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THE RELATIVE WELFARE COST OF INDUSTRIAL AND AGRICULTURAL PROTECTION POLICIES USING PHILIPPINE DATA

Ramon L. Clarete
and
James A. Roumasset

This paper contains preliminary findings from research work still in progress and should not be quoted without prior approval of the author.

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The Relative Welfare Cost of Industrial and Agricultural Protection Policies Using Philippine Data

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ABSTRACT

An applied general equilibrium model of the Philippine economy is described and calibrated for evaluating the relative welfare cost of industrial/trade and agricultural policies. Industrial policies have larger economic waste relative to agricultural policies. Agricultural policy reforms without accompanying liberalization of foreign trade regimes result in relatively small improvement in economic welfare, and in the case of export taxes and production taxes may even be welfare worsening.

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The Relative Welfare Cost of Industrial and Agricultural Protection Policies Using Philippine Data

by Ramon Clarete and James Roumasset

I. Introduction

The purpose of this paper is to compare the respective welfare costs of agricultural and industrial protection policies using an applied general equilibrium model of the Philippine economy. Earlier studies analyzed the impacts of industrial promotion policies in developing countries (e.g., see Balassa; and Bautista, Power and Associates), while others have evaluated the effects of price distortions on agricultural production and trade (e.g. See Bale; Bale and Lutz; Bautista; David; Chisolm and Tyers; Lutz and Scandizzo; and Trela, Whalley, and Wigle). Apparently no study, however, was done to compare the respective economic effects of industrial and agricultural policies despite the usefulness of its results to many developing countries.

Industrial protection policies are largely carried out by tariffs and quantitative trade restrictions (QRs), which distort both demands and supplies of importables as they apply to net trades. If QRs are binding and rent seeking is practiced, rents from quota restrictions may be dissipated constituting additional waste.

Agricultural price distortions such as production taxes, price controls, export taxes, and parastatals also induce economic waste. It is also interesting to find out if agricultural policies have a larger deadweight loss relative to industrial protection policies in developing countries. While apparently an empirical proposition, this is plausible considering that such distortions typically affect the important agricultural production sectors which contribute substantially to the gross domestic products in these countries. Although agricultural supplies are generally viewed as price
inelastic, nevertheless it is common to find multiple distortions in one single agricultural market which increase welfare costs. Moreover, economic waste is aggravated by agricultural export taxes. Parastatals with broad regulatory and monopoly powers over the domestic and foreign trades of important agricultural tradables are typically after their own welfare rather than that of the agricultural producers (Bale; Lele). It is not unlikely that marketing profits are dissipated by their own inefficiencies and by rent seeking activities which secure their presence.

It is also interesting to find out in this paper how an agricultural policy liberalization program performs given that industrial protection policies are in place. One can argue in theory that the program can be stymied by the rent seeking processes associated with QRs. Specifically, agricultural liberalization puts more pressure on import rationing, increasing import premia and their associated economic waste. This result is extremely useful in designing structural adjustment programs in developing countries.

In the following section, we modify the general equilibrium model of a small-open economy (Clarete and Roumasset, Clarete and Whalley) for evaluating the impacts of trade restrictions and agricultural price distortions including price controls, production taxes, and parastatals. In Section III, we discuss briefly the Philippine industrial and agricultural protection policies, and the steps taken in calibrating the model with Philippine economic data. In Section IV, we present and discuss the empirical results of this study. Section V concludes the paper.
II. The Structure of the Model

Consider an economy consisting of $N$ producers, $H$ consumers, and a government. Of the $N$ production sectors, some goods are not traded comprising the set $SH$, while other goods are fully traded which make up the set $ST$. The economy is a price taker in its tradables. We denote the exogenous world price vector as $v$.

Production is carried out under a decreasing returns to scale technology. Every producer utilizes $M$ variable factors, a sector-specific factor, and intermediate inputs. Denoting $X$ to be the output vector, $F$ to be the $M$-by-$N$ factor demand matrix and $Z$ to be the $N$-dimensional vector of fixed factors, we describe the $N$ production functions as: $X_j = f_j (F_j; Z_j)$, $j = 1, \ldots, N$.

