THE IMPACT OF A COMPLETE TRADE LIBERALIZATION ON HOUSEHOLD GROUPS IN TURKISH ECONOMY: A CGE APPROACH

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Abstract

This study examines the impacts of complete trade liberalization in terms of tariffs and export subsidies on the household income distribution and agriculture intensive sectoral output using a CGE framework. Results show that over the long run despite export specific liberalization yields stagnant results for household income and real GDP, tariff specific and complete liberalization raises the incomes of the households, although the high income households benefits more. The complete liberalization benefits the agribusiness and sugar sectors while the tobacco suffers noticeably.

Keywords: Trade Liberalization, Geographic Household Income, CGE.
JEL Classification: C68, F13.

Introduction

Like many developing countries in which agriculture plays a vital role, Turkish agricultural policies aim at providing a standard level of income in agricultural sector. On the other hand, the globalization process that reflects the liberalization in trade barriers paves a challenging way for the developing countries. Trade liberalization can impact the incomes of various household groups in rural and urban areas. This paper analyses the income distributional effects of liberalizing the Turkish agricultural trade policies in terms of tariffs and export subsidies using a general equilibrium framework. That way, whether trade liberalization efforts benefit the developing economies can be determined and policy-makers can make necessary adjustments for income distribution among the households.

The general equilibrium models in the area of international trade stressed the significance of trade liberalization. In one of the earlier studies De Melo and Robinson (1980) developed a multisector CGE model for Colombia to simulate the effects of trade on the distribution of income among socioeconomic groups using the factors of production they own for the related sectors. Their results indicate that outward-looking policies are more detrimental for distribution of income than the inward-looking ones in the medium term. Lofgren (1999) used a general equilibrium model to asses the impact of trade reform on the rural and urban households. A 25 % cut in border barriers is simulated for both agriculture and the industry. His findings indicate that the results are unfavorable for rural low income households. Harrison et al. (1993) analyzed the trade reform in Turkish economy using a multi-sector general equilibrium model. They found that further tariff reductions are needed to attain significant welfare gains. Other studies, such as Mercenier and Yeldan (1997), Harrison et al. (1996) studied the impacts of Turkey-EU customs union and indicated that further tariff reductions are required for welfare gains. However, the household income distribution effect of trade liberalization for Turkey was not

studied in specific. The contribution of this paper to the existing CGE literature for Turkey is twofold. First the previous studies did not specify the household groups in terms of their geographical locations, namely rural and urban. This paper specifies three rural and three urban household groups. That way the impact of trade liberalization can be assessed specifically. The second contribution is that this study interacts with the export subsidies which has not been included in traditional Turkish SAM. That way the impact of elimination of these subsidies combined with the tariffs can be studied.

This paper analyzes the change in geographical household income, and GDP for freer trade and complete trade liberalization cases. The result of this study can shed a light to the debate whether globalization that reflects the trade liberalization benefits the households in a developing country, in this case Turkey.

Data

SAM provides a general overview of a economy and shows the transactions among the agents in a particular point in a time. The row accounts represents the income received from various agents while the column accounts represent the expenditures (Pyatt and Round, 1985). In this study, a Turkish SAM for the year 1990 constructed by De Santis and Ozhan (1995, 1997) is reorganized for household income distribution analysis. In that study, they constructed the comprehensive and detailed SAM for Turkey. In production accounts a distinction is made between activities and commodities that permits the Armington specification of imperfect substitution in general equilibrium modeling. Their SAM consists of 226 accounts which disaggregates 8 different types of labor, 5 different types of capital, 20 classes of households according to their income sizes and geographical regions, state and private companies, 54 activities and corresponding commodities, and a capital account that consists of private and public gross fixed capital formation. For this study the Turkish SAM is reorganized to measure the distribution of income among household groups. Thus, 6 different types of households are classified

according to their income size and geographical location. These are rural low (RL), rural medium (RM), rural high (RH), urban low (UL), urban medium (UM), and urban high (UH). Activities are reorganized to include agriculture, agribusiness, sugar, tobacco, manufacturing, and services. Sugar sector, which is mainly nontradable and tobacco, which is Turkey's traditional export sector, are used to measure sectoral production impacts of various scenarios. There are also five commodity accounts for the corresponding sectors. Factors are comprised of labor and capital. Government, Investment, and Rest of the World (ROW) accounts are used as exogenous. Since export subsidies are not the legitimate trade tools, like most of the SAMs, Turkish SAM does not treat the export subsidies separately. For this analysis, the sectoral export subsidies obtained from the World Bank (Harrison et al., 1996) are inserted in the model. The reorganized SAM for this study is presented in Table 1. Based on that SAM the rate of protection in terms of tariffs and export subsidies are presented in Table 2. As can be seen from that table, in terms of import tariffs tobacco sector is the one with highest protection (over 100 %) while the sugar has the lowest. In terms of the export subsidies, the manufacturing sector has the highest protection with almost 12 % followed by tobacco and agribusiness. The notable point is that agriculture has the lowest subsidy protection. Based on that it can be said that in terms of both import tariffs and export subsidies the manufacturing sector is favored compared to the agriculture in Turkey.

