

Trade Policy Analysis of Edible Oil Imports of India under CGE framework

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Abstract

Edible oil sector of India is undergoing perceptible changes in the new environment of liberalized trade. With the formation of WTO, high inflow of imported edible oil into the country arises several interesting issues to debate. The consequence of trade liberalization is approached through trade policy analysis of edible oil imports by simulation of import tariff on edible oils in the general equilibrium framework. With the possible assumptions and limitations, the impact of tariff simulation was carried out using Social Accounting Matrix of India 2003-04 as database.

Keywords: trade liberalization, edible oil imports, India, CGE, simulation analysis

1. Introduction

Most industrialized countries have supported agriculture using domestic subsidies, export subsidies, and restrictions on market access. Attempts have been made to discipline these trade policies like reduction and removal of the distortionary price and trade policies of WTO member countries by moving domestic prices closer to international prices. The impact of trade liberalization upon the agricultural sector has not been well understood in the public debate. The policy of liberalizing agricultural exports has been once criticized on the grounds that it would create domestic scarcity and hurt domestic consumers. These criticisms conceded the point that liberalizing agricultural exports would certainly help agricultural producers, but argued against the policy on the grounds of consumer interests. It could be argued symmetrically that liberalization of agricultural imports would also hurt producers in the same way for the cheaper imports would favour the domestic consumers. Hence a dispassionate assessment of impact of trade liberalization on the agricultural sector would be need of the hour.

Among the agricultural sector a study on impact of trade liberalization on edible oils sector is appropriate for five reasons. First, oilseeds production and the production of edible oils have high growth potential in marginal and less favored areas. Second, oil seeds served as a source of agricultural diversification. Third, oilseeds are predominantly grown in rainfed regions, and hence any impacts on oilseeds are linked to the farmers' income in poor regions. Fourth, production of oilseeds has provided balanced agricultural

growth in the country. Fifth, recent studies on household budget shares indicated a rising share in edible oils in the food consumption, which indicated increased future demand for edible oils.

The oilseed sector in India has undergone perceptible changes in the new environment of liberalized trade. Consumption patterns have been changing, as consumers began to accept edible oils other than those consumed traditionally. Changes in cropping patterns have also taken place with the help of technology missions and price support. The edible oil processing technology adopted in the country was a mix of the traditional and modern methods. The edible oils/ oilseeds sector currently faced several challenges due to the formation of WTO during 2005. Decreasing price of edible oils due to trade liberalization resulted in low prices for oilseeds resulting in poor supply response. High import tariffs and non-tariff barriers such as sanitary and phyto sanitary (SPS) restrictions put oilseed exports unattractive. Low priced imported oils have benefited the consumers but tended to reduce the margins on domestic oils affecting processors and oilseed farmers adversely. Thus, with trade liberalization several issues have arisen, including the choice between protecting the seed sector as opposed to the processing sector. Both consumption patterns and cropping patterns were likely to be influenced by the choice of customs duties and the price differences maintained among various edible oils. Imported edible oils alone accounted for close to fifty per cent of the total edible oil consumption. Among the oilseed crops, groundnut is the major edible oilseed crop (accounted for 45 per cent of oilseed area and 55 per cent of oilseed production in the country) subjected to all the situations described above and India being a signatory in the WTO, prompted the researchers to investigate the impact of the trade liberalization measures on oilseed economy of India with special reference to groundnut sector.

2. Model and Data

Computable General Equilibrium (CGE) models have been developed to capture nonlinear substitution possibilities and multi sectoral supply demand interactions, and also to incorporate macro variables and mechanisms for achieving balance among aggregates. The previous studies on CGE modeling and tariff policy simulation were discussed below for understanding the current problem. Krugman (1997) insisted the

necessity for analyzing the trade policy through general equilibrium theory. Cruse (2003) constructed an econometric model for international edible oil sector that could be used to simulate policy changes, macro economic changes, and technology growth. On policy side, the implications of domestic policy on making acreage decisions, on the demand side, oil meal demand for livestock and on the macro economic side, total edible oil demand for the country were analyzed in the structural model. Dorothee and Savard (2005) developed micro simulated multiple household computable general equilibrium model to analyze the impact of trade liberalization in agriculture, in particular groundnut sector of Senegal. Different scenarios were stimulated for the prices of groundnut and groundnut oil and the study revealed that the fixed producer's price partly protected the producer against the volatility in the world prices of groundnut.

