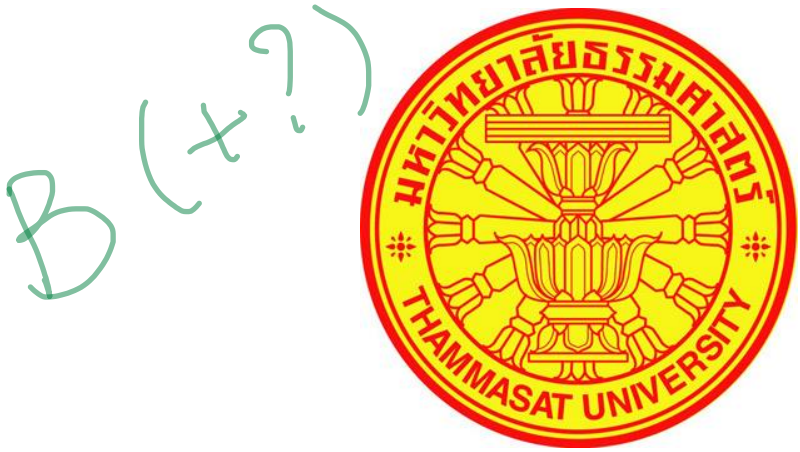

Why can't we increase the quality of palm oil input?

In case of: Asymmetric information problem in Thailand?

(EE489: Seminar in industrial economics)

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Why quality uncertainty of palm oil occurred in palm oil industry especially in Thailand?

In case: Quality Uncertainty problem

Abstract

This study aims to figure out significant factors that cause quality uncertainty problem and technical inefficiency as well as lead to inefficiencies in palm oil production. There are six important factors in the supply chain that affect the palm oil mill business. It composes of the farm owner, farmer, middleman, CPO-B, big buyers (CP), and government policy collected from the expertise who work in palm oil mills factory of Smothong Group Co, Ltd. An asymmetric information model (Akerlof (1970)'s Market for "Lemons") provides the core theory of this paper. This theory will help explain how asymmetric information affects quality uncertainty and technical efficiency problem that occurred in the industry.

Introduction

When everyone sees and uses the oil they do not know that it is Refined palm oilein, they just called it “oilein” but do not know where it come from. In fact, oilein is the output of fresh fruit bunch or fresh palm bunch. Fresh fruit bunch is an important raw material to produce a product not only oilein (Refined palm oilein) but also using to produce many kinds of product such as Biodiesel, animal feed, or even create electricity by using biogas from the production process by palm oil mills. However, there are less people know that palm oil industries in Thailand mostly consume in domestic and cannot compete with neighbor countries at all. We can know this by looking at the volume on country’s export. Only 2% out of whole outputs from palm oil mills can export to Malaysia, Cambodia, and others. (Source: Department of Internal Trade (DIT) and collected by Krungsri Research) Are the investors suffered from this situation? Is the high cost of the production being the real root cause for the palm oil mills owner? What should they do under the low oil extraction rate? How they still alive in perfect competitive markets and price war situation?

In general, the palm oil industry, including palm oil mills usually faces a high profit all the time in most of people’s perception since it is a necessary product. This implies that no matter what the economic condition is people will consume it. However, people forget that even the large business like this still have a lot of competitors under perfect competitive markets this means there are a lot of entries and a lot of incumbents. So, the market share in this business mostly own by the biggest factory which can create economies of

scale. Others factory that does not have economies of scale could face loss or break-even depend on the situation of the market and economy. However big or even small factory is still in the business because it is better to continue to operate as the fixed cost paid for the land and machine is very huge.

Therefore, managing the production process by looking at supply chain, the quality of inputs and outputs, and volume of percent palm yield is becoming the tasks for the palm oil mills owner to avoid the quality uncertainty problem that caused by uncontrollable supply chain, lack of raw materials (inputs), asymmetric information, and many factors that will be described in the background section to make the reader see that quality uncertainty caused by many factors and everything affect each other in the supply chain. And to raising quality level of Thai palm oil to export to neighboring country by following the RSPO (Roundtable on Sustainable Palm Oil). A standard which is the regulation that use to assess the quality of palm oil output from each palm oil mill. Before going to the next section, I will elaborate more about the CPO that I will mention up next. The CPO is stand for Crude Pail Oil which classified into 2 types: 1. Crude Palm Oil-A and 2. Crude Palm Oil-B. Both types of CPO are created from palm oil mills that use different process and raw material to produce a crude palm oil.

The palm oil mill owners also afraid that quality uncertainty and inefficiency in palm oil production that create from the existing of palm oil mills of Crude Palm Oil Type B cannot eliminate and will play a crucial role

and affect this market to be weaker and weaker and finally its will drive good producers who produce Crude Palm Oil Type A out of the market due to an asymmetric information during the process in the supply chain. (Akerlof said that “The bad (lemons will be driven the good out of the market”). Hence, this research paper would try to figure out the significant factors that affect quality uncertainty problem and inefficiency in palm oil production of Thailand palm oil mills in Thai’s palm oil industry.

