minimization problem in the following form

$$PD_i DC_i + PM_i M_i \quad (12)$$

subject to:

$$CC_i = C_i [\phi_i M_i^{-\phi_i} + (1 - \phi_i) DC_i^{-\phi_i}]^{-1/\phi_i} \quad (13)$$

where CC_i represents composite commodity, which consists of, imported commodity, M_i , and domestically produced commodity, DC_i . In equation 13, C_i represents a shift parameter, ϕ_i represents share parameter and $1/(1+\phi_i) = \sigma_i$ represents the elasticity of substitution between domestic and imported goods. PD and PM represent domestic and imported good prices, respectively.

The private income (YH) consists of gains from value added production of the private sector, transfers from the 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 as follows:

$$YH = [\square(PVA_i \cdot V_i) - FI_G - TAX_{CAP}] + \underline{T} + (\underline{FI}_P - \underline{PT}_{ROW}) \cdot ER \quad (14)$$

where FI_G , and FI_P represent factor income of the government and private sector, respectively, TAX_{CAP} represents corporation tax rate, which is proportional to total profit. T represents transfers to the private sector, PT_{ROW} represents private income transfers to the ROW. ER stands for the exchange rate, which is defined as the domestic price of the foreign currency. In this equation and the rest, an underlined notation signifies the exogeneity of the variable in question.

The public sector is another independent component of the economy. Given this, the public sector should be carefully considered 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:

$$GREV = \underline{TARIFF} + TAX_{IND} + TAX_{HH} + TAX_{CAP} + FI_G + \underline{GFI}_{ROW} \cdot ER \quad (15)$$

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 $PQ \cdot Q \cdot tax$, and TAX_{HH} is directly proportional to YH . GFI_{ROW} represents government's factor income from the rest of the world. $TARIFF$ is an ad valorem type tax imposed on all goods and services imported into the country. $TARIFF$ is an exogenous variable for our modeling purposes since they are determined by international agreement.

$$YH = [(PVA_i \cdot V_i) - FI_G - TAX_{CAP}] + \underline{T} + (\underline{FI}_P - \underline{PT}_{ROW}) \quad (16)$$

POLICY SCENARIOS

The model is simulated under the following four scenarios through which the conditions of the two labor sectors are analyzed. Tables show the equilibrium labor in both labor markets for 22 sectors of the Turkish economy.

1) *Customs Union with the EU*: This scenario considers the agreements 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 a higher tariff rate 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 loss due to tariff reduction is compensated by increasing the rate of indirect tax. By doing so, the government can finance its 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 is made not only in the tariff rates but also non-tariff barriers such as funds 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 manufacturing and services sectors. 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.

CALIBRATION AND DATA

The model has been calibrated using the data provided by the social accounting matrix of [1], which represents the benchmark equilibrium of the model. [1] produced the matrix based on the input-output table prepared by the Turkish State Statistics Institute for the year 1990. This is the most recent year for which such a table is produced. When calibrating the scale and share parameters we make use of [9] 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 the available empirical studies such as [4], [5] and [1].

Since the data used for the base year 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 knowledge.

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 in that point. The elasticities which show the curvature of the isoquant are used in the last step of the calibration.

LABOR DEMAND AND EMPLOYMENT IMPACTS

The results of the experiments are found in Tables 1 and 2, which explain the relationships between value added price, labor supply in each sector, and production. According to the assumptions of the customs union scenario, organized labor demand increases in most of the sectors with the exception of the tobacco industry, paper and publishing, petroleum products, electrical machinery, transportation equipment and the service sectors. However, the decrease in organized labor demand in these sectors is greater than that of the marginal labor market. This is due to the increase in average wages in the marginal labor market. The decrease in organized labor demand is 13.3% in the tobacco industry, 9.9% in transportation equipments, 3.5% in the service sector, 2.9% in the paper and publishing sector, 2.5% in electrical machinery, and 2.1% in petroleum products. Although some sectors such as paper and publishing, electrical machinery, transportation equipment and the services sectors experience a decrease in marginal labor demand, in average, wage rate in the marginal labor market increases.

