

IDENTIFYING EXPORT COMPETITIVENESS OF MALAYSIA'S PROCESSED PALM OIL: USING SHIFT- SHARE TECHNIQUE

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Abstract: *Palm oil is a very important commodity in Malaysia and it is the fourth largest contributor to the national economy with a total export at RM 67.6 billion or 6.1% from the total export earnings in 2016. However, current total of Processed Palm Oil (PPO) exports shows declining trend in some of the Malaysia's traditional market (e.g. China, India, and United States). Therefore, this paper aims to analyse the export competitiveness of Malaysia's PPO in 10 major importing countries. The data used in this study is annual time series data spanning from the years of 2001 through 2016 for PPO products which is classified as 151190 in the Harmonized Tariff Nomenclature (HS Codes). The Shift-Share approach is used to identify the potential export growth in selected major importing countries for Processed Palm Oil from Malaysia to calculate the net shift. The finding shows that Vietnam has the highest percentage of positive net shift followed by Philippines, Iran and United States. Information generated from this study will be useful in understanding the Malaysian palm oil industry's position for PPO in the global market. This study provides significant factors that influence Malaysian export competitiveness of PPO and responses from different countries and the palm oil industry players can make use the information for their business decision making.*

Keywords: *Export Opportunity, Processed Palm Oil, Shift-Share Technique*

Introduction

The year of 2017 has been notable history of the palm oil industry in Malaysia for celebrating the 100th anniversary of its commercial oil palm plantation in 1917 at Batang Berjuntai, Kuala Selangor (now known as Bestari Jaya). Starting 1960s, Malaysia has moved from mainly exporting crude palm oil (CPO) to exporting the higher value added processed palm oil (PPO) in the late 1970s. Since then the palm industry has continued to spur measures and is now become an important pillar in Malaysia's economic development. Currently, Malaysia's palm oil industry is the fourth largest contributor to the national economy. Compared to other vegetable oils, palm oil the most productive crop. Palm oil yields are about five times higher

than other major vegetable oils in the world such as rapeseed, sunflower or soy shows that it is the most productive fruits. High oil palm demand is due to their lower production costs. In addition, palm oil has beneficial properties where it can remain solid at room temperature and does not oxidize (Koushki et. al. 2015).

CPO is the palm fruit oil extracted from the fruit's but it has not been processed and would contain more solids than palm oil which is highly filtered. PPO is the conversion of CPO to refined oil into liquid fraction obtained by fractionation of palm oil after crystallization at controlled temperatures (Gee, 2007). PPO is versatile oil used not only in the food applications but also non-food products such as cosmetics, pharmaceuticals, detergents and biofuels (Razmah et. al., 2016 and Rosen and Kunjappu, 2012). Palm oil nutritional values as well as versatility make it the most "value for money" oil for industrial as well as individual consumers. Malaysia's export of PPO accounted for 72.4% (on average) of the total palm oil export during 2010-2016. Through its export-oriented activities which provided more foreign exchange for the country, this industry plays important role to cushion any impact of the economic downturn during the economic crisis (vijaya et.al. 2008). Based on Table 1, 80.4% from the total palm oil export or 11.85 billion tonnes was exported as PPO in 2010. However, PPO export declined to 72.2% in 2016.

Table 1: Malaysia Palm Oil Export Performance (Billion Tonnes)

Year / Product	Crude Palm Oil (CPO)	Processed Palm Oil (PPO)	Total Palm Oil	PPO share (%)
2010	2.88	11.85	14.73	80.4
2011	3.70	12.08	15.78	76.6
2012	4.80	10.80	15.60	69.2
2013	3.96	11.28	15.24	74.0
2014	4.61	10.52	15.14	69.5
2015	5.44	9.98	15.42	64.7
2016	3.84	9.97	13.81	72.2

Source: MPOB, UN Comtrade

A major policy instrument used in stimulating the Malaysian palm oil industry has been weighted on the fiscal measure of imposing an export duty on palm oil exports. Malaysia's pattern of palm oil products exported has undergone a structural change since government introduced an export tax for CPO and PPO in 1976. This policy aims to maintain the CPO supply in the local market and stimulate the downstream industries. Before 1976, most of the products exported oil is CPO (82% of the total palm oil export in 1975). However, after implementing the policy, the CPO export started to decline and open more opportunity for the PPO with high value added to penetrate in the international markets.

