

UNIVERSITI PUTRA MALAYSIA

IMPACT OF CRUDE PALM OIL EXPORT DUTIES ON MALAYSIAN PALM OIL INDUSTRY

ABDULLA GAFURJANOVICH IBRAGIMOV

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By

ABDULLA GAFURJANOVICH IBRAGIMOV

These Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirement for the Degree of Master of Science

April 2014

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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April 2014

Chair: Prof., Datin Paduka, Fatimah Mohamed Arshad, PhD Faculty: Institute of Agricultural and Food Policy Studies

Malaysia and Indonesia are the world's largest producers of palm oil. Both countries export crude and processed palm oil. Since Malaysia and Indonesia are close competitors and they compete in the same market, a change in export duty rate in one country will affect the other. Indonesia, as the world's biggest palm oil producer, has drastically widened the gap between the crude palm oil and refined palm oil export taxes since October 2011, to encourage more downstream investments and production of refined palm oil products. Under the revised export duty structure, crude palm oil and crude palm kernel oil are cheaper for downstream activities in Indonesia. The new structure is expected to reduce Malaysia's competitiveness in the world market as its export duty is relatively higher. Realizing this fact, Malaysia has reduced the export duty structure to be in line with the Indonesia's duty structure (MPOB, 2013).

The general objective of the study is to examine the impact of export tariffs on Malaysian palm oil industry. The specific objectives are (i) to examine the impact of changes in the Malaysian export tariffs on palm oil production; (ii) to examine the impact of changes in the Malaysian export tariffs on exports of crude palm oil and processed palm oil; and (iii) to simulate scenarios under different levels of export duty.

The research questions are: (i) what are the likely future trends of crude palm oil exports under the new crude palm oil export duties? Will it increase, decline or stabilize? (ii) What are the likely future trends of processed palm oil exports? Will it increase exponentially, stabilize or decline? To answer these questions, a system dynamics model was developed for the Malaysian palm oil. Application of the system dynamics model provides a framework to understand the feedback structure and how changes in variables impact the behavior of the palm oil industry.

New planting, oil palm immature area, mature area, total planted area, production, crude palm oil price, crude palm oil export and processed palm oil export are simulated under four policy scenarios. This research suggests that with low crude palm oil export duties, the crude palm oil domestic price, profitability of plantation owners, immature crop, mature crop, total planted area, production and exports of crude palm oil are expected to increase, while the exports of processed palm oil is expected to decline.

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Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

KESAN DUTI EKSPORT MINYAK SAWIT MENTAH KE ATAS INDUSTRI MINYAK SAWIT DI MALAYSIA

Oleh

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April 2014

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Malaysia dan Indonesia adalah pengeluar minyak sawit terbesar di dunia. Kedua-dua negara mengeksport minyak sawit mentah dan minyak sawit yang telah diproses. Memandangkan Malaysia dan Indonesia bersaing di pasaran yang sama, perubahan duti eksport oleh sesebuah negara akan memberi kesan ke atas negara lain. Indonesia, pengeluar minyak sawit terbesar didunia telah meningkatkan jurang tax eksport antara minyak sawit mentah dan minyak sawit yang telah diproses secara drastik sejak Oktober 2011 untuk menggalakkan pelaburan industri hiliran minyak sawit dan pengeluaran produk hasil daripada minyak sawit yang telah diproses. Dengan menstruktur semula duti export, minyak sawit mentah dan minyak inti kelapa sawit secara relatifnya didapati lebih murah bagi aktiviti industri hiliran di Indonesia. Pengenalan struktur baru dijangka mengurangkan persaingan Malaysia di pasaran dunia ekoran daripada duti eksport yang secara relatifnya adalah lebih tinggi. Duti eksport yang tinggi akan menyebabkan harga minyak sawit mentah yang tinggi memandangkan ia merupakan bahan mentah dalam penghasilan minyak sawit. Ini secara tidak langsung membawa kepada harga minyak sawit yang tinggi untuk dieksport. Oleh yang demikian, Malaysia telah mengurangkan struktur duti eksport sejajar dengan struktur duti eksport di Indonesia. (MPOB, 2013).

Objektif umum kajian ini adalah untuk menilai kesan tarif eksport terhadap industri minyak sawit di Malaysia. Manakala objektif khusus adalah (i); untuk menilai kesan perubahan tarif eksport Malaysia ke atas pengeluaran minyak sawit; (ii) untuk menilai kesan perubahan tarif eksport Malaysia ke atas minyak sawit mentah dan minyak sawit yang telah diproses; (iii) untuk menguji senario pada pelbagai tahap duti eksport.

