

# Stock Market Development and Commodity Price on ASEAN-5 Economic Growth

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***Abstract*— The advance in financial service industry and commodity price’s fluctuation play a pivotal role for the development of economic growth. This study attempted at analyzing the relationship among stock market development (market capitalization, total value traded ratio and turnover ratio), commodity price (Coal, CPO, Oil, Rubber, and Gold) on economic growth in ASEAN-5 countries, namely Indonesia, Malaysia, Singapore, Thailand, and the Philippines. All the annual data has been taken from World Bank over the period of 2000 to 2018. The panel data was applied by using Eviews 9. The result revealed that market capitalization, total value traded ratio, oil and rubber have positive impact, while turnover ratio, crude palm oil, and gold have negative impact on economic growth. This research will help investors and policy makers to understand the impact of stock market development and commodity price for economic growth in ASEAN-5 countries.**

***Keywords:* stock market development, commodity price, economic growth**

## I. INTRODUCTION

The development of capital market industry has attracted significant amount of practitioner and academic interest, especially the one associated with world capital markets. Capital market integration can be seen from the spillover effect that occurs when a crisis hits one market and impacts on other markets [1]. For instance, the Subprime Mortgage crisis that occurred in America in 2008 that affected the world financial markets [2]. ASEAN-5 capital markets (Indonesia, Malaysia, Singapore, the Philippines and Thailand) experienced a 48 percent reduction in market capitalization or equivalent to US \$655 billion (worldbank). Indonesia experienced the largest decline in capital market capitalization in the ASEAN region, which was as much as 54 percent. In contrast, the smallest market capitalization decreased was experienced by Malaysia which went from US \$ 325 billion in 2007 to US \$ 189 billion in 2008 or 42%.

This research focused on understanding capital market development for this industry is considered as one of the

important variables for companies to obtain sources of funds [3], [4]. For public, the existence of capital market provides alternative investment in accordance with the investor’s risk profile [5]. Furthermore, capital market is also able to improve the efficiency of financial system and encourage investment [6]. In addition, the existence of capital market is considered able to reduce agency conflict and mitigate asymmetric information which in turn can encourage stability and economic growth in a country [7].

Capital market development is measured by using three variables including capital market capitalization, stock traded value ratio to Gross Domestic Product (GDP) and share turnover ratio to market capitalization [8]; [9]; [10]. These three variables are used by [11] to see the effect of capital market development on economic growth in Pakistan, India and China. The result of this study explained that capital market development has a positive relationship with economic growth. This empirical evidence is in line with the studies conducted by [12] in BRICS countries (Brazil, Russia, India, China and South Korea), [13] in the United Kingdom, and [14] in Bangladesh over the period of 1980 to 2016. Moreover, the research conducted by [15] found out that there is no relationship between capital market development and economic growth in India during the 1981 - 2001 period.

The commodity variable used world prices of coal, palm oil, gold, rubber and oil. [16] research on the effect of oil prices on economic growth in developed countries found out that there is an influence between oil prices on economic growth in oil exporting countries. A study conducted by [17] stated that the fluctuation of oil and palm oil prices has an influence on economic growth in Malaysia. Empirical evidence explained by [7] found out that commodity prices movement have an important impact on economic growth since the 17<sup>th</sup> century.

Previous studies related to capital market development and macroeconomic indicator have been carried out in many countries. However, this research has contributed in analyzing capital market and macroeconomic development on economic growth in ASEAN countries represented by Indonesia, Malaysia, Singapore, the Philippines and

Thailand. The countries that are members of ASEAN-5 have Gross Domestic Product (GDP) of US \$2.3 trillion, or contribute 86 percent to the total ASEAN economy. Furthermore, based on capital market capitalization, ASEAN-5 countries contribute more than 90 percent of total capital market capitalization in ASEAN.

## II. LITERATURE REVIEW

### A. Capital Market Development and Economic Growth

Growing capital market industry provides an alternative capital for companies. Capital flow is able to encourage companies to achieve their goals. Good company performance is believed to accelerate economic growth in the long run [18]. According to [19] and [20] capital market industry provides long-term capital access and has an influence on company financial structure. Furthermore, capital market development is also considered capable of encouraging investment liquidity and risk diversification [21].

The study on capital market development in four Asian countries was carried out by [22]. The result showed that there is a cointegration between capital market development and economic growth in Bangladesh, India, Singapore and China. Other empirical studies that were carried out by [23] and [24] found that capital market development have a significant impact on economic growth in South Africa. [25] explained that capital market integration has a positive influence on economic growth in European countries. The main factors influence capital market development are market capitalization, capital mobility, stock trading value, and others.

