International Competitiveness in Rice Exports under High Oil Prices
- Among U.S., Japan, Thailand, Vietnam and Myanmar -

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I. Introduction

Asia is becoming a heart for global agricultural commodity trade as Asia is unique regarding the political and cultural aspects. Rice is the major source of livelihood of small farmers and agricultural households in Asia. Rice continues to be the most important staple food for most of the Asian population, contributing 85% of area harvested and 88% of production in the global total (Figure 1). Because of the economic and political importance of rice in Asia, no government has left its domestic rice sector freely influenced by market demand and supply forces. Most Asian countries aim for rice self-sufficiency rather than rely on international trade to pursue their food security goals (David and Huang, 1996). Moreover, Hossain and Fischer (1995) indicates that rice is more important to the economy and the people at lower income levels, and hence is an important intervention point for promotion of agricultural development and alleviation of poverty. Rice is the major source of livelihood of small farmers and agricultural labor households in Asia where at least two thirds of arable land is planted to rice (David and Huang, 1996).

Figure 1. Shares of rice production in U.S., Asia and the others.

While the most of the Asian governments have been trying hard to raise their self-sufficiency rates, they have been taken a vital role in global rice trading. In 2006, a volume accounting for 78% of international rice trade took place within Asia. Asia is the critical component of the world rice economy by increasing its area harvested and production but the export is distinctly 8 times (2007) higher after “Green Revolution” period with the share of 75 percent in the world market (Figure 2). Efficient and integrated rice markets in Asia are essential for improving the share of rice exports to seek international competitiveness under the high oil price conditions. In the past, the biggest exporters from Asia were traditional exporters since 1940s, such as China, India, Bangladesh, Myanmar and Thailand (Mya Than & Nishizawa, 1990). Currently the major rice exporters from Asia are Thailand, Vietnam, China, India, and Pakistan. Myanmar is getting weak to participate in world market. In fact, Myanmar (Burma) had earned as the “No.1 Exporter” and as the “Rice Bowl of Asia” as early as 1890. Rice Production was as much as 3 million tons with 3.07 million hectares in 1923 to 1940 (Tin Soe & Brain S. Fisher, 1989). But in 2008, the loss of rice production in Myanmar due to Cyclone Nargis caused more difficulties for the task of stabilizing the world rice market.

The current world largest rice exporter, Thailand, has historically competed with the U.S. when its rice come to the export of higher quality varieties to the E.U., the Middle East, and South Africa, while Vietnam, India and
Pakistan are Thailand’s greatest rivals when it comes to exporting low-to-medium quality varieties. But Thailand’s share in the world market is declining comparing with the late 1980s while Vietnam’s share is increasing gradually. For instance, Thailand share changed from average 43 percent in 1987 to 30 percent in 2005 while the share Vietnam increased from 10 percent in 1987 to 16 percent in 2005.

**Figure 2. Shares of rice export in U.S., Asia and the others.**

For these reasons, the objectives of this research was carried out to find out the degree of international competitiveness regarding production costs, productivity and price factors among rivals of rice exporting countries such as Thailand, Vietnam, Myanmar, Japan and the U.S. while the oil prices are increasing.

II. Methodology

1. Cost Competitiveness

In this study, historical data and time series data were used. To investigate the cost competitiveness at the condition of high oil prices, the production costs for 2007 and 2008 were estimated using own surveyed data. The production costs are collected relying on the study country’s computation with the fixed and variable costs. However, it is mainly classified on four factors of total production costs for rice: fuel costs, chemical cost, labor costs and others.

The production costs formula for estimation is used as follows:

\[ TC_t = \alpha FC_{t-1} + \alpha \beta CC_{t-1} + \alpha \gamma LC_{t-1} + \Omega OC_{t-1} \]

Where,

- \( TC_t \) = total production cost for the current year
- \( FC_{t-1} \) = fuel costs from the last year
- \( CC_{t-1} \) = chemical costs for the last year
- \( LC_{t-1} \) = labor cost from last year
- \( OC_{t-1} \) = other cost from last year
- \( \alpha \) = increasing rate of diesel price
- \( \beta \) = \((CC_{t-1}/CC_{t-2})/(FC_{t-1}/FC_{t-2})\) (assuming fuel price partially influence to the fertilizer cost)
- \( \gamma \) = increasing rate of minimum wage rate
- \( \Omega \) = average increasing rate of other costs

For this evaluation, increasing rate of diesel prices are used to understand how much fuel prices are influencing in the production costs. Moreover, influencing rate of fuel costs on chemical costs is also applied to point out how high oil prices can affect on agricultural chemical inputs as the share of oil costs is large in the production costs of fertilizer. So it is assumed that the fuel price partially influence to the fertilizer costs. Moreover, the labor rate is gradually increasing both in developed and developing countries. Thus, the increasing rate of minimum wage rate is also used to support the estimation of the production costs for the year 2007 and 2008 for the study countries.

2. Price Competitiveness

In this section, regression analysis is used to examine the relative price response for the export share while the commodity prices are going high in the global market. Thus this analysis can understand the competitiveness power of the rice exporting countries by finding out the ratio of their share in international market.