Persoalan kajian adalah: (i) Apakah tren eksport minyak sawit mentah di masa hadapan dibawah duti eksport yang baru? Adakah ia akan meningkat, menurun atau stabil? (ii) Apakah tren eksport minyak sawit mentah di masa hadapan? Adakah ia akan meningkat, menurun atau stabil? Untuk menjawab persoalan tersebut, model sistem dinamik telah dibangunkan untuk industri minyak sawit di Malaysia. Aplikasi model sistem dinamik memberi pemahaman mengenai tindak balas struktur dan bagaimana perubahan dalam pembolehubah memberi kesan terhadap industri minyak sawit.



Penanaman baru, kawasan pokok sawit yang belum matang, kawasan matang, jumlah kawasan tanaman, pengeluaran, harga minyak sawit mentah, eksport minyak sawit mentah dan eksport minyak sawit yang telah diproses adalah ditafsirkan dalam empat senario polisi. Kajian ini mencadangkan dibawah keadaan duti eksport minyak sawit mentah yang rendah, pembolehubah harga domestik minyak sawit mentah, keuntungan pemilik tanaman, hasil tanaman tidak matang, hasil tanaman yang matang, jumlah kawasan tanaman, pengeluaran dan eksport minyak sawit mentah dijangka meningkat, namun eksport minyak sawit yang diproses dijangka mengalami penurunan.



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LIST OF ABBREVIATIONS

BPA **Bilateral Payments Agreement** CLD Causal Loop Diagram СРКО Crude Palm Kernel Oil CPO Crude Palm Oil FAO Food and Agriculture Organization FFB Fresh Fruit Brunch FOB Free on Board IMP Industrial Master Plan MPOB Malaysian Palm Oil Board MSE Mean Square Error MYR Malaysian Ringgit OER **Oil Extraction Rate** PK Palm Kernel PKC Palm Kernel Cake PKO Palm Kernel Oil PKO Palm Kernel Oil PO Palm Oil РРКО Processed Palm Kernel Oil PPO Processed Palm Oil R&D Research and Development RBD **Refined Bleached Deodorized RMSPE** Root Mean Square Percent Error SD System Dynamics

CHAPTER 1

INTRODUCTION

1.1 Overview of the Palm Oil Industry

The palm oil industry in Malaysia has expanded rapidly in terms of plantation area, production, downstream activities and export, since 1970s. The total oil palm planted area in Malaysia has increased from 642 thousand hectares in 1975 to 5.1 million hectares in 2012. The increase in land area reached its peak in the 1970s and later continued to increase at a decreasing rate in the 1980s and beyond as shown in Figure 1.1 and Table1.1.



Figure 1.1: Total Oil Palm Planted Area ('000 ha) and Annual Growth Rate (%) in Malaysia (1975-2012)

Source: Malaysian Oil Palm Statistics, Malaysian Palm Oil Board (MPOB), 1985-2010 (Various issues). Economics & Industry Development Division, Malaysian Palm Oil Board (MPOB), 2011-2012

After 1970s, the oil palm area rate of annual change started to decline and indicated average growth rates of 15.6 % in 1970s, 7.6 % in 1980s, 5.5 % in 1990s and 3.3 % in the millennium.

The rapid increase in the 1970s and 1980s was due to the land expansion programs introduced by the government through land resettlement schemes (such as Federal Land Development Authority) and infrastructural and institutional supports to the industry (such as R&D and replanting subsidies). However, by the late 1990s and the first decade of the millennium, land expansion was limited by urbanization and industrialization activities. Total production of palm oil in Malaysia consisted 1.2 million metric tonnes in 1975 and increased by an average growth rate of 8% to 18.7 million metric tonnes in 2012. Since 1970s, palm oil production growth rates commenced to decline which means that the production grew at decreasing rate of 15 % in 1975-1979, 11.3 % in 1980s, 6.1 % in 1990s and 4.7 % in 2000-2012 (Table 1.1).





Figure 1.2: Palm Oil Production ('000 mt) and Annual Growth Rate in Malaysia (1975-2012)

Source: Malaysian Oil Palm Statistics, Malaysian Palm Oil Board (MPOB), 1985-2010 (Various issues). Economics & Industry Development Division, Malaysian Palm Oil Board (MPOB), 2011-2012

