

Assessing the Competitiveness of Malaysia and Indonesia Palm Oil Related Industry

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This study aims to examine the comparative advantage of palm oil related products in Malaysia and Indonesia using the Revealed Comparative Advantage (RCA) approach introduced by Balassa (1989). Our findings based on 20 related palm oil products show the following. Firstly, the RCA indexes for these products in both countries are unstable during the analytical period. Secondly, Malaysia is more competitive than Indonesia in most of the downstream palm oil related industries such as S3-42229, S3-42249, S3-43122, S3-51217, S3-51222 and S3-55419. Thirdly, in some industrial activities, both countries show that the development of certain palm oil industrial products are consistent with the product life cycle (PLC) theory. They are mainly upstream industrial products such as the S3-08138, S3-42221, S3-42231, S3-42239, and S3-42241 commodities. As the biggest producers of palm oil, both countries should put more emphasis on downstream industrial products--which are of higher value-added--taking the benefit of their comparative advantage in upstream industries.

JEL Codes: F14, and Q17

1. Introduction

Over the last four decades, the palm oil industry has expanded dramatically as one of the global major oils and fats resources. The share of palm oil production from total world oils and fats has increased by 16.8 percent, from only 4 percent in 1962 to 20.8 percent in 2002 (Basiron et al., 2004). This significant figure portrays the importance of palm oil as one important source of Malaysia's export incomes. From merely concentrated on simple cultivation and crude oil processing during early 1980s, palm oil industry in Malaysia has grown to more diversified downstream products which are of higher value-added (Rasiah and Shahrin, 2006).

In spite of significant and drastic share of palm oil related products in world production, there is still a large gap in existing literature in addressing the issues pertain to the development of this sector. The shortcoming is mainly because of two reasons. Firstly, due to the nature of palm oil industry; and secondly, due to insufficient statistical information, which impedes empirical studies on the economic impacts and business potential. On the other hand, studies on environmental impacts of palm oil plantation, which are rather critical especially to the producing countries, are well documented. As far as analytical studies on business and economic potential of palm oil related industrial sector is concerned, a large bulk of the existing documents related to Malaysia

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and Indonesia mostly emphasize on the aggregate trade volume and its contributory role to the gross domestic product (GDP).

Notwithstanding the fact that both countries are the largest palm oil producers in the world, there are limited empirical evidences that illustrate their competitiveness in the production of downstream products in palm oil industry. McCarthy, Gillespie, and Zen (2012) critically assert that insufficient empirical analyses of local production network in palm oil industry have resulted in manufacturing lower value-added downstream palm oil products in the two major producing countries.

For this reason, this study aims to assess the comparative advantage of palm oil related products in Indonesia and Malaysia. The analysis focuses on the micro level of production activity in palm oil industry where the empirical findings could be of policy relevancy for the government in both countries.

2. Literature Reviews

The development of some robust empirical methods in tandem with the advancement of statistical softwares have influenced a large number of analytical studies to concentrate on specific issues such as identifying the determinants of microeconomic and macroeconomic variables. Similar trend is also being observed in palm oil industry related studies like in Talib and Darawi (2002), Ramasamy, et. Al. (2005), Chalil (2008), Applanaidu, *et.al.* (2011), and Asari et al. (2011). With different analytical methods and approaches, these studies attempt to explain the factors behind the return and growth of palm oil production. The findings are mixed but they are complementary and mutually supportive. It is noteworthy to underline that these studies are characterized in one aspect, viz., the level of industrial activities chosen as the dependent variable. This chosen activities is the upstream palm oil production activities. In other words, they worry more on the production of oil palm at the level of plantation and refinery level. Empirical studies on the palm oil industry rarely examine the potential of downstream products. For example, Applanaidu et. al. (2011), Asari et. al. (2011), Sulistyanto and Akyuwen (2011), attempt to identify those factors that determine the oil palm production. Meanwhile, Ramasamy, et. Al. (2005) focus on the determinants of the rate of returns (before tax) of palm oil industry. In term of policy implications, there are not many differences because the findings provide suggestions that are prescribed narrowly for the palm oil production. In other words, the findings are useful in terms of the mechanism for evaluating the investment performance of palm oil production activities. It has less implication on how a palm oil producing countries could create more value-added from their comparative advantage as producers.