Background:

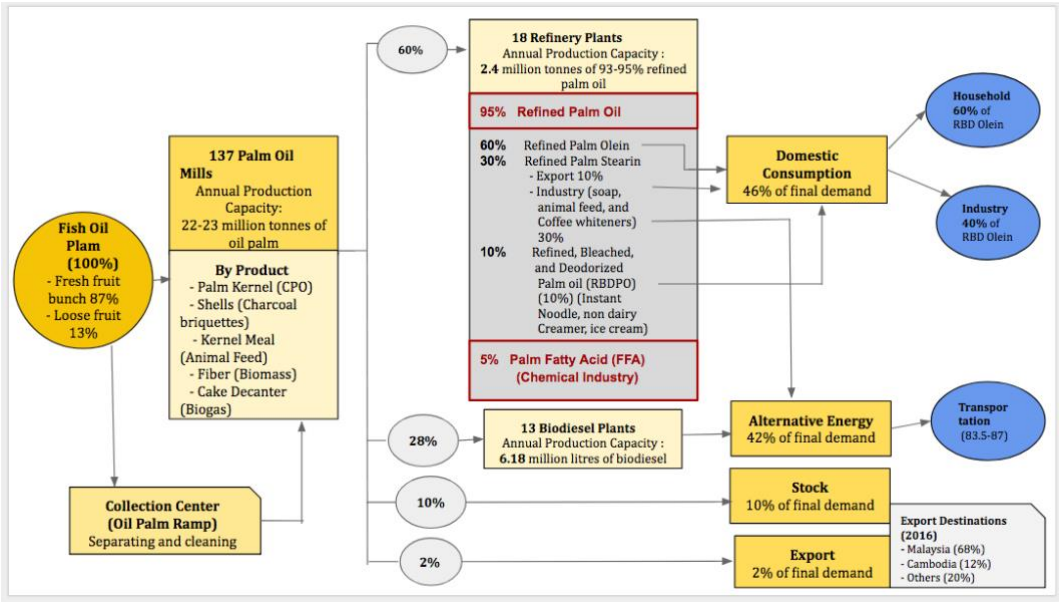
This section consisted of the background of palm oil, market situation, business structure, supply chain, and route cause of quality uncertainty of palm oil in Thailand respectively. All of components in background section only focus on CPO-A. Any detail for CPO-B will describe later in the last paragraph of this section. The palm is the popular plant for farmer in Southern and North-East areas. Moreover, the palm is the plant, required higher volume of water than other plants. This implied that the area appropriated for plant palm need to be lowland that can maintain a lot of water for palm. Another implication is palm in the southern area where food and minerals are abundant and have better quality than poor or dry area at North-East areas due to the geography under absence of human intervention assumption. However, this just a nature of palm and it can be improved by human action and this study mainly focus on quality uncertainty of palm oil industry in Thailand.

In additional to, this paragraph will illustrate upstream until downstream of the palm oil business structure to make reader understand more

clearly and deeply about this business. The primary of upstream is the farmers or farm owners (some farmer is a farm owner at the same time). As we well known the duty of farmer is planting the palm tree. And next step farmers have to harvest fresh palm bunches from a palm tree and sell it to middleman to make an income. Then, middleman brings these fresh fruit bunches to the oil palm ramps (collection center, separating and cleaning) provided by the palm oil mills factory.

Next, palms mill factory brings fresh fruit bunches into palm pressing machine to get crude palm oil and then keep it in the tank for next operation. The input of the palm oil mills is a fresh fruit bunch from and the outputs are palm kernel (CPO), shells (Charcoal briquettes), kernel meal (Animal feed), Fiber (Biomass), Cake Decanter (Biogas). Most of palm kernel around sixty percent has to send to refinery plants. The proportion of annual production from refinery plants classified into two types, which are Refined Palm Oil—95% and Palm Fatty Acid (FFA)—5%. Refined palm oil consists of the following proportion that is sixty percent of Refined Palm Oil is Refined Palm Olein, thirty percent is Refined Palm Stearin, and another ten percent are Refined, Bleached, and Deodorized Palm Oil (RBDPO). Then we use 60% from Refined Palm Stearin to produce Biodiesel (B100), 30% send to an industry that used it to produce soap, animal feed, and coffee whiteners, and the last 10% is for exportation. (Office of Agricultural Economics (OAE))