Year	1970-1979	1980-1989	1990-1999	2000-2012
Total Planted Area ('000 ha)	641.7-938.8	1,023.3-1,946.5	<mark>2,029.5-3,</mark> 313.4	3,376.6-5,076.9
Average Annual Growth Rate (%)	15.6	7.6	5.5	3.3
Palm Oil Production ('000 mt)	1,257.5-2,188.6	2,573.2-6,056.5	6,094.6-10,553.9	10,842.1-18,785
Average Annual Growth Rate (%)	15	11.3	6.1	4.7
CPO Export ('000 mt)	957.4-356.1	197.7-19.2	93.9-262.1	398.4-4,642.2
Average Annual Growth Rate (%)	-21	54.4	108.1	32.7
PPO Export ('000 mt)	215.5-1,559.9	2,073.5-5,172.9	5,633.5-8,650.2	8,683.2-12,933.3
Average Annual Growth Rate (%)	66.6	13.4	5.5	3.3

Table 1.1: Production and Export of Palm Oil ('000 mt) and an Average Annual Growth Rate (%) in Malaysia (1975-2012)

Source: Malaysian Oil Palm Statistics, Malaysian Palm Oil Board (MPOB), 1985-2010 (Various issues). Economics & Industry Development Division, Malaysian Palm Oil Board (MPOB), 2011-2012

This behavior suggests that the production of CPO in Malaysia is largely determined by land expansion rather than productivity improvement particularly in fresh fruit bunch yield and oil extraction rate. Exports of CPO consisted 957,411 metric tonnes in 1975 or about 76.1% of the total palm oil exports and grew by an average rate of 53.1 % to 4.6 million metric tonnes or 24.7 % of the total palm oil exports in 2012 (Figure 1.3). Because of the higher CPO export duty structure introduced in 1965, exports of CPO decreased rapidly by 21.1 % in 1975-1979. However, exports of CPO grew by an average annual growth rate of 53.1 % in 1975-2012. Exports of PPO increased from only 215,515 mt in 1975 to 12,933,316 mt in 2012 suggesting an increment of 384.8 % (Figure 1.4). The rapid growth of the PPO export is largely due to the imposition of export duty which made CPO export unattractive. The export duty was imposed to discourage export of CPO and hence developed the processing industry.



Figure 1.3: CPO Export ('000 mt) and Annual Growth Rate (%) in Malaysia (1975-2012)

Source: Malaysia Oil Palm Statistics 2010 Handbook, MPOB (1975-2010) Economics & Industry Development Division, (MPOB), (2011-2012)

Exports of PPO grew at decreasing rate of 66.6 % in 1975-1979, 13.4 % in 1980s, 5.5 % in 1990s and 3.3 % in 2000-2012. The rapid increase in the CPO exports in the last decade could be explained by firstly, the increase in demand for biofuel where CPO is the feedstock for biodiesel. Secondly, it could also be attributed to the increasing price trend of major commodities in the world market due to strong fundamentals in major economies of the world. The increase in CPO export has somewhat led to reduction in the PPO exports in a lesser extent.

Malaysia is now the second largest producer of oil palm products in the world after Indonesia but continues to be world largest exporter of oil palm products. In 2012, Malaysia and Indonesia were major producers and exporters of palm oil products in the world where they together accounted over 87 % of palm oil production. In the last decades,

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the two producers tended to compete for market share as both were offering more or less similar products. Being the largest palm oil producers, the two appear to strategize in tandem to ensure that their market shares are either sustained or expanded. Hence, it is no surprise that when Indonesia decided to reduce its export duty in 2011, Malaysia has taken a similar stand, albeit a little later in 2013.



Figure 1.4: PPO Export (mt) and Average Annual Growth Rate (%) in Malaysia (1975-2012)

Source: Malaysia Oil Palm Statistics 2010 Handbook, MPOB (1975-2010) Economics & Industry Development Division, (MPOB), (2011-2012)

Figure 1.5 summarizes the relationship between CPO production and export and PPO export and average CPO export duty in 1975-2012. This diagram indicates that export duty encourages downstream activities in the beginning of 1980s and beyond. In 1975, CPO exports made up about 81.6% of the total palm oil export compared to 0.5% in 1998. However by 2012, the share has gone up to 26.4%. Despite the increase in the average export duty, the CPO export has increased quite significantly between 1999 and 2011. In 2011, Indonesia has decreased its export duty of CPO and increased its PPO export duty in its bid to encourage palm oil processing. Indonesia's move is perceived by Malaysia as a challenge to its competitiveness as with the new structure, Indonesia's CPO is relatively cheaper. In response to this move, in January 2013, Malaysia has reduced its CPO export duty to a lower level to sustain its competitiveness (Table 1.2).



