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THE ROLE OF EXTENDED VALUE CHAIN ACTIVITIES IN ENHANCING ECONOMIC VALUE ADDED PLANTATION COMPANIES IN MALAYSIA

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ABSTRACT

The palm oil industry in Malaysia has faced issues of lower palm oil price and limited land area, and these issues have created a challenging environment for plantation companies to operate in. Plantation companies are constrained in maximizing their profits. Thus, this paper aims to examine the Economic Value Added (EVA) and the factors that influence the EVA of different value chain activities. The dynamic generalized method of moments (DGMM) estimators were adopted for the analysis and the focus was on the -40 Malaysian plantation companies that were listed in the Bursa Malaysia from 2010 to 2018. The results revealed that both downstream integrated activities, namely oleo-chemicals/biodiesel and refineries activities

had a significant influence on the plantation companies' EVA, with the coefficient value 1.12 and 0.09 respectively. Other factors such as the gross margin, crude palm oil price, and exchange rate also significantly influenced the plantation companies' EVA. The empirical results which were based on the plantation companies' EVA were influenced by different value chain activities as expected. The findings show that the downstream integrated activities like refineries, and oleo-chemicals/biodiesel activities have played a significant role in increasing the EVA of plantation companies.

Keywords: Dynamic generalized method of moments (DGMM), economic value added (EVA), extended value chain activities, pure upstream and downstream integrated plantation companies, value chain.

INTRODUCTION

Since the 1960s, the agricultural economic sector in Malaysia has been supported by its palm oil industry (Basiron, 2007). The economic contribution of palm oil to Malaysia is well known, and the nation has a competitive advantage due to its 100-year history in this sector. Malaysia was the second-largest producer and exporter of palm oil in the world after Indonesia in 2018, according to data from the Malaysian Palm Oil Board (2019), accounting for 39 percent of global production and 44 percent of global exports. However, due to fluctuations in palm oil prices and the scarcity of cultivable lands, this industry's total export revenue fell precipitously in 2018 by 13.3 percent to RM67.49 billion from RM77.81 billion (The Star, 2021). In order to increase their profits, plantation companies cannot solely rely on high CPO prices. In order to maximise their profits, plantation companies must coordinate all the elements of their value chain (Wahab et al., 2019).

Nowadays, a company's top priority is to increase the value of its market share for its owners, such as shareholders, stakeholders, investors, and others, in addition to maximising profits and reducing costs in order to generate profits. Given that shareholders play such a crucial part in businesses, it is crucial to assess their wealth. Every business must provide an implicit rate of return to its debt holders and shareholders. The opportunity cost, which is modified for the

risk that investors assume when they invest in a specific company, is represented by the required rate of return. Knowing the return that the shareholders receive will help them make a decision about whether to continue investing in or leaving a company. Additionally, it can help a novice investor choose which plantation companies to back.

Therefore, maintaining a long-term existence while achieving adequate capital returns at consistently favorable liquidity is crucial. Investors and corporate managers have been looking for a dependable way to gauge shareholders' wealth, claims Wainaina (2001). The economic value added (EVA) model has been therefore, regarded as the most trustworthy and accurate model to describe the wealth of the shareholders. The EVA is typically used as a benchmark for the company to determine whether it has been providing value to its shareholders while also ensuring that it operates consistently to maximise shareholder value. In conclusion, the primary goal of this study was to assess the contribution of extended value chain activities to the EVA of 40 plantation companies in the country.

Palm Oil Value Chain

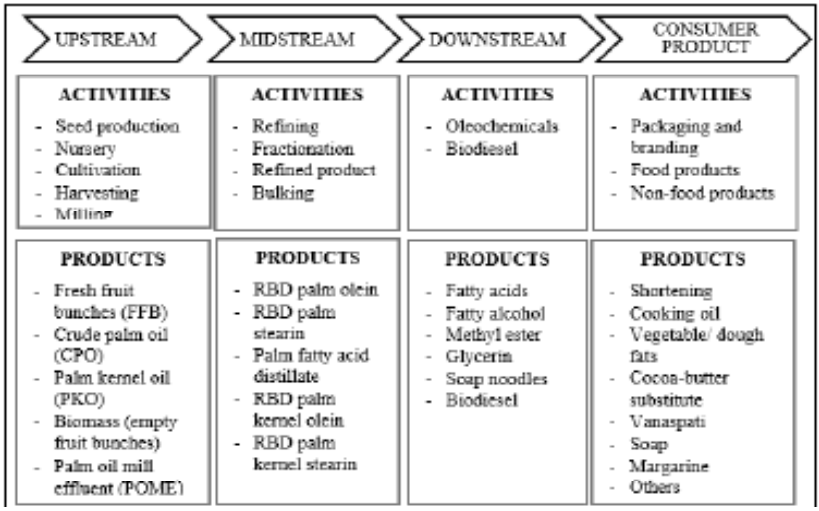
The value chain concept helps the palm oil producer to evaluate which specific activity that will give a higher value to the product or services of organizations. This will also help palm oil producers to identify each part of its production process and to make improvements to deliver the most value for the least possible cost. The palm oil industry's value chain involves a variety of players, including pure planters (who only own plantations), millers (who own both mills and refineries), millers and refinery owners, and planters engaged in all value chain activities from upstream to downstream, including processors, manufacturers, and retailers (Mahat, 2012). As shown in Figure 1, the palm oil value chain is divided into four public policy segments: upstream, midstream, downstream, and consumer products.