Palm oil has been identified as one of the main raw materials for many high end products that have universal demand. It can be separated into a wide range of distinct oils with different properties that can be used in a variety of products which in the past were sourced from animals or vegetables. Currently, it is a major source of sustainable and renewable raw material for the world's food, oleochemical and biofuel industries. In general, palm oil is used as cooking oil and is the main ingredient for most margarine. Moreover, it is the basic material for most liquid detergents, soaps, shampoos, lipstick, waxes and polishers. Palm oil is also important in reducing frictions during the manufacturing process of steels.

Looking at the variety of finished goods of palm oil, it is therefore crucial to narrow the analysis to factors that affect the performance of downstream activities of palm oil industry. In the existing literature, there are many studies that attempt to analyze the competitiveness and business growth potential of these industries. One influential study in those particular areas was conducted by Hassanpour and Ismail (2010). They analyze the competitiveness of Malaysian palm oil products compared to other industrial plantation products in selected ASEAN countries as well as in China. The annual export data in year 2004 and 2006 for seven groups of products based on the standard commodity categories as defined in the harmonized tariff system (HTS) at the four-digit level were employed in that empirical inquiry. Using revealed symmetric comparative advantage (RSCA) indices, the empirical findings revealed that Malaysia has a comparative advantage in six products, which are palm oil, coconut and palm kernel oil, cocoa butter, cocoa powder, cocoa paste and pepper. Similar study also reveals that Indonesia is ranked first while Malaysia is ranked second in competitiveness position of palm oil products. The category of product highlighted in that research can be classified as low value added industrial activity. However, more of such type of empirical analysis is of practical relevancy because the findings provide implications for enhancing the oil palm related goods production.

3. Methodology

This study intends to examine the competitiveness of downstream palm oil products in Malaysia and Indonesia. For this purpose, we employ a method that measures the production capacity of one country against the rest of the world. Moenius (2006) suggests two measurement methods for comparative advantage,. The first method is based on production data (Harrigan, 1997) and the second one uses export data (Balassa, 1965). There are many empirical studies on trade that devote to the analysis of comparative advantage which based on export data. For example, Yue (2001), Laursen (1998), Ferto and Hubbard (2002), Bender and Li (2002), Utkulu and Seymen (2004) as well as Benedictis and Tambari (2001) represent this school of thought. Similarly, this study intends to apply the export-based measurement.

In determining the comparative advantage of certain products in the market, the measurement of standardized net export shares called revealed comparative advantages (RCA) is preferred by most of the researchers. According to Balassa (1965), the RCA is a measurement of country's comparative advantage based on relative export ratio of a particular commodity of a particular country against that of the world. The RCA index pioneered by Balassa (1965) is extremely useful for empirical research on trade patterns. This RCA measurement may not distinguish between the factors endowment effects from the trade policy. However, it provides indication on the movement in a region's comparative advantage (Bender and Li, 2002). It has a role to quantify the commodity specific degree of comparative advantage (Aini, Roda and Fauzi, 2010). RCA indices provide useful guides to underlying comparative advantage, which in turn provides crucial insight into the competitiveness of Malaysian and Indonesian palm oil related products.

In this study, we adopt the formula introduced by Balassa (1989) as expressed in Formula (1). This formula in general calculates the relative export ratio of a particular commodity against the total export of one country to the relative ratio of total export of the same commodity against the total export value of the world. The underlying reason

to the application of relative export rather than the net-export in this formula rests upon the system of trade protection.

$$RCA_i^j = \frac{X_i^j / X_t^j}{X_i^w / X_t^w} \quad (1)$$

Where, RCA is the index of revealed comparative advantage; X_i^j is the export of commodity i by country j; X_t^j is total export of country j; X_i^w is export of commodity i in the world; and X_t^w is total export of the world.

