Market Reaction to Government Policy for Implementation of Biodiesel Mixture Proportion to Palm Oil Plantation Issuers.

Muhammad Ivan Ardhiansyah[1]; Agus Munandar[2]

[1,2] *Universitas Esa Unggul Bekasi, email :* agus munandar@esaunggula.ac.id

ARTICLES INFORMATION	ABSTRACT

This research attempts to make investors in palm oil plantation capital market can take appropriate action on their portfolios if in the future the government issues a policy of implementing biodiesel. The manufacturing companies listed on the Indonesia Stock Exchange (IDX) from 2015 to 2019 served as the study object. Purposive sampling was utilized in sample selection, yielding 15 samples. The research conducted is quantitative with the Single Index Model (SIM) method were the analytical techniques used in this study, with the SPSS 25 program being used for the t-test. The analysis results indicated that mandatory B30 implementation have a significantly different impact between before and after the announcement. The study's findings offer insight and input for palm oil plantation company management that the next mandatory is good news. The findings of this study should be helpful to investors how to implement action in the capital market. This study uses samples were taken without regard to the size of the company based on market capitalization and the number and class of investors, and the domestic CPO price variable only takes one price point.

A. INTRODUCTION

Palm oil (*Elaeis guineensis* Jacq) is the main commodity in world trade. and oil palm plantations as leaders in vegetable oil resources (Henson, 2012). Since signing the ratification of global climate change in Rio De Janeiro, Brazil in 1994, Indonesia continues to be committed to reducing greenhouse gas emissions (Murdiyarso, 2003). One of the government's efforts is to gradually replace fossil fuels with environmentally friendly fuels, namely biodiesel or diesel fuel whose raw materials come from oil palm plants. This is certainly a very good opportunity economically and technologically for New Renewable Energy (EBT) for the progress of the nation and state of Indonesia at the global level. Indonesia as the world's largest oil palm plantation country continues to strive to develop diversification of CPO derivative products so that added value is in line with the commitment to preserve the environment.

The dynamics of world crude palm oil (CPO) prices played from 2015 to 2019 driven by internal factors that pushed domestic consumption in the form of mandatory biodiesel policies that had a positive impact on prices (Rizki Amalia, 2020). Effective implementation of the mandatory B30 action to ensure availability at all gas stations in Indonesia as of January 1 2020 has in fact resulted in stable prices for oil palm fresh fruit bunches (FFB) at the farmer level and domestic use has increased. The world price of CPO continues to increase until now. This is because the use of domestic CPO with B30 which exceeds 7.226 million tons of CPO in 2020 causes a reduction in world CPO stocks so that the law of demand and supply applies (BPDP, 2021).

Formally the Minister of Energy and Mineral Resources (ESDM) Sudirman Said conveyed the obligation to use 15% biodiesel (B15) at the Ministry of Energy and Mineral Resources on Monday, 23 March 2015. This event aims to provide 10 days when the President announces the package Indonesia's economic structural reform policy, the government has prepared a B15 plan, from executives, palm oil producers, biodiesel producers, fuel business entities, car and heavy equipment manufacturers, as well as biodiesel observers and practitioners, as well as related associations attending the conference (ESDM, 2015).

After some time, the government officially announced the mandatory B20 biodiesel expansion plan on Friday, August 31, 2018. With this inauguration, starting September 1, 2018, the use of biodiesel fuel containing 20% palm vegetable oil for (Public Service Obligation / PSO) and the non-subsidized (non-PSO) sector was introduced (BPDP, 2018). After a series of tests and positive results, the President of the Republic of Indonesia Joko Widodo announced the mandatory B30 plan (30% biodiesel and 70% diesel) on Monday morning, 23 December 2019 at the Pertamina MT Haryono gas station, Jakarta (Kominfo, 2019).

According to Halimatussadiah et al. (2021) the potential for export losses is greater than the savings in diesel imports until 2030, and the gap is widening along with a more progressive biodiesel policy. The initial goal of the biodiesel policy in Indonesia was to achieve energy security and boost the economy by reducing the trade balance deficit. In addition, in recent years, the biodiesel policy has become a means to take advantage of the excess supply of domestic CPO.

The main reference in this thesis is research from Gursida & Indrayono (2019) which examines the effect of the government's economic policy packages volumes I, X, and XVI on abnormal returns in each JCI and industry sector. The results suggest that statistical analysis with respect to abnormal returns (AR) on sectoral indices shows that only a few sectors show

reactions to EPP (Economic Policy Package) announcements. Specifically for volume I, only the agricultural and basic industrial sectors considered that the announcement had information content and was good news because there was a relevant positive difference in the average abnormal return gap before and after the incident (Gursida & Indrayono, 2019; Wibowo, 2017). For EPP volume X, the agricultural sector shows a significant reaction and in relation to volume XVI, the agricultural and basic industrial sectors show significant changes in AR (Gursida & Indrayono, 2019).

The implication of this analysis is that the Indonesian financial market is generally able to process information related to EPP announcements, but does not perceive it as a positive value in terms of higher expected returns. This may reveal an assessment that the policies issued by the government do not provide sufficient incentives to eliminate challenges to the establishment of business operations across economic sectors (Gursida & Indrayono, 2019).

Event study studies related to previous government announcements both from abroad and in Indonesia, are often related to macroeconomics, especially GDP, interest rates and monetary. Research conducted by Gursida & Indrayono (2019) covers more general policies regarding macroeconomics which have implications for the JCI and abnormal returns on sectoral stocks. In this thesis, researchers try to create novelty by examining the effect of more specific government announcements so that the coverage is more focused, namely the application of biodiesel to a mixture of diesel fuel on abnormal stock returns, CPO prices and share sales volume in the oil palm plantation sub-sector. In this case the population is oil palm plantation issuers listed on the Indonesian Stock Exchange.

