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THE ECONOMIC EFFECTS OF TRADE LIBERALIZATION ON PHILIPPINE AGRICULTURE

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This paper evaluates the economic effects of the trade liberalization program on the Philippine agricultural sector, using a 25-sector computable general equilibrium model of the Philippine economy. The paper discusses the extent of the tariff reforms and the import liberalization program in agriculture, indicating the bias of these reforms against the agricultural sector. Their economic effects are computed using the CGE model. In addition to these reforms, the study also assesses the economic effects of alternative tariff policy reforms including uniform tariff rates, higher agricultural tariffs, and lower industrial tariffs.

1. Introduction

The main purpose of this paper is to assess the economic effects of trade liberalization on the Philippine agricultural sector. In 1981, the Philippine government began to liberalize its trade policies, including those in many agriculture-related sectors.

The trade liberalization program lowered tariff rates and removed many import licensing regulations intended to protect producers of import-substitutes. The first component of the program, the Tariff Reform Program (TRP), was started in 1981 and was completed in 1985. The second component, the Import Liberalization Program (ILP), was also initiated in 1981 and is in its second phase in 1989.

A general equilibrium model of the Philippine economy was used in evaluating the economic effects of the trade liberalization program on the agricultural sector. Such a model was constructed with 25

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sectors, 13 of which were agriculture-related.[1]

In the following section, the extent of trade liberalization in the agricultural sector is assessed. An applied general equilibrium model of the Philippine economy suitable for analyzing trade policies is briefly described in Section 3. This is followed by a discussion of the economic effects of trade liberalization on the agricultural sector (Section 4). A summary of the main findings and policy recommendations is contained in Section 5.

2. Extent of Trade Liberalization in Agriculture

The government liberalized the country's trade policies in 1981 to increase economic efficiency and enhance the competitiveness of domestic producers. The trade liberalization program consisted of tariff reforms carried out between 1981 and 1985, and the ongoing import liberalization program eliminating non-tariff import restrictions which protect producers of import-substitutes.[2]

Tariff Reforms

The tariff reforms mainly reduced tariff barriers to trade and their variance. They cut the average tariff rate from 43 to 28 percent. Maximum tariff rate was lowered from 100 percent under the 1978 Tariff and Customs Code to 50 percent. The seven-rate tariff structure was replaced with one having six rate categories, namely: 5, 10, 20, 30, 40, and 50 percent, partly explaining the present lower variance of tariff rates from a standard deviation of 30 to 15.

Tariff rates were modified in 1986 and 1988 to help local producers adjust to the effects of the import liberalization program. These modifications were embodied in Executive Order No. 49 which took effect on October 1, 1986 and in Republic Act No. 6647 enacted by Congress in February 1988.

The agricultural sector, which broadly includes the agriculture-

[1]The Tariff Commission is presently undertaking a study assessing the overall impacts of the import liberalization program, using a model developed by Prof. Chung Lee. Although multisectoral, the Chung Lee model is not a general equilibrium one. It was applied to evaluate the impact of the Tariff Reform Program (Lee, 1984).

[2]Thus, phytosanitary import restrictions continue to be imposed to protect the health of the population, plants and animals.

Table 1 – Average Tariffs and Tariff Cuts, By Sector, 1979-1988

Sector	Average Tariff Rates			Average Tariff Cuts		Weighted Average* Tariff Cuts	
	1979	1985	1988	1979/85	1985/88	1979/85	1985/88
AGRICULTURE							
Primary	69.31	39.85	39.54	36.69	0.79	30.39	0.02
Processed	60.50	38.38	38.69	35.24	-0.81	45.47	-0.34
FORESTRY & MINING	20.50	14.50	14.50	17.18	0.00	12.15	0.00
INDUSTRY	40.91	28.48	27.29	21.95	4.73	20.66	1.71

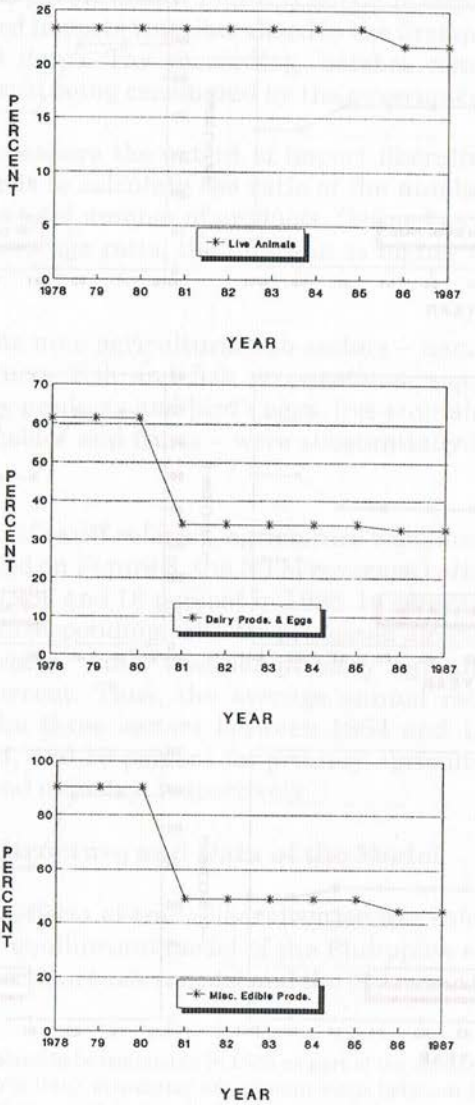
*Using 1983 import values.
Source: Department of Agriculture (1989).

based manufacturing industries, had its share of lower rates in the tariff reform program. Figure 1 illustrates the average tariff rates on nine agricultural commodity groups from 1979 to 1987 (Department of Agriculture, 1989; Seligman, 1987). The average tariff rate for miscellaneous edible products and preparations declined from 90 to 51 percent. At the other extreme, live animals used chiefly for food received the smallest cut in tariff rates.

Agricultural products apparently received deeper cuts in their tariff rates than nonagricultural manufactured goods (Department of Agriculture, 1989). This is indicated in Table 1, showing the unweighted average tariff rates and the mean tariff cuts for agricultural sectors, forestry and mining, and industrial sectors. The average tariff cut for the entire agricultural sector was 36.0 percent, while those for industry and forestry and mining sectors were 22 and 17 percent, respectively. The disparities among these indicators would be larger if weighted averages were used as indicators. The tariff adjustments in 1986 and 1988 hardly changed the tariff structure.[3]

[3]That agricultural sectors have a higher average tariff rate than industry is misleading because of redundant agricultural tariff rates. See Department of Agriculture (1989) and Azarcon, C. (1987).

