Market Integration and the Development of Sustainable Palm Oil

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Abstract

Palm oil is one of the world's important commodities with a fairly rapid development. However, with its current management, it is feared that the growth would not be sustained. Therefore, a sustainable palm oil management is needed as an alternative. In order to run well, the sustainable management needs to be supported by the palm oil producers and consumer. In fact, the producers’ support is quite good, but the consumers’ support is not optimal yet, including those from European countries that usually insist the implementation of sustainable palm oil. With such conditions, many parties suggest Indonesia to focus more on other markets such as India, China and Bangladesh, as they have high demand but with fewer requirements. However, it is feared that this will not be a solution because nowadays markets among countries tend to be integrated. In this study these arguments will be tested using the Seemingly Unrelated Regression model with quarterly data 2008-2014 from producer countries such as Indonesia and Malaysia, and from consumer countries such as India, China, Bangladesh, the Netherlands, Germany, Italy and EU28. The result shows that the European countries import volumes are mutually influential with India, China and Bangladesh. The European countries’ volume of imports also influence Indonesia’s and Malaysia’s export volume. However, the influences of India’s, China’s and Bangladesh’s import volume to Indonesia’s and Malaysia’s export volume are greater than that of European countries. Although the European market demands can not be ignored, Indonesia and Malaysia need to pay more attention to the demand from India, China and Bangladesh.

Keywords: sustainable palm oil, market integration, seemingly unrelated regression

1. Background

Palm oil is one of the world's important commodities. With its wide derivative products and competitive price, palm oil demands tend to increase over time. To meet such a demand, producer countries significantly increased the oil palm plantations area. It is recorded that in the last 10 years (2004-2013) the area increased 5,285,692.00 ha (101%), leading to an additional forest clearing. In addition, this also required a significant increase in the chemical fertilizers usage. This raises concerns from various parties regarding the environmental impact and sustainability of oil palm plantations in the long term. However, compared with other vegetable oils, palm oil productivity can reach 10 times higher with only half usage of fertilizers and pesticides (The Guardian, 2014). Therefore, the usage of palm oil is still the best option and can
not be avoided. However, a sustainable palm oil management is still needed to reduce the negative impacts and can be used on an ongoing basis.

Discourse of sustainable palm oil generally comes from palm oil consumers in European countries. Even in 2014 the country Germany, Austria and Switzerland have committed to only use CSPO, and followed by Netherlands, Belgium, UK, France, Norway and Sweden to do so in 2015 (RSPO, 2015). However, this does not automatically follow the willingness of consumer companies from these countries to buy the certified products with premium price. This might be a disincentive for the development of sustainable palm oil since producers have spent extra costs to produce the certified products. In fact, individually, the demand from these European countries is relatively small compared to the demand from India and China, which have less import requirements. Currently, more than 80% of India's imports come from Indonesia. Therefore, many parties suggested that Indonesia should be more concentrated to India and China rather than to the European countries. In fact, many producers are still trying to obtain the certificate as they predict that all countries are interlinked in an open world trade. In addition, as CPO is relatively perishable and more export oriented, the influence of consumer countries might be significant. This study is conducted to analyze these conditions. In the first part the role of producers and the consumers will be analyzed descriptively, and then follows by the SURE model with four scenarios to test the market integration. Finally, a number of concluding comments are made.

2. Method
This study uses secondary data namely (a) quarterly CPO export volumes from Indonesia and Malaysia, and import volumes from Netherlands, Germany, Italy, EU28, India, Bangladesh and China in 2008-2014, (b) the CPO buyer firms’ scorecard values, (c) the quantities and values of CSPO trade and (d) the CSPO premium prices. Data is obtained from (a) ISTAMielkeGmbh, Hamburg, Germany (b) The Central Bureau of Statistics Indonesia, (c) the Ministry of Trade of the Republic of Indonesia, (d) Indonesian Palm Oil Association (GAPKI), (e) the Malaysian Palm Oil Board (MPOB), (f) the Roundtable on Sustainable Palm Oil (RSPO), (g) WWF and(h) Green Palm. Data were analyzed with the following Seemingly Unrelated Regression (SURE) model.
\[
\Delta Y_{it} = \sum_{i=1}^{n} \beta_i \Delta Y_{-it} + \varepsilon_i
\]