As shown in Figure 1, Malaysia's exports of PPO are greater than Indonesia from 1990 to 2013. However, in 2011 Indonesia had increased their export duty on CPO and lowered export duty for PPO to support production and export of PPO. Export tax revision by Indonesian government had attracted response of Malaysian government. Theoretically, the decrease of the export duty will lead to a decline of export price. Thus the received price of suppliers will increase and local producers will gain a higher profit due to the export and the increase of received price, with the condition that production costs remain unchanged. Starting January 2013, Malaysian government impose the new CPO export tax which starts at 4.5% when the price of CPO exceeds RM 2,250 per tonne and rising 0.5% as the price increases by RM150 per tonne. The aims of this policy was to reduce export of CPO which are low value added and to increase PPO export which are high value. However, the impact of the new CPO export tax

was not really successful as comparing with Indonesian. It is clearly here that the implementation of the new CPO export tax is not the only significant factor that can stimulate export of PPO sector in Malaysia. Other economic factors can also affect this industry since palm oil products are traded at the global level. In short, the policy implement in Indonesia has successfully increased the export of PPO in Indonesia and widen the gap between Malaysia.

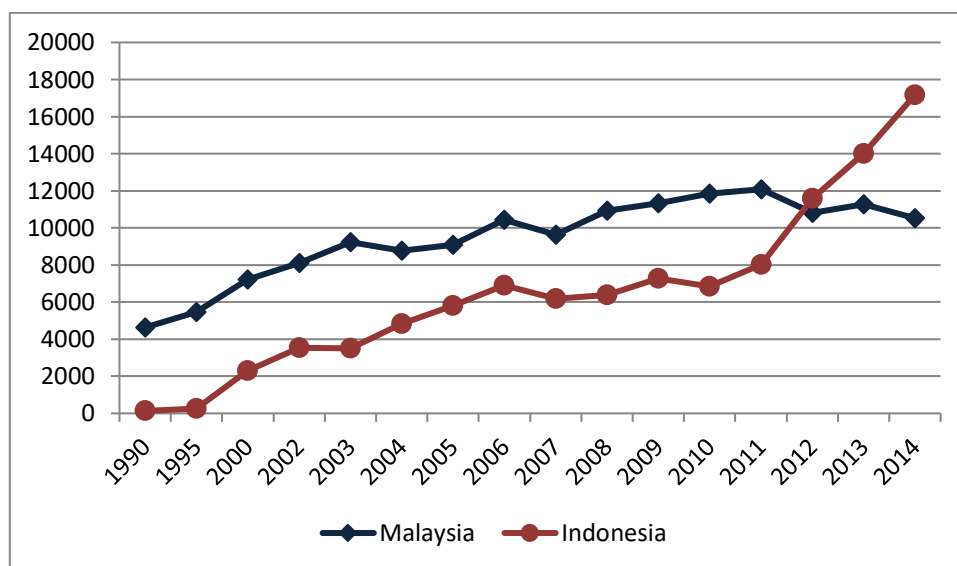


Figure 1: Malaysian and Indonesia Export on PPO, Mn tonnes
(Source: UN Comtrade)

The diversity of palm oil products has helped attract buyers and thus put palm oil as the main option in the chain of food production compared to other vegetable oils. Table 2 shows Malaysia’s major market destinations for PPO (China, India, Pakistan, EU-28, USA, Egypt, Vietnam, Philippines, Iran and Turkey) which are represent for 5.12 billion tonnes or 51.3% of Malaysian total PPO exports in 2016. In terms of market share within these 10 major importing countries, China is the largest Malaysian palm oil export market in 2016, with an intake of 1.83 billion tonnes. However, in terms of export performance for Malaysia’s PPO, most of these countries (except for Philippines, Iran and Turkey) shows declining trend in market share.