The European Union (Full Access) scenario considers full membership into the EU. The decreases in labor demand will continue in the tobacco industry, transportation equipment, the paper and publishing sector, electrical machinery, and petroleum products. A decrease in formal labor demand under the full membership scenario assumptions will be greater than that of the customs union scenario. The decreases in marginal labor demand in these sectors under the full membership scenario will also be small. The remaining sectors experience a demand increase for both marginal and organized labor. The highest demand increase in organized labor will be 15.4% in wearing apparel, 13.5% in textiles, 12.4% in leather and 8.8% in the mining industry. Also, marginal labor demand increases by 14.9% in wearing apparel, 13% in the textile, 12% in leather products, and 8.5% in the mining sector.

The European Union plus Revenue Replacement Tax scenario involves imposing an indirect tax to compensate government losses due to decreases in tariff revenues. Under the assumptions of this scenario, increase in organized labor demand will be considerably high in wearing apparel (12.9%), textiles (9.9%), and mining (4.6%) sectors. The decreases in organized labor will be in the transportation equipment (18.3%), the tobacco industry (18.2%), the petroleum industry (7.7%), and the paper and publishing sector (5.6%). The marginal labor market also experiences similar impacts, but in lower amounts.

For example, marginal labor demand decreases by 17% in transportation equipment, 5% in the paper and publishing industry, and 3% in services sector. The increases in the marginal labor market, however, will be in the wearing apparel (14.4%), in the textile industry (11.3%), and leather and fur industry (11.3%). The changes in other sectors in either direction will be small.

The free trade scenario produces similar results as in the full membership scenario. Demand for marginal labor will increase in all sectors with the exception of paper and publishing, electrical machinery, transportation equipment, and service sectors. In the organized labor market, however, demand will decrease in the tobacco industry, petroleum products, and energy sector in addition to those sectors in the marginal labor market. The highest decreases in marginal labor demand will be seen in transportation equipment (15%), services sectors (6.6%), and electrical machinery

(4%). The highest increases in marginal labor demand, however, will be seen in wearing apparel (19.3%), textiles industry (17%), and leather and fur products (15.7%). In the organized labor market, the direction is the same but the magnitude of changes are more severe. For example, the increases in organized labor demand is 20% in wearing apparel, 17.7% in textiles, 16.4% in leather and fur, and 11.1% in the mining sector. The highest decreases in this labor market, however, will be in the tobacco industry (22.5%), services (6%), and petroleum products (3.5%).

Table 1
Marginal Labor Demand

Sectors	Base Value	CU	EU	EU+Tax	Free Trade
Basic Agriculture	9,119,161	1.0109	1.0152	1.0106	1.0187
Agribusiness	155,899	1.0279	1.0345	1.0350	1.0467
Mining	82,317	1.0666	1.0854	1.0563	1.1063
Beverage Industry	3,305	0.9999	0.9965	0.9765	1.0015
Tobacco Industry	-	-	-	-	-
Textile	81,488	1.1006	1.1298	1.1137	1.1708
Wearing Apparel	135,967	1.1179	1.1491	1.1445	1.1936
Leather & Fur Products	73,014	1.0959	1.1191	1.1135	1.1577
Wood & Furniture	188,716	1.0066	1.0071	1.0026	1.0087
Paper & Publishing ind.	36,715	0.9683	0.9638	0.9551	0.9543
Chemical Products	21,698	1.0012	0.9995	0.9871	1.0065
Petroleum Products	-	-	-	-	-
Glass & Glass Products	7,742	1.0040	1.0016	0.9941	1.0074
Non-Metallic Products	104,481	0.9957	0.9934	0.9822	0.9943
Metal Industry	180,020	1.0058	0.9992	0.9928	1.0011
Non-electrical Machinery	30,501	1.0128	1.0141	1.0094	1.0220
Electrical Machinery	22,987	0.9714	0.9650	0.9527	0.9611
Transport. Equipment	28,376	0.8976	0.8652	0.8301	0.8529
Electricity-Gas-Water	-	-	-	-	-
Construction	492,443	1.0159	1.0210	1.0375	1.0223
Transportation-Commun.	371,479	1.0350	1.0423	1.0383	1.0547
Other Services	3,722,374	0.9601	0.9484	0.9733	0.9347

