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Economic Implications for Turkey of a Customs Union with the European Union

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Turkey stands to gain from 1 to 1.5 percent of GDP annually from the customs union arrangement with the European Union. It also stands to lose about 1.4 percent of GDP from lost tariff revenues. Applying the value-added tax (VAT) uniformly (instead of just raising it) would allow VAT rates to fall while compensating for the revenue loss from reduced tariffs and increasing the welfare gain from the customs union.

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Summary findings

Turkey and the European Union (EU) have agreed to implement a customs union. This means Turkey will eliminate its tariffs and levies on imports of manufactured products from the European Union. Turkey will also apply the EU's "common external tariff" on imports from third countries. Turkey will be obligated by 2001 to provide preferential access to its markets to all countries to which the EU grants such access.

Since Turkey is both eliminating tariffs on EU imports and reducing tariffs on imports from third countries, it will become a rather open economy in nonagricultural sectors, with tariffs below 2 percent (zero for imports from the EU and slightly over an average 3 percent for third countries).

And since preferential access agreements with third countries will typically be reciprocal, Turkish exporters can expect improved access to those markets.

According to Harrison, Rutherford, and Tarr, Turkey's biggest gains from the customs union arrangement will come from this improved access to third country markets. Using a comparative static computable general equilibrium model of Turkey, they estimate that Turkey stands to gain between 1 and 1.5 percent of GDP annually from the customs union arrangement with the EU, depending on what complementary policies it adopts.

They also estimate that lost tariff revenues will amount to 1.4 percent of GDP. For Turkey to avoid worsening its fiscal deficit, it must find ways to reduce expenditures or increase revenues. Its best choice is to reduce expenditures through accelerating privatization of state-owned enterprises which will generate a number of macroeconomic and efficiency benefits in addition to the fiscal benefits.

If a value-added tax (VAT) is used as a replacement tax, they estimate that VAT rates must increase 16.2 percent in each sector --- for example, from 10 percent to 11.6 percent --- to compensate for the revenue losses from implementing the full customs union. But uniform application of the VAT would allow the VAT rates to fall while still compensating for the loss from reduced tariffs and would increase the welfare gain from the customs union.

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ECONOMIC IMPLICATIONS FOR TURKEY OF A CUSTOMS UNION WITH THE EUROPEAN UNION: A QUANTITATIVE BASED POLICY ANALYSIS

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I. Summary and Overview

The Customs Union with the EU contains many elements, and we have developed a computable general equilibrium model to quantify their impacts on Turkish welfare, employment and value-added by sector, revenue implications for the government, real exchange rate effects and other relevant variables. In this section we provide a broad overview of those results and summarize the main themes that emerge from the analysis.

It is well known that the customs union with the EU will imply that Turkey will eliminate its tariffs and levies on imports of manufacturing products originating from the EU. In addition, Turkey will apply the "Common External Tariff" (CET) of the EU on imports from third countries. It may be less understood that application of the CET for most products will also involve a substantial reduction of tariffs against imports from third countries. In part this is true because the "most favored nation" (MFN) tariff of the EU is only about 7-8 percent on average. But equally important, application of the EU's CET implies that Turkey will be obligated to provide preferential access to its markets to all countries to whom

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the EU grants preferential access.[1] By the year 2001, it is expected that Turkey will negotiate preferential trade agreements with all countries with whom the EU has a preferential agreement. By the year 2001, based on Turkey's present import shares, the average tariff on non-agricultural imports will be less than 2 percent (zero for imports from the EU and slightly over 3 percent on average for third countries).

Since Turkey is complementing its tariff elimination on EU imports with tariff reductions on imports from third countries, Turkey will become a rather open economy in the non-agricultural sectors. This complementary tariff reduction to third countries should be regarded optimistically since it reduces the trade diversion costs of the customs union, and results in additional gains from trade. Moreover, since the preferential access agreements with third countries will typically be negotiated reciprocally, Turkish exporters can anticipate improved access to the markets of the third countries to whom it grants preferential access. According to our estimates, improved access to third country markets results in gains to Turkey that are quantitatively the most important element in the customs union arrangements. This indicates that the government should expedite its negotiations with all countries with whom it will negotiate preferential agreements, analogous to the steps it has already taken with Hungary.

Our estimates are that the gains to Turkey of the customs union with the EU are between 1%-1.5% of its GDP per year depending on the complementary policies adopted by Turkey, as discussed below. These gains are recurring, in the sense that they can be expected each year, and they take into account the costs of imposing higher taxes to compensate for the revenue loss of the tariff. Of course, the results are

[1]This includes all the Eastern European countries with whom the EU has "Association agreements," the countries in the Mediterranean that are subject to the EU's Mediterranean policy, the African, Caribbean and Pacific countries that are part of the Lome convention, as well as GSP treatment for eligible countries.

dependent on the model structure. In particular, the long run dynamic impact on the growth rate of the Turkish economy, however, is not estimated in our model, so the gains from the customs union are likely to be larger than we have estimated.[2]

At the same time, the movement toward a more open economy presents certain challenges for Turkish policy-makers. One important challenge is the revenue replacement challenge. We estimate that Turkey will lose tariff revenue equal to 1.4% of GDP. Given the crucial importance in Turkey of reducing the fiscal deficit, it is essential that expenditure reduction or revenue increases be found so that the customs union does not increase the fiscal deficit. If the VAT is used as the replacement tax, we estimate that VAT rates will have to increase by 16.2% in each sector to compensate for the revenue loss from implementing the full customs union (for example from 10% to 11.6%). This challenge is complicated by the fact that some tax experts in the government of Turkey believe that the most obvious choice for a revenue replacement tax, the VAT, will generate little revenue due to tax evasion problems. There is a concern that an increase in the VAT rates will increase the relative share of the informal sector in the

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[2]Of course, there are some caveats to the estimates due to the specific model structure employed. The estimates may be high to the extent that they ignore the costs of adjustment. There are likely to be short-run costs of adjustment to labor, including temporary unemployment, even though in the medium to long run there is no reason to believe the unemployment rate would change. And Turkish industry will have to incur adjustment costs in order to produce at higher product quality standards. Estimates of the costs of adjustment, however, are typically small in relation to the gains from trade liberalization. (See Tarr and Morkre, 1984.) Moreover, it is possible that some of the funds that the EU has allocated to assist Turkey in its adjustment to the customs union could be used for the purpose of product quality upgrading in Turkish industries as well in retraining and relocating labor. This would reduce the adjustment costs to Turkey. The estimates also assume that the preferential access agreements with third countries are all implemented, something that will be phased in through 2001. Since the full gains will not be realized before 2001, the estimates should be viewed as a comparison between 1993 and 2001 and subsequent years. For years in between only a portion of the gains would be realized.

On the other hand, recent models have shown that the dynamic gains from trade liberalization are several times the static gains. (See, Baldwin, 1989; and Rutherford and Tarr, forthcoming.) Incorporating the impact of imperfect competition would also increase the gains, although to a much smaller extent than the dynamic impacts. (See Harrison, Rutherford and Tarr, 1995.) Taking all these caveats into account, the gains to Turkey are likely to be considerably larger than we have estimated.

economy. To the extent that this is a valid concern, subsidy reductions would serve the dual purpose of increasing efficiency directly by reducing distortions, but also would reduce the revenue needs of the state and reduce the indirect distortions imposed by subsidies through the requirement of additional taxes.

A second challenge is how to use the trade and tax policies available to Turkey after becoming a member of the customs union so that significant unintended distortions are not introduced into the economy. For example, the customs union will not impose any restrictions on Turkey with respect to its tariffs on agricultural imports. Consequently, agriculture in Turkey will become highly protected relative to manufacturing unless Turkey takes unilateral action to reduce agricultural protection. Similarly, the customs union imposes no restraints on export subsidies to third countries or in agricultural products to any destination.[3] Distortions would be created regarding the use of export subsidies, unless proportional reductions in export subsidies are applied to third countries. In addition, the revenue replacement requirements of implementing the customs union will be significantly reduced if export subsidies are reduced in third country and agricultural markets. We estimate that the VAT would have to increase by only 9.1% (rather than 16.2%) if export subsidy reduction to the rest of the world complemented implementation of the customs union.

A third challenge is to develop a stable macroeconomic environment that will encourage foreign direct investment. Many believe that the creation of a customs union with the EU will encourage foreign direct investment in Turkey, and that this will be one of the more important benefits of the customs union.

[3] Turkey is bound by GATT/WTO rules, in addition to any specific agreements with the EU. Our analysis assumes (without investigation) that Turkey is in compliance with its GATT/WTO obligations with respect to export incentives. There are many in Turkey who believe that the Framework Agreement for the customs union between the EU and Turkey imposes comparable restraints as GATT/WTO rules regarding the subsidies and export incentives code. If that interpretation is true, then our simulation of export subsidy reduction to the rest of the world should be considered as part of the gain of the customs union, not as a policy option for Turkey. Our interpretation, however, is based on Articles 30-36 of the Framework Agreement which relate to competition policy within the customs union. These articles restrain a wide range of actions in the area of state aid and competition policy and establish measures for dispute resolution which have the potential of being more binding that GATT/WTO commitments.

For EU investors, the customs union may reduce the risk of investing in Turkey. For third country investors, the improved access to EU markets may also encourage them to invest in Turkey.[4] On the other hand, the crisis in Mexico demonstrates that financial flows can flow out of Turkey if the macroeconomic situation deteriorates. This emphasizes the need to take actions to reduce the fiscal deficit.

The customs union will result in Turkish industries being exposed to international competition to a greater extent than has been the case to date. Thus, a fourth important challenge is to develop policies that will help Turkish industries become more competitive in this increasingly competitive environment. World Bank experience with industrial strategy (see Lieberman, 1990) has shown that the key ingredients to a successful national industrial strategy are: creation of a stable macroeconomic environment; development of a competitive markets, both for products and labor; and neutrality of incentives so that firms and entrepreneurs realize that there is more to gain by effectively competing in the market-place as opposed to lobbying the government.

The solution to all four of the above challenges point to the same set of policy options: reduction of state subsidies of various types and reduction of the role of the state in production. The need to compensate for the revenue loss from the tariff, given the limitations of the other taxes, suggests that it is may be necessary to find ways of reducing state subsidies to generate revenue. Subsidy reduction meets efficiency goals as well since it will allow Turkey to avoid unintended new distortions and optimize its entry into the customs union. To encourage foreign direct investment, a reduction in state aids will provide two benefits: by reducing the fiscal deficit, the rate of inflation should be reduced. The resulting more stable macroeconomic environment should encourage foreign direct investment. In addition, foreigners will be more likely to invest if they are confident that they will receive equal treatment relative to Turkish firms. In particular, foreign investors will likely have much greater confidence in equal treatment if the

[4]There is significant competition from similar economies that have preferential access to the EU market, such as Tunisia. This competition would moderate the increased foreign direct investment.

sector has little or no state owned enterprises. Finally, an increasingly competitive industrial structure brought on by the customs union will further expose inefficient state owned enterprises. The loss-making state owned enterprises will lose even more, making it increasingly costly to maintain inefficient SOEs. The drain on the state budget and the rest of the economy would likely become even more of a constraint on growth of the Turkish economy.

In summary, with participation with the EU in a customs union, Turkey now stands at an historical crossroads. One road it can take at this time is the successful road taken by Spain after it decided to accede to the EU (see box). Spain complemented its accession (and anticipated accession) to the EU with a significant reduction in the role of the state in the domestic economy.

On the other hand, despite rapid growth in the 1960s, Greece has made much less progress after its accession to the EU. Although both Greece and Spain adopted the external trade policies of the EU, Greece continued to support its state owned enterprises to a much greater degree. As a result its consolidated fiscal deficit and public sector borrowing requirements rose to a large share of GDP in the 1980s; this crowded out private investment (which plunged) and contributed to stagnant growth. Moreover, even the private sector is highly regulated. Bureaucratic control by state banks is one means of applying public influence in the private sector; and the Greek industrial structure is characterized by numerous cases of featherbedding and subsidized credit to feeble producers. If, due to financial problems, a company is taken over by a bank, it subsequently obtains a soft budget constraint analogous the state enterprises in Eastern Europe of the 1980s. (See Katseli, 1990; and Bliss and Macedo, 1990)

Between 1980 and 1992, Spain grew at over twice the rate of Greece. By 1992, among the four relatively poor members of the EU (Greece, Portugal, Spain and Ireland), Spain had by far the highest per capita income (at $14,000 it was about twice the level of Greece).[5]

[5]See The World Bank, World Development Report, 1994, table 1.

