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INTERACTIONS BETWEEN TRADE POLICIES AND DOMESTIC DISTORTIONS IN A SMALL OPEN DEVELOPING COUNTRY

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This paper reports results from a price-taking open economy numerical general equilibrium model of the Philippines whose purpose is to explore the ways in which trade policies and other domestic distortions interact in a small open developing economy. The trade policies featured in the model include tariffs, export taxes, and import quotas, while the domestic distortions considered are rent seeking, and Harris–Todaro labour market dualism. Results clearly indicate that interactions between trade policies and other domestic distortions are significant, and need to be more fully considered in numerical economic policy analyses for developing countries.

1. Introduction

In this paper we explore the interaction of trade policies with other domestic distortions in a numerical general equilibrium small open economy model of the Philippines. Its purpose is to highlight the ways in which domestic distortions in developing countries can change the traditional analysis of trade policies, such as tariffs. The domestic distortions we focus on are rent-seeking activities associated with import quotas, and sector-specific minimum wages which induce rural–urban migration. While the impacts of these distortions have been explored in the theoretical literature [Krueger (1974), Harris and Todaro (1970)], the quantitative dimensions of their links to trade policies have not been explored in numerical general equilibrium models. Our results suggest that existing numerical models need to more fully incorporate such domestic institutional arrangements when analysing trade policy issues in developing countries since they can change the perceptions one has as to what constitutes an appropriate trade policy stance.

We describe the structure of the basic model in section 2, and incorporate import quotas, rent seeking, and a Harris–Todaro labour market distortion into the model in section 3. In section 4, we describe how the model is

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calibrated to Philippine data for 1978. The interactions explored in this study are discussed in section 5. Section 6 concludes the paper.

2. The basic model

The model of the Philippines used here is a basic Arrow–Debreu model with production, into which domestic distortions and trade policies are incorporated. Following Shoven and Whalley [see Shoven and Whalley (1984)], the model is calibrated to a benchmark equilibrium data set and a fixed-point algorithm [e.g. Merrill (1972), Broadie (1983)] is then used to solve for equilibrium prices under various counterfactual assumptions.

The main point of departure relative to earlier applied general equilibrium modelling efforts is the explicit modelling of a small open economy. Several features make this approach especially suitable for analysing trade and other policies in small developing countries. As in theoretical trade models, we treat imports as perfect substitutes for comparable domestic products, and the model thus avoids using the Armington (1969) assumption, common in other applied general equilibrium trade models. The model specification also explicitly introduces parameters which directly determine output supply elasticities, which enter here through share parameters on industry specific factors of production in industry production functions. Finally, the price-taking behaviour of these countries which has hitherto been assumed only for imports [e.g. see Dervis, de Melo and Robinson (1983)] is broadened here to include exports as well.

The model includes N sectors producing T traded goods and NT non-traded goods; $N=T+NT$. Each industry uses K variable factors and an industry-specific fixed factor in production. There is one aggregate consumer, and world prices are given for traded goods.[1]

More specifically, production in each industry is represented by a Cobb–Douglas value-added function defined over both variable and 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 $\bar{Z}_j$ as the fixed factor in sector j,

$$X_j = B_j \prod_{i=1}^{K} F_{ij}^{\alpha_{ij}} \bar{Z}_j^{(1-\theta_j)}, \quad \forall j, \tag{1}$$

where $\theta_j = \sum_{i=1}^{K} \alpha_{ij}$, and $\theta_j \geqq 0$. θ_j and α_{ij} are Cobb–Douglas exponents, and B_j is a units parameter.

Intermediate production enters the model through fixed intermediate coefficients, a_{ij}, $i,j=1,2,\dots,N$, defining the use of good i in production of

[1]The structure of the basic model was described in Clarete and Roumasset (1987). However, tariff policies were the only policy distortions incorporated in this earlier work.

one unit of good j. Thus, the demand for input i in sector j, ID_{ij}, equals $a_{ij}X_j$.

Given these production functions, industry supply functions from profit maximization are:

$$X_j = \left[B_j p_j^{\theta_j} \prod_{i=1}^{K} (\alpha_{ij}/w_i)^{\alpha_{ij}} \right]^{[1/(1-\theta_j)]}, \quad \forall j, \tag{2}$$

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 θ_j is the total share of variable factors in value added in sector j, it follows that the supply of good j is more elastic the larger the weight on variable factors relative to the fixed factor. From a modelling perspective, supply elasticities introduced through sector-specific factors provide a natural strategy for avoiding the well-known problems of specialisation in production when modelling the effects of policy changes in small open price-taking economies.