The researcher sees that with an announcement from the government that is mandatory regarding the proportion of biodiesel blends, it will result in an increase in raw materials from upstream, namely from the price of oil palm FFB (Fresh Fruit Bunches) both at the farmer and company level, up to the price of CPO (Crude Palm Oil). Oil / crude palm oil) as a basic ingredient for making biodiesel. The CPO export price will certainly compete with the CPO price for domestic demand. Thus, there will be a surge in the share price of issuers of oil palm plantation companies. With the results of this study, investors can determine their portfolio in the best possible way to obtain optimal returns on their investment in the capital market in the future.

B. LITERATURE REVIEW

Previous Research and Hypotheses Development

Abnormal Return

The capital market is where parties who have more budget and those who lack budget meet through securities transactions (Tandelilin, 2017). Meanwhile, based on Article 1, Article 13 of the Capital Market Law in Nasarudin (2011), the capital market is an activity related to public offerings and sales of securities by public companies related to the capital market, published securities and as securities-related organizations and industries. Stock prices change due to the emergence of new information, and investors will reassess the value of their assets based on this information (Ross, 2014).

According to Han et al. (2021) that expected returns are positively related to trading volume among underpriced stocks but negatively among overpriced stocks. Thus, trading volume reinforces mispricing. The result is that it has a strong influence on alternative mispricing and trade volume measures, alternative portfolio formation methods, and controlling for variables that are known to have an amplifying effect on mispricing. By linking trading volume with investor disagreement, the results show that the research results are

consistent with the latest theoretical model from Atmaz and Basak (2018) where investor disagreement predicts stock returns conditional on expectations bias.

Abnormal returns are the difference between the actual returns around the announcement and the expected returns (Tandelilin, 2017). According to Jogiyanto (2013) extraordinary returns are the excess of actual returns over normal returns. Normal yield is the expected return or return desired by investors. So, the extraordinary return is the difference between the gap between the actual return and the expected return. Often the mobilization of idle funds to be held by potential long-term investors and the channeling of funds to meet the long-term funding needs of prospective borrowers is fraught with market risk. The occasional burst into the stock market is something special. Investors and borrowers both face risks (Onyiriuba, 2017). The semi-strong form of the efficient capital market in which it reacts quickly to any information of value. This is shown by the variation in stock prices outside the general condition, which then results in abnormal returns (Jogiyanto, 2013).

Based on the research of Salman and Farisi (2020), there was no difference in the average abnormal return for the announcement of mandatory biodiesel 20 (B20). In addition, there is no difference in the average transaction volume activity for the announcement of the 20% biodiesel policy. The results of the overall resistance test for the window period of 7 days and 15 days showed no difference relevant to the biodiesel policy 20 (Farisi & Salman, 2020). The stock price of the plantation and palm oil processing industries that produce biodiesel is influenced by international biodiesel prices, international CPO prices, world oil prices, exchange rates, SBI interest rates, CPO export taxes and inflation (Sundoro & Sukamulja, 2018). Based on the theory and the previous research results, the following hypothesis was formulated:

H1: There is a difference in abnormal returns before and after the announcement of the implementation of the B15 policy. This influence had implications before and after the announcement of the application of a 15% biodiesel blend on 23 March 2015 on the JCI on the Indonesia Stock Exchange.

H2: There is a difference in abnormal returns before and after the announcement of the implementation of the B20 policy. This influence had implications for before and after the announcement of the application of a 20% biodiesel blend on 31 August 2018 at the JCI on the Indonesia Stock Exchange.

H3: There is a difference in abnormal returns before and after the announcement of the implementation of the B30 policy. This influence had implications before and after the announcement of the application of a 30% biodiesel blend on 23 December 2019 at the JCI on the Indonesia Stock Exchange.

Crude Palm Oil (CPO) Price

CPO producing countries benefit from high CPO prices, but for CPO consuming countries this will cause the prices of other commodities that use CPO as raw material to skyrocket. In the stock market, the opposite is true. As the world CPO price rose, investors responded by investing in the plantation sector. When the price of CPO fell, investors reacted by selling their shares and moving them to other, more stable sectors to block the performance of shares in the plantation and consumer goods sectors. Investor decisions will then have a significant effect on price movements in the stock market (Karina, 2018).

Besides being determined by the availability of goods in the market, CPO prices are also determined by many other factors. The international price standard for one ton of CPO uses the Malaysian Ringgit (MYR) on the Malaysian capital market or US Dollars (USD) on the Rotterdam capital market, the Netherlands. While the domestic prices in this study were taken at the Medan spot, North Sumatra. Even though Indonesia is the largest CPO

producer in the world, because the movement of domestic CPO prices refers to developments in international CPO prices located in Rotterdam, the Netherlands. Indeed, so far Indonesia and Malaysia have not been able to determine international CPO prices (Barus, 2021). Based on the explanation above, the following fourth to sixth hypothesis was proposed:

H4: There was a difference in CPO prices before and after the announcement of the implementation of the B15 policy. This influence had implications before and after the announcement of the application of a 15% biodiesel blend on 23 March 2015 on the JCI on the Indonesia Stock Exchange.

H5: There was a difference in CPO prices before and after the announcement of the implementation of the B20 policy. This influence had implications for before and after the announcement of the application of a 20% biodiesel blend on 31 August 2018 at the JCI on the Indonesia Stock Exchange.

H6: There was a difference in CPO prices before and after the announcement of the implementation of the B30 policy. This influence had implications before and after the announcement of the application of a 30% biodiesel blend on 23 December 2019 at the JCI on the Indonesia Stock Exchange.

Stock Trading Volume

Actively trading high volume stocks indicates that the stock is popular with investors meaning it trades fast. The sales volume of shares is the total purchase and trading value of investors' shares. This trading volume is often used as a reference to study information and the impact of various events. The effect of trading activity volatility on stock expected returns is driven by risk variables and liquidity factors, then stocks with high volatility will play high profit expectations (Chordia et al., 2001).

H7: There is a difference in trading volume before and after the announcement of the implementation of the B15. This influence had implications before and after the announcement of the application of a 15% biodiesel blend on 23 March 2015 on the JCI on the Indonesia Stock Exchange.