Figure 1 – Average Tariff Rates in Agriculture 1978-1987



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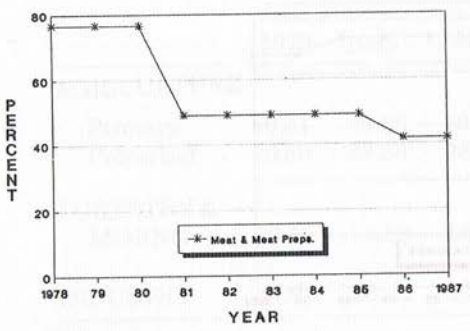
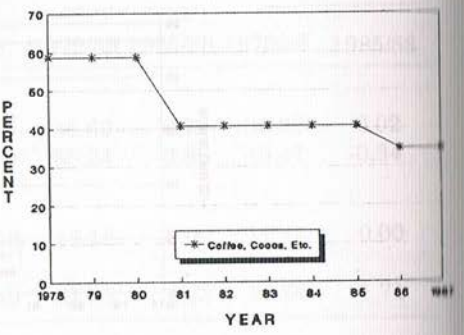
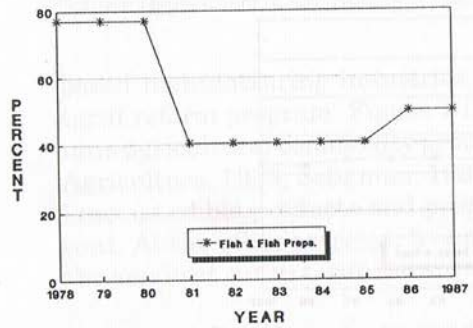
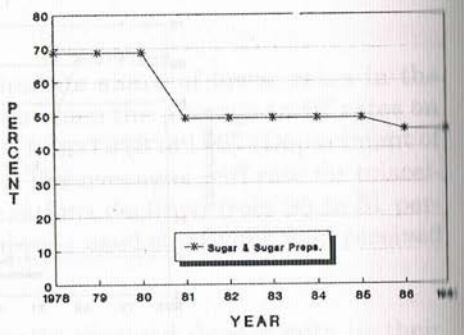
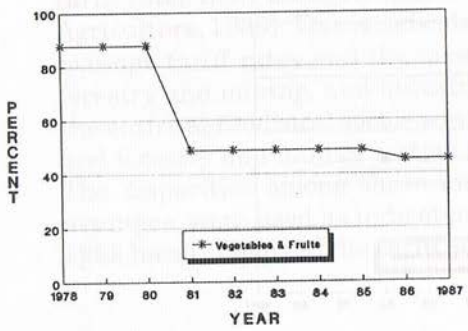
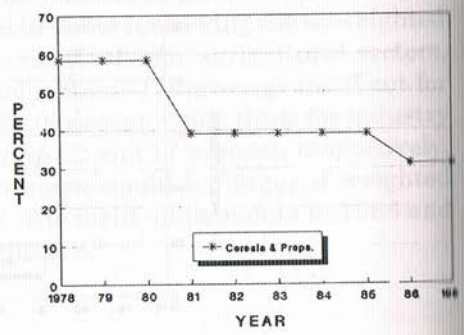












Import Liberalization

Import liberalization refers to the elimination of import licensing used to protect producers of import substitutes. Implemented between 1981 and 1988, the first of the two phases of the program liberalized a total of 2,159 imports. The bulk of these imports was deregulated in 1986 by the Aquino government.[4] Phase II of ILP is ongoing. The first batch of deregulated imports was liberalized in the first quarter of 1989 and included 104 items. The succeeding batches consisting of 453 import items are still being considered by the government.

One way to measure the extent of import liberalization in the agricultural sector is to calculate the ratio of the number of its regulated imports to its total number of products. Defined as the non-tariff measure (NTM) coverage ratio, the indicator is higher the more protected the sector.

Majority of the nine agricultural sub-sectors – namely: miscellaneous edible products, fish and fish preparations, sugar and sugar preparations, dairy products and bird's eggs, live animals used chiefly for food, and vegetables and fruits – were substantially liberalized as shown in Figure 2.

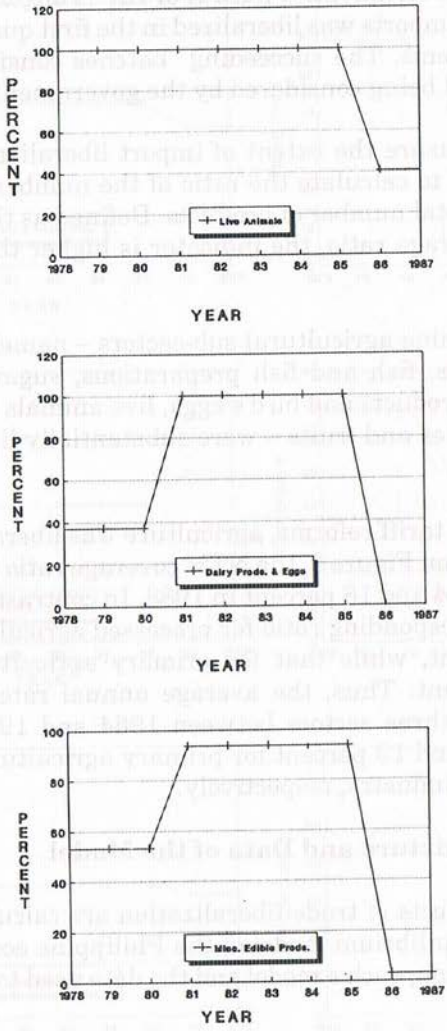
As in the case of tariff reforms, agriculture was liberalized faster than industry. Based on Figure 3, the NTM coverage ratio for industry was 33 percent in 1984 and 18 percent in 1988. In contrast and for the same period, the corresponding ratio for processed agriculture was 55 percent and 7 percent, while that for primary agriculture was 42 percent and 11 percent. Thus, the average annual rates of import liberalization in the three sectors between 1984 and 1988 were 19 percent, 35 percent, and 13 percent for primary agriculture, agricultural processing, and industry, respectively.

