

Determinants of Entry into Malaysian Palm Oil Refinery Industry (Penentu Kemasukan Industri Penapisan Minyak Kelapa Sawit)

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ABSTRACT

The palm oil refinery industry continued to rise as Malaysia's key trade, following the nation's transitional economy in the early 1970s. Known as the workhorse of its industry, palm oil refinery began to boom with the early establishment of refineries in several states throughout east and west Malaysia. However, in recent years, it was reported that the establishment of licensed refineries in the country recorded a rise in numbers, and yet the companies did not step up into the market as planned. The issue of industrial competitiveness was put into question by the decreasing rate of new entrants. In this study, the logit model was adopted to identify entry-related factors in the industry. The prescribed period of study was set between 2005 and 2013, involving 52 firms in operation in the Malaysian palm oil refining industry, where their annual reports were obtained from the Companies Commission of Malaysia (CCM). The empirical results implied that profit, distribution, marketing intensity, coupled with minimum efficient scale and growth were all significant and carried the correct coefficient signs.

Keywords: Malaysian palm oil refinery industry; determinants of entry; logit model

ABSTRAK

Industri penapisan minyak sawit menjadi industri utama berikutan peralihan polisi ekonomi negara pada awal 1970an. Dikenali sebagai tulang belakang industri minyak sawit, aktiviti penapisan mula berkembang dengan pesat berikutan penubuhan kilang penapisan di Semenanjung Malaysia, Sabah dan Sarawak. Walau bagaimanapun, penubuhan kilang penapisan di negara ini dalam beberapa tahun kebelakangan ini telah membangkitkan kebimbangan dengan peningkatan jumlah firma penapisan yang memperolehi lesen, tetapi tidak memasuki industri seperti yang dirancang. Isu daya saing industri penapisan dipersoal dengan kadar kemasukan firma baru yang semakin berkurangan. Di dalam kajian ini, model logit digunakan untuk mengenal pasti faktor-faktor kemasukan firma baru dalam mengkaji daya saing industri penapisan minyak sawit. Tempoh masa kajian telah ditetapkan dari tahun 2005 hingga 2013 melibatkan 52 firma yang beroperasi dalam industri penapisan minyak sawit Malaysia, di mana laporan tahunan diperoleh daripada Suruhanjaya Syarikat Malaysia (SSM). Hasil empirik menunjukkan pembolehubah kadar keuntungan, pembolehubah pengagihan dan pemasaran, pembolehubah skala cekap minimum dan pembolehubah kadar pertumbuhan adalah signifikan dan memaparkan tanda-tanda jangkaan yang betul.

Kata kunci: Industri penapisan minyak kelapa sawit Malaysia; penentu kemasukan; model logit

INTRODUCTION

Since Malaysia's independence in 1957, tremendous economic transformation has provided great new opportunities for the country's palm oil refining industry. According to Ahmad (2012), following economic transition plans in the early 1970s, Malaysia's palm oil refining industry has been known as the workhorse of the palm oil industry. It began to boom with the establishment

of refineries in several states in the early days, spreading from Peninsular Malaysia to Sabah and Sarawak in recent years. New firms were seen entering the industry while some incumbents were taken over and some expanded their operations (Fold & Whitfield 2012).

In recent years, entry had been rather slow with a record of 48 new firms in 2005, which increased to 54 in 2014. Based on records between 1980 and 2010, the average number of new entrants was six. Thus, the



increase in the number of the industry's firms over a span of thirty years was exceptionally small. It is also worth noting that, refineries under planning were relatively high with 12 firms in 2006, which increased to 25 in 2010. Despite owning licences to operate, these refineries did not enter the industry as planned. The issuance of licences with no entry has drawn concerns over slow entry in the industry. Besides, we should also consider the reason as to why refineries with licences did not start operation as planned.

The entry and establishment of a firm would lead to the formation of many more firms producing similar products and services for the industry. The occurrence of entry cannot happen overnight, as it is in fact the results of a series of planning and decision-making. For example, more often than not, the decision to enter an industry is closely connected with the behaviour and structure of a market. The interests of economists are often concerned with the determinants that may have caused the occurrence of entry into an industry.