The production of crude palm oil (CPO), palm kernel oil (PKO), refined palm oil (RPO), and fractionation of palm oil (for both crude and refined palm oil) to obtain the liquid olein and solid stearin fraction, as well as oleochemical products were the primary upstream activities of the palm oil industry in the past. The Economic Transformation Program (ETP), which was launched by the Malaysian government

in September 2010, altered this conventional strategy. After being chosen as one of the 12 National Key Economic Areas (NKEA) to propel the country's economy, the palm oil industry gained a new focus with the implementation of the ETP.

Figure 1

Malaysian Palm Oil Industry Supply Chain Process



Note. Sourced from the various reports of the Malaysian Palm Oil Board (MPOB).

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In 2018, there were about 44 plantation companies which had become Bursa-listed companies in Malaysia as they were involved with palm oil activities along the supply chain process; from planting, milling,

and refining, engaging in oleochemicals or biofuel activities, and producing consumer products as is shown in Table 1. However, the number of plantation companies that were used to gather data for the study were the 40 plantation companies which met the selection criteria. Four plantation companies were excluded due to the following three reasons: (i) a company with multi-discipline activities was excluded because too many activities can affect the results since it could not be properly assigned to its plantation segment. Thus, to be included in the study, palm oil-related sales had to be at least 50 percent of the total sales within the group (Ramasamy et al., 2005); (ii) a company that was under legal proceedings at the time of the study was excluded since no revenue was being generated for that company (i.e., Malpac Holdings Berhad); and (iii) not in operation in the observation period. The plantation companies which were excluded from the study sample were namely, Jaya Tiasa Holdings Bhd, Malpac Holdings Berhad, Matang Berhad, and Ta Ann Holdings Berhad.

Table 1

The 40 Plantation Companies Based on their Value Chain Activities and Listed in Bursa Malaysia as of 2018

Plantation Activity			
1.	Astral Asia Berhad	7.	Kluang Rubber Company (Malaya) Berhad
2.	Dutaland Berhad	8.	PLS Plantations Berhad
3.	Gopeng Berhad	9.	Riverview Rubber Estates Berhad
4.	Hap Seng Plantations Holdings Berhad	10.	Sin Heng Chan (Malaya) Berhad
5.	Inch Kenneth Kajang Rubber Public Ltd Co	11.	Sungei Bagan Rubber Company (Malaya) Berhad
6.	Innoprise Plantations Berhad		
Plantation and Mills Activity			
1.	Boustead Plantations Berhad	9.	MHC Plantations Bhd
2.	Cepatwawasan Group Berhad	10.	Negri Sembilan Oil Palms Berhad
3.	Chin Teck Plantations Berhad	11.	NPC Resources Berhad
4.	Far East Holdings Berhad	12.	Pinehilll Pacific Berhad
5.	Golden Land Berhad	13.	Rimbunan Sawit Berhad
6.	Harn Len Corporation Bhd	14.	Sarawak Plantation Berhad
7.	IJM Plantations Berhad	15.	TDM Berhad
8.	Kim Loong Resources Berhad	16.	TH Plantations Berhad
		17.	United Malacca Berhad

Plantation, Mills, and Refineries Activity			
1.	BLD Plantation Bhd.	4.	TSH Resources Berhad
2.	Kretam Holdings Berhad	5.	United Plantations Berhad
3.	Kwantas Corporation Berhad		
Plantation, Mills, Refineries, and Oleochemicals/Biodiesel Activity			
1.	Batu Kawan Berhad	5.	Kuala Lumpur Kepong Berhad
2.	FGV Holdings Berhad	6.	Sarawak Oil Palms Berhad
3.	Genting Plantations Berhad	7.	Sime Darby Plantation Berhad
4.	IOI Corporation Berhad		

Note. Sourced from the Bursa Malaysia and Companies Annual Report (2018).