3. Structure and Data of the Model

The economic effects of trade liberalization are calculated using an applied general equilibrium model of the Philippine economy with 25 sectors. In this section, such a model and the data used to calibrate it are described.

[4]The ILP was supposed to be completed in 1985 as part of the country's policy commitments under two World Bank structural adjustment loans between 1981 and 1985. However, the balance of payments crisis in 1983 required the postponement of the program. In 1986, the program resumed and the new government had to liberalize many imports including those originally slated for liberalization during the crisis years. See Alburo, F. and Shepherd, G. (1986) for more details.

Figure 2 – Average Number of Restricted Agricultural Imports, 1978-1987 (in % of total products per sector)



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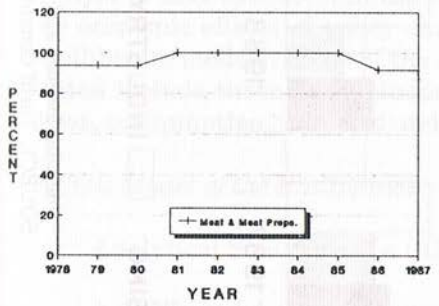
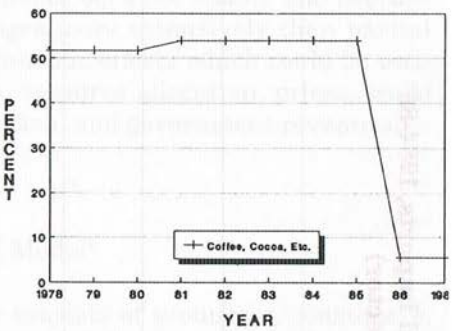
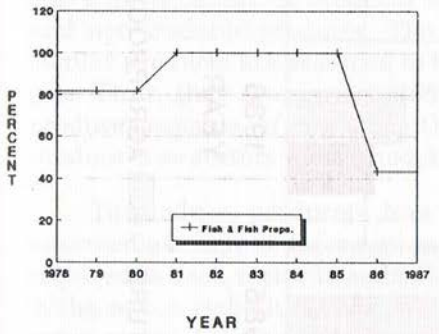
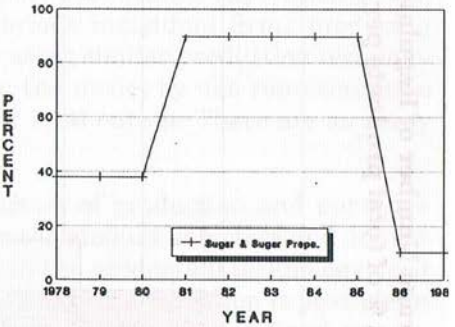
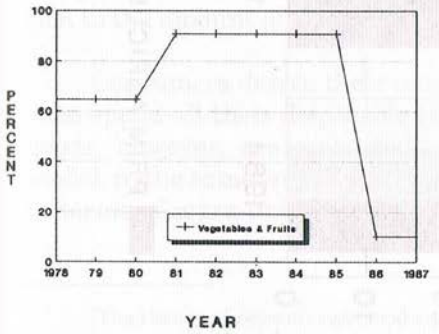










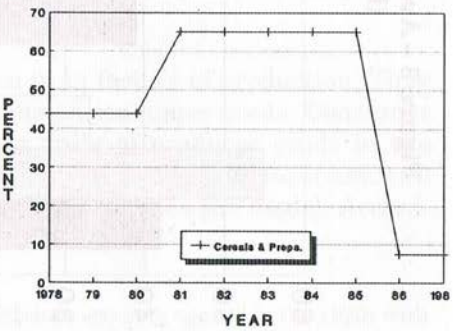
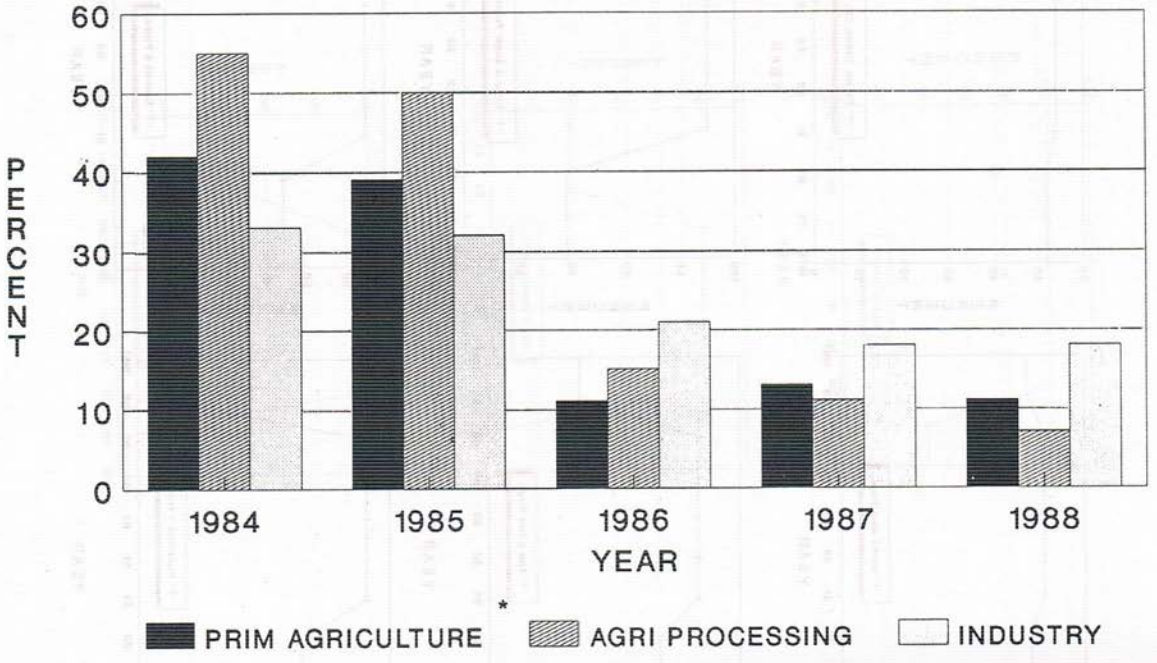


Figure 3 – Average Number of Regulated Imports, 1984-88
(in % of total products per sector)



* Includes forestry and mining.
SOURCE: Tariff Commission.