Diagram: Supply chain of palm oil industry



In case of RBDPO use to produce instant noodle, non-dairy creamer, and ice cream. Twenty-eight percent of palm oil mill's production sends to Biodiesel plants, ten percent of output have kept in stock, and two percent for export to other countries. As we know that Biodiesel is used to be an alternative energy for transportation. Both of Refined Palm Oil and Refined Palm Stearin also mostly use for domestic consumption and can be divided into two parts:1) Household (60% of RBD Olein) and 2) Industry (40% of RBD Olein). Moreover, there are three mainly destination from two percent of exports in 2016 which are Malaysia (68%), Cambodia (12%), and others (20%) consecutively. (The picture provided in Appendix section)

Before going to talk about the supply chain of palm oil mill business, readers need to know every output produced by palm oil mills more deeply first and this paragraph will be explained about an existing of CPO-B more deeply in detail. An existence of CPO-B is one of the core problems that

create weakness to palm oil market in Thailand. It is because middleman will have another channel to make their profit by sell kernel to CPO-B first, then they sell fresh fruit bunches with less or without kernel to CPO-A.

According to lack of raw material they know that palm oil mills, especially CPO-A's owners have to buy a lot of raw materials to produce their outputs as much as possible to maximizing their profits. Not only an existing of CPO-B caused weakness in this market, but also the biggest supplier of animal feed such as CP is another thing that make palm oil mills of CPO-B still alive in this industry. The biggest supplier such as CP need a very large amount of CPO-B that using to produce animal feed and when the suppliers who produce crude palm oil type B see that there is huge demand for this type of product then they decide to continue their business. And it still supports an existence of palm oil mills of CPO-B and the market of the CPO-B since there are many buyers in this market. Furthermore, the reason that palm oil mills of CPO-B is the cancer of this industry because the process that they use are dangerous for humans since the heat from pressing machine that crush kernel in palm fruits create carbon into their outputs (CPO-B) and it encourages middleman to maximize their profit by sell the used fresh fruit bunches to palm oil mill owners who produce crude palm oil type A and sell kernel to crude palm oil type B producers. So, the author would suggest that the process to produce crude palm oil type B is very dangerous. Then it cannot use to produce a cooking oil. CPO-B use to produce only animal feed.

Next, I will describe additional information about the supply chain of palm oil mill business from the factor that I have collected from two MR. Kusol Sripaoraya, Chief Financial Officer and MS. Thanamas Theparos,

Financial Analyst from Smothong Group Co, Ltd. First of all, this research paper has focused only factors that involve only upstream process in all of this industry. And before I break down the business of palm oil mills reader should understand the structure of palm oil industries which provided above first. As we know a supply chain of palm oil mills factory starting with farm owner and farmer sell raw material to middleman and then middleman sell it to palm oil mill owners. And according to a reason above that an existing of palm oil mills for CPO-B and the big buyers for outputs from palm oil mills of CPO-B lead to quality uncertainty and inefficiency in production of outputs from palm oil mills of CPO-A. Somebody will be wondering if an existing of CPO-B is a bad situation for this business, then why they still alive in Thailand.

There are many reasons that CPO-B is still alive. First of all, palm oil mills for CPO-A required a lot of money for their fixed costs such as a cost for pressing machine, land, and other capital. This implied that somebody who cannot bear a burden of their fixed cost will not establish palm oil mills of CPO-A. MS. Thanamas also said that working capital such as cash in term of reserves (cash) and short-term loan from commercial banks are crucial things required to run this business because palm oil mill business is the seasonal business that has both high and low season for palm oil yield.

High season is the period that fresh fruit bunches generates high percent palm yield, while the low season is the period that fresh fruit bunches generate low percent palm yield. Weather and rain also directly impact the percent palm yield, especially the volume of rain. It means that when there is a low volume of rain, it directly affects percent palm yield and lead to low

season of palm oil mill business because of the rising level of lack of raw materials and higher cost of inputs.

This situation is a nightmare for every palm oil mill owner particularly who run palm oil mills by of CPO-A since they have to use more money, including their reserves to be able to survive during the low season. And the worst case they have to borrow a money from commercial banks to run their business and cover their fixed costs, although they do not have a profit in this period.

For example, money which uses to purchase raw materials to produce outputs from palm oil mill's production to gain crude palm oil type A. And to construct palm oil mills for CPO-A required money at least around 150 million baht to produce 15-30 tons per hour. While, 50 million baht is enough to establish palm oil mills for CPO-B. Hence, working capital is a barrier to entry this business since it requires a lot of money to construct each palm oil mills factory.

Finally, the last thing that palm oil mill owners should concern is the government regulation, policy, and laws used in this business, including RSPO which is the standard that needed when want to compete with foreign producers. This standard will be guaranteed the quality in every production process and will create more credibility for sellers. Other regulation from government is imposed import tariff and not create a free trade agreement for crude palm oil. The first regulation created by product domestic producer by changing the high price of goods that imported from foreign countries. Another one is no Free Trade Agreement (FTA) that a palm oil mill owner cannot import if there is no FTA.

