FOOD SECURITY, FREER AGRICULTURAL
TRADE AND ENDOGENOUS
POLICY FORMATION

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ABSTRACT

In light of the ongoing policy debate on globalization issues, this paper illustrates the implication of interest group influence and national strategic interests on policy formation in the Malaysian rice sub-sector when the policymaker welfare criterion was used in drawing up policies. This paper suggests a domestic and international political-economic scenario where joint welfare maximization will be the desirable policy choice among trading countries.

INTRODUCTION

Many developments in the evolution of world agricultural policies have been evident over the last decade of the past millenium. One important development, especially, relates to the development of regional free trading zones (e.g., AFTA) and general trade framework which affects many countries (e.g., WTO).

In a multi-sector general equilibrium framework, economic theory asserts that free trade would be beneficial to all parties. It contends
Many studies have attempted to consider explicitly the interaction between policymakers and interest group influence as a basis for policy formulation. Notable examples include Sarris and Freebairn (1983), Karp and McCalla (1983), Rausser, Lichtenburg, and Lattimore (1983). To illustrate the theoretical framework that embodies our endogenous policy trade model, let us consider an example of a world market comprising N countries, engaged in a single commodity trade. Let E countries be net exporters while all others (N-E) net importers. Further, we assumed that the objective of public policymakers in each country is to select levels for a set of domestic and trade policy variables which maximize its welfare as represented by a preference function (Rausser Lichtenburg, and Lattimore (1983)). The preference function for this policymaker can be expressed as:

\[ W_i = \sum_{i=1}^{N} \gamma_i \mu_i (i = 1, \ldots, N) \]

where \( W_i \) denotes the welfare of the policymaker, \( \mu_i \) is the welfare criterion for the various interest groups in country \( i \), and \( \gamma_i \) specifies the relative weight (marginal values) attached to the \( i \)th group’s welfare by the policymaker in country \( i \). These weights describe the policymakers’ perspective toward the influence and power of the various domestic interest groups. In this study, the welfare criterion for the various specific interest groups (\( \mu_i \)) is derived by assuming optimizing (maximizing) behavior for consumers, producers, and taxpayers. The above welfare criterion assumes each interest group may face a different price which is affected by public policies. Producer and consumer prices are both affected by production and trade policies. Taxpayers’ welfare is expressed as net revenue to the government as a result of policies levied on the commodity. The policymakers’ preference function \( W_i \) for an individual country with domestic and trade policy options can therefore be expressed as:

\[ dW_i = (\gamma_i^C d\mu_i^C + \gamma_i^P d\mu_i^P + \gamma_i^T d\mu_i^T) (i = 1, \ldots, N) \]

where \( dW_i \) represents the change in the policy makers’ criterion function and \( d\mu_i^C, d\mu_i^P \) and \( d\mu_i^T \) represent changes in consumer surplus, producer surplus and taxpayer surplus, respectively.

Linear price dependent, Hicksian domestic supply and demand functions are used to estimate the change in producer and consumer surpluses, respectively. The welfare measures for consumers and producers in terms of changes (denoted by \( d \)) are then expressed, respectively, as:

\[ d\mu_i^C = (q_i^C p_i^D - p_i^D)(1 + 0.5 q_i^C), (i = 1, \ldots, N) \]
A free trade model assumes that all countries cooperate to maximize joint welfare, defined as the sum of the national welfare gains in all countries. With equal weights assigned to the welfare of each political interest group in each country \( \gamma_i = 1 \), the global welfare criterion (6) is equivalent to the sum of national welfare in all countries. Therefore, maximizing global welfare requires maximizing (6) with \( \theta, \gamma^0 = 1 \). In this trade scenario, maximum joint welfare would be attained if all countries decided not to impose distortionary policies, meaning that the best policy option for all countries is free trade. Cooperative solutions assume that all players will not jointly forego possible gain.