Table 2: Malaysia Processed Palm Oil (PPO) Market Share in Major Importing Countries (Billion Tonnes and Percentage share)

Countries	2010			2016			Malaysia Performance (Changes in market share)
	World	Malaysia	% Share	World	Malaysia	% Share	
China	5.49	3.37	61.4	4.45	1.83	41.1	-20.3
India	0.95	0.28	29.5	2.82	0.52	18.4	-11.1
Pakistan	1.45	1.38	95.2	2.48	0.41	16.5	-78.7
EU-28	1.20	0.59	49.2	4.12	0.43	10.4	-38.8
USA	0.95	0.88	92.6	1.29	0.55	42.6	-50.0
Egypt	0.24	0.13	54.2	0.27	0.02	7.4	-46.8

Vietnam	0.31	0.29	93.5	0.72	0.53	73.6	-19.9
Philippines	0.01	0.00	10.2	0.03	0.01	33.3	23.1
Iran	0.62	0.23	37.1	0.38	0.33	86.8	49.7
Turkey	0.41	0.26	63.4	0.51	0.49	96.0	32.6

Source: UN Comtrade

Based on the declining of PPO export in major importing countries, this study is conducted to examine the potential market for Malaysian P using the shift-share analysis for time period of 2001 to 2016. This study aims to identify the relative growth of Malaysian PPO exports to selected countries.

Literature review

Recent studies on palm oil industry in Malaysia highlight the important issues of sustainability (Aikanathan et. al.,2014and Abazue et.al., 2015) and palm oil biodiesel (Chakrin et. al., 2015 and Rahyla et. al.,2017). Aikanathan et. al.,(2014) discusses how existing economic theory can link the sustainability and development of the palm oil industry. The findings show that existing economic theory can't solve the issue of sustainable production in relation to land management or sustainable land development in the agricultural sector. Abazue et.al., (2015) explore the awareness of sustainability of 50 smallholders in Terengganu state under the Federal Land Development Authority of Malaysia (FELDA). It's revealed that most of the smallholders have sufficient knowledge of sustainability consistent with Roundtable on Sustainable Palm Oil (RSPO). Chakrin et. al., (2015) examines the impact of exports of palm oil biodiesel for the period 2010-2012 on land use changes in Malaysia, they found weak significant impact on exports towards direct and indirect land use changes. Rahyla et. al.,(2017) identify the best strategies and policies should be implement in Malaysia by looked at the biofuel industry in the US and Germany as a benchmark.

There are studies which look at screening the export opportunity using shift share. Focusing on Malaysian economy, some studies are particularly of interest. Shift-share is one of the most appropriate tools for screening the export opportunity and it can be used for identifying the most profitable countries for exporting a specific product. The shift-share technique has been accepted as an empirical analysis for the purpose of export opportunity analysis of business. This has been proved through studies by Castaldi (2009) on employment productivity (Asfaranjan and Moayyed, 2012). Additionally, policy-makers who often have need of quick, inexpensive analysis tools that are neither mathematically complex nor data intensive also utilize shift-share extensively Knudsen (2000). Fothergill and Gudgin (1979) proved that the shift-share technique is an appropriate tool to analyse regional growth in the United Kingdom.

Shift-share technique was first discussed by Green and Allaway (1985) in identifying the export opportunities. They demonstrated how the analysis can be used to find the possibility set of high technology manufactured products with high export potential and to identify opportunity for a given set of product categories. In their study, they not only considering the absolute net shift value in imports, but also the percentage net shift of production of imports to total imports (Asfaranjan and Moayyed, 2012). Haque (2002) shows that shift-share analysis, despite some limitations, can be utilized to measures four elements, which are product, market growth, percentage growth and net-shift. Wilson et al. (2005) used dynamic shift-share analysis to examine the export performance of China in electronics products compared to the East Asian Newly industrializing economies (NIEs) in the USA, EU and Japan market between 1988 and

2001. The outcomes showed that China had emerged as a huge competitor in electronics export market, but it was not a dominant one as China still could not gain in the high-end electronics products export.