The last regulation that I will talk about is price ceiling policy that government used to protect farmers from sellers that usually dump the price of fresh fruit bunches last two years ago. Moreover, it creates a huge burden to the buyers so much since farmers do not have to care much about the quality of the fresh fruit bunches and it create high cost of production to palm oil mill owner (sellers). Furthermore, this policy also caused the quality uncertainty to this business.

Literature Review

This section illustrates the related and relevant researches, concepts and theories in used, which enable the researcher to identify the significant factors affects inefficiency of palm oil industries in Thailand. I have divided this section into three parts. The first one will talk about the brief review of my topic. Second one illustrates the concept and theories from related and relevant research paper and aims to figure out factors which causes inefficient to palm oil industries. The last one is the conclusion and preliminary theories.

Briefly review of my topic

To enable readers review about my researching topic, this part illustrates the briefly background of the inefficiency of palm oil industry in Thailand. A current situation of palm oil industries in Thailand is a perfect competitive market. The main problem in this industry is a shortage of raw materials, lack of incentive of farmer and high cost of production, which

caused by many factors that will be described in the second part of this section.

The shortage of raw material occurred Thailand due to the impact of government policy which do not make Free Trade Agreement and import tariff. An import tariff imposed by government to protect domestic producers, including domestic farmers. Therefore, this is the reason why Thai palm oil mill owner does not import raw material from other countries.

All of these problems are huge obstacles that affected the performance of palm oil industry in Thailand and make us far away from Malaysia and Indonesia who is the main producers, exporters, and huge shareholder in this market. Readers need to know the structure of palm oil industry in Thailand that state in background section first to understand deeply when the author talk about factors that affect this market.

According to the emergence of CPO-B that constructed by entrepreneurs, who want to invest in palm oil industry, but cannot entry CPO-A market due to high money and working capital requirement. They decide decision to construct palm oil mills produce crude palm oil type B instead, since use lower money for operating the business. It makes the owner of palm oil mills who produces crude palm oil type A face the quality uncertainty and technical inefficiency problem because middleman want to maximize their profit by sell kernel to palm oil mill owners producing CPO-B and sell fresh fruit bunch without or less kernel to producers who produce CPO-A.

Middleman sells kernel to CPO-B's producers since palm oil mill type B using raw materials only kernel, while crude palm oil can produce by every part of fresh fruit bunch. Although, is the most important part of fresh fruit

bunch that give highest percent palm yield, but it is the most expensive part of fresh fruit bunch too. Thus, if CPO-A producer use only kernel to produce CPO-A, then they have to may much more money than using every part of fresh fruit bunch. It implies that the raw materials which the palm oil mill owners producing CPO-A buy from middleman has low quality and give low yield. This suggested that an emergence of CPO-B creates severe impact to CPO-A's market and palm oil industry in Thailand.

Review literature, preliminary concept, theories, and factors caused quality uncertainty and inefficient in market

This part will start with the factors came from both sources. One of my important sources comes from the relevant research paper. Another source comes from in-depth interviews that I have interviewed Ms. Thanamas Theparos, financial analyst of and MR. Kusol Sripaoraya, chief financial officer of Smothong Group Co, Ltd. There are many factors that caused inefficient to palm oil industry in Thailand. An author will talk about it consecutively.

The first one is farm's owner due to lack of knowledge and incentive to plant palm make they do not know how to cultivate and plant it correctly. Another thing is the way that they deal with the farmer when they want to cultivate for selling to a middleman or oil palm plantation is inappropriately by using the weight of palm instead of percent of palm yield per unit of the palm fruit bunch.

Secondly, the farmer is another factor that creates bad supply chain since they know that the greater weight the greater income they received. Then this induces farmer to cultivate palm fruit bunch regardless it maturate or not.

Thirdly, the middleman is one of the significant factors caused inefficient due to an asymmetric information between them and palm oil mills. Gorton, et al. (2006) illustrated that how asymmetric information between dairy farmers and milk processors leads to market failure. Akerlof (1970) stated that it has been seen that the good cars may be driven out of the market by the lemons since the bad car sell at the same price as the good car because it is impossible for the buyer to tell the difference between a good and a bad car. Most of middleman in these industries cheats palm oil mills by two ways. The first way is sprinkling water on fresh fruit bunch to make higher weight before sells it to palm oil mills since they know that they will gain more money when the weight is higher. Another way is to sell a kernel to another type of palm oil mills (CPO-B) and sell a fresh fruit bunch with less kernel to CPO-A to maximize their profit.