### B. Commodity Prices and Economic Growth

The countries whose the economic growth depend on the commodity prices experience a direct impact when the commodity prices fluctuate. Commodity prices movement affects the long-term economic growth due to increased uncertainty and risks on investment. Middle East countries and other oil exporting countries receive a positive impact when commodity prices increase [26]. On the other hand, these countries also experienced an economic slowdown when the world crude oil prices decrease. The study conducted by [27] showed that an increase in oil price will drive up product prices and make them less competitive.

A research on commodity price volatility phenomenon on economic performance was carried out by [28]. The research studied the effect of coal consumption on economic growth in Organization for Economic Co-operation and Development (OECD) and Non-OECD countries from 1990 to 2013. The result showed that increasing coal consumption has a positive relationship on economic growth in short term, yet has negative relationship in long term. This is because of the technology and policies transformation related to coal consumption which has short-term benefit yet risks the long run. This is in line with the empirical studies conducted by [29] and [30] on the important role of palm oil price for economy in Nigeria and gold price on economic growth in Pakistan.

## III. METHODOLOGY

This research used panel data that refers to [31] study, "Stock Market Development and Economic Growth: Empirical Evidence from Some Arab Countries". The data is sourced from the World Bank from 2000 to 2018. The study used panel data regression to determine the effect of market capitalization, stock value, turn over ratio, world coal, palm oil, gold, and oil prices on economic growth in five ASEAN countries. The basic panel data model is as follows.

### Equations

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + e \quad (1)$$

If the basic model above is associated with the variables in this research, the formula is as follows.

$$PE_{it} = \alpha + \beta_1 KP_{it} + \beta_2 HS_{it} + \beta_3 TOR_{it} + \beta_4 HB_{it} + \beta_5 HKS_{it} + \beta_6 HE_{it} + \beta_7 HM_{it} + \beta_8 HK_{it} + e \quad (2)$$

Explanation:

PE is *Pertumbuhan Ekonomi* (Economic Growth)

KP is *Kapitalisasi Pasar* (Market Capitalization)

HS is *Nilai Saham* (Stock Traded Value)

TOR is Turn Over Ratio

HB is the *Harga Batu Bara* (World Coal Price)

HKS is the *Harga Kelapa Sawit* (World Palm Oil Price)

HE is the *Harga Emas* (World Gold Price)

HM is the *Harga Minyak* (World Oil Price)

HK is the *Harga Karet* (World Rubber Price)

$\alpha, \beta_1, \beta_2, \beta_3, \beta_4$  are coefficients

$i$  represents Five Countries in ASEAN (cross section)

$t$  represents time period/year to  $t$  (time series)

$e$  is Term of Error

Regression method used with panel data generally result in difficulties in model specification. The residual will have three possibilities: residual time series, cross section, or a combination of both. There are three approaches used in panel data, namely:

### Pooled Least Square (PLS)

This method is also known as Common Effect Model. In this method, the model assumes that the combined data that exists shows the real condition where the intercept value of each variable is the same. The slope coefficient of the variable used is identical for all cross section units. The weakness in PLS model is its incompatibility with the real situation that the condition is different in each object, even the condition of one object at a time will be very different from the others [32].

### Fixed Effect Method

Fixed Effect Model technique is a technique for estimating panel data by using *dummy* variables to get intercept differences. This understanding is based on intercept differences between places of observation but it is

the sama in time invariant. In addition, this model also assumes that regression coefficient (slope) remains between regions and times. Fixed effect model arise when individual and change effects correlated with non-random patterns [32].

*Random Effect Method*

Using Fixed Effect Model to estimate panel data with dummy variable technique has uncertainty in the model used. To overcome this, you can use residual variables or known as the Random Effect Model. In this model, panel data estimation will be chosen where residuals may be interconnected between time and individuals. In Random Effect Model, it is assumed that each variable has different intercepts. However, it assumes that the intercepts are random or stochastic variables. This model is very useful if individual variables are randomly selected and are the representative of the population [32].

In processing panel data, the test mechanism is to determine the appropriate panel data selection method by firstly comparing Random Effect Model approach with Common Effect Model approach. If the results obtained indicate that the Common Effect Model approach is accepted, the approach method will be compared again with Fixed Effect Model. If the Common Effect Model approach method is accepted, then that method will be analyzed. To decide which model to use, the following tests will be carried out:

*Legrange Multiplier Test*

The function of Legrange Multiplier test is to decide whether random effect model or common effect model that is appropriate for conducting panel data regression analysis.

