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Interactions between the Trade Policies and Domestic Distortions: The Philippine Case

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and

John Whalley

This paper contains preliminary findings from research work still in progress and should not be quoted without prior approval of the author.
INTERACTIONS BETWEEN THE TRADE POLICIES AND DOMESTIC DISTORTIONS:
THE PHILIPPINE CASE

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I Introduction

In this paper we explore the interaction of trade policies with other domestic distortions in a small-open economy numerical general equilibrium model of the Philippines. The purpose of the exercise is to both highlight and explore the ways in which domestic distortions in developing countries can change the traditional analysis of such trade policies as tariffs. The domestic distortions we focus on are rent-seeking activities associated with import quotas, and those involved with rural-urban migration processes.

While the impacts of these distortions have been explored in theoretical literature (Krueger, 1974; Bhagwati and Srinivasan, 1974; 1980), the quantitative dimension of their links to trade policies have not been explored in a numerical general equilibrium model. The theme that emerges from our results is that quantitative as well as qualitative analysis of these interactions is needed when discussing trade policy issues in developing countries. In turn, existing numerical models need to incorporate more fully those distinctive yet important institutional arrangements in these countries which are usually excluded from theoretical work, since their presence can change the perceptions one has as to what might be an appropriate policy stance.

In Section II, we describe the structure of the basic model. We then expand the discussion of the model in Section III to include quantitative trade barriers, rent seeking, and Harris-Todaro type labor market distortions. In Section IV, we discuss how the model is calibrated to Philippine data for 1978, and in Section V we report the main numerical results from our model experiments. We summarize the paper in Section VI.
II The Basic Model

The applied general equilibrium model used here to represent the Philippines is that of a competitive small-open economy. The model follows the Shoven-Whalley approach to applied general equilibrium analysis (Shoven and Whalley, 1984). An Arrow-Debreu model of an economy is specified and calibrated to a benchmark equilibrium dataset; a fixed-point algorithm (e.g., Merrill, 1972; Broadie, 1983) is then used in solving for equilibrium prices for counterfactual situations.

The main point of departure in the present paper relative to earlier applied modelling efforts (see Shoven and Whalley, 1984) is the explicit modelling of a small-open economy. Several features make the model especially suitable for analyzing trade and other policies in small developing countries. The price-taking behavior of these countries which has hitherto been assumed only for imports (e.g., see Dervis, de Melo, and Robinson, 1982) is broadened here to include exports as well. We treat imports as perfect substitutes for comparable domestic products, as in theoretical trade models. The model thus avoids using the Armington assumption, common in other applied general equilibrium trade models.

The model specification also explicitly introduces parameters which directly determine output supply elasticities. These parameters, which are omitted in other applied models of developing countries, enter here through factors which are imperfectly mobile across industries. This situation is quite typical in developing countries where factor markets are less developed and integrated than in the developing world.

As in Clarete and Roumasset (1985), the model consists of N sectors producing T trade goods and NT homegoods, where N = T + NT. World prices are given for traded goods. Each producer uses K variable factors and a fixed factor in production.
Production in each industry is represented by a Cobb-Douglas value-added function defined on both the variable and the sector-specific factors. Denoting $X_j$ as the output of sector $j$, $F_{ij}$ as sector $j$'s use of the variable factor $i$, and $Z_j$ as the fixed factor in sector $j$, these functions can be written as:

$$X_j = B_j \frac{K}{\prod_{i=1}^n F_{ij}} \left( \frac{1-\theta_j}{\theta_j} \right) Z_j$$

where $\theta_j$ and $\alpha_{ij}$ are Cobb-Douglas exponents, and $B_j$ is a units parameter. Intermediate inputs enter production in fixed proportion to output, denoted by the coefficients $a_{ij}$, representing the requirement of good $i$ in producing one unit of good $j$.

Under profit-maximization, the supply function corresponding to (1) is:

$$X_j = \left[ B_j p_j \frac{K}{\prod_{i=1}^n (\alpha_{ij}/w_i)} \right]^{1/(1-\theta_j)} \left( \frac{1}{\theta_j} \right) Z_j$$

where $p_j$ and $w_i$ are the domestic prices of good $j$ and factor $i$ respectively. The price elasticity of supply for good $j$ is $\theta_j/(1-\theta_j)$. Since $\theta_j$ is the total share of variable factors in the value added originating in sector $i$, the supply of good $j$ is more elastic the more important the variable factors are relative to the fixed factor.