Beghin and Matthey (2003) presented a new international groundnut product model with important and novel features that set new standards in groundnut market modeling in the context of severe data limitations on the production, utilization, and trade of value-added peanut products. The model provided an explicit world price determination via world market clearing. Meilke et al., (2004) assessed the impact of removing border protection for the world oilseed and oilseed product trade. The price impacts of removing all the import tariffs and taxes indicated an increase in the world vegetable oil prices by six per cent and a rise in the oil meal price by two per cent. The average effect on the world oilseed price was an increase of two per cent. The largest consumption decline was in European Union by 1.8 per cent and the lowest was in Australia by 0.7 per cent. The largest decline in the oilseed crush was in the case of Japan by 24.3 per cent. Increase in oilseed production was witnessed in the case of Canada and Brazil.

Gulati and Mullen (2003) analyzed the impact of import liberalization on edible oils. India had been following an import substitution strategy since 1986 when it launched the Technology Mission on Oilseeds (TMO) and accorded high protection through trade policy. A noteworthy feature of the policy was that protection was targeted to protect more the oil crushers rather than oilseed farmers. Interestingly, oil processors were relatively less efficient than oilseed farmers. The main reason for this was that oil

processors were unable to take advantage of economies of scale as the processing of groundnut and mustard, India's two largest oilseeds, is reserved for small-scale industries.

Suresh and Landes (2006) in their simulation through Indian Oilseed Model evaluated the impact of increasing the oil tariffs by ten per cent and found that it resulted in 4.5 per cent increase in the average wholesale prices of oil and increase in the farm prices of oilseeds by 2.9 per cent. In the second scenario wherein the oil tariff was reduced by ten per cent and observed a fall in the domestic price of the oilseed by 4.5 per cent but the consumption increased by 2.5 per cent and the import by 6.7 per cent respectively. Sameer (2001) examined the impacts of trade liberalization on the welfare of the Indian economy. Simulations were performed to analyze the effect of pure tariff cuts in the presence as well as in the absence of a CET function. Each simulation was subjected to sensitivity analysis to see the robustness of the results and identify the parameters crucial for the behaviour of the economy. Trade liberalization implied that lowering / eliminating tariff barriers, which make consumer better off by reducing the prices. With the small country assumption, there were welfare gains by liberalizing trade and with the large country assumption, welfare gains were observed when CET transformation function was used and welfare loss in its absence.

The aim of studying a problem in a general equilibrium setting is to analyze the overall effects exerted by the economy because of the exogenous shocks given. In our case, the consequences of trade liberalization are studied by providing exogenous shocks i.e., simulation of tariff levels for the imported edible oils that are feasible under the new trade policy regime. The bench mark data for the general equilibrium frame work is provided by the SAM 2003-04. The oilseed production of the country is represented by three major oilseeds namely, groundnut, rapeseed/ mustard and soyabean. The other crop production activities are segregated into food crops comprising cereals and pulses and other crops including remaining cash crops and plantation crops. The possible crop diversification due to the impact of tariff simulation on edible oils can also be found because of such disaggregation. The livestock sector is included under the agri-allied activities. The secondary sector activities are divided into two namely, edible oil processing and manufacturing of both registered and unregistered goods for simplicity. The factor services for carrying out the economic activities are as usual labour and capital.

The major institutions are the households, government, investment, indirect taxes and tariffs. Exports and imports are depicted in the rest of world sector. Hence the SAM 2003-04 is restricted to represent only the desired sectors viz., producers, processors, traders and consumers for which the consequences of tariff simulation of imported edible oils are studied as mentioned earlier.

Due to the complexity of the general equilibrium models and with permissible assumptions and violations, only the fundamental principles of the equilibrium models that too with the simplest functional forms are adhered. The production activities are of the Cobb Douglas form, the factor substitutions are of Leontief functional forms. The Armington assumption for differentiating the domestically produced, imported and exported goods and services are adopted using the CES and CET functional forms. Owing to the time constraint and the practical difficulty in computing, the model is restricted in size and executed through GAMS programming.

3. Experiments

Trade policy analysis of the edible oil imports were achieved through simulation of import tariff on edible oils in the general equilibrium framework. The simulation was done by increasing the tariff levels on the imported edible oils by 10 per cent and 15 per cent and by decreasing 10 per cent and 15 per cent from the existing level. The simulations were carried out with the help of GAMS programming software and the consequences of the tariff simulations are discussed in the following section.

3.1. Simulation results on Value of Output

The simulation results for the edible oil imports on the value of output are presented in Table 3.1. By increasing the edible oil tariff by 10 per cent from the base level, the value of domestic edible oilseed output increased. Similarly an increase in the tariff for imported edible oils by 20 per cent enhanced the value of output from the oilseed sector of India. Other sectors of the economy remained unaffected. In third situation, edible oil tariff was decreased by 10 per cent from the base level which resulted in the decline in the value of output of edible oilseeds of the country and the same results were obtained while decreasing the import tariff of edible oil by 15 per cent.