LITERATURE REVIEW

Shareholders in a company are crucial in providing capital for the establishment and operation of the business. The shareholders are the company's owners and provide financial support in exchange for potential dividends paid out over the course of the business. For this reason, the management of the company places a high priority on increasing shareholder value. Therefore, when making decisions, management must keep shareholders' interests in mind. The higher the shareholder value, the better it is for the business and management. According to Shakina and Barajas (2013), identifying value drivers from activities is the most important problem for businesses because they need to know the real value of their shares in order to determine whether the company is producing any value. In order to make wise decisions in the future, management, shareholders, and investors must be aware of a company's performance.

However, the variety of performance metrics and the diversity of businesses make this a difficult task. Hence, there are two groups of measurements that can be used to measure a companies' value creation, which are the traditional and modern metrics. Financial performance was typically measured in terms of traditional metrics (also known as accounting income), such as earnings growth, earnings per share (EPS), return on equity (ROE), and return on assets (ROA). Accounting income, according to financial experts, is insufficient because it does not accurately represent a company's value. The traditional indicators have come under fire, according to

Fisher and McGowan (1983), because the use of accounting methods have been frequently found to affect the indicators. The accounting return rate has frequently come under fire for failing to accurately assess the economic profit. Furthermore, because these measurements were based on asset values and were therefore influenced by other factors, they did not accurately reflect the economic return (Sichigea & Vasilescu, 2015).

Regarding this issue, Ismail et al. (2008) and Ismail (2010) stated that companies need to have a special tool that can measure the performance and at the same time help the shareholders in deciding whether it is worth it for them to stay in the company. Thus, in 1991, Stewart introduced a modern financial metrics that combines the factors of economy, accounting, and market information to improve and measure efficiency and "value creation" that is known as EVA. The EVA is a useful tool for evaluating business performance because it considers a variety of variables, including the economy, accounting approach, and market data. Investors who wish to ascertain how well the product has value for them can use it as an indicator to measure performance based on real economic profits of the company's product, which allows measurement of its success or failure over time.

The EVA can be a special tool for investors to assist them in deciding whether or not to continue to invest in a company. Ismail et al. (2008) showed that the EVA had a better relationship with the company's performance and revealed that the two major components that could influence the companies' performance were size and ownership. The companies with a larger size resulted in higher EVA values, while companies with the government as stakeholders, or government-linked companies contributed to lower EVA scores. They concluded that the EVA had a better relationship with companies' performance than traditional tools. Many other studies have shown the advantages of using the EVA compared to traditional tools for assessing companies' performance due to its transparency and capacity to provide more vital information. Fard et al. (2012) argued that the EVA is the best measurement to measure a company's performance since the EVA can achieve the business results, while other traditional methods or tools such as return on equity (ROE), return on assets (ROA), earnings per share (EPS), the ratio of price to earnings per share (P/E) only achieved an accounting result. Thus, the findings revealed that

the EVA is the best tool for businesses since it observed the broad perspective covering economics and accounting. This is in line with the findings in Markauskas et al. (2015), who stated that the standard financial ratios, such as earnings per share (EPS), return on equity (ROE), and return on assets (ROA) were not sufficient to evaluate the value of a company and there was a need for different measurements such as the EVA.

In order to investigate the factors that affect corporate performance in Malaysian listed companies, Mokhtar et al. (2006) have studied the relationship of ISO 9000, capital structure, company size, company age, company growth, and category of the industry towards the EVA, the ROA, and the return on sales (ROS). The results indicated that ISO 9000, capital structure, company size, and category of the industry significantly influence the corporate performance in companies. Atanda et al. (2015) examined the impact of macroeconomic variables on the wealth generated by Nigerian companies using descriptive and inferential statistical tools (such as mean, standard deviation, and correlation), ordinary least square (OLS) regression, and generalized method of moments (GMM). According to their findings, the creation of value by the firm was significantly influenced by inflation rates, interest rates, foreign exchange rate growth, capital expenditure ratios, and labor market developments (as measured by the EVA).

Additionally, Ramadan (2016) conducted a study to investigate the effects of macroeconomic variables on the performance of Jordanian manufacturing companies, where the performance was indicated by the EVA. The study came to the conclusion that the performance of the companies was significantly influenced by macroeconomic factors like inflation, government spending, and gross domestic product. Additionally, Lin and Zhilin (2008) used a multivariable linear regression model and factor analysis to investigate the variables that affect the EVA of listed companies in China's securities market. The results indicated that several variables, which were capital structure (proxied by liability/asset ratio, current ratio, and equity ratio), profitability (proxied by financial ratios), size (total asset), growth ability (proxied by total asset increasing rate), management ability (total asset turnover), and industry's return on equity had a positive influence on the EVA. Another study by Sulger (2008) indicated that the EVA was influenced by the income from exploitation (such as

mix products, mix of customers, market size, market share, revenue per unit of product, productivity, the efficiency of sales departments), gross margin, income tax adjusted, net assets (i.e., the level of debts, the volume of stocks), fixed assets (i.e., machinery, equipment, investment in intangible assets), capital structure, cost of capital, and cost of debt.

