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**Dolly Parlagutan Pulungan¹,
Sugeng Wahyudi², Suharnomo
Suharnomo²**

¹Doctoral Program in Economics,
Post Graduate Universitas
Diponegoro

Jl. Erlangga Tengah No. 17,
Semarang 50246, Indonesia

²Department of Management
Faculty of Economics and
Business, Universitas Diponegoro
Jl. Erlangga Tengah No. 17,
Semarang 50246, Indonesia

✉Corresponding Author:

Dolly Parlagutan Pulungan:

Tel. +62 24 8452269

Fax. +62 24 8450310

Email: dollyundip@gmail.com



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**Dolly Parlagutan Pulungan (Indonesia),
Sugeng Wahyudi (Indonesia), Suharnomo Suharnomo (Indonesia)**

Does the Crude Palm Oil Market Walk Randomly?

Abstract

Study about the efficiency of the capital market has been extensively conducted, but it is still lack of research on the efficiency of another financial market such as commodity markets. This study specifically examines market efficiency in a weak form in the commodity market, especially in the crude palm oil (CPO) market. The purpose of this research is to analyze the weak form efficiency of the CPO market. Data used in this research is monthly CPO closing price data in 2010-2017 from Bursa Malaysia Derivative Exchange (BMD). This data was obtained from Malaysian Palm Oil Council (MPOC). The analysis tool used is Runs Test, following by Unit Root Test and Correlogram as robustness checking. The result of this study shows that the CPO market is being efficient in a weak form. This shows that CPO price walks randomly so that the technical analysis cannot be applied to predict the CPO price. The result of this study suggests to both of CPO traders, and CPO speculators in their transaction on BMD do not rely on technical analysis.

Keywords: Bursa Malaysia Derivative Exchange (BMD); Crude Palm Oil (CPO); Market Efficiency; Runs Test; Weak Form

JEL Classifications: G14; Q02

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Abstrak

Penelitian mengenai efisiensi pasar modal telah banyak dilakukan, namun masih sedikit penelitian yang melakukan kajian mengenai efisiensi pasar pada pasar keuangan lainnya seperti pasar komoditas. Penelitian ini secara khusus melakukan kajian mengenai efisiensi pasar dalam bentuk lemah pada pasar komoditas yaitu pasar minyak kelapa sawit/crude palm oil (CPO). Tujuan penelitian ini adalah menganalisis efisiensi bentuk lemah pasar CPO. Data yang dipergunakan dalam penelitian ini adalah data harga penutupan CPO bulanan dari tahun 2010-2017 dari Bursa Malaysia Derivative Exchange (BMD). Data ini diperoleh dari Malaysian Palm Oil Council (MPOC). Alat analisis yang digunakan adalah Runs Test, diikuti dengan Unit Root Test dan Correlogram untuk Robustness Checking. Hasil penelitian ini adalah bahwa pasar CPO efisien dalam bentuk lemah. Hal ini menunjukkan bahwa harga CPO berjalan secara acak (random walk) sehingga analisis teknikal tidak dapat diterapkan untuk memprediksi harga CPO. Hasil penelitian ini menyarankan agar para pedagang CPO dan spekulasi CPO dalam bertransaksi CPO di BMD tidak mengandalkan analisis teknikal.

Kata Kunci: Bursa Malaysia Derivative Exchange (BMD); Minyak Kelapa Sawit/ Crude Palm Oil (CPO); Efisiensi Pasar; Runs Test; Bentuk Lemah;

Capital market efficiency is a very interesting topic for researchers on finance in general and financial markets in particular. A market is defined as efficient if the asset price contains full of information (Fama, 1970). Since Fama (1970) introduce it, capital market efficiency has become the basis for the efficiency tests, not only being limited to capital markets but also on other financial markets such as foreign exchange markets and commodity markets (precious metal and crude oil). Fama (1970) distinguished the market efficiency into three categories: market efficiency in a weak form, market efficiency in a semi-strong form and market efficiency in a strong form. The main component to determine the type of efficiency is information (Khajar, 2010; Taungke & Supramono, 2015; Robiyanto, 2017; Onwukwe & Ali, 2018). Market declared as being efficient in a weak form if the price of an existing asset reflects all past information (Supramono, Widhiastuti, & Utami, 2017). This weak form efficiency is closely related to the theory of random walk (Fama, 1965; Fama, 1970). Then, market declared being efficient in a semi-strong form if the asset price reflects all publicly available information, while the market is declared efficient in a strong form if the asset price reflects all public and private information.