### Table 1
Definition of Variables

<table>
<thead>
<tr>
<th>Endogenous Variables</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \hat{q}_i^D )</td>
<td>Percentage change in demand for output produced by country i</td>
</tr>
<tr>
<td>( \hat{q}_i^S )</td>
<td>Percentage change in supply of output produced by country i</td>
</tr>
<tr>
<td>( \hat{p}_i^D )</td>
<td>Percentage change in demand (consumer) price of output in country i</td>
</tr>
<tr>
<td>( \hat{p}_i^S )</td>
<td>Percentage change in supply (producer) price of output in country i</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Exogenous Variables</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>( q_i^C )</td>
<td>Base level of consumption in country i</td>
</tr>
<tr>
<td>( q_i^S )</td>
<td>Base level of production in country i, ( q_i^S = q_i^D )</td>
</tr>
<tr>
<td>( q_i^S )</td>
<td>Base level combined production across countries, ( q_i^s = q_i^D )</td>
</tr>
<tr>
<td>( E_i^S )</td>
<td>Output supply elasticities in country i</td>
</tr>
<tr>
<td>( E_i^D )</td>
<td>Consumer demand elasticities in country i</td>
</tr>
<tr>
<td>( E_i^{ed} )</td>
<td>Export demand elasticity for country i</td>
</tr>
<tr>
<td>( E_i^{es} )</td>
<td>Export supply elasticity for country i</td>
</tr>
<tr>
<td>( E_i^{id} )</td>
<td>Import demand elasticity for country i</td>
</tr>
<tr>
<td>( E_i^{is} )</td>
<td>Import supply elasticity for country i</td>
</tr>
<tr>
<td>( E_i^T )</td>
<td>Total Demand elasticity for country i</td>
</tr>
</tbody>
</table>

### Ad-Valorem Policies

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \hat{O}_i )</td>
<td>Percentage change in ad valorem subsidy (tax) on output in country i</td>
</tr>
<tr>
<td>( \hat{t}_i )</td>
<td>Percentage change in ad valorem export subsidy (tax) imposed by country i</td>
</tr>
</tbody>
</table>

Symbolic solutions which express the effects of policy changes on prices \( (\hat{p}_i^D, \hat{p}_i^S) \) and quantities \( (\hat{q}_i^D, \hat{q}_i^S) \) in a multicountry trade framework are...
(Table 2, continued)

\[
\hat{p}_i^D = (\hat{\Omega}_i) \left( \frac{E_i^S}{E_i^T E_i^S} \right) + \sum_{n=1(n \neq i)}^N (\hat{\Omega}_n) \left( \frac{E_n^S}{E_n^T E_n^S} \right) + (\hat{t}_i) \left( \frac{E_i^{ed}}{E_i^{ed} E_i^{is}} \right)
\]

\[
+ \sum_{n=1(n \neq i)}^N (\hat{t}_n) \left( \frac{E_n^{es}}{E_n^{ed} E_n^{is}} \right) + \sum_{n=E+1(n \neq i)}^N (\hat{t}_n)(E_n^{id}) \left( \frac{E_n^{id}}{E_n^{id} E_n^{is}} \right)
\]

Percentage change in supply price of output in country \( i \) — country \( i \) is exporter \( (i=1,\ldots,E; \text{where } n=1,\ldots,E \text{ are exporters and } n=E+1,\ldots,N \text{ are importers})\):

\[
\hat{p}_i^S = (\hat{\Omega}_i) \left( \frac{E_i^T}{E_i^T E_i^S} \right) + \sum_{n=1(n \neq i)}^N (\hat{\Omega}_n) \left( \frac{E_n^S}{E_n^T E_n^S} \right) + (\hat{t}_i) \left( \frac{E_i^{ed}}{E_i^{ed} E_i^{is}} \right)
\]

\[
+ \sum_{n=1(n \neq i)}^N (\hat{t}_n) \left( \frac{E_n^{es}}{E_n^{ed} E_n^{is}} \right) + \sum_{n=E+1(n \neq i)}^N (\hat{t}_n)(E_n^{id}) \left( \frac{E_n^{id}}{E_n^{id} E_n^{is}} \right)
\]