Although Turkey in 1995 is a more open economy than either Greece or Spain at the start of their accessions to the EU, and the precise form of state intervention in the domestic economies differed, all three economies experienced the problem of excessive state involvement in their domestic economies. In Turkey's case, state owned enterprises are its analogous achilles heal. The example of Greece demonstrates that simply adopting the external trade policy of the EU will not be sufficient to propel the economy forward to much higher growth rates. Bold and dramatic action to reduce the role of the state with respect to subsidies and ownership of production are crucial for a fully effective integration with the EU that will be capable of significantly boosting the growth of the Turkish economy.

SPAIN'S SUCCESSFUL ACCESSION TO THE EU

After Franco's death in November 1975, Spain was confronted with a mixed economy that was administered and controlled by the state to a much greater extent than it was free market. Business organizations depended on the state and the state bureaucracy was a power of the first order.

The industrial structure inherited at this time was obsolete and remained isolated from world markets. Under Franco's autarkical and dirigist objectives, it was highly protected and subsidized.

There were similar problems in factor markets. The labor markets were extremely rigid. Interest rates were controlled by the Ministry of Finance, and Spain's dependence on energy was among the highest in Europe.

Although's Spain's industrial development of the 1960s and early 1970s was capital intensive, unemployment did not increase owing to a tide of emigration to the EU. After the energy crisis it became difficult for Spanish emigrants to find work and many returned to Spain. This greatly augmented unemployment and social tensions.

Thus, at Franco's death, Spaniards found themselves in an economic crisis of enormous proportions for which the Spanish economy was poorly equipped to react. Starting from this extremely weak position, after three decades of economic autarky first and state intervention and regulation later, the new democratic governments elected after 1977 chose in a rational and coherent manner to integrate with Europe, open up the economy, and reduce the role of the state in the domestic economy. While some other Western European governments desired to maintain strong state intervention to correct market failures, in Spain reduction of the role of the state in the economy was regarded the only viable option to release the economic potential of the economy. Thus, despite the Spanish left's traditional fears of capitalism, the Socialist and Communist parties voted unanimously with all other parties to accede to the EU and to declare in the new constitution that Spain is a market economy.

Despite the fact that Spain did not become a member of the EU until 1986, liberalization, both external and domestic, began in earnest in 1977 due to anticipated accession to the EU. It was not until 1986, however, that Spain actually became a member of the EU. Despite its difficult starting position, Spain is regarded as the most successful of the "Southern" countries in integrating with Europe. On the negative side, in the mid-1990s Spain was struggling with an excessive unemployment problem.

Sources: Dehesa, 1991; Bliss and Macedo, 1990; Vinals, 1990; Blanchard et al. (1995).

II. Results for the Customs Union

We elaborate the principal elements of the Customs Union as we explain the results of our simulations in Table 1. First we explain the variables that make up the rows of tables 1 and 2.

W_AGG is the welfare gain to Turkey in billions of 1990 Turkish lira, while W_AGG% is the welfare gain as a percent of GDP. In all of our experiments, we have imposed a constraint that the fiscal deficit of the government of Turkey cannot increase. We implement this constraint by allowing the VAT rate to adjust in all sectors, such that the fiscal deficit is unchanged. The variable "TAU" shows the amount that the VAT must change. For example, a value of 124.6 for TAU in the "TAR" column, means the VAT rate must increase to 124.6% of its original level in all sectors, i.e., a 24.6% increase. We examine below the implications of using other instruments of taxation or expenditure reduction.

We report results for the variable PFX% which is the percentage change in the real exchange rate required to keep the balance of trade unchanged. In general, reduction of tariffs induces a depreciation of the real exchange rate. This is because tariff reduction induces an increase in imports, and a real depreciation is then required to increase exports and reduce imports such that the balance of trade is unchanged.[6]

The percentage change in the eight types of labor and the two types of capital in the model are shown by the variables labelled L_PROF and so forth. The percentage change in the value added of the 54 sectors in the model are shown for each scenario starting with "AGR" for agriculture and animal husbandry (see the appendix for the specific definitions).

In the appendix we present the results of our systematic sensitivity analysis. While the overall results for welfare, revenue implications and real exchange rate effects are quite robust, the results for

[6]This is a "real" model so there is no money or financial asset which is devalued. The real exchange rate is the relative price of tradeable goods to non-tradeable goods.

specific sectors in many cases are very sensitive to the choice of parameters. In particular, there are some cases where the "standard deviation" of the estimate exceeds the point estimate; this means that some sectors estimated to expand their value-added might be estimated to contract with another very plausible specification of model elasticities. Thus, this model should not be used for the purpose of picking winners and losers (nor should any other model in our view).

In the scenario labelled "ACCESS," we estimate the impact of improved access to the EU markets. Turkey already has tariff free access to EU markets in manufactured products, and agriculture is for the most part excluded from the customs union agreement. However, Turkish exporters should obtain improved access in textiles and apparel, steel and to a small extent in agriculture. After an adjustment period, Turkish exporters will not be subject to quantitative restraints on textile and apparel exports.[7] This should be especially helpful in the categories of tee shirts and sweatshirts. In steel, Turkish exports will not be subject to the 6% import tax, and there is some hope of a reduction in other non-tariff barriers that the EU applies against Turkish exports. Finally, although agriculture is essentially out of the agreement, it is expected that some limited improved access to the EU markets will be obtained. Thus, we have assumed that as a result of the Customs Union, the price received by Turkish exporters to the EU will increase by: 5% in textiles; 15% in apparel; 10% in steel; and 1% in agricultural products. We find that the combined affects of this improved access will increase Turkish welfare by 0.3 % of GDP.

In the scenario "STD" we simulate the impact of improved access to EU markets due to harmonization of product quality standards and improvement in testing laboratories in Turkey. It is recognized that additional testing laboratories are necessary for Turkey, and the pressure of increased EU competition in import markets is likely to improve Turkish product quality and the price of Turkish

[7] These restrictions derive from voluntary export restraints, and not from the MFA. Although a transition period has been mentioned in some negotiating documents, the current expectation from both sides is that there will in fact be no such transition period. Our simulations assume no transition.

products in EU markets. In this scenario we have assumed that the price of Turkish exports will increase by 1% in EU markets. This results in an increase in welfare of 0.1%.

In the scenario "TAR" we simulate the impact of Turkey lowering its non-agricultural tariffs against the manufactured products of the EU and implementing the CET of the EU, including the preferential access agreements. We take as our initial equilibrium the situation that prevailed in 1993 (based on actual collections of tariffs, as opposed to MFN rates). By 1993, Turkey has already implemented a large portion of the tariff changes by phasing in the tariff changes over a 12 year or 22 year period, depending on the product. We take as our counterfactual scenario, the tariffs that will prevail in 2001, after preferential agreements have been negotiated with those countries that the EU has preferential agreements.[8] This scenario results in an improvement of welfare equal to 0.1% of GDP. The benefits from this aspect of the customs union are perhaps smaller than some would anticipate. This follows from a number of reasons: First, in our base year data, although the EU was the major trading partner of Turkey (43.6% of imports and 48.3% of exports), the trade intensity of Turkey was not very high--imports were 18.6% of GDP and exports were 14.6% of GDP. Thus, the total value of all EU imports was only about 9% of GDP, and the tariff reductions induce "triangles" of consumption efficiency gains that are only a proportion of the value of the imports[9]. Additional gains come from reductions in

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[8]Tariffs in the initial equilibrium are based on actually collected rates, and are taken from Arslan (1995). Tariffs in the counterfactual are taken from data provided by Professor Subidey Togan (see appendix for precise rates). These latter data are based on nominal tariffs expected to prevail in 2001. It is assumed with these latter data that actual and nominal tariffs will be equal. Reasons for differences between collected and nominal rates of tariffs should be significantly reduced if not totally eliminated due to CU regulations. That is, there will be little scope for the investment code and duty drawback exemptions.

[9]In partial equilibrium, the static consumption deadweight loss from an ad valorem tariff equal to t is:

$$CDWL = 0.5\ [t/(1+t)]^2\ e\ V$$

where e is the elasticity of demand, and V is the initial value of imports (see Morkre and Tarr, 1980, chapter 2). That is, the gains from eliminating tariffs are proportional to the value of the imports, where

tariffs against the rest of the world (due to the common external tariff of the EU, from production efficiency gains as well, and from dynamic gains from trade (we do not measure the latter); but static efficiency gains are dependent on trade intensity. Second, because tariff changes required by the customs union were phased in over time and already significantly implemented in our benchmark year of 1993, there already was a low level of tariffs in Turkey in 1993. Thus, the reductions in the tariffs induced by the customs union are not large typically. As explained in the previous footnote, welfare gains from tariff reductions increase more than proportionally with the height of the initial tariff. Third, the tariffs on agricultural products are not reduced, so there are some non-uniformity distortions introduced as the new tariff structure strongly favors agriculture. Finally, there are some trade diversion costs in any customs union. The latter costs should not be high in Turkey's case since third country tariffs will not be high.

In the scenario "RECIP" we simulate the impact of Turkey negotiating reciprocal access to the markets of third countries with whom it will grant preferential access to its markets. That is, the EU has negotiated Association Agreements with a number of countries, such as the central European countries, and Free Trade Agreements with others such as Israel and Tunisia. Turkey is obligated to negotiate similar preferential trade agreements with these countries for non-agricultural products. The impact of Turkey reducing its tariffs against these countries is incorporated in the scenario "TAR." But Turkey should obtain

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that proportion increases with the elasticity of demand and increases geometrically with the initial value of the tariff rate. For example, if the elasticity of demand is unity and the tariff rate is 10% (t=0.1), then the consumption deadweight loss from elimination of the tariff is 4/10 of one percent of the value of the imports. To illustrate the geometric nature of the increase in the consumption deadweight loss with the tariff rate, if t=0.2, the deadweight loss is 3.3 times greater, at 1.4% of the value of imports; if t=0.4, the deadweight loss is 9.9 times greater, at 4.1% of the value of imports.

In our data, the weighted average tariff on non-agricultural imports is being reduced by about 7%, and the value of all Turkish imports is about 21.1% of Turkish GDP. With a 7% tariff reduction in the above formula, the gain is equal to about 2/10 of one percent of the value of imports. If the tariff reduction were applied on all imports (including agriculture), with unitary elasticity of demand, the gain is small at 5/100 of one percent of GDP. The gains increase proportionally with the elasticities.

improved access to the markets of these countries, since the tariffs of these countries will be reduced against Turkish exports. We assume that the improved access for Turkish exports in third markets will equal the improved access that Turkey will offer third country imports. This implies that improved access will increase the price Turkish exporters can obtain on exports to third countries by 4.2%.[10] Improved access to these markets results in a gain in Turkish welfare of 0.5%, which is the largest gain of all the components.[11]

In the scenario labelled "XSB" we simulate elimination of the remaining export incentives program for exports of non-agricultural products destined to the EU only.[12] Compared with more general reduction of export subsidies with respect to all countries (which appears to be the more likely policy choice), this does not affect Turkish welfare significantly (there is a negligible reduction in welfare). The reason is that with removal of export subsidies only to the EU, exporters have the incentive to switch export markets away from the EU so they continue to receive export subsidies. Thus, the distortion costs of the export subsidy program are not reduced significantly, unless they are reduced to all export markets. (More general reduction in export subsidies is discussed below.)

In the scenario labelled "TRD" we simulate the impact of reduction in the costs of trading between the EU and Turkey. As a result of the customs union, closer relations with the EU will likely bring with it a possible reduction in costs of clearing goods at the frontier. This is an effect similar to that of the single market program of the EU. In the case of the EU this effect was assumed to reduce the costs of

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[10]The difference between the EU's most favored nation CET and Turkey's third country tariff taking into account preferences (and weighted by Turkey's trade weights) is 4.2%. This may be an underestimate of the improved access Turkey will receive in third markets since Turkish external tariffs under the common external tariff of the EU are lower on average than the MFN rates of developing countries receiving preferential access to the EU.

[11]Improved access, by improving the prices received by Turkish exporters, results in both "rectangles" of gains on all previous sales in these export markets, plus triangles of gains on new sales.

[12]The rate of export subsidies by sector is taken from Arslan (1995); see the appendix for the precise rates per sector.

trading by 1.5%-2% The impact should be quantitatively less important for Turkey so we assume that there will be a 0.3% reduction in the costs of goods imported from the EU and the costs of exporting to the EU will also decline by 0.3%. This results in an improvement in Turkish welfare of 0.1%.