Various studies have been conducted to test the efficiency of capital markets and financial markets. The research that examines a market efficiency in a weak form such as Dickinson & Peterson (1995) who examined the options market. While Jain, Vyas, & Roy (2013) conducted a study on the stock mar-

ket in India, Robiyanto (2015) conducted a study on the stock market in ASEAN and the precious metals market, while Dima & Milo^o (2009) did their study in the Romanian stock market. The other studies also were done in the bond market, i.e., Robiyanto (2017) and Onwukwe & Ali (2018) reviewing the efficiency of the insurance market in Nigeria.

From the previous explanations, it can be seen that most research on market efficiency is mostly done in the stock market. However, there are several studies that examine commodity markets and other financial markets. Dickinson & Peterson (1995) and Robiyanto & Puryandani (2015) conducted a study in addition to the stock market that is commodity market and options market. Other studies are specifically examining the crude palm oil (CPO) commodity market has been conducted by Liu (2009) and Snaith, Kellard, & Ahmad (2015) who reviewed the CPO market in Europe. Where as the largest and most liquid CPO market is on Bursa Malaysia Derivative Exchange (BMD).

Based on this explanation, it is necessary to conduct a study that runs on market efficiency in other financial markets even in the commodity market. Agricultural product prices are important both economically and politically, the same also apply to the CPO. This study specifically examines market efficiency in a weak form in the CPO market in BMD. CPO market is being studied in this research because it is a commodity market that has strategic value for Indonesia where CPO industry is seen as a strategic industry (GAPKI, 2017). GAPKI (2017)

Table 1. Indonesian CPO Net Export, Non-CPO Net Export, and Non-Oil and Gas Net Export during 2008-2014 (in Billion USD)

Year	CPO Net Export	Non-CPO Net Export	Non-Oil and Gas Net Export
2008	13.8	1.3	15.1
2009	12.3	13.3	25.6
2010	16.3	11.1	27.4
2011	21.6	13.8	35.4
2012	21.3	-7.7	13.6
2013	19.2	-3.6	15.6
2014	21.1	-9.9	11.2

Source: GAPKI (2017)

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also stated that the CPO industry in Indonesia contributes most of the non-oil and gas exports during 2008-2014 as shown in Table 1.

Also, CPO products are the world's most consumed oil products (Liu, 2009; Indonesia Investments, 2017). Hopefully, this research can be a reference for CPO traders and CPO speculators in CPO transactions in the CPO market.

In his earliest paper which will become an embryo of the market efficiency concept, Fama (1965), stated a chartist always assume that the past behavior of a security's price is rich in information concerning its future behavior. While on the contrary, the random walk theory stated that the security's future price level are unable to predict. Shortly, the past cannot be used to predict the future in any meaningful way. The market is said to be efficient in weak form if the prices of securities are fully reflected past information (Ambarwati, 2009). If market efficient in weak form, investors cannot use the past information to get an abnormal return (Hersugondo et al., 2016).

Fama (1970) introduced the market efficiency concept which was then divided into 3 categories, the efficiency in the weak form, the efficiency in the semi-strong form, and efficiency in the strong form. The empirical testing of market efficiency focuses on market efficiency in a weak form (Lean & Smyth 2014). Market efficiency in a weak form is if the price of an asset in the future can not be predicted by using the past price, so investors may use technical analysis to get a profit that goes beyond normal. Some research which scrutinizes the weak form market efficiency are Ambarwati (2009), Khajar (2010), Lean & Smyth (2014), and Robiyanto (2015; 2017). Ambarwati (2009) using seasonality approach to test weak form market efficiency in the Indonesia Stock Exchange and found that there was seasonality effect in the Indonesia Stock Exchange, hence the Indonesia Stock Exchange is not efficient in a weak form. This finding also supported by Robiyanto (2015; 2017) and Khajar (2010). Lean & Smyth (2014)

scrutinize the weak form efficiency in the CPO market by using unit root test and found that the CPO market is not efficient, so trader strongly recommends using technical analysis.

The market is said to be efficient in semi-strong form if the security prices fully reflect all publicly available information (Fama, 1970), including the information contained in the issuer's financial statements, dividend announcement and other corporate actions (Ambarwati, 2009; Haryanto, 2011). The market will get response that information instantly once that information is publicly available. Several research has been done to test the semi-strong form market efficiency, i.e., Haryanto (2011), Herdinata (2012), and Makaryanawati (2012). All of those studies were using event study technique. Haryanto (2011) conducted a study about the effect of the investor reaction about dividend announcement in the Indonesia Stock Exchange and found that the investor did not react to the announcement, so none abnormal return found. The same result also found by Herdinata (2012) who scrutinize the investor reaction toward ESOP announcement, and Makaryanawati (2012) who study the investor reaction toward Corporate Governance Perception Index (CGPI) in the Indonesia Stock Exchange.