From the discussion above, the previous studies on the EVA were concentrated on proving the efficiency of the EVA as a tool to measure performance in comparison to traditional methods, such as earnings per share (EPS), return on equity (ROE), and return on assets (ROA) (Ismail et al., 2008). However, the present study focuses on the non-financial variables that influence the EVA of companies. This study, which includes relevant determinants like the value chain activities of palm oil companies (divided into four groups, i.e., plantation, mills, refineries, and oleochemicals/biodiesel activities), was therefore, carried out to fill the aforementioned knowledge gaps and assess the profit efficiency and economic value added on plantation companies in Malaysia. The present study on the EVA of palm oil plantation companies using the value chain approach provides an interesting perspective to this growing corpus of literature and its results have been able to confirm that the companies that engaged with the extended value chain, especially the downstream activities gave a high economic value added to the companies.

DATA AND METHODOLOGY

Sample Data

This study involved 40 plantation companies (refer to Table 1) listed in the Bursa Malaysia. Data from each company from 2000 to 2018 was collected from the DataStream database, Company Annual Reports, and the Bursa Malaysia website. Other sources used in this study were the Bank Negara Malaysia Monthly Statistical Bulletin, Malaysian Oil Palm Statistics (book), and the Malaysian Palm Oil Board (MPOB) website. This study applied unbalanced panel data (time series and cross-sectional), since not all companies have a long history due to emergence, transformation, consolidation, and demergers. Since the purpose of this study was to examine which value chain activities

gave the highest economic value added to plantation companies, the plantation companies were segregated into the following two groups: (i) pure upstream (PU) plantation companies; and (ii) downstream integrated (DI)[1] plantation companies. PU plantation companies can be defined as plantation companies that are engaged with palm oil upstream activities, which are plantation and mills activities, whereas DI plantation companies are plantation companies that are engaged with the entire palm oil value chain activities, including plantations, mills, refineries, oleochemicals/biodiesel activities, and producing consumer products.

Theoretical Framework

The EVA is a performance metric that, after deducting the cost of capital invested, is reflected in a company's profits. It is the outcome of a decrease in the operating profit after tax to the total capital cost. It is able to determine the true economic profit of a company in a given year and is very different when compared to the account profit. The cost of equity capital can be either the cost of debt or cost of equity.

The EVA Model Specification

According to Stewart and Stern (1991), the three main components of EVA are as follows: (i) return on invested capital (ROIC); (ii) invested capital (IC); and (iii) weighted average cost of capital (WACC) as is shown in Equation 1:

EVA= (Return on Invested Capital – Invested Capital) X Weighted Average Cost of Capital (1)

where,
Return on Invested Capital = Net Operating Profit after Tax/ Invested capital (2)

where,
Invested Capital= Working capital + property, plant, & equipment (3)

where,
Weighted Average Cost of Capital (WACC) = $\frac{E}{V} * Ce + \frac{D}{V} * Cd * (1 - T)$ (4)

where, E denotes the market value of the firm's equity, D denotes the market value of the firm's debt, Ce denotes the cost of equity, Cd denotes the cost of debt, V denotes the total market value of the firm's (E+D), and T denotes the corporate tax.

The calculation of WACC components is as shown in Equation (5) to (9), respectively:

E= (share price x total share outstanding) + total debt + minority interest (5)

D= current maturity of long term debt + long term debt (6)

Ce= calculated by using capital asset pricing model (CAPM) (7)

Cd= interest expense / total debts (8)

V= market value of firm's equity + market value of firm's debt (9)

In order to investigate the factors that influence the EVA of plantation companies, the study applied dynamic generalized method of moments (GMM) which was proposed by Arellano and Bond (1991) and the model is constructed as in Equation (10):

$$EVA_{it} = \beta_0 + \beta_1 P_{it} + \beta_2 S1_{it} + \beta_3 S2_{it} + \beta_4 S3_{it} + \beta_5 \ln GM_{it} + \beta_6 \ln CPOP_t + \beta_7 \ln ER_t + \mu_{it} \quad (10)$$