In the scenario "FULL" we combine all of the above elements. The overall gain in Turkish welfare is equal to 1.1% of GDP. These are annual gains in the sense that they can be expected to recur each year. Since our model is a static model, we ignore the dynamic gains from trade which would be expected to increase the benefits of trade liberalization, i.e., produce larger benefits.

The variable TAU shows that it will be necessary to increase the rate of VAT taxation by 16.2% in order to keep the fiscal deficit unchanged. This is a proportional increase in the rate of VAT for each sector, starting from the initial collected VAT rates. The variable PFX% shows that the real exchange rate must depreciate by 0.5% in order to hold the balance of trade constant. This is a modest real depreciation and reflects a number of considerations: (1) the tariff change is not large; (2) there is some limited improved access to the markets of the EU, which has the effect of appreciating the real exchange rate; and (3) improved access to the markets of third countries under reciprocal free trade agreements will also appreciate the real exchange rate.[13]

III. Revenue Replacement

Given the importance of the fiscal deficit in Turkey, it is important that steps are taken to avoid an increase in the fiscal deficit as a result of the tariff reductions engendered by the customs union. We estimate that Turkey will lose about 1.4% of GDP from tariff reductions, although Turkish government revenue will increase by 0.3% from reduction in export subsidies to the EU.

[13]Of course, since there is no money in the model, we are not referring to the nominal exchange rate. If Turkish inflation continues, significant nominal depreciation would be required to keep the real exchange rate from appreciating.

In our principal scenarios we have used a VAT as the means of generating government revenue. Taking into account general equilibrium effects, we have found that VAT rates will have to increase by 16.2% in order to compensate for the revenue loss of the tariff. More generally, we would expect that improving collection rates in the VAT which would make it more uniform, should reduce the economic distortions of the VAT as well as increase its revenue potential; that would allow lowering of the average VAT rate.[14]

There are, however, other mechanisms available. We have estimated the gains (or losses) to Turkey of implementing the customs union while using other taxes as the "replacement" tax. In all cases we consider the scenario FULL, and ask what is the scaler multiple of the existing tax that would be required such that the fiscal deficit would not be increased.

One alternate replacement tax that we have evaluated is a broad based uniform consumption tax. We have found that the welfare increase from the customs union, with a uniform consumption tax is 1.0% of GDP, only a 0.1% reduction relative to the use of the VAT as the replacement tax. Given its uniform nature, the consumption tax is almost as efficient as the VAT.

Another tax which has received limited discussion in Turkey is a special consumption tax on a limited range of products: notably, autos, fuels, alcohol and tobacco products. The problem with a special consumption tax is that by imposing a tax on only a limited range of products, the tax base is narrow. Then considerable distortions are created, since the rate of taxation on these specific products must be very high to generate adequate revenue which induces resources to move out of the highly taxed sectors.

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[14]A similar conclusion was drawn in the report by Krueger et al. (1995, pp. 61, 62). They estimated that Turkey will lose 3.52% of its GDP as a result of tariff and special fund reduction, but that increases in the VAT rate and alignment of the VAT across all sectors as in the EU will result in compensation of revenue loss from the tariff. Their report (p. 62) notes:

> insofar as tariffs are removed and no measures are taken to increase VAT revenues, entry into the customs union will be marked by a fall in government revenues. If, however, the Turkish authorities take advantage of the opportunity to align VAT rates and *maintain or increase collection rates* [emphasis added], the revenue consequences of entry should be positive.

In fact, with plausible elasticities a narrow consumption tax is not a feasible option for replacement of revenue. That is, the tax base is too small to generate adequate income to replace the revenue lost. The higher tax discourages consumption of the product, and thus cannot generate unlimited revenue. The value of Turkish income spent on these commodities is simply not large enough to generate the required revenue, given normal assumptions about elasticities.[15]

In summary, the government will need to factor into its fiscal program possible revenue shortfall arising from implementation of the customs union. We show below, that uniform taxation aggressively enforced is the best way to proceed with goods market taxation. If the VAT could be applied uniformly, welfare would be increased and the rate of VAT could be reduced without reducing revenues. In addition, as mentioned above, subsidy reduction and the reduction of the role of the state in production are important elements in reducing the need for taxation and help to relieve fiscal pressures.

IV. Additional Unilateral Measures

The changes required by the customs union may in some cases introduce distortions in the incentive structure in Turkey that are unintended by the government. In this section we examine the consequences of Turkey taking additional unilateral steps that are not required by the EU to implement the customs union that will allow Turkey to make a more effective and efficient transition to the customs union.

Reduction in Agricultural Tariffs

Since agricultural tariff changes are not required by the customs union agreement, without unilateral policy action by the Turkish government the level of agricultural tariff protection will increase substantially relative to manufacturing. That is, the customs union requires the imposition of zero tariffs

[15]In fact, some discussion of the special consumption tax indicates that it is not intended as a replacement tax for lost revenues from the customs union. Rather several taxes in the named sectors would simply be aggregated into a single tax in each sector for the purpose of tax reform or simplicity.

on manufacturing products from the EU and the EU's CET on third country imports of these same products, while no changes in agricultural protection are required. Without further unilateral measures on the part of Turkey beyond the customs union, the relative protection of agriculture will increase substantially. In the scenario labelled "AGLIB," we simulate the impact of Turkey lowering its tariffs on agricultural imports from all regions by 50 percent, in addition to the changes entailed in the customs union. This results in some improvement in Turkish welfare as measured in Turkish lira (relative to "FULL"), but the percentage impact on GDP is small. The reason for the small gains from the marginal reduction in agricultural tariffs is that export subsidies in agriculture remain to all destinations. The reduction in import tariffs in agriculture reduces the incentive to produce in the domestic market relative to exports. The increase in exports, induced by the tariff reductions, is an inefficient increase due to the export subsidies, and results in only very small gains from this piecemeal policy change. What is required for more significant gains is simultaneous removal or reduction of both the import tariff and the export subsidy.[16]

Removal of Export Subsidies to Third Countries

Even though the customs union might only require elimination of export subsidies on exports going to the EU on non-agricultural products, considerable additional efficiency gains would accrue to Turkey if export subsidies were eliminated more widely. This is because if export subsidies are eliminated on EU exports and not on exports to the rest of the world, exporters will divert exports to the rest of the world where the export subsidies remain. The diversion of exports substantially reduces the efficiency gains from discriminatory export subsidy reduction. Consequently, it is only with non-discriminatory elimination of export subsidies that we observe a welfare increase from the elimination of export subsidies.

[16]Morkre and Tarr (1995) have shown that the welfare impact of piecemeal tariff reduction in a sector with an export subsidy is equal to a triangle of gain in reduced import distortions less the rectangle of increased export subsidies. They show, also using a general equilibrium model, that simultaneous removal of the import tariff and the export subsidy yields much larger benefits.

We therefore simulate the elimination of export subsidies on a non-discriminatory basis in addition to all the changes entailed in the customs union; this scenario is labelled "XSB0." It results in a gain in welfare equal to 1.2% of GDP, or an increase in 0.1% of GDP relative to the gains derived from implementation of the "FULL" customs union without additional action on export subsidy reduction to the rest of the world. The marginal 0.1% of GDP improvement is comparable to the gains received from discriminatory tariff reduction discussed above, and reflects the fact that the exports to GDP ratio of Turkey (14.6%) is not high in our base data.

The revenue impact of this scenario is also quite important, and we observe that the variable TAU increases by only 9.1% in XSB0, compared to an increase of 16.2% in FULL. This means that due to the reduction in expenditures on export subsidies there is less of a need to raise revenues through an increase in the VAT. To the extent that there are limitations on the ability of the VAT to effectively collect revenues, this advantage of reducing export subsidies generally in parallel with implementation of the customs union could be crucial to avoid damaging fiscal deficits.

Removal of all Subsidies and Taxes except the VAT

In the scenario labelled "SECOND" we eliminate all tariffs, subsidies and taxes present in the base model except for the VAT, and allow the VAT in each sector to adjust proportionally to compensate for any changes in the fiscal deficit. These changes are implemented in addition to the changes that are part of the customs union. We observe that welfare increases by 1.4% of GDP (or 0.3% more than in the case of implementation of the customs union alone), but the rate of VAT taxation must increase by 74% in order for the fiscal deficit to remain unchanged.

Many subsidies that apply to specific industries do not appear in the 1990 input-output table. With improved data and measurement of these distortions, the estimated benefits of wider subsidy reduction would likely be larger.

In the scenario labelled "FIRST" we implement the same elimination of all distortions and use only a uniform VAT as the replacement tax. Welfare increases by 1.5% of GDP. Interestingly, the rate of VAT that would apply for all sectors is only 12.8 percent. This rate of VAT is lower than the legal rate in most sectors. The reason that a low rate of VAT can coexist with the reduction of all taxes and subsidies is that it is applied uniformly; this means that in this scenario we assume that we eliminate exemptions and well as different rates of collection across sectors. (Other things equal, the scenario "SECOND" shows that the VAT must increase by 74% of its base rate in each sector if exemptions and evasions are not reduced.) Implementation of a uniform rate across all sectors may be difficult to achieve in reality, but if it can be implemented, the scenario shows that considerable reduction in the rate of VAT taxation can be achieved.

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Table 1: Impact of the Customs Union with the European Union on Turkey: Full and Decomposed Effects

	ACCESS	STD	TAR	RECIP	XSB	FULL	TRD
W_AGG	904.3	272.9	286.4	1203.0	-75.4	2861.3	182.0
W_AGG%	0.3	0.1	0.1	0.5		1.1	0.1
TAU%	98.7	99.4	124.6	97.7	97.6	116.2	99.8
PFX%	-3.0	-0.5	3.0	-1.8	1.4	0.5	-0.1
L_PROF	1.1	0.1	-0.6	0.4	-0.5	0.4	0.1
L_ADMN	1.7	0.2	-0.7	0.6	-0.8	0.4	0.1
L_CLER	0.7	0.1	-0.4	0.5	-0.2	0.7	0.1
L_RETL	0.1	0.1	-0.4	0.5	0.4	0.9	0.1
L_SRVC	0.5	0.1	-0.5	0.4		0.6	0.1
L_AGRC	-0.4	0.1	0.6	0.4	0.4	1.4	
L_PROD	1.3	0.2	-0.9	0.7	-0.7	0.3	0.1
L_OTHR	1.5	0.2	-1.0	0.5	-0.8		0.1
K_HOM	1.7	0.2	-0.5	0.5	-0.8	0.6	0.1
K_AGRC	-0.4	0.1	0.4	0.4	0.4	1.2	
AGR			0.1			0.1	
FRS	-1.4	-0.1	-0.6	-0.4	0.6	-1.2	-0.1
FIS		0.1	-1.0	-0.2	0.1	-0.9	
COL	-0.9	-0.1	-0.6	0.5	0.6	-0.1	
CRU	-0.2		-1.4	0.3		-1.0	
MIN	-4.5	-0.6	0.8	2.5	2.2	2.3	-0.2
STO	-0.5		0.2			-0.2	
MEA	3.8	0.1	1.5	-0.1	-1.4	2.2	
CAN	-25.6	1.7	45.3	-4.9	27.1	47.7	0.5
VEG	-4.2	-0.4	1.6	1.7	2.2	2.7	-0.1
GRN	-1.6		-0.4	0.3	1.0	0.2	
SUG	-1.5	-0.1	-0.7	-0.2	1.0	-0.8	-0.1
OFP	-2.2	0.1	0.9	0.1	1.5	1.6	
ALC	-5.8		-9.3	1.1	2.8	-8.3	
BEV	-3.0		-4.5	0.8	2.3	-3.2	
TOB	-1.4		-6.6	0.7	1.4	-4.9	
TXT	11.7	0.6	6.6	-2.5	-10.0	2.2	0.2
WAP	57.9	1.1	9.4	-3.5	-19.1	18.6	0.3
LEA	22.3	0.3	8.1	-1.8	-11.4	6.9	
SHO	-2.1	-0.1	-0.5	0.8	0.3	-0.6	
WOO	-0.8		-0.8	0.1	0.4	-0.9	
FRN	-1.1		-0.8	0.2	0.5	-0.7	
PAP	-2.1	-0.1	-2.1	0.2	1.0	-2.3	
PRN	-0.9	0.1	-1.5	0.5	0.8	-0.3	
FRT	-2.4	-0.2	4.0	-0.3	-0.7	1.5	
DRG	-3.3	-0.3	0.6	0.5	1.7	0.5	-0.1
OCP	-3.8	-0.2	-0.7	0.4	-0.1	-2.5	-0.1
REF	-0.2	0.1	-2.6	0.4	0.1	-1.7	
PET	-0.9		-0.9	0.4	0.4	-0.4	
RBR	-1.3	-0.1	-0.8	0.2	0.4	-0.9	
PLA	-1.6	0.1	0.8	0.6	0.7	1.2	0.1
GLA	-5.1		2.2	0.6	-0.8	-1.0	
CEM	-0.5		0.1	0.2			
NMM	-2.0	-0.1	-3.7	-0.3	0.2	-5.0	-0.1
IRO	-4.3	-0.6	0.6	3.4	2.1	3.0	-0.2
NFM	-3.4	-0.1	-0.5	1.2	-1.6	-2.6	
FAB	-1.6		-1.5	0.7	0.4	-1.3	
MAC	-1.2	-0.1	0.4	0.5	0.1	0.4	
AGM	-0.3		-0.5	0.1		-0.5	
ELM	-2.6		-2.0	0.2	-1.4	-4.3	
SHP	-5.5	-0.5	4.2	1.6	0.9	2.8	-0.1
RRE	-0.4		-0.1	-0.1	0.2	-0.2	
VEH	-2.8	-0.2	-13.0	-0.2	1.5	-13.2	-0.1
OTE	-2.2	-0.2	0.3	-0.7	0.3	-1.4	-0.1
OMN	0.3	0.3	-3.4	1.5	-0.2	-1.3	0.2
ELE			-0.1	0.2	-0.3	-0.1	
GAS	-0.5		0.1		0.3	0.1	
CON	0.1		-0.1	0.1		0.1	
TRD	-1.0	-0.1	-0.2		0.8	-0.1	
RES	-4.3	-0.1	0.9	0.3	2.6	1.1	
TRN	-0.5		0.2		0.3	0.3	
COM	-0.6		-1.6	0.2	0.7	-1.0	
FIN	0.1				0.1	0.1	
SRV	-0.6		-0.1	-0.1	0.3	-0.3	