The results of the trade policy simulation of import tariff on edible oil under different scenarios within the bound rate approved by WTO for India revealed that an increase in import tariff for edible oil increased the value of domestic oilseed output. The value of output in the groundnut sector increased significantly because of the protection given to domestic farmers in the form of import tariffs. Totally domestic oilseed sector was benefited because of increase in the import tariff for edible oils. But the value of output from edible oil processing and vanaspati were reduced under both the scenario of increased tariff which implied that the heavy dependence of the domestic edible oil processing and vanaspati units on the cheap edible oil imports which served as the raw material for processing. In reducing the import tariff on edible oil imports, the value of output from edible oil processing and vanaspati were increased. Owing to the forward integration of edible oil sector with the manufacturing and service sector the output increased in both these sectors in the decrease in the import tariff reduction scenario.

3.2. Simulation Results on Factors of Production

The results of tariff simulation of edible oil on the factors of production - labour are presented in Table 3.2. The increased edible oil tariff from the base level both under 10 per cent and 15 per cent level increased the labour usage in the oilseed sector while the labour engagement in the edible oil processing and vanaspati production were on decline as the edible oil processing units were dependent upon the cheap imports. The forward integration of the imported edible oils resulted in the increased use of labour in the secondary sector of the economy. The reduction in the import tariff led to diversion of labour employment from the oilseed sector. The simulation results on factor- capital are presented in Table 3.3 and the increase in the import tariff from the existing level led to diversion of capital investment from other primary sectors to oilseed sector. The simulation of decrease in the import tariff level triggered the diversion of capital use to all other sectors of the economy including vanaspati sector leaving the edible oilseed with reduced capital usage in oilseed production.

The simulation analysis of edible oil tariff on the economy was mostly influenced the domestic oilseed sector and edible oil industry either positively or negatively based upon the increase or decrease in the tariff level from the base level. More labour and

capital investment in the oilseed sector including groundnut sector was observed while increasing the tariffs from the base level. At the same time the factors usage in primary activities were on the decline which confirmed the process of crop diversification. Already Indian tariff for edible oil were very high when compared to the global scenario. In the presence of the increased tariff, the interests of domestic oilseed producers and processors were safeguarded and hence the usage of factors of production was more in the case of domestic oilseed sector. While reducing the import tariff on edible oils, the decline in the factors of production employed in the oilseed sector was observed. But the factors of production engaged in edible oil processing units were more in the reduction of import tariff implying the heavy dependence of domestic processing sector for the cheaper edible oil imports.

3.3. Simulation Results on Household Consumption

Results of the impact of tariff simulation for the edible oil imports on the household consumption revealed that the enhanced tariff levels from the existing level affected the consumption of vanaspati and edible oil significantly where as the consumption level for the remaining commodities were not altered much. Similarly a reduction in the import tariff resulted in the enhanced consumption of vanaspati and edible oil but there was no change in the consumption of oilseeds. Therefore consumption of edible oil and vanaspati was very much influenced by the tariff simulation as given Table 3.4.

The results of the impact of tariff simulation for the edible oil imports on the household consumption revealed that the enhanced tariff levels from the existing level affected the consumption of primary commodities significantly. So the import of cheap edible oil comprising palm and soybean oils and duty free vanaspati imports from Nepal and Sri Lanka increased the demand for edible oil which again triggered out of the ever increasing population, rapid urbanization, change in dietary pattern, emergence of high income group in the case of consumption side coupled with inadequate domestic supply because of the failure of monsoon, crop diversification and poor infrastructure and inefficient edible oil processing.

Table 3.1. Results of Edible oil Tariff Simulation Value of Output

Variable	Base level	SIM 1	SIM 2	SIM 3	SIM 4
Groundnut	111.67	0.285	0.423	-0.299	-0.457
Mustard	106.90	0.293	0.434	-0.307	-0.469
Soybean	88.81	0.275	0.407	-0.288	-0.440
Cereals	953.57	-0.008	-0.011	0.009	0.012
Pulses	150.00	-0.011	-0.016	0.013	0.019
Other Crops	1494.29	-0.007	-0.011	0.007	0.013
Livestock	1026.43	-0.008	-0.012	0.008	0.012
Allied Agri.	1487.62	-0.053	-0.078	0.058	0.090
Vanaspati	36.19	-0.155	-0.228	0.127	0.256
Edible Oil	314.29	-1.738	-2.575	1.825	2.787
Manufacturing	12830.95	-0.016	-0.024	0.017	0.027
Services	11792.62	-0.001	-0.003	0.001	0.002

Note: Value in Million US \$.