Therefore, entry is of prime importance in an economy as it helps increase the level of competitiveness between firms, through proper long-term economic growth allocation. Entry in accordance to Jelili and Goaid's views (2010), however, is a good phenomenon that does more good than harm to the industry and economy as a whole. Their extensive analysis demonstrated that new entry did, as a result, inflict affirmative growth to the European industries.

As found by Geroski (1989), entry in three-digit industries in the United Kingdom generated growth in terms of productivity. In an environment of more stable growth, entry can, as a result, stimulate efficient allocation in production and resources (Daunfeldt et al. 2006; Günalp & Cilasun 2006; Siegfried & Evans 1994). When healthy competition arises in the market, consumers are better off with high quality and innovation of goods and services, variety of choices and fair prices. The inefficiencies associated with monopoly are offset as the level of competition in the market increases.

Valuations also become compelling in markets as new entry ensures improvement in technologies used (Austin & Rosenbaum 1991; Lay 2003) and helps boost post-entry performance in an industry (Günalp & Cilasun 2006). On one hand due to the rising competitiveness, positive organisational transformation would be expected to take place in the presence of entry (Jelili & Goaid 2010). Based on the studies done by Jelili and Goaid (2010), coupled with Geroski (1995), innovation and changes are often driven by new entry. Caution has set in, motivating established firms to be productive and innovative as they could to remain in the market than in the absence of the threat of new entrants.

In other words, barriers to entry in the perspectives of existing firms are to maintain their welfare and position in the market from invasion of new firms. By raising the barriers, be it strategic or natural market barriers, existing

firms can keep new firms off the market. It is however arguable that market barriers are seriously retarding efficiency and growth of a market. When competitiveness is restricted in a market, it can be expected that product development, resource allocation and growth would be equally constrained.

LITERATURE REVIEW

Entry is one of the fundamental issues that are of great importance to the studies of industrial economics. Many have indebted their studies related to entry to that of Bain's work (1956). Bain (1956) was among the firsts to initiate discussion on the concept of barriers to entry, where he defined barriers to entry as the advantages enjoyed by established firms without inducing entry. Bain specifically indicated that the act of raising prices above competitive level would not attract entry of newcomers. He suggested absolute cost advantages, product differentiation and economies of scale as the three important determinants that barricade entry. Later in 1968, Stigler further defined barriers to entry as the cost that is to be borne by new entrants upon stepping into the industry that does not apply to established firms. Stigler's definition aimed more on the post-entry cost advantage condition of both established and new firms, while Bain's definition back in 1956 had focused on the ability of established firms to gain additional profits over new firms.

On the other hand, it was suggested that entry barrier is "a structural characteristic of a market that protects the market power of incumbents by making entry unprofitable" (Church & Ware 2000). The conservation of a firm's market power to increase or at the very least sustain its output post-entry is the main concern and purpose in entry barriers. In a recent discussion by Niu et al. (2012), entry barriers are formed to delay entrants' approach towards the market. Conclusively, the longer the time entrants take to enter an industry, the more perceptible the entry barriers affect new firms, the harder it is for them to enter (Niu et al. 2012). The work of Orr (1974a) that introduced the adaptation of barriers to entry as the determinants of entry to the literature of industrial economics, has laid a foundation to the studies of entry in various industries to which would be discussed extensively in the following part of this paper.

The nature of a business is to maximise its profit rate. It is believed to be the first aspect likely to be the concern of potential entrants before stepping into a market. The profit rate acts as an incentive to attract entry of new firms into the market. It has been predicted that when a past profit rate is high, one can expect the current and future profit to be high as well. Based on the general belief and prediction of scholars, profit rate is asserted to have a positive relationship with entry. The notion that high profit rate attracts entry is supported by Jelili and Goaid

(2010), Günalp and Cilasun (2006), Saikia (1997), Amel and Liang (1997), Siegfried and Evans (1994) and Jeong and Masson (1991).

A growing industry always attracts entry as it increases the probability of investors to reap high return in the market (Economy Watch 2010). The advantage of growing markets as illustrated by Sekkat (2010), Pamukçu et al. (2010), Carree (2007) and Günalp and Cilasun (2006), is that these markets are often seen as less competitive but with wider market opportunities. When the opportunities intensified, it would create an extra room for entrants to serve as incumbents overwhelmed by escalating demand. If future growth rate of the market is predicted to be relatively high, potential new firms would still be driven to enter, as affirmed by Siegfried and Evans (1994). Potential entrants were more attracted to future demand growth and future profit rate, than the current condition of a market. The relevance of this, as reasoned by Mata (1993), is that new firms are likely to survive and expand in an evolving market.