From a modelling perspective, supply elasticities introduced in this way through sector-specific factors also provide a natural strategy of avoiding the problem of complete specialization when modelling small countries. As is well known from trade theory, this problem can easily
occur in a Samuelson trade model which has more traded goods than factors. Moreover, even if absent in a base case equilibrium, a small shift in policy can lead to a large and discrete supply response possibly producing complete specialization. By making supply curves rise through factor specificity, these problems are removed.

In the model, the return to sector-specific factors is obtained by deducting total intermediate and factor costs from total sales. Denoted by M, this amount is:

\[
M = \sum_{j=1}^{N} p_j X_j - \sum_{j=1}^{N} \sum_{i=1}^{K} w_{ij} F_{ij} - \sum_{j=1}^{N} \sum_{i=1}^{a_{ij}} p_{aij} X_{ij}.
\]

Since the consumer sector is endowed with these sector specific factors, the rent accruing to these factors appear as part of household income.

Consumer demands are also assumed to be Cobb-Douglas, with the demand for good \( j \) given by:

\[
C_j = \gamma_j Y / p_j
\]

where \( Y \) is the total household income, and \( \gamma_j \) is the share of commodity \( j \) in total expenditures.

Since the model includes homegoods and internationally immobile factors, an equilibrium solution must include the relative price between tradables and nontradables. In a small-open economy without homegoods, the given world prices fully characterize a domestic equilibrium. Any excess demands are absorbed by the much larger rest of the world, and trade balance is satisfied by Walras' Law. But in the presence of non-traded goods, the relative price between tradables and non-tradables is
endogenous. In equilibrium, any excess demands for non-tradables must be fully absorbed domestically by appropriate adjustments of their prices relative to those of traded goods.

The relative price of traded and non-traded goods is calculated using the Hicks' aggregation theorem (Hicks, 1939; Dievert, 1978) which states that if the prices of a basket of goods are proportional, the goods in the basket can be regarded as one commodity with its own price. As a result, in this framework tradables can be aggregated at their fixed world prices to form a Hicksian composite good. The demand, $C_T$, and supply, $X_T$, of this good are:

\[
C_T = \sum_{j=1}^{T} p_j X_j; \quad \text{and}
\]

\[
X_T = \sum_{j=1}^{T} \frac{1}{p_j (C_j + \text{ID}_j)}
\]

where $p_j$ is the given world price and $\text{ID}_j$ is the total intermediate demand for good $j$, i.e., $\text{ID}_j = \sum_{i=1}^{N} a_{ji} X_i$.

The price of the composite good, $r_T$, is the relative price of tradables and nontradables, or the real exchange rate (Dornbusch, 1973; Dervis, de Melo, and Robinson, 1982; and Whalley and Yeung, 1984). The expenditure on the composite good is $r_T C_T = \sum_{j=1}^{T} \frac{1}{p_j (C_j + \text{ID}_j)}$, and the value of production is $r_T X_T = r_T \sum_{j=1}^{T} \frac{1}{p_j} X_j$. It follows from the Hicks' theorem that the domestic price of tradable good $j$ is $p_j = r_T \bar{p}_j$.

This treatment of the Hicksian composite good closes the external sector of the model. The excess demand function for this aggregate commodity is by definition the total net imports of residents. Thus, in equilibrium, when the market for this commodity clears, trade balance holds, i.e., residents sell enough goods and services to nonresidents to pay for their imports.
Under this treatment, relative domestic prices of traded commodities are equal to the given relative world prices. Because of this feature of the model, larger impacts of changes in trade policies will be produced than using the alternative Armington (1969) assumption which regards imports and domestic products as imperfect substitutes for each other. The latter approach fails to fully transmit trade-related disturbances to domestic prices, resulting in smaller impacts on consumption and production at home.

In the following section, we expand on this basic model and describe how we incorporate tariffs, quantitative trade barriers, rent-seeking activities, and a Harris-Todaro downward-rigid urban wage into our model of the Philippines. As we add each of these distortions to the model, we indicate how the system of excess demand functions associated with it must be solved to obtain a general equilibrium changes.