Source: Model Estimates

Table 2: Impact of Unilateral Turkish Policy Choices to Optimize Customs Union Implementation

	FULL	AGLIB	XSB0	SECOND	FIRST
W_AGG	2861.3	2958.7	3246.6	3639.7	4027.7
W_AGG%	1.1	1.1	1.2	1.4	1.5
TAU%	116.2	118.4	109.1	174.9	12.8
PFX%	0.5	0.8	2.8	2.3	4.2
L_PROF	0.4	0.4	0.7	-4.2	-3.9
L_ADMN	0.4	0.5	-0.2	-7.6	-4.7
L_CLER	0.7	0.7	1.0	-5.2	-4.3
L_RETL	0.9	1.0	2.5	-6.2	-5.4
L_SRVC	0.6	0.6	1.4	-4.9	-5.1
L_AGRC	1.4	1.4	0.8	-3.9	-13.5
L_PROD	0.3	0.4	-0.6	-8.7	-4.6
L_OTHR		0.1	-0.5	-7.4	-4.6
K_HOM	0.6	0.7	0.6	-6.3	-4.6
K_AGRC	1.2	1.2	0.7	-3.8	-12.4
AGR	0.1	0.1		-0.2	-0.4
FRS	-1.2	-1.3	-0.4	3.5	0.9
FIS	-0.9	-0.9	-0.3	4.8	4.4
COL	-0.1	-0.2	-2.1	-3.3	-2.4
CRU	-1.0	-1.2	-1.5	-3.6	2.4
MIN	2.3	2.2	-11.0	-12.2	-7.7
STO	-0.2	-0.2	-0.5	-0.3	-0.3
MEA	2.2	3.6	-1.5	5.8	0.3
CAN	47.7	57.0	-26.1	-17.0	-18.8
VEG	2.7	3.1	-2.0	4.7	-4.0
GRN	0.2	0.5	0.9	3.6	2.1
SUG	-0.8	-2.2	0.8	-18.5	-17.1
OFP	1.6	3.1	2.2	8.8	3.4
ALC	-8.3	-9.0	-4.9	-51.1	-25.1
BEV	-3.2	-3.1	-3.3	-7.8	16.8
TOB	-4.9	-5.5	-2.7	-52.5	-29.5
TXT	2.2	2.7	4.0	14.9	9.1
WAP	18.6	19.8	20.7	45.3	28.0
LEA	6.9	8.2	3.3	18.9	6.7
SHO	-0.6	-0.6	-2.5	1.0	-4.2
WOO	-0.9	-1.0	-0.9	1.5	-1.8
FRN	-0.7	-0.9	-0.6	1.4	-0.4
PAP	-2.3	-2.4	-3.7	-5.3	-2.6
PRN	-0.3	-0.8	0.4	-1.9	11.5
FRT	1.5	1.6	-2.0	-3.3	-4.2
DRG	0.5	0.3	-0.5	5.9	-4.8
OCP	-2.5	-2.6	-6.7	-5.2	-7.9
REF	-1.7	-1.9	-2.2	-7.3	2.9
PET	-0.4	-0.5	-0.3	-3.1	-1.4
RBR	-0.9	-1.0	-1.1	0.8	-2.3
PLA	1.2	1.2	-1.2	0.3	0.8
GLA	-1.0	-1.1	-4.8	-1.8	-7.1
CEM			-0.3	-1.0	-0.2
NMM	-5.0	-5.1	-4.6	-4.7	-3.9
IRO	3.0	2.9	-12.8	-14.3	-9.4
NFM	-2.6	-2.8	-8.8	-10.4	-0.7
FAB	-1.3	-1.4	-3.1	-0.9	-2.9
MAC	0.4	0.3	-1.3	-0.4	-1.8
AGM	-0.5	-0.5	-0.7	-1.5	-0.6
ELM	-4.3	-4.5	-5.6	-6.8	0.6
SHP	2.8	2.9	-2.3	1.2	-3.1
RRE	-0.2	-0.2		-0.5	-0.4
VEH	-13.2	-13.5	-11.4	-19.2	8.7
OTE	-1.4	-1.4	-0.5	-2.2	3.9
OMN	-1.3	-1.8	-1.5	-6.7	19.2
ELE	-0.1	-0.1	-1.4	-1.4	0.3
GAS	0.1	0.1	0.5	2.2	-1.2
CON	0.1	0.1	0.1	-0.9	0.3
TRD	-0.1	-0.2	0.9	-1.0	-2.3
RES	1.1	1.4	4.4	6.5	5.4
TRN	0.3	0.3	0.7	1.0	
COM	-1.0	-1.3		-1.9	8.9
FIN	0.1	0.1	0.1	-0.4	0.7
SRV	-0.3	-0.3	0.2	2.4	0.5

Source: Model Estimates

Appendix: Model Documentation

1. General Model Structure

Our Small Open Economy (SOE) model is designed for trade policy analysis with a large number of sectors. The model is a "generic" general equilibrium model of a single economy along the lines of de Melo and Tarr [1992], Harrison, Rutherford and Tarr [1993] and Rutherford, Rutström and Tarr [1994]. We describe here the general features of the base model, adding details about the 1990 version for Turkey later.

Goods are produced using primary factors and intermediate inputs. Primary factors include eight types of labor and five types of capital.[1] It is common to assume in the "short run" that factors are likely to be sector-specific, and in the "long-run" that factors tend to be mobile across sectors. We would expect a short run model of his kind to generate smaller welfare gains from liberalization, since resources are constrained in their ability to reallocate to more productive uses. On the other hand, we would expect the short run model to exhibit less extreme changes in production structure since the sector-specificity of factors generates less elastic supply schedules. We also recognize that some factors are likely to be specific to one or other sectors even in the long run. An obvious example might be the natural resources used in mining.

Production exhibits constant returns to scale and individual firms behave competitively, selecting output levels such that marginal cost at those output levels equals the given market price. Output is differentiated between goods destined for the domestic and export markets. Exports are further distinguished according to whether they are destined for the EU or the Rest

[1] The specific types are discussed below.

Of the World (ROW). This relationship is characterized by a two-level constant elasticity of transformation frontier. Composite output is an aggregate of domestic output and composite exports; composite exports are aggregates of exports for the EU and ROW markets.

Final demand by private households arises from nested constant elasticity of substitution (CES) utility functions. This allows consumer decision-making to occur in the form of multi-stage budgeting. At the top level goods from different sectors compete subject to the budget constraint of the consumer, and all income elasticities are unity. In the second stage the consumer decides how much to spend on domestic or imported goods in each sector, subject to income allocated to spending in that sector in the first stage. Finally, having decided how much to spend on imports as a whole, the consumer allocates this expenditure on EU and ROW imports. Each allocation decision is modelled as a CES function.

The model allows tariff rates to differ depending on whether the imports are from the EU or the ROW. Exports can be sold at different prices depending on whether they are destined for EU or ROW markets. The same is possible on the import side. These distinctions allow us to study policy options from Turkey's trade negotiations with the EU that result in improved market access for Turkish exporters or for EU exporters to Turkey.

Government expenditures and investment demand are exogenous. Funding of government expenditures is provided by tax revenues and tariff revenues. In addition to tariffs, the government also derives income from indirect taxes (net of subsidies). These are modelled as Value Added Taxes (VAT).

We also allow for a special tax to be levied on the consumption of a specified set of consumer goods. In early debates over the need to replace lost revenues, this consumer tax was

proposed by the Turkish authorities as the device to be used to ensure that there is no net revenue impact from the CU. Since the expectation is that tariff revenues will decline, all other things being equal we would expect this tax to have to be positive to ensure revenue neutrality. Our model solves explicitly for the level of this tax required for this to be so, taking into account changes in "all other things".

Since private consumption equals the income from primary factors plus net transfers to the consumer by the government (from domestic and foreign trade taxes), Walras law is satisfied. Public consumption is balanced with revenue.

World market import and export prices are fixed, so there are no endogenous changes in the terms of trade. In other words, import supplies and export demands are infinitely elastic at given world prices. The current account balances the value of exports and imports taking into account exogenously-fixed capital inflows. Our model allows for changes in these fixed world prices, such as might be expected to occur after the Uruguay Round reforms have been implemented (see Harrison, Rutherford and Tarr [1995]).

2. Empirical Implementation for Turkey

We employ a 1990 Social Accounting Matrix (SAM) for Turkey, due to De Santis and Ozhan [1994], which distinguishes 54 production sectors, 8 types of labor, 5 types of capital, and 40 households differentiated by rural or urban residence and income level. This SAM provides a consistent set of relationships showing intermediate, final demand, value added and foreign transactions.

We also employ some ancillary data on production subsidies from the 1990 Input-Output (IO) table provided by the State Institute of Statistics [1994].[2] Import tariffs and export subsidies are calibrated to collected rates in 1993, the most recent year for which we have consistent data. We also use estimates of collected VAT rates for 1990.

Table A1 lists the names of our 54 production sectors, along with a 3-letter acronym that we will use throughout. This level of disaggregation provides excellent detail on the effects of tax and subsidy distortions, although there is some aggregation in the area of transportation sectors (TRN) which would be useful to have given the level and variation of SOE activity.[3]

Table A2 lists the names of the primary factors of production identified in the SAM, along with the acronym to be used for each. Some of the occupational distinctions (e.g., L_PROF and L_ADMN) are likely to be important for understanding the impacts of reforms on the distribution of welfare across household types to the extent that we expect some correlation between household income levels and occupation. In Table A2b, we list the percent of value-added in the sector that is accounted for by the specific labor type. If we sum across a row in Table A2a, we have the percent of value-added due to all labor types. The decomposition of labor's share into labor type is derived from De Santis and Ozhan (1994, Table B8). In addition to the Household Labor Force Survey, De Santis and Ozhan used the Census of Population (which provides data on the population according to economic activity and occupation), and the

[2] The SAM only report net indirect taxes, whereas the IO table breaks out production subsidies and indirect taxes by sector.

[3] This aggregation is relative to the 64 sectors available in the IO table. The IO sectors are Railway Transport (#56), Other Land Transport (#57), Water Transport (#58) and Air Transport (#59). By far the largest of these in terms of value added in 1990 was Other Land Transport, with a Gross Value Added (at purchasers prices) of 42.5 billion TKL. Water Transport is next largest, with a value added of only 3.4 billion TKL. On the other hand, Railway Transport receives the largest direct production subsidy of 331 million TKL on a value added of only 457 million TKL.