In Malaysia, Arshad and Radam, (1997) applied the shift-share technique to explore the market opportunities for Malaysian electrical and electronics (E&E) products from 1984 to 1992. The finding shows that the market opportunities for Malaysian E&E products were mainly in the ASEAN regions. Each product category in their study provided comparison between absolute and percentage growth and percentage net shift for the period of 1984-86 and 1990-92. Asfaranjan and Moayyed, (2012) identify the export opportunities of four Malaysia's palm oil products namely, palm oil, palm kernel oil, oleochemical products, and palm kernel cake and to highlight the export opportunities as well as to forecast future export over 150 countries. Malaysian palm oil products still depend on a few countries for the bulk of exports. They found that China is the most potential exporting country for palm oil, palm kernel oil, and oleochemicals products. The United States is the second most potential country for exporting palm oil and palm kernel oil while ranked second for the export of oleochemical products.

From the discussion on empirical analysis above, we can conclude that the method of shift share analysis is proven to be one of the useful tools for applying international trade analysis, evaluate export market growth and export competitiveness. It measures the percentage net shift which is the relative gain or loss in growth of a particular variable in a specific region in the time period chosen and incorporating reasons that caused the change. It is also changed by a particular period of time and incorporating reasons that caused the change.

Method

Shift-Share Analysis (SSA) measures the percentage changes in a country's export with the corresponding exports of a selected group of reference economies. A time frame is required for this Shift-share analysis since it deals with the economic growth over time. In this study, we use time period of 16 years and then divided into two equal parts, the initial period (2001 to 2008) and the terminal period (2009 to 2016). The selected major importing countries for Malaysia's Processed Palm Oil (PPO) products are China, India, Pakistan, European Union (EU-28), Egypt, Vietnam, Philippines, Iran, Turkey and United State of America (USA). A positive net shift indicates huge potential of the market over the years. The Processed Palm Oil (PPO) product which is classified as 151190 in the Harmonized Tariff Nomenclature (HS Codes) is chosen for this study.

Results Discussion

Result of shift share analysis shows the future market trend of the Malaysia's PPO export opportunity. The chosen period coincides with highest CPO price in 2008 and then decline till 2015. So sort of dynamic analysis, the data was categorized in two parts to simplify the calculation by averaging 2001 to 2008 as initial period and 2009 to 2016 as terminal period. The method of calculation and data evaluation results as follows:

Real change

Let $V_{j,t}$ represents the values of the export for market j at the end of the terminal time period t , and ΔV_j be the actual change in market j over the specified period of time. Therefore, the equation is:

$$\Delta V_j = V_{j,t} - V_{j,t-1} \quad (1)$$

If $\Delta V_j > 0$ then, j market will increase. If $\Delta V_j < 0$, the j market will experience decline. Finally, if $\Delta V_j = 0$, the j market experienced will remain unchange. The result from Table 3 shows overall countries experienced increasing real change except for EU-28.

Table 3: Real Change (million tonnes)

RC = Real change	ΔV_j	Remark
China	592.91	Increase
India	103.21	Increase
Pakistan	260.60	Increase
EU-28	-140.52	Declined
USA	269.93	Increase
Egypt	104.30	Increase
Vietnam	319.97	Increase
Philippines	275.24	Increase
Iran	250.21	Increase
Turkey	11.85	Increase

Overall growing rate

The growing rate for all markets K is equivalent to the proportion of the sum value in the terminal time period to the sum value of initial time period. Thus, the equation is:

$$K = \frac{\sum_{j=1}^m V_{j,t}}{\sum_{j=1}^m V_{j,t-1}} \quad (2)$$

Where K is the growing proportion for all markets and we have overall growth rate equal to 1.4 for Malaysia's PPO export in 10 selected importing countries in this study.

Projected value

Haque (2002) stated that if an assume market develop at the degree which achieve for all markets, the projected value of the growing value at the end of the terminal time period, $E(V_{j,t})$ is the invention of the real value of this market at the termination of the initial time period and the degree of modification for all markets. To get this, multiply the value between the original time period ($V_{j,t-1}$) and growing rate for all market (K). Thus:

$$E(V_{j,t}) = K(V_{j,t-1}) \quad (3)$$

Table 4: Projected Value (Million tonnes)