III Trade and Domestic Distortions in the Model

To incorporate tariffs into the model, we introduce a government which collects both tariffs and export taxes and redistributes the revenues to the consumer in a lump-sum fashion. Denoting $t$ as the vector of ad valorem tariff rates, where $t_j > (\leq) 0$ if $j$ is an importable (exportable), and $E_j$ as the net import of good $j$, we define the tariff revenue, $TR$, of the government as:

$$ TR = r_t \sum_{j=1}^{T} p_{j} t_{j} E_{j}. $$

A problem encountered in all general equilibrium modelling of distortions is the simultaneity between the revenues generated by distortions and demands (see Shoven and Whalley, 1972). In order to deal with this in the present model, we treat government transfers to consumers, $L$, as endogenous. In any evaluation of consumer demands,
the government distributes $L$ to the consumer, who then calculates his income (consisting of transfers from the public sector and the value of endowments of variables and sector-specific factors). Given this income, the consumer then evaluates his demands, based on which tariff revenues can be computed. In full equilibrium, the income received by the household sector from the government exactly matches the revenues actually collected.

Denoting $Y$ as income and $F_{S_i}$ as the endowment of variable factor $i$,

$$Y = \sum_{i=1}^{K} w_i F_{S_i} + M + L = \sum_{j=1}^{N} p_j C_j$$

where the second equality implies that the household sector spends its entire income, satisfying Walras' Law.

The excess demand system characterizing the model is derived as follows. Substituting (3), (5), and (6) into (7), we obtain:

1. $(C_j + D_j - X_j)$ for all home goods;
2. $(F_i - F_{S_i})$ for all variable factors;
3. $(C_T - X_T)$ for the composite traded good; and
4. $(TR - L)$ for government revenues. If all these excess demands equal zero, an equilibrium for the model will have been found. There are as many excess demands to be solved as there are prices of home goods and variable factors plus two; an equal number of endogenously determined prices and excess demands. Such an equilibrium can easily be found using a fixed-point or other algorithm.

Besides tariffs, non-tariff barriers also appear in the model. Import quotas are commonly imposed in developing countries both as a short-term response to disturbances in the current account, and also as a way of protecting domestic industries from foreign competition. During periods of rising world prices for important exportables where
domestic prices are controlled by the government, exports of these commodities are typically restricted to meet domestic shortages, through export bans and other devices.

In the present model, only import quotas are explicitly included since these are quantitatively more important in the Philippine case than export controls. We assume that the government imposes binding quotas on imports through a licensing system. Under these arrangements, importables become more expensive due to the scarcity induced by the quota system. Inefficiencies result as producers allocate more resources to produce more import-substitutes, while consumers reduce their demands for importables in response to higher prices. The economic rents created accrue to producers who sell these importables to consumers at a premium.

To incorporate import quotas in the model, we require that importers purchase a license from the government for every unit of quota restricted imports they bring into the country. We assume that there is a market for licenses for each restricted importable good. Importers demand licenses, while the government supplies a fixed amount of licenses equal to the permitted quota. The cost of a license reflects the scarcity premium consumers are willing to pay for the importable. The proceeds to the government from selling licenses to importers define revenues from the quota system and are part of total income. Denoting $\bar{q}_j$ as the level of quota on import $j$, and $T'$ as the set of tradables with binding quotas, the revenues from quotas are defined as:

$$QR = \sum_{j \in T'} \left( p_j - \bar{r}_j \bar{p}_j (1 + t_j) \right) \bar{q}_j.$$  

(8)  

The inclusion of import quotas in the model in this way introduces one additional excess demand function for each restricted importable. Under
the quota system, the excess demands for restricted importables are absorbed by the rest of the world only to the extent permitted by the quota. Thus, the domestic prices of these goods must be adjusted until the domestic supply and the quota match the domestic demand in these markets, or until an equilibrium import premium (the equilibrium price of the import license) is found. Thus, for all tradables with binding trade quotas, \( C_j + D_j - X_j - \bar{F}_j \) must equal zero in equilibrium.