The strong-form market efficiency contends that securities/assets reflect all information from historical, both public and private information so that investor is impossible to gain abnormal return (Fama, 1970; Jain, Vyas, & Roy, 2013). Khan & Ikram (2011) trying to test the strong-form market efficiency in the Indian stock market by using a comparison between mutual funds and market index performance as benchmark indicator. Khan & Ikram (2011) found that mutual funds have better performance than benchmark indicator, so indicates that the Indian stock market is not efficient in strong form. This study specifically examines market efficiency in a weak form in the commodity market, especially in the crude palm oil (CPO) market. The purpose of this research is to analyze the weak form efficiency of the CPO. market.

HYPOTHESES DEVELOPMENT

Fama (1970) also argued that market efficiency in a weak form can be implemented if an asset price walks randomly. The weak forms market efficiency testing will prove that future price changes should not be related to changes in the price of securities in the past, current prices are not correlated (independent) to previous prices (Khajar, 2010). Many ways of analysis are being used to examine market efficiency in a weak form, some of them are unit root test (Lean & Smyth, 2014), heteroscedasticity test (Snaith, Kellard, & Ahmad, 2015), runs test (Ghozali, 2011), and seasonality test (Rita, 2009). In this research, market efficiency test is in a weak form which uses runs test.

The CPO market is not expected to walk randomly because the capital markets and other financial markets are often found to be inefficient in a weak form (Dickinson & Peterson, 1995; Rita, 2009; Jain, Vyas, & Roy, 2013; Shah & Ahmed, 2014; Hersugondo et al., 2016; Robiyanto, 2017; Onwukwe & Ali, 2018). Then the CPO market will also experience the same thing. CPO price is also predicted using the past price as other asset prices did. Based on this, the hypothesis is formulated as follows:

H_1 : the CPO market does not walk randomly

METHODS

The data used in this study is secondary data obtained from the official website of Malaysian Palm Oil Council (MPOC) namely http://www.mpoc.org.my/Monthly_Palm_Oil_Trade_Statistics.aspx. This data is in the form of monthly closing CPO price data during 2010-2017 at BMD. The CPO price data from BMD is used with the reason that the CPO trading in BMD is the most liquid in the world.

Meanwhile, the data analysis tool used is runs test. Runs test is performed using cut-point mean and median. The hypothesis formulated in this study

will be accepted if it has a significant Z statistics value at the 0.05 significance level. There are some additional test also for robustness checking. Those tests are unit root test by using Augmented Dickey-Fuller test and correlogram. Correlogram conducted by using 36 lags, which is default setting in Eviews software. Augmented Dickey-Fuller test also used by Jain, Vyas, & Roy (2013) to test whether Indian Stock Markets are efficient in weak form. While correlogram been used by Dima & Milo^o (2009) for their study about market efficiency hypothesis in the Romanian stock market.

RESULTS

The result of runs test can be seen in Table 2. Based on the result of runs test by using the mean, then it is obtained a test value of 0.0012458 with a value of Z amounted to -1.644. This value of Z has a significance of 0.100. Since this significance value is greater than the 0.05 level of significance, so H_1 which states that the CPO market does not walk randomly is unacceptable. The same conclusion is also found in the result of the runs test using the median. The test value of runs test using median - 0.00432 with Z value equal to -1.340. The Z value has a significant value of 0.180 which is greater than 0.05.

Table 2. Runs Test Results

	Mean	Median
Test Value ^a	.0012458	-.00432
Cases < Test Value	53	47
Cases >= Test Value	42	48
Total Cases	95	95
Number of Runs	40	42
Z	-1.644	-1.340
Asymp. Sig. (2-tailed)	.100	.180

Source: MPOC (2018), processed

Robustness checking conducted by using by using the Augmented Dickey-Fuller test and

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correlogram with 36 lags. The result of the Augmented Dickey-Fuller test shown in Table 3, while the result of correlogram with 36 lags is shown in Figure 1.

Table 3. The Results of the Augmented Dickey-Fuller Test

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.709477	0.0000
Test critical values:		
1% level	-3.501445	
5% level	-2.892536	
10% level	-2.583371	

Source: MPOC (2018), processed

The results of Augmented Dickey-Fuller test shows that Augmented Dickey-Fuller statistics is significant even at 1 percent significance level. Based on this finding, so it concluded that none unit root found in CPO data, hence the CPO market is efficient. This finding also supported by correlogram results. From 36 lags, none lag has significant at 5 percent significance level.

DISCUSSIONS

The result of runs test, Augmented Dickey-Fuller test, and correlogram provides evidence that the CPO market walks randomly. In contrast to the result of study on market efficiency in a weak form as conducted in various capital market, e.g., Rita (2009), Robiyanto & Puryandani (2015), and Hersugondo et al. (2016), which found a seasonal and discontinuous patterns in the Indonesian stock market, and Onwukwe & Ali (2018) found that the Nigerian capital market does not walk randomly, and Jain, Vyas, & Roy (2013), which found similar results in the Indian stock market. As well as other financial markets, e.g., Dickinson & Peterson (1995) and Robiyanto. (2015), which generally concluded that capital markets and other financial markets such as option markets and precious metals markets have one pattern that causes movements of traded assets to move randomly.