Table 1. The Reorganized Turkish SAM for 1990.

	Sectors						*Commodities*						*Factors*		*Households*						*Comp.*	*Gov.*	*Inv*	*ROW*	*Total*
	Agr.	Agb.	Sug.	Tob.	Man.	Serv.	1	2	3	4	5	6	Labor	Capital	RL	RM	RH	UL	UM	UH					
Agr.							93928															75		2513	96516
Agb.								31944														497		4966	37407
Sug.									3126															8	3134
Tob.										4911												13		114	5038
Man.											244832											2563		21737	269132
Serv.												237972												22726	260698
1	14927	12216	1810	1847	6308	2954									3297	18346	4275	2552	18178	6970		514	2814		97008
2	2003	6827			841	2823									966	6152	1549	1501	7590	3190		1078	-4		34516
3	59	571			8	482									164	822	212	146	676	151		43	662		3996
4						85									337	1867	438	362	2493	1048			171		6801
5	6591	3084	397	360	114409	29216									1732	14813	4333	2475	24912	20781		4943	86719		314765
6	7436	4377	525	245	36950	33898									3343	23264	6378	3812	40976	32104		36505	12246		242059
Labor	6613	2951	450	1143	34204	61742																			107103
Capital	58645	6578	-48	1428	61598	121710																			249911
RL													4795	2112							868	97		4	7876
RM													23777	40215							22605	1011		1210	88818
RH													3760	14516							15580	85		1508	35449
UL													7597	138							817	131		79	8762
UM													48304	4936							45457	2648		3418	104763
UH													18870	5466							61539	727		2566	89168
Comp.														156287								18247		4381	178915
Gov.	242	803		15	14814	7788	469	382	69	968	11509				348	2956	1655	512	6096	7042	7829				63497
Sav.														26241	-2311	20598	16609	-2598	3842	17882	21445	-11955	3456	12855	106064
ROW							2611	2190	801	922	58424	4087									2775	6275			78085
Total	96516	37407	3134	5038	269132	260698	97008	34516	3996	6801	314765	242059	107103	249911	7876	88818	35449	8762	104763	89168	178915	63497	106064	78085	

Source: Reorganized from De Santis and Ozhan (1995, 1997).

Table 2. Trade Protection in Related Sectors for Turkey (%).

Sector	*Tariff Rates*	*Export Subsidy Rates*
Agriculture	17.96	2.98
Agribusiness	17.44	10.00
Sugar	8.61	-
Tobacco	104.98	11.40
Manufacturing	19.69	11.79
Services	-	-

Source: Calculated from the SAM and Harrison et al., 1996.

Model Structure

In the model, the small country assumption is employed for the import side. Thus, the world prices (PWM) are exogenous (De Melo and Robinson, 1980).

$$PM(i) = PWM(i) * (1 + tm(i)) * R \qquad (1)$$

where, *PM (i)* represents domestic price of imports, *PWM* represents world prices of imports, *tm* represents import tariff, and *R* represents the exchange rate. Since Turkey is a net exporter for some of the traditional agricultural sectors, a downward-sloping world demand curve is assumed for the agricultural sector (Derviş et al., 1982).

$$PE(i) = PWE(i) * (1 - te(i)) * R \qquad (2)$$

where, *PE* represents the domestic price of exports, *PWE* represents world price of exports, and *te* represents the export subsidies. Other prices are as follows:

$$P(i) = (PD(i) * DS(i) + PM(i) * M(i)) / CQ(i \qquad (3)$$

where, *P* represents price of composite goods, *PD* represents domestic sales price, *DS* represents domestic sales, *M* represents the imports and *CQ* represents the composite good supply.

$$PX(i) = (PD(i) * DS(i) + PE(i) * E(i)) / Q \qquad (4)$$

where, *PX* represents the output price and *E* represents exports. These last two price equations are a reflection of the homogeneity of the import aggregation and export transformation functions. Price for value added is given by

$$PVA(i) = PX(i) * (1 - itx(i)) - \sum_{i=1}^{5} IO(i,j) * P(i)) \qquad (5)$$

where, *PVA* is the sectoral value-added price, *itx* represents indirect taxes, and *IO* represents the fixed input-output coefficients. In the model, a capital composition matrix is used to reflect the heterogeneity of the capital used in various sectors.