Under profit-maximization, one derives the $N$ supply functions,

\[
(1) \quad X_j = X_j (w_j; p_j; Z_j), \quad j = 1, \ldots, N,
\]

where $w$ and $p$ are respectively the vectors of domestic factor and producer prices; and the $M$ derived demands for factors in each of the $N$ sectors,

\[
(2) \quad F_{ij} = F_{ij} (w_i; p_j; Z_j), \quad i = 1, \ldots, M; \quad j = 1, \ldots, N,
\]

by taking the respective gradients of the $N$ restricted profit functions. Intermediate inputs are utilized in fixed proportion to production. We denote the $N$ square matrix $A = [a_{ij}]$ to be the input-output matrix.

Economic rents are generated because of the presence of sector-specific factors. The respective rents in each sector are given by:
(3) \[ \pi = p_X \sum_{j=1}^{N} \sum_{i=1}^{M} a_{ij} X_{qi} - \sum_{i=1}^{M} F_{ji} W_{ij} \]  
where \( q \) is the \( N \)-dimensional vector of domestic consumer or user prices. The system of distribution of these profits is assumed exogenous. This can be done by specifying how \( Z \) is distributed among consumers. To simplify our exposition, we introduce a set of exogenous share parameters, to be denoted by the \( H \)-dimensional vector \( \sigma \), defining how the aggregate profit in the economy is to be divided.

Consumer preferences are described by \( H \) utility functions, each a function of the final demand for goods: \[ U_h = U_h(C_h), \quad h=1,\ldots,H, \]  
where \( U_h \) denotes the \( H \)-dimensional vector of utility indices and \( C_h \) stands for the \( N \)-dimensional vector of final demands by consumer \( h \). Under constrained utility maximization,

(4) \[ C_{hj} = \frac{C_{hj}(q,Y_h)}{Y_h} \quad h=1,\ldots,H; \quad j=1,\ldots,N, \]

where \( Y_h \) is the income of consumer \( h \). Summing up (4) across all consumers gives the vector of market demands, \( C \).

The incomes of consumers come primarily from their endowments in variable and fixed factors. We assume that consumers are exogenously endowed with factors and derive income by selling these resources to firms. There is no tradeoff between leisure and market time in the model. Denoting \( FS \) to be the \( H \)-by-\( M \) factor endowment matrix,

(5) \[ Y_h = \sum_{i=1}^{M} w_{ih} FS_i + \sum_{j=1}^{N} \sigma_{hj} \pi_j \quad h=1,\ldots,H. \]

The total supply of factor \( i \) in the economy is \[ FS = \frac{H}{i} \sum_{i=1}^{H} FS_{ih}. \]
Since the world prices of traded goods are fixed, we can define the following Hicksian composite quantities as in Clarete and Roumasset:

\[ C = \sum_{j \in T} v (C + ID) \] and

\[ X = \sum_{j \in T} v X \]

where \( ID_j \) is the total intermediate demand for good \( j \). \( C_T \) and \( X_T \) are respectively the demand and supply for the composite good. Clearing the market of this Hicksian composite traded good implies trade balance.

By choosing a numeraire, we can scale the fixed world prices of traded goods with a scalar \( r_T \), the domestic price of the composite commodity. If the chosen numeraire is a collection of homegoods, \( r_T \) can be interpreted as the relative price of homegoods and traded goods or the real exchange rate, as in a special case involving two tradables and a homegood. Accordingly the domestic prices of traded goods are given by the vector \( p = r_T v \).

Summing up (5) across all consumers and equating the total with aggregate expenditures of consumers, and using (3), and (6), we obtain the following expression of Walras' Law:

\[ \sum_{i=1}^{M} w_i (\sum_{j=1}^{N} F_{ij} - FS) + \sum_{i \in SH} p_i (C + ID - X_i) + r_T (C - X_T) = 0. \]

Thus, general equilibrium for this basic formulation of a small-open economy is the set of equilibrium prices of homegoods, factors, and of the composite commodity which clear all markets and simultaneously satisfy trade balance.