TABLE I. LEGRANGE MULTIPLIER TEST RESULTS

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	1.024724 (0.3114)	19.88593 (0.0000)	20.91065 (0.0000)
Honda	-1.012286 --	4.459364 (0.0000)	2.437452 (0.0074)
King-Wu	-1.012286 --	4.459364 (0.0000)	0.985832 (0.1621)
Standardized Honda	-0.254214 --	5.929598 (0.0000)	0.130384 (0.4481)
Standardized King-Wu	-0.254214 --	5.929598 (0.0000)	-1.155854 --
Gourieriou, et al.*	--	--	19.88593 ( $< 0.01$ )

The test result shows that Breusch-Pagan Cross-section value is 0.3114 that is greater than 0.05. This shows that the best estimation method is common effect model.

*Chow Test*

Chow test is a test used to choose between common effect model or fixed effect model that is going to be used for data estimation.

TABLE II. COW TEST RESULTS

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.017105	(4,82)	0.0996
Cross-section Chi-square	8.915782	4	0.0632

From the result above, Chi-Square probability value is 0.0632. Therefore, Common Effect Model is better or more precise than Fixed Effect Model.

TABLE III. REGRESSION RESULTS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.055302	0.009437	5.860162	0.0000
KP	3.70E-15	2.49E-14	0.148669	0.8822
NS	0.000139	0.000112	1.243674	0.2170
TOR	-0.000293	0.000131	-2.233632	0.0281
HB	0.000220	0.000188	1.171400	0.2447
HKS	-1.57E-05	2.94E-05	-0.534343	0.5945
HE	-3.10E-05	1.48E-05	-2.098811	0.0388
HM	4.08E-05	0.000209	0.195135	0.8457
HK	0.011100	0.007025	1.580043	0.1178
R-squared	0.178584	F-statistic	2.337153	
Adjusted R-squared	0.102173	Prob(F-statistic)	0.025363	
S.E. of regression	0.022815	Sum squared resid	0.044766	

The result of panel data estimation by using Common Effect Model above can be simplified as follows:

$$PE_{it} = 0.055302 + 3.70E-15KP_{it} + 0.000139HS_{it} + (-0.000293)TOR_{it} + 0.000220HB_{it} + (-1.57E-05)HKS_{it} + (-3.10E-05)HE_{it} + 4.08E-05HM_{it} + 0.011100HK_{it} + e$$

Based on the equation of the regression result above, the effect of independent variables toward dependent ones can be analyzed. The average value of the random error component is 0.055302, while the R-squared value is 0.178584 (17.85 percent). This shows that all independent variables affect the dependent variable by 17.85 percent and the rest are influenced by variables outside the model.

Market capitalization variable has a probability value of 0.8822, that is greater than 0.05. This result indicates that market capitalization variable has no significant effect on economic growth and each increase in market capitalization variable by one percent will result in an increase in dependent variable by 3.70E-15 percent.

Stock traded value variable has a probability value of 0.2170, that is greater than 0.05. This result indicates that stock traded value variable has no significant effect on economic growth and each increase in stock traded value variable by one percent will result in an increase in the dependent variable by 0,000139 percent.

The turn over ratio variable gets a probability value of 0.0281, that is smaller than 0.05. This result indicates that turn over ratio variable has a significant effect on economic growth and each increase in turn over ratio variable by one

percent will result in a decrease in dependent variables by 0.000293 percent.

World coal price variable has a probability value of 0.2447, that is greater than 0.05. This result indicates that world coal price variable has no significant effect on economic growth and each increase in world coal price variable of one percent will result in an increase in dependent variables by 0.000220 percent.

World palm oil price variable has a probability value of 0.5945, that is greater than 0.05. This result indicates that world palm oil price variable has no significant effect on economic growth and each increase in world palm oil price variable by one percent will result in a decrease in dependent variables by 1.57E-05 percent.

World gold price variable has a significant effect on dependent variables with a probability value of 0.0388, that is smaller than 0.05. The coefficient value of -3.10E-05 shows that each increase in world gold price variable by one percent will cause a decrease in dependent variables by 3.10E-05 percent.

World oil price variable has a probability value of 0.8457, that is greater than 0.05. This result indicates that world oil price variable has no significant effect on economic growth and each increase in world oil price variable by one percent will result in an increase in dependent variables by 4.08E-05 percent.