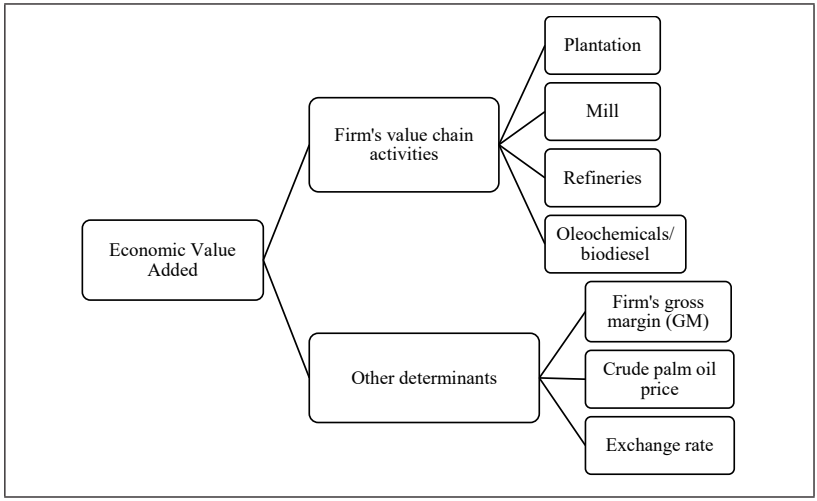
In Equation (10), the EVA represents the economic value added as a dependent variable, P is a plantation activity, S1 is a mills activity, S2 is a refineries activity, S3 is an oleochemicals/ biodiesel activity, GM is a gross margin which represents the profitability, CPOP is a crude palm oil price, ER is the exchange rate, *i* and *t* represents palm oil companies and a 9-year period, respectively.

Conceptual Framework

The aim of this study was to examine whether by engaging with the extended value chain activities, the economic value added of the plantation companies would increase and the conceptual framework of this study is as shown in Figure 2.

Figure 2

Conceptual Framework of the Study



From Figure 2, it can be seen that the EVA of the plantation companies can be affected by the firm's value chain activities, namely plantation, mill, refineries, and oleochemicals/biodiesel activities and other determinants such as gross margin, crude palm oil price, and exchange rate. The variables are as shown in Table 2.

Table 2

The Definition of Variables

Variable	Description	Unit
EVA	Economic value added	RM Million
	Independent Variables	
P	Plantation activity	Dummy
S1	Mills activity	Dummy
S2	Refineries activity	Dummy
S3	Oleochemicals/ biodiesel	Dummy
GM	Gross margin (Profit ability)	RM Million
Exchange rate (ER)	Yearly average Ringgit Malaysia (RM) per unit of US$	RM per unit of USD
Crude palm oil price (CPOP)	Log of the yearly average price of CPO per tonnes (in RM)	RM thousand/ Tonnes

Estimation Method

According to Arellano and Bond (1991), the issue with static panel data models (such as pooled OLS fixed effects (FE) and random effects (RE)) arises because these estimators did not take into account the possibility of heteroscedasticity, serial correlation, and endogeneity of some explanatory variables. As stated by Beck et al. (2000), the GMM is a suitable estimator for taking advantage of the time series variation in the data because it takes into account unobserved individual specific effects and permits the inclusion of the lagged dependent variables as regressors. As a result, it provides much better endogeneity control for each independent variable. The one step estimator and the two step estimator are two types of GMM estimators. The use of optimal weighting matrices makes the two-step estimator theoretically more effective than the one-step estimator. Additionally, while differencing removes the country-specific effect, it also creates a new bias by adding a new error term that is correlated with the lagged dependent variable.

Holtz-Eakin et al. (1988), and Arrellano and Bond (1991) established the estimators based on moment equation, where they recommended building it from further lagged levels dependent variable with first differences of the error term and to use the first difference of errors of exogenous variables to create moment conditions that are as shown in Equation (11) and Equation (12) as follows:

$$\mathrm{Y_{it}} = \beta_1 + \beta_2\, Y_{\mathrm{it-1}} + \beta_3 X_{\mathrm{it}} + \lambda_{\mathrm{i}} + \varepsilon_{\mathrm{it}} \quad i = 1, \ldots \mathrm{N}; \mathrm{t} = 1, \ldots \mathrm{T} \qquad (11)$$

$$Y_{\mathrm{it}} - \mathrm{Y_{it-1}} = \alpha' \left(\mathrm{Y_{it-1}} - Y_{\mathrm{it-2}}\right) + \beta'(X_{\mathrm{it}} - \mathrm{X_{it-1}}) + (\varepsilon_{\mathrm{it}} - \varepsilon_{\mathrm{it-1}}) \qquad (12)$$

$$\Delta \mathrm{Y_{it}} = \alpha' \Delta \mathrm{Y_{it-1}} + \beta' \Delta \mathrm{X_{it}} + \Delta \varepsilon_{\mathrm{it}}$$