Country	K	$V_{j,t-1}$	$E(V_{j,t})$
China	1.445656	1907.37	2757.41
India	1.445656	374.29	541.10
Pakistan	1.445656	770.21	1113.45
EU-28	1.445656	490.15	708.59
USA	1.445656	298.77	431.91
Egypt	1.445656	256.95	371.47
Vietnam[#]	1.445656	119.61	172.91
Philippines	1.445656	98.13	141.86
Iran	1.445656	163.90	236.94
Turkey	1.445656	115.42	166.86

Projected change

Projected change in the price of a growth variable for a specific market in an assumed time period is the modification between the projected value and real value for the market at the termination of the preliminary time period. Let $E(\Delta V_j)$ represents the projected change. Thus,

$$E(\Delta V_j) = E(\Delta V_{j,t}) - V_{j,t-1} = V_{j,t-1}(K - 1) \quad (4)$$

Table 5 : Projected Change

Country	Projected change; $E(\Delta V_j)$
China	850.03
India	166.81
Pakistan	343.25
EU-28	218.44
USA	133.15
Egypt	114.51
Vietnam	53.30
Philippines	43.73
Iran	73.04
Turkey	51.44

Net shift

The change between the real change and the projected change of an assumed market is the net shift. This change is denoted as N_j . Thus, the equation is:

$$N_j = \Delta V_j - E(\Delta V_j) \quad (5)$$

Here, if $N_j > 0$, it does not essentially imply that the j market's growth rises by a greater quantity than it could have if it has grown up at the total market rate. This assumption would be true only if, $E(\Delta V_j) > 0$. But if $E(\Delta V_j) < 0$ and $E(\Delta V_j) < \Delta V_j < 0$, then $N_j > 0$.

Nevertheless, this suggests that the j market does not decline as speedily as it would be estimated. Thus, a proportion between the real and estimated variation will not be an appropriate portion. The sum of the net shift values for all markets should be zero ($\sum_{j=1}^m N_j = \sum_{j=1}^p N_j^+ + \sum_{j=1}^q N_j^- = 0$)

Table 6: Net shift

Country	N_j
China	-257.12
India	-63.60
Pakistan	-82.64
EU-28	-358.96
USA	136.78
Egypt	-10.21
Vietnam	266.66
Philippines	231.51
Iran	177.17
Turkey	-39.58

Total absolute net shift

The sum of the optimistic net shift ‘S’ denotes the total absolute net shift. Therefore, the equation is:

$$S = \frac{\sum_{j=1}^m [\Delta V_j - E(\Delta V_j)]}{2} = \sum_{j=1}^p N_j^+ \quad (6)$$

In this study, we have obtained $S = 812.12$

Net shift percentage

The comparative gain in the value of a growth adjustable for a particular market j, in a given time period is distinct as the proportion net shift P_j . The percentage net shift is defined as,

$$P_j = \frac{N_j}{S} (100\%) \quad (7)$$

$P_j = \frac{N_j}{S}$, where N_j is net shift equal to actual change minus expected change. The members identified positive net shifts are the most potential market. Importantly, it can be assumed that the sum of the ratio net shift for all marketplaces is zero.

Table 7: Net shift Percentage

Country	P_j
China	-31.66
India	-7.83
Pakistan	-10.18
EU-28	-44.20
USA	16.84
Egypt	-1.26
Vietnam	32.84
Philippines	28.51
Iran	21.82
Turkey	-4.87

Table 8 shows the overall result for Processed Palm Oil product in Malaysia for the period of 16 years in 10 selected major importing countries for PPO products. Based on Table 8, Vietnam, Philippines, Iran and USA indicate a positive net shift percentage values. This implies that, these four countries concerned gaining shares over for relative reference group as a whole

period (improvement in competitiveness). While China, EU-28, Pakistan, India, Turkey and Egypt show a negative value constitutes losing its market share.

Each market implements different types of policy towards their oils and fats issues, thus the effect towards PPO export also vary among the countries. Based on the comparison of Malaysia's PPO export performance, we can consider which markets have high potential for Malaysia's export market. From the finding, it shows that Malaysia has potential PPO export markets in Vietnam, Philippines, Iran and USA. The increase of exports and market share for PPO in Vietnam can be explained by the shift in demand and increasing competitiveness. The shift in demand is mainly caused by the trade liberalization policy imposed by the importing countries, which reduces trade barriers in the form of import duties.

