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**Turkish EU Membership:
A Simulation Study of
Economic Effects**

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ABSTRACT

This paper evaluates the economic effects of Turkish EU membership. The evaluation is based on a widely utilized computable general equilibrium model called GTAP (Global Trade Analysis Project). Imperfect competition is modelled via assumption of scale economies on non agricultural sectors. The latest GTAP database version (base year 2001) is aggregated into seven regions: Turkey, Germany-Austria, North EU, South EU, Balkan countries, NAFTA, ASIA and Rest of World. We analyse economic effects of abolishing trade barriers between the EU25 and Turkey and applying common external tax on Turkey. Major sectoral effects are bound to originate from the agriculture which accounts 11.4 % of Turkey's GDP.

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1 Introduction

1.1 Preliminaries: Turkey's integration with the EU

Turkey's integration with the European Community has a long history. It applied for associate membership already in 1959, just two years after the establishment of the European Economic Community (EEC). The application resulted in an association agreement (Ankara agreement) four years later in 1963. Already this agreement had an intermediate goal to gradually form a customs union with the EEC by 1995. Customs union was seen as a step to a full membership as the ultimate goal. No timetable was, however, set to full membership.

In practise, Turkey pursued very inward-oriented development strategies and trade policy during the 1960s and 1970s. Only in the 1980s the Turkish economy started to open up. The shift to more outward-oriented strategy led finally to an application for EU membership in 1989.

In 1996, Turkey and the EU agreed that Turkey will join the EU's customs union. The agreement covers industrial products and processed agricultural goods. Turkey adopted the EU's common external tariff (CET), resulting in lower duties for imports from third countries, including the United States. The union establishes zero duty rates and no quotas for non-agricultural items of EU and European Free Trade Association (EFTA) origin. The current import regime is organized in five chapters that list more than 20,000 items, identified with 12 digit harmonized tariff system numbers. Turkey also adopted most of the preferential trade agreements concluded by the EU, as well as other measures covered by the EU's external trade policy. Turkey did not, however, obtain any influence of EU's external trade policy – it only started to follow the EU's commercial policy. Moreover, agriculture was excluded and it is still heavily protected by both the EU and Turkey.

Turkey started its membership negotiations with the EU in October 2005 after a 16 years delay after its application. On Turkish side the public opinion on membership is positive. According to the most recent Eurobarometer survey 54 per cent of Turks are in favour of membership and only 20 per cent against. The share of Turks who do not favour nor oppose Turkish membership has increased during the negotiations. In general, the survey results demonstrate that economic prosperity, social protection and freedom to travel, study and work in other EU countries are seen as the main benefits whereas less use of own language, loss of national identity and organised crime are placed as the main fears. All in all the results suggest that Turks think that they will benefit from membership, in particular, economically.

On the EU side the opinion is not at all as positive. Only 39 per cent of EU citizens are in favour of Turkish membership. Moreover, among the potential new member states Turkey is seen as least popular. The public opinion towards Turkish membership is most critical in Austria, Germany and Luxembourg. This suggests that membership negotiations will last long and, indeed, they have made only a little progress so far.

Thus a number of Europeans seem reluctant to accept Turkey as a member of the. One reason may be that culture of the Turkish society is seen 'non-European' reflecting the fact that Islam is the main religion and that Turkey is largely an Asian rather than a European country. Another reason why EU members may be reluctant about the Turkish accession may originate from its size. Population forecasts indicate that the Turkish population will exceed that of Germany by 2020,

which would mean that Turkey would be the biggest country in the EU and hence it would obtain substantial power in EU decision making.

1.2 Earlier studies on Turkey's EU membership

Despite the sluggish progress in membership negotiations it is important to evaluate the effects of Turkish membership from several perspectives. In this paper, we concentrate on the economic effects of Turkish EU membership using a computable general equilibrium model. There are several earlier studies on Turkish EU integration using similar methodology. Harrison, Rutherford and Tarr (1997) estimated that gain from adopting the EU's common external tariff (CET) amount 1.1 percent of Turkish GDP. As an implication Francois (2005) argues that the trade effects of EU membership will be very small due to the existing CU between the EU and Turkey. The same reason leads him to conclude that in terms of regulatory stance Turkey has developed towards the EU regime. Agriculture is not, however, a part of the CU and therefore the most substantial trade effects of Turkey's membership are expected concern agriculture.

Lejour and de Mooij (2005) focus on three following main changes associated with Turkish membership: accession to the internal European Market, institutional reforms in Turkey triggered by EU-membership and migration in response to the free movement of workers.

The authors utilise gravity estimation to derive the potential trade between the EU and Turkey. By comparing this potential trade with actual trade, they estimate the tariff equivalent of the remaining trade barriers between Turkey and the EU. These barriers were then removed to simulate the accession of Turkey to the EU internal market, thereby using a computable general equilibrium (CGE) model for the world economy that is calibrated on data for 2001. The *acquis communautaire* could act as a catalyst for improving institutions in Turkey. Many institutional indicators show that these institutions are less market oriented in Turkey than in the EU member states or the other accession countries. The authors investigate to what extent a reform of these institutions could benefit the Turkish economy by improving its competitive position. This was done by deriving the potential trade between Turkey and other countries if the institutions would be improved. They then simulated the macroeconomic effects of this trade increase with CGE model. Thirdly, the authors elaborated on the potential migration flows following the accession of Turkey to the EU. They explored the implications for labour markets with their CGE model.

