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

Wei Chen

School of Public Economics and Administration
Shanghai University of Finance and Economics, chenw@vt.edu

Andrew Muhammad

Economics Research Service (ERS)
United States Department of Agriculture (USDA), amuhammad@ers.usda.gov

Poster prepared for presentation at the Agricultural & Applied Economics Association 2010 AAEA,CAES, & WAEA Joint Annual Meeting, Denver, Colorado, July 25-27, 2010

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Wei Chen, Shanghai University of Finance and Economics, chen.wei@mail.shufe.edu.cn
Andrew Muhammad, ERS, USDA, AMUHAMMAD@ers.usda.gov

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)

- Palm Oil from Indonesia
- Palm Oil from Malaysia
- Soybean Oil from Brazil
- Soybean Oil from Argentina
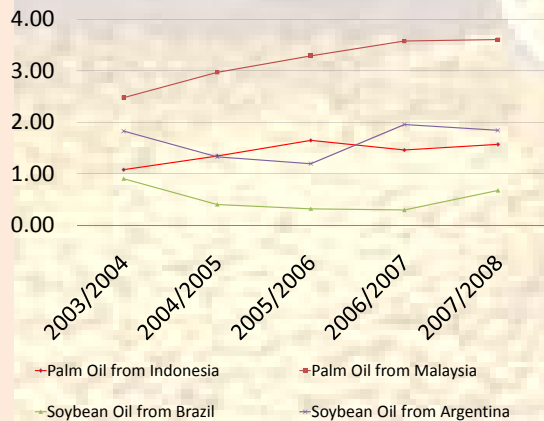
Data source: USDA, FAS GAIN Reports , *Available on the World Wide Web:*
http://www.fas.usda.gov/scriptsw/AttacheRep/default.asp

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:

$$\bar{f}_{it} Dx_{it} = \theta_i \, DX_t + \sum_{j=1}^{n} \pi_{ij} \, Dw_{jt} + u_{it}$$

$f_i = w_i x_i / \Sigma_i (w_i x_i)$: ith import share.

$\theta_i = \partial w_i x_i / \partial \Sigma_i (w_i x_i)$: marginal import share.

π_{ij} : conditional price effect.

u_{it} : random disturbance term.

$DX_t = \sum_{i=1}^{n} \bar{f}_{it} \, Dx_{it}$: Divisia volume index
(change in real aggregate expenditures)

$Dx_{it} = \log(x_{it} / x_{it-1}); \quad Dw_{jt} = \log(w_{jt} / w_{jt-1}).$

Model Restrictions

Adding up: $\sum_i \theta_i = 1$ & $\sum_i \pi_{ij} = 0$

Homogeneity: $\sum_j \pi_{ij} = 0$

Symmetry: $\pi_{ij} = \pi_{ji}$

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

Exporter /Product	Expenditure	Price			
		Soy. Oil Brazil	Soy. Oil Argentina	Palm Oil Malaysia	Palm Oil Indonesia
Soybean Oil Brazil	0.80751 (0.3613) *	-3.8069 (0.9091)*	2.4437 (1.0593)*	3.5562 (1.0639)*	-2.1930 (0.8886)*
Soybean Oil Argentina	1.6743 (0.2534) *	0.5985 (0.2594)	-0.0011 (0.5960)	-0.6755 (0.4896)	0.0780 (0.4314)
Palm Oil Malaysia	0.7184 (0.1178) *	0.4921 (0.1472)*	-0.3816 (0.2766)	-1.5147 (0.5152)*	1.4043 (0.4508)*
Palm Oil Indonesia	0.8349 (0.1783)*	-0.6890 (0.2792) *	0.1001 (0.5533)	3.1882 (1.0234)*	-2.5993 (0.9684)*

* 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
-Laitinen, K. and H. Theil (1978). "Supply and Demand of the Multiporduct Firm." *European Economic Review*, 11: 107-154.
-USDA, FAS GAIN Reports

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