Minimum efficient scale is the term used to describe the condition of a firm where its long run average cost is minimised despite producing the smallest output. The expected sign for this variable, as discussed by Günalp and Cilasun (2006), would be negative. They explained that when market demand is not as large as minimum efficient scale in the industry, increment of both prices above the minimum average cost and profit would not induce entry of potential entrants. It would be unwise for entrants to enter in this condition, thus a negative relationship would be expected. From Siegfried and Evans' paper (1994), it may seem that entry was somehow barred as investment in minimum efficient scale was amplified.

Industries such as manufacturing, commodities plantations, telecommunication, and property development are among capital-intensive industries that require large-scale investments to operate. Often, investment in these industries includes machinery, equipments, technology and expertise that are considered sunk which could be a major turn off for firms to enter. As pointed out by Jelili and Goaid (2010), Geroski (1995), Austin and Rosenbaum (1991), Jeong and Masson (1991) and Gilbert (1989), capital requirements that are sunk would not be recovered or earned in the occurrence of exit, which is considered a credible threat for incumbents to deter entry from new firms. In this way, it would increase the losses incurred by entrants in the event of entry and exit, making capital requirement a barrier. Requirements in capital investment add to the potential new firms' disadvantages that would further exhaust them financially. Capital requirement creates financial constraints and difficulties that would intimidate potential entrants to enter.

Product differentiation, among others, is considered a vital threat to the entry of entrants. Product differentiation may also be found in the form of distribution and

marketing expenses. Distribution and marketing expenses cover expenses on storage, handling, and organisation of inventory, distribution network and marketing of product, as well as after sales services (Basant & Saha 2005; Karakaya & Stahl 1989). Product differentiation as implied by Bunch and Smiley (1992), Karakaya and Stahl (1989), and Schwalbach (1987) in their studies, was a significant barrier to entry. It is a form of incumbent-advantage that imposes additional costs and expenses on new entrants in which the latter deems as barrier or threat upon entry.

As suggested by Bain (1956), firms in highly concentrated market tend to hold market power close to that of monopoly power. In order to prevent advancement of new entrants into the market, firms may collaborate with one another to fix price and output to earn normal profit. In highly concentrated markets, Jelili and Goaid (2010), Sekkat (2010), Pamukçu et al. (2010), Nyström (2007), Günalp and Cilasun (2006), Saikia (1997), Bunch and Smiley (1992), Cotterill and Haller (1992), Harrigan (1981) and Orr (1974a) observed that firms evidently implement pre-emption strategies to deter or delay new firms from entering the industry. They believed that potential entrants are aware of the possibility of incumbents colluding in highly concentrated markets to hamper new entries.

METHODOLOGY

The studies related to entry were inspired by the pioneer economist in industrial economics field, Joe S. Bain when he first studied the conditions of a market that leads to entry (Martin 2010). Bain (1956) described entry as a set of exogenous factors that are favourable and attracting new firms to enter the market. He further added that these factors are advantages incumbent firms have over new potential entrants. Later on, other prominent scholars came up with different definitions and interpretations of barrier to entry and these definitions are still being used up to this day.

For the purpose of this study, barrier to entry is employed as a factor or determinant that attracts new firms to enter the market. Presumably, entry is influenced by determinants that act as incentives and barriers that may have, in one way or another, affected entry positively or negatively. The determinants of entry were studied directly in effect to entry following the pioneering work of Orr (1974a, 1974b, 1974c). In this paper, the discrete choice model of logit by Cotterill and Haller (1991, 1992) would be used in analyzing the determinants of entry into the palm oil refining industry in Malaysia.

The decision of a firm's entry is a dichotomous decision. Often, the dichotomous decision is studied through the logit model developed by Joseph Berkson back in 1944, following the original logistic function model that was invented by Belgian mathematician,

Pierre-François Verhulst. It was first developed for the purpose to study population growth that was later used widely in biological assay (biological standardization), to the recent development of statistics and econometrics. The logit model has been extensively adopted in various disciplines ranging from biology (toxicology), medicine (epidemiology), statistics and economics (econometrics) (Cramer 2003). In the field of economics, it is usually used in studying behavioural choices and decision-making responses such as a student's decision on whether to attend university, or a consumer's consideration in deciding whether to purchase a house.