**Price Distortions**

The government is now added into the model, distorting domestic prices. One set of distortions are price ceilings and price floors affecting traded goods. We denote STC to be the set of traded goods with consumer price
ceilings and STF to be the set of traded goods with producer price floors, while the respective sets TNC and TNF refer to traded goods without price ceilings and price floors. Any excess demands arising from these pricing policies are absorbed by the rest of the world. Hence, no rationing is featured here to enforce such policies.\footnote{For related literature on introducing price controls in a numerical general equilibrium model, see Imam and Whalley; and Kehoe and Serra.}

The subsidy required to enforce these price interventions is fully paid by the government, which levies trade and production taxes. We denote \( t \) to be the vector of tariff (or export tax, if negative) rates, and \( \tau \) to be the vector of production tax rates.

We also feature quantitative trade restrictions, \( Q \), in the model. We denote \( \mu \), as the vector of \emph{ad valorem} import premium rates associated with such restrictions.

The domestic price received by producers is given by:

\[
\begin{cases}
(1+t_j)(1+\mu_j) \\
\max[p_j, r j T j \frac{v_j}{1+\tau_j}], \forall j \in \text{STF};
\end{cases}
\]

\[
(8) \quad p_j = \begin{cases}
p_j, & \forall j \in \text{SH}; \text{ and} \\
\frac{(1+t_j)(1+\mu_j)}{r j T j \frac{v_j}{1+\tau_j}}, & j \in \text{NTF},
\end{cases}
\]
where $\mathbf{p}$ is the vector of price supports. The total amount of production subsidy (PS) is:

$$
(9) \quad PS = \sum_{j \in \text{STC}} \left[ p_j - \frac{r_j v_j}{T_j} \right] \frac{(1 + t_j)(1 + \mu_j)}{(1 + \tau_j)} X_j.
$$

The domestic price paid by consumers is given by:

$$
(10) \quad q_j = \begin{cases} 
\min \{ q_j, r_j v_j (1 + t_j)(1 + \mu_j) \}, & \forall j \in \text{STC}; \\
p_j (1 + \tau_j) & \forall j \in \text{SH}; \text{ and} \\
r_j v_j (1 + t_j)(1 + \mu_j), & \forall j \in \text{NTC},
\end{cases}
$$

where $\mathbf{q}$ is the vector of price ceilings. The total consumption subsidy (CS) is:

$$
(11) \quad CS = \sum_{j \in \text{STC}} \left[ \frac{r_j v_j (1 + t_j)(1 + \mu_j) - q_j}{T_j} \right] (C_j + ID_j) X_j.
$$

The revenues from trade taxes (TR), production taxes (PR), and quota rents (QR) are given by:

$$
(12) \quad TR = \sum_{j \in \text{ST}} \frac{r_j}{T_j} \frac{1}{(1 + \tau_j)} (C_j + ID_j - X_j);
$$

$$
PR = \sum_{j \in \text{ST}} \frac{r_j}{T_j} \frac{1}{(1 + \tau_j)} (1 + t_j) X_j + \sum_{j \in \text{SH}} \frac{r_j}{T_j} \frac{1}{(1 + \tau_j)} (1 + t_j) X_j.
$$

$$
QR = \sum_{j \in \text{ST}} \frac{r_j}{T_j} \frac{1}{(1 + \tau_j)} (1 + t_j) Q_j.
$$
The fiscal surplus of the government is defined as:

\[(13) \quad D = TR + PR - CS - PS.\]

We assume that the surplus is given back to consumers in a lump-sum fashion as transfer payments, denoted by \(TY\). We further suppose that the \(H\)-dimensional vector of share parameters, \(\phi\), which describes how \(TY\) is to be distributed to all consumers in the model is known.

Accordingly, the income of consumer \(h\) is modified to reflect the transfer payment he received from the government. Equation (5) becomes

\[(14) \quad Y = \sum_{h=1}^{H} \sum_{i=1}^{\infty} w_{hi} F_{i}^{FS} + \sigma \sum_{h=1}^{H} \sum_{j=1}^{N} \phi_{ij} + \sum_{h=1}^{H} \sum_{j=1}^{N} \gamma_{ij} Q_{j}, \quad h=1, \ldots, H,\]

where the \(H\)-dimensional vector \(\gamma\) describes how quota rents are distributed to consumers.