where the left side is the amount of import or export volumes in the country \(i\), while the right side is the amount of import or export volumes in the country other than \(i\), \(\varepsilon\) is the error term, and \(\beta\) is the regression coefficient. The model is modified from the model of Ravallion model (1986), which was used to estimate the partial linkages between horizontal markets. In integrated markets, price movements in a market or price are transmitted to other markets. Thus the model can be used to analyze whether the movement of the European countries’ import volume will influence the import volumes from India, China or Bangladesh, or will influence the export volumes from Indonesia or Malaysia, and vice versa. The model has been widely used in estimating the horizontal integration among different markets, both domestic (Virmani and Mittal, 2006; Firdaus and Gunawan, 2012) and international markets (Wu, 2001).

The first and second scenarios are designed to examine the relationship between importer countries. The assumption is that the perception of country \(i\) will be reflected in its import volume. If this influences the perception of the country \(j\), the regression coefficient \(\beta_{ij}\) will be significant, and vice versa. In this case the volume of imports will be analyzed the influence of European countries against import volume of the countries of India and China. The third and fourth scenarios are designed to examine the relationship between importing and exporting countries. The assumption is that the traded volume can be supply driven or demand driven. If supply-driven, the export volume will significantly influence the imports volumes, and vice versa if demand driven.

3. Results

The Role of Producers

The role of producers in supporting the development of sustainable palm oil is by producing FFB, CPO and its derivatives in accordance with the sustainability principle and criteria. The implementations can be seen from the certificate acquisition such as RSPO (Roundtable on Sustainable Palm Oil), ISPO (Indonesia Sustainable Palm Oil) or MSPO (Malaysian Sustainable Palm Oil). Therefore, the role of the manufacturer can be approximated from the development of certified oil palm plantation and CSPO. RSPO certification is not mandatory but the demand for
RSPO certificate appear to continuously increase and until 2014, 57 growers and 258 palm oil mills have obtained the RSPO certificate. This includes around 3 million hectares of plantations and 11 million of CSPO, in which 81% of the total certified area and 90% of the CSPO came from Indonesia and Malaysia. Details of the development areas follows.

Table 1. The Development of Certified Oil Palm Production Area and CSPO Supply, 2008-2014

<table>
<thead>
<tr>
<th>Area</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>Apr-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>production area (ha)</td>
<td>106,384</td>
<td>264,952</td>
<td>644,816</td>
<td>1,130,969</td>
<td>1,526,273</td>
<td>1,978,110</td>
<td>2,280,272</td>
</tr>
<tr>
<td>certified area (ha)</td>
<td>125,288</td>
<td>304,421</td>
<td>718,080</td>
<td>1,299,891</td>
<td>2,105,433</td>
<td>2,653,058</td>
<td>2,825,731</td>
</tr>
<tr>
<td>annual production capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSPO (mt)</td>
<td>619,012</td>
<td>1,473,912</td>
<td>3,522,207</td>
<td>5,573,202</td>
<td>8,184,200</td>
<td>9,792,185</td>
<td>10,763,261</td>
</tr>
<tr>
<td>CSPK (mt)</td>
<td>154,335</td>
<td>338,740</td>
<td>803,999</td>
<td>1,296,488</td>
<td>1,896,702</td>
<td>2,244,312</td>
<td>2,486,116</td>
</tr>
<tr>
<td>Supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSPO (mt)</td>
<td>163,364</td>
<td>1,357,511</td>
<td>2,773,567</td>
<td>4,798,512</td>
<td>6,724,236</td>
<td>8,735,843</td>
<td>3,446,570</td>
</tr>
<tr>
<td>CSPK (mt)</td>
<td>41,811</td>
<td>321,322</td>
<td>640,316</td>
<td>1,111,998</td>
<td>1,570,070</td>
<td>2,030,746</td>
<td>793,433</td>
</tr>
</tbody>
</table>