Percentage change in demand price of output in country \( i \) — country \( i \) is importer \( (i=E+1,\ldots,N; \text{where } n=1,\ldots,E \text{ are exporters and } n=E+1,\ldots,N \text{ are importers})\):

\[
\hat{p}_i^D = (\hat{\Omega}_i) \left( \frac{E_i^S}{E_i^T E_i^S} \right) + \sum_{n=1(n \neq i)}^N (\hat{\Omega}_n) \left( \frac{E_n^S}{E_n^T E_n^S} \right) + (\hat{t}_i) \left( \frac{E_i^{is}}{E_i^{ed} E_i^{is}} \right)
\]

\[
+ \sum_{n=1(n \neq i)}^N (\hat{t}_n) \left( \frac{E_n^{is}}{E_n^{ed} E_n^{is}} \right) + \sum_{n=E+1(n \neq i)}^N (\hat{t}_n)(E_n^{id}) \left( \frac{E_n^{id}}{E_n^{id} E_n^{is}} \right)
\]

Percentage change in supply price of output in country \( i \) — country \( i \) is importer \( (i=E+1,\ldots,N; \text{where } n=1,\ldots,E \text{ are exporters and } n=E+1,\ldots,N \text{ are importers})\):

\[
\hat{p}_i^S = (\hat{\Omega}_i) \left( \frac{E_i^T}{E_i^T E_i^S} \right) + \sum_{n=1(n \neq i)}^N (\hat{\Omega}_n) \left( \frac{E_n^S}{E_n^T E_n^S} \right) + (\hat{t}_i) \left( \frac{E_i^{is}}{E_i^{ed} E_i^{is}} \right)
\]

\[
+ \sum_{n=1(n \neq i)}^N (\hat{t}_n) \left( \frac{E_n^{es}}{E_n^{ed} E_n^{is}} \right) + \sum_{n=E+1(n \neq i)}^N (\hat{t}_n)(E_n^{id}) \left( \frac{E_n^{id}}{E_n^{id} E_n^{is}} \right)
\]
input and/or trade subsidies/taxes) which would provide more protection to its producers become more desirable.

On the other hand, maximum joint welfare is attained when all countries forego all trade enhancement or protective policies. This is achieved when a cooperative solution is feasible. Conceptually, if policymakers consider all political interest groups within each country and across countries are of equal importance, free trade by all countries would be desirable.

APPLICATION TO THE MALAYSIAN RICE SUBSECTOR

We will now apply the endogenous policy model to the Malaysian rice subsector using 2000 as the base year. However, in this paper, the model only focuses on the determination of optimal policy choices under assumption that all other trading countries (such as Thailand, Vietnam, and the US) will not change their policy mix regardless of Malaysia’s policy choices. This is equivalent to maximizing equation 2 for a single country or maximizing equation 6 given (i set equal to zero for all other countries. This assumption is considered appropriate as Malaysia is only a small player in world rice trade. Any changes in Malaysia’s rice policy regime will not affect world trade flows and prices substantially.

It is important to note here that the type of trade game assumed is immaterial in illustrating the mechanism of the endogenous policy model in this study. Optimal policy levels might differ across game types, however, policy implications will remain the same for all games.

Specifically, in this paper we examine the impacts on optimal policy choices under varying assumptions of political influences for all interest groups in Malaysia.

Before the endogenous policy model can be empirically applied, several methodological issues need to be resolved. These include determining the baseline or free-trade solutions and the relative influence of the various political interest groups with policymakers in Malaysia.