The function for the regression analysis is used as an empirical model of price competitiveness.
\[
\log \left( \frac{q}{Q} \right)_i = \beta_0 + \beta_1 \log \left( \frac{q}{Q} \right)_{i+1} + \beta_2 \log \left( \frac{p}{P} \right),
\]

Where,

\[
\begin{align*}
q & = \text{the volume of rice exported from each country in the thousand metric tons (U.S., Thailand, Vietnam, Myanmar)} \\
Q & = \text{The volume of rice exported from world in thousand metric tons} \\
p & = \text{the export price of rice from each country (U.S., Thailand, Vietnam, Myanmar) in US$/MT} \\
P & = \text{the average export price of rice from remaining countries in US$/MT}
\end{align*}
\]

III. Results and Discussion

According to the results of the estimation of production costs for 2007 and 2008 when the fuel prices rose abnormal height, the fuel costs become nearly double comparing with early stage of 21st century. The share of fuel costs in the total production costs started to increase gradually from 2003 and it was obviously boosted in 2007 and 2008. The share of fuel costs in U.S. has reached from 10% in 2000 to 19% in 2008 while those of Thailand and Myanmar have increased from 5% and 15% in 2000 to 10% and 29% in 2008, respectively. However, the share of fuel costs which accounts for relatively lesser from 2% in 2000 to 3% in total production costs for Japan in 2008; a large amount in volume as the production costs in Japan is quite huge comparing with other countries. The result in production costs competitiveness index based on Thailand, currently the largest rice exporter, shows that the production costs in the U.S. and Japan are getting stronger in competitiveness power at the condition of high oil prices.

<table>
<thead>
<tr>
<th>Table I. Production Costs Competitiveness Index (USD/ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
</tr>
<tr>
<td>Japan</td>
</tr>
<tr>
<td>US</td>
</tr>
<tr>
<td>Myanmar</td>
</tr>
<tr>
<td>Vietnam</td>
</tr>
</tbody>
</table>

Source: computed on the base of surveyed data by the authors.

Namely, the competitiveness in Asian developing countries from the production costs point of view is getting weaker because of the impacts of high oil prices. The direct expenditure of agricultural industries on fuel may not seem to be significant in Asian countries; however, indirectly many agricultural industries are closely linked to oil-based products and services. For example, some chemicals and fertilizers used in agriculture are made from petroleum products or by-products. Also agriculture’s reliance on irrigation and transportation causes to be indirectly linked to the price of petroleum. Thus, developing countries from Asia such as Thailand and Vietnam will be losing their production cost competitiveness if the oil prices remain at the high level in the future.

According to the results of statistical analysis, shares of rice export market are found to be quite sensitive to export prices in the individual exporting countries. The market price movements determining the competitiveness of Thailand, the U.S., Vietnam and Myanmar are strongly linked to positive response of market shares in world market. In this regard, 1% increase in rice price would bring about increase in export share by 0.34% and 0.50% for the U.S. and Thailand, respectively. The export share of Vietnam was found to be significantly price elastic at 1.48 indicating that 1% increase in price ratio derives 1.48% increase in Vietnamese rice export share. Meanwhile, Myanmar export price is responded not significant implying that rice exports may be manipulated by the government irrationally.

IV. Conclusion
Asian countries such as Thailand and Vietnam are competitive in production costs at current situation but it is weakening as the prices of fuel increase. In contrast, the U.S. can be relatively stronger in production cost competitiveness even though high oil prices adversely affected in agricultural business. However, the export share of Thailand and Vietnam are powerfully responded to export prices in the global market when Myanmar shows non-significant results in price.

In the most of the Asian developing countries, fuel costs are not well subsidized and prices of gasoline are quite high relative to their labor costs. The results in this research imply that the producers in the developing countries are affected more seriously than those in the developed countries by the high oil prices. Accordingly, the governments in the developing countries should consider some kind of subsidy to compensate some of the increased costs that derived from the higher oil prices.

### Table 2. Results of empirical analysis for export price response to export share by OLS

<table>
<thead>
<tr>
<th>Dependent Variable = Export Share</th>
<th>U.S.A</th>
<th>Thailand</th>
<th>Vietnam</th>
<th>Myanmar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.04</td>
<td>0.13</td>
<td>1.73</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.27)</td>
<td>(0.92)*</td>
<td>(0.98)</td>
</tr>
<tr>
<td>Export Share_{t-1}</td>
<td>0.88</td>
<td>0.69</td>
<td>0.79</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>(0.07)***</td>
<td>(0.10)***</td>
<td>(0.09)***</td>
<td>(0.08)***</td>
</tr>
<tr>
<td>Price Ratio_{t}</td>
<td>0.34</td>
<td>0.50</td>
<td>1.48</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>(0.14)**</td>
<td>(0.22)**</td>
<td>(0.50)***</td>
<td>(0.62)</td>
</tr>
<tr>
<td>No. of observations</td>
<td>45</td>
<td>45</td>
<td>22</td>
<td>45</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.78</td>
<td>0.58</td>
<td>0.77</td>
<td>0.72</td>
</tr>
<tr>
<td>Adjusted R-Squared</td>
<td>0.76</td>
<td>0.56</td>
<td>0.75</td>
<td>0.71</td>
</tr>
<tr>
<td>Durbin-Watson Sta</td>
<td>2.28</td>
<td>2.24</td>
<td>2.25</td>
<td>1.90</td>
</tr>
</tbody>
</table>

***, **, * indicate significance level at 1%, 5% and 10%, respectively. Those in parentheses are standard error.

### Reference

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