The main findings of Lejour and de Mooij study are three-fold. First, the economic effects are asymmetric. The accession to the internal market yields positive effects for Turkey: private income (a measure for welfare) increases by 4.4 billion US$ (approximately €3.5 billion, assuming 1€= 1.25US$), while GDP expands by about 0.8% in the long term. Incumbent EU countries benefit from the accession of Turkey to the EU, albeit only marginally. This is a typical finding in studies concerning EU enlargements where a relatively small country or groups of countries assumed to join. The result is simply due to the fact that the EU is in relative terms much more important trading partner than Turkey is from the viewpoint of the EU. Second, membership in the Internal Market is likely to improvement national institutions in Turkey and this would bring large effects relative to the direct impact of the accession to the Internal Market. Turkish GDP would increase according to Lejour and Mooij estimate by 5.6% due more working institutions. Third, migration involves a potentially important effect in light of the accession of Turkey to the EU. An expected inflow of 2.7 million Turks to the current EU, mainly to Germany, would reduce GDP in Turkey by between 1.8% and 2.2%, and increase it in the EU-15 by between 0.5% and 0.7%, depending on the

skill composition of the migrants. Flam (2005) estimates that the number of Turks in Germany will reach 3.5 million from the current 2.2 million. Drawing on earlier empirical and theoretical literature, he argues that wages of skilled workers might increase in the current EU countries if the immigrants are complements to local skilled labour. Wages of unskilled labour is, in turn, are likely to decrease.

Francois (2005) explores both quantitative and qualitative implications of Turkish accession to the EU for the transport sector. The paper executed an application of numerical estimates of the economy-wide and sector impact of accession (given the pre-existence of a customs union) on the sector. Also a factor analysis of regulatory regimes was performed.

The customs union, as currently constructed, yielded a boost in Turkish welfare (measured as a % of base national income) of over 1.3 % relative to baseline with MFN industrial tariffs. Based on 1997 values, this was comparable to a boost in real GDP of $2.2 billion. The static effect is slight, adding less than 0.1 % to welfare through induced capital accumulation. Both skilled and unskilled workers gained from the agreement, with a 2.2 % and 1.7 % boost to real incomes (net of changes in the CPI) over the long-run. Such wage changes were considerable, given that they were realised in the context of a trade agreement.

In their recent study, Togan and Hoekman (2005) argue that the main economic dimensions of Turkish membership are the availability of the EU model, free labour mobility, assistance from the EU budget and EU institutions. Contrasting to other studies they argue that the first effect seems gradually been achieved through the CU with the EU. Agriculture, which has an important role in Turkish economy, is however excluded from the CU. De-regulation is another additional issue that is not directly implied by the CU but is an essential part of the Internal Market. Togan (2005) estimates that the economic gain from EU membership for Turkey will be 3.6 per cent of Turkish real household income and 2.6 percent increase in GDP. The major impact on welfare comes from deregulation of banking, transportation, telecommunications and electricity sector. The total income effect is slightly smaller than in Lejour and Mooij (2005) but the output effect is slightly bigger. In this paper, we also deal indirectly with regulation by using a simulation model that assumes imperfect competition. We also put emphasis on sectoral and geographical results.

2 The Turkish economy

The per capita GDP for the year 2003 (PPP) is almost 6,400 dollars, significantly lower than the average of the EU. The main contribution to the Turkish GDP comes from the services sector (60%). Other sources are industry (28%) and agriculture (12%).Tourism is the leading branch in the services sector. In 2000, the number of tourists reached 10.2 million while the forecast is that by the year 2020 the number of tourists visiting Turkey each year will reach some 40 million. Approximately 33% of the Turkish work force is employed in agriculture.

The Turkish economy possesses a number of advantages, including a very young population, very low labour costs (some 25% of the labour costs that are the norm in Germany), a proficient labour force and a central and convenient location between Western Europe, Asia and the countries of the Middle East.

In 2003, exports from Turkey amounted to some 47 billion dollars. In the same year, imports into Turkey amounted to some 68 billion dollars. The main export components are the textile industry, followed by the automobile industry and food. The main import components are machinery and

equipment and the import of types of fuel. Turkey's main trading partners are the countries of the EU. In 2003, main exports were to Germany (16%), the U.S. (8%) and the U.K. (8%).

In 2003, most imports, were from the EU countries, mainly Germany (13.7%) and Italy (7.9%). The Turkish economy benefits from a Customs Union agreement that was signed in 1996 with the EU. The agreement increases profitability of trade with the EU countries. The main natural resources in Turkey are the Chromites copper mines, sulfur and coal. Turkey is also very rich in water resources that it is attempting to export to other countries. The Turkish economy benefits from membership of a number of international organizations, including, among others - NATO, OECD and IMF.

Analysis of the main indices in Turkey shows a high rate of inflation in Turkey compared to the EU. Despite the recent decrease in inflation, the 2003 annual rate of inflation is still around 25% per annum. The forecast for 2004 is around 11%. The GDP in 2002-2003 shows a recovery. The unemployment rate in 2003 is around 10%.