Table A1: Production Sectors

AGR	Agriculture and animal husbandry
FRS	Forestry
FIS	Fisheries
COL	Coal mining
CRU	Crude petroleum and natural gas production
MIN	Iron ore mining
STO	Non-ferrous ore & non-metallic mineral mining & stone quarrying
MEA	Slaughtering preparing & preparing & preserving meat
CAN	Canning and preserving of fruits and vegetables
VEG	Manufacture of vegetable and animal oils and fats
GRN	Grain mill products
SUG	Sugar
OFP	Manufacture of other food products
ALC	Alcoholic beverages
BEV	Soft drinks and carbonated water industries
TOB	Tobacco manufactures
TXT	Textiles (inc. ginning)
WAP	Wearing apparel
LEA	Leather and fur products
SHO	Footwear
WOO	Wood and wood products
FRN	Furniture and fixtures
PAP	Paper and paper products
PRN	Printing & publishing & paper products
FRT	Fertilizers
DRG	Drugs and medicine
OCP	Other chemical products
REF	Petroleum refineries
PET	Petroleum and coal products
RBR	Rubber products
PLA	Plastic products
GLA	Glass and glass products
CEM	Cement
NMM	Non-metallic mineral products
IRO	Iron and steel
NFM	Non-ferrous metal
FAB	Fabricated metal products
MAC	Machinery except electrical
AGM	Agricultural machinery and equipment
ELM	Electrical machinery
SHP	Shipbuilding and repairing
RRE	Railroad equipment
VEH	Land transport vehicles and equipment
OTE	Other transport equipment
OMN	Other manufacturing industries
ELE	Electricity
GAS	Gas manufacture and waterworks
CON	Building construction and other construction
TRD	Wholesale and retail trade
RES	Restaurants and hotels
TRN	Railway transport & other land & water & air transport
COM	Communications
FIN	Financial institutions and insurance
SRV	Private & public services & ownership of dwellings

Table A2: Factors of Production

Labor Types

L_PROF	Scientific, technical, professional and related workers.
L_ADMN	Administrative, executive and managerial workers.
L_CLER	Clerical and related workers.
L_RETL	Sales workers.
L_SRVC	Service workers.
L_AGRC	Agricultural, animal husbandry and forestry workers, fisherman and hunters.
L_PROD	Non-agricultural production & related workers, transport equipment operators & laborers.
L_OTHR	Workers not classifiable by occupation.

Capital Types

K_RENT	Rent.
K_AGRC	Operating surplus in agriculture.
K_PROD	Operating surplus in non-agriculture.
K_TRAD	Operating surplus in trade.
K_SERV	Operating surplus in services.

Manufacturing Industry Statistics which indicates the number of people in each manufacturing activity.

In Table A2b, we list the percent of value-added by capital type. Some of these types are not very useful for our purposes, since they largely identify factors that are specific to certain groups of sectors. Thus, we aggregate K_RENT, K_PROD, K_TRAD and K_SERV into one homogeneous capital factor which can move across sectors. The factor K_AGRC is free to move across the agricultural sectors in which it is used in the base year, but not to any other sectors.

Some explanation may be required for the fact that the Turkish input-output table classifies 91 percent of value-added in agriculture to capital. The reason is that the returns to individuals who operate their own farms are classfied in the Turkish input-output table as a return to the owner as a capitalist, rather than to the owner as a worker. We chose not to alter the input-output data. But since we have classified both capital and labor in agriculture as sector

Table A2a: Percent of Value Added by Labor Type and Sector

Sector	L_PROF	L_ADMN	L_CLER	L_RETL	L_SRVC	L_AGRC	L_PROD	L_OTHR
AGR			1			8		
FRS			5		8	1	9	
FIS				1	11			
COL	9	1	6		3		53	
CRU	1						4	
MIN	8	1	6		3		50	
STO	2		2		1		14	
MEA	1	2	1		1		19	
CAN	1	2	1		1		19	
VEG	1	2	1		1		18	
GRN	2	3	2		1		24	
SUG	6	8	6		3		75	2
OFP	2	3	2		1		24	1
ALC	2	3	2		1		23	1
BEV	3	4	3		2		37	1
TOB	3	4	3		1		33	1
TXT	1	2	1		1		17	
WAP	1	2	1		1		16	
LEA							4	
SHO	2	2	2		1		21	
WOO	1	1	1				9	
FRN	1	2	1		1		18	
PAP	2	3	2		1		24	1
PRN	2	3	2		1		29	1
FRT	2	4	3		2		34	1
DRG	1	2	1		1		17	
OCP	2	2	2		1		20	
REF							4	
PET	1	2	1		1		19	
RBR	2	3	2		1		29	1
PLA	2	2	2		1		20	
GLA	2	3	2		1		24	
CEM	1	2	1		1		17	
NMM	2	3	2		1		25	1
IRO	3	4	3		2		39	1
NFM	1	2	2		1		20	
FAB	1	2	1		1		19	
MAC	1	2	2		1		20	
AGM	2	2	1		1		19	
ELM	2	3	2		1		26	1
SHP	3	5	3		2		45	1
RRE	5	7	5		3		66	2
VEH	3	4	3		2		39	1
OTE	3	5	3		2		36	2
OMN	2	3	2		1		27	1
ELE	9	1	13		3		14	
GAS	6	1	9		2		10	
CON	3	5	2		1		43	
TRD	2		3	6	9		2	
RES	2		4	10	14		3	
TRN	1		2				6	
COM	3	2	10		2		35	1
FIN	22	8	29	1	3		2	
SRV	28	3	9		9		9	1

Source: Calculated from De Santis and Ozhan (1994, Table B8).

Table A2b: Value Added by Sector and by Capital Type within Sectors

Sector	Value Added		Percent of Value Added by Capital Type				
	Billions of Turkish Lira	%	K_RENT	K_AGRC	K_PROD	K_TRAD	K_SERV
AGR	60	17		91			
FRS	3	1		77			
FIS	2	1		88			
COL	2	1			28		
CRU	1				95		
MIN					32		
STO	2	1			81		
MEA	1				75		
CAN	1				75		
VEG	1				76		
GRN	1				68		
OFP	4	1			68		
ALC	2				69		
BEV	1				51		
TOB	3	1			56		
TXT	8	2			77		
WAP	3	1			78		
LEA	1				94		
SHO					72		
WOO	3	1			88		
FRN	1				76		
PAP	2				68		
PRN	1				61		
FRT	1				55		
DRG	2				77		
OCP	4	1			73		
REF	4	1			95		
PET	1				75		
RBR	1				61		
PLA	1				74		
GLA	1				68		
CEM	2	1			77		
NMM	2				66		
IRO	3	1			48		
NFM	1				73		
FAB	4	1			75		
MAC	3	1			74		
AGM	1				75		
ELM	3	1			66		
SHP					41		
RRE					12		
VEH	4	1			49		
OTE					50		
OMN	1				64		
ELE	7	2			59		
GAS	2				71		
CON	23	7			45		
TRD	58	16				77	
RES	9	3				66	
TRN	47	13					91
COM	4	1					47
FIN	11	3					35
SRV	54	15	21				20
TOTAL		100					

Source: Calculated from De Santis and Ozhan (1994, Table B8).

specific, the impact on our results of a probably excessive share of value-added attributed to capital in agriculture should be minimal. For example, an adverse impact on agricultural sectors will induce a reduction in the price of both labor and capital in agriculture, without a shift of either to non-agricultural sectors. We should, however, be skeptical in interpreting results regarding the relative price of labor and capital in the agricultural sectors.

Although the SAM identifies a large number of households, distinguished by income level and location of residence, we choose to aggregate these into one representative household. For the immediate applications of the model, such an aggregation greatly facilitates understanding and exposition of the basic results.

The key tax instruments are import tariffs and the value added tax. The key subsidy instruments are export subsidies and production subsidies. These are all represented in the model as fixed *ad valorem* distortions. One of the challenges of assembling our model was to determine appropriate values for these items. The rates we employ are listed in percentage form, on a net basis, in Table A3.

Import tariffs should provide the least difficulty in estimation. Unfortunately, there are major discrepancies between statutory rates on imports and collected rates. This discrepancy is relatively common amongst less developed countries (see Pritchett and Sethi [1994]). However, it is particularly severe in the case of Turkey because of the pervasive use of complex transfer pricing arrangements for SOE imports, as well as the use of duty drawback schemes to provide investment and export incentives.

We employ pre-CU tariff rates based on 1993 collections and 1991 import weights. These differ considerably from (unweighted) statutory rates. Our post-CU tariff rates on non-EU

Table A3: Percentage Tax and Subsidy Rates in the Base Model (Net Basis)

Sector	1993 Import Tariffs	Post-CU Import Tariffs: MFN	Post-CU Import Tariffs: GSP	Post-CU Import Tariffs: Average	1993 Export Subsidy	1990 VAT+ConsTax	1990 Production Subsidy
AGR	21	21	21	21	3	1	2
FRS					-1	2	
FIS	39	39	39	39	5	1	
COL		4		2	7	8	3
CRU					17	15	
MIN	1					4	
STO	3	1	1	1	9	5	
MEA	24	24	24	24	13	1	
CAN	45	45	45	45	8	3	
VEG	4	4	4	4	9	2	
GRN	39	39	39	39	5	11	
SUG	18	18	18	18		9	15
OFP	52	52	52	52	2	2	
ALC	62	11	7	9	6	32	32
BEV	107	15		7	5	37	
TOB	81	9		5	11	35	35
TXT	10	21	21	21	8	7	
WAP	28	30	30	30	11	4	
LEA	2	10	3	7	14	4	
SHO	30	23	9	16	9	4	
WOO	19	2		1	10	2	
FRN	22	6		3	5	7	
PAP	19	3		1	25	4	
PRN	14	5		2	5	28	
FRT	1	8		4	24	8	
DRG	1	5		3	9	3	
OCP	11	9		4	15	2	
REF	9	2		1	16	162	
PET	4	5		2	29	1	3
RBR	18	6		3	10	1	
PLA	24	10		5	5	9	
GLA	23	6		3	10	4	
CEM	2	3		2	8	3	
NMM	18	5		3	9	6	
IRO	1	6	3	4	21	9	
NFM	4	3	1	2	19	2	
FAB	14	6		3	8	4	
MAC	6	4		2	8	2	
AGM	17	4		2	9	3	
ELM	11	8		4	13	16	
SHP	3	1			8	2	
RRE	5	4		2		1	
VEH	27	9		5	7	43	
OTE		2		1	14	16	
OMN	10	3		1	4	51	
ELE						18	1
GAS						1	
CON						4	
TRD						6	4
RES						6	
TRN						2	1
COM						24	
FIN						16	
SRV						6	

Sources: 1993 Import Tariffs are based on collected revenues, estimated by the State Planning Organization (SPO); Post-CU Import Tariffs are estimated by Togan [1996]; 1993 Export Subsidies are World Bank estimates; 1990 VAT rates plus consumption tax rates are based on collected indirect tax revenues, estimated by SPO; 1990 Production Subsidy rates are based on collections reported in the IO table.

countries are based on estimates from Togan [1996], recognizing differences between MFN rates

and GSP rates that Turkey will be required to apply. We take a simple average of the GSP and MFN rates in each sector, reflecting the *aggregate* share of each group of countries in Turkish imports in recent years. Note that agricultural import tariffs do not change after the CU.

Export subsidies are notoriously difficult to estimate in Turkey, because of the complex way in which they are implemented as reductions in other tax obligations. We employ World Bank estimates of these rates for 1993 (see Arslan [1995]), although subsequent government decisions indicate that these rates will be much lower in 1995.

The VAT rates reported in Table A3 reflect actual collections, using data for 1993 obtained from the State Planning Organization (SPO). There are several reasons for these rates to vary more than one would expect after the CU. Turkey has only employed a VAT for a few years, and administrative problems in uniformly implementing and enforcing the statutory rates cause collection rates to vary across sectors even if statutory rates do not. Some sectors are easier to audit than others, by the nature of their activities (e.g., urban-based *versus* rural-based, large invoiced transactions *versus* smaller cash-based transactions, more computerized accounting systems *versus* more traditional accounting systems).

Production subsidies are calculated using data from the 1990 IO table. For tobacco and alcoholic beverages we assume a production subsidy equal to the benchmark consumption tax[4] applies. We compute these subsidies as *ad valorem* rates from the IO data and transfer these rates to our SAM, re-balancing domestic supply in each sector so as to ensure zero profits. This re-balancing also takes into account our use of data on tariffs, VAT rates and export subsidies from "outside" the original, balanced SAM.

[4] These taxes are embodied in our benchmark VAT rates.