The estimation model, which is also adopted for this study, is extracted from the proposed model used by Cotterill and Haller (1992) in their studies on a single industry of supermarket entry in the United States. The same model will now be used to study the influence of determinants of entry in the Malaysian palm oil refining industry. As this study also aims to focus on a single industry, employing the model studied by Cotterill and Haller is equally important and appropriate.

Among the variables used in estimating the model include growth rate of industry sales revenue, minimum efficient scale in sales production, profit rates, capital requirement, distribution and marketing intensity and concentration ratio. The logit model will be employed when estimating the probability of entry facing the determinants as listed above.

The estimation equation and variables are as follows:

$$E_{i,t} = \beta_0 + \beta_1 P_{i,t} + \beta_2 G_{i,t} + \beta_3 MES_{i,t} + \beta_4 CAP_{i,t} + \beta_5 DMI_{i,t} + \beta_6 CR_{i,t}$$

where;

- $E_{i,t}$: 1 for the occurrence of entry in the period between 2005 and 2013;
- $P_{i,t-1}$: Past profit rate of firm in time between 2005 and 2013;
- $G_{i,t}$: The growth rate of a firm's sales revenue in the market between 2005 and 2013;
- $MES_{i,t}$: Minimum efficient scale of firm in the market between 2005 and 2013;
- $CAP_{i,t}$: Capital requirements of firm in time between 2005 and 2013;
- $DMI_{i,t}$: Distribution and marketing intensity of firm in time between 2005 and 2013; and
- $CR_{i,t}$: Concentration ratio of industry in time between 2005 and 2013.

In this study, the entry of firms in the palm oil refining industry is influenced by independent variables such as past profit rates, growth rate, minimum efficient scale, capital requirements, distribution, marketing intensity and concentration ratio. These determinants will be tested empirically against the occurrence of entry in the palm oil refining industry in Malaysia.

The adoption of the discrete choice model is similar to that of Cotterill and Haller (1991, 1992). Entry in this

case is the dependent variable that can be represented by a binary variable in which a firm's decision is assigned with one (1) as the event of entry takes place, and zero (0) in the case of no entry.

$$Y_t = ENTRY_t = \begin{cases} 1, & \text{if } ENTRY_t \\ 0, & \text{otherwise} \end{cases}$$

The formation or expansion of new plants by existing refinery firms in the industry would be considered as an occurrence of entry as well.

Past profit rate is one of the independent variables in this study and is measured as:

$$Profit_{i,t-1} = \frac{Net\ income_{i,t-1}}{Total\ assets_{i,t-1}}$$

A positive coefficient variable would signify that entry of a new firm into the palm oil refining industry in Malaysia is driven by profit rate. Potential refiner opts to enter this particular industry following incumbents' past profit rate as well as positive expectations of future returns.

The past growth rate of a firm's revenue is measured as follows:

$$G_{i,t} = \frac{G_{i,t} - G_{i,t-1}}{G_{i,t-1}}$$

The variable of growth that comes with a positive sign in this study further confirms the establishment that growth rate contributes to a firm's entry into the palm oil industry in Malaysia.

In this study, the economies of scale is represented and measured as minimum efficient scale (MES), an adaptation from the work of Basant and Saha (2005):

$$MES_{i,t} = \text{Log} \left[\frac{Revenue\ sales_{i,t}}{Number\ of\ firms_t} \right]$$

A negative sign on the coefficient of this variable denotes that potential entrants consider MES as a barrier and are therefore reluctant to enter the industry.

Inspired by the work of Nyström (2007), capital requirements in this study are the cost of fixed capital needed to operate a plant or firm, measuring as:

$$CAP_{i,t} = \frac{Tangible\ capital\ value_{i,t}}{Cost\ of\ sales_{i,t}}$$

The tangible capital that occurs in this study is inclusive of fixed capital such as machinery, inventories, buildings and lands needed in the production of refinery. The negative coefficient is estimated as to deter new potential firms from entering. This estimation is however, incapable of determining if the reason of firms being deterred is due to the additional costs issued upon entrance or the sunk expenditure involved upon exit.