The Government of Turkey estimates that as a result of its accession to the European Customs Union, the average duty rate for imports from the European Union and EFTA countries has dropped from approximately ten percent to zero. For products imported from third countries, including the United States, the average duty rate has dropped from ten percent to approximately five percent. Turkey has reserved some exempted categories for sensitive products with tariffs on these items generally much higher than the CCT. Some agricultural goods will remain protected by steep tariffs until the next WTO round is concluded. When the European Union applies further Uruguay Round reductions, Turkey's average rates for third countries (including the U.S.) will be lowered to 3.5 percent.

Turkey is a member of GATT/WTO and regulates its customs practices in line with GATT requirements. In 1989, Turkey, along with the United States, converted to the new GATT Harmonized System. While generally in compliance with the WTO agreement, Turkey has exceeded its annual export subsidy limits for sugar and wheat in the past. In the current year, Turkey has exceeded its limits for barley. Turkey regularly fails to notify the WTO of changes to import requirements. Application of non-tariff barriers also poses problems for agricultural products such as wheat and bananas. Maintenance of high import duties on agricultural products, while consistent with WTO obligations, is not consistent with the spirit of the WTO agreement. Turkey's failure to establish protocols for the importation of all meat products (except for breeding cattle-beef and dairy), effectively banning all imports is in violation of WTO obligations.

Import duties are calculated on the CIF value. Turkey is a signatory to Article VII of the General Agreements on Tariffs and Trade (GATT). The agreement stipulates that the customs valuation is the transaction value (the price that is actually paid or payable plus costs and expenses). Turkey is also obliged to comply with other Article VII provisions including the rapidity of clearance of goods, currency convertibility, and appeal privileges and rights. Turkish regulations do not allow for advance rulings on customs HS classification or on the applicable import duties on particular products.

Customs surcharges including a value-added tax (VAT) being levied on most imported, as well as domestic, goods and services. The importer is responsible for paying the VAT. The VAT is calculated on a C.I.F. basis plus duty rate and any other applicable charges levied before the goods clear customs. It has a ceiling of 26 percent; however; most industrial products are charged a rate of

18 percent. Capital goods, some raw materials, imports by government agencies and state owned enterprises, and products for investments with incentive certificates are exempt from import fees.

3 GTAP model

The Global Trade Analysis Project1 (GTAP) is a multi-region, computable general equilibrium (CGE) model. The inter-regional linkages originate from bilateral trade flows, while intra-industry linkages are captured by the regional input-output structure. The associated GTAP database covers bilateral trade data, structure of production, consumption and intermediate use of commodities and services. The latest version of the database, GTAP 6 Beta, includes 78 different regions[2] and 57 different sectors of production.

Macroeconomic data (GDP, private consumption, government consumption, and investment) are used in updating the input-output tables to a common reference year – 2001. The primary source of 2001 macroeconomic data used in the GTAP 6 Data Base is the World Bank.

Reconciled bilateral 2001 merchandise trade data is based on COMTRADE data. Services trade data was updated to 2001 using the IMF Balance of Payments Statistics.

GTAP model computes money metric equivalent of aggregate per capita utility for a region (using the regional household's utility function). The regional household's Equivalent Variation (EV) which is the difference between the expenditure required to obtain the new, post-simulation level of utility at initial prices.

The standard GTAP-model is a multi-region, applied general equilibrium model, with perfect competition and constant returns to scale. Imports are differentiated by their source from domestic goods, that is, the Armington assumption is made on bilateral trade. The standard model has some salient features that distinguish it from other CGE models: a presentation of private household preferences with a non-homothetic constant-difference-of-elasticity (CDE) functional form, an explicit treatment of international trade and transport margins, and a global banking sector which intermediates between global savings and consumption.

Each industry is represented by a single homogeneous commodity. The basic model includes three factors of production: labour, capital, and land. Labour and capital are mobile across domestic sectors, while land is assumed to be used only in agricultural sectors. Capital is traded internationally like intermediate inputs, while labour and land are not mobile across borders.

The model gives users a wide range of closure options (choosing which variables are exogenous), including a selection of partial equilibrium closures which facilitate comparison of results to studies based on partial equilibrium assumptions.

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[1] See (http://www.gtap.agecon.purdue.edu)

[2] Of which 56 are primary regions and 10 composite regions.

3.1. Regional Household

In each region, there is a regional household whose Cobb-Douglas preferences are defined over composite private expenditures, composite public sector expenditures and savings. The regional household derives income from ownership and sales of primary factors of production - capital, skilled and unskilled labour, land and natural resources. It turns out that the inter-temporal, extended linear expenditure system could be derived from an equivalent, static maximization problem, in which savings enters the utility function (Howe 1975). This result provides a justification for the inclusion of savings in the regional utility function.

Private expenditures are governed by a Constant Difference of Elasticity (CDE) function which was first proposed by Hanoch (1975). The CDE function has the desirable property that the resulting preferences are non-homothetic and is more parsimonious in its parameter requirements than functional flexible forms. It can also be shown that the CES and the Cobb-Douglas are special cases of the CDE function. Government expenditures are governed by a Cobb-Douglas preference function. Finally, there is inter-industry demand whose technical specifications are described by the usual input-output matrix.

3.2 Production

Production is presented by a multi-level production function. The upper nest is a Leontief production function involving value added and intermediate inputs. Value added is produced through a Constant Elasticity of Substitution (CES) function of the three primary factors of production. Each intermediate input is in turn produced using domestic and imported components (the Armington assumption) with the technical process described by a CES function. Finally, imported components are a mix of imports from the other regions in the global model with the technical process again described by a CES function.