Estimates of elasticities of substitution must be assumed for primary factor substitution, value added and intermediate input substitution, import demand, detailed import component, import source, and domestic demand; elasticities of transformation must also be assumed for the allocation of domestic supply into domestic and exported markets, the allocation of exports into detailed export components, and the allocation of exports to destination. Despite our literature search, there are many elasticities about which there is considerable uncertainty. Our solution for that problem is to undertake a systematic sensitivity analysis with respect to key elasticities. Harrison and Vinod [1992] and Harrison, Rutherford, and Tarr [1993] demonstrate the role of systematic sensitivity analysis of models such as these with respect to plausible ranges of uncertainty about key elasticities.

The base model assumptions with respect to key elasticities are listed in Table A4. These elasticities refer to:

- The elasticity of substitution between capital and labor in each sector, ESUB_KL, for which we employ point estimates from Harrison, Rutherford, and Tarr [1993].
- Elasticities of substitution between intermediate inputs and the value added composite in each sector, ESUB_IO, assumed to be 0 in all sectors reflecting the Leontief tradition for intermediate input substitutability.
- Elasticities of substitution between domestic production and an imports composite in each sector, ESUB_DM. In Harrison, Rutherford, and Tarr [1993] we employed a common value of 2 across all sectors. Here we assume elasticity values documented in Harrison, Jones, Kimbell and Wigle [1992] and Harrison, Rutherford and Wooton [1991].

Table A4: Base Model Elasticities for Each Sector

Sector	ESUB_KL	ESUB_IO	ESUB_DM	ESUB_G	ESUB_MM	ETRN_DX	ETRN_G	ETRN_XX
AGR	0.94	0.0	2.00	2.00	5.00	2.90	2.00	5.00
FRS	0.94	0.0	2.00	2.00	5.00	2.90	2.00	5.00
FIS	0.94	0.0	2.00	2.00	5.00	2.90	2.00	5.00
COL	0.43	0.0	0.50	2.00	5.00	2.90	2.00	5.00
CRU	0.43	0.0		2.00	5.00	2.90	2.00	5.00
MIN	0.43	0.0	0.50	2.00	5.00	2.90	2.00	5.00
STO	0.43	0.0	2.00	2.00	5.00	2.90	2.00	5.00
MEA	0.94	0.0	0.50	2.00	5.00	2.90	2.00	5.00
CAN	0.94	0.0	1.10	2.00	5.00	2.90	2.00	5.00
VEG	0.94	0.0	1.70	2.00	5.00	2.90	2.00	5.00
GRN	0.94	0.0	2.10	2.00	5.00	2.90	2.00	5.00
SUG	0.94	0.0	2.00	2.00	5.00	2.90	2.00	5.00
OFP	0.94	0.0	0.50	2.00	5.00	2.90	2.00	5.00
ALC	0.94	0.0	2.10	2.00	5.00	2.90	2.00	5.00
BEV	0.94	0.0	2.00	2.00	5.00	2.90	2.00	5.00
TOB	0.84	0.0	2.00	2.00	5.00	2.90	2.00	5.00
TXT	0.93	0.0	2.00	2.00	5.00	2.90	2.00	5.00
WAP	0.93	0.0	3.40	2.00	5.00	2.90	2.00	5.00
LEA	0.75	0.0	2.00	2.00	5.00	2.90	2.00	5.00
SHO	0.93	0.0	6.80	2.00	5.00	2.90	2.00	5.00
WOO	0.74	0.0	2.00	2.00	5.00	2.90	2.00	5.00
FRN	0.74	0.0	1.90	2.00	5.00	2.90	2.00	5.00
PAP	1.09	0.0	1.10	2.00	5.00	2.90	2.00	5.00
PRN	1.09	0.0	2.00	2.00	5.00	2.90	2.00	5.00
FRT	1.01	0.0	1.40	2.00	5.00	2.90	2.00	5.00
DRG	1.01	0.0	2.00	2.00	5.00	2.90	2.00	5.00
OCP	1.01	0.0	1.80	2.00	5.00	2.90	2.00	5.00
REF	0.29	0.0	0.34	2.00	5.00	2.90	2.00	5.00
PET	0.29	0.0	0.34	2.00	5.00	2.90	2.00	5.00
RBR	0.97	0.0	1.30	2.00	5.00	2.90	2.00	5.00
PLA	0.97	0.0	1.30	2.00	5.00	2.90	2.00	5.00
GLA	0.96	0.0	1.40	2.00	5.00	2.90	2.00	5.00
CEM	0.96	0.0	0.80	2.00	5.00	2.90	2.00	5.00
NMM	0.43	0.0	2.00	2.00	5.00	2.90	2.00	5.00
IRO	0.91	0.0	0.50	2.00	5.00	2.90	2.00	5.00
NFM	0.91	0.0	0.50	2.00	5.00	2.90	2.00	5.00
FAB	0.91	0.0	1.50	2.00	5.00	2.90	2.00	5.00
MAC	1.20	0.0	0.50	2.00	5.00	2.90	2.00	5.00
AGM	1.20	0.0	0.50	2.00	5.00	2.90	2.00	5.00
ELM	0.98	0.0	1.30	2.00	5.00	2.90	2.00	5.00
SHP	1.88	0.0	0.50	2.00	5.00	2.90	2.00	5.00
RRE	1.88	0.0	0.50	2.00	5.00	2.90	2.00	5.00
VEH	1.88	0.0	2.00	2.00	5.00	2.90	2.00	5.00
OTE	1.88	0.0	0.50	2.00	5.00	2.90	2.00	5.00
OMN	1.19	0.0	1.20	2.00	5.00	2.90	2.00	5.00
ELE	1.88	0.0	2.00	2.00	5.00	2.90	2.00	5.00
GAS	1.88	0.0	2.00	2.00	5.00	2.90	2.00	5.00
CON	1.99	0.0	2.00	2.00	5.00	2.90	2.00	5.00
TRD	1.28	0.0	2.00	2.00	5.00	2.90	2.00	5.00
RES	3.12	0.0	2.00	2.00	5.00	2.90	2.00	5.00
TRN	1.88	0.0	2.00	2.00	5.00	2.90	2.00	5.00
COM	1.99	0.0	2.00	2.00	5.00	2.90	2.00	5.00
FIN	2.05	0.0	2.00	2.00	5.00	2.90	2.00	5.00
SRV	1.99	0.0	2.00	2.00	5.00	2.90	2.00	5.00

- The elasticity of substitution between detailed import components, ESUB_G, assumed to be 2.
- The elasticity of substitution for detailed imports distinguished by source, ESUB_MM, assumed to be 5 across all sectors.
- The elasticity of substitution between the domestic consumption of each good, ESUBC, assumed to approximately 1.5.
- The elasticity of transformation of domestic production into domestic uses and export, ETRN_DX, assumed to be 2.9 across all sectors following the estimates for Turkey by Faini [1988].
- The elasticity of transformation between detailed export components, ETRN_G, assumed to be 2.
- The elasticity of transformation between regional destinations, ETRN_XX, assumed to be 5 across all sectors.

These elasticity values reflect our best guesses based on past experience and the available data.

Our sensitivity analysis with respect to these elasticities employs a number of assumptions as to their likely range of variation. These assumptions are based partly on available econometric estimates of standard errors, and largely on *a priori* judgement. Specifically, we assume:

- ESUB_KL is distributed normally, with a mean equal to the point estimate assumed in the base model and a standard deviation from Harrison, Rutherford, and Tarr [1993].
- ESUB_IO is distributed uniformly between 0 and 0.5 in all sectors.
- ESUB_DM is distributed uniformly, with a range equal to the point estimate assumed above plus or minus 50% of that point estimate.

• ESUB_G is distributed uniformly between 1 and 3.

• ESUB_MM is distributed uniformly between 4 and 6.

• ESUBC is distributed uniformly, with a range equal to the point estimate assumed above plus or minus 50% of that point estimate.

• ETRN_DX is distributed normally, with a mean equal to the point estimate assumed in the base model (2.9) and a standard deviation of 1.3 from Faini [1988].

• ETRN_G is distributed uniformly between 1 and 3.

• ETRN_XX is distributed uniformly between 4 and 6.

In all cases we assume that elasticities generated by random perturbation must be non-negative, resulting in some truncation at zero for those generated assuming a normal distribution.

Additional tables of basic data employed in the model or calculated from our benchmark data are presented at the end of this appendix. The SOE model is generated with the GAMS/MPSGE software developed by Brooke, Kendrick and Meeraus [1992] and Rutherford [1992a][1992b]. It is then solved using the MILES algorithm developed by Rutherford [1993].

3. Systematic Sensitivity Analysis

To calibrate our model estimates of elasticities must be assembled for primary factor substitution, import demand, import source, and domestic demand, amongst the more important for our purposes. In the base model all elasticity values are assigned *a priori* to values which we believe are plausible central tendency estimates. Since elasticity estimates are subject to a margin of error, our "remedy" for this problem, which is endemic to any large-scale model of this kind, is to undertake systematic sensitivity analyses of our major results with respect to plausible

bounds on these elasticities. Even if we are unable to specify a point estimate with any precision, our priors over the likely bounds that these elasticities could take are quite strong. To the extent that our major conclusions are robust to perturbations over these bounds, we do not see our uncertainty over specific values of these elasticities as a weakness of the model.[5]

Our sensitivity analysis employs the procedures developed by Harrison and Vinod [1992]. Essentially these procedures amount to a Monte Carlo simulation exercise in which a wide range of elasticities are independently and simultaneously perturbed from their benchmark values. These perturbations follow prescribed distributions, such as a *t* distribution with a specified standard deviation and degrees of freedom, or a uniform distribution over a specified range. For each Monte Carlo run we solve the counter-factual policy with the selected set of elasticities. This process is repeated until we arrive at the desired sample size, in our case 1000. The results are then tabulated as a distribution, with equal weight being given (by construction) to each Monte Carlo run. The upshot is a probability distribution defined over the endogenous variables of interest. In our case we focus solely on the welfare impacts of the FULL CU scenario.

The sensitivity analysis we undertake reflects a diffuse set of priors over the plausible elasticity values. The specific assumptions made are set out in an appendix. If we find that these

[5] These remarks should not be interpreted as denying the value of any new empirical work on generating such elasticities. On the contrary, any effort that could generate better bounds on these point estimates is useful in generating policy conclusions that carry greater credibility, even if those conclusions will still be probabilistic in nature. Moreover, we do not consider sensitivity analysis with respect to more general functional forms, even though we share concerns with the restrictiveness of some of the popular forms we employ.

wide ranges result in fragile inferences about welfare or revenue effects, then the next step would be to employ data-based priors about plausible ranges.[6]

The results for the FULL scenario, in which the VAT is used as a replacement tax, are reported in Table A5 after 5000 Monte Carlo runs. The variables reported, apart from the percent welfare effect and summary variables for the tax change and exchange rate, include the percentage change in value added in each sector.

These results indicate that the overall conclusions we have drawn are not fragile to the assumptions made about underlying elasticities, although some of the sectoral impacts are. Welfare impacts range from 0.8% up to 1.2%, and the change in the replacement tax ranges from 13% up to 20%. These do not appear to be large variations, relative to the main theme of our analysis. Given that there is some variation in the individual sectoral impacts, and relatively little variation in the overall welfare or revenue impacts, these results also indicate some caution in using a model such as this one to predict specific "winners" and "losers". Despite this uncertainty, the basic conclusions as to welfare and revenue effects are robust.

[6] This data-based method was employed, for example, in Harrison, Rutherford and Tarr [1993]. Harrison, Jones, Kimbell and Wigle [1993] advocated it as a means of minimizing the chance of overly fragile results from such sensitivity analyses.