Based on studies by Basant and Saha (2005), distribution and marketing intensity is given away as:

$$DMI_{i,t} = \frac{\text{Firm distribution and marketing expenditure}_{i,t}}{\text{Firm sales}_{i,t}}$$

Distribution and marketing expenditure is commonly referred to as selling and distribution expenses, or marketing and distribution expenses. A negative coefficient would imply that this particular determinant is a barrier that forestalls new firms from advancing into the industry.

Concentration ratio, on the other hand, is derived as:

$$CR_t = \text{Four-firm concentration ratio } CR_4$$

Based on the findings by Pamukçu *et al.* (2010) and Günalp and Cilasun (2006), concentration ratio is the CR_4 of the industry in time that takes into account the top four firms' market share that would provide a thorough analysis for this study. A negative sign would verify the understanding that a concentrated industry does indeed deter new firms' advancement.

The time-period for this study is set from 2005 to 2013, involving 52 companies and refinery plants in operation in the Malaysian palm oil refining industry, compiled from the Malaysian Palm Oil Board (MPOB) directory. The directory consists of the name of the refinery company and its parent company, postal and factory addresses and the products it produced. With the list of the companies in hand, their registration numbers were obtained beforehand from the CCM website to ease the process of acquiring access to 265 company records in the CCM office strictly for academic research purposes. It is worth noting that the financial data extracted are not from consolidated financial statements, but from unconsolidated annual reports of the refinery companies in accordance with the suitability, availability and applicability of this study.

EMPIRICAL RESULTS

This study combines the empirical works of Orr (1974a, 1974b, 1974c) on determinants of entry via the discrete choice model presented in Cotterill and Haller's work (1991, 1992). Based on this, the researcher would look into the determinants of entry within the Malaysian palm oil refining industry, specifically from 2005 to 2013. By utilising the financial statements obtained from the CCM involving 52 refinery firms from 2005 to 2013, the independent variables in this study are inclusive of past profit rate, growth, minimum efficient of scale, capital requirement, distribution and marketing intensity and concentration ratio. An analysis on all 52 companies was conducted, including 35 public listed firms. A separate analysis focusing on the public listed firms was necessary as these firms tend to practise different standards of conduct as indicated by Cotterill and Haller (1992) in their analysis on supermarket chains.

As panel and binary data present an opportunity for endogeneity problems, where variables are correlated with the error term, Table 2 illustrates the Hausman endogeneity test results in order to address the issue. According to Wooldridge (2009), a two-stage least square (2SLS) estimator is commonly used as an instrumental variable (IV) estimator in addressing the issue of endogeneity. It has been described that the Durbin-Wu-Hausman (DWH) specification test, also widely known as the Hausman test, is used to determine whether or not the variables suffer from endogeneity. As the probability of Hausman for all firms and public listed firms were stated as 0.637 and 0.920 respectively in this study, it was evident that the analyses indicated a failure to reject the null hypothesis. Therefore, it was sufficient to say that the variables and error terms were not correlated and that the issue of endogeneity did not occur in this study. The ordinary estimation model is a preferred and efficient one to be used although the IV would be fit as well (Dougherty, 2007). In the case where endogeneity was ruled out in the variables, the ordinary estimation result was deemed fit, efficient and consistent to be used for further analysis. As such, the logit estimation results for all firms and public listed firms in this study should be employed instead of the IV estimation results.

Table 3 exhibits a summary of the estimation results for the logit model used. The adaptation of the discrete choice model in this study is similar to that of Cotterill and Haller (1991, 1992). Referring to the results, it is important to state that the interpretation of the logit model differs to that of conventional empirical tests or models (Gujarati, 2003). The logit model focuses on whether or not the regression coefficients bore the right sign, followed by the level of significance of each coefficient. Referring to the correlation matrix for the logit model in Table 1, the independent variables tested in this study did not indicate any sign of correlation.

Accordingly, based on the analysis of all 52 firms with the six independent variables tested, profit, distribution and marketing intensity and minimum efficient scale exhibited the correct signs consistent to that of theoretical expectation signs and are all significant. The p-value of the logit model exhibited a 1% level of significance, which indicated that the overall influence of independent variables was considered significant on entry.