Given any set of world commodity and domestic factor prices, the total return to all sector-specific factors, M, in the model is obtained by deducting intermediate and factor costs from the value of total output, i.e.

$$M = \sum_{j=1}^{N} p_j X_j - \sum_{j=1}^{N} \sum_{i=1}^{K} w_i F_{ij} - \sum_{j=1}^{N} \sum_{i=1}^{N} p_i a_{ij} X_j. \tag{3}$$

Since the consumer sector owns these sector-specific factors, the rent accruing to factor owners appears as part of household income.

For simplicity, consumer demands are assumed to be Cobb–Douglas, with the demand for good j given by:

$$C_j = \gamma_j Y/p_j, \quad \forall j, \tag{4}$$

where Y is the total household income, and γ_j is the share of commodity j in total expenditure.

In a small open economy with no non-traded goods, the given world prices fully characterise a domestic equilibrium. Any excess demands are absorbed by the larger rest of the world, and trade balance is satisfied by Walras' Law. But in the presence of non-traded goods, the prices of non-tradables are endogenously determined, since in equilibrium excess demands for each home good must be zero.

To solve this model for an equilibrium, we therefore utilise the Hicks composite commodity theorem [Hicks (1936), Diewert (1978)], which states that if the prices of a group of commodities are fixed, these goods can be treated as one composite commodity with its own price. Tradables can thus be aggregated using their fixed world prices to form a Hicksian composite good. The domestic demand, C_T, and supply, X_T, of this good are:

$$C_T = \sum_{j=1}^{T} \bar{p}_j(C_j + ID_j) \tag{5}$$

and

$$X_T = \sum_{j=1}^{T} \bar{p}_j X_j,$$

where $\bar{p}_j$ represents the given world prices, and ID_j is the domestic intermediate demand for good j, i.e. $ID_j = \sum_{i=1}^{N} a_{ji} X_i$.

This treatment of tradables as a 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 domestic residents. Since no international flows of financial assets enter the model, when the market for this commodity clears trade balance holds, i.e. residents sell enough goods and services to non-residents at the given world prices to pay for their own imports.

Because relative domestic prices of traded commodities are based directly on the given relative world prices, larger impacts of changes in trade policies tend to come out of this type of model compared to those produced by Armington (1969) models which treat 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 domestic consumption and production.

In the following section, we expand on this basic model and describe how we incorporate tariffs, quotas, rent-seeking activities, and a Harris–Todaro fixed rural–urban wage differential into the model. As we add each of these distortions to the model, we indicate how the system of excess demand functions associated with it is solved to obtain a general equilibrium.

3. Trade and domestic distortions in the model

To incorporate trade taxes into the model described above, we introduce a government which collects both tariffs and export taxes and redistributes the revenues to consumers in a lump-sum fashion. We denote the ad valorem trade tax rates as t, where $t_j > (<) 0$ if j is an importable (exportable), and E_j as the net import good j.[2] The combined tariff and export tax revenues, R, of the government are given by:

$$R = \sum_{j=1}^{T} \bar{p}_j t_j E_j. \tag{6}$$

[2] E_j is positive if good j is imported, and is negative if good j is exported.

A common feature of all general equilibrium models of distortions is the simultaneity between the revenues generated by distortions and demands originally pointed out in Shoven and Whalley (1972). In order to deal with this in the present model, we assume that expected trade tax revenues, L, are distributed to the household sector in lump-sum form and we treat them as endogenous in the model. Thus, in any evaluation of consumer demands, the government distributes L to the consumer sector, who then calculates income as the value of endowments of variable and sector-specific factors, plus transfers from the public sector. Given this income, the consumer sector then evaluates demands, based on which R can be computed. In full equilibrium, the lump-sum transfers received by the consumer sector from the government exactly match the trade tax revenues actually collected.

Denoting Y as income and $\bar{F}_i$ as the endowment of variable factor i,

$$Y=\sum_{i=1}^{K} w_i\bar{F}_i+M+L=\sum_{j=1}^{N} p_jC_j. \tag{7}$$

The second equality implies that the consumer sector spends its entire income, implying that the relevant version of Walras' Law holds.

The excess demand system associated with this extension of the model involves:

(i) excess demand functions for each non-traded good, i.e. $(C_j+ID_j-X_j)$;

(ii) excess demand functions for each variable factor, i.e. $(F_i-\bar{F}_i)$;

(iii) an excess demand function for the composite traded good, i.e. (C_T-X_T); and

(iv) a government budget imbalance function, i.e. $(R-L)$.