All of previous factors are the main thing that result in low percent of palm yield because farmers will cultivate palm fruit bunch whether it mature or still raw and the emergence of the CPO-B encourage middleman to cheating (the reader should know that fresh palm bunch which collect when it is raw will generate lower percent of palm yield than when it maturates and kernel is the most important part that generate crude palm oil for CPO-A). Low percent of palm yield leads to the shortage of raw material and causes reduction in the oil extraction rate and lower output, crude palm oil. And the owner of palm oil mills cannot do anything with an asymmetric information between them since

the process for checking quality in this industry is nothing without a pair of eyes and due to the shortage of raw material forces them to buy for their production. The last one, this factor is price that a palm oil mills owner offers to farm owner (after the emergence of CPO-B and cheating by middleman palm oil mills decide to create their own buying point due to the cost of dishonesty). Akerlof (1970) stated that the cost of dishonesty, therefore, lies not only in the amount by which the purchaser is cheated; the cost also must include the loss incurred from driving legitimate business out of existence. It is one of the most important that affects the amount of raw material that palm oil mills will obtain.

Other factors are the factors that cannot control compose of distance between farm owner and supply chain of palm oil mills,[Bukki, and Khan (2011) claimed that dairy farm which stay close to supply chain generate lower technical inefficiency], government policy that prevent local supplier from Foreign direct investment (FDI) by impose export tax, [Dolan and Humphrey (2000) and Weatherspoon and Reardon (2003) concluded that FDI negatively affects small local suppliers] and [Gow and Swinnen (2001) and Dries and Swinnen (2004) shown that FDI related vertical and horizontal integration contributes to increased access to finance, inputs and productivity growth], and whether such as dry and rainless also affects the percent of palm oil yield. All of these factors affect palm oil industry in Thailand cannot reach an efficiency point.

The Shortage of raw materials, quality uncertainty, and technical inefficiency problem that I have mentioned above barely seeing in leader countries like Indonesia and Malaysia. Both Indonesia and Malaysia have

enough fresh fruit bunches to produce crude palm oil since palm is the plant that both countries grow it in mostly area in their countries that make inputs enough for the capacity of palm oil mill producers in Malaysia and Indonesia. Another thing, almost producers, including farmers in Malaysia and Indonesia have better knowledge how to generate high percent palm yield and how to control their quality in crude palm oil production.

They use RSPO as a standard and use this standard to guarantee the quality for their exportation. Moreover, both countries have laws and regulations using to prohibit emergence of palm oil mills for crude palm oil type B to prevent negative impact caused by CPO-B business. The last thing, there are a low number of middleman since most of producers also have their own farm and most of farm owners in both countries have very large area that they have planted palm.

In sum, the author writes this research paper because no one does this research about the inefficiencies in palm oil industry of Thailand before. Most researchers have focused on the impact of the pollution or any negative externalities and the oil extraction rate (percent of palm oil yield). Then the purpose of the author aims to figure out significant factor that affects this industry and want this paper to be able to answer readers or persons who need to know why palm oil industries in Thailand cannot reach an efficiency point as same as Malaysia and Indonesia.

According to the collecting data which come from both sources, stated above in part two of this section. Author decide to use this following factor: farm owner, farmer, middleman, emergence of CPO-B (another type of palm oil mills), distance between the farm owner and supply chain, government

policy, climate change and disaster, and price to explain this situation and answer the topic why the palm oil industry in Thailand cannot reach an efficiency point. And author will emphasize the significantly factor and problem that needs to improve as soon as possible in the conclusion section of this research paper.

Methodology

In this part, I will collect the data of palm oil industry (Palm Oil Mills of CPO-A) to define the structure of this industry from the expertise and to determine what is the significance factor between the job market and quality uncertainty problem which affect an inefficiency of this industry. Hence, the theories that will apply to explain the problem in this paper are asymmetric information (Lemon Market) which will come up with the complement theory, but not completely explained for the palm oil market called “Gresham’s Law”- suggested that the bad driving out the good; both good and bad cars have the same price. Including the costs of dishonesty that will drive out the good business (the existence of cheating middleman will drive out the good middleman and business). This problem is a negative externality for the business CPO A since the factory will face a severe problem because of quality uncertainty in the market.

Another one is the theory about the quality of education which will produce better workers than slum education and can be linked with the quantity uncertainty because if they have the true knowledge when they should cultivate palm bunch, then it could be solved both quantity uncertainty

and the lack of raw materials by gaining greater volume of palm yield. One way, that I use to measure the efficiency in this paper, is using technical efficiency rate to support that farmer, small supplier in the supply chain, is one of many factors causes inefficiency in palm oil production. Salop model use to explain the distance between the farm owner and supply chain.

According to the Akerlof paper (market for "lemons"), I have copied the model from this and rearranged it for my topic since my topic also focuses problem as same as this paper which is quality uncertainty problem caused by asymmetric information problem. The individuals palm oil mills in this market buy a new fresh fruit bunch (raw material in this process) every day without knowing whether the car they buy will be good or a lemon (bad).