H8: There is a difference in trading volume before and after the announcement of the implementation of the B20. This influence had implications for before and after the announcement of the application of a 20% biodiesel blend on 31 August 2018 at the JCI on the Indonesia Stock Exchange.

H9: There is a difference in trading volume before and after the announcement of the implementation of the B30. This influence had implications before and after the announcement of the application of a 30% biodiesel blend on 23 December 2019 at the JCI on the Indonesia Stock Exchange.

Bodies et al. (2014) argue that event studies design real financial study techniques that allow them to assess the impact of certain events on a company's stock price. In particular, event tracking tracks market response to the informative content of advertisements or publications about specific events. The content of this information can be in the form of good news or bad news. The efficient market hypothesis predicts that the market will react positively to good news and negatively to bad news. Market reactions turned into positive abnormal returns (good news) and negative abnormal returns (bad news) (Tandelilin, 2017). There is, even evidence that positive (negative) news causes an increase (decrease) in cryptocurrencies (Yue et al., 2021).

C. RESEARCH METHODOLOGY

This type of study is deductive research, namely the study of testing a hypothesis by testing the application of the theory to related situations, and using the results of the test as a basis for drawing a summary of the study. That is, to motivate or reject hypotheses derived from theoretical research. The study format is an event study that investigates the market reaction to these conditions, and the information is published in the form of an announcement.
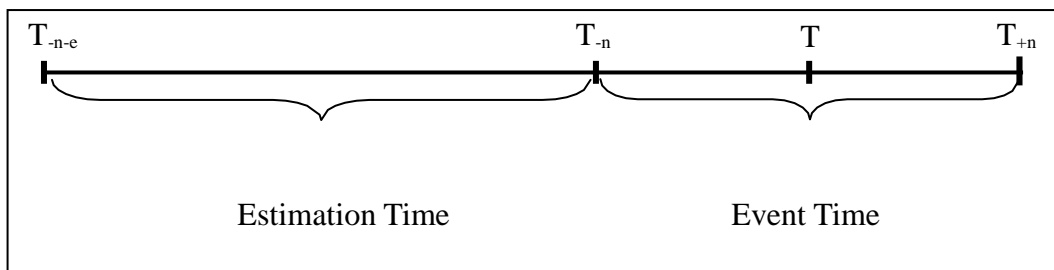

Figure 2. Estimation time and event time for event study (Jogiyanto, 2013).

The data used together with the study is secondary data. The data provided by the IDX is available in a processed format, allowing researchers to use the processed data directly. The independent variables are the announcement of the implementation of B15 (15% proportion of biodiesel), the announcement of the implementation of B20 (20% proportion of biodiesel), the announcement of the implementation of B30 (30% proportion of biodiesel). While the dependent variable is abnormal returns, trading volume and CPO price. The event period takes 10 days before the event and 10 days after the event. Meanwhile, the estimation limit is 40 days before the event window.

This study took a population of 15 oil palm plantation companies listed in the JCI. The method of determining the sample is target sampling, namely collecting samples according to certain criteria. The criteria are (1) oil palm plantations that have been IPO before December 23, 2019. (2) During the incident period, shareholder companies in the JCI category will not announce dividends, stock splits, mergers, or rights issues. Therefore, the selected sample will be able to show that stock returns are free from the negative impacts created by the company. The reason for using the JCI as the sample in this study is because the JCI recorded 22 issuers of oil palm plantation companies in Indonesia.

Stock Return

The actual return on stock (R_{it}) is obtained from the daily stock price of security i at time t (P_{it}) minus the daily price of security i stock at time t-1 (P_{it-1}), divided by the daily stock price of security i at time t- 1 (P_{it-1}) or together the formula:

$$R_{it} = (P_{it} - P_{it-1}) / P_{it-1}$$

Expected Return

Expected return is the future expected return of a stock according to the risk level of that stock. Before calculating the expected rate of return, first find the alpha and beta coefficients for each stock by regressing Rit and Rmt over the forecast period. Calculation of normal return (normal return) uses alpha and beta numbers that have been summed up beforehand, market returns are used, namely market returns during the event. Single Index Model (SIM) is calculated with the formula:

$$E(R_{it}) = \alpha_i + \beta_i * R_{mt}$$

α_i = independent intercept to R_{mt}
β_i = systematic risk slope depends on R_{mt}
R_{mt} = market returns calculated along with the formula:

$$(IHSG_t - IHSG_{t-1})/IHSG_{t-1}$$

Abnormal Return

In order to add up the abnormal return on stock i on day t, a formula is used, namely:

$$AR_{it} = R_{it} - E(R_{it})$$

Where:

AR_{it} = abnormal return in stock i at day t
R_{it} = actual return in stock i at day t
$E(R_{it})$ = excpected return in stock i at day t

The share price of each issuer and the combined stock price index are obtained to obtain the company's individual returns and market returns. After that, calculate alpha and beta by regressing the company's individual returns and market returns in the estimation period. After obtaining this value, the expected return is calculated using the single index model. The abnormal return is then obtained from the realized return minus the expected return. Abnormal yields, trading volume of all issuers, as well as CPO prices in three sources, namely the Rotterdam and Malaysia capital markets, as well as the Medan spot for before and after the announcement date were then tested for normality. If the normality test produces a value <0.05 then the distribution is not normal. And if the number is > 0.05, it means that the distribution is normal.

Abnormal yields, trading volumes, and CPO prices before and after events for each announcement of implementation of B15, B20, and B30 were hypothesized to be analyzed using the paired sample Wilcoxon signed ranked test or the paired sample t-test. The paired sample t-test is applied if the results of the normality test in both conditions before and after the incident are the same, that is, both are normally distributed or both are not normally distributed. If the results of one of them are normal distribution and the other one is abnormal distribution or vice versa, then the hypothesis is tested using the paired sample Wilcoxon signed ranked test.