Assuming that (i) the error term, ε, is not serially correlated; and (ii) the independent variables' x', are weakly exogenous (i.e., the explanatory variables are assumed to be uncorrelated with future realizations of the error term). Thus, Arellano and Bond (1991) have suggested the following moment conditions as shown in Equation (13) and Equation (14):

$$\mathrm{E}[Y_{\mathrm{it-s}}\,(\varepsilon_{\mathrm{it}} - \varepsilon_{\mathrm{it-1}})] = 0 \qquad \text{for } \mathrm{s} \geq 2; \mathrm{t} = 3, \ldots\ldots, \mathrm{T} \qquad (13)$$

$$\mathrm{E}[X_{\mathrm{it-s}}\,(\varepsilon_{\mathrm{it}} - \varepsilon_{\mathrm{it-1}})] = 0 \qquad \text{for } \mathrm{s} \geq 2; \mathrm{t} = 3, \ldots\ldots, \mathrm{T} \qquad (14)$$

Arellano and Bond (1991) have proposed a two-step GMM estimator by applying the conditions of moments as specified in Equation (13) and Equation (14). The error term at the first step is assumed to be independent and homoscedastic across companies and over times. For the second step, the residuals that were acquired from the first step were then used to build a consistent estimate of the variance-covariance matrix, hence relaxing the assumptions of independence and homoscedasticity. Thus, the two-step estimator is seen as more efficient than the one-step estimator. For this reason, the two-step difference GMM estimator has been applied to examine the economic value added in plantation companies, as well as the determinants that could influence the plantation companies economic value added. The consistency of the GMM estimator depends on the two specification tests proposed by Arellano and Bond (1991).

The first test is a Sargan test of over-identifying restrictions test, which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. If the moment condition holds, then the instrument is valid, and the model has been correctly specified (Karim & Zaidi, 2015). The second test, known as the serial correlation test, looks at the possibility that the transformed error terms do not all exhibit serial correlation with the error term under test. The present study has examined the possibility of second order serial correlation for the differenced error term (by construction, the differenced error term is probably first order serially correlated even if the original error term is not). Both tests failed to disprove the null hypothesis, supporting the study's model (Khadraoui and Smida, 2012).

RESULTS AND DISCUSSION

Table 3 shows a descriptive statistic of variables used in the regressions. It shows that the average EVA had a range from RM872 million to RM2416 million. There were seven explanatory variables concerning the factors that had influenced the EVA, and they were as follows: (i) plantation activity (P); (ii) mills activity (S1); (iii) refineries activity (S2); (iv) oleochemicals/ biodiesel activity (S3); (v) gross margin; (vi) exchange rate; and (vii) world crude palm oil price. The first

until the fourth variables were the main factors in this study. These variables were used to investigate how the EVA was affected by these variables.

Table 3

Summary of Descriptive Statistics for Plantation Companies in Malaysia, 2010 to 2018

Variables	Mean	Standard Deviation	Min.	Max.
Economic Value Added (EVA, RM Million)	72.478	296.967	-872.139	2415.705
Plantation activity (P)	1	0	1	1
First Stage Processing activity, Mills (S1)	0.673	0.470	0	1
Second Stage Processing activity, Refineries (S2)	0.284	0.452	0	1
Third Stage Processing activity, Oleochemicals/ Biodiesel (S3)	0.168	0.374	0	1
Gross margin (%)	31.570	21.371	-72.530	95.600
Crude Palm Oil Price (RM Thousand/ Tonnes) ER (Exchange	2912.481	290.436	2571.010	3441.440
Rate, RM per unit of USD)	3.688	0.535	3.060	4.490

From Table 3, it can be seen that the mean for variables P was 1, S1 was 0.673, S2 was 0.284, and S3 was 0.168. For the P, the minimum and maximum values were 1 because, during the period covered in the research (2010 to 2018), all 40 plantation companies owned their plantation area. The minimum value for S1, S2, and S3 was 0, and the maximum value for these three variables was 1. Gross margin was used as a proxy for profitability indicators, and it was in percentage value. The gross margin average was 31.57 percent, with a minimum value of 72.53 percent and the maximum value of 95.6 percent. In terms of control variables, the mean for world crude palm oil price was RM2912 per ton, between RM2571 million per ton to RM3441.4 per ton. Meanwhile, the average exchange rate was RM3.69 per 1 USD, with a minimum of RM 3.06 to a maximum of RM4.49.