Adding up (14) across all consumers, equating the result to the total expenditures of consumers in the model, and making use of equations (3), (6), (8) through (13), we obtain the following expression of Walras' Law:

\[(15) \quad \sum_{i=1}^{M} \sum_{j=1}^{N} w_{ij} \left( \sum_{i} F_{i}^{FS} \right) + \sum_{j \in STQ} \sum_{j} p_{j} (1+t) (C + ID - X_j) + r \left( C - X_j \right) + (D - TY) + \sum_{j \in STQ} \sum_{j} \mu_{j} \left( 1+t \right) (C + ID - X_j - Q_j) = 0\]

where \(STQ\) is the set of traded goods with QRs.

General equilibrium for this formulation is the set of factor prices, homegood prices received by producers, the composite traded good price, the transfer payment, and the import premium rates which clear all markets of factors and homegoods, balance the trade and public sector accounts, and ration the limited imports. Formally, we solve the following simultaneous equation set for \(w, p_{j} (\forall j \in SH), r, TY, \) and \(\mu_{j} (\forall j \in STQ)\) such that:
(16) \[ \sum_{j=1}^{N} F_{ij} - F_{Si} = 0 \quad i=1, \ldots, M; \]

\[ (C_j + ID_j - X_j) = 0 \quad \forall j \in S_H; \]

\[ C_T - X_T = 0; \]

\[ D - TY = 0; \]

\[ (C_j + ID_j - X_j - Q_j) = 0 \quad \forall j \in STQ. \]

**Parastatals and Rent Seeking**

An important distortion in the agricultural markets of developing countries is the presence of quasi-private marketing boards empowered to regulate and monopolize domestic and foreign trades of primary commodities. We assume that these organizations are profit maximizing monopsonists in the domestic agricultural trade. We model their presence in the economy through a tax on production of affected agricultural products to represent monopsony profits. For modelling purposes, we treat the production tax rate, \( \tau_j \), as gross of the monopsony profit rate accruing to parastatals. We introduce the parameters \( \beta_j \) (0 \leq \beta_j \leq 1) such that \( \beta_j \tau_j \) is the monopsony profit rate. Hence, the profits of parastatals, QRP, is defined by:

(17) \[ QRP = \sum_{j \in ST} \beta_j \tau_j \sqrt{V/(1 + t_j)(1 + \mu_j)x_j/(1 + \tau_j)}. \]

Such profits, however, tend to be wasted by the parastatals themselves either because they are less efficient in marketing relative to competitive private traders, or they engage in rent-seeking activities to secure legally their presence in the economy. In either case, the rents they collect from the farmers are dissipated. To formally model this, we follow the procedure described in Hamilton, Mohammad and Whalley and Clarete and Whalley.
Let $FRS_i$ be the amount of variable factor $i$ used up in rent seeking activities. This amount is proportional to the rents generated, the proportions being the relative economy-wide endowments of the factors. Thus:

$$(18) \quad FRS = \left( \frac{FS}{w} \sum_{i=1}^{N} w_i FS \right) (QR + QR_P)$$

Thus the value of resources wasted in rent seeking activities is equal to the total rents. Since these rents are dissipated, they do not constitute part of consumer incomes. The market clearing conditions involving factors become:

$$(15) \quad F_i + FRS_i - FS_i = 0 \quad \forall \ i,$$

where $F_i$ is the amount of the factor that is used productively.

III. **Industrial and Agricultural Protection Policies and A Numerical General Equilibrium Model of the Philippine Economy**

In the preceding section, we outlined a theoretical general equilibrium model of a small-open economy which can be used for evaluating the protection policies in developing countries. We now apply the model to Philippine economic conditions. First we briefly discuss the key features of Philippine protection policies, which we assume are represented by the industrial and agricultural policies of the previous Philippine government in 1978 (the benchmark period of the model). We then discuss the steps taken in connection with calibrating the model.