SIM 1: 10 % increase in edible oil Tariff; SIM 2: 15 % increase in edible oil Tariff;
SIM 3: 10 % decrease in edible oil Tariff; SIM 4: 15 % decrease in edible oil Tariff;

Table 3.2. Results of Edible Oil Tariff Simulation on Factor - Labour

Variable	Base level	SIM 1	SIM 2	SIM 3	SIM 4
Groundnut	45.95	0.287	0.425	-0.301	-0.459
Mustard	44.05	0.274	0.436	-0.308	-0.471
Soybean	37.14	0.275	0.408	-0.290	-0.442
Cereals	415.48	-0.006	-0.009	0.007	0.011
Pulses	56.43	-0.010	-0.015	0.011	0.017
Other Crops	735.95	-0.006	-0.009	0.007	0.010
Livestock	420.48	-0.007	-0.010	0.008	0.011
Allied Agri.	286.67	-0.052	-0.076	0.056	0.087
Vanaspati	0.95	-0.153	-0.225	0.165	0.253
Edible Oil	5.95	-1.741	-2.580	1.828	2.792
Manufacturing	1765.48	-0.015	-0.021	0.017	0.026
Services	3595.95	0.001	0.002	-0.002	-0.004

Note: Value in Million US \$.

SIM 1: 10 % increase in edible oil Tariff; SIM 2: 15 % increase in edible oil Tariff;
SIM 3: 10 % decrease in edible oil Tariff; SIM 4: 15 % decrease in edible oil Tariff;

Table 3.3. Results of Edible Oil Tariff Simulation on Factor - Capital

Variable	Base level	SIM 1	SIM 2	SIM 3	SIM 4
Groundnut	36.19	0.284	0.421	-0.297	-0.454
Mustard	35.95	0.291	0.432	-0.305	-0.466
Soybean	28.33	0.273	0.404	-0.287	-0.438
Cereals	326.67	-0.009	-0.013	0.010	0.015
Pulses	44.76	-0.013	-0.019	0.014	0.021
Other Crops	585.00	-0.008	-0.012	0.011	0.015
Livestock	334.05	-0.009	-0.014	0.011	0.016
Allied Agri.	376.90	-0.055	-0.080	0.059	0.092
Vanaspati	2.86	-0.155	-0.229	0.167	0.257
Edible Oil	19.52	-1.738	-2.574	1.823	2.785
Manufacturing	1411.43	-0.017	-0.025	0.020	0.030
Services	36.19	0.284	0.421	-0.297	-0.454

Note: Value in Million US \$.

SIM 1: 10 % increase in edible oil Tariff; SIM 2: 15 % increase in edible oil Tariff;
SIM 3: 10 % decrease in edible oil Tariff; SIM 4: 15 % decrease in edible oil Tariff;

Table 3.4. Results of Edible Oil Tariff Simulation on Household Consumption

Variable	Base level	SIM 1	SIM 2	SIM 3	SIM 4
Groundnut	16.67	-0.005	-0.007	0.006	0.008
Mustard	16.19	-0.005	-0.007	0.006	0.008
Soybean	10.71	-0.004	-0.005	0.003	0.005
Cereals	590.48	-0.003	-0.004	0.003	0.004
Pulses	94.05	0.002	0.004	-0.003	-0.005
Other Crops	646.67	-0.001	-0.002	0.001	0.001
Livestock	740.00	-0.016	-0.023	0.017	0.029
Allied Agri.	246.90	0.019	0.027	-0.021	-0.030
Vanaspati	19.05	-0.192	-0.284	0.203	0.311
Edible Oil	232.62	-1.368	-2.011	1.483	2.286
Manufacturing	2244.29	0.001	0.002	-0.002	-0.003
Services	5150.71	-0.001	-0.002	0.002	0.003

Note: Value in Million US \$.