Similarly, the analysis of the 35 public listed firms confirmed that four independent variables exhibited the correct theoretical expectation signs. They were profit, growth, minimum efficient scale and distribution and marketing intensity. The p-value of the logit model used for the public listed firms analysis exhibited a 5% significance level, which indicated that the overall influence of independent variables was somehow significant on entry.

The results for both logit analyses were consistent and further affirmed the theoretical and past empirical

TABLE 1. Correlation matrix of independent variables in discrete choice model (logit) equation

Variable	Profit	Growth	MES	CAP	DMI	CR
Profit	1.0000					
Growth	0.2027	1.0000				
MES	-0.4129	-0.1238	1.0000			
CAP	0.3176	0.2069	-0.6216	1.0000		
DMI	0.2869	0.0804	-0.4930	0.4541	1.0000	
CR	0.0336	-0.1366	-0.0425	0.0071	0.0957	1.0000

Source: Author's calculation

TABLE 2. Hausman endogeneity test results

Variable	All Firms		Public Listed Firms Only	
	Logit	IV	Logit	IV
Profit	2.142*** (0.783)	0.035 (0.083)	2.342** (0.957)	0.053 (0.080)
Growth	1.081 (0.908)	0.001 (0.074)	2.096*** (0.628)	-0.0003 (0.003)
MES	-1.547* (0.899)	0.035** (0.002)	-2.884*** (0.727)	0.022 (0.020)
CAP	1.331 (0.879)	0.008 (0.013)	0.634 (0.874)	0.011 (0.010)
DMI	-1.102*** (0.278)	-0.567 (0.484)	-1.309*** (0.372)	-0.492 (0.623)
CR	58.037 (37.734)	-	30.827 (29.049)	-
Constant	-192.644 (123.149)	-0.192** (0.083)	-103.391 (94.533)	-0.128 (0.128)
R ²	0.255	-0.023	0.269	0.07
Observations	467	467	314	314
Probability	0.004***	0.49	0.031**	0.747
Hausman Test Probability	-	0.637	-	0.920

Notes: *** denotes significance at 1% level

** denotes significance at 5% level

* denotes significance at 10% level

Source: Author's calculation

findings that showed profit was the determinant that encouraged entries of new firms into the palm oil refining industry. It was therefore evident that past profit rate of firms in the Malaysian palm oil refining industry was a significant determinant in luring entry of firms into the industry. In relation to the issue raised in this study, the slowdown in the rate of entry by refineries under planning may have been influenced by the fact that Malaysian refiners have been suffering from negative profits in recent years. It is rational to suggest that refineries under planning would not enter despite obtaining licences to do so because existing refineries have not been reaping lucrative profits from their operations to lure the new comers to enter.

The results had also indicated that both analyses recorded positive coefficients with significant results by the public listed firms. The Malaysian palm oil

refining industry's positive growth has been consistent with previous empirical studies and theoretical views of scholars. Hence, it has validated that growth in the market demand and sales of domestic refined products are seen as an opportunity that attracts and encourages new firms to enter the industry. The insignificant coefficients for all the firms' analysis suggested the influence of a governmental intervention particularly in the domestic palm oil refining industry. And because the Malaysian palm oil refining industry is a highly regulated industry, the Malaysian government implements strict regulations in terms of entry, production capacity, quality control and licensing of refining firms specifically under the purview of the Malaysian Palm Oil Board (MPOB). The strict regulations were believed to be a significant factor that may have possibly caused potential entrants to shy away.

The coefficients of minimum efficient scale for all

TABLE 3. Estimation result for logit model, 2005-2013

Variable	All Firms			Public Listed Firms Only			Expected Sign
	Coefficient	Standard Error	z-Statistic	Coefficient	Standard Error	z-Statistic	
Profit	2.142***	0.783	2.736	2.342**	0.957	2.446	Positive
Growth	1.081	0.908	1.189	2.096***	0.628	3.335	Positive
MES	-1.547*	0.899	-1.720	-2.884***	0.727	-3.964	Negative
CAP	1.331	0.879	1.514	0.634	0.874	0.725	Negative
DMI	-1.102***	0.278	-3.956	-1.309***	0.372	-3.517	Negative
CR	58.037	37.734	1.538	30.827	29.049	1.061	Negative
Constant	-192.644	123.149	-1.564	-103.391	94.533	-1.093	-
Mc-Fadden R ²		0.255			0.269		
LR-statistic		18.565			13.806		
Prob (LR-statistic)		0.004***			0.031**		

Notes: *** denotes significance at 1% level

** denotes significance at 5% level

* denotes significance at 10% level

Source: Author's calculation

the companies and public listed firms carried the correct sign and were significant. The negative coefficients found in this study were similar and consistent with past literatures on how entry of new firms was being deterred by minimum efficient scale of existing refineries in the industry. It is therefore suggested that minimum efficient scale is a significant threat factor for new firms to enter the domestic palm oil refining industry.