CU: Percentage Change Under Customs Union

EU: Percentage Change Under Full Membership

EU+Tax: Percentage Change Under Revenue Replacement Tax

Free Trade: Percentage Change Under Free Trade

Base Value: Person

Table 2
Organized Labor Demand

Sectors	Base Value	CU	EU	EU+Tax	Free Trade
Basic Agriculture	147,208	1.0147	1.0194	0.9984	1.0239
Agribusiness	179,378	1.0309	1.0379	1.0252	1.0509
Mining	100,330	1.0702	1.0881	1.0456	1.1111
Beverage Industry	14,921	1.0009	0.9982	0.9715	1.0035
Tobacco Industry	32,107	0.8672	0.8659	0.8185	0.7754
Textile	230,315	1.1058	1.1351	1.0989	1.1774
Wearing Apparel	152,270	1.1248	1.1544	1.1293	1.2004

Leather & Fur Products	30,202	1.1008	1.1244	1.0987	1.1642
Wood & Furniture	61,760	1.0106	1.0120	0.9889	1.0144
Paper & Publishing ind.	46,363	0.9713	0.9677	0.9442	0.9590
Chemical Products	66,268	1.0043	1.0031	0.9771	1.0110
Petroleum Products	10,106	0.9794	0.9760	0.9237	0.9657
Glass & Glass Products	17,462	1.0064	1.0043	0.9885	1.0106
Non-Metallic Products	132,144	1.0013	1.0000	0.9751	1.0020
Metal Industry	172,720	1.0185	1.0254	1.0005	1.0293
Non-electrical	62,128	1.0146	1.0161	1.0036	1.0245
Machinery	54,526	0.9750	0.9690	0.9412	0.9660
Electrical Machinery	72,368	0.9017	0.8698	0.8175	0.8584
Transport. Equipment	66,734	0.9895	0.9845	0.9640	0.9817
Electricity-Gas-Water	403,763	1.0234	1.0296	1.0126	1.0328
Construction	374,962	1.0399	1.0479	1.0225	1.0616
Transportation- Commun.	2,435,343	0.9646	0.9531	0.9586	0.9408
Other Services					

CU: Percentage Change Under Customs Union

EU: Percentage Change Under Full Membership

EU+Tax: Percentage Change Under Revenue Replacement Tax

Free Trade: Percentage Change Under Free Trade

Base Value: Person

As can be seen from Tables 1 and 2, the demand for organized (formal) labor increases in most sectors under all scenarios. This indicates that the Turkish economy will experience an increase in the quality of labor when it is opened to the world. Marginal labor will be used mostly in the sectors in which no qualifications are necessary. In other words, under all scenarios, the quality of Turkish labor will improve.

The theoretical justification for the findings come from widely known economic facts in the labor market. In that sense, we can stimulate the discussion by recognizing that the production decisions are made according to changes in value added prices. This change in value added prices results in changes in production and factor demands by altering marginal revenue of production. Since capital stock is assumed unchanged in the TRCGE model, the changes in labor demand determine sectoral distribution of the resources. According to this argument, a decrease in the value added price results in a decrease in production and organized labor demand, given organized labor wage. If this decrease is not compensated for by an increase in other sectors, unemployment exists in the economy. Excess labor in the organized labor market will move to the marginal labor market. Thus, marginal labor supply increases. This increase in marginal labor supply causes a decrease in the wage rate for marginal laborers.

One should be cautious in comparing these results with the actual numbers published elsewhere since the definitions of the variables vary greatly from one source to another with no apparent standard. We know through our personal contacts with people working for the government of Turkey that the government is in the process of standardizing these definitions in line with the internationally accepted norms under the auspices of the World Bank and IMF. Furthermore, the vast majority of the findings of the paper pertains to such cases which are not realized yet as the actual membership of Turkey into the European Union.