The data requirements for the optimization model are: a) base prices (producer, consumer, and trade) and quantities (supply, consumption, and trade) and b) output supply and demand elasticities. These data are used to calculate the base year: a) export and import elasticities, b) free trade prices and quantities, c) world price, d) implied policies,
Analyses of Changes in Policymakers' Concern about Malaysian Interest Groups

Revealed preference 2000 weights for Malaysia were used as the base weights in the analyses. The relative weights of the Malaysian interest groups were parameterized to assess the effects of varying influence of Malaysian policymakers on optimal policies in the country. Four sets of weights were modeled. The first set of weight represents the base year scenario. The second set considers the situation where consumers were more influential relative to others while the third set favors the taxpayers. The fourth set models the situation where all interest groups had equal weights to policymakers. Optimal policies for the various weight scenarios are shown in Table 4.

The base policies show that in 2000 Malaysia was heavily supporting producers via a high import tariff (tarification of import quota) and consumer taxes (effects of consumer tax outweighs the output subsidy). This is consistent with the implied political weights of 0.9 for consumers while both the taxpayers and producers show equal weights of 1. In an earlier study (Jamal, 1998), using a Nash non-cooperative game assumption, the political weight for consumers and tax-payers for the 1991 base year were found to be respectively, 0.75, and 0.84 relative to 1 for producers.

As consumer weight increases (scenario 2), optimal policies shift to favor output or price subsidies (or deficiency payments) as well as import subsidies. On the other hand, as taxpayers weight was increased relative to other groups, both consumer and import taxes became more desirable to policymakers. When all political weights are equal, the optimal policy choice is a 40 percent import tax. The above findings are interesting since they demonstrate that trade policies could be a rational policy choice in the face of varying interest groups influence and monopsony trade relationship. Figures 1-3 present an intuitive graphical illustration on the linkages between optimal policies and interest groups influences.

In general, given an increase in Malaysian consumers' political influence with policymakers, policymakers would respond by favoring output subsidy and less import taxes. Table 4 also shows the impacts on rice imports under varying optimal policies. Generally, an increase in consumer and taxpayer weights would, respectively, increase and decrease rice imports.
Table 4
Effects of Varying Assumptions of Malaysian Interest Groups' Political Influence (assuming only Malaysia maximizes welfare)

<table>
<thead>
<tr>
<th>Policy Options Available</th>
<th>Political Weights</th>
<th>Optimal Policy Choices (percent)</th>
<th>Import (000 mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$Y^C$ $Y^p$ $Y^{t(1)}$</td>
<td>$\hat{e}(2)$</td>
<td></td>
</tr>
<tr>
<td>Free Trade Results</td>
<td>1.0 1.0 1.0</td>
<td>0.00 0.00</td>
<td>878.00</td>
</tr>
<tr>
<td><strong>Base Scenario</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output and Trade Policies</td>
<td>0.9 1.0 1.0</td>
<td>-22.00 60.00</td>
<td>536.28</td>
</tr>
<tr>
<td><strong>Scenario 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output and Trade Policies</td>
<td>1.2 1.0 1.0</td>
<td>64.86 -11.07</td>
<td>741.60</td>
</tr>
<tr>
<td><strong>Scenario 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output and Trade Policies</td>
<td>1.0 1.0 1.2</td>
<td>-71.80 81.06</td>
<td>554.43</td>
</tr>
<tr>
<td><strong>Scenario 4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output and Trade Policies</td>
<td>1.0 1.0 1.0</td>
<td>0.05 42.4</td>
<td>585.00</td>
</tr>
</tbody>
</table>

1/. Deficiency payments (price or output subsidies) when positive and consumer taxes when negative.
2/. Import tariff when positive and subsidy when negative.

SUMMARY AND POLICY IMPLICATIONS

- Often, policies are shaped by the political influence and power of the various domestic interest groups on policymakers in the effort of the former to secure the benefits of the policy decisions. Policymakers may also establish policies to favor a
Figure 1
Optimal Output Subsidies or Consumer Taxes (Oa) Under Varying Consumer (wca) and Taxpayers (wta) Interest Groups

Figure 2
Optimal Import Taxes (ta) Under Varying Consumer (wca) and Taxpayers (wta) Interest Groups