**Protection Policies of the Philippines**

The main thrust of post-war industrial policies in the Philippines has been to promote import-competitive sectors through trade policies, such as restrictions on imports and foreign exchange in the 1950s, and the tariffs and
import licensing since the 1960s. Incentives granted to industrial investors since 1967 have marginally supplemented the protection afforded by trade policies to import-substitutes. Moreover, trade liberalization programs in the past had limited success in dismantling import substitution because of countervailing tariffs and taxes.

The Investment Incentives Act of 1967 reinforced this protective role of tariff policies by granting a package of fiscal incentives to import substituting industries. Promulgated to accelerate the pace of Philippine industrialization, the Incentives Act allowed accelerated depreciation as well as deductions of organization and pre-operating expenses from taxable income, granted tax credits on domestic capital equipment, and exempted beneficiaries from paying taxes on imported capital equipment. However as Tan pointed out, the investment subsidy had insignificant promotion effect on industry relative to trade policies.

In 1970, the Philippine government floated the country's exchange rate, subsidized non-traditional exports, and devalued the peso. The extra income of agricultural producers from the devaluation of the peso however, was taxed under the Stabilization Tax Law of 1970 which introduced explicit export taxes into the tax system.

The Tariff Code of 1978 simplified the prevailing tariff schedule. A basic revenue rate of 10 percent was imposed on all imports. A five-level schedule of additional rates ranging up to a maximum of 100 percent was added on top of the 10-percent revenue rate for promoting domestic industries. With regards to exports, a basic rate of 4 percent was levied on all exports. Additional rates up to 10 percent were also imposed to promote domestic processing of agricultural commodities.
Import-licensing was practiced widely. The importation of nonessential and unclassified consumer goods required the approval of the Central Bank. Out of about 3,500 goods in the tariff schedule, 1,304 nonessential and unclassified consumer (NEC/UC) products were subject to one form of import-licensing or another. Intermediate goods in producing exportables also require import licenses.

Agricultural policies complimented the indirect effect of trade and industrial policies in retarding agricultural growth. Price-controls, production taxes, and parastatals in important agricultural industries like rice, sugar, and coconut provided disincentives to agricultural producers.

For our purposes here, we consider only the following policies: industrial protection policies such as tariffs and QRs; and agricultural policies as reflected by price controls, production taxes, quasi-state trading, and export taxes.

The Philippine Applied General Equilibrium Model

The Philippine Numerical General Equilibrium model is described in earlier papers. The Philippine model featuring only the trade taxes is discussed in Clarete and Clarete and Roumasset. The specification of the model with QRs and rent seeking is described in Clarete and Whalley. Here, we briefly summarize the key features of the model referring the interested reader to these other studies for details, and discuss additional calibration steps we took in connection with introducing the agricultural policies considered in this paper.
The Philippine economy is represented by seven sectors. The sectors are commercial crops, food industries in agriculture, industrial exportables, industrial importables, import substitutes, the rest of agriculture and services. The first three are exportables, the next two are importables and the last two are not traded. Sector 1 includes such industries as copra, sugar cane, and bananas. Sector 2 covers grains, poultry, livestock and fisheries. The third sector consists mainly of semi-processed agricultural commodities, while the fourth sector includes energy, chemicals, machineries, and equipment. Sector 5 includes beverages, tobacco, manufactured food items, and crude materials. The rest of agriculture comprises the sixth sector, while services is represented by Sector 7.

There are two variable factors, labour and capital, each assumed to be homogeneous. There is one aggregate consumer who has a Cobb-Douglas utility function defined on all the seven goods and services of the model. The production functions of the model are also Cobb-Douglas. The model was calibrated with Philippine economic data in 1978.

In Table 1 we summarize the key policies and policy parameters of the model. Except for trade taxes which were estimated by Clarote, we assume the values of parameters of the model, expressing our own views of their likely real-world magnitudes.