Households own all factor supplies - land, natural resources, capital, skilled and unskilled labour and sell their services to firms. In the GTAP model, sluggishness of some factors is allowed so that it is possible for factor prices not to be equalized within a region. Firms are supposed to sell output and purchase inputs (whether primary factors or intermediates) in competitive markets. Hence, firms make no economic profits.

Labour and capital are mobile across domestic sectors, while land is assumed to be used only in agricultural sectors. Capital is traded internationally like intermediate inputs, while labour and land are not mobile across borders.

The GTAP model allows for factor taxes, production and consumption taxes, export taxes and import tariffs which are in turn distinguished by production sector, by agent (regional household, firm, government) and by region.

3.3 Savings and Investment

Given the Cobb-Douglas assumption about preferences of the regional household, savings are a constant proportion of regional household income. The pool of savings is what becomes available for investments. There is a capital goods sector in each region, which produces the investment goods. The rate of return on capital goods is assumed to be inversely related to the stock of capital.

The allocation of investment across regions and sectors is done in such a way that expected regional rates of return change by the same percentage. In the model, the pooling of savings and the global allocation of investment are costless.

The GTAP model does not contain a financial sector. An investment is therefore represented by a unique investment good that is not form-specific, sector-specific, or region-specific. As such, the model framework has a limitation in the flow analysis of FDI. The model is strongly relevant, though, to general equilibrium analyses of an FDI-related increase in a region's capital stock, and of a technology spill-over.

3.4 Macro Framework

In the GTAP model, private households and government are treated as a single decision-making economic agent called the regional household. Private households supply productive factors (land, labour, and capital) to producers, and obtain factor income in return. Government revenues come from household income taxes, producers' taxes, and taxes on international transactions (minus subsidies if they exist). Regional income is defined as the sum of private households' factor income and government revenues minus capital stock depreciation. Regional income in excess of regional expenditures is saved and used as investments by producers. Two global sectors complete the system. The global transportation sector provides services that account for the difference between FOB and CIF values for a particular commodity shipped along a specific route. The global banking sector is designed in such a way as to secure the global savings-investment consistency.

3.5 Imperfect competition

The standard GTAP model assumes perfectly competitive markets and hence marginal cost pricing rule. Francois (1998) formulated an imperfect competition module that can be added to the standard GTAP model. The imperfect competition module[3] includes several types of oligopoly models: increasing returns to scale, monopolistic competition, and free entry and exit assumptions. The models are documented in Francois (1998).

For this study we considered the effect of scale economies. For these we needed information on cost disadvantage ratios defined as CDR=(AC-MC)/AC.

Martins et. al (1996) estimate sector specific P/MC margins for OECD countries. The link between cost disadvantage ratio and price cost margins comes from

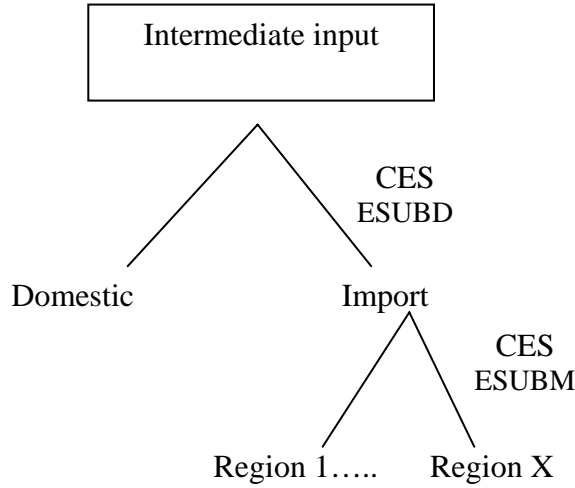$$CDR=(AC-MC)/AC = (P-MC)/P=1-(MC/P) \text{ under P=AC pricing.}$$

In the model, falling average costs are captured via variable *ao*, which is output augmenting technical change. For imperfectly competitive sectors this is determined endogenously via following equation.

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[3] see also http://130.94.208.165/francois/data.htm

$$\frac{1}{CDR} = (qva - FIRMS) = ao$$

where *CDR* denotes the scale-economies parameter defined above, *qva* is percentage change in real value-added demanded by the sector. FIRMS is a variable denoting entry to the market (assumed here exogenous). According to the above equation, *ao* rises, or equivalently average costs fall as the quantity of value-added per firm rises. The rate at which this fall in average costs takes place when output increases depend inversely on the CDR parameter value.

In Armington models, goods are differentiated by country of origin, and the similarity of goods from different regions is measured by the elasticity of substitution. Within a particular region, we assume that demand goods from different regions are aggregated into a composite good according to the CES function.

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        ┌─────────────────────┐
        │  Intermediate input │
        └─────────────────────┘
                  /\
                 /  \  CES
                /    \ ESUBD
               /      \
          Domestic   Import
                        /\
                       /  \ CES
                      /    \ ESUBM
                     /      \
               Region 1…..  Region X
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The imperfect competition module assumes a non-nested Armington structure, that is ESUBD, the Armington CES elasticity for domestic/imported allocation equals ESUBM, the Armington CES elasticity for regional allocation of imports.

4 Simulations

4.1 Scenarios

In the following, we assess the economic effects of Turkish EU membership. To carry out the investigation we run the following simulations.