The excess demand functions above involving the composite good and tariff revenues are also slightly modified. Since the country can only import up to what is allowed by the quota, the balance of payment equilibrium condition becomes 
\[
C_T - X_T + \sum_{j \in T} \bar{P}_j (\bar{Q}_j - E_j) = 0.
\]
Similarly, the condition for a balanced public sector budget becomes:
\[
QR + r_T \sum_{j \in T} \bar{P}_j t_j (\bar{Q}_j - E_j) - L = 0.
\]

The above model extension assumes that import quotas are auctioned by the government, implying that economic rents from import licensing are income transfers among agents in the economy, and generate no economic waste from rent seeking. However, in our modelling approach we also feature rent-seeking activities and assume that import licenses are allocated through administrative discretion.

Competitive rent-seeking activities are known to be a significant source of economic inefficiency (Krueger, 1974). These activities use real resources to seek out rights to quotas and other rent-generating licenses. If perfect competition is assumed, agents will use real resources to acquire licenses until the amount of rents generated by them is dissipated by the cost of rent seeking. Resources used in rent seeking produce no incremental output and are thus wasted.
The amount of this waste depends on how the rent-seeking activity is specified. Little is known about the extent of rent seeking in practice, and about how it actually takes place in developing countries. Not all economies that use quotas necessarily exhibit large degrees of rent seeking. The popular perception seems to be that rent seeking is widespread in South Asia, but less prevalent in Latin America despite their widespread use of quotas. The claim often-made is that Latin American countries have monopoly importers, and so competition for licenses is largely excluded.

The conventional approach in empirical work thus far on rent seeking and trade policy has been to follow Krueger's assumption of full and competitive rent seeking (e.g., Mohammad and Whalley, 1984; Hamilton, Mohammad and Whalley, 1984; Blomqvist and Mohammad, 1984). Under this approach, factors are drawn from economically productive uses and devoted to unproductive rent seeking until the rents are dissipated.

Following Hamilton, Mohammad and Whalley (1984), the version of our model of the Philippines which incorporates rent seeking assumes that the value of resources used in rent seeking is proportional to the value of rents created, with the proportion reflecting the relative economy-wide endowments of each factor input. Factor demands include both the amounts of factors used productively, and those employed in rent seeking. Denoting $FRS_i$ as the amount of variable factor $i$ allocated for rent seeking,

$$ (9) \quad FRS_i = \frac{K}{\sum_{i} w_i F_i} \cdot QR. $$

Accordingly, the excess demand function for variable factor $i$ becomes $(F_i + FRS_i - F_i)$. The income of the consumer excludes rents from quotas which are lost in rent seeking.
A final feature which we incorporate in extending our basic model is the presence of rural-urban migration, widely observed in developing countries. A predetermined rural-urban wage differential is often thought to explain the phenomenon (Harris and Todaro, 1970).

In response to a higher wage in urban sectors, labor migrates from rural areas to the cities until the expected urban wage, i.e., the urban wage multiplied by the probability of being employed in the city, is equal to the free-market wage in rural sectors. Letting \( \rho \) be the urban employment rate, \( (1/\rho) \) workers will move and compete for every job offered in the city.

In this model formulation, the total labor endowment of the economy (including those unemployed) is valued at the free-market wage in the rural sector, since all migrants expect to receive at least the rural wage while employed in the urban sector. Denoting UR and RL as the sets of industries in urban and rural sectors respectively, the superscripts U and R as urban and rural, and L as labor,

\[
(10) \quad \sum_{i \in \text{EUR}} w^U_{L_i} + \sum_{i \in \text{RL}} w^R_{L_i} = w^R_L.
\]

Since \( w^U_L = \frac{R}{L} \), and \( \rho = \frac{\sum_{i \in \text{EUR}} L_i^U}{\sum_{i \in \text{EUR}} L_i^U + \text{UE}} \), where UE stands for the unemployed labor in the urban areas, the total wage bill can be restated as: \( \frac{R}{L} (\sum_{i \in \text{EUR}} L_i^U + \sum_{i \in \text{RL}} L_i^R + \text{UE}) \). Hence the excess demand function for labor is \( (LD + UE - L) \), where LD is total productively employed labor. This excess demand function must include any amount of labor used in rent seeking. In determining an equilibrium in this model formulation, the rural wage is adjusted to clear the labor market.