If a zero for all of these functions occurs simultaneously at a set of endogenously determined prices for factors and non-tradables (and tariff revenues), an equilibrium for the model will have been found. Such equilibrium prices can be computed using a fixed-point or other algorithm.

3.1. *Import quotas*

Besides tariffs, import quotas can also be incorporated into model. Quantitative import restrictions are commonly imposed in developing countries both as a short-term response to current account deficits, and as a further way of protecting domestic industries from foreign competition to allow import substitution to occur.

To enforce restrictions, we assume that the government imposes an imports licencing system. Under the licencing scheme, importers are required to purchase a licence from the government for every unit of quota-restricted imports they bring into the country. Importers demand licences for restricted importables, while the government fixes the supply of licences at the permitted quota. The cost of a licence reflects the scarcity premium on restricted importables induced by the quota policies.

In the one consumer model we use, we assume that the government sells licences and returns the proceeds in lump-sum fashion to consumers. Denoting $\bar{Q}_j$ as the import quota for good j, and T' as the set of importables with quotas, the total quota premium value, QR (in the presence of tariffs), is given by:

$$QR = \sum_{j \in T'} [p_j - \bar{p}_j(1+t_j)]\bar{Q}_j, \tag{8}$$

where the difference inside the bracket is the per unit premium value of the quota on importable j.

The four excess demand functions listed above for the tariff case still hold in this model variant, except that the public sector budget in balance becomes $R+QR-L$. Besides these functions, including import quotas introduces one additional excess demand function into the model for each restricted importable. Excess demands for restricted importables are accommodated by the rest of the world only to the extent permitted by the quota. Thus, domestic prices of quota-restricted imports adjust until the domestic supply plus the quota matches domestic demand. Equivalently, given that one licence is required to bring in one unit of import, the domestic prices of licences (the premium values of imports) adjust such that the market for licences clear. Thus, for all tradables with binding quotas, $(C_j + ID_j - X_j - \bar{Q}_j)$ will equal zero in equilibrium.

3.2. Rent seeking

Our modelling approach also allows us to incorporate rent-seeking activities into the case where import licences are allocated by administrative discretion. Competitive rent-seeking activities are widely thought to be a major source of economic inefficiency [Krueger (1974)] since these activities use real resources to seek out rights to quotas and other rent-bestowing licences. Under perfectly competitive rent seeking, agents will invest resources to acquire licences until the value of rents equals the cost of rent seeking. Resources used in rent seeking produce no incremental output and are thus wasted.[3]

In practice, the amount of waste associated with rent seeking depends upon how rent-seeking activities are specified. Little is known about the

[3]Tariff-revenue seeking, as analysed by Bhagwati and Srinivasan (1980), is not included in our analysis, since with revenue seeking the process of assignment of a rent-accruing device to a particular firm or agent is not the same, and the assumption of a rent dissipation process, at least in the Philippines case, seems to us to be weaker.

extent of rent seeking in practice, and not all economies that use quotas necessarily exhibit large degrees of rent seeking. The popular perception seems to be that rent seeking is common in the Indian subcontinent and in some Pacific Rim countries, but is less prevalent in Latin America. The claim sometimes made is that Latin American countries have monopoly importers, and so competition for licences is largely excluded.

Following Hamilton, Mohammad and Whalley (1984), the variant of our model which incorporates rent seeking assumes that the value of resources used in rent seeking equals the value of rents created by import licences. The proportion of each factor used in rent seeking is assumed to reflect the relative economy-wide endowments of each factor input. Factor demands thus include both the amounts of factors used productively, and those employed in rent seeking.

Denoting FRS_i as the amount of variable factor i used in rent seeking,

$$FRS_i = \left(\bar{F}_i \Big/ \sum_{j=1}^{K} w_j \bar{F}_j \right) QR. \tag{9}$$

Thus, in the presence of rent seeking, the excess demand function for variable factor i becomes $(F_i + FRS_i - \bar{F}_i)$. In calculating consumer income, rents from quotas are excluded since these are effectively lost through resources used up in rent seeking. With these modifications, the model is the same as the quota variant described above.

3.3. Rural–urban wage gap

We can also extend our basic model to incorporate a fixed rural–urban wage differential inducing rural–urban migration and urban unemployment. As in Harris and Todaro (1970), labour migrates from rural areas to the cities in response to a higher wage in urban sectors until the expected urban wage (i.e. the urban wage multiplied by the probability of being employed) is equal to the free-market wage in rural sectors.