Source:

Table 1 shows that in 5 years (2008-2014) the certified land area and CSPO have significantly increased by more than 22 fold and more than 21-fold, respectively although the cost of certification is quite expensive, especially for smallholders. According to WWF there are at least four certification cost components in RSPO certification namely the cost for (1) initial certification and staffing, (2) staffs’ and smallholders’ trainings, (3) corrective actions and(4) ongoing certification and maintenance, with an estimated cost per ha from about US$ 11.91 to US$ 66.57 (WWF, 2012). This means that oil palm producers have spent about US$27,160,691 to US$151,792,602 for the total of 2,280,272 ha certified land area in 2013. Therefore, premium price is needed to cover the extra costs. However, premium price is not the only factor that influences the implementation of sustainable palm oil. Chalil and Barus (2013) find that age, years of knowing RSPO, continuity in sales, an increase in oil palm production, and participation in trainings are other factors that also influence oil palm producers’ participation in implementing the sustainable palm oil and paying costs incurred from the implementation. This also includes smallholders, although in general they have limited capital and a greater gap between their existing condition and the required sustainable management.
The Role of Consumers

Besides producers, consumers also play an important role in the development of sustainable palm oil. They include end consumers and intermediate consumers. The latter includes refineries and manufactures that use of CPO or its derivatives to produce intermediate or final products. The consumers spread across more than thirty countries, while the producers only exist in five countries. In many countries, especially European countries, the demand from end consumer appears to be the key driver for manufacturers to produce sustainable palm oil. However the development of the manufacturers’ support to sustainable palm oil is likely to be higher than those of the consumers. From 2008 to 2010 CSPO has significantly increased from 2.73% to 46.20% of the total CSPO production, but since then this maintain at 52% (Figure 1). This means that almost half of the CSPO production is still sold as the non certified CPO. If left unchecked this can be a disincentive to the development of CSPO production, hence the development of sustainable palm oil.

Source: www.rspo.org/about/impacts

Figure 1. Certified Sustainable Palm Oil Supply and Sales (mt)

The low CSPO absorption might stem from the different characteristics between the producers and consumers. Main producers in Indonesia and Malaysia (which contribute 86% of the world CPO total supply (WWF, 2013a)) is dominated by big companies, while most end consumers in European countries are households. This means that the number of producers are far less than the
consumers. An additional production from a big company will be much more than an additional consumption from members from a household. Moreover, in some European countries sustainable palm oil concern does not come from the manufacturers and refineries but from environmental NGOs. Therefore, the manufacturers and refineries do not fully commit to buy and use CSPO. WWF survey results (2013) show that only 39 out of the 52 retailers use CSPO, and only 21 have 100% CSPO usage. From 78 manufacturers, only 60 use CSPO and only 24 have 100% CSPO usage. From four Indian companies that are included in the survey, none uses CSPO (WWF, 2013a).

In addition to the low CSPO uptake, premium price for the CSPO in unlikely realized. No definite provision for premium price in each CSPO trade. Although premium price is not the only factor that influences consumers' decision to get the certification, but in general the greater the difference between premium and non premium price, the greater willingness of producers to get a certificate will be. In fact, from 2012 to 2014 the premium price tends to decrease. In 2010, difference could reach US$13, but in 2014 only US$3.64 in January and US$0.70 in December (Figure 2).


Figure 2. The Development of Premium Price, 2010-2014
Market Integration
As been described previously, the benefits of producing CSPO have not been fully enjoyed by the producers. Although the CSPO requirement mostly comes from European countries, this still need to be considered as palm oil markets might be integrated one to another. Results of the SURE model can be seen in the following scenarios.

Scenario 1: Integration among Consumer Countries with Individual EU countries
In this scenario the system consists of 6 equations of import volumes from India, China, Bangladesh, the Netherlands, Germany and Italy. The results are as follows.