With these modifications, our basic model can therefore be extended to incorporate a series of institutional arrangements common in developing countries and each potentially important to the evaluation
of impacts of trade policies. These extensions to the model allow us to consider how these factors, either singly or cumulatively, interact with more traditionally analyzed trade policies (such as ad valorem tariffs and export taxes) to either modify or amplify the effects usually associated with these distortions.

IV. Applying the Approach to Philippine Data

We have applied the model outlined in the previous two sections to Philippine data to investigate the strength of interactions between trade policies and domestic distortions in the Philippine case. We have calibrated the model to a Philippine benchmark equilibrium data set for 1978 and performed counterfactual equilibrium analysis for a range of policy changes, following the procedures described in Mansur and Whalley (1984) and in Shoven and Whalley (1984). In so doing, as we noted earlier, we treat the Philippines as a small-open, price-taking economy in both its exports and imports.\(^1\) In our analysis, the trade policies we focus on are tariffs, export taxes, and import licensing.

The main thrust of Philippine post-war trade policies has been to promote import-competing industries at the expense of agriculture-based, export-oriented industries. Based on the Philippine Tariff Code,\(^2\) a basic revenue rate of 10 percent applies to all imports. Besides this, incremental rates up to a maximum of 100 percent are also imposed on certain imports in order to protect domestic industries. A basic

\(^1\)Although the Philippines is the world's largest exporter of coconut products, it has little monopoly power in coconut trade because of several coconut substitutes (see Clarete and Roumasset, 1984).

\(^2\)This Code was applicable in 1978, the benchmark year we use. Since 1980, however, the Philippine government has been liberalizing its tariff policies.
4 percent tax is collected on all exports. Additional taxes up to 10 percent are added to the basic rate in the case of some exports to promote domestic processing of primary and agricultural products, such as copra. Tariffs and export taxes accounted for a quarter of the total public revenue in 1978.

In addition to tariffs, import licensing applies to most non-essential consumer goods. Prior approval by the Central Bank of the Philippines is required to import these items. The goods falling under this category account for 670 out of approximately 3,500 items listed in the country's tariff schedule. A few intermediate goods are also subject to import licensing, but most of these are inputs into export production. There are no studies estimating the import premium values created by the import licensing system in the Philippines, and as a result we assume alternative plausible values of import premia in our benchmark data and conduct sensitivity analysis around these parameter values.

Following Clarete (1984), we represent the Philippine economy by seven productive sectors: three exportables, two importables, and two homegoods. Table 1 lists these sectors along with some of the key industries included in each. Exportables are commercial crops, agricultural food industries, and industrial exportables. The importables include industrial importables, consisting mainly of producer goods, and import-substitutes. Other agricultural products and services are non-traded. Two variable factors are specified; labor and capital. The aggregate supply of each is assumed to be fixed.

We have assembled three benchmark equilibrium data sets for 1978, one for each of three characterizations of the Philippine economy used in our analysis. In Case I, rent seeking and Harris-Todaro features in
### Table 1

**Sectors Specified in the Philippines Model**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Representative Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Crops</td>
<td>Copra, Sugarcane, Bananas</td>
</tr>
<tr>
<td>Agricultural Food Industries</td>
<td>Grains, Poultry, Livestock, Fisheries</td>
</tr>
<tr>
<td>Industrial Exportables</td>
<td>Coconut oil, Centrifugal sugar, Logs and lumber, Copper milling</td>
</tr>
<tr>
<td>Industrial Importables</td>
<td>Petroleum, Chemicals, Machinery and Equipment</td>
</tr>
<tr>
<td>Other Industrial Sectors (including import substitutes)</td>
<td>Beverages, Tobacco, Food, Crude materials.</td>
</tr>
<tr>
<td>Rest of Agriculture Services</td>
<td>Agricultural Services</td>
</tr>
<tr>
<td></td>
<td>Wholesale and retail trade, Educational, Medical</td>
</tr>
</tbody>
</table>
labor markets are excluded, but tariffs and export taxes are present. Case II introduces rent-seeking activities associated with import licensing. Both rent seeking and Harris-Todaro features are included in Case III.

