How China's Palm Oil Imports Impact Its Soybean Oil Imports

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How China's Palm Oil Imports Impact Its Soybeans and Soybean Oil Imports
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Introduction
• China is the world’s largest soybean oil importer.
• Brazil and Argentina dominate China’s soybean oil imports.
• Soybean oil is imported to produce edible oil.
• China imports a large quantity of palm oil from Malaysia and Indonesia.
• Palm oil is imported for the food industry (i.e. producing instant noodle) and producing edible oil.

Figure 1. China’s palm oil and soybean oil imports (metric tons, millions)

Objective
To assess the competitiveness between China’s palm oil and soybean oil imports differentiated by exporting country.

Method
The differential production model is used in estimating China’s oil demand (Laitinen and Theil, 1978). Four imports/inputs are considered: soybean oil imported from Brazil and Argentina, palm oil imported from Malaysia and Indonesia.

Let \( x \) denote the import quantity and \( w \) the import price. The oil-import allocation decision for China can be specified as:

\[
\hat{f}_{it} = \theta_i \Delta X_t + \sum_{j=1}^{n} \pi_j D_{wj} + u_x
\]

\( f_t = w_x / \sum_j (w_{x_j}) \): \( t \)th import share.
\( \theta_i = \delta w x / \delta x_j \): marginal import share.
\( \pi_j \): conditional price effect.
\( u_x \): random disturbance term.

\( \Delta X_t = \sum_{j=1}^{n} \hat{f}_{jt} \hat{D}_{jx} \): Divisia volume index (change in total aggregate expenditure)

\( DX_t = \log(x / x_{-t}) \); \( Dw_x = \log(w / w_{-t}) \).

Model Restrictions
Adding up: \( \sum_i \theta_i = 1 \) & \( \sum_i \pi_j = 0 \)
Homogeneity: \( \sum_j \pi_j = 0 \)
Symmetry: \( \pi_j = \pi_j^* \)

Data
China’s monthly quantities (million metric tons) and values (million U.S. dollars), soybean oil and palm oil imports, Jan. 05 - Dec. 08

Estimation Results
Conditional Expenditure and Price Elasticities

<table>
<thead>
<tr>
<th>Exporter/Product</th>
<th>Soybean Oil</th>
<th>Soybean Oil</th>
<th>Palm Oil</th>
<th>Palm Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brazil</td>
<td>Argentina</td>
<td>Malaysia</td>
<td>Indonesia</td>
</tr>
<tr>
<td>Soybean Oil</td>
<td>0.80751</td>
<td>-3.8069</td>
<td>2.4437</td>
<td>3.5562</td>
</tr>
<tr>
<td>Brazil</td>
<td>(0.3613)*</td>
<td>(0.9091)*</td>
<td>(1.0593)*</td>
<td>(1.0639)*</td>
</tr>
<tr>
<td>Soybean Oil</td>
<td>1.6743</td>
<td>0.5985</td>
<td>-0.0011</td>
<td>-0.6755</td>
</tr>
<tr>
<td>Argentina</td>
<td>(0.2534)*</td>
<td>(0.2594)</td>
<td>(0.5960)</td>
<td>(0.4896)</td>
</tr>
<tr>
<td>Palm Oil</td>
<td>0.7184</td>
<td>0.4921</td>
<td>-0.3816</td>
<td>-1.5147</td>
</tr>
<tr>
<td>Malaysia</td>
<td>(0.1178)*</td>
<td>(0.1472)*</td>
<td>(0.2766)</td>
<td>(0.5152)</td>
</tr>
<tr>
<td>Palm Oil</td>
<td>0.8349</td>
<td>-0.6890</td>
<td>0.1001</td>
<td>3.1882</td>
</tr>
<tr>
<td>Indonesia</td>
<td>(0.1783)*</td>
<td>(0.2792)*</td>
<td>(0.5533)</td>
<td>(1.0234)*</td>
</tr>
</tbody>
</table>

* Denotes significance at the 5% level.

Findings
China’s total expenditures have a positive effect on all oil imports particularly for Argentina.
Imports from Brazil and Indonesia are highly elastic.
Soybean oil from Brazil and palm oil from Malaysia are substitutes. Palm oil from Malaysia and Indonesia are substitutes.

References
-ERS, FAS GAIN Reports

*The views expressed are those of the authors and not necessarily those of ERS or USDA.