I assume that q is a probability of fresh fruit bunches which have good quality. Definitely, (1-q) is a probability which is lemon; by assumption, q is the proportion of good fresh fruit bunches bought and (1-q) is the proportion of lemons. After the owner of palm oil mills owning a specific fresh fruit bunch, the owner of palm oil mills can form a good idea of the quality owning a specific raw material, however, for a length of time, the owner of palm oil mills can form a good idea of the quality of this fresh fruit bunch; i.e., they assign a new probability to the event that his raw material is a lemon. This estimate is more precise than the original estimate.

After owning a specific fresh fruit bunch, however, for a length of time, the palm oil mill owner can form a good idea of the quality of this fresh fruit bunch; i.e., the owner assigns a new probability of the event that his fresh fruit bunch is a lemon. This estimate is more accurate than the original

estimate. As an asymmetric information: the sellers (Middlemen) absolutely have knowledge about the quality of the raw material more than buyers (Palm oil mill owners). But good and bad raw materials have sold at the same price since it is impossible for buyers to distinguish quality between good and bad of a specific fresh fruit bunch. We obviously know that a used fresh fruit bunch (less or low kernel) cannot have the same value as a new fresh fruit bunch – if it did have the same value, it would clearly be advantageous to trade a lemon (bad quality) at the price of new fresh fruit bunch, and buy another new fresh fruit bunch, at a higher probability q of being good and lower (1-q) which is a probability of being bad. Therefore, the owner of a good raw material must be locked in. Not only is it true that he cannot receive the true value of his fresh fruit bunch, but he also cannot obtain the expected value of a new fresh fruit bunch.

A. Asymmetric information

I have copied the model from Akerlof (1970). It has been seen that the good fresh fruit bunches may be driven out of the market by the lemons (bad quality). And with the quality uncertainty of outputs can lead to the worse problem. It is possible that the Bad quality inputs and outputs will drive out the good quality inputs and outputs. It leads to market failure of palm oil industry, which there is no market exist at all at the end. We can assume that the quantity demand for used fresh fruit bunch is $\boldsymbol{Q^d =}$ D(p, μ) (low or without kernel). It depends on two variables which are the price (p) of fresh fruit bunch and another variable is the average quality of used fresh fruit bunch traded (μ). Moreover, supply and average quality of used fresh fruit

bunch depend on the price. This is the function for both supply and average quality of used fresh fruit bunch μ= μ (p) and S=S(p). Hence, we get the equilibrium equation equal to S(p) = D(p, μ (p)) when supply equal to demand at the equilibrium point.

This equation implies that when the price fall, then the quality will also fall. Furthermore, the possibility that no traded in the market could be occurring. There are some assumptions that use in this model. The first one is there are two groups of traders.

$$U_1 = M + \sum_{i=1}^{n} x_i \qquad (1)$$

According to the above equation, this is the utility function of group one trader where *M* is the consumption of goods other than fresh fruit bunches, x_i is the quality of the ith fresh fruit bunch, and *n* is the number of fresh fruit bunches. And the utility when they buy used fresh fruit bunch equal to 1.

$$U_2 = M + \sum_{i=1}^{n} \frac{3}{2} x_i \qquad (2)$$

An above equation is a utility function of group two traders and the definition of the variables is as same as variables from the equation (1). A 3/2 is the utility when group two traders buy fresh fruit bunch. To continue with this model, there are three assumptions (1) both types of traders are von Neumann-Morgenstern maximizers of expected utility, (2) group one of the

traders has N fresh fruit bunches and group two of the traders has no fresh fruit bunch, (3) M is the price of other goods.

Let y_1 be the income of all type one traders

Let Y_2 be the income of all type two traders

The demand for used fresh fruit bunches is the sum of the demands of both groups of traders. Another assumption is indivisibilities, the demand for fresh fruit bunches of type one trader will be;

$D_1 = Y_1/P$ $\mu /P > 1$

$D_1 = 0$ $\mu /P < 1.$

And the supply of fresh fruit bunches offered by group one traders is

(1) $S = pN /2$ $p \leq 2$

with average quality

(2) $\mu = p/2.$

(To derive (1) and **(2),** the uniform distribution of fresh fruit bunch quality is used.)

Similarly, the demand of group two traders is

$D_2 = Y_2/p$ $3\mu/2 > p$

$D_2 = 0$ $3\mu/2 < p$

And supply of group two traders is $S_2 = 0.$

Therefore, total demand D (p, μ) is:

$D (p, \mu) = Y_2 + Y_1/ p$ if $p < \mu$

$D (p, \mu) = Y_2/ p$ if $\mu < p < 3\mu/ 2$

$D (p, \mu) = 0$ if $p > 3\mu/ 2$

According to an asymmetric information model, it suggested that if the price is more than the utility when buyers have from buying good used fresh fruit bunches, then there are no trade at any level between group one (sellers) and group two of traders (Buyers).