In Table 2, we summarize the policy parameters used for each of these three cases. The tariff and export tax rates are trade-weighted averages of the respective industry rates. Industry rates are averages over commodity specific rates listed in the Tariff Code. Thus, the industrial importables have an ad valorem tariff rate equal to 23 percent, and import-substitutes face a rate of 62 percent. The export tax rates for commercial crops, agricultural food industries, and industrial exportables are set respectively at 5, 3, and 3 percent. The values assumed for import premia associated with quotas are 5 and 20 percent for industrial importables and import-substitutes respectively. We also assume that the quotas are binding in the benchmark equilibrium and, hence, are equal to the observed 1978 imports; namely 16,261 million pesos of industrial importables and 2,187 million pesos of import-substitutes. Rent-seeking activities are assumed to completely dissipate all the rents generated by the import licensing system.

We use the Philippine employment data reported in Canlas et al. (1984) in specifying the rural-urban wage differential for the model variant with the Harris-Todaro labor market structure. In 1978, 0.8 million people or 5.2 percent of the country's labor force were unemployed. Another 1.5 million individuals were estimated to be underemployed. Of those employed in 1978, 52.9 percent were in
Table 2
Description and Policy Parameters Used In
Three Alternative Model Specifications

<table>
<thead>
<tr>
<th>Model Variant</th>
<th>Description</th>
<th>Policy Parameters Used in Model Base Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Excludes import quotas, rent seeking, and Harris-Todaro labor market distortion</td>
<td>Export Taxes: 5, 3, and 3% (Sectors 1, 2, and 3); Tariffs: 23 and 62% (Sectors 4 and 5)</td>
</tr>
<tr>
<td>II</td>
<td>Includes quotas and rent seeking but excludes Harris-Todaro labor market distortion</td>
<td>Export Taxes: 5, 3, and 3% Tariffs: 23 and 62%; Import Premia: 5 and 20% (Sectors 4 and 5); Quota Levels: 16,361 and 2,187 million pesos; Rent seeking: 100%</td>
</tr>
<tr>
<td>III</td>
<td>Includes quotas, rent seeking, Harris-Todaro labor market distortion</td>
<td>Export Taxes: 5, 3, and 3% Tariffs: 23 and 62%; Import Premia: 5 and 20%; Quota Levels: 16,361 and 2,187 million pesos; Rent seeking: 100%; Rural-urban wage differential: 72%</td>
</tr>
</tbody>
</table>
agriculture, 19 percent were in industry, and 28.1 percent were in the service sectors. Using these data, we estimate this differential to be 72 percent.

In our calculations, we assume that both unemployed and underemployed labor are all in the urban areas and that industry and services are exclusively urban activities. These assumptions imply that the urban-employment rate is equal to the rural-urban differential in the benchmark equilibrium. The urban sectors in the model are the industrial exportables, industrial importables, import-substitutes, and services.

The policy parameters reported in Table 2 are combined with other data from Clarete (1984) to assemble the benchmark equilibrium data sets for our three model variants. We use these information in calibration to determine the parameters of the production and demand functions, which, in turn, are used in our counterfactual equilibrium analyses.

V. **Empirical Results**

We have performed a series of policy experiments for each of the three calibrated model variants listed in Table 2. These experiments, undertaken separately, include the removal of all tariffs, of both tariffs and export taxes, of import quotas, of all trade distortions (tariffs, export taxes, and quotas) and of both trade and Harris-Todaro labor market distortions. The resulting counterfactual equilibria are then compared to the benchmark equilibrium data set of the relevant model variant. The associated deadweight loss is calculated using the equivalent variation of income.
In Table 3 we report the equivalent variation of income expressed as a percentage of national income associated with policy changes for all three model variants. Tariffs and export taxes in model variant I cause a deadweight loss of 3.4 percent of national income. The same trade distortions interacting with import quotas and rent-seeking activities cost 5.2 percent of total income. Finally, if the Harris-Todaro labor market distortion is also accounted, the resulting economic inefficiency of all these distortions taken together is 10.3 percent of national income.

These results suggest that interactions of trade policies with the domestic distortions featured in this study increases the economic loss of these policies significantly. The joint loss from import licensing and tariffs and export taxes exceeds that from tariffs alone because of rents dissipated in rent seeking. Perhaps more interestingly, tariff policies encourage rural-to-urban migration by promoting production of import-subsidies based in the cities. This results in additional economic waste through higher urban unemployment.