In the supply side of the model production is defined as a Cobb-Douglas production function that employs capital *(K)* and labor *(L)*.

$$Q(i) = aK^{\alpha}L^{\beta} \qquad (6)$$

where, Q is the output, and α and β are share parameters respectively.

Domestic production is supplied to export market in constant elasticity of transformation (CET) functional form

$$Q(i) = \beta(i) * (\gamma(i) * E(i)^{\rho(ie)} + (1 - \gamma(i)) * DS(i)^{\gamma(ie))})^{(1/\gamma(ie)} \qquad (7)$$

Where, β is a shift parameter and γ is a share parameter. Export supply is a first order condition of the CET function

$$E(i) = DS(i) * (PE(i) / PD/i) * (1 - \gamma(i)) / \gamma(i))^{(1/\rho(ie)-1))} \qquad (8)$$

Consumers demand the imported and domestic goods as composites in the form of constant elasticity of substitution (CES)

$$CQ(i) = c(i) * (\delta(i) * M(i)^{(-\rho}(i)) + (1 - \delta(i)) * DS(i)^{(-\rho(i))})^{(-1/\rho(i))} \qquad (9)$$

Where, *CQ* is the composite good and *c,* δ, ρ are shift parameter, share parameter, and function exponent respectively. Import demand is a first order condition of buying a given amount of composite good,

$$M(i) = DS(i) * ((PD(i) / PM(i)) * (\delta(i) / (1 - \delta(i))))^{(1/(1+\rho(i)))} \qquad (10)$$

Income, expenditure and equilibrium:

In the model, factor incomes are mapped in institutional income (labor and enterprise). The institutional income is distributed to households with fixed allocation shares. Households also receive remittances from abroad and transfers from the government. The demand for primary factors reflects the first order condition for a profit maximization,

$$FP(f) = PVA(i) * \alpha(i,f) * Q(i) * / FD(i,f) * \varpi(i,f) \qquad (11)$$

where, FP represents factor price, FD represents factor demand, and ϖ represents factor price sectoral proportionality constants. Factor incomes are given by

$$YF(f) = \sum_{i}^{n} YF(f) * \varpi(i,f) * FD(i,f) \qquad (12) \quad \text{for i=1, 2.}$$

Since labor and enterprise incomes are mapped in institutional income,

$$YINS(L) = YF(L) \qquad (13) \quad \text{and}$$

$$YINST(ent) = YF(K) + GENT - ENTSAV - ENTTAX - DEPR \qquad (14)$$

where, *GENT, ENTSAV, ENTTAX, DEPR* are transfer payments from government, enterprise savings, enterprise tax, and depreciation respectively. The household income equation is given by

$$YH = \sum_{I}^{n} \omega * YINST + \varepsilon * REMIT * R + \theta * HT \qquad \text{for i} = 1...6 \qquad (15)\ ,$$

where, YH represents the household income, ω represents the household distribution of institutional income share, YINST represents the institutional income, ε represents the household remittance share, REMIT represents the net remittance from abroad, θ represents the household share of government transfers, and HT represents the government transfer payments to households respectively.

Government Revenue is given by

$$GR = TR - ES + ITR + THTXR + ENTXR + FBR * R \qquad (16)$$

where, *TR* represents tariff revenue, *ES* represents export subsidy, *ITR* represents indirect tax revenue, *THTXR* represents total household tax revenue, *ENTXR* represents enterprise tax revenue and *FBR* represent the total foreign borrowing. Savings are given by

$$SAV = HHSAV + GSAV + DEPR + FSAV*R + ENTSAV \qquad (17)$$

where, *HHSAV, GSAV, and FSAV r*epresent the household, government, and foreign, savings respectively.

In terms of the expenditures, consumer expenditures are functions of prices and income in Linear Expenditure Systems (LES) form. Government demand for final goods is determined in terms of fixed shares of aggregate real government spending on goods and services. Intermediate demand is determined as a function of a capital composition matrix and a fixed investment by sector of destination. The nominal GDP is given by

$$GDP = \sum_{i}^{n} PVA*Q + ITR + TR - NS \qquad (18) \qquad \text{for i=1..7}$$

where, *NS* represents the net export subsidy. The real GDP is obtained by adjusting for the exchange rate.

In equilibrium, sectoral supply of composite commodities equals the demand. The supply of primary factors is assumed fixed exogenously. In market clearing total factor demand equals the supply. In this model both factors of production are mobile. So the model defines the long run equilibrium.

In the model the sum of private and government savings and foreign savings equals the aggregate investment such that it satisfies the Walras' Law (Robinson et al., 1990).