Based on this formula, if the index exhibits a value greater than one, it means that the particular product has a comparative advantage in the exportation of the goods. This indicates that a country produce those goods that in which it is relatively cost efficient. Conversely, if the index is less than one, it indicates a comparative disadvantage in the exportation of that particular products. However, a commodity does not necessary has higher export share even though it has higher RCA index. It is because the RCA index is derived from two sets of relative export values, which are the country's relative export value and the world relative export performance. Hence, the flow of RCA index is disregard of its contribution to the national export income but depending on the relative size of demand and supply in both national and international market. Therefore it is also imperative to weigh the RCA index findings with the total export volume of that particular commodity and it share from total export.

4. Output and Discussions

Table 2 and Table 3 show the RCA measurement results for Malaysia and Indonesia, respectively. The highlighted cell shows the comparative advantage indexes that are greater than one ($RCA > 1$) for 20 selected palm oil products between 1989 and 2010. Table 2 illustrates that Malaysia recorded high RCA indices for most of the products especially the S3-08138 (Oilcake and other solid residues of oil from palm kernel), S3-42229 (Palm oil, refined, and its fractions), and S3-42249 (Palm kernel or babassu oil, refined, and fractions) products throughout the period. This is self-explanatory because Malaysia is one of the biggest palm oil producers. However, being one the biggest producers of crude and refined palm oil does not warrant a natural evolution of a diversified and a specialized development in agriculture industry, which brings about higher value-added products. In order to sustained a long term development of agricultural sector, it is imperative for that sector to move from low to high value-added sector over time. In the case of palm oil industry, its comparative advantage can be maintained by diversifying from upstream to a broader scope of downstream industrial products that are of higher value-added. In spite of such reasoning, the competitiveness of downstream industrial palm oil products still remain weak. As shown in our Table 2, the value of Malaysia's RCA of most of the high value-added palm oil products such as S3-55411, S3-55415, and S3-55419 are very low and the situation is even worse off--which implies the comparative disadvantage--for those products being classified as S3-55421, S3-55422, and S3-55423.

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As far as Indonesia is concerned, although it also has the comparative advantage in the production of most products where Malaysia has shown comparative advantage, the RCA index is rather low. This low RCA index on Indonesia part is mainly because in comparison to Malaysia it was a late comer in commercial agricultural-based industry. This is obvious from the RCA indices for most of the product, where Indonesian figures are lower than those of Malaysia. Such pattern, with some commodities show the interception of RCA indices between the two countries reflects the transition process which is consistent with the product life cycle (PLC) theory.

**Table 1: Selected Palm Oil Related Products under the SITC Revision 3
Commodity Code and Details**

| Products Code | Name of Palm Oil Products |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S3-08138 | Oilcake and other solid residues of oil from palm nuts or kernel |
| S3-09101 | Margarine (excluding liquid margarine) |
| S3-42131 | Groundnut oil, crude |
| S3-42139 | Groundnut oil, refined, and its fractions |
| S3-42219 | Linseed oil, refined, and its fractions |
| S3-42221 | Palm oil, crude |
| S3-42229 | Palm oil, refined, and its fractions |
| S3-42231 | Coconut (copra) oil, crude |
| S3-42239 | Coconut (copra) oil, refined, and its fractions |
| S3-42241 | Palm kernel or babassu oil, crude |
| S3-42249 | Palm kernel or babassu oil, refined, and fractions |
| S3-43122 | Vegetable fats and oils and their fractions, partly or wholly hydrogenate |
| S3-51217 | Fatty alcohols, industrial |
| S3-51222 | Glycerol (glycerine); glycerol waters and glycerol lyes |
| S3-55411 | Soap and organic surface-active products and preparations, in the form of bars, cakes, moulded pieces or shapes, and paper, wadding, felt and non-wovens, impregnated, coated or covered with soap or detergent, for toilet use (including medicated products) |
| S3-55415 | Soap and organic surface-active products and preparations, in the form of bars, cakes, moulded pieces or shapes, and paper, wadding, felt and non-wovens, impregnated, coated or covered with soap or detergent, for other uses |
| S3-55419 | Soap in other forms |
| S3-55421 | Organic surface-active agents (other than soap), whether or not put up for retail sale |
| S3-55422 | Surface-active washing or cleaning preparations, n.e.s., put up for retail sale |
| S3-55423 | Surface-active washing or cleaning preparations, n.e.s., not put up for retail sale |