(1) China = -5.23 – 2.31**Bangladesh + 1.81*Germany + 0.63**India – 0.69Italy + 0.42**Netherlands
(2) Bangladesh = -2.08 - 0.17**China + 0.45*Germany + 0.18**India - 0.36Italy + 0.37*Netherlands
(3) Germany = 5.18 + 0.11China + 0.37*Bangladesh - 0.18**India + 0.98**Italy – 0.13Netherlands
(4) India = 10.80 + 0.53**China + 2.08**Bangladesh - 2.44**Germany + 3.57**Italy – 0.13Netherlands
(5) Italy = -2.28 - 0.02China – 0.14Bangladesh + 0.44**Germany + 0.12**India + 0.00Netherlands
(6) Netherlands = 1.62 + 0.25**China + 0.91**Bangladesh – 0.37Germany - 0.03India + 0.03Italy

note: * : significant at α5%
** : significant at α1%

The results show that import volumes in Germany, India and Netherlands positively influence the import volumes in China, with the largest influence coming from Germany. In contrast, the import volume in Bangladesh negatively influences the import volume in Chinese, which appears to be even larger from that of the Germany. Similar results appear in the Bangladesh equation. Import volumes in China, Germany, India and the Netherlands significantly influence the import volume in Bangladesh, with a negative coefficient from China
and positive from other countries. The import volume in Germany is significantly influenced by the import volumes in India, Bangladesh and Italy. The import volume in India is significantly and positively influenced by the import volumes in China, Bangladesh, Germany and Italy. The import volume in Italy is only influenced by the import volume in Germany and India, while that in the Netherlands is only influenced by the import volumes in China and Bangladesh. This shows that individually the import volume in EU countries influence those in India and China, and vice versa. However, the influence of European countries to India or China is greater than vice versa. For example the coefficient regression of Italy to India is 3.57, while conversely the coefficient regression of India to Italy is only 0.12.

**Scenario 2: Integration among Consumer Countries with EU28 as A Single Entity**

In this scenario the system consists of 4 equations of import volumes from China, Bangladesh, India, and EU28. The results are as follows.

(1) China = \(6.79 + 1.04\text{Bangladesh} + 0.39**\text{India} + 0.39**\text{EU28}\)

(2) Bangladesh = \(-0.61 + 0.07\text{China} + 0.15**\text{India} – 0.11**\text{EU28}\)

(3) India = \(-2.30 + 0.46**\text{China} + 2.68**\text{Bangladesh} + 0.12\text{EU28}\)

(4) EU28 = \(-8.88 + 1.28**\text{China} – 5.50**\text{Bangladesh} + 0.34\text{India}\)

Note: * : significant at \(\alpha_{5\%}\)

** : significant at \(\alpha_{1\%}\)

Results from the 4 equations show that import volume in EU28 significantly influences import volumes in China and Bangladesh but not India, and vice versa. This is slightly different from results in scenario 1, in which import volumes in Germany and Italy significantly influence the import volume in India, and vice versa. This might be explained by the small share of the Germany and Italy import values in 2008-2014 to the total volume of EU28 import value, which ranges of 4.31% -7.60% and 2.84% -7.78%, respectively (Eurostat, 2015)

**Scenario 3: Integration among Consumer and Producer Countries with Individual EU countries**

In this scenario the system consists of 8 equations of import volumes in China, Bangladesh,
Germany, India, Italy and the Netherlands EU28, and export volumes in Indonesia and Malaysia. The results are as follows.

(1) China = -3.20 - 1.49**Bangladesh + 1.90**Germany - 0.03India – 2.84**Italy - 0.14Netherlands + 0.04 Indonesia + 0.82**Malaysia

(2) Bangladesh = 0.01 – 0.24**China + 0.61**Germany + 0.15*India - 0.64Italy + 0.12Netherlands - 0.02Indonesia + 0.16*Malaysia

(3) Germany = 0.96 + 0.24**China + 0.47**Bangladesh - 0.12*India + 1.09**Italy + 0.14Netherlands + 0.02Indonesia - 0.22**Malaysia