Result

Therefore, this model suggested that if the price is greater than the expected utility of the good used fresh fruit bunches, then there is no quantity demand at any price level more than 3/2. While, if the price is less than 1 then then quantity demand of used fresh fruit bunches is equal to the sum of quantity demand of two groups of traders (sellers and buyers). And from the part A. it implies that if the buyers know an actual average quality of fresh fruit bunches trade is equal to p/2, when price is p, then buyers will not trade with sellers who set the price more than p/2 because of asymmetric information. This can explain only in term of theory.

But in realistic related to the current market situation, palm oil mill owners are facing shortage of raw materials and quality uncertainty of inputs. So, they cannot divide it into two parts and think that the bottom one could be bad fresh fruit bunches. This is because in realistic there are no useful tools that can a quality of fresh fruit bunches precisely. And all of palm oil mill owners in the market have to buy both good and bad fresh fruit bunches from middleman to serve

their production capacity as well as maximize their profit or some of them could do it to reach the breakeven point of their business.

Conclusion

To sum up, buyers still cannot distinguish quality of fresh fruit bunches precisely. While, sellers gain a lot of profits from this problem and no incentive to improve or care much about the quality uncertainty due to the market situation and government policy that supported them because they think that no matter what the quality of fresh fruit bunches would be good or bad, they will probably sell it to some producers. Another reason is sellers knowing that all buyers are facing shortage of raw materials. In additional to, the government policy, such as price ceiling and import tariff that government use to protect domestic producers also support sellers who do not care much about the quality of their inputs. It suggested that an asymmetric information does exist in this market until now and these things also create lots of affect to this industry. For example, the problem that occurred between middleman and palm oil mill owner is caused by an asymmetric information as well as palm oil mills owner cannot detect the quality of raw materials precisely.

Therefore, this problem will last long in our country because of an existing of palm oil mills of crude palm oil type B (CPO-B), existing of large buyers who need a lot of CPO-B, and the price ceiling policy from government that induce lower incentive of the farmer. They do not care much about the yield of percent palm (yield =

quality) since they know that they can sell all of their fresh fruit bunches under lack of inputs and price war situation. In addition to, government also protect domestic producers by imposing import taxes and do not create a free trade agreement to prevent a palm oil mill owner import fresh fruit bunch from foreign producer. So, it will be like this forever if government does not change the policies which is the most significant factor that affect current market situation and cause a lot of problems of asymmetric information problem in palm oil industry.

Time constrain is the limitation of this paper that make me decide decision to focus on only palm oil mill business. It is one of the important parts in palm oil industry. And I can get deeply information about this business more than others in the industry due to the main source of information come from expertises who have working in this business.

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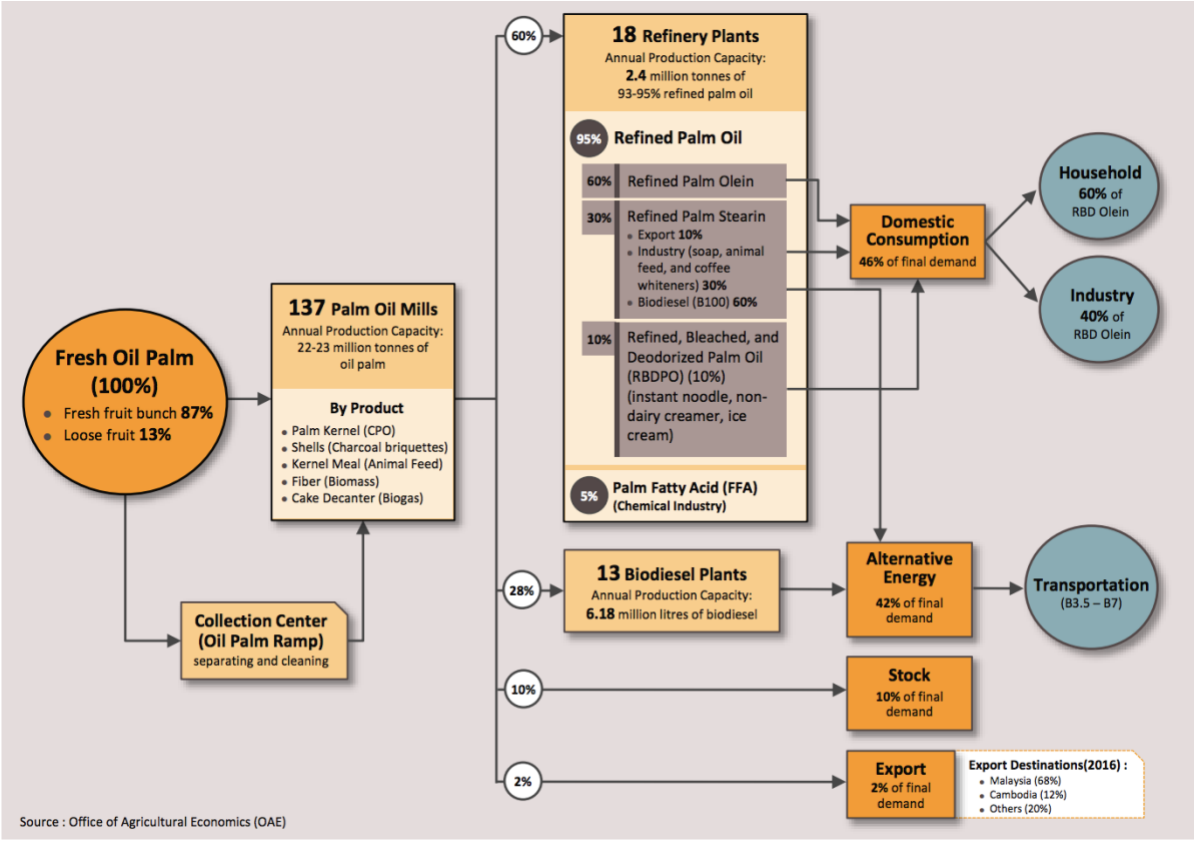
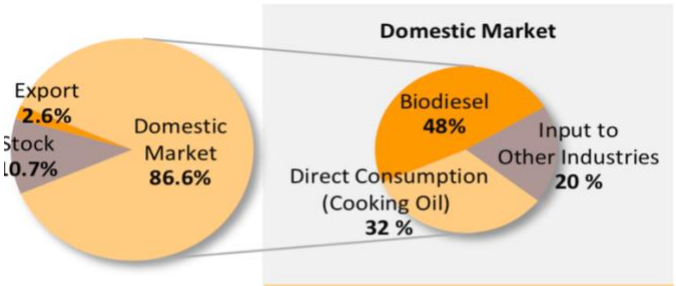
Appendix