In this model variant, the total labour endowment of the economy (including those unemployed) is valued at the free-market wage in the rural sector, since all migrants expect to receive the rural wage when they migrate to the urban sector. Letting ρ be the urban employment rate, $(1/\rho)$ workers will move and compete for each job offered in urban areas. 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 labour, the wage bill of employed labour is given by:

$$\sum_{i \in UR} w_L^U L_i + \sum_{i \in RL} w_L^R L_i. \tag{10}$$

Since $w_L^U = w_L^R/\rho$, and

$$\rho = \sum_{i \in UR} L_i \Big/ \Big(\sum_{i \in UR} L_i + UE \Big),$$

the total wage bill can be restated as:

$$w_L^R \Big(\sum_{i \in UR} L_i + \sum_{i \in R} L_i + UE \Big) = w_L^R \bar{L},$$

where UE denotes unemployed labour in the urban areas. The excess demand function for labour in this model extension becomes $(LD + UE - \bar{L})$, where LD is total productively employed labour. In determining an equilibrium in this model extension, the rural wage is adjusted until $(LD + UE - \bar{L}) = 0$.

With this series of modifications, the basic model outlined in section 2 can incorporate a series of institutional arrangements common in developing countries, each of which is potentially important to the evaluation of impacts of trade policy changes. These extensions allow us to consider how these features, either singly or in combination, interact with traditionally analysed trade policies (such as ad valorem tariffs and export taxes) and either modify or amplify the effects usually associated with these distortions.

4. Applying the approach using Philippine data

We have applied the model outlined in the previous two sections to Philippine data, calibrating the model to a Philippine benchmark equilibrium data set for 1978 following the procedures described in Mansur and Whalley (1984), and performed counterfactual equilibrium analysis for a range of policy changes. In so doing, we treat the Philippines as a small open, price-taking economy in both its exports and imports.[4]

The main thrust of Philippine post-war trade policy has been to promote import-competing industries at the expense of agriculture-based, export-oriented industries. Under the Philippine Tariff Code, a basic revenue tariff of 10 percent applies to all imports. In addition, further tariffs up to a maximum of 100 percent are imposed on certain imports to protect domestic industries. On exports, a basic 4 percent tax is collected. Additional taxes up to 10 percent are added to the basic rate for some exports to promote domestic processing of primary products, such as copra. In combination, tariffs and export taxes accounted for a quarter of the total public revenue in 1978.

[4]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 (1983)].

Import licencing applies to most non-essential consumer goods, with the prior approval of the Philippine Central Bank being required to import these items. Goods falling under this category of licencing account for about 1300 out of approximately 3500 items listed in the country's tariff schedule in 1978. A few intermediate goods are subject to import licencing, but most are also inputs into export production.[5] There are no studies estimating the import premium values created by the import licencing system in the Philippines, and few for other developing countries. As a result, we assume alternative values of import premia in our benchmark data, and conduct sensitivity analysis around these.

Following Clarete (1984), the model we use specifies seven productive sectors: three are exportables and two importables in the 1978 benchmark data, and two are non-traded goods. Exportables are commercial crops, agricultural food industries, and industrial exportables. The importables include industrial importables, which consist mainly of producer goods, and import substitutes. Other agricultural products and services are non-traded. Two variable factors are specified: labour and capital. The aggregate supply of each is assumed to be fixed.

The tariff and export tax rates are trade-weighted averages of respective industry rates which, in turn, are averages over commodity-specific rates listed in the Tariff Code. Industrial importables have an ad valorem tariff rate equal to 23 percent, and import substitutes face a rate of 62 percent. Export tax rates for commercial crops, agricultural food industries, and industrial exportables are set at 5, 3, and 3 percent, respectively.

We have assembled a series of benchmark equilibrium data sets for 1978, for each of the model variants used in our analyses. In variant I, quotas, rent-seeking and Harris–Todaro features in labour markets are excluded, but tariffs and export taxes are present. Variants II and III introduce rent seeking associated with import licencing; variant II assumes binding quotas on all imports, variant III only on import substitutes. Variants IV and V correspond to II and III, but exclude rent seeking. Both rent-seeking and Harris–Todaro features are included in variants VI and VII.

Under the model variants incorporating quotas, we assume that quotas are binding in the benchmark equilibrium and are equal to the observed 1978 net imports; namely 16,216 million pesos of industrial importables and 2,187 million pesos of import substitutes. The assumed import premium values are 20 and 5 percent, respectively, for these importables. Where rent-seeking activities for quotas are incorporated, they are assumed to completely dissipate all the rents associated with the import licencing system.