Figure 1.5: Production of CPO; Export of CPO and PPO ('000 mt) and CPO Export Tax (%) in Malaysia (1975-2012)

Source: Malaysia Oil Palm Statistics 2010 Handbook, MPOB (1975-2010) Economics & Industry Development Division, (MPOB), (2011-2012) Note: The CPO Export Tax Rates (%) are indicated using Table 1.7

CPO FOB	Crude I	Crude Palm Oil		RBD Palm Oil		RBD Palm Oil	
Price							
MYR/t	Old	New	Old	New	Old	New	
<650	0	0	0	0	0	0	
650-950	1-7	0	0	0	0	0	
951-1250	8-12	0	0	0	0	0	
1251-1550	12-16	0	0	0	0	0	
1551-1850	16-18	0	0	0	0	0	
1851-2250	18-20	0	0	0	0	0	
2251-2400	20-21	4.5	0	0	0	0	
2401-2550	21	5	0	0	0	0	
2551-2700	22	5.5	0	0	0	0	
2701-2850	22	6	0	0	0	0	
2851-3000	22-23	6.5	0	0	0	0	
3001-3150	23	7	0	0	0	0	
3151-3300	23	7.5	0	0	0	0	
3301-3450	23-24	8	0	0	0	0	
3451-3600	24	8.5	0	0	0	0	
>3600	24-30	8.5	0	0	0	0	

Table 1.2:	Summary	of the	Malaysian	Palm	Oil Expo	rt Duty	(1974-2013)

Source: Business Times, Maybank-KE, Ministry of Finance, Malaysia

Note: Old refers to CPO export tax in 1974-2012, New refers to CPO tax effective since 1 January 2013

1.2 Problem Statement

Export tariffs are applied for fiscal and market balancing purposes. As for fiscal, it is used to raise fund. Export duty is also used as an instrument to narrow the big difference in the level of domestic prices as against the world prices for individual goods. In a large country, the introduction of export duties would affect the level of world prices. Hence, the effectiveness of such a trade policy critically depends on the correct determination of the optimal level of export duties.

Duty tax on exports of CPO from Malaysia was imposed with the objectives of contributing to government revenue, encouraging value - added or downstream processing of Malaysian palm oil and to enhance the marketability/ market access of Malaysian palm oil to the world (Nasir, 2003).

Malaysia and Indonesia are the world largest producers of palm oil. Both countries export crude and processed palm oil. Export duty taxes are imposed on exports of palm oil products by both countries for the purpose of raising government revenue. Later, in the case of Malaysia, it has been used to encourage the downstream processing. In Indonesia it is used as a means of monitoring the domestic supply of cooking oil particularly during the high oil prices in the world market (MPOB, 2012).



Figure 1.6: Monthly Export Volume ('000 mt) and Value (RM million) of Oil Palm Products in Malaysia (2011-2012)

Source: MPOB, 2013

Since Malaysia and Indonesia are close competitors in that they compete in the same market, a change in export duty rate in one country will affect the other. Indonesia, as the world's biggest palm oil producer, has since October 2011, drastically widened the gap between the crude palm oil and refined palm oil export taxes, to encourage more downstream investments and production of refined palm products. Under the revised export duty structure, crude palm oil and crude palm kernel oil are cheaper for downstream

activities in Indonesia (Dompok, 2012). It is a boon to the domestic downstream sector. The new structure is expected to reduce Malaysia's competitiveness in the world market as its export duty is relatively higher. A high export duty results in high price of CPO which is the raw material for PPO. This in turn will lead to higher prices for PPO for exports. Realizing this, Malaysia has decided to reduce the export duty structure to be in line with the Indonesia's tax structure. The new CPO export duty structure of Malaysia is given in Table 1.2. Since October 2011, exports of CPO increased from 428,810 mt to 472,502 mt in December 2012. However, export value of CPO decreased from about RM 1.3 billion in October 2011 to RM 1.1 billion in December 2012.