In model variants II and III, the equivalent variation of income from removing tariffs in the presence of rent seeking is -1.5 percent of national income, i.e., the economy is worse off. Removing tariffs in the presence of rent seeking increases the economic rents associated with import quotas, which in turn, are wasted in rent seeking. Without tariffs, the premium values of import quotas increase, and consequently, the economic rents competed away through unproductive rent seeking are larger. However, the real exchange rate depreciates in order to eliminate the trade deficit induced by the removal of tariff policies, decreasing the rents from import quotas. Based on these results, the net effect of removing tariffs is to leave the economy worse off.
Table 3
Welfare Effects of Trade Policy Experiments
With Three Model Variants: Philippine Data for 1978
(Equivalent Variations as a Percent of National Income)  

<table>
<thead>
<tr>
<th>MODEL VARIANT</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>TARIFFS REMOVED:</td>
<td>3.3</td>
<td>-1.5</td>
<td>-1.5</td>
</tr>
<tr>
<td>Equivalent Variation as % of National Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TARIFFS/EXPORT TAXES REMOVED:</td>
<td>3.4</td>
<td>-1.6</td>
<td>-1.6</td>
</tr>
<tr>
<td>Equivalent Variation as % of National Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMPORT QUOTAS REMOVED:</td>
<td>---</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Equivalent Variation as % of National Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TARIFFS/EXPORT TAXES/IMPORT QUOTAS REMOVED:</td>
<td>---</td>
<td>5.2</td>
<td>5.2</td>
</tr>
<tr>
<td>Equivalent Variation as % of National Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREE TRADE AND HARRIS-TODARO WAGE DIFFERENTIAL REMOVED:</td>
<td>---</td>
<td>---</td>
<td>10.3</td>
</tr>
<tr>
<td>Equivalent Variation as % of National Income</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTES: 1. See Table 2 for description of model variants.
2. Equivalent variation of income is expressed as a percentage of benchmark national income.
Lifting export taxes also increases the premium values of import quotas and, in the presence of rent seeking, reduces overall welfare. In model variants II and III, the equivalent variation of income changes from -1.5 to -1.6 percent of national income as export taxes are lifted following the removal of tariffs while rent seeking is in place. This effect operates through the real exchange rate which appreciates to correct the trade surplus induced by lifting export taxes, and thus, causes import premia to increase.

Results from model variants II and III are similar, except when the Harris-Todaro distortion is removed. This is because the third model variant is calibrated to the same benchmark equilibrium data on production and prices as the second model variant. The rural-urban wage differential of model variant III implies that labor employed in urban-based sectors are more productive, displacing surplus urban labor to maintain the same level of production as in model variant II. Thus, given the way these model variants are calibrated, their results are similar unless the displaced and idle labor are productively reemployed.

The extent to which rent seeking and the Harris-Todaro labor market distortion increase the deadweight losses of tariffs and export taxes depends on the assumed sizes of the premium values and the rural-urban wage differential. To investigate this, we have also performed sensitivity analysis around the import premium parameter of model variant II.

We have increased the benchmark premium value associated with quotas on import substitutes from 20 percent to 50 and 100 percent, holding
the premium of industrial importables at 5 percent. Models II, II-A, and II-B in Table respectively correspond to each of these assumed import premia. The results of these analyses are reported in Table 4.

With free trade the economy improves its welfare; and this improvement is larger the higher the benchmark import premium. The equivalent variation of income from removing tariffs and import quotas is 5.2 percent of national income in model variant II, implying a welfare improvement. This gain becomes progressively larger in model variants II-A and II-B.

As already noted above, removing tariffs increases the premia generated by import quotas. However, these premia fall as the real exchange rate depreciates to eliminate the trade deficit caused by the removal of tariffs. The negative estimates of the equivalent variation of income in Table 4 indicate that the net effect of removing tariffs in the presence of quotas and rent seeking is likely to leave the economy worse off, confirming the same observation in Table 3.