Table 8: Correlation of the countries

Country	Initial period	Terminal Period	Actual Change	Expected value	Expected Change	Net Shift Nj	Percentage Netshift, Pj
China	1907.37	2500.29	592.91	2757.41	850.03	-257.12	-31.66
India	374.29	477.50	103.21	541.10	166.81	-63.60	-7.83
Pakistan	770.21	1030.81	260.60	1113.45	343.25	-82.64	-10.18
EU-28	490.15	349.63	-140.52	708.59	218.44	-358.96	-44.20
USA	298.77	568.70	269.93	431.91	133.15	136.78	16.84
Egypt	256.95	361.25	104.30	371.47	114.51	-10.21	-1.26
Vietnam	119.61	439.57	319.97	172.91	53.30	266.66	32.84
Philippines	98.13	373.37	275.24	141.86	43.73	231.51	28.51
Iran	163.90	414.11	250.21	236.94	73.04	177.17	21.82
Turkey	115.42	127.27	11.85	166.86	51.44	-39.58	-4.87
Total						0.00	0.00

While for Philippines, they are the major coconut oil producing countries in the export of coconut oil and have exported between 70-80% of their coconut oil production. A disruption of supply from local coconut oil production due to typhoon increase the price of coconut oil used in higher value added industries such as oleochemical industry. PPO is the most economical alternatives as it will not compromise quality and even better for some product. Malaysia's PPO has been the preferred as complementary to Philippines oils and fats requirement.

Iran, an upper middle income country, is also the second largest, in term of the population in Middle East and North Africa (MENA) region, after Egypt with 78.5 million people. The lifting of economic sanctions could boost Iran's trade with Malaysia as well as open doors for local entrepreneurs to expand in sectors other than palm oil products. With most financial and economic sanctions against Iran have now been lifted, economic ties between Malaysia and Iran are expected to be stronger and bilateral trade volume between this two countries will experience strong growth in the years to come.

China is the largest Malaysian PPO export market, the declining of market potential in China can be explained by slowing down for growth in the food industry in China. Palm oil is mainly confined to industrial use, especially in the food industries. Since the slowing down of growth in the food industry in China, the demand of palm oil has also experienced a similar scenario.

Soybean oil is currently available as cooking oil for consumers as the domestic production of soybean oil has increased steadily within few past years. The use of palm oil in this sector is limited due to its physical characteristics, which solidify during colder period. Competition from palm oil exported from Indonesia which enjoys a comparative advantage due to export tax structure also affected the PPO export demand from Malaysia.

Conclusion

The shift share technique aimed to determining the percentage net shift to identify the relative gain or loss in growth of a particular member relative to all members selected in the group for the time period chosen. The positive net shift indicate the particular member have high potential for export market. The countries selected for study were China, India, Pakistan, EU-28, USA, Egypt, Vietnam, Philippines, Iran and Turkey. Time period of 16 years are chosen in this study (from 2001 to 2016). The period covered the highest palm oil price in 2008 till the lowest in 2016. Vietnam, Phillipines, Iran and USA shows a positive net shift percentage with 33.24%, 28.51%, 21.82% and 16.84% respectively. However, the remaining six countries showed negative correlation. From above calculation, we can conclude that Vietnam is the most potential market for PPO to be exported for Malaysia with percentage net shift of 32.84%. Some other countries like Phillipines, Iran USA are also very close to Vietnam market by showing 28.51%, 21.82% and 16.84% net shift respectively. If we look at Malaysia's Palm Oil traditional market, such as EU-28, China and India, they have a large sale in their domestic market, but that does not consider as a factor of their shift share result with a negative figure of -44.20%, -31.66% and -7.83% respectively which shows a bad sign to export to these countries. It is important for Malaysia to penetrate other importing countries in order to increase her competitiveness level and their potential growth. The aggressive marketing strategy by Malaysia exporter companies assisted by relevant government agencies is also a positive factor for palm oil industry. In summary, based on the results, there are vast opportunities in several importing countries that can benefit Malaysia's export share in order to boost PPO export competitiveness.

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