1. Competition standard – this corresponds to standard GTAP model with import sourcing.
2. Scale with no entry – this corresponds to the existence of scale economies (as quantified by the cost disadvantage ratios defined as CDR = (AC-MC)/AC.
3. Scale with entry – is the same as above, but with zero profit (p=ac) assumption

The first scenario is applies the standard perfect competition version of the GTAP model and it serves as a benchmark. The two other scenarios assume economies of scale

Figure 1   Scale parameter values
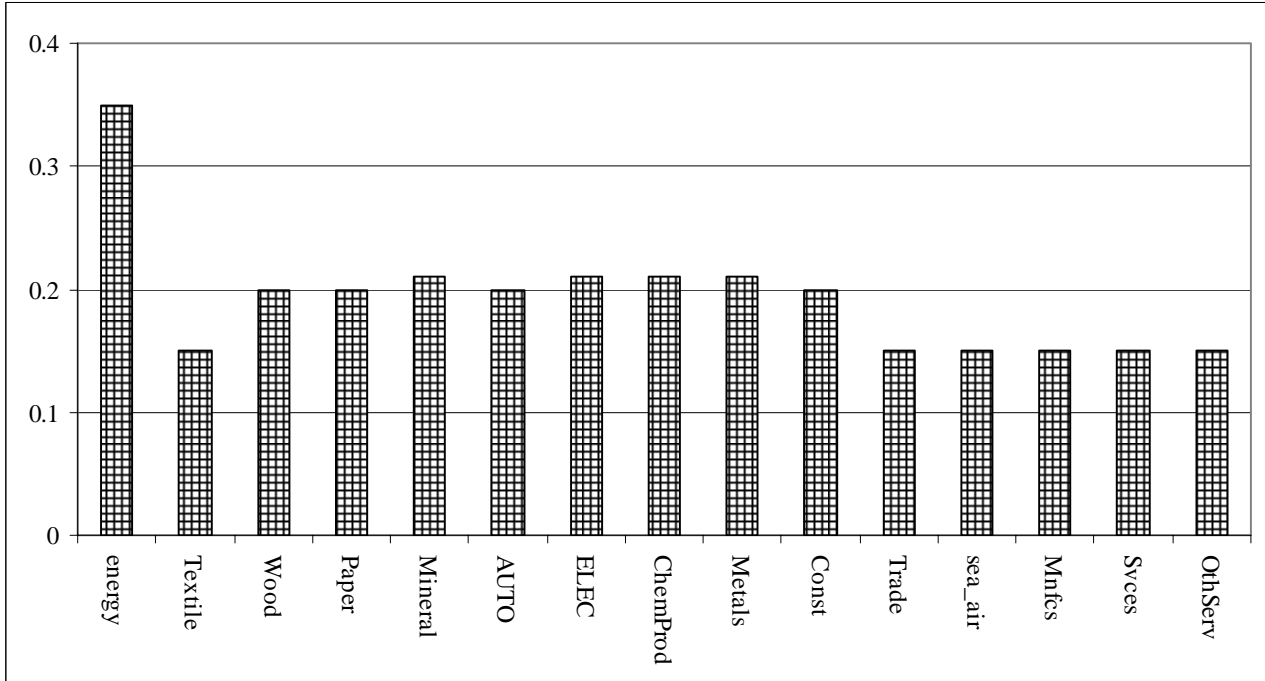
Note: Using the fact that CDR=(AC-MC)/AC = (P-MC)/P=1-(MC/P) under P=AC pricing, the above estimates for the scale economies parameter were used.

Togan (2005) considers only some industries with a different methodology. He ends up with 26 per cent price decline in banking, 33 per cent in telecommunications, 9 per cent in transport and 21 per cent in electricity. Using these we end up with almost exactly the same scale parameters as shown in figure 1.

In simulations, we aggregated the 78 regions into eight and 57 industries into 15. The regions in the simulations are Turkey, EU north (EUN) comprising Nordic countries, Baltic countries, Benelux countries, Poland, the UK and Ireland; EU south (EUS) comprising the rest of the EU except Germany and Austria that were assumed to form one unit; Balkan countries, NAFTA, Asia and the rest of the world (ROW). The industry aggregation can be seen in figure 1 and the detail in appendix 2.

4.2 Results

Our simulation results clearly confirm earlier findings that suggest clear benefits for Turkey and not significant impact on the other parts of the world. Figures 2 and 3 show the welfare effect measured by equivalent variation in million of USD and the output effect as a percentage of GDP. As an aggregate the rest of the world seems to gain welfare slightly especially in scale with entry scenario. This does not hold in standard benchmark scenario with perfect competition in which the EU

incumbent countries lose. Moreover, EU south loses under both imperfect competition scenarios. The output effect for the rest of the world can hardly be seen.

Compared to earlier quantitative estimates our positive effect for Turkey is smaller in terms of output and welfare than most of the earlier studies. Our results are, however, very similar to those obtained in Francois (2005). He also considers dynamic effects, which is not done here. Their impact on welfare is roughly additional 50 per cent and they have various output effects, biggest being in agriculture.

Let us next have a look on sectoral output effects shown in table A1 in appendix 1. The results assume scale economies. Again there are no significant effects on other regions and countries than Turkey. The sectors that gain output in Turkey are wood, electronics, manufactures and to some extent car and textile industries. The only sector that is shrinking is agriculture. Compared to Francois (2005) results ours are somewhat different as we obtain a positive output effect for car and metals industries. Moreover, in textiles the output effect in table A1 is much smaller than in Francois (2005). One obvious reason for this is the small scale parameter value in textiles.