Scenarios

For this model, three different scenarios were considered. These are; FTT that represents the tariff liberalization, FTE that represents the export subsidy liberalization, and FT that represents the free trade in both tariffs and export subsidies in all sectors.

Results

The result of the scenarios is presented in Table 4. The results are the changes from the baseline solution. After the base year SAM values are read in the model, the baseline solution replicates initial SAM given the defined equations. Once the benchmark solution is found, various liberalization experiments are realized by changing the parameters, in that case the protection ratios. The model is solved using the GAMS-IDE software with CONOPT solver (Brooke et al., 1992). When only the import tariffs are liberalized the output of tobacco decreases approximately by 31 % and manufacturing by 2 % while the outputs of agriculture, agribusiness, and services sectors increase. Household income increases almost homogeneously (4.25-4.81 %) benefiting rural and urban high more. Government revenue decreases by 18 % because of the loss in tariff revenues. Change in real GDP adjusted for the exchange rate rises as well in small scale. When only export subsidies are liberalized, manufacturing output decreases in small scale, while there is an increase in agribusiness sector. Household income decreases in small scales (0.56-0.75%) with highest decrease occurring in urban low and medium. Government revenue increases by almost 4 % because of the savings in export subsidies. Change in GDP is quite small while the government revenue increases by almost 4 %. When complete liberalization is realized, output of tobacco decreases almost 31 %, and that of the manufacturing by 2 %, while the outputs of sugar, agribusiness, and services sectors increase. Household income also increases and that increase is highest in RH,

with 4 %, but it is less than the tariff liberalization. Government revenue decreases by 13 %. Also the increase in real GDP is less than the tariff specific liberalization while the government revenue decreases by 13 %. These results indicate that tariff led liberalization increases the GDP in small scale but increases the household income because of the increasing factor prices and enterprise income that constitutes the part of the household income. The highest decrease in production occurs in highly protected sectors such as tobacco and manufacturing. Export led liberalization does not have any significant effect neither in GDP nor the production and household income but government revenue increases improving the budget savings. Complete free trade that comprises the both tariffs and subsidies have similar impacts with the tariff led liberalization on the economy, but household income increases less than the tariff liberalization case and decrease in government revenue is less than the previous one. The increase in real GDP is highest in that case. Since the manufacturing sector is protected more with export subsidies relative to the other sectors, decrease in subsidies causes the decrease in the output of that sector. Consequently the incomes of urban households that receive their income mostly from the manufacturing decreases. Exchange rate depreciates with tariff led and complete liberalization so that the current account rebalances because of the increasing imports, while it appreciates with export led liberalization.

Table 4. The Turkish CGE Results on Sectoral Output, Household Income, and the GDP.

	Scenarios		
% Change in Variables (from the baseline solution)	**FTT**	**FTE**	**FT**
Output			
Agriculture	0.28	0.47	0.81
Agribusiness	3.76	2.36	6.63
Sugar	4.34	0.46	4.87
Tobacco	-30.66	0.39	-30.40
Manufacturing	-1.96	-0.26	-2.26
Services	1.60	0.00	1.60
Household Incomes			
RL	4.25	-0.65	3.37
RM	4.46	-0.57	3.67
RH	4.81	-0.56	4.03
UL	4.29	-0.75	3.29
UM	4.64	-0.66	3.73
UH	4.74	-0.60	3.91
Government Revenue	-18.01	3.76	-13.16
Exchange Rate	-18.94	1.67	-16.54
GDP (Real)	0.40	0.04	0.43

Source: Calculated.

Conclusions

This study analyzed the impact of partial and complete trade liberalization in terms of kind of a protection in a six sector-six household model. Results show that over the lung run, complete trade liberalization benefits Turkey, the GDP increases and household income benefits from the liberalization. That happens because the free trade increases the factor income of the households and the enterprise income that constitutes the institution income distributed to the households as well. Another point to indicate that the household income rises almost homogeneously even though rural and urban high benefit from that comparatively more. Although tariff led liberalization increases the GDP, export subsidy specific liberalization does not change it very much. These results indicate that complete freer trade in all sectors is needed for Turkey to improve household income in the long run, although households do not benefit from that as much as the tariff specific liberalization because the elimination of export subsidies reduce the factor earnings of households. The decrease in government revenue can be compensated by additional income tax coming from higher incomes of the households. In a debate regarding the impact of trade liberalization movement on developing economy, the benefit largely depends on how much that country protects its sectors before the liberalization and how strong its tie with the rest of the world. As countries open their markets to the international trade arena, their sectors and meanwhile their households get more involved with the trade related activities causing their income to get more related to the trade. Although the outward looking policies of Turkey can only increase the prosperity of the household groups in relatively small scales, these policy tools can be used as complementary with the inward looking policies such as government transfers to improve the incomes of the households.

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