Looking at the PLC trend of palm oil industrial products in both countries, this commercial agricultural sector is still rather static in term of development process. Following the PLC theory, Malaysia should—at the time Indonesia is revealing its comparative advantage in S3-08138, S3-42229, and S3-42249 products—have moved to a broader scope of downstream palm oil processing activities. This is noteworthy because in other advanced nations, agricultural sector is play a crucial role in

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generating national income. In the United State for example, the high-value share of commodity accounts for about 60 percent of agricultural output (see USDA, 2012).

Table 2: Palm Oil Related Industries RCA Index for Malaysia, 1989-2010

| Malaysia-World | 1991 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| S3-08138 | 61.53 | 31.52 | 25.12 | 39.09 | 46.52 | 37.35 | 30.59 | 23.40 | 32.05 | 51.69 | 38.16 | 18.58 | 35.96 |
| S3-09101 | 0.74 | 0.56 | 0.33 | 0.55 | 0.62 | 0.52 | 0.46 | 0.48 | 0.76 | 0.93 | 1.48 | 1.52 | 0.77 |
| S3-42131 | 0.20 | 0.00 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| S3-42139 | 0.09 | 0.01 | 0.05 | 0.87 | 0.01 | 0.02 | 0.08 | 0.02 | 0.04 | 0.06 | 0.08 | 0.39 | 0.07 |
| S3-42219 | 0.06 | 2.11 | 0.38 | 0.39 | 0.33 | 0.30 | 0.37 | 0.11 | 0.22 | 0.29 | 0.75 | 0.62 | 0.47 |
| S3-42221 | 13.45 | 1.01 | 8.87 | 23.21 | 25.94 | 20.09 | 16.08 | 14.56 | 22.92 | 25.16 | 21.70 | 16.95 | 17.27 |
| S3-42229 | 81.56 | 54.06 | 25.76 | 41.99 | 59.52 | 50.45 | 37.88 | 31.85 | 38.32 | 55.08 | 54.82 | 37.21 | 41.53 |
| S3-42231 | 6.00 | 1.64 | 1.96 | 0.91 | 1.25 | 2.21 | 2.65 | 2.60 | 2.21 | 2.96 | 3.13 | 1.24 | 1.32 |
| S3-42239 | 12.13 | 5.47 | 2.62 | 2.79 | 10.04 | 14.13 | 12.46 | 12.37 | 7.95 | 13.33 | 14.11 | 9.24 | 12.50 |
| S3-42241 | 42.67 | 5.30 | 1.54 | 5.55 | 8.19 | 9.30 | 15.69 | 7.61 | 5.29 | 14.29 | 10.43 | 7.56 | 10.07 |
| S3-42249 | 69.04 | 43.06 | 22.30 | 35.64 | 60.14 | 57.58 | 47.46 | 41.17 | 32.71 | 62.03 | 61.03 | 36.39 | 61.39 |
| S3-43122 | 29.33 | 24.53 | 11.54 | 17.97 | 26.05 | 26.61 | 24.10 | 22.08 | 21.47 | 32.11 | 32.08 | 27.83 | 37.36 |
| S3-51217 | 3.08 | 0.00 | 10.62 | 12.76 | 12.25 | 14.22 | 13.15 | 14.94 | 9.43 | 14.88 | 10.65 | 10.33 | 18.59 |
| S3-51222 | 9.60 | 16.22 | 24.19 | 15.71 | 15.14 | 18.12 | 15.01 | 15.24 | 14.57 | 24.24 | 26.36 | 8.59 | 14.02 |
| S3-55411 | 2.50 | 2.72 | 2.29 | 2.81 | 2.26 | 2.13 | 3.46 | 2.48 | 2.07 | 2.90 | 2.77 | 2.72 | 1.52 |
| S3-55415 | 1.36 | 1.43 | 0.24 | 0.25 | 0.44 | 0.20 | 1.25 | 1.11 | 0.16 | 0.13 | 0.19 | 0.35 | 0.28 |
| S3-55419 | 4.05 | 6.22 | 5.71 | 5.87 | 7.24 | 8.55 | 5.48 | 7.63 | 8.96 | 10.24 | 12.30 | 15.04 | 11.61 |
| S3-55421 | 0.02 | 0.08 | 0.13 | 0.14 | 0.20 | 0.38 | 0.39 | 0.43 | 0.74 | 0.79 | 1.04 | 0.90 | 0.84 |
| S3-55422 | 0.71 | 0.48 | 0.21 | 0.33 | 0.26 | 0.26 | 0.20 | 0.25 | 0.20 | 0.24 | 0.28 | 0.38 | 0.32 |
| S3-55423 | 0.13 | 0.16 | 0.46 | 0.64 | 0.77 | 0.73 | 0.36 | 0.28 | 0.34 | 0.34 | 0.46 | 0.54 | 0.38 |