In sum, Turkish EU membership is clearly beneficial for Turkey and it does not seem to have significant negative impact for the rest of the world. If we take scale economies into account the aggregate effects are larger than in perfect competition case. Also, the industries having the highest scale parameters naturally gain more than those with lower scale parameters, which makes the some difference to the results that assume perfect competition. Still, lighter industries like electronics and light manufacturing, where Turkey has comparative advantage, are the winners of deeper EU integration.

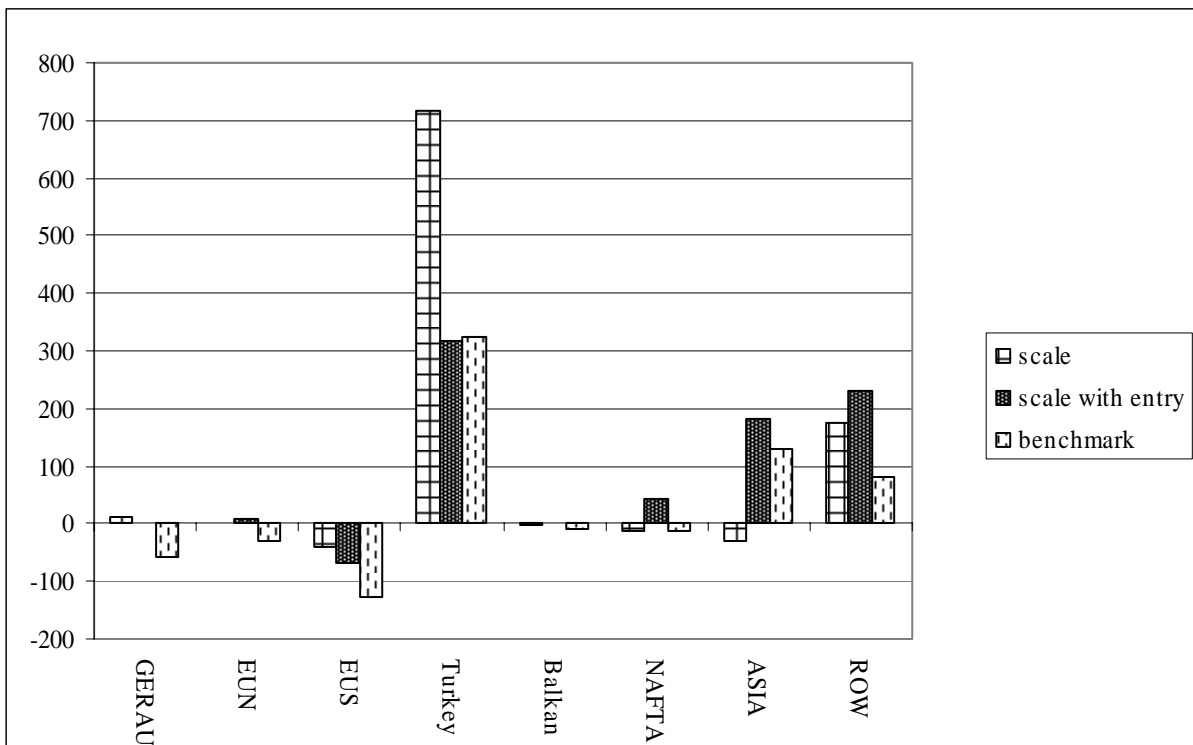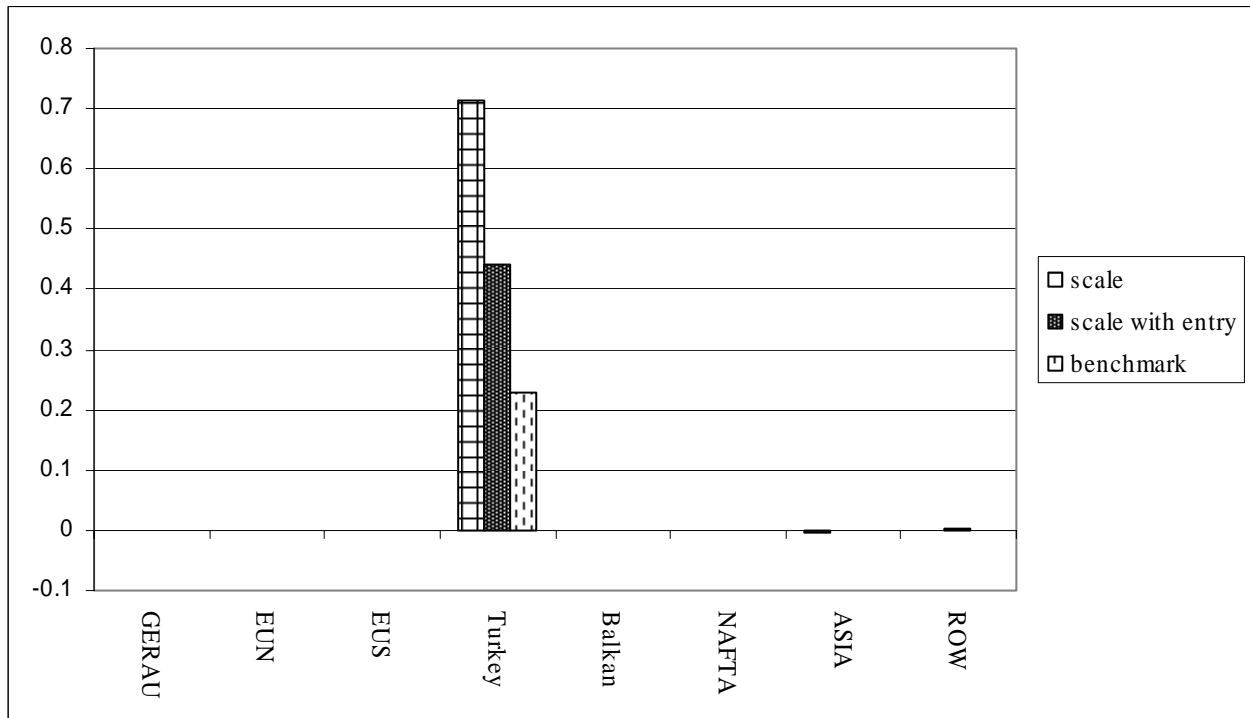Figure 2.   Economic welfare effects of Turkish EU accession, EV in mill. USD