Applied General Equilibrium Models

A recent addition to the economist's toolkit, the applied or computable general equilibrium (CGE) model is quite suitable for analyzing simultaneous policy changes such as those embodied in the trade liberalization program. The CGE models enable the economic policy analyst to take into account the linkages between sectors and capture the economic effects of policy changes more extensively than partial equilibrium models. Some of the economic effects which could be estimated include those on production, resource allocation, prices, trade flows, consumption, income distribution, and government revenues.[5]

A CGE Model of the Philippines

Analytical Structure of a CGE Model[6]

A CGE model of an economy consists of producers, consumers, and a government. It produces import-substitutes, exportable goods, and non-tradable products. The various individual firms producing similar products are assumed to be using similar production technologies. Thus, they are represented in the model by one representative producer capable of producing their total output. There are as many producers as sectors in the model.

To produce, producers hire factors of production and purchase intermediate inputs. Information on the amount of factors and inputs required in each sector is embodied in the production technology used in the sector. Substitution between factors of production is possible in every sector. Intermediate inputs, however, are used in fixed proportion to the amount of production.

Consumers derive their income from factors of production. They then spend all their disposable income on consumer goods. Consumer goods, however, are converted into units of producer goods in the model, in the same way that one can analyze the demand for coconut oil in terms of copra units. This conversion simplifies the model. Accord-

[5]The theory of economic general equilibrium was only applied in the 1970s with the discovery of the Scarf algorithm which made general equilibrium models computable. See Scarf (1973). Shoven and Whalley (1972), is an early application of the Scarf algorithm on the US corporate income tax. Philippine CGE models have been developed since then. See for example the works of Bautista (1986), Clarete (1984), and Habito (1984).

[6]The equations and the computer program of the model used in this study are available from the author upon request.

ingly, consumers purchase consumer goods in units of the corresponding producer goods.

The government imposes tariffs and non-tariff trade barriers to derive income. Non-tariff trade measures are actually import quota restrictions. By maintaining a non-tariff barrier, the government is in fact limiting the amount of imports that can come into the country.

By limiting imports, the government in effect makes the affected product scarce. As a result, the price of the product increases depending upon the restrictiveness of the non-tariff measure. This increase reflects the scarcity premium arising from the non-tariff barrier. Since it issues the import quotas, the government gets the scarcity premia, adding these to its income.

In order for the economy to attain a general equilibrium, the following conditions will have to be satisfied: 1) supply must equal demand in product and factor markets; 2) the government budget must be balanced; and 3) there must be a balance of payments equilibrium. Selected prices will have to be iteratively computed using a computer algorithm [7] until the above conditions are met.

Calibrating the Philippine Model[8]

The basic data used in constructing the Philippine CGE model was the 1979 input-output table which contained 65 economic sectors. Since the Philippine model used in this study has only 25 sectors, the input-output table was aggregated down to 25 sectors, which are listed in Table 2.

Aside from classifying the 25 sectors by type of activity, Table 2 also identifies the sectors producing import-substitutes, exportable goods, and homegoods. There are 11 export-oriented sectors (i.e., producing exportable products), 12 import-competing sectors, and 2 homegood sectors.[9] There are 13 agricultural sectors including those engaged in processing agricultural products, 8 industrial sectors, and 4 service sectors.

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[7]Since the Scarf algorithm, faster and more efficient algorithms have been developed such as the Merrill algorithm, the OCTASOLV and the most recent MPS/GE which is used in this study (Rutherford, 1986).

[8]The procedure used in calibrating the Philippine model is that described in Mansur and Whalley (1984).

[9]A sector is regarded as import-competing (export-oriented) if its net imports are positive (negative). If its net imports are close to zero, the sector is regarded as producing a homegood.

Table 2 – A 25-Sector CGE Model of the Philippines

Model Code	Description	1979 I/O Sector Code	Trad-ability
	Primary Agriculture, Forestry, & Mining		
01	Palay	1	X
02	Corn	2	M
03	Coconut incl. copra	3	X
04	Sugarcane	4	H
05	Other crops incl. agri services	5,6	X
06	Livestock and poultry	7,8	M
07	Resource industries	9 to 12	M
	Processed Agriculture		
08	Grain milling & feeds	13, 19, 20	M
09	Sugar milling & refining	14	X
10	Milk & dairy products	15	M
11	Vegetable oil milling & refining	16,17	X
12	Meat and meat products	18	M
13	Other food, beverage & tobacco	21 to 23	X
	Industry		
14	Textiles, apparel, leather	24 to 26	X
15	Wood, paper, & products	27 to 31	M
16	Rubber & chemical products	32 to 36	M
17	Coal and petroleum products	37	M
18	Cement, minerals & machineries	38 to 43	M
19	Motor vehicles & equipment	44	M
20	Other manufacturing	45	M
	Services		
21	Construction & utilities	46, 48 to 49	X
22	Electricity	47	H
23	Transportation services	50 to 55	X
24	Communication, storage, warehousing	56 to 57	X
25	Other services	58 to 65	X

Legend: X – Export-oriented; M – Import-competing; H- Homegood.

There are 11 consumers in this model, each representing an income group. Their income disparities are explained by the differences in the amount of their respective endowments of resources, which include labor, capital and fixed factors. The data describing their resource endowments were obtained from a study of Habito (1984). Although the consumers have different income levels, it is assumed in the model that they apportion the same share of their budget for each good purchased.

There are three types of primary factors – labor, capital, and fixed factors. The latter are sector-specific and cannot be employed elsewhere in the economy.

The benchmark year is 1979 when previous trade policies were still in place.

Tariff and Non-Tariff Measures in the Model

Table 3 shows the benchmark tariff and non-tariff protection rates used in the model. The tariff rates reported for 1979 and 1985 were simple averages of the tariff rates belonging to each of the 25 sectors in the model. The rates were computed using the tariff data for the 127 input-output sectors prepared by the Tariff Commission. These were computations for 1979, before tariff rates were lowered, and for 1985, when all tariff changes were completed.

Having computed the simple averages of tariff rates, the net imports of each of the 25 sectors were then calculated. If a sector has negative (zero) net imports, implying the sector is producing exportable goods (homegoods), the tariff rate is set to zero. Thus, only import-competing sectors have tariff rates.

The computations of non-tariff protection rates are less straightforward than those of tariff rates. This is because there is no published information about the scarcity premium rates associated with local import licensing or quota regulations. Accordingly, such rates were estimated first for 1979 for each of the 25 sectors in the model.