Interestingly, the higher the import premium in the benchmark data, the less worse off the economy is in the absence of tariffs. The equivalent variation of income is −1.5 percent in model variant II, −1.4 percent in variant II-A, and −1.3 percent in II-B. The explanation seems to be that the marginal increase in import premia following the lifting of tariffs is smaller the larger are the base case import premia, largely because the real exchange rate depreciates less with larger import premia. After tariffs are lifted, the real exchange rate depreciates from its benchmark equilibrium value of
Table 4
Sensitivity of Welfare Effects of Trade Policy Experiments With Model Variant II to Alternative Benchmark Import Premium Values
(in million pesos)

<table>
<thead>
<tr>
<th>MODEL VARIANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
</tr>
<tr>
<td>TARIFFS REMOVED:</td>
</tr>
<tr>
<td>Rents from Quotas</td>
</tr>
<tr>
<td>Equivalent Variation (%)</td>
</tr>
<tr>
<td>TARIFFS/EXPORT TAXES REMOVED:</td>
</tr>
<tr>
<td>Rents from Quotas</td>
</tr>
<tr>
<td>Equivalent Variation (%)</td>
</tr>
<tr>
<td>IMPORT QUOTAS REMOVED:</td>
</tr>
<tr>
<td>Rents from Quotas</td>
</tr>
<tr>
<td>Equivalent Variation (%)</td>
</tr>
<tr>
<td>TARIFFS/EXPORT TAXES/IMPORT QUOTAS REMOVED (Free Trade):</td>
</tr>
<tr>
<td>Rents from Quotas</td>
</tr>
<tr>
<td>Equivalent Variation (%)</td>
</tr>
<tr>
<td>BENCHMARK EQUILIBRIUM</td>
</tr>
<tr>
<td>National Income</td>
</tr>
<tr>
<td>Rents from Quotas</td>
</tr>
</tbody>
</table>

NOTES: 1. The values of import premia on import substitutes in the benchmark are 20% for Variant II; 50% for Variant II-A; and 100% for Variant II-B. The premium on industrial importables is 5% for all three model variants.

2. Equivalent variation of income is expressed as a percentage of benchmark national income.
1.0 to 1.13 in model variant II, to 1.09 in model variant II-A, and 1.02 in model variant II-B (not reported in Table 4). Correspondingly, rents from quotas increase by 5,437 million pesos in model variant II, 5,264 million pesos in model variant II-A, and only 4,902 in model variant II-B.

Table 4 also confirms the welfare-worsening effect of removing export taxes in the presence of import licensing and rent seeking. The estimates of the associated equivalent variation of income are also all negative, implying a welfare loss. As discussed above, lifting export taxes yield real exchange rate appreciation and consequently, increases the import premia.

Results discussed in this section therefore suggest that not only do trade policies interact strongly with domestic distortions in this model of the Philippines, but these interactions produce important sensitivity behavior of results with respect to key parameter values.

VI. Conclusion

This paper reports on results obtained from a price-taking open economy numerical general equilibrium model of the Philippines. The purpose is to explore the ways in which trade policies and other domestic distortions interact in a small-open developing economy. We extended the basic Philippine model, due to Clarete (1984), to incorporate nontariff trade barriers, rent seeking, and a Harris-Todaro labor market distortions with urban unemployment.

The model we used differs from those used elsewhere in the applied general equilibrium literature. In addition to featuring
explicitly price-taking behavior, rather than making all prices fully endogenous, this model specifies homogenous products across countries instead of heterogeneous (as under the Armington assumption). Sector-specific factors in each sector are incorporated in order to bound production responses. Lastly, the Hicks composite commodity theorem is used in closing the external sector of the model. We believe that these modifications yield a more realistic modeling approach for small developing countries, and one which is easier to implement than existing approaches.

The results reported here clearly indicate that interactions between trade policies and other domestic distortions are significant. An interesting result is that in the presence of import quotas and rent seeking, removing tariffs (even for a small-open price-taking economy) is typically welfare worsening. This is because in the presence of quotas, tariffs serve to reduce quota values and hence lower the costs of rent seeking. Thus, removing tariffs is typically undesirable. Even the lifting of export taxes has the same effect since the real exchange rate appreciates, increasing the premium value from quotas. The social cost of trade distortions (including quotas) in the presence of rent seeking and the Harris-Todaro labor market distortions is approximately double their cost when these factors are ignored. The lesson would seem to be that these interactions need to be considered more fully in numerical trade policy analysis for developing countries.
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