Figure 3   The output effects of Turkish accession to the EU, % of GDP

5. References

Flam, H. (2005): Economic Effects of Turkey's Membership on the European Union, in Hoekman, B. and Togan, S. (eds.): Turkey Economic Reform & Accession to the European Union, World Bank and CEPR.

Francois, J. F. (1998), 'Scale economies and imperfect competition in the GTAP Model,' GTAP Technical Paper No. 14

Francois, J. (2005): Accession of Turkey to the EU: Implications for the Transport Sector, in Hoekman, B. and Togan, S. (eds.): Turkey Economic Reform & Accession to the European Union, World Bank and CEPR.

Hanoch, G. 1975. "Production and Demand Models with Direct or Indirect Implicit Additivity," Econometrica 43:395_419.

Harrison, G.W., T.F. Rutherford, and D.G. Tarr, (1997): Economic implications of Turkey of a Customs Union with the European Union, European Economic Review 41, p. 861-870.

Hoekman, B. and Togan, S. (1995, eds.): Turkey Economic Reform & Accession to the European Union, World Bank and CEPR.

Howard Howe, Robert A. Pollak, Terence J. Wales, (1975) Theory and Time Series Estimation of the Quadratic Expenditure System Econometrica, Vol. 47, No. 5 (Sep., 1979), pp. 1231-1248

Lejour, A and de Mooij, R. (2005): Turkish Delight – Does Turkey's accession to the EU bring economic benefits? KYKLOS Vol. 58/1: pp. 87-120

Joaquim Oliveira Martins & Stefano Scarpetta & Dirk Pilat, 1996. "Mark-Up Ratios in Manufacturing Industries: Estimates for 14 OECD Countries," OECD Economics Department Working Papers 162, OECD Economics Department.

Togan, S. (2005): Economic Implications Of EU Accession for Turkey, in Hoekman, B. and Togan, S. (eds.): Turkey Economic Reform & Accession to the European Union, World Bank and CEPR.