D. RESULT AND DISCUSSION

Abnormal return data is obtained from the actual return minus the expected return during the event period outside the event date, namely 10 days before and 10 days after the event date. Then a normality test was performed to determine the comparative test method, namely the paired sample t-test or the paired sample Wilcoxon signed ranked test. The results are as shown in the table below. The results of the normality test for data distribution are then carried out by a comparative test or t test.

Table 1. Normality test with a comparative test of abnormal yield variables

Variable	Mixed Biodiesel Proportion	Event Date	Normality Test				T-test
			Kolmogorov-Smirnov[a]			Distribution	Sig. (2-tailed)
			Statistic	df	Sig.		
Abnormal Return	B15	Before	0.090	24	0.200[*]	Normal	0.14
		After	0.172	24	0.065	Normal	
	B20	Before	0.104	24	0.200[*]	Normal	0.378
		After	0.192	24	0.022	No Normal	
	B30	Before	0.148	24	0.188	Normal	0.029
		After	0.168	24	0.077	Normal	

In the implementation of the proportion of 15% biodiesel mixture, the two data that were compared were normally distributed data so that a comparative test was used, namely the paired sample t-test. The results of the t test show a significance number of 0.14, which means that the initial hypothesis (H0) is accepted. It can be concluded that H1 is rejected, meaning that there is no difference before and after the government's announcement of a mandatory proportion of 15% biodiesel mixture on abnormal yields (Table 1).

The normal distribution of data before announcement and after announcement which is not normal in the proportion of 20% biodiesel mixture leads to the use of the paired sample Wilcoxon signed ranked test method for the comparative test. The results show the number 0.378. With this number above the error rate of 0.05, the initial hypothesis (H0) is accepted. Thus, H2 is rejected meaning there is no difference before and after the B20 announcement of abnormal yields.

The policy of implementing the proportion of 30% biodiesel mixture, the two data are paired, namely the data is normally distributed, then the comparative test used is the paired sample t-test. The results of the t test show a significance number of 0.029 which means that the initial hypothesis (H0) is rejected. This figure can be stated that H3 is accepted, so it can be concluded that the government's announcement for a mandatory proportion of 30% biodiesel mixture has no significant difference before and after the announcement date on abnormal yields.

Table 2. Normality test with CPO price variable comparison test

Variable	Mixed Biodiesel Proportion	Event Date	Normality Test				T -test
			Kolmogorov-Smirnov[a]			Distribution	Sig. (2-tailed)
			Statistic	df	Sig.		
CPO Price	B15	Before	0.234	24	0.002	No Normal	0.658
		After	0.160	24	0.114	Normal	
	B20	Before	0.317	24	0.000	No Normal	0.000
		After	0.347	24	0.000	No Normal	
	B30	Before	0.154	24	0.144	Normal	0.000
		After	0.118	24	0.200*	Normal	

Table 2 shows that the implementation of the proportion of 15% biodiesel mixture has a t-test rate above 0.05 so that H0 is accepted and H4 is rejected, which means there is no difference in CPO prices before and after the announcement date. Whereas in the implementation of the proportion of biodiesel mixture of 20% and 30%, the significance is below 0.05. From this figure, it can be concluded that H5 and H6 are accepted, namely the proportion of biodiesel mixture of 20% and 30% of the CPO price.

Table 3. Normality test with comparative test of stock trading volume variable

Variable	Mixed Biodiesel Proportion	Event Date	Normality Test				T -test
			Kolmogorov-Smirnov[a]			Distribution	Sig. (2-tailed)
			Statistic	df	Sig.		
Trading Volume	B15	Before	0.230	24	0.002	No Normal	0.885
		After	0.175	24	0.057	Normal	
	B20	Before	0.380	24	0.000	No Normal	0.057
		After	0.349	24	0.000	No Normal	
	B30	Before	0.381	24	0.000	No Normal	0.057
		After	0.361	24	0.000	No Normal	

Based on table 3 above, it can be seen that only the proportion of 15% biodiesel mixture has an unequal distribution, so the paired sample Wilcoxon signed ranked test method is used for the comparative test. The data for the proportion of 20% and 30% biodiesel blends used the paired sample t-test.

The t-test for the proportion of policies of 15% and 20% shows the numbers 0.885 and 0.057 so that H0 is accepted. This result means that H7 and H8 are rejected, meaning that there is no difference in trading volume before and after the announcement of the implementation of the 15% and 20% biodiesel mixture proportions. Meanwhile, the announcement of the implementation of the 30% biodiesel blend proportion made a difference to the sales volume of shares before and after the date of the announcement.

Tabel 4. Empirical data changes before and after the announcement
of the mandatory government implementation of 30% biodiesel

Announcement B30				
Time Window	Date	Rerata		
		Stock Price (IDR)	Stock Trading Volume (Shares)	CPO Price (IDR)
t-10	12/9/2019	2.275	12.529.018	9.484
t-9	12/10/2019	2.249	8.890.747	9.536
t-8	12/11/2019	2.221	7.330.165	9.494
t-7	12/12/2019	2.213	5.243.394	9.571
t-6	12/13/2019	2.245	7.457.924	9.560
t-5	12/16/2019	2.243	8.660.453	9.697
t-4	12/17/2019	2.281	6.680.276	9.690
t-3	12/18/2019	2.276	6.635.529	9.635
t-2	12/19/2019	2.241	6.943.235	9.684
t-1	12/20/2019	2.261	5.739.859	9.844
t-0	12/23/2019	2.268	7.000.365	9.767
t+1	12/26/2019	2.342	18.336.194	10.645
t+2	12/27/2019	2.392	34.176.541	10.590
t+3	12/30/2019	2.397	30.200.388	10.361
t+4	1/2/2020	2.332	38.715.194	10.368
t+5	1/3/2020	2.345	20.227.353	10.369
t+6	1/6/2020	2.264	10.330.788	10.606
t+7	1/7/2020	2.255	10.960.682	10.681
t+8	1/8/2020	2.221	4.891.800	10.553
t+9	1/9/2020	2.294	21.610.429	10.306
t+10	1/10/2020	2.271	23.639.588	10.094

Based on table 4 above, it shows empirical data regarding market reactions in stock prices, stock trading volume, and CPO prices before and after the announcement of the mandatory implementation of the 30% biodiesel blend proportion. The numbers after the announcement (t+1 to t+10) show an increasing value compared to the day of the announcement (t-0). Although there were a few days later it began to experience a decline. This is because the information received by the market is optimal (Ross, 2014). Rising CPO prices are also a separate problem because biodiesel producers and cooking oil producers will compete for CPO. This certainly requires intervention from the government to make the right policy.