More findings indicated that the coefficients carried positive signs during the analysis of all the companies and public listed firms. The positive sign of capital requirement coefficient probably signifies new entrants' perception towards huge investment in machineries, inventories, buildings and lands as a form of motivation or incentive to continue to stay in the palm oil refining industry, instead of seeing them as the unbearable costs to exit. Tangible capital investment could be seen as an effective push for new firms to be as competitive as the existing firms.

Distribution and marketing intensity is a common expenditure in manufacturing industries where it involves storage, handling and transportation of products, and other marketing costs. The empirical findings of this study were consistent for both analyses on all companies and public listed firms, where estimation of the logit model showed the correct and significant negative coefficients, proving that distribution and marketing was indeed a significant barrier in the Malaysian palm oil refining industry. Refined palm oil is considered a product that is not differentiated but requires careful handling during storage period and transportation. As a result, refiners incur high expenditures before and during sales process that becomes the barrier that deters potential entrants from entering.

The results of the logit analysis on concentration ratio indicated that the coefficients were insignificant

and did not carry the correct theoretical sign. This was probably due to the fact that entry of new refineries into the industry is subject to strict license approval by the MPOB acting on behalf of Malaysian government where it may thus disrupt the nature of a firm's entry into the industry. With that being said, as suggested by Niu et al. (2012), government policy may probably be the contributor of the insignificant results in the empirical logit analysis.

CONCLUSION

A firm's decision to step into a particular industry or market is often reflected through incentives that encourage them or barriers that pose as hindrance to entry. Pioneer studies have listed economic of scale, product differentiation and absolute cost advantage as barriers to entry (Bain 1956). These barriers normally functioned to act as advantages for existing firms or incumbents, in order to prevent attracting new firms or entrants into the same market. Following the pioneering work of Orr (1974a, 1974b, 1974c) in studying barriers to entry as factors that lead to entry, this topic has gained interest of scholars and researchers in the field of industrial economics, thus resulting in increasingly globalized market research for various industries and markets.

The analysis on determinants of entry on 52 firms between 2005 and 2013 was conducted using a discrete choice model. The act of barring entries, according to Bain (1956), is an advantage enjoyed by all incumbents in an industry regardless of whether the company falls under public listed or non-public listed category. He added that the analysis on determinants of entry could be conducted collectively. This study however, analyzed the determinants of entry chosen by public listed firms

for a better understanding on their actual behaviour and reaction towards entry, as these firms have the tendency to react differently based on observation of dominant firms in Cotterill and Haller's (1992) work on supermarket chains in the United States. The panel estimation of the discrete choice model of logit indicated that profit rate, distribution and marketing intensity, and minimum efficient scale were significant variables that carried the expected coefficients. The analysis on public listed firms indicated that profit, growth, minimum efficient scale, and distribution and marketing intensity were significant with the correct expected signs. The statistically significant p-values of these analyses directly indicated that the overall influence of independent variables was considered significant on entry in this model. With that being said, the issue of lacking in entry within the industry was probably caused by the reported negative profits in refineries' operation in recent years; the high cost incurred in refining operation; and the weak demand for Malaysian processed palm oil (PPO) in the global market.

At the end of the day, there is no doubt that entry of new firms into the industry is necessary for encouraging healthy competition. It is prudent for the government to ascertain whether the slow entry is caused by the barriers or other problems, and to encourage large-scale entries through horizontal mergers and acquisition of small firms. The traditional belief is that small firms are less capable to survive in the face of intense competition from other producing countries. Large firms, on the other hand, are believed to have the financial abilities to progress well in the global market. The outcome of this study is hoped to drive policy makers and regulators to maintain competitiveness for firms in a conducive environment.

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