Revisiting the palm oil boom: An examination of consumption in the oils complex

D. Sanders¹
J. Balagtas¹
G. Gruere²

¹Department of Agricultural Economics, Purdue University
²International Food Policy Research Institute


Copyright 2011 by Sanders, Balagtas and Gruere. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.
Revisiting the palm oil boom: An examination of consumption in the oils complex

D. Sanders1, J. Balatgas1, & G. Gruere2
1Department of Agricultural Economics, Purdue University; 2International Food Policy Research Institute

Introduction

Palm oil has demonstrated significant growth in production, trade, and market share in the last two decades. The majority of this growth has taken place in Malaysia and Indonesia: these two countries combined account for approximately 95% or more of world palm oil exports in recent years. As palm oil production has boomed, so have concerns about its sustainability, as well as the underlying causes for the unprecedented growth. The recent surge in biofuel production has provided one suspected culprit, although other disruptions could play a role as well. Import restrictions on genetically modified crops, specifically soybeans, as well as health concerns over issues such as trans fats may have changed the traditional structure of the edible oil complex. In turn, these shifts can change the price relationships in the market that reflect the underlying consumptive patterns. This project examines horizontal price transmission through the market complex, with particular focus on the short and long run responses of edible oil prices to exogenous changes in other oil prices.

State of the Edible Oils Complex

The edible oil complex for the world market has varied markedly in recent years. Figure 1 below demonstrates the price volatility that has appeared in the market. Figures 2-5 show the average share of domestic consumption for four major consumers of edible oils, while Figures 6-9 frame the rapid growth in the trade of these commodities.

Granger Causality

Granger causality is a test for information flow between variables within a vector autoregression framework. With this test, a variable x is proposed to ‘Granger-cause’ another variable y if the combination of the lagged values of x and y provides more information in explaining y than its own lags alone. The seven variables were tested for Granger causality using bivariate causality tests within the larger VEC framework. The p-values of each test are below, with a significant value indicating that the proposed exogenous variable Granger-causes the proposed endogenous variable. Clearly, it is common in relationships of this type, many edible oil prices are found to each Granger-cause each other, indicating that neither variable is exogenous to the relationship. There are a few one-way interactions, however. Sunflower oil is found to exogenously Granger-cause coconut, palm, and cottonseed oils. Palm kernel oil exogenously Granger-causes coconut oil, while coconut oil exogenously Granger-causes cottonseed oil.

Conclusions

The world edible oils market contains a number of complex relationships among its members. The rising prices of the oils market make it important to understand the dynamic interactions among these oils and their prices. As was seen in the results of the Granger-causality tests, many of the oils share information in price discovery, such that adjustments to one of the oils markets will almost certainly be shared with the other oils as the entire complex adjusts. In particular, the Granger causality relationships of soybean oil and sunflower oil with palm oil are worth noting. Soybean oil, often associated with biofuels production, does not affect palm oil, while sunflower oil, which is often regarded as a healthier oil choice, is found to exogenously Granger-cause palm oil. This distinction might suggest that drivers behind the recent tumult in edible oils might be more multi-dimensional than they initially appear.

References


Model

The modeling framework utilized here is the vector error correction model (VEC). This model incorporates the cointegrating vectors that represent long-run equilibrium relationships into a vector autoregression framework made stationary through first differences. This model can be represented by:

\[ \Delta y_t = \alpha_t + \beta_t x_t + \sum_{j=1}^{p} \omega_j \Delta y_{t-j} + \sum_{j=1}^{p} \varphi_j \Delta x_{t-j} + \epsilon_t \]

where \( y_t \) is an \( n \times 1 \) vector of time series, \( \alpha_t \) is an \( n \times 1 \) constant vector, \( \beta_t \) is an \( n \times m \) matrix of cointegrating coefficients, \( z_t \) is a stationary \( n \times 1 \) vector of the transformed time series, and \( \Delta \) is an \( n \times n \) matrix of estimated coefficients.

Data

The data employed here comes from the statistical databases of the United Nations Conference on Trade and Development (UNCTADStat). Specifically, edible oil prices are taken from those of Oil World, an industry group. Monthly prices from January 1990 through February 2011 for seven commodities are used. All prices are in U.S. dollars per tonne. The seven commodities, origin and pricing points are:

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Origin</th>
<th>Pricing Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybean Oil</td>
<td>The Netherlands</td>
<td>FOB ex-mill</td>
</tr>
<tr>
<td>Sunflower Oil</td>
<td>European Union</td>
<td>FOB NW European ports</td>
</tr>
<tr>
<td>Groundnut Oil</td>
<td>Any origin</td>
<td>CIF Rotterdam</td>
</tr>
<tr>
<td>Coconut Oil</td>
<td>Philippines/Indonesia</td>
<td>CIF European Ports</td>
</tr>
<tr>
<td>Palm Kernel Oil</td>
<td>Philippines</td>
<td>CIF Rotterdam</td>
</tr>
<tr>
<td>Palm Oil</td>
<td>Malaysia/Indonesia</td>
<td>CIF NW European ports</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Data Source</th>
</tr>
</thead>
</table>

Figure 1. World prices for edible oils

Figure 2. Average domestic edible oil consumption shares for four major edible oil consuming entities

Figure 3. Average domestic edible oil consumption shares for four major edible oil consuming entities

Figure 4. China

Figure 5. China

Figure 6. United States

Figure 7. United States

Figure 8. China

Figure 9. India

Figure 2: United States

Figure 3: European Union

Figure 4: China

Figure 5: India

Figure 6: United States

Figure 7: European Union

Figure 8: China

Figure 9: India

Figure 1. United States

Figure 2: European Union

Figure 3: China

Figure 4: India

Figure 5: United States

Figure 6: European Union

Figure 7: India

Figure 8: China

Figure 9: United States

Figure 1. United States

Figure 2: European Union

Figure 3: China

Figure 4: India

Figure 5: United States

Figure 6: European Union

Figure 7: India

Figure 8: China

Figure 9: United States

Figure 1. United States

Figure 2: European Union

Figure 3: China

Figure 4: India

Figure 5: United States

Figure 6: European Union

Figure 7: India

Figure 8: China

Figure 9: United States