(4) India = -11.95 - 0.04China + 1.26*Bangladesh - 1.36*Germany + 0.55Italy + 0.52Netherlands + 0.25Indonesia + 0.00Malaysia

(5) Italy = -1.94 - 0.15**China - 0.20Bangladesh + 0.45**Germany + 0.02India - 0.06Netherlands + 0.01Indonesia + 0.13**Malaysia

(6) Netherlands = 7.59 - 0.05China + 0.25Bangladesh + 0.38Germany + 0.12India - 0.35Italy - 0.08**Indonesia + 0.27**Malaysia

(7) Indonesia = 68.71 + 0.52China - 1.26Bangladesh + 2.26Germany + 2.11**India + 3.39Italy - 3.05**Netherlands + 0.44Malaysia

(8) Malaysia = -4.27 + 0.91**China + 1.13*Bangladesh - 0.21**Germany + 0.00India + 2.87**Italy + 0.90**Netherlands + 0.04Indonesia

note: * : significant at α5%
    **: significant at α1%

Results of the 8equationestimation show that export volumes in producer countries and import volumes in consumer countries influences one to another. Except for the coefficients between Indonesia and the Netherlands, and between Malaysia and Germany, all others have positive signs. However, magnitudes of the coefficients show that influences from consumer countries (such as India, China, Bangladesh, Germany, Italy and the Netherlands) to the producer countries (such as Indonesia and Malaysia) are greater than vice versa.
Scenario 4: Integration among Consumer and Producer Countries with EU28 as A Single Entity

In this scenario the system consists of 6 equations of import volumes in China, Bangladesh, India and EU28, and export volumes in Indonesia and Malaysia. The results are as follows.

(1) China = 8.68 - 0.25Bangladesh - 0.30India + 0.14*EU28 + 0.02Indonesia + 0.70**Malaysia
(2) Bangladesh = 0.18 - 0.03China + 0.06India - 0.10EU28 + 0.00**Indonesia + 0.09Malaysia
(3) India = -12.72 - 0.42China + 0.67Bangladesh - 0.03EU28 + 0.22**Indonesia + 0.46**Malaysia
(4) EU28 = -26.84 + 0.84*China - 5.16**Bangladesh - 0.11India + 0.26*Indonesia - 0.02Malaysia
(5) Indonesia = 78.23 + 0.26China + 0.54Bangladesh + 2.11**India + 0.56*EU28 - 0.14Malaysia
(6) Malaysia = 10.45 + 1.05*China + 1.16*Bangladesh + 0.50**India - 0.01EU28 + 0.02Indonesia

note: * : significant at $\alpha_{5\%}$
** : significant at $\alpha_{1\%}$

Similar results can be seen from this scenario that treated European countries as a single entity. Export volumes in producer countries and import volumes in consumer countries influence one to another, but the influence from consumer countries to producer countries are greater than vice versa.

4. Conclusions

From the previous discussion it can be concluded that basically both palm oil producers and consumers agree with the sustainable palm oil idea. However, the implementation of the idea tends to be stronger among producers than consumers although the latter are likely to campaign more. The campaign mostly come from European countries, in which individually are not the largest importers but appears to be the second largest importer as the EU28. This makes palm oil
producer countries, such as Indonesia and Malaysia cannot just shift their export focus to the large consumer markets such as India, China and Bangladesh. The estimation results show that importer countries influence one another. The estimation results also show that the influence of consumer countries to producer countries is greater than vice versa. However, the greatest influence to Indonesia and Malaysia do not come from European countries, either individually or in groups, but India, China and Bangladesh. Therefore the suggestions that are not only focused on European countries are not completely wrong. In other words, India, China and Bangladesh markets needs to be maintained and enhanced as an alternative export markets for producer countries such as Indonesia and Malaysia. However, it is worth noting that the aim of implementing of the principles and criteria in the certificate is not merely to enjoy premium prices or continuous sale, but also to enjoy higher and longer production in the long term. Therefore although costly and needs extra effort, the influence of European countries and market integration could be a positive influence for the development of sustainable palm oil.