**US-Australia Competition for the Japanese Sorghum Market: Is it Quality Time?**

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**Introduction**

The US held the largest share in the Japanese sorghum market for 20 years. However, in recent years Australia's share has grown, challenging the US's dominance in the market. The price of US sorghum is expected to remain competitive, and it can explain the decline of the market share of US sorghum.

**Procedure of the Analysis**

The cross price elasticity of US sorghum and Australian sorghum in the Japanese market was analyzed to determine the factors affecting market share. The analysis showed that the price of US sorghum has not affected the demand for US sorghum in the market. If the cross price elasticity is close to zero, the price is not an important factor for the loss in market share of US sorghum in the Japanese market.

**Econometrics model**

A 3 stage least square (3sls) regression is used to estimate the elasticity, since this analysis has a simultaneity problem. The quantity of US sorghum imports affects the import price of US sorghum in the Japanese market, given that Japan is the second largest importer of sorghum in the world. The simultaneous equation shown below is used for this estimation:

\[
\log Q_i = a + \sum_j \alpha_i \log P_{jt} + \sum_j \beta_i \log P_{jt} + \gamma \log(\text{Total Expenditure}) + \varepsilon_i
\]

\[
\log P_{jt} = a + \sum_j \gamma_i \log Q_j + \varepsilon_i
\]

where:
- \(Q_i\) is the quantity of sorghum from country \(i\) (Australia, China, USA, and Argentina)
- \(P_{jt}\) is the CIF price of sorghum in Japan
- \(\varepsilon_i\) is the error term

**Data**

CIF price and quantity of Japanese sorghum imports from major sorghum exporting countries were collected from 1981 to 2013, and obtained from FAO. In this analysis, only data from the major exporting countries to Japan was used, that is, those who have more than 5% share of the total quantity of sorghum imported by Japan for at least 10 years. Those countries are USA, China, Argentina, and Australia. The 5% tariff is added on the CIF price for the sorghum price.

A price index was constructed using the prices of the sorghum imported from 10 countries (Australia, China, USA, Argentina, Brazil, France, India, South Africa, Slovakia, and Sudan). The market share of sorghum imported from each country is at least above 5%. However, it was not required for a country to keep 5% market share for all the 10 years of this period. The total combined share of those countries accounted for more than 99% of every year's imports. The price index is the geometric average of the sorghum prices.

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**Results**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>US Sorghum Quantity</th>
<th>Australian Sorghum Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
<td>S.E.</td>
<td>Sig</td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.70</td>
<td>2.79</td>
</tr>
<tr>
<td>US Sorghum Price</td>
<td>-14.41</td>
<td>5.15**</td>
</tr>
<tr>
<td>Chinese Sorghum Price</td>
<td>-0.03</td>
<td>0.14</td>
</tr>
<tr>
<td>Australian Sorghum Price</td>
<td>-0.14</td>
<td>0.37</td>
</tr>
<tr>
<td>Argentina Sorghum Price</td>
<td>-1.07</td>
<td>0.99</td>
</tr>
<tr>
<td>Total Expenditure</td>
<td>1.01</td>
<td>0.19***</td>
</tr>
</tbody>
</table>

1: *** indicates 1% significance level, ** 5% significance level, and *** 10% significance level.

**Findings**

The parameter of Australian sorghum price is not significant in the equation of the demand of US sorghum quantity meaning that the demand of US sorghum is not sensitive to the price of Australian sorghum in the Japanese market. Also, the demand of Australian sorghum quantity is not sensitive to the price of US sorghum there, as is indicated by the parameter of US sorghum price in the demand equation of Australian sorghum.

The parameter of the total income expenditure is positively significant in the equation of the demand of US sorghum, while this parameter is not significant in the equation of the demand of Australian sorghum. The total expenditure on sorghum imports has been downward in Japan for the past 20 years. This result indicates that the reduction of the total sorghum expenditure by Japanese livestock producers might have caused the decrease on the consumption of US sorghum in Japan, but might have had small impact on the consumption of Australian sorghum there.

**Conclusion**

The results of the analysis suggest that the price of Australian sorghum has not influenced the demand of US sorghum in the Japanese market. The price may not be an important factor for the decline of the market share of US sorghum in the Japanese market.

This result also suggests that the US sorghum is positively income elastic, and Australian sorghum is not significantly income elastic in the Japanese market. Japanese farmers generally have reduced their expenditure on imported sorghum for last 20 years. It may have decreased imports of US sorghum, but has not decreased imports of Australian sorghum. This may imply that Japanese farmers get to favor Australian sorghum over US sorghum in terms of quality, and it can explain the decline of the market share of US sorghum.