By looking at the three calculation results, the variables that have significant differences before and after the announcement by the government policy on the mandatory implementation of biodiesel in three variables, namely abnormal yields, CPO prices, and trade volume are policies implementing the proportion of B30. Thus, it can be said that the financial behavior of investors has reacted to the announcement of the implementation of the 30 percent proportion of biodiesel, namely by considering it as new information that affects the market. This is in accordance with what was stated by Dwipayana & Wiksuana (2017) that the IDX is a semi-strong efficient market.

This study explores more broadly the differences before and after the announcement of the proportion of biodiesel blends of 15%, 20% and 30% on abnormal yields, CPO prices

and trading volume on the stock exchange, in this case the IDX. In testing the first hypothesis (H1), fourth hypothesis (H4), and seventh hypothesis (H7), all of which are hypotheses with a 15% biodiesel mixture proportion show no difference in abnormal yields, CPO prices, and stock sales volume before and after the announcement. . This is because the policy has not been seen by investors as something that can have an impact on the cost of palm oil business activities from upstream to downstream. Investors also saw that on the ground they did not feel that the government was moving quickly to ensure its implementation in the field.

The global average CPO price fell 1% in April 2015 compared to the previous month, then fell again from $662/ton in March to $654.6/ton the following month. This price cut proves that the requirement for 15% CPO-based biofuel (B15) which took effect from 1 April 2015 has not been enforced. Pertamina also does not buy biodiesel because the subsidy system planned by the CPO Support Fund (CSF) has not been implemented and mandatory B15 has no significant impact (Herlinda, 2015).

The campaign regarding the badness of oil palm plantations to the existence of forests or deforestation even the law has been approved by the European Union in December 2022. One of the points states that companies must carry out due diligence which shows that their supply chain does not contribute to forest destruction so that their products can be marketed to European Union territory. Oil palm plantations are declared as a business sector that carries out deforestation (cnbcindonesia, 2022).

In the previous study from Salman and Farisi (2020), which only examined the different test of the announcement of a 20% biodiesel blend on abnormal returns and trading volume, the results of his research conveyed that there was no difference before and after the announcement by the government regarding the mandatory implementation of diesel fuel with a 20% biodiesel blend to abnormal returns and trading volume. Based on the study carried out, namely on the second hypothesis (H2) and the eighth hypothesis (H8).

Even though the mandatory B20 announced on August 31 2018 is an expansion of the sector, namely besides PSO but also non-PSO (Public Service Obligation), namely industry and commercial so that private vehicles and so on use B20, the capital market still has not shown a positive reaction. significantly around the day of the announcement. The above can be caused by the level of public awareness about 20% biodiesel on the island of Java being considered less (0% - 55%). Apart from the logistical spread factor, the direct economic benefits of using B20 or other palm oil derivative products are not yet clear to non-Sumaterans, especially in Java. The geographic location of the region is a limiting factor in awareness of biodiesel products (Oktarina et al., 2019). While the IDX office is located in the city of Jakarta or the island of Java, of course most market players or investors are people who live on the island of Java. Understanding of biodiesel when the announcement of the proportion of 20% biodiesel mixture was not realized by the people on the island of Java in particular, thus influencing financial behavior in the capital market.

Behavioral finance integrates sociology and psychology with financial science. This new discipline has resulted in more insight into financial markets. The EMH theory is based on rationality. The assumption of rationality can be considered a major drawback of EMH, resulting in anomalous markets (Singh et al., 2021). Anomalies are generated either due to underreaction or overreaction from investors (Fama, 1998). In addition, the incessant black campaign against the palm oil commodity industry which was not environmentally friendly continued to be intensified by the United States and the European Union at the time before the mandatory B20 announcement also caused investors in the stock market to not react after the announcement. CPO sales abroad in the first quarter of 2018 amounted to 7.84 million tons, down 2% from 8.02 million tons in the first quarter of 2017. In particular, crude

palm oil and its derivatives (not classified as chemical oils and fats and biodiesel) decreased 3% in the first quarter of 2017 to 7.5 million tonnes from 7.73 million tonnes in the first quarter of 2017 (BPDP, 2018).

The Efficient Market Hypothesis (EMH) is considered one of the foundational theories of traditional finance. EMH was proposed by Eugene Fama in 1965. It was continuously reviewed and developed from the 1960s to 1990s, resulting in the emergence of a contemporary branch of science, namely Behavioral Finance which became an alternative model for EMH, explaining the behavioral biases of market participants (Singh et al., 2021). According to the efficient market concept, available information plays an important role in identifying the true value of shares, and any change in information directly reflects the share price. Stock prices express flashes on new insights, therefore it is very complex to identify movement patterns, as no predetermined patterns of stock price movements are found in the market. Consequently, EMH theory is analogous to the idea of a random walk of stock prices (Fama, 1970) in that it is easier to predict a series of random numbers than it is to predict the future path of a security's price. Thus, it is evident that future security prices are difficult to predict and past data cannot be used to predict future figures. So, Fama considers the technique of predicting stock prices based on past data including technical analysis and considers fundamental analysis irrelevant. Conversely, there is no strong evidence or literature proving that stock prices move randomly, but there is some literature which states that prices do not necessarily follow sharply changing patterns (Dupernex, 2007) and that the relationship between random patterns of stock movements and investor rationality or market efficiency is not statistically significant (Singh et al., 2021).