A supply chain of palm oil industry

Figure 5: Sales Volume Thai Palm Oil Industry (2016)

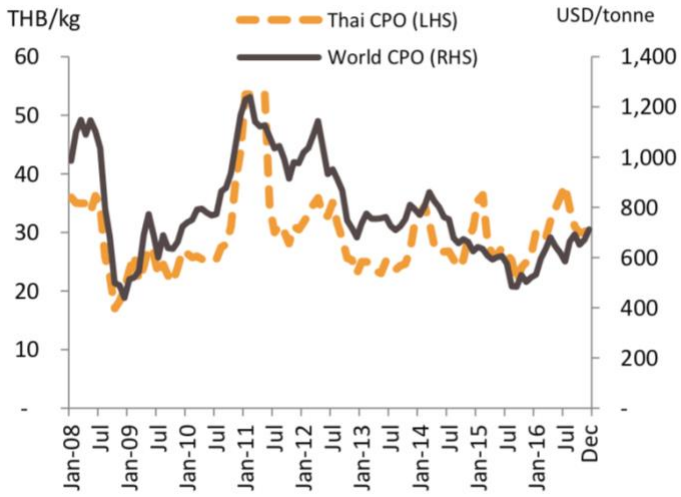


	% Share of other industries
Snack & Instant Noodles	30
Soap	20
Non-dairy Creamer	15
Others	35

Source : Department of Internal Trade (DIT) and collected by Krungsri Research

Sales volume of Thai Palm oil industry

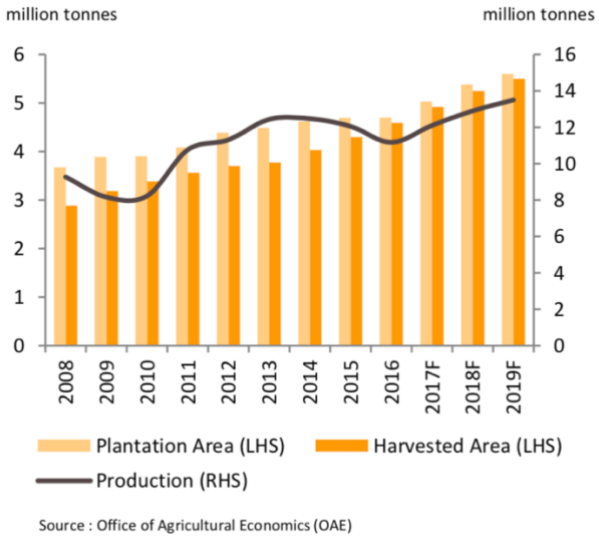
Figure 8: Crude Palm Oil (CPO) Prices



Source : Department of Internal Trade (DIT) and World Bank

This figure shows the price of crude palm oil type A in 2016 which is higher than current price due to the price ceiling policy of government that rising the cost of production due to quality uncertainty of inputs.

Figure 12: Thailand Oil Palm Plantation and Production



Source : Office of Agricultural Economics (OAE)

Thailand Oil Palm Plantation and Production