Table 3: Palm Oil Related Industries RCA Index for Indonesia, 1989-2010

| Indonesia-World | 1991 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|-----------------|--------|-------|-------|-------|--------|-------|--------|-------|-------|--------|--------|-------|-------|
| S3-08138 | 22.34 | 19.54 | 19.87 | 23.49 | 38.16 | 31.60 | 45.75 | 31.51 | 46.88 | 80.81 | 61.86 | 27.17 | 48.33 |
| S3-09101 | 0.17 | 0.49 | 2.51 | 4.65 | 7.61 | 7.61 | 5.27 | 4.38 | 3.80 | 4.67 | 5.49 | 3.36 | 3.02 |
| S3-42131 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| S3-42139 | 0.00 | 0.00 | 0.02 | 0.07 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.00 |
| S3-42219 | 0.00 | 0.00 | 0.00 | 0.11 | 0.58 | 0.07 | 0.05 | 0.02 | 0.36 | 0.06 | 0.12 | 0.00 | 0.01 |
| S3-42221 | 136.92 | 76.64 | 69.96 | 51.63 | 97.20 | 71.46 | 76.11 | 67.67 | 78.79 | 115.15 | 109.86 | 77.83 | 71.98 |
| S3-42229 | 1.64 | 3.85 | 10.96 | 21.60 | 38.53 | 29.31 | 31.72 | 30.55 | 40.31 | 50.20 | 42.54 | 30.87 | 30.17 |
| S3-42231 | 63.13 | 11.65 | 55.17 | 14.64 | 26.57 | 22.63 | 39.14 | 47.38 | 20.96 | 68.48 | 50.89 | 24.42 | 34.78 |
| S3-42239 | 6.53 | 3.91 | 7.83 | 7.03 | 18.54 | 21.27 | 12.36 | 15.83 | 14.84 | 22.75 | 33.91 | 16.07 | 26.07 |
| S3-42241 | 28.90 | 77.44 | 43.26 | 57.27 | 127.16 | 80.00 | 134.79 | 81.71 | 80.86 | 128.25 | 105.17 | 78.91 | 97.73 |
| S3-42249 | 2.09 | 1.09 | 15.40 | 15.24 | 32.00 | 24.09 | 37.28 | 35.25 | 24.69 | 51.47 | 38.89 | 23.37 | 31.66 |
| S3-43122 | 0.10 | 1.12 | 0.75 | 1.13 | 1.84 | 1.51 | 1.90 | 1.34 | 7.19 | 11.08 | 7.41 | 1.74 | 3.19 |
| S3-51217 | 4.34 | 6.54 | 6.68 | 5.56 | 5.80 | 6.88 | 8.11 | 9.83 | 6.84 | 9.30 | 11.14 | 10.31 | 13.90 |
| S3-51222 | 2.91 | 8.48 | 8.62 | 5.33 | 4.71 | 4.44 | 6.67 | 6.96 | 6.89 | 12.78 | 13.35 | 4.59 | 8.60 |
| S3-55411 | 3.94 | 4.84 | 6.76 | 9.00 | 9.44 | 9.23 | 9.38 | 8.84 | 8.23 | 10.79 | 12.09 | 13.65 | 8.19 |
| S3-55415 | 4.79 | 3.34 | 6.20 | 3.01 | 2.88 | 2.91 | 2.75 | 3.51 | 3.13 | 3.73 | 4.40 | 3.78 | 3.39 |
| S3-55419 | 0.55 | 0.38 | 0.22 | 0.38 | 0.64 | 0.43 | 2.24 | 3.17 | 2.84 | 3.26 | 2.66 | 3.85 | 2.63 |
| S3-55421 | 0.68 | 0.49 | 0.63 | 0.89 | 0.86 | 0.89 | 0.79 | 0.60 | 0.68 | 0.89 | 0.87 | 0.82 | 0.70 |
| S3-55422 | 0.35 | 0.64 | 0.71 | 0.96 | 1.04 | 1.15 | 1.17 | 0.99 | 0.96 | 0.89 | 0.90 | 1.15 | 0.65 |
| S3-55423 | 0.24 | 0.10 | 0.21 | 0.27 | 0.36 | 0.48 | 0.48 | 0.44 | 0.43 | 0.41 | 0.45 | 0.41 | 0.36 |