Table 4

Correlation Analysis Matrix

	LEVA	S1	S2	S3	LGM	LCPOP	ER
LEVA	1.00						
S1	0.060	1.00					
S2	0.120	0.439	1.00				
S3	0.101	0.313	0.712	1.00			
LGM	0.026	-0.244	-0.153	-0.168	1.00		
LCPOP	0.065	-0.012	0.005	-0.028	0.177	1.00	
ER	-0.023	0.031	0.026	0.076	-0.214	-0.258	1.00

Note. The variables were defined as follows: LEVA= log of economic value added; S1= Mills activity; S2= Refineries activity; S3= Oleochemicals/ biodiesel activity; LGM = log of gross margin; LCPOP= log of world crude palm oil price; and ER= exchange rate.
* The plantation activity (P) was omitted from the regression because, during the period of study for this objective (2010 to 2018), all 40 plantation companies were involved with plantation activities.
** The number of plantation companies listed in S1 (Mills) was 29 companies; S2 (Refineries) was 12 companies; and S3 (Oleochemicals/Biodiesel) was 7 companies.

Table 4 shows that the correlation coefficients of the independent variables were below 0.95, indicating no multicollinearity tendency to occur among the independent variables. The Difference GMM estimation technique eliminated the unobservable factors.

Table 5 shows the result of the average EVA for pure upstream and downstream integrated plantation companies from 2010 to 2018. From total of 40 plantation companies, 12 companies were classified as downstream integrated plantation companies, while 28 companies were under pure upstream plantation companies. The results indicate that the mean average of downstream integrated plantation companies was higher than pure upstream plantation companies, which were 107.49 and 4.42, respectively. The year 2011 showed a high average EVA for both categories of plantation companies, which was 6.69 (pure upstream), and 137.85 (downstream integrated), while the lower

average profit efficiency for pure upstream and downstream integrated plantation companies was recorded in the year 2018, which were 2.19 and 64.21, respectively.

Table 5

The Average Economic Value Added in 40 Plantation Companies in Malaysia based on Categories (PU and DI Plantation Companies), 2010-2018

Year	PU Companies	DI Companies	Overall Companies
2010	4.127	112.438	58.283
2011	6.690	137.848	72.269
2012	4.895	109.784	57.340
2013	4.785	104.637	54.711
2014	3.489	111.357	57.423
2015	2.935	84.498	43.716
2016	4.620	130.840	67.302
2017	6.039	111.774	58.906
2018	2.191	64.208	33.200
Total Average	4.419	107.487	55.794

Table 6 presents the empirical results of the linear model using the dynamic panel GMM approach. In this model, the EVA was used as performance measurement (dependent variable). The lagged dependent variable was statistically significant, which implied that the dynamic GMM was an appropriate estimator, and the empirical results could be relied upon for statistical inference. The results of the diagnostic tests have suggested that the models were relatively well specified. The Sargan test for all models failed to reject the over-identification restriction. The absence of first-order serial correlation (AR1) was rejected, and all models showed the absence of second-order serial correlation (AR2).

The findings indicate that the different processing stages of value chain activities, i.e., S1 (mills activity), S2 (refineries activity), and S3 (oleochemicals/ biodiesel activity) had a positive coefficient and was

statistically significant at the 1 percent level of significance, except for S1 which was not statistically significant. The positive relationships between these value chain activities show that an increase in these activities will increase the EVA of plantation companies. The results indicate that as the plantation companies engage with more downstream value chain activities from refineries to oleochemicals/ biodiesel activity, it will improve its value creation and increase the EVA of plantation companies. This result is consistent with that in Jacobs (2003) which has found that the value chain disaggregated a firm into its strategically relevant activities in order to understand the existing and potential differentiation sources. This result implies that the downstream integrated activities help the firm gain a competitive advantage and create more EVA.

The empirical findings of the present study also confirm that firm-specific factors such as the gross margin (GM) have a positive relationship with the EVA, other than different value chain activities, where the company that has better profitability has a lower bankruptcy risk. This circumstance will lead to a higher profit for the company and create more economic value added to the plantation companies (Lin & Zhilin, 2008). The crude palm oil price (CPOP) and exchange rate are significant at the 1 percent significance levels. Ramasamy et al. (2005) and Hafizuddin-Syah and Shahida (2018) reported similar results, which have found a positive relationship between the annual average prices of CPO and profitability. The higher price could result in higher profits for plantation companies. The exchange rate showed a negative coefficient towards the plantation companies' EVA and was statistically significant at the 1 percent level of significance. This result implies that when Ringgit Malaysia currency appreciates (depreciates), the export cost will increase (decrease), and this will lead to a decrease (increase) in the export volume and value of palm oil and palm oil-based products. As a result, the companies' profit will decline (rise) and affect the plantation companies economic value added. This finding is in line with the argument in Khalid et al. (2018) which found that the exchange rate was highly correlated in terms of influencing a firm's profitability and performance.