Appendix 1. Regional welfare and output effects of Turkish EU accession

Figure A1.   Regional welfare effects in standard model
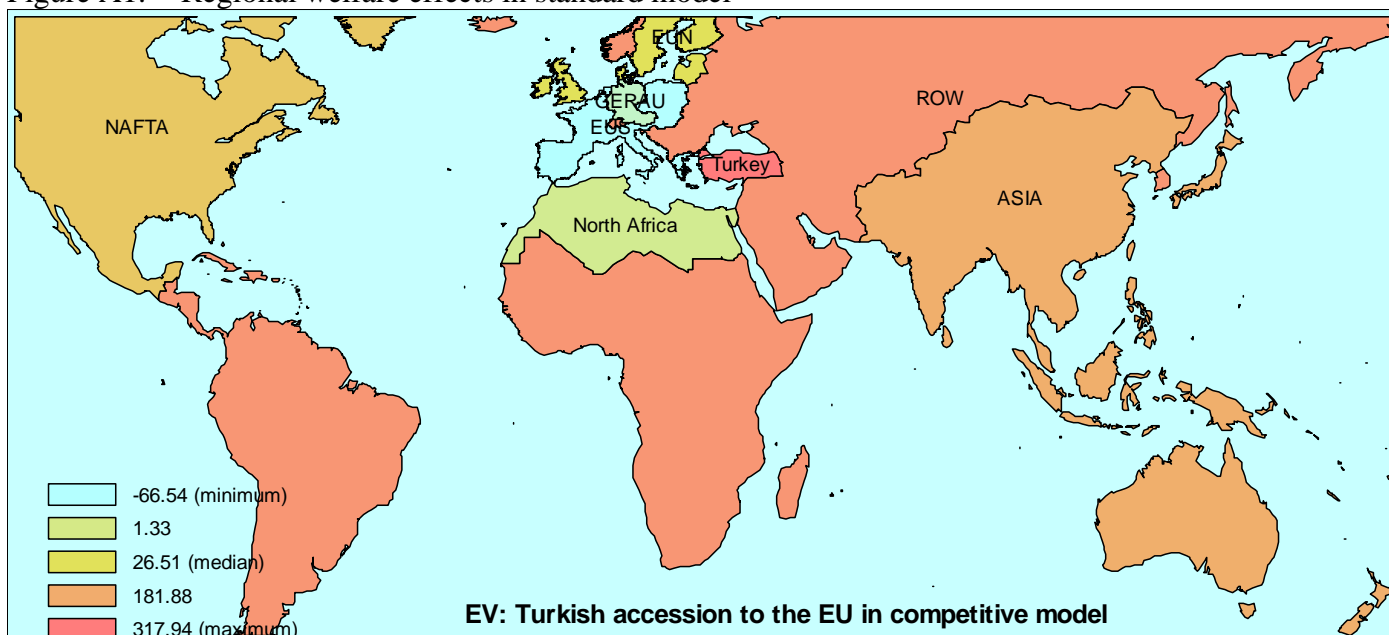
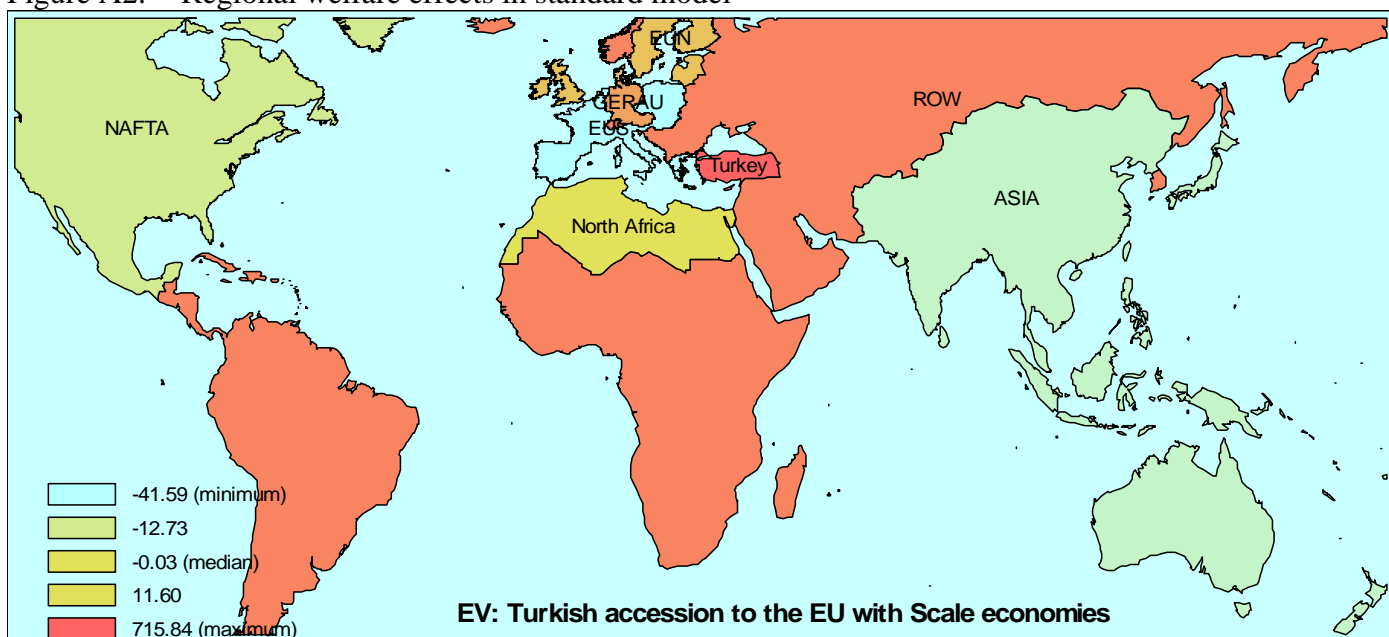

Figure A2.   Regional welfare effects in standard model

Table A1.   *The effects of Turkish accession to the EU on output in different regions and sectors assuming scale economies*

	GERAU	EUN	EUS	Turkey	BALK	NAFTA	ASIA	ROW
AGRI	-0.071	-0.016	-0.064	-4.575	0.031	0.042	0.056	0.024
energy	0.017	0.012	0.019	0.776	0.014	0.003	-0.003	0.001
Textile	-0.236	-0.160	-0.112	1.754	-0.246	-0.015	0.044	-0.088
Wood	-0.022	-0.003	0.013	6.758	-0.037	0.000	-0.037	-0.063
Paper	0.013	0.001	0.014	0.481	-0.014	0.002	-0.008	-0.019
Mineral	-0.002	-0.008	-0.002	1.064	-0.001	-0.003	-0.009	0.001
AUTO	0.006	-0.009	0.009	1.747	-0.014	-0.004	-0.018	-0.017
ELEC	0.049	0.015	0.096	3.594	-0.007	0.000	-0.042	-0.050
ChemProd	0.011	0.001	0.004	0.238	-0.035	0.003	-0.001	-0.004
Metals	-0.073	-0.092	-0.133	4.640	0.122	-0.010	-0.012	0.089
Const	-0.010	-0.003	0.000	1.490	-0.003	-0.003	-0.005	0.005
Trade	0.002	0.001	0.000	0.585	0.002	0.000	-0.006	0.000
sea_air	0.042	0.030	0.047	0.556	0.030	0.001	0.004	0.008
Mnfcs	0.045	0.023	0.073	3.976	-0.027	-0.015	-0.048	-0.073
Svces	-0.003	-0.003	-0.007	0.940	0.006	0.000	-0.002	0.000
OthServ	0.005	0.003	0.005	0.475	0.004	-0.002	-0.006	-0.002