The first step taken was to calculate a three-year moving average of the percentage premium of local to border prices for several commodities. Then a simple average of such price spreads was computed for primary agriculture, agricultural processing, and industry. The corresponding price spread for each of the 25 sectors in the model was

Table 3 – Tariff and Non-Tariff Protection Rates Used in the Model

Code	Sector	Net Imports (in min. pesos) (1)	Tariff Rates (%) 1979 (2)	Tariff Rates (%) 1985 (3)	Price Spreads (%) 1979 (4)	Non-tariff Protection Rate (%) 1979 (5)
01	Palay	-300	0.00	0.00	0.00	0.00
02	Corn	18	70.00	50.00	130.01	8.00
03	Coconut incl. copra	-593	0.00	0.00	0.00	0.00
04	Sugarcane	0	0.00	0.00	0.00	0.00
05	Other crops incl. agri services	-54	0.00	0.00	0.00	0.00
06	Livestock and poultry	13	48.81	33.75	90.66	5.58
07	Resource industries	1734	39.49	18.75	73.33	4.51
08	Grain milling & refining	13	48.52	32.67	54.39	0.00
09	Sugar milling & feeds	-1683	0.00	0.00	0.00	0.00
10	Milk & dairy products	538	35.00	14.01	39.23	0.00
11	Vegetable oil milling & refining	-4967	0.00	0.00	0.00	0.00
12	Meat and meat products	74	61.00	30.06	68.38	0.00
13	Other food, beverage & tobacco	-1757	0.00	0.00	0.00	0.00
14	Textiles, apparel, leather	-3305	0.00	0.00	0.00	0.00
15	Wood, paper, & products	197	56.60	32.83	199.16	102.73
16	Rubber & chemical products	3828	24.26	20.45	85.35	44.02
17	Coal and petroleum products	1356	23.86	23.35	83.95	43.30
18	Cement, minerals & machineries	8980	34.32	29.26	120.76	62.29
19	Motor vehicles & equipment	3465	26.00	23.66	91.49	47.19
20	Other manufacturing	283	53.79	30.85	189.29	97.64
21	Construction & utilities	-123	0.00	0.00	0.00	0.00
22	Electricity	0	0.00	0.00	0.00	0.00
23	Transportation services	-1534	0.00	0.00	0.00	0.00
24	Communication, storage, warehousing	-103	0.00	0.00	0.00	0.00
25	Other services	-6079	0.00	0.00	0.00	0.00

then extrapolated using the respective ratios of the average tariff rate to the sectoral average price spread for primary agriculture, agricultural processing and industry, as well as the tariff rates of each of the 25 sectors in the model (column in Table 3). The results of these calculations are reported under column 4 in the table.

Due to lack of data on the marketing costs by sector, it was assumed that about 40 percent of the price spreads accounts for marketing costs in primary agricultural sectors. The marketing margins for industry and agricultural processing were also assumed at a lower rate, 30 percent of the price spread. The difference between the two margins is due to the poor infrastructure, communication, and post-harvest systems in the country.

The non-tariff protection rates, reported under column 5 in Table 3, were calculated by subtracting the sum of the tariff rate and the estimated marketing cost from the price spread for each of the 25 sectors in the model. If the remainder was negative, the corresponding import licensing regulations were assumed to be not binding, and thus, the non-tariff protection rate was set to zero. This occurred for the agricultural processing sectors.

Trade Policy Simulations

The model is used for simulating both the tariff reforms and the import liberalization program. Five alternative tariff policy regimes were evaluated in this study, namely, the tariff reform program, a 20 percent uniform tariff rate, a 30 percent uniform tariff rate, higher agricultural tariff rates, and lower industrial tariff rates.

In the first regime, the tariff rates used were those reported under column 3 in Table 3. In the scenario involving higher agricultural tariffs, the tariff rates used were the respective 1979 tariff rates for agricultural sectors, and the 1985 rates for industrial goods. In the case of lower industrial tariff rates, the 1985 tariff rates for industrial goods were reduced by 20 percent, holding constant the agricultural tariff rates in 1985.

The import liberalization program is less easy to simulate in the model. Our data on the import liberalization program pertain to the reduction in the coverage of imports which are restricted as shown in Figures 2 and 3 above. The extent of reduction in the number of

restricted imports does not necessarily reflect the actual extent of import liberalization which occurs in the economy. This is because some of the restricted imports which are liberalized may not be actually imported. If there are many such imports, the extent of reduction in the number of restricted imports would overestimate the actual liberalization which is accomplished.

In simulating the import liberalization program, the study first assembled a model variant with both tariff and non-tariff import restrictions. Most of the imports in the model have binding non-tariff import restrictions. These imports are identified in Table 3 with a positive non-tariff protection rate. Imports with zero non-tariff protection rates have redundant quantitative import restrictions. With import liberalization, the quantitative import restrictions are relaxed, i.e. more imports are allowed into the country. The percentage increase of imports allowed under the import liberalization program is computed as follows. If the sector belongs to primary agriculture, the percentage increase is 76 percent. The corresponding percent increases for processed agriculture and industry are 124 percent and 52 percent respectively. That is, between 1984 and 1988 (or a period of four years), the government is presumed to have allowed more imports four times the average annual rates of liberalization as discussed in Section 2.

Using this model variant 2 with non-tariff import restrictions, the model is first solved for the benchmark equilibrium case in which both the tariff and the non-tariff measures are present. The tariff rates are then lowered to post a tariff reform program levels holding the non-tariff import restrictions constant. This is followed by the import liberalization program featuring more liberal quantitative import restrictions as discussed above. After this, alternative tariff policy regimes are then simulated holding the new quantitative import restrictions constant. These regimes include a 30% uniform tariff rate, higher agricultural tariff rates, and lower industrial tariff rates. The results of these policy experiments are contrasted with those obtained using the original model without the non-tariff import restrictions.

4. Empirical Results

Table 4 shows the real income gains of consumers from alternative tariff policy regimes. The lower consumer groups represent the lower income classes in society. Government real income gains represent revenue gains from tariff rate changes.