Agricultural production levies are respectively 30 and 5 percent in Sectors 1 and 2. These are mostly appropriated by the parastatals. Price ceilings are set equal to corresponding benchmark consumer prices; however no subsidies are paid at such prices. In the counterfactual policy experiments, where market prices may deviate from such ceilings, subsidies would be paid and inefficiencies are induced by price controls. The import quotas are
TABLE 1  
Policies and Policy Parameters of the Model

<table>
<thead>
<tr>
<th>Sector</th>
<th>Key Policies</th>
<th>Key Policy Parameters</th>
</tr>
</thead>
</table>
| 1      | production tax, export tax, state trading | \( \tau = 30\%; \ t = 5\%; \)  
          |                                       | \( \beta = 75\% \)           |
| 2      | price ceiling, export tax            | \( \tau = 5\% \)            |
          |                                       | \( p = \text{benchmark} \)  
          |                                       | consumer price; \( t = 3\%; \)  
          |                                       | consumer subsidy = 0; \( \beta = 1 \) |
| 3      | price ceiling, export tax            | \( p = \text{prevailing benchmark} \)  
          |                                       | consumer price; \( t = 3\%; \)  
          |                                       | consumer subsidy = 0           |
| 4      | tariffs, QRs                         | \( t = 23\%; \ QR \text{ binding}; \)  
          |                                       | \( Q = \text{benchmark net import}; \)  
          |                                       | \( \mu = 4\% \)               |
| 5      | tariffs, QRs                         | \( t = 62\%; \ QR \text{ binding}; \)  
          |                                       | \( Q = \text{benchmark net import,} \)  
          |                                       | \( \mu = 12\% \)               |
| 6      | no distortions                       | -                           |
| 7      | no distortions                       | -                           |

Notations: \( \tau \) - production tax rate; \( \beta \) - parastatal monopsony profit; and \( t \) - trade tax rates; \( p \) - price ceiling; and \( \mu \) - import premium rate
also set equal to the corresponding base year imports. The premium values associated with such restrictions are assumed equal to 4 and 12 percent respectively for industrial importables and import substitutes as in Clarete and Whalley.

IV. Welfare Cost Estimates of Protection Policies

We made the following policy experiments with the model to estimate the welfare cost of industrial and agricultural policies of the Philippines: (a) the removal of tariffs, QRs, and of tariff and QRs taken together; (b) the removal of export taxes, production taxes, parastatals, price controls, and of all such agriculture-related policies; and (c) the lifting of both industrial and agricultural policies. We use the Hicksian equivalent variation of income in measuring the welfare cost of policies. Given a homothetic utility function, the equivalent variation of income as a percent of benchmark income gives the percentage change of the utility index of the aggregate consumer in the model.

Table 2 shows the results of our counterfactual experiments. Lifting tariffs results in a welfare loss equal to 1.45 percent of the benchmark income. This is because this policy change increases the rents associated with QRs, and given competitive rent seeking induces more resources to be diverted to unproductive activities. However if QRs are removed, while tariffs are in place, economic welfare improves by 1.68 percent.

Taken together, tariffs and QRs account for a welfare cost of about 4.91 percent of benchmark income, which is relatively large compared to other estimates of the welfare cost of trade policies computed with other types of models (e.g. see Boardway and Treddennick; Hamilton and Whalley). One reason
for this is that other models only addressed tariff policies, while here
tariffs, QRs, and associated rent seeking are jointly considered. As pointed
out by Clarete and Whalley, another reason is that the model here tends to
produce larger welfare cost estimates of trade policies because of homogenous
products; in contrast the other models are mostly of the Armington type where
imports are qualitatively different from competing domestic products and yield
smaller magnitudes of economic waste for comparable policy regimes. Our
welfare cost estimate underscores the centrality of trade policies to overall
economic performance of the Philippines, a point that is often made by
Philippine policy analysts (e.g. see Bautista and Power; Alburro and Shepherd;
Power and Sicat; and de Dios).