SUMMARY AND CONCLUSIONS

Turkey's long-time policy-target of joining the EU has raised interesting debates among academics and labor unions about the impact of a probable membership in the EU. In this study, we considered several economic integration scenarios between Turkey and the EU. Although there are very important changes in Turkish economy as a whole due to European accession, the paper focused on the labor market. This is because skilled and unskilled labor show completely separable characteristics in many sectors. Also, a huge wage difference between labor markets creates non-optimal input use in some sectors. To capture the impact of this heterogeneity, this model distinguishes skilled and unskilled labor as organized labor and marginal labor, respectively

Simulation results obtained concerning the labor market indicate that wage rate and employment will be affected positively in almost all sectors by Turkish access into the European markets. Marginal labor demand in paper and publishing, electrical machinery, transportation equipments, and service sectors decreases under every scenario. Organized labor demand, however, tends to increase more than marginal labor demand in most sectors. This shows that the quality of Turkish labor tends to increase with European access. In addition, results showed that, in general, sectoral variable costs increase due to an increase in average wage rate. The results also indicate a tendency to increase demand for skilled labor, given that the cost of skilled labor is higher than that of marginal labor.

In light of the policy assumptions and simulation results discussed above, we propose that a full membership appears to be the most beneficial scenario for the Turkish economy.

REFERENCES

- de Santis, R. A. and Ozhan, H. G. "A Social Accounting Matrix for Turkey 1990." *Economic System Research*, 9(1997): 281-285.
- de Santis, R. A. and Ozhan, H. G. "The Impacts of a Customs Union with the EU on Turkey's Welfare, Employment and Income Distribution: An AGE Model with Alternative Labor Market Structures" *Inforum Working Papers*, Department of Economics of University of Maryland at College Park, n.1. 1995.
- Diao, X., Roe, T. L., and Yeldan, A. E. "How Fiscal (Mis)-Management May Impede Trade Reform: Lessons from an Intertemporal, Multi-Sector General Equilibrium Model for Turkey." *Economic Development Center, University of Minnesota, Department of Economic, and Applied Economics, Minneapolis*. January 1998: 1-30.
- Harrison, G. H., Rutherford, T. F., and Tarr, D. G. "Economic Implications for Turkey of a Customs Union with the European Union." *World Bank Policy Research Working Papers*, n.1599, 1996.
- Harrison, G. H., Rutherford, T. F., and Tarr, D. G. "Piecemeal Trade Reform in Partially Liberalized Economies: An Evaluation for Turkey" *World Bank Working Papers*, no:951, 1993.
- Kose, A. H. "Gumruk Birliğinin Türkiye Ekonomisi Üzerine Etkileri: Bir Hesaplanabilir Genel Denge Modeli Çalışması" Unpublished Ph.D. Dissertation, Ankara University, Sosyal Bilimler Enstitüsü, Ankara, Temmuz, 1996.

- Mercenier, J. and Yeldan, E. "On Turkey's Trade Policy: Is a Customs Union with Europe Enough?" *European Economic Review* 41(1997):871-880.
- Panchamukhi, V. R. "Recent Developments in Trade Theory and Practice." *The Indian Economic Journal* 41(3), January-March 1994:1-37.
- Rutherford, T. F. "Applied General Equilibrium Modeling with MPSGE as a GAMS Subsystem: An Overview of the Modeling Framework and Syntax" *Computable Economics*, 14(1999) pp: 1-46.
- Tovias, A. "Integrating Turkey into the European Community: A Stabilizing Factor for the Middle East." *Futures* 25(9), November 1993:949-962
- Yeldan, A. E. "On Structural Sources of the 1994 Turkish Crisis: A CGE Modeling Analysis" *International Review of Applied Economics* 12(1998):379-414.
- Yeldan, A. E. "Financial Liberalization and Fiscal Repression on Turkey: Policy Analysis in a CGE Model with Financial Markets." *Journal of Policy Modeling* 19(1), 1997: 79-117.
- Yeldan, A. E. "Political Economy perspectives on the 1994 Turkish Economic Crisis: A CGE Modeling Analysis" *Economic Development Center, University of Minnesota, Department of Agricultural and Applied Economics*, Minneapolis, March 1995:1-40.