The goal of behavioral finance is to analyze this anomaly by explaining what, why and how to invest from a human perspective (Prosad et al., 2015). The BF theory helps financial professionals to identify their own mistakes related to making investment/financial decisions and others. However, to capture the essence of behavioral finance, an investor must reflect it on his own investment decisions and gain proficiency in it (Subash, 2012). In doing so, financial professionals can gain a deeper understanding of the emotional drivers of their own and their clients' investment decisions, and apply their professional practice to make better rational decisions. Therefore, with the increasing volatility of financial markets, research on financial behavior is a necessity nowadays.

There are three main factors causing mandatory B15 and B20 not reacting in the capital market before and after the announcement on palm oil issuers. First, the European Union Parliament's policy of rejecting palm-based biodiesel. Second, the United States also issued a loud condemnation of anti-dumping biodiesel from palm oil. Third is the market India raised tariffs on imports of oil from plants, as well as tightening by China in monitoring the purchase of vegetable oil from abroad. When the need for imports slumped, domestic production of palm oil in the first quarter of 2018 actually rose 24%, from 8.4 million tonnes in the first quarter of 2017 to 10.41 million tonnes. This substantial increase was because in the first quarter of 2017 there was an improvement in the quality of dry land experienced in 2015 (BPDP, 2018).

The announcement of the implementation of B30 gave a difference before and after the government's announcement on the three variables, namely abnormal yields, CPO prices, and stock trading volume. These can be explained as follows. In world politics, Indonesia is the first country in the world to use a 30% proportion of blended biodiesel in diesel fuel. Even until this situation, Indonesia was the only country with the highest proportion of biodiesel blends (Arini, 2022). In this case investors in the capital market see that Indonesia is serious about implementing biodiesel products.

Efforts to take political action include forming discussion forums discussing environmental issues both formally and informally, sharing information about green products with friends and relatives, and writing in the mass media and speaking in discussion forums about green behavior. These efforts have had a significant impact on increasing environmentally friendly consumer behavior by helping to achieve environmental sustainability (Utami, 2020). In this case, biodiesel business players continue to promote that biodiesel products from palm oil are environmentally friendly energy sources. This was reinforced by the conference of the Council of Palm Oil Producing Countries (CPOPC) where brought biodiesel in the G20 which took place in Bali (Aprobi, 2022).

Indonesia as a country with the largest income from palm oil in the world has so far been exported in the form of CPO, it will decrease because it is used domestically for biodiesel production and then used domestically. This will reduce supply in the international market so that economic law applies because stocks decrease with the assumption that demand is constant, so CPO prices will increase.

E. CONCLUSION

Conclusion

The results of the study are only the hypothesis with the announcement of the proportion of 30% biodiesel mixture that there are significant differences in the three variables, namely abnormal yields, CPO prices, and sales volume before and after the announcement. Meanwhile, for the mandatory implementation of B15 and B20, EMH anomalies occurred due to external factors, such as the ban on biodiesel products by the European Union parliament, US accusations regarding Indonesia's anti-dumping of palm oil products, and India's raising CPO import tariffs and China's tightening supervision of palm oil products. enter the country. Other external factors include national and international NGOs, especially Greenpece, which continue to voice that the upstream palm oil industry has not paid any attention to the environment.

But the state continues to prove that Indonesia still pays attention to environmental issues from the upstream level, such as zero burning and creating HCVF (High Conservation Value Forest). Apart from following the RSPO (Roundtable on Sustainable Palm Oil), the state also requires every palm oil company to be ISPO (Indonesian Sustainable Palm Oil) certified. RSPO is a coalition of organizations from various sectors of the palm oil industry that aims to develop and implement global standards for the production of sustainable palm oil. ISPO, on the other hand, is an economic business system, social and environment friendly in the field of oil palm plantations based on the laws and regulations of sustainable palm oil production in Indonesia.

Based on the government's announcement on the proportion of 30% biodiesel mixture, it proved that there was a positive difference before and after the announcement. The results of this study can be guided by potential investors and investors who adhere to fundamental analysis in determining their portfolios, bearing in mind that this policy will continue with a proportion of biodiesel blends of 40% to 100%. The government policy must be carried out in stages in later years so that it requires a longtime horizon. Meanwhile, investors who adhere to technical analysis can also make this announcement a positive factor that can affect stock prices, trading volume and CPO prices.

Public awareness of environmental concern also provides impetus to move investors to respect more environmentally friendly products. According to Siringi (2012) Green Consumer Behavior (GCB) is people's behavior that impacts their interest in the environment. Individual behavior is reflected in buying, seeking, using, evaluating, and disposing of products.

Limitation and suggestions

This research is inseparable from a number of limitations or deficiencies that can be seen through observations in the course of the research. Weaknesses that are realized by researchers need to be conveyed for the integrity of further research in the same study. The first is that the samples were taken without regard to the size of the company based on market capitalization and the number and class of investors, so that the conclusions are still not specific. Second, the domestic CPO price variable only takes one price point, namely in Medan. Actually, the CPO export center is also in Kalimantan. But due to the limitations of the author's ability to get more information than that can not be done. Third, the research did not conduct a questionnaire on issuers regarding the impact of real sales of CPO commodities and the level of company satisfaction with the mandatory implementation of biodiesel.

Suggestions for further research are to examine more deeply whether the 30% biodiesel policy and hereinafter affect the profitability and company value (Enterprise Value) of palm oil, how to save foreign exchange by looking at the opportunity cost that arises compared to imported diesel, and examine the effect of the successful implementation of biodiesel on the economy environment. This emphasizes biodiesel as a low emission product (EBT/renewable energy) compared to diesel fuel, which originates from efforts to actualize petroleum, namely non-renewable energy. In the commodity market, investors can enter into futures or forward contracts because the price will definitely go up if the government plans to increase the proportion of its blend of biodiesel above 30%.