5. Conclusions

This study examines the competitiveness of palm oil related industry in Malaysia and Indonesia from year 1989 to year 2010. Our findings based on 20 related palm oil products show the following. Firstly, the RCA indices for these products in both countries are unstable during the analytical period. Secondly, Malaysia is more competitive in most of the downstream palm oil related industries such as S3-42229, S3-42249, S3-43122, S3-51217, S3-51222 and S3-55419 compare to Indonesia. Thirdly, in some industrial activities, both countries revealed the transition process as recommended by the product life cycle (PLC) theory. This mainly happens in upstream industry activities such as the S3-08138, S3-42221, S3-42231, S3-42239, and S3-42241 commodities. As the biggest producer of palm oil, both countries should have emphasized more on downstream industries taking the benefit of their comparative advantage in upstream industries.

5.1 Policy Implications

Given that Malaysia and Indonesia are the leading global palm oil producers, both countries should have the potential to further enhance their comparative advantage as palm oil related industrial products. In order to create higher value-added products vis-a-vis their comparative advantage as palm oil producers, Malaysia and Indonesia should enhance its research and development (R&D) activities in palm oil related industries. Both countries should emphasize on the palm oil products that have comparative advantages in the production, especially for those products which have high comparative advantage indices. Both countries must take initiatives to shift the border of palm oil export share from upstream dominant activities to downstream activities with higher value-added products. The government should enhance the existing research institutes to generate better product innovation and process innovation. This is a crucial driver for achieving higher product values, hence improving term of trade in both countries with the rest of the world especially the developed nations.

Apart from that, both countries are encouraged to shift their factor intensity in production of palm oil products from labor-intensive production activities to technology intensive production activities. This will boost the productivity of both upstream and downstream industries and at the same time improve the quality of the products. Hence, both countries should shift the factor intensity from labor based to technology based in order to strengthen the production of higher value-added palm oil products.

All these would need continuous government support by enhancing existing agricultural related institutions, infrastructures, better incentive schemes and welfare for agricultural workers.

5.2 Limitations of the Study

It should be cautioned that our empirical findings represent the overall comparative advantage of Malaysia and Indonesia in palm oil products exportation markets. Nevertheless, this study contributes to narrow the gap in existing literature which is limited by the inadequacy of information in this research area, which is of great potential to increase future research attention. The number of commodities covers in this study is limited to 20 potential palm oil products. There is a likelihood that this study has failed to identify other palm oil products. As such, our empirical analysis is constrained by the limited scope on palm oil products. Therefore, more palm oil products should be included in future studies.

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