Nevertheless, this study is consistent with research conducted by Snaith, Kellard, & Ahmad (2015) and Dima & Milo^o (2009) who did their study in Romania, and Liu (2009) who conducted a study on the CPO market in Europe. This condition can occur because the CPO market is a market that is more likely to be influenced by increasing demand but is accompanied by an offering that is highly dependent on various aspects such as weather and another factor of less appropriate to be used as an investment instrument considering the nature of its products intended for consumption (Go & Lau, 2017) and not a safe haven or preserve of values as well as precious metals (Robiyanto, Wahyudi, & Pangestuti, 2017).

CONCLUSION AND SUGGESTIONS

Conclusion

This study finds a consistent result between the runs test using the mean and median saying that the CPO market is efficient in a weak form. This finding is robust since the consistent results also found by using the Augmented Dickey-Fuller test and correlogram. These findings indicate that the CPO market is running randomly and there is no pattern in the CPO price movement. So, the technical analysis is not appropriate to be applied to it. The CPO prices walk randomly because it is a very active market. CPO has become a commodity needed by people of the world and is heavily dependent on the supply of CPO as a result of plantation activities. Many things can influence the supply of CPO such as weather, which will ultimately affect the price of CPO in the market. This findings also prove that efficient market hypothesis also applies to another market such as commodity market. Based on this, it is concluded that the efficient market hypothesis applies to various financial and commodity markets.

Suggestions

Traders and speculators in the CPO market are advised not to use the technical analysis in their trading activities, as this analysis is not appropriate to be applied to a weak form efficient market. Traders and speculators can use fundamental analysis such as demand and supply analysis. Also, they can use some recent issue to analyze the CPO market

such as embargo which imposed by European Union (EU) and some trade barriers.

For the researchers who want to conduct a study in the CPO market, they can assess the CPO market's weak form efficiency by using other methods such as the presence or absence of seasonal patterns. Researchers can also use analysis based on fundamental data such as demand and supply or other data.

Figure 1. Correlogram of CPO Market

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. *	. *	1	0.191	0.191	3.5631	0.059
. * .	. * .	2	-0.071	-0.112	4.0661	0.131
. .	. *	3	0.051	0.092	4.3293	0.228
. *	. .	4	0.079	0.044	4.9671	0.291
. * .	. * .	5	-0.083	-0.102	5.6669	0.340
. * .	. * .	6	-0.188	-0.150	9.3431	0.155
. * .	. * .	7	-0.142	-0.106	11.449	0.120
. .	. .	8	-0.019	0.005	11.488	0.176
. .	. .	9	-0.007	0.006	11.494	0.243
. .	. .	10	0.035	0.073	11.630	0.311
. .	. .	11	0.073	0.050	12.212	0.348
. .	. * .	12	-0.017	-0.082	12.243	0.426
. * .	. * .	13	-0.107	-0.141	13.540	0.407
. *	. *	14	0.088	0.102	14.411	0.420
. *	. .	15	0.081	0.035	15.160	0.440
. * .	. * .	16	-0.118	-0.084	16.786	0.400
. * .	. .	17	-0.118	-0.045	18.422	0.363
. * .	. * .	18	-0.124	-0.173	20.247	0.319
. *	. *	19	0.119	0.150	21.972	0.286
. .	. .	20	0.021	-0.019	22.028	0.339
. * .	. * .	21	-0.176	-0.128	25.870	0.211
. * .	. * .	22	-0.088	-0.071	26.850	0.217
. *	. .	23	0.094	0.028	27.992	0.216
. .	. * .	24	-0.029	-0.095	28.103	0.256
. .	. .	25	-0.045	0.006	28.364	0.291
. .	. .	26	-0.046	-0.054	28.649	0.327
. .	. .	27	-0.003	-0.008	28.650	0.378
. .	. * .	28	-0.028	-0.070	28.761	0.425
. * .	. * .	29	-0.082	-0.140	29.696	0.429
. .	. .	30	0.041	0.068	29.939	0.469
. .	. * .	31	-0.050	-0.128	30.301	0.502
. .	. *	32	-0.029	0.092	30.425	0.546
. *	. .	33	0.087	0.029	31.559	0.539
. *	. .	34	0.189	0.052	36.943	0.335
. *	. *	35	0.095	0.077	38.326	0.321
. .	. .	36	-0.010	-0.031	38.342	0.364

Source: MPOC (2018), processed

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