[5]The tariff and import licensing structures were applicable in 1978, the benchmark year we use. From 1981 to 1985, however, Philippine tariff rates were lowered, and over a thousand imports were liberalized under a structural adjustment programme.

We use Philippine employment data reported in de Dios (1984) to specify the rural–urban wage differential for model variants VI and VIII, which has a Harris–Todaro labour market structure. In 1978, 0.8 million people, or 5.2 percent of the country's labour force, were unemployed, and another 1.5 million individuals were estimated to be underemployed. Of those employed in 1978, 52.9 percent were in agriculture, 19 percent were in industry, and 28.1 percent in the service sectors.

Using these data, we estimate the benchmark urban employment rate to be 72 percent. This calcualtion assumes that both unemployed and underemployed labour are all in the urban areas and that industry and services are exclusively urban activities. In calibrating the relevant model variants, the rural–urban wage differential parameter in the model is given by the estimated urban-employment rate. The urban sectors in the model are assumed to be industrial exportables, industrial importables, import substitutes, and services.

In applying these model variants, the policy parameters listed above are combined with other data from Clarete (1984) to assemble corresponding benchmark equilibrium data sets. We use these data in calibration to determine the parameters for the production and demand functions in our model. These, in turn, are used in a series of counterfactual equilibrium analyses.

5. Empirical results

We have performed a series of policy experiments using the model variants described above. These include the separate removal of tariffs on industrial importables, on import substitutes, and on both imports; the removal of export taxes; the removal of both tariffs and export taxes taken together; of import quotas; of all trade distortions (tariffs, export taxes, and quotas); and of both trade and Harris–Todaro labour market distortions. The resulting counterfactual equilibria are then compared with the benchmark equilibrium data for the relevant model variant. Welfare impacts associated with each policy change are then calculated using a Hicksian equivalent income variation.

In table 1 we report the equivalent variation expressed as a percentage of benchmark national income for this series of policy changes using the model variants. These results clearly suggest that interactions of trade policies with other domestic distortions can change estimates of the welfare impacts of trade policies significantly.

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 in model variant II. If the Harris–Todaro labour market distortion is also taken

Table 1
Welfare effects of trade policy changes in the Philippines in 1978 using various model variants (equivalent variation as a percentage of benchmark income).

	Model variants						
Policy change	I	II	III	IV	V	VI	VII
Remove tariff on industrial importables	−0.25	−1.1	0.51	0.0	0.43	−1.1	0.51
Remove tariff on import substitutes	2.86	−0.4	−0.45	0.0	0.00	−0.4	−0.45
All tariffs removed	3.30	−1.5	0.02	0.0	0.43	−1.5	0.02
Export taxes removed	0.30	−0.2	0.08	+0.0	0.11	−0.2	0.08
All trade taxes removed (export taxes and tariffs)	3.40	−1.6	0.04	+0.0	0.46	−1.6	0.04
All quotas removed	—	1.7	1.50	1.3	1.3	1.7	1.5
Trade taxes and quotas removed	—	5.2	5.00	4.8	4.8	5.2	5.0
Harris–Todaro labour market distortion removed	—	—	—	—	—	5.1	5.3
Trade taxes/quotas/ Harris–Todaro labour market distortion removed	—	—	—	—	—	10.3	10.1

Note: The distortions included in each model variant are as follows:
I: tariffs and export taxes
II: tariffs, export taxes, quotas on all imports and rent seeking
III: tariffs, export taxes, quotas only on import substitutes, and rent seeking
IV: variant II without rent seeking
V: variant III without rent seeking
VI: variant II with Harris–Todaro labour market distortion
VII: variant III with Harris–Todaro labour market distortion.

into account, the resulting economic inefficiency from these distortions taken together is 10.3 percent of national income in model variant VI.

A further example is the result that in model variants II and VI, the equivalent variation 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. In the case where quotas are binding only on import substitutes, a similar result prevails, but reducing tariffs on non-quota restricted imports is welfare improving, in large part due to the reduction in premium values (and hence rent seeking) for quota-restricted imports. Based on these results, the net effect of removing tariffs if quotas with associated rent seeking are unchanged seems to be to make the economy worse off.