These gains were assessed relative to the income of each of the

Table 4 – Real Income Gains of Consumers from Alternative Tariff Policy Regimes (In Million Pesos, 1979 Prices)

Consumer Group	Tariff Reform Program	Uniform 20% Tariff	Uniform 30% Tariff	Higher Agri'l Tariff	Lower Indst'l Tariff
I	-5.76	-6.45	-4.22	-0.98	-6.31
II	-9.31	-182.00	-6.04	-0.85	0.75
III	77.10	158.60	36.40	28.30	122.60
IV	162.60	283.90	78.00	56.50	235.80
V	181.70	315.50	90.90	60.80	261.60
VI	276.60	441.30	154.40	81.40	376.10
VII	394.90	614.80	209.20	122.00	533.50
VIII	270.10	439.00	141.30	85.40	373.70
IX	502.00	774.90	283.70	144.50	670.00
X	380.70	608.30	204.90	116.50	520.30
XI	1,125.60	1,875.90	765.00	255.50	1,526.30
Govt.	4,412.73	3,004.38	3,001.13	1,247.49	3,905.63
Total	7,768.96	8,328.13	4,954.67	2,196.56	8,519.97

classes in 1979, before the launching of the tariff reform program.

With the exception of the bottom two income class groups, the alternative tariff policy regimes which we analyzed were apparently beneficial to consumers. The total real income gains to society more than outweighed the real income losses of the bottom two consumer groups. This passes the conventional economic test of whether each of the alternative tariff policy regimes will make society better off, or that gainers can potentially compensate the losers. In fact, the government revenue gains alone more than compensated for the losses of the two income classes.

It is important to point out that the tariff reform program on the whole improves social welfare. Society appears to gain about 7.8 billion pesos as a result of the program. This represents about 5 percent of the gross national product of the Philippines in 1979.

Further gains accrue to society if a 20 percent uniform tariff is implemented, amounting to about 8.3 billion pesos. A uniform tariff appears to be a welfare-improving option for society. However, if it is

raised to 30 percent, the gain falls to 4.9 billion pesos. In other words, society is better off with the existing tariffs.

It should be noted that raising agricultural tariffs to correct the anti-agriculture bias of existing tariff policies will provide the least real income gain to society. Further, the losses of the bottom two income groups will not necessarily be eliminated, and the revenue gain of the government will be reduced to a third of the gain under existing tariffs. The country appears to be better off with existing tariffs.

It is equally important to note that the largest income gain to society is if we lower industrial tariff protection while holding all other tariffs at their current levels. The second income class group in this case will enjoy a net positive income gain. Thus, if we have to rationalize further our tariff policies, it appears that a good option for us is to cut industrial tariff rates.

Effects on Prices

Real income gains are primarily the result of lower prices of goods which in turn is caused by rationalizing the tariff policies. In Table 5, we showed the percentage changes in prices which were computed corresponding to the alternative tariff policy regimes analyzed in this study. Generally, real income gains to society increase with the average price reduction. Interestingly, the 20 percent uniform tariff rate has the largest average percentage price reduction, although this policy regime is only second, in terms of real income gains, to the case of lower industrial tariffs.

Effects on Production

What do all these changes mean for the agricultural sector? These mean that resources will be reallocated from import-competing sectors in agriculture to export-oriented sectors. In Table 6, the average percentage change in production in export-oriented primary agriculture ranges from 0.40 to 2.65 percent; in the case of processed agricultural products, 1.13 to 7.70 percent and 0.84 to 5.57 percent for both agricultural sub-sectors.

In contrast, production will decline from 46.35 to -0.01 percent for import-competing primary agricultural sectors, 48.0 to -0.75 percent for processed agricultural products, and 43.81 to -0.38 percent for all import-competing agricultural sectors.

Table 5 – Price Changes Due to Alternative Tariff Policies (In Percent)

Sector	Tariff Reform Program	Uniform 20% Tariff	Uniform 30% Tariff	Higher Agri'l Tariff	Lower Indst'l Tariff
Palay	0.00	0.00	0.00	0.00	0.00
Corn	-14.33	-29.41	-23.53	-0.10	-14.65
Coconuts	0.00	0.00	0.00	0.00	0.00
Sugarcane	-0.26	-0.39	0.07	-0.13	-0.48
Other Crops	1.24	1.87	1.21	0.28	1.32
Livestock	-15.24	-19.45	-14.99	0.00	-15.25
Natural Resources	-14.87	-13.97	-6.80	0.00	-14.87
Grains	-5.88	-5.88	-3.58	0.00	-5.88
Sugar	0.00	0.00	0.00	0.00	0.00
Meat	-15.55	-11.11	-3.70	0.00	-15.55
Dairy	0.00	0.00	0.00	0.00	0.00
Vegetable Oils	19.22	-25.47	-19.25	0.00	-19.22
Food, Beverages & Tobacco	0.00	0.00	0.00	0.00	0.00
Textiles, Apparel & Leather	0.00	0.00	0.00	0.00	0.00
Wood Products	-15.18	-23.37	-16.99	-15.18	-19.37
Rubber and Chemicals	-3.06	-3.42	4.62	-3.06	-6.35
Coal and Petroleum	-6.65	-5.68	-2.39	-0.41	6.42
Mineral Products	-3.77	-10.66	-3.22	-3.77	-8.12
Vehicles	-1.86	-4.76	3.17	-1.86	-5.61
Other Manufacturing	-14.92	-21.97	-15.47	-14.92	-18.93
Construction & Utilities	0.00	0.00	0.00	0.00	0.00
Electricity	-2.97	-2.54	-0.98	-0.74	-2.94
Transportation Services	0.00	0.00	0.00	0.00	0.00
Communication & Storage	0.00	0.00	0.00	0.00	0.00
Other Services	0.00	0.00	0.00	0.00	0.00
AVERAGE	-5.30	-7.05	-4.07	-1.60	-6.09

Table 6 – Changes in Production and Alternative Tariff Policies (In Percent)