The government must also be serious about implementing the mandatory proportion of the next biodiesel mixture, including the biodiesel purchase scheme by Pertamina. So far, biodiesel producers have received incentives from the government so that Pertamina buys at prices that have been corrected by this incentive. From a macroeconomic and environmental perspective, how mandatory is this government in the escalating implementation of biodiesel, possibly triggering pressure on the export-import balance, the sum of subsidies or incentives for the biodiesel business, and the consequences of oil palm business actors increasing their business which means more land is needed more broadly (Halimatussadiah et al., 2021).

REFERENCE

Anderson, H. D., Balli, F., & Godber, C. (2018). The effect of macroeconomic announcements at a sectoral level in the US and European Union. Research in International Business and Finance, 44,256–272. https://doi.org/10.1016/j.ribaf.2017.07.095s

Aprobi. (2022, 4 18). Retrieved from Aprobi: https://www.aprobi.or.id/id/komitmen-penggunaan-biodiesel-jadi-bagian-dari-transisi-energi-global/

Arini, S. C. (2022, Juni 30). Finance. Retrieved from Detik: finance.detik.com/energi/d-6155447/malaysia-hingga-brazil-kepo-ri-berhasil-terapkan-b30#:~:text=Indonesia%20menjadi%20satu-satunya%20negara,%25%20(B3)%20secara%20nasional.

Atmaz, A., & Basak, S. (2018). Belief Dispersion in the Stock Market. Journal of Finance, 73(3), 1225-1279. https://doi.org/10.1111/jofi.12618

Barus, Y. (2021). INTEGRASI HARGA CPO (Crude Palm Oil) di PASAR INTERNATIONAL DENGAN HARGA TBS (Tandan Buah Segar) PROVINSI SUMATERA UTARA.

Bodie, Z., Kane, A., & Marcus, A. J. (2014). Manajemen Portofolio dan Investasi. Buku 1. Edisi 9. Jakarta: Salemba Empat.

BPDP. (2018, 5 24). Retrieved from BPDP: https://www.bpdp.or.id/Kampanye-Negatif-Gerus-Ekspor-Minyak-Sawit-Kuartal-I-2018

BPDP. (2018, Agustus 30). Program Perluasan B20 Resmi Diluncurkan. Retrieved from https://www.bpdp.or.id/Program-Perluasan-B20-Resmi-Diluncurkan

BPDP. (2021, Mei 18). Retrieved from https://www.bpdp.or.id/5-faktor-penguatan-harga-minyak-sawit-yang-mampu-pukau-dunia

Chordia, T., Subrahmanyam, A., & Anshuman, V. R. (2001). Trading Activity and Expected Stock Returns. CFA Digest, 31(3), 18-19. https://doi.org/10.2469/dig.v31.n3.908

Cnbcindonesia. (2022, Desember 12). Retrieved from cnbcindonesia: https://www.cnbcindonesia.com/market/20221209123030-17-395328 /eropa-larang-impor-hasil-pembabatan-hutan-nasib-cpo-ri-piye

Dupernex, S. (2007). Why Might Share Prices Follow a Random Walk? Student Economic Review, 21, 167-179.

Dwipayana, I., & Wiksuana, I. (2017). Pengujian Efisiensi Pasar di Bursa Efek Indonesia. E-Jurnal Manajemen Universitas Udayana, 6(4), 246943.

EBTKE. (2019, September 18). Pahami Istilah B20, B30, B100, BBN dalam Bioenergi. Retrieved from https://ebtke.esdm.go.id/post/2019/12/18/2433/pahami.istilah.b20.b30.b100.bbn.dalam.bioenergi

ESDM. (2015, Maret 24). Menteri ESDM Luncurkan Pelaksanaan Mandatori Pemanfaatan Biodiesel 15 Persen (B15). Retrieved from https://migas.esdm.go.id/post/read/menteri-esdm-luncurkan-pelaksanaan-mandatori-pemanfaatan-biodiesel-15-persen-(b15)

Fama, E. F. (1970). Session Topic: Stock Market Price Behavior Session Chairman: Burton G. Malkiel Efficient Capital Markets: A Review of Theory and Empirical Work. The Journal of Finance, 25(2), 383-417.

Fama, E. F. (1998). Market efficiency, long-term returns, and behavioral finance. Journal of Financial Economics, 49(3), 283-306. https://doi.org/10.1016/s0304-405x(98)00026-9

Farisi, A., & Salman, G. (2020, November 14). Analisis Perbedaan Reaksi Bursa Efek Indonesia Sebelum Dan Sesudah Pengumuman Kebijakan Biodiesel 20 (B20). Retrieved from http://repository.ub.ac.id/id/eprint/172404

Gursida, H., & Indrayono, Y. (2019). Understanding capital market responses to government economic policy announcements: An event study on Indonesia's Economic Policy Package. Management Science Letters, 9(11), 1887-1900. https://doi.org/10.5267/j.msl.2019.6.004

Halimatussadiah, A., Nainggolan, D., Yui, S., Moeis, F. R., & Siregar, A. A. (2021). Progressive biodiesel policy in Indonesia: Does the Government's economic proposition hold? Renewable and Sustainable Energy Reviews, 150(January), 111431. https://doi.org/10.1016/j.rser.2021.111431

Han, Y., Huang, D., Huang, D., & Zhou, G. (2021). Expected return, volume, and mispricing. Journal of Financial Economics. https://doi.org/10.1016/j.jfineco.2021.05.014

Henson, I. E. (2012). A Brief Story of The Oil Plam. In Palm Oil: Production, Processing, Characterization, and Uses. Bristol: AOCS Press.

Herlinda, W. D. (2015, 5 28). Retrieved from Bisnis: https://ekonomi.bisnis.com/read /20150528/12/437349/mandatori-b15-belum-jalan-harga-cpo-april-kembali-melorot

Hutang Sebagai Variabel Moderasi. *Jurnal Syntax Admiration*, *3*(10), 1341-1352.

Jogiyanto, H. (2013). Teori Portofolio dan Analisis Investasi. Edisi 6. Yogyakarta: BPFE.