An example of interactions on the export side is that removing export taxes increases the premium values associated with import quotas and, in the presence of rent seeking, reduces overall welfare. In model variants II and VI, the equivalent variation changes from −1.5 to −1.6 percent of national income as export taxes are also removed along with tariffs, while rent seeking associated with quotas remains in place. Removing export taxes alone gives a welfare loss of −0.2 percent of national income. However, in model variants III and VII with only one binding quota in place, lifting export taxes improves welfare (although by an amount less than that in variant I). In this case the surge in exports is accompanied by an increase in the non-quota-restricted import.

Results using model variants incorporating labour market distortions (model variants VI and VII) yield similar results except when the Harris–Todaro distortion is also removed. Because these model variants are calibrated to the same benchmark equilibrium data on production and prices as the other model variants, the rural–urban wage differential used in model variants VI and VII implies that labour employed in urban-based sectors will be more productive, displacing surplus urban labour to maintain the same level of production as in other model variants. Thus, given the wage data to which these model variants are calibrated, their results will be similar unless idle labour is productively re-employed.

The extent to which these various domestic distortions affect measures of the deadweight losses of tariffs and export taxes clearly depends on the assumed prices of the import premium rates among other parameter values. To explore this, we have also performed sensitivity analysis around the import premium parameter values assumed for model variant II. We have increased the benchmark quota premium values on import substitutes first from 20 to 50 percent, and then to 100 percent, holding the premium value for industrial importables constant at 5 percent. Variants II, II-A, and II-B referred to in table 2 correspond to these different import premium assumptions.

In table 2 the equivalent variation from removing tariffs and import quotas from model variant II of 5.2 percent of national income is repeated,

Table 2

Sensitivity of welfare effects of trade policy experiments to alternative benchmark import premium values (Philippine data for 1978 equivalent variations as a percent of benchmark income).[a]

	II	II-A	II-B
All tariffs removed	−1.5	−1.4	−1.3
Tariffs/export taxes removed	−1.6	−1.6	−1.5
Import quotas removed	1.7	4.1	8.6
Tariffs/export taxes/ import quotas removed	5.2	7.7	12.4

[a]The values of import premia associated with quotas on import substitutes assumed in the benchmark data are 20% for variant II; 50% for variant II-A; and 100% for variant II-B. The premium value for industrial importables is 5% in all three cases.

but this gain becomes progressively larger in model variants II-A and II-B. However, the loss from removing tariffs falls as the assumed quota premium values increase in the benchmark data. The explanation seems to be that the marginal increase in economic rents from import quotas following the lifting of tariffs is smaller the larger is the base case import premium, largely because tariff revenues are lower on account of smaller import volumes. The negative equivalent variations in table 2, as in table 1, emphasize that the net effect of removing tariffs in the presence of quotas and rent seeking is likely to leave the economy worse off.

Table 2 also confirms the welfare-worsening effects of removing export taxes in the presence of import licensing and rent seeking. Estimates of the associated equivalent variations are also all negative in this table, implying a welfare loss. As discussed above for table 1, lifting export taxes increases the import premia.

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

6. Summary and conclusion

This paper reports results from a price-taking open economy numerical general equilibrium model of the Philippines whose purpose is to explore the ways in which trade policies and other domestic distortions interact in a small open developing economy. We use a small economy model of the Philippines similar to that in Clarete (1984) and incorporate quotas, rent seeking, and Harris–Todaro labour market distortions with urban unemployment, in addition to tariffs and export taxes.

This model differs from trade models reported elsewhere in the applied general equilibrium literature in featuring explicit price-taking behaviour, rather than making all prices fully endogenous. The model also specifies homogeneous rather than heterogeneous products across countries (as under the Armington assumption). Sector-specific factors in each sector are incorporated in order to bound production responses, and the Hicks composite commodity theorem is used in closing the external sector of the model. We believe that this not only yields a more realistic modelling approach for small developing countries, but also one which is easier to implement than most existing approaches.

The results clearly indicate that interactions between trade policies and other domestic distortions are significant. A particularly 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 lower the social costs of rent seeking. Thus, removing tariffs is typically undesirable if quotas with associated rent seeking remain in place. Even the lifting of export taxes has the same effect since the premium value from quotas increases. However, where one import is quota restricted and the other is not, and rent seeking is present, lifting the tariffs of the quota-free imports enhances economic efficiency because of substitution away from the restricted import, reducing rents and waste due to rent seeking. The social cost of trade distortions (including quotas) in the presence of rent seeking and the Harris–Todaro labour market distortions is approximately double their cost when these labour distortions are ignored. The lesson would seem to be that these interactions need to be considered more fully in numerical economic policy analyses for developing countries.

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