Sector	Tariff Reform Program	Uniform 20% Tariff	Uniform 30% Tariff	Higher Agri'l Tariff	Lower Indst'l Tariff
Exportables					
Palay	2.84	2.76	0.09	0.75	3.76
Coconuts	-0.24	-1.32	-0.34	-0.48	-0.80
Other Crops	5.02	6.45	4.21	1.09	5.25
Sugar	2.19	1.89	0.74	0.21	2.36
Vegetable Oils	0.41	-1.65	-2.37	0.35	0.15
Food, Beverages & Tobacco	25.53	25.11	14.34	3.72	25.92
Textiles, Apparel & Leather	41.51	39.62	15.70	8.09	44.93
Construction & Utilities	15.90	33.86	9.13	12.39	28.66
Transportation Services	9.36	8.62	3.42	1.03	9.71
Communication & Storage	1.43	1.29	1.99	1.23	1.18
Other Services	3.66	1.29	4.09	0.12	1.61
Primary Agriculture	2.46	2.45	1.18	0.40	2.65
Processed Agri.	7.58	6.81	3.36	1.13	7.70
Agriculture incl. sugarcane	5.42	5.02	2.49	0.84	5.57
Importables					
Corn	-35.26	-64.47	-55.62	0.34	-35.49
Livestock	-40.63	-51.30	-41.78	-0.25	-40.77
Natural Resources	-24.48	-23.29	-11.49	-0.06	-24.57
Grains	-39.50	-20.50	-3.00	-0.72	-39.76
Dairy	-43.85	-27.27	-5.92	3.44	-42.47
Meat	-60.65	-76.04	-61.71	-0.47	-60.88
Wood Products	-56.27	-77.85	-65.15	-99.99	-67.92
Rubber and Chemicals	-7.08	-8.21	17.28	-8.39	-17.01
Coal and Petroleum	10.34	9.86	10.01	-9.00	9.85
Mineral Products	-0.94	-7.92	-1.53	-3.29	-5.22
Vehicles	-0.49	-2.79	4.48	-1.43	-3.99
Other Manufacturing	-39.71	-58.43	-48.80	-42.05	-47.88
Primary Agriculture	-33.46	-46.35	-36.30	0.01	-33.61
Processed Agriculture	-48.00	-41.27	-23.54	0.75	-47.70
Agriculture	-40.73	-43.81	-29.92	0.38	-40.66
Homegoods					
Sugarcane	2.20	1.90	0.75	0.22	2.37
Electricity	0.17	-2.00	-0.23	-4.76	-1.50
All Goods					
Agriculture*	-12.26	-13.01	-8.79	0.58	-12.18
Industry*	5.36	0.75	2.52	-10.76	2.05
Services & Utilities*	6.17	7.47	4.79	2.24	6.91

*Weighted average using value-added.

Results show that in all but one tariff policy regime resources appear to be shifted out of agriculture in favor of industry, services and utilities. The weighted average percentage decline in agricultural production ranges from 13.01 to -0.58 percent. Only in the case of raising agricultural tariffs, while holding industrial tariffs constant, does agricultural production increase, although by only a small percentage.

We should point out here that these changes are all evaluated relative to the situation occurring in 1979 just before the tariff reform program. If we evaluate the level of production under a lower industrial tariff policy regime relative to the new set of tariff rates implemented under the tariff reform program, then on average, agricultural production will increase. This can be seen from Table 6, where the production decline for agriculture under the tariff reform program (12.26 percent) is more than that under a lower industrial tariff policy regime (12.18 percent).

Farm Income

In Table 7, farm income, defined as the total payment to factors of production in primary agriculture, will also decline in all but one tariff policy regime. Likewise for agricultural income, which is farm income plus the value added in agricultural processing.

Will farm and agricultural income increase if we lower industrial tariff rates? Apparently, yes. The respective percentage decline in both farm and agricultural income is less under a lower industrial tariff policy regime than those under the tariff reform program.[10]

Effects of the Import Liberalization Program

Tables 8 and 9 show the effects on real incomes and production in the various sectors of the economy of the import liberalization program. In Table 8, the tariff reforms are analyzed while pre-import liberalization non-tariff measures are still in place. The reforms appear to hurt the bottom five income groups in the country. The same effect is observed in Table 4 which shows the effects of the reforms using a model without non-tariff measures. The difference between the two sets of results is that more low income consumer groups suffer real

[10]The effects reported both in Tables 6 and 7 are those of the tariff policy changes holding all other factors constant. Hence, these do not imply that the agricultural output will go down. Investments, employment, yields, and related factors will be growing, which will then cause agricultural output to increase each year.

Table 7 – Farm and Agricultural Income (In Million Pesos)

Income	Tariff Reform Prog.	Uniform 20% Tariff	Uniform 30% Tariff	Higher Agri'l Tariffs	Lower Indst'l Tariffs
Farm	-11.77	-13.19	-9.37	0.27	-11.68
Agriculture	-10.55	-10.81	-7.62	0.58	-10.46

Table 8 – Real Income Gains of Consumers From Import Liberalization and Alternative Tariff Policy Regimes (in million pesos, 1979 prices)

Consumer	Tariffs Reforms	Import Libera-lization	Uniform 30% Tariffs	Higher Agri. Tariffs	Lower Industrial Tariffs
I	-2.02	-3.31	-3.13	-2.34	-3.31
II	-11.47	63.15	61.70	54.31	63.15
III	-10.41	261.55	254.45	237.04	261.55
IV	-3.60	410.84	399.33	377.62	410.84
V	-1.10	450.76	437.95	411.24	450.76
VI	21.71	564.73	547.62	506.49	564.73
VII	29.22	774.35	751.24	706.41	774.35
VIII	12.51	582.04	565.03	529.91	582.04
IX	50.33	949.85	920.63	851.59	949.85
X	24.81	786.46	763.04	712.31	786.46
XI	144.68	2395.49	2318.04	2014.97	2395.49
Govt	6039.40	6266.83	6644.95	1140.96	6266.93
Total	6294.07	13502.73	13660.85	7540.51	13502.83

income losses if the tariff reforms are undertaken in the presence of the non-tariff import restrictions. Despite these losses, the entire economy gains over six billion pesos as a result of the tariff reforms per period of time.

The efficiency gains of the import liberalization program are double those of the tariff reforms. This is because on top of the tariff reforms, non-tariff measures are also relaxed to allow additional imports into the country. Only the bottom income group suffers a real income loss under the import liberalization program.