					Total
					Export
	CPO	CPO Export		PPO Export	Value of
Month	Export	Value (RM	PPO Export	Value (RM	Oil Palm
	(mt)	million)	(IIII)	million)	Products
					(RM
					million)
Jan-11	182,749	594.64	1,039,318	3,641.33	5,519.17
Feb-11	173,239	626.62	941,354	3,440.09	5,512.16
Mar-11	135,029	483.24	1,100,232	4,067.20	6,271.22
Apr-11	196,088	707.17	1,153,651	4,098.27	6,592.40
May-11	252,668	857.32	1,158,647	4,040.47	6,648.02
Jun-11	379,259	1,253.04	1,205,781	4,231.14	7,185.04
Jul-11	268,123	845.22	1,467,769	<mark>4,9</mark> 84.37	7,559.44
Aug-11	406,243	1,237.72	1,286,867	4,177.05	7,182.25
Sep-11	330,157	1,017.28	1,216,039	3,985.07	6,619.02
Oct-11	428,810	1,311.88	1,414,792	4,604.52	7,710.00
Nov-11	344,853	1,014.94	1,320,738	4,213.54	6,914.04
Dec-11	380,383	1,154.29	1,210,479	3,885.49	6,698.67
Jan-12	161,733	490.41	1,229,626	4,028.37	6,051.41
Feb-12	127,112	386.58	1,096,399	3,500.39	5,332.93
Mar-12	328,945	1,025.00	1,000,590	3,233.95	5,858.26
Apr-12	374,661	1,247.92	959,152	3,231.30	5,990.00
May-12	395,285	1,324.88	1,017,128	3,448.85	6,375.55
Jun-12	512,033	1,629.29	1,035,172	3,408.61	6,559.09
Jul-12	301,015	1,012.28	990,566	3,152.18	6,085.92
Aug-12	442,655	1,303.14	1,000,654	3,052.44	5,836.89
Sep-12	509,478	1,446.19	1,004,366	3,010.57	5,959.70
Oct-12	606,870	1,508.81	1,170,305	3,226.57	6,177.99
Nov-12	409,882	1,022.52	1,251,667	3,247.43	5,757.72
Dec-12	472,502	1,078.58	1,177,690	2,978.31	5,462.69

Table 1.3: Monthly Export Volume (mt) and Value (RM million) of Oil Palm
Products in Malaysia (2011-2012)

Source: MPOB, 2013

Exports of PPO declined from about 1.4 million mt in October 2011 to 1.2 million mt in December 2012 while export value of PPO decreased from RM 4.5 billion to RM 2.9 billion in the same period (Table 1.4). Total export value of oil palm products declined from RM 7.7 billion in October 2011 to RM 5.5 billion in December 2012. In 2011, total export value of oil palm products indicated RM 80.4 billion while in 2012 it indicated RM 71.4 billion.



Figure 1.7: Scenarios of Future Behavior of CPO and PPO Export (million mt)

Source: MPOB, 2012

Under the new CPO export duties, the possible behavior of CPO and PPO exports in the future is shown in Figure 1.7. Will the exports of CPO increase exponentially because of low duty tax or will it stabilize in the future? Will exports of PPO respond to the change in exports of CPO? Or what growth pattern will it exhibit? These questions require a methodology that can estimate the trajectory behavior of these variables in the future. Among the methodologies available, system dynamics approach is highly suitable to examine the circular causality phenomenon between variables under a complex system such as in the palm oil industry (Sterman, 2001). The discussions earlier indicate that the relevant variables such as palm oil land area and production indicate an S-shaped growth which suggests the growing dominance of balancing loop in the later years offsetting the exponential growth in 1970s and 1980s caused by the reinforcing loops. A similar line of arguments can be used to explain the change in behavior of CPO and PPO exports. Hence the study attempts to use system dynamics approach to answer the specific questions below:

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- i. What is the impact of CPO export duty on Malaysian palm oil industry, mainly on exports of CPO and PPO?; and
- ii. What will be the effect of new export duty which was introduced in January 2013 on palm oil industry, mainly on exports of CPO and PPO.

1.3 Objectives of the Study

The general objective of the study is to examine the impact of export tariffs on Malaysian palm oil industry. The specific objectives are:

- i. To examine the impact of changes in the Malaysian export tariffs on palm oil production;
- ii. To examine the impact of changes in the Malaysian export tariffs on exports of CPO and PPO; and
- iii. To simulate scenarios under a different level of export duties.

1.4 Justification of the Study

The above arguments show the complexity of issue encountered by the palm oil industry. High export duty rates on crude palm oil decrease the amount of crude palm oil export, however increase exports of processed palm oil. In turn, it increases the crude palm oil inventory levels, consequently price of crude palm oil declines. As the price goes down profitability of new planting and replanting diminishes, which reduces further production. Causal relation among variables demonstrates a non-linear tendency. According to system behavior, system dynamics is the appropriate tool to understand what tendency system demonstrates in the future and how the changes in the policy impact non-linear relationship among variables. It is hoped that the results from this study can be utilized in determining the changes in the policy and to take the right direction to sustain competitiveness in the world market.

1.5 Organization of the Study

The thesis contains six chapters. The first chapter discusses the overview of the industry with a specific focus on the problem definition and this is followed by the objectives and justification of the study. Following chapter reviews the palm oil sector in Malaysia. Chapter III provides with the reviews of past works related to this study. Chapter IV explains the methodology utilized and the palm oil system dynamics model developed for the study. Chapter V discusses model validation and simulation results. Chapter VI provides the conclusion as well as future research implications.

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