Table A5: Results of Sensitivity Analysis

Measure	Mean	Std. Dev.	Skew.	Kurt.	Minimum	Maximum	Cases
W_AGG	2614.3	201.12	-0.023	2.165	2070.	3132.	5000
W_AGG%	0.99720	0.81814E-01	-0.021	2.209	0.8000	1.200	5000
TAU%	115.38	0.69745	0.245	3.407	113.3	120.3	5000
PFX%	-0.95140E-01	0.36141	0.299	3.132	-1.300	1.700	5000
AGR	0.10340	0.33417E-01	0.605	8.740	0.0000	0.2000	5000
FRS	-1.4767	0.40126	-0.190	2.876	-3.100	-0.2000	5000
FIS	0.87138	0.25102	-4.201	43.360	-3.200	1.500	5000
COL	0.96494	0.38366	0.106	3.395	-1.100	2.400	5000
CRU	-0.24440E-01	0.16025	-0.511	3.715	-0.9000	0.5000	5000
MIN	2.2560	1.5492	0.211	2.994	-2.200	8.200	5000
STO	-0.79240E-01	0.75034E-01	-0.260	3.257	-0.4000	0.2000	5000
MEA	2.1384	0.65966	-0.007	2.917	-0.2000	4.500	5000
CAN	23.163	11.941	1.058	6.875	-0.6000	142.6	5000
VEG	3.2869	1.0868	0.493	3.361	0.5000	8.600	5000
GRN	1.7521	0.46402	-0.340	7.714	-3.500	3.400	5000
SUG	0.40598	0.55279	-0.243	4.052	-4.400	2.200	5000
OFP	2.3623	0.60378	0.372	3.436	-1.100	4.800	5000
ALC	-9.4629	3.9955	-0.242	1.934	-18.60	-2.200	5000
BEV	-4.4299	2.7239	-0.377	2.022	-10.90	0.5000	5000
TOB	-33.654	10.943	0.248	2.845	-52.50	45.40	5000
TXT	1.8865	1.2233	0.074	2.854	-2.000	6.100	5000
WAP	9.8477	6.2739	0.003	2.871	-7.900	36.30	5000
LEA	2.5946	2.8435	0.077	2.921	-6.200	14.90	5000
SHO	-0.88300	0.82398	-0.079	2.124	-2.800	1.400	5000
WOO	-0.30728	0.36078	-0.057	2.490	-2.100	0.7000	5000
FRN	-0.45072	0.40409	-0.179	2.508	-3.200	0.5000	5000
PAP	-3.9090	1.2668	0.038	2.288	-7.100	0.8000	5000
PRN	-0.84486	0.55648	-0.048	2.479	-3.300	0.6000	5000
FRT	2.1185	0.83111	0.248	2.912	-0.3000	5.200	5000
DRG	1.9487	0.58888	0.230	5.249	-3.400	5.000	5000
OCP	-5.3812	2.0774	-0.004	2.166	-10.60	4.000	5000
REF	-2.1000	0.75504	-0.316	3.672	-8.400	-0.2000	5000
PET	1.1451	0.35965	-0.529	8.252	-3.000	2.400	5000
RBR	-1.3091	0.92979	-0.084	2.216	-3.900	1.200	5000
PLA	-2.3164	1.2241	0.212	3.034	-5.400	5.400	5000
GLA	-2.9574	1.2523	-0.055	2.374	-7.100	1.200	5000
CEM	0.16964	0.13782	0.481	3.391	-0.2000	0.8000	5000
NMM	-4.6632	1.6472	-0.095	1.904	-8.400	-1.300	5000
IRO	2.9949	2.1176	0.166	2.876	-2.500	10.60	5000
NFM	-2.8915	0.70456	0.023	2.997	-5.300	0.0000	5000
FAB	-2.3216	0.85136	-0.070	2.103	-4.500	0.1000	5000
MAC	-0.51118	0.48827	0.086	2.815	-1.900	1.400	5000
AGM	-0.35402	0.26375	-0.049	2.497	-1.300	0.4000	5000
ELM	-5.3718	1.4792	-0.026	2.108	-9.400	-1.700	5000
SHP	4.5309	2.2082	0.629	3.618	-0.4000	15.40	5000
RRE	0.39572	0.17126	-0.023	3.093	-0.5000	1.000	5000
VEH	-15.763	4.5986	0.019	1.861	-25.00	-2.600	5000
OTE	-0.80694	0.38975	-0.283	3.113	-2.600	0.5000	5000
OMN	-3.7645	1.2664	-0.066	2.230	-7.100	0.0000	5000
ELE	-0.24380E-01	0.19959	0.159	2.997	-0.7000	0.8000	5000
GAS	0.70026	0.10229	-0.896	9.405	-0.3000	1.000	5000
CON	0.21296	0.53559E-01	-0.178	5.199	-0.2000	0.4000	5000
TRD	1.1038	0.23436	-1.054	11.169	-1.600	2.100	5000
RES	2.2249	0.67432	0.405	3.273	-0.4000	5.100	5000
TRN	0.66956	0.12665	0.031	3.946	-0.1000	1.100	5000
COM	0.38418	0.25133	-5.723	97.936	-5.700	0.9000	5000
FIN	0.25342	0.10693	-0.217	3.741	-0.3000	0.6000	5000
SRV	0.51508	0.12464	-2.665	35.120	-1.700	0.9000	5000

TABLE A6: THE COST STRUCTURE OF DOMESTIC PRODUCTION

OUTPUT : TOTAL PRODUCTION -- BILLIONS OF TL (1990)
INTERM : INTERMEDIATE INPUTS -- BILLIONS OF TL (1990)
LABOR : TOTAL PAYMENTS -- BILLIONS OF TL (1990)
CAPITAL : TOTAL PAYMENTS -- BILLIONS OF TL (1990)
K/L : RATIO OF CAPITAL EARNINGS TO LABOR EARNINGS
K/VA : RATIO OF CAPITAL PAYMENTS TO VALUE ADDED -- %
VA/GDP : RATIO OF VALUE ADDED TO ECONOMY-WIDE GDP -- %

	OUTPUT	INTERM	LABOR	CAPITAL	K/L	K/VA	VA/GDP
AGR	89.0	30.0	5.8	55.1	9.5	90.5	16.9
FRS	3.4	0.5	0.7	2.3	3.4	77.3	0.8
FIS	2.6	0.5	0.2	1.9	7.7	88.5	0.6
COL	2.8	0.8	1.5	0.6	0.4	27.7	0.5
CRU	1.9	0.3	0.1	1.5	18.5	94.9	0.4
MIN	0.2	0.1	0.1	0.0	0.5	31.6	0.0
STO	3.1	0.6	0.5	2.0	4.3	81.0	0.7
MEA	3.3	2.6	0.2	0.5	3.0	75.3	0.2
CAN	2.1	1.5	0.2	0.5	3.0	75.1	0.2
VEG	4.0	2.9	0.3	0.8	3.2	76.3	0.3
GRN	6.1	5.2	0.3	0.6	2.2	68.5	0.2
SUG	2.8	2.7	0.5				0.1
OFP	17.9	13.6	1.4	2.9	2.1	67.9	1.2
ALC	2.8	0.7	0.7	1.4	2.2	68.9	0.4
BEV	1.5	0.7	0.4	0.4	1.0	50.8	0.2
TOB	5.9	2.5	1.5	1.9	1.2	55.5	0.7
TXT	27.6	18.6	2.1	6.9	3.4	77.1	2.4
WAP	10.6	7.5	0.7	2.5	3.6	78.4	0.8
LEA	2.4	1.5	0.1	0.8	15.6	94.0	0.2
SHO	1.7	1.2	0.1	0.3	2.6	72.3	0.1
WOO	8.2	5.3	0.4	2.6	7.3	87.9	0.8
FRN	2.3	1.6	0.2	0.5	3.2	75.9	0.2
PAP	5.0	3.3	0.5	1.1	2.1	67.8	0.5
PRN	3.3	2.1	0.5	0.7	1.6	61.5	0.3
FRT	2.0	1.5	0.3	0.3	1.2	55.1	0.1
DRG	3.8	2.1	0.4	1.3	3.3	76.8	0.4
OCP	12.6	8.0	1.2	3.3	2.7	72.9	1.3
REF	22.5	11.0	0.6	10.9	19.6	95.1	1.2
PET	2.1	1.6	0.2	0.5	3.0	74.7	0.2
RBR	4.9	3.5	0.6	0.9	1.6	61.0	0.4
PLA	2.8	2.0	0.2	0.6	2.8	73.9	0.2
GLA	2.3	1.1	0.4	0.9	2.1	67.7	0.3
CEM	4.7	2.2	0.6	1.9	3.4	77.4	0.7
NMM	3.7	1.8	0.6	1.2	1.9	66.1	0.5
IRO	16.1	12.8	1.7	1.6	0.9	48.1	0.8
NFM	4.8	3.2	0.4	1.1	2.8	73.4	0.4
FAB	9.6	5.9	1.0	2.8	3.0	74.9	1.0
MAC	7.5	4.3	0.8	2.3	2.8	73.8	0.9
AGM	1.9	1.3	0.2	0.5	3.0	75.2	0.2
ELM	9.5	5.8	1.3	2.4	1.9	65.7	0.9
SHP	0.5	0.3	0.1	0.1	0.7	41.0	0.1
RRE	0.3	0.1	0.2	0.0	0.1	11.9	0.0
VEH	12.5	7.3	2.6	2.5	1.0	48.8	1.0
OTE	0.1	0.0	0.0	0.0	1.0	50.0	0.0
OMN	5.4	3.5	0.7	1.2	1.8	64.4	0.4
ELE	10.7	2.9	3.2	4.7	1.5	59.2	1.9
GAS	2.4	0.8	0.5	1.2	2.5	71.3	0.5
CON	57.0	32.7	13.4	10.9	0.8	44.9	6.5
TRD	72.8	15.0	13.9	47.2	3.4	77.3	16.1
RES	21.2	11.2	3.4	6.6	1.9	65.8	2.6
TRN	76.1	28.6	4.5	43.8	9.8	90.7	13.3
COM	6.8	1.9	2.6	2.3	0.9	47.1	1.1
FIN	16.1	3.1	8.5	4.5	0.5	34.7	3.1
SRV	67.0	9.6	33.6	23.7	0.7	41.3	15.1

TABLE A7: PRODUCTION AND TRADE

OUTPUT : TOTAL PRODUCTION -- BILLIONS OF TL (1990)
DOMEST : PRODUCTION FOR DOMESTIC MARKET -- BILLIONS OF TL (1990)
EXPORT : PRODUCTION FOR EXPORT MARKETS -- BILLIONS OF TL (1990)
IMPORT : TOTAL VALUE OF IMPORTS -- BILLIONS OF TL (1990)
M/(M+D) : IMPORT SHARE OF DOMESTIC DEMAND -- %
X/(X+D) : EXPORT SHARE OF DOMESTIC OUTPUT -- %

	OUTPUT	DOMEST	EXPORT	IMPORT	M/(M+D)	X/(X+D)
AGR	89.0	86.5	2.5	2.6	2.9	2.8
FRS	3.4	3.4	0.0	0.5	12.4	0.8
FIS	2.6	2.5	0.1	0.0	0.5	3.7
COL	2.8	2.8	0.0	0.8	23.1	0.0
CRU	1.9	1.9	0.0	9.9	84.3	0.3
MIN	0.2	0.2		0.2	51.9	
STO	3.1	2.5	0.6	0.3	10.9	18.0
MEA	3.3	3.0	0.3	0.5	15.0	8.9
CAN	2.1	0.5	1.6	0.1	10.1	76.5
VEG	4.0	3.5	0.5	0.8	19.0	12.0
GRN	6.1	5.9	0.2	0.2	3.5	2.9
SUG	2.8	2.8	0.0	0.9	23.7	0.3
OFP	17.9	15.6	2.3	0.8	4.8	12.7
ALC	2.8	2.4	0.3	0.2	6.5	12.1
BEV	1.5	1.4	0.1	0.0	2.6	7.0
TOB	5.9	5.8	0.1	1.9	24.6	2.1
TXT	27.6	20.9	6.7	2.4	10.4	24.3
WAP	10.6	5.3	5.3	0.6	10.0	50.2
LEA	2.4	1.9	0.5	0.5	20.7	19.0
SHO	1.7	1.6	0.1	0.1	4.0	5.7
WOO	8.2	8.1	0.1	0.2	2.0	0.9
FRN	2.3	2.2	0.1	0.1	2.4	2.7
PAP	5.0	4.8	0.1	1.0	17.5	3.0
PRN	3.3	3.2	0.1	0.1	3.9	1.6
FRT	2.0	1.8	0.2	0.8	30.1	10.1
DRG	3.8	3.6	0.2	0.9	20.0	4.8
OCP	12.6	11.2	1.4	8.8	44.2	11.5
REF	22.5	21.6	0.9	3.4	13.7	3.9
PET	2.1	2.1	0.0	0.2	10.1	0.9
RBR	4.9	4.8	0.2	0.6	11.5	3.5
PLA	2.8	2.7	0.1	0.4	12.2	4.3
GLA	2.3	1.9	0.5	0.2	11.6	19.4
CEM	4.7	4.5	0.2	0.1	2.8	3.6
NMM	3.7	3.5	0.2	0.6	14.5	6.1
IRO	16.1	12.8	3.3	4.9	27.6	20.7
NFM	4.8	4.1	0.7	5.4	57.1	14.0
FAB	9.6	9.2	0.4	1.4	13.3	4.4
MAC	7.5	7.0	0.4	10.6	60.2	6.0
AGM	1.9	1.9	0.0	0.2	8.0	1.3
ELM	9.5	8.5	0.9	5.6	39.8	9.9
SHP	0.5	0.3	0.1	0.6	63.0	29.3
RRE	0.3	0.3		0.1	17.5	
VEH	12.5	12.0	0.5	5.4	31.1	3.8
OTE	0.1	0.1	0.0	0.9	89.7	4.3
OMN	5.4	5.1	0.4	2.5	32.9	7.0
ELE	10.7	10.6	0.1	0.0	0.1	0.8
GAS	2.4	2.4	0.0	0.0	0.0	1.2
CON	57.0	57.0				
TRD	72.8	67.4	5.4			7.4
RES	21.2	17.6	3.5	1.2	6.5	16.7
TRN	76.1	63.6	12.5	2.1	3.2	16.4
COM	6.8	6.8	0.1	0.1	1.1	0.9
FIN	16.1	16.0	0.1	0.0	0.0	0.8
SRV	67.0	65.8	1.1	0.7	1.0	1.7