Johnson, T. (2020, February 19). Retrieved from tinuiti.com: https://tinuiti.com/blog/amazon/amazon-supply-chain/

Karina, L. A. (2018). Pengaruh Kejutan Permintaan dan Penawaran Crude Palm Oil (CPO) Terhadap Pasar Saham Syariah di Indonesia. https://dspace.uii.ac.id/handle/123456789/5364

Kominfo. (2019, Desember 23). index.php/content/detail/23437/pertama-di-dunia-indonesia-terapkan-biodiesel-30-persen-b30/0/artikel_gpr. Retrieved from kominfo.go.id: https://kominfo.go.id/index.php/content/detail/23437/ pertama-di-dunia-indonesia-terapkan-biodiesel-30-persen-b30/0/artikel_gpr

Lesmana, R., Sutarman, A., & Sunardi, N. Building A Customer Loyalty Through Service Quality Mediated by Customer Satisfaction. *American Journal of Humanities and Social Sciences Research (AJHSSR)*, 5(3), 38-45

Murdiyarso, D. (2003). Konvensi Perubahan Iklim: Sepuluh Tahun Perjalanan Negosiasi. Jakarta: Kompas.

Nasarudin, M. I. (2011). Aspek Hukum Pasar Modal Indonesia. Jakarta: Kencana.

Oktarina, S. D., Nurkhoiry, R., Nasution, M. A., & Rahutomo, S. (2019). Riset Pasar Biodiesel B20 di Indonesia: Evaluasi terhadap Produk dan Kesadaran Konsumen. Analisis Kebijakan Pertanian, 17(2), 79. https://doi.org/10.21082/akp.v17n2.2019.79-93

Onyiriuba, L. (2017). Bank Risk Management in Developing Economies. Cambridge: Academic Press.

Prosad, J. M., Kapoor, S., & Sengupta, J. (2015). Theory of behavioral finance. Handbook of Research on Behavioral Finance and Investment Strategies: Decision Making in the Financial Industry, January 2015, 1-24. https://doi.org/10.4018/978-1-4666-7484-4.ch001

Rizki Amalia, R. N. (2020). Analisis Kinerja dan Prospek Komoditas Kelapa Sawit. Bogor: De Plantation.

Ross, S. A. (2014). Pengantar Keuangan Perusahaan. Buku 1. Edisi Global Asia. Jakarta: Salemba 4.

Singh, J. E., Babshetti, V., & Shivaprasad, H. N. (2021). Efficient Market Hypothesis to Behavioral Finance: A Review of Rationality to Irrationality. Materials Today: Proceedings, xxxx. https://doi.org/10.1016/j.matpr.2021.03.318

Siringi, R. (2012). Determinants of Green Consumer Behavior of Post graduate Teachers. IOSR Journal of Business and Management, 6(3), 19-25. https://doi.org/10.9790/487x-0631925

Subash, R. (2012). Role of Behavioral Finance in Portfolio Investment Decisions: Evidence from India. Faculty of Social Science Institute of Economic Studies, 8-9Dash, M. K. (2010). Factors Influencing Investm. http://ies.fsv.cuni.cz/default/file/download/id/20803

Sunardi, N. (2017). Determinan Intelectual Capital dengan Pendekatan iB-VAIC™ Terhadap Efisiensi Biaya Implikasinya Pada Profitabilitas Perbankan Syariah di Indonesia. *JIMF (Jurnal Ilmiah Manajemen Forkamma)*, *1*(1).

Sunardi, N. (2019). Relevansi Intelectual Capital terhadap Harga dan Retun Saham di Industri Perbankan Pemerintah di Indonesia. *JIMF (Jurnal Ilmiah Manajemen Forkamma)*, *3*(1).

Sunardi, N. (2020). Penilaian Kinerja Keuangan menggunakan Economic Value Added (EVA) dan Market Value Added (MVA) dengan Time Series Approach pada Industri Semen di Indonesia. *JIMF (Jurnal Ilmiah Manajemen Forkamma)*, *3*(2).

Sunardi, N., & Lesmana, R. (2020). Konsep Icepower (Wiramadu) sebagai Solusi Wirausaha menuju Desa Sejahtra Mandiri (DMS) pada Masa Pandemi Covid-19. *JIMF (Jurnal Ilmiah Manajemen Forkamma)*, *4*(1).

Sundoro, P. D., & Sukamulja, S. (2018). Pengaruh Perubahan Harga Biodiesel Internasional Akibat Kewajiban Minimal Blending Rate Biodiesel (B20) Terhadap Harga Saham Perusahaan Perkebunan Dan Pengolahan Kelapa Sawit|Diunduh dari http://etd.repository.ugm.ac.id//penelitian/detail/163902.

Tandelilin, E. (2017). Pasar Modal: Manajemen Portofolio dan Investasi. Yogyakarta: Kanisius.

Tractionenergy. (2020, Desember 10). Comparing GHG Emissions from Biodiesel Production and Fossil Fuels: Which is Lower? Retrieved from https://tractionenergy.asia/emisi-gas-rumah-kaca-dari-produksi-biodiesel-lebih-rendah-dari-bahan-bakar-fosil-atau-sebaliknya/

Utami, K. S. (2020). Green Consumers Behavior: Perilaku Konsumen dalam Pembelian Produk Ramah Lingkungan. Jurnal Maksipreneur: Manajemen, Koperasi, dan Entrepreneurship, 9(2), 209. https://doi.org/10.30588/jmp.v9i2.499

Wibowo, A. (2017). Reaksi Investor Pasar Modal Indonesia Terhadap Paket Kebijakan Ekonomi Tahap I Jokowi - JK (Studi pada Saham LQ 45 Periode Agustus 2015 - Pebruari 2016). Media Ekonomi dan Manajemen, 32(1). https://doi.org/10.24856/mem.v32i1.452

Yue, W., Zhang, S., & Zhang, Q. (2021). Asymmetric News Effects on Cryptocurrency Liquidity: An Event Study Perspective. Finance Research Letters, 41, 101799. https://doi.org/10.1016/j.frl.2020.101799