The removal of export taxes implies an economic waste of about 0.14
percent of income. The economic intuition behind this is that the surge in
exports following the lifting of export taxes is stymied by the industrial
protection structure which inhibits imports and encourages rent seeking in the
import sectors (Clarete and Whalley). Import restrictions create a surplus in
external payments which, to restore equilibrium, requires an appreciation if
the exchange rate, which in turn implicitly taxes exports. On the other hand,
the export liberalization causes incomes and the demands for importables to
rise. This increases the premium value of imports due to QRs and accordingly
enlarges the rents to be wasted in rent seeking activities.

Parastatals in agriculture imply a deadweight loss of about 1.16 percent
of income; and removing production taxes results in an efficiency loss equal
to .04 percent of income. These are relatively small numbers, which may be
Table 2
Welfare Costs of Industrial And Agricultural Protection
Policies of the Philippines
(measured as Hicksian equivalent variation as a percent of benchmark income)

**Policy Change**

**Industrial Policies**

<table>
<thead>
<tr>
<th>Policy Change</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tariffs Removed</td>
<td>-1.45</td>
</tr>
<tr>
<td>Quotas Removed</td>
<td>1.68</td>
</tr>
<tr>
<td>All Industrial Policies</td>
<td>4.91</td>
</tr>
</tbody>
</table>

**Agricultural Policies**

<table>
<thead>
<tr>
<th>Policy Change</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export Taxes Removed</td>
<td>-0.14</td>
</tr>
<tr>
<td>Production Taxes Removed</td>
<td>-0.04</td>
</tr>
<tr>
<td>Parastatals Removed</td>
<td>1.16</td>
</tr>
<tr>
<td>Price Controls Removed</td>
<td>0.00</td>
</tr>
<tr>
<td>All Agricultural Policies</td>
<td>0.94</td>
</tr>
</tbody>
</table>

**Industrial and Agricultural Policies Removed**

<table>
<thead>
<tr>
<th>Policy Change</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policies Removed</td>
<td>7.92</td>
</tr>
</tbody>
</table>
due to the relatively inelastic supply functions of agriculture-based outputs. Lifting price controls has no effect on welfare since they are redundant policies.

Agricultural policies (export taxes, production taxes, parastatals, and price controls) induce economic waste equal to close to one percent of income. This is sharply small relative to the deadweight loss associated with industrial policies. These numbers indicate that the trade/industrial policies are more serious concerns than agricultural policies, at least as far as the Philippines is concerned.

While this result can partly be traced to model specification and parameterization, there are economic arguments for it. First, the deadweight losses of agricultural policies are small because of price inelasticities of supplies and demands in agriculture compared to industry. Secondly, since most exports are agricultural-based, agricultural liberalization tends to increase exports and incomes. Given industrial protection through import QRs, this puts more pressure on import rationing and increases import premia and their associated economic waste through rent seeking. For example, rents increased by 67 percent with agricultural liberalization. Third, the surge in exports leads to an appreciation of the exchange rate and thus introduces implicit export taxes. Thus, the efficiency gains with agricultural reforms are offset by induced economic inefficiencies via the industrial protection structure. For example, removing industrial policies results in a 4.91 percent improvement in economic welfare; but with agricultural reforms, the package of liberalizing measures implies a total welfare gain of 7.92 percent of income, underscoring the negative interaction which agricultural liberalization has with a protective industrial/trade policy regime.
The policy implication which comes out of this paper is that agricultural policy liberalization without accompanying liberalization of foreign trade regimes may induce additional waste due to increased rent seeking elsewhere in the economy. In fact, agricultural policy reforms can indirectly promote industry by increasing domestic prices of importables and lowering the prices of exportables. In our view, this result is extremely useful in designing structural adjustment programs in LDCs.

V. Concluding Remarks

In this paper, we designed and calibrated a numerical general equilibrium model of the Philippine economy for evaluating industrial/trade and agricultural policies. In particular, we were interested in comparing the relative welfare cost of agricultural and industrial protection policies of the Philippine economy associated with the previous Philippine government. These are the broad themes which came out of this study. First, industrial/trade policies have larger economic waste relative to agricultural policies. Secondly, that agricultural policy liberalization without accompanying liberalization of foreign trade regimes can result in relatively small gains in economic welfare because of countervailing induced industrial protection via higher import premia and exchange rate appreciation.
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