TABLE A8: IMPORTS VOLUMES, SHARES AND RATES OF PROTECTION

IMPORT : TOTAL IMPORTS -- BILLIONS OF TL (1990)
M(I)/M : COMMODITY IMPORT SHARE -- %
MEU/M(I) : EU IMPORT SHARE -- %
EU_TAR : TARIFF RATE ON EU IMPORTS -- %
EFTA_TAR : TARIFF RATE ON EFTA IMPORTS -- %
ROW_TAR : TARIFF RATE ON REST OF WORLD IMPORTS -- %

	IMPORT	M(I)/M	MSHR_EU	EU_TAR	EFTA_TAR	ROW_TAR
AGR	2.1	2.8	25.0	15.7	18.1	23.1
FRS	0.5	0.6	16.5	0.3	0.3	0.5
FIS	0.0	0.0	30.5	37.6	37.6	40.2
COL	0.8	1.1	0.3	0.2		0.4
CRU	9.9	13.2	0.0	0.0		0.0
MIN	0.2	0.3				0.6
STO	0.3	0.4	32.2	4.2	3.0	1.9
MEA	0.4	0.6	35.8	27.7	27.7	22.6
CAN	0.0	0.1	47.3	40.4	40.4	48.2
VEG	0.8	1.0	7.7	4.1	4.1	3.7
GRN	0.2	0.2	3.6	36.5		38.7
SUG	0.7	1.0	93.5	18.4	18.4	18.2
OFP	0.5	0.7	75.5	51.7	51.7	53.1
ALC	0.1	0.1	81.4	63.8		51.5
BEV	0.0	0.0	66.7	103.3		114.3
TOB	1.1	1.4	3.5	20.3	20.3	82.7
TXT	2.2	2.9	26.6	11.6	10.5	8.9
WAP	0.5	0.6	70.2	26.0	26.0	32.7
LEA	0.5	0.7	68.6	1.7	1.7	2.3
SHO	0.0	0.1	25.7	24.4		32.2
WOO	0.1	0.2	41.6	17.9	17.9	19.4
FRN	0.0	0.1	87.9	22.1	22.1	25.0
PAP	0.9	1.1	35.2	17.7	17.7	19.1
PRN	0.1	0.2	72.9	12.7	12.7	17.1
FRT	0.8	1.0	8.7	0.5	0.5	0.8
DRG	0.9	1.2	59.6	1.1	1.1	1.2
OCP	8.0	10.6	63.0	9.8	9.8	11.8
REF	3.1	4.2	63.5	8.3	8.3	9.2
PET	0.2	0.3	24.8	4.9	4.4	3.7
RBR	0.5	0.7	64.1	16.6	16.6	20.0
PLA	0.3	0.4	75.1	22.9	22.9	28.9
GLA	0.2	0.3	64.1	21.4	21.4	27.2
CEM	0.1	0.2	13.6	1.9		2.2
NMM	0.5	0.7	71.4	17.5	17.5	20.1
IRO	4.8	6.4	48.9	1.3	1.3	1.5
NFM	5.3	7.0	38.4	3.7	3.7	3.4
FAB	1.2	1.7	77.4	13.3	13.3	17.6
MAC	10.1	13.3	62.4	5.2	5.2	6.4
AGM	0.1	0.2	78.7	15.7	15.7	21.1
ELM	5.1	6.8	55.7	9.4	9.4	12.7
SHP	0.6	0.7	21.4	2.3	2.3	3.1
RRE	0.1	0.1	10.8	4.7	4.7	5.3
VEH	4.2	5.6	53.0	24.4	24.4	30.9
OTE	0.9	1.2	31.2	0.3		0.6
OMN	2.3	3.0	56.7	8.3	8.3	12.4
ELE	0.0	0.0	43.90814			
GAS	0.0	0.0	43.90814			
CON						
TRD						
RES	1.2	1.6	43.90814			
TRN	2.1	2.8	43.90814			
COM	0.1	0.1	43.90814			
FIN	0.0	0.0	43.90814			
SRV	0.7	0.9	43.90814			

TABLE A9: EXPORT VOLUMES, SHARES AND RATES OF SUBSIDY

EXPORT : TOTAL EXPORTS -- BILLIONS OF TL (1990)
E(I)/E : COMMODITY EXPORT SHARE -- %
XS_E : EXPORT SUBSIDY RATE -- %
XSHR_EU : EU SHARE OF TOTAL EXPORT DEMAND -- %

	EXPORT	E(I)/E	XS_E	XSHR_EU
AGR	2.4	4.6	3.2	21.7
FRS	0.0	0.0	-0.8	56.1
FIS	0.1	0.2	4.9	82.7
COL	0.0	0.0	6.6	47.5
CRU	0.0	0.0	17.0	50.0
MIN				
STO	0.5	1.0	9.2	43.8
MEA	0.3	0.5	12.6	52.9
CAN	1.5	2.8	8.4	66.0
VEG	0.4	0.8	8.7	5.1
GRN	0.2	0.3	5.4	4.6
SUG	0.0	0.0	0.2	10.1
OFP	2.2	4.3	2.2	60.4
ALC	0.3	0.6	5.6	42.0
BEV	0.1	0.2	4.6	12.3
TOB	0.1	0.2	11.3	28.5
TXT	6.2	11.9	8.0	69.3
WAP	4.8	9.2	11.0	71.8
LEA	0.4	0.8	13.5	46.4
SHO	0.1	0.2	8.9	17.6
WOO	0.1	0.1	9.9	23.0
FRN	0.1	0.1	5.0	24.1
PAP	0.1	0.2	24.9	22.2
PRN	0.0	0.1	4.6	44.5
FRT	0.2	0.3	24.1	36.4
DRG	0.2	0.3	9.1	9.2
OCP	1.3	2.4	14.8	30.5
REF	0.7	1.4	16.0	41.5
PET	0.0	0.0	28.8	69.0
RBR	0.2	0.3	9.5	30.0
PLA	0.1	0.2	4.9	37.1
GLA	0.4	0.8	10.2	46.1
CEM	0.2	0.3	8.3	34.2
NMM	0.2	0.4	9.0	56.3
IRO	2.7	5.3	21.0	3.6
NFM	0.6	1.1	19.3	34.7
FAB	0.4	0.8	8.0	40.9
MAC	0.4	0.8	8.2	32.0
AGM	0.0	0.0	8.8	37.1
ELM	0.8	1.6	13.2	60.4
SHP	0.1	0.2	7.6	24.7
RRE				
VEH	0.4	0.8	6.7	42.3
OTE	0.0	0.0	13.9	60.0
OMN	0.4	0.7	4.2	48.0
ELE	0.1	0.2		47.5
GAS	0.0	0.1		47.5
CON				
TRD	5.4	10.4		47.5
RES	3.5	6.8		47.5
TRN	12.5	24.0		47.5
COM	0.1	0.1		47.5
FIN	0.1	0.2		47.5
SRV	1.1	2.2		47.5

TABLE A10: THE COMPOSITION OF DOMESTIC DEMAND

DOMEST : DOMESTIC SUPPLY TO DOMESTIC MARKET -- BILLIONS OF TL (1990)
IMPORT : IMPORT SUPPLY TO DOMESTIC MARKET -- BILLIONS OF TL (1990)
INTERM% : INTERMEDIATE DEMAND -- % OF TOTAL
D_HOUSE%: DOMESTIC HOUSEHOLD DEMAND -- % OF TOTAL
D_GOVT% : GOVERNMENT DEMAND -- % OF TOTAL
INVEST% : INVESTMENT DEMAND -- % OF TOTAL
STOCK% : STOCK CHANGE -- % OF TOTAL

	DOMEST	IMPORT	INTERM%	D_HOUSE%	D_GOVT%	INVEST%	STOCK%
AGR	86.5	2.6	41.3	56.5	0.4	1.9	1.8
FRS	3.4	0.5	78.3	25.9	4.7	-8.9	-8.9
FIS	2.5	0.0	9.4	90.9		-0.3	-0.3
COL	2.8	0.8	58.5	32.1	8.0	1.4	1.4
CRU	1.9	9.9	95.1			4.9	4.9
MIN	0.2	0.2	102.7			-2.7	-2.7
STO	2.5	0.3	72.4			27.6	27.6
MEA	3.0	0.5	31.2	52.0	15.9	0.9	0.9
CAN	0.5	0.1	44.1	39.7	18.1	-1.9	-1.9
VEG	3.5	0.8	44.4	61.5	1.2	-7.1	-7.1
GRN	5.9	0.2	52.5	56.3	1.0	-9.8	-9.8
SUG	2.8	0.9	30.5	59.1	1.2	9.3	9.3
OFP	15.6	0.8	30.4	65.0	1.8	2.7	2.7
ALC	2.4	0.2	22.5	58.1		19.4	19.4
BEV	1.4	0.0	32.5	46.2	0.5	20.8	20.8
TOB	5.8	1.9	1.1	85.1		13.8	13.8
TXT	20.9	2.4	56.6	41.4	0.3	1.7	1.3
WAP	5.3	0.6	3.0	89.8	6.9	0.3	0.1
LEA	1.9	0.5	78.6	13.5	0.0	7.9	7.9
SHO	1.6	0.1	5.7	73.2	10.7	10.4	10.4
WOO	8.1	0.2	74.0	27.8	0.2	-2.0	-2.0
FRN	2.2	0.1	39.2	48.0		12.8	0.8
PAP	4.8	1.0	79.6	15.7	2.3	2.4	2.4
PRN	3.2	0.1	24.1	71.0	0.9	4.1	4.1
FRT	1.8	0.8	100.2			-0.2	-0.2
DRG	3.6	0.9	34.8	63.7	1.6	-0.2	-0.2
OCP	11.2	8.8	60.8	40.1	0.5	-1.4	-1.4
REF	21.6	3.4	88.5	21.8	5.5	-15.8	-15.8
PET	2.1	0.2	91.2	31.3	5.3	-27.8	-27.8
RBR	4.8	0.6	65.3	34.6	0.7	-0.5	-0.5
PLA	2.7	0.4	58.0	41.4	0.3	0.3	0.3
GLA	1.9	0.2	45.6	55.4	1.7	-2.7	-2.7
CEM	4.5	0.1	100.2		0.6	-0.8	-0.8
NMM	3.5	0.6	94.2	14.0	1.0	-9.3	-9.3
IRO	12.8	4.9	98.3		0.1	1.6	1.6
NFM	4.1	5.4	84.0		0.0	16.0	16.0
FAB	9.2	1.4	36.7	50.0	0.7	12.6	3.1
MAC	7.0	10.6	14.6	19.2	3.3	62.9	2.1
AGM	1.9	0.2	31.5			68.5	10.7
ELM	8.5	5.6	39.5	27.3	1.4	31.7	9.1
SHP	0.3	0.6	28.9			71.1	9.5
RRE	0.3	0.1	30.3			69.7	-33.9
VEH	12.0	5.4	37.2	21.3	0.2	41.3	10.1
OTE	0.1	0.9	9.3			90.7	-2.6
OMN	5.1	2.5	12.6	58.2	1.3	27.9	4.8
ELE	10.6	0.0	73.8	12.0	3.8	10.4	10.4
GAS	2.4	0.0	51.7	33.9	14.2	0.2	0.2
CON	57.0				0.4	99.6	-0.9
TRD	67.4		38.6	47.7	1.6	12.1	3.7
RES	17.6	1.2	7.4	90.3	1.5	0.8	0.8
TRN	63.6	2.1	38.6	54.7	1.7	5.0	2.6
COM	6.8	0.1	53.1	31.2	6.6	9.1	9.1
FIN	16.0	0.0	84.2	3.0	4.0	8.8	8.8
SRV	65.8	0.7	20.4	33.2	49.6	-3.2	-3.2

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