Table 6

Results of Difference GMM Estimations

Variables	Coefficient	Standard Error	Z-statistics
	Dependent Variable: Ln EVA		
$LEVA_{it}$	0.095***	0.005	20.250
P_{it}	0.070	0.070	1.000
S_{it}	0.077***	0.025	3.010
$S2_{it}$	0.089***	0.002	41.730
$S3_{it}$	1.117***	0.141	7.940
LGM_{it}	0.038**	0.015	2.440
$LCPOP_{t}$	0.888***	0.040	22.470
ER_{t}	-0.246***	0.425	-5.800
Constant	5.379***	0.318	16.900
Sargan Test		34.420 (0.154)	
AR (1)		-1.427 (0.154)	
AR (2)		-0.878 (0.3380)	

Notes. All models were estimated using the two-step Arellano and Bond (1991) dynamic panel GMM estimations (Stata xtabond two-step command). The variables were defined as follows: LEVA= log of economic value added; P= plantation activity; S1= mills activity; S2= refineries activity; S3= oleochemicals/ biodiesel activity; LGM= log of gross margin; LCPOP= log of world crude palm oil price; and ER= exchange rate.

***, **, * indicates significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

CONCLUSION

Studies on value chain activities are crucial because they can identify the most valuable activity that maximizes a company's margins. However, capturing the value generated along the chain is only possible if the value at each link of the chain is known. As aforementioned, since the producer has no power to determine the commodity market price, they need to focus on the internal factors, which in this case are the value chain activities. It is important to understand that the value chain helps to disaggregate a firm into its strategically relevant activities, so as to better understand the behavior

of costs and the existing and potential sources of differentiation. This study investigated the effect of extended value chain activities on the EVA of 40 Malaysian plantation companies from 2010 to 2018. The results of the two-step difference GMM showed that the palm oil value chain activities, namely oleochemicals/ biodiesel activity, and refineries activity significantly increased the companies' EVA. This study's findings reveal that as companies engage with more downstream integrated activities like refineries and oleochemicals/ biodiesel activities, they can achieve higher EVA. Apart from the different stage processing of value chain activities, other factors such as the gross margin, exchange rate, and crude palm oil prices are essential in influencing the plantation companies' EVA.

The findings of this study pertaining to the EVA can serve as a decision-making guide for potential investors in choosing the plantation companies that can maximize the wealth and net worth of the company. In addition, for existing shareholders or investors, they always have the option to withdraw their investment and diversify their investment portfolio to other investments that give good returns should the EVA obtained by the plantation companies is lower than the cost of capital. Following a discussion of how crucial downstream activities are to plantation companies' profitability, it is a wake-up call for an upstream to companies engaged in downstream activities. According to PEMANDU's (Malaysia's Performance Management & Delivery Unit) director, Ku Kok Peng, as indicated in the NKEA (National Key Economic Area) program, the future of the palm oil industry lies in downstream activities, thus reducing its dependency on the fluctuation of CPO prices and will help plantation companies to increase their margins (The Star, 21 Jan 2014). Thus, it is time for companies to start focusing on downstream integrated supply chain processes in the value chain activities to create a high EVA.

Following the discussion of the importance of downstream activities to the EVA of plantation companies, it is suggested that plantation companies that are not yet engaged in downstream value chain activities to get involved with downstream activities. It is a big challenge to the upstream companies that already have established expertise in upstream activities to venture into downstream activities. In order to overcome this obstacle, the giant plantation companies, such as Sime Darby Plantation Berhad, IOI Corporation Berhad, FGV

Holdings Berhad, and other big plantation companies can contract out or outsource the manufacturing of their production to upstream plantation companies. For example, as an anchor plantation company, Sime Darby Plantation Berhad will focus on product research, brand development and market penetration, while the other selected upstream plantation companies will focus on product manufacturing. In addition, support and funds from government agencies like the Malaysian Palm Oil Board (MPOB) is highly needed so that the upstream plantation companies can engage with other downstream value chain activities. It is important to understand that for the upstream plantation, it does not necessarily follow the processing sequence from mills to refineries activities, but can directly go through to the oleochemicals/ biofuels activities. According to Jalil (1996), in Malaysia the capacity of refineries has exceeded the total production of CPO (Crude Palm Oil) in the country, and the refineries' excess capacity and losses have made this segment less attractive for the new producer.

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ENDNOTE

1. The activities of refineries will be considered under DI plantation companies. Thus, plantation companies that engaged with value chain activities such as plantation, mill, and refinery activities are under the DI plantations group.

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