Table 9 – Changes in Production Due to Import Liberalization and Alternative Tariff Policy Regimes (in Percent)

Sector	Tariff Reforms	Import Libera-lization	Uniform 30% Tariffs	Higher Agri. Tariffs
EXPORTABLES				
Palay	2.51	4.30	4.33	-1.90
Coconuts	1.80	-1.28	-1.15	-6.02
Other Crops	2.11	0.68	0.76	-0.69
Sugar	1.67	1.86	1.88	-2.75
Vegetable Oils	0.53	-1.51	-1.25	-6.80
Food, Beverages and Tobacco	12.85	20.04	19.38	-4.07
Textiles, Apparel and Leather	0.78	7.39	7.81	-2.48
Construction and Utilities	2.28	61.77	61.02	61.35
Transportation Services	-0.33	12.45	11.21	4.55
Communication, Storage	1.34	-0.36	-0.23	-4.97
Other Services	7.45	-3.71	-3.47	-5.47
Primary Agriculture	2.14	1.24	1.31	-2.87
Processed Agriculture	5.02	6.80	6.67	-4.54
Agriculture incl. Sugarcane	3.58	4.02	3.99	-3.70
IMPORTABLES				
Corn	-58.28	-58.61	-65.11	-7.35
Livestock	-40.30	-40.56	-39.87	-4.12
Natural Resources	2.25	-3.34	-3.39	-7.44
Grains	-64.20	-64.86	-71.90	-7.31
Dairy	-51.00	-44.16	-4.40	4.39
Meat	-58.84	-60.18	-59.60	-6.25
Wood Products	3.36	1.42	2.12	-2.59
Rubber and Chemicals	0.38	-21.85	-21.94	-24.60
Coal and Petroleum	-0.37	-5.65	-5.85	-7.73
Mineral Products	5.26	-14.42	-14.13	-19.23
Vehicles	6.49	-26.79	-22.82	-26.31
Other Manufacturing	1.77	2.37	2.62	-0.87
Primary Agriculture	-32.11	-34.17	-36.12	-6.31
Processed Agriculture	-58.02	-56.40	-45.30	-3.05
Agriculture	-42.95	-43.14	-34.82	-4.15
HOMEGOODS				
Sugarcane	1.67	1.88	1.90	-2.71
Electricity	2.08	-2.12	-1.95	-3.33

Table 9 (continued)

Sector	Tariff Reforms	Import Libera-lization	Uniform 30% Tariffs	Higher Agri. Tariffs
ALL GOODS				
Agriculture	-19.02	-18.90	-16.80	-4.08
Industry	2.53	-8.22	-7.45	-11.97
Services and Utilities	2.56	13.61	13.32	10.43

Holding the new liberalized import policies in place, the alternative tariff policies are analyzed. If the government adopts a uniform tariff rate policy at 30%, additional efficiency gains accrue to the economy. The amount of real income loss for the poorest consumer is lessened. If agricultural tariff rates are raised relative to industrial tariff rates, less efficiency gains are going to be obtained. A reason for this is that food prices go up as a result of the higher agricultural tariff rates which tend to offset the efficiency gains of the import liberalization program. Interestingly, lowering industrial tariff rates have no real income effects. The tariff rates which are lowered are not the binding import restrictions in the model. The binding restrictions are the non-tariff measures. Since the rents from the import restrictions go to the government, the real incomes of the eleven consumer groups and the government remain unchanged.

Unlike the results obtained using the model without non-tariff measures, lowering industrial tariff rates no longer appears an option to the government to further improve efficiency gains. What is required are further import liberalization measures to increase the proportion of tariff rates, these being the binding restrictions on the country's imports.

These changes in trade policies have resource allocation effects which are indicated by changes in production in the various sectors of the economy, as shown in Table 9. The Table is patterned after Table 6. Resources are allocated to exportables and homegoods away from importables. Export oriented primary agricultural sectors receive the highest amount of resources if the tariff reforms are undertaken without liberalizing the non-tariff import restrictions. Processed agricultural exportable goods are the main beneficiaries of the import liberalization program. Their average rate of output increase is 6.80 percent. The outputs of agricultural importables all decline under the alternative trade policy regimes.

The agricultural production falls in all trade policy regimes while that of industry increases under the tariff reforms and falls for the other policy regimes at a lower rate compared to agriculture. Services and utilities are the net gainers of resources in all policy regimes.[11]

5. Summary

In summary, this paper looks into the economic effects of the trade liberalization program on the agricultural sector. The economic effects are calculated using a computable general equilibrium model of the Philippine economy. The extent of trade liberalization in the agricultural sector is discussed as well. The Philippine CGE model with 25 sectors, and the data used to calibrate it, are described.

In its present version, the paper discusses the effects of alternative tariff policy regimes. The simulations involving the import liberalization program are not reported yet.

The economic effects obtained in this study include the following:

- The majority of income classes achieve positive real income gains due to the tariff reform program and the alternative tariff rate regimes;
- The highest real income gain to society is obtained when current agricultural tariffs are maintained while industrial tariff rates are lowered;
- Average prices decrease due to the tariff reforms and the alternative tariff rate policies;
- Outputs of agricultural export-oriented sectors increase while those of agricultural importables decline in all tariff policy regimes, implying that resources are allocated in favor of exportables;
- However, aggregate agricultural output declines except in the case when agricultural tariffs are raised;
- Both farm and agricultural incomes decline in all but the higher agricultural tariff rate regime; and

[11]Simulations of the lower industrial tariff rates are not reported here because these rates are not binding in the model.

o But relative to their current levels, farm and agricultural incomes will increase if industrial tariffs are lowered and post-tariff reform agricultural tariffs are maintained.

Some of the above results of the alternative tariff policy measures are affected if the non-tariff import restrictions are present in the model. In particular, the economic effects of trade liberalization using a model with non-tariff restrictions are the following:

- The real income gains are higher if the alternative tariff policy measures are imposed after the import liberalization program;
- The import liberalization program has a markedly beneficial effect on the country's consumer groups; and
- Lowering industrial tariff rates has no real effects on the economy because the rates are not the binding import restrictions.

Policy Implications

These effects raise the policy question of whether the Department of Agriculture should recommend raising agricultural tariffs or reversing the import liberalization measures in agriculture. If farm income is what the Department is trying to maximize, then the tariff regime option is clearly that of higher agricultural tariffs. In other words, the Department should fight to reverse the tariff reform program.

However, there are other considerations. By raising the prices of agricultural products, higher agricultural tariffs and quantitative restriction will reduce the real purchasing power of all consumers including the country's farmers. Furthermore, the empirical results of this study indicate that higher potential real income gains will accrue to society under alternative tariff policy regimes other than higher agricultural tariffs.

The highest potential real income gain is obtained when agricultural trade protection is maintained and industrial trade protection is lowered. This trade policy regime is one which corrects the anti-agriculture bias of existing trade policies. Such a regime is obtained if additional non-tariff import restrictions in the industrial sector are liberalized. Lowering industrial tariff rates without doing anything to the industrial non-tariff protection measures cannot increase the real income gains of consumers.

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