SIM 1: 10 % increase in edible oil Tariff; SIM 2: 15 % increase in edible oil Tariff;
SIM 3: 10 % decrease in edible oil Tariff; SIM 4: 15 % decrease in edible oil Tariff;

Table3.5. Results of Edible Oil Tariff Simulation on Exports

Variable	Base level	SIM 1	SIM 2	SIM 3	SIM 4
Groundnut	7.86	0.199	0.296	-0.205	-0.311
Mustard	7.86	0.206	0.306	-0.211	-0.321
Soybean	4.05	0.188	0.279	-0.193	-0.293
Cereals	39.52	-0.091	-0.134	0.101	0.156
Pulses	1.43	-0.099	-0.145	0.109	0.168
Other Crops	40.95	-0.094	-0.138	0.103	0.160
Livestock	1.43	-0.128	-0.189	0.141	0.217
Allied Agri.	56.90	-0.139	-0.204	0.154	0.238
Vanaspati	0.71	-0.814	-1.199	0.874	1.343
Edible Oil	13.57	1.537	2.276	-1.615	-2.468
Manufacturing	1254.05	-0.101	-0.148	0.111	0.172
Services	761.19	-0.086	-0.127	0.094	0.146

Note: Value in Million US \$.

SIM 1: 10 % increase in edible oil Tariff; SIM 2: 15 % increase in edible oil Tariff;
SIM 3: 10 % decrease in edible oil Tariff; SIM 4: 15 % decrease in edible oil Tariff;

Table 3.6. Results of Edible Oil Tariff Simulation on Imports

Variable	Base level	SIM 1	SIM 2	SIM 3	SIM 4
Groundnut	5.71	0.385	0.569	-0.408	-0.625
Mustard	2.14	0.394	0.583	-0.417	-0.643
Soybean	12.38	0.370	0.547	-0.392	-0.600
Cereals	26.67	0.084	0.122	-0.092	-0.143
Pulses	535.95	0.078	0.114	-0.086	-0.133
Other Crops	774.29	0.084	0.123	-0.093	-0.143
Livestock	86.67	0.113	0.166	-0.123	-0.190
Allied Agri.	29030.71	0.046	0.068	-0.051	-0.079
Vanaspati	375.00	0.546	0.807	-0.575	-0.881
Edible Oil	2543.10	-6.723	-9.845	7.411	11.474
Manufacturing	65406.19	0.091	0.133	-0.099	-0.154
Services	18131.19	0.099	0.145	-0.109	-0.169

Note: Value in Million US \$.

SIM 1: 10 % increase in edible oil Tariff; SIM 2: 15 % increase in edible oil Tariff;
SIM 3: 10 % decrease in edible oil Tariff; SIM 4: 15 % decrease in edible oil Tariff;

3.4. Simulation Results on Exports and Imports

Impact of tariff simulation on exports are presented in Table 3.5 indicating that most of the sectors were unaffected, except the edible oil sector in the increased tariff scenario. Export of edible oil products were enhanced while increasing the import tariff which gave protection to the domestic oilseed sector which was in turn utilized in the processing industries. Reduction in tariff resulted in the increase in exports of both manufacturing and service sectors of the country.

Table 3.6 indicated the impact of tariff simulation on edible oil imports was realized only by the edible oil industry. While increasing import tariff, domestic edible oil processing was declined and in reduction of tariff from the base level paved way for cheaper edible oil in flow to the country.

Increased tariff on the edible oil imports resulted in the marginal increase in the exports of oilseeds but the edible oil exports were more because of the utilization of domestic raw materials from the increased production of oilseeds in the tariff protected situation. All other sectors of economy witnessed decline in exports indicating the forward linkages the imported edible oil had with service sector of the country. Except the oilseed and edible oil industry, all the remaining sectors registered positive growth of exports in the reduction of edible oil tariff scenario.

When the tariff for imported edible oil is increased, the in flow of cheaper edible oil imports were reduced but the imports in other sectors marginally increased. The magnitude of the edible oil imports on the total Indian agricultural imports was evident from the above facts. In reduction scenario of edible oil tariff, it was noticed that change in the imports from the base case was around 11 per cent increase and led to surge in edible oil imports to the country.

4. Conclusion

The consequences of trade liberalization were approached by the trade policy analysis of edible oil imports through simulation of import tariff on edible oils permissible under WTO regime in the general equilibrium framework. Increase in the import tariff for edible oil, resulted in the increased output from groundnut and oilseed sector of the country but decrease in import tariff led to decline in the value of output from oilseed sector. Edible oil sector was benefited while reduction of import tariff.

Increase in import tariff led to utilization more labour and capital in groundnut and remaining oilseed sectors and acted as protective measure for the domestic oilseed farmers. Reducing import tariff favoured the domestic edible oil processing and vanaspati industries. Household consumption was increased for majority of the sectors when tariff for edible oil imports was decreased and vice versa. As expected, increased import tariff led to reduction in the volume of edible oil imports and vice versa. Broad outcome of the simulation was that impact of tariff simulation was partial and the consequences were felt mainly by oilseed / edible oil sector of India.

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