World rubber price variable has a probability value of 0.1178, that is greater than 0.05. This result indicates that world rubber price variable has no significant effect on economic growth and each increase in world rubber price variable by one percent will result in an increase in dependent variables by 0.011100 percent.

All in all, independent variables have a significant effect on dependent variables with a Prob (F-statistic) of 0.025363, that is smaller than 0.05.

TABLE IV. Correlation

No.	Independent Variable	Correlation	Effect Level
1	Market Capitalization	Positive	Not Significant
2	Stock traded value	Positive	Not Significant
3	Turn Over Ratio	Negative	Significant
4	World Coal Price	Positive	Not Significant
5	World Palm Oil Price	Negative	Not Significant
6	World Gold Price	Negative	Significant
7	World Oil Prices	Positive	Not Significant
8	World Rubber Prices	Positive	Not Significant

*Definition of Operational Variables*

*1) Endogenous Variable*

Economic growth in this study is the process to better the economic conditions of the five ASEAN countries during over the period of 2000 to 2018. The formula for calculating economic growth is:

$$PE = \left( \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}} \times 100\% \right)$$

(source: [33])

Explanation:

PE = Economic Growth

GDP\_t = GDP year t

GDP\_(t-1) = GDP year t-1

*2) Exogenous Variable*

*a) Market Capitalization*

Market capitalization is the value of all company stock circulating on the stock market of a country. The data used for this study is the annual data from 2000 to 2018.

*b) Stock Traded Value*

Stock traded value is the ratio of the amount of market capitalization and the number of stock traded. The data used for this study is the annual calculated from 2000 to 2018.

*c) Turn Over Ratio*

Turn over ratio is ratio of financial activity used to measure the number of times a company is able to sell and replace its inventory. The data used for this study is the annual data calculated from 2000 to 2018.

*d) World Coal Price*

World coal price is the price of coal which refers to the international market index. The data used for this study is the annual data calculated from 2000 to 2018.

*e) World Palm Oil Price*

World palm oil price is the average price of palm oil sales on the international market. The data used for this study is the annual data calculated from 2000 to 2018.

*f) World Gold Price*

World gold price is the price of gold based on the accumulation of gold supply and demand in London (London's gold market) in US \$/onz. The data used for this study is the annual data calculated from 2000 to 2018.

*g) World Oil Price*

World oil price is the oil price in the world market that is based on West Texas Intermediate standard which is formed from the accumulation of supply and demand in US \$/bbl. The data used for this study is the annual data calculated from 2000 to 2018.

*h) World Rubber Price*

World rubber price is the average selling price of coconut rubber in the international market. The data used for this study is the annual data calculated from 2000 to 2018.

IV. CONCLUSION

Understanding the importance of the relationship between capital market development on economic growth and the effect of various commodities prices related to the economic performance of ASEAN countries is important. This study combines two main variables, namely capital market development and commodity prices on economic

growth in 5 ASEAN countries by using panel data over the period of 18 years. This study is an alternative in providing a comprehensive description and understanding related to the influence of market capitalization, stock traded value, stock price ratio, and coal, palm oil, gold, oil and rubber prices toward the economic growth in Indonesia, Malaysia, Singapore, Thailand, and the Philippines.

This research is important because the 5 ASEAN countries studied have a GDP contribution of more than 86 percent and the market capitalization reaches 90 percent in the ASEAN region. ASEAN has become one of the world regions considered to have better economic growth prospect in the upcoming years. ASEAN is predicted to be a positive catalyst for the world economy progress. However, several ASEAN countries such as Indonesia and Malaysia that make their commodities as important economic variable are strongly influenced by the various commodities price fluctuation. In investment perspective, especially in capital market, ASEAN-5 countries have good potential related to the large number of developing companies, but not yet listed on the Stock Exchange.

The findings of this study explained that capital market development, namely market capitalization and total value traded, have a positive correlation with economic growth. The increase in market capitalization is able to better the investment climate so it can increase liquidity that can be used to boost company performance. Furthermore, the increase in total traded value reflects the level of capital market liquidity that has performed well. This condition can encourage many investors to actively participate in this market and increase their investment in the market that will encourage economic growth. Therefore, capital market capitalization and total value traded are the important variables to encourage economic growth. On the other hand, turnover ratio has a negative relationship on economic growth. This indicates that if the capital market liquidity in ASEAN-5 countries increases, the economic growth will decline.

The prices of coal, rubber and oil have a positive relationship with economic growth in ASEAN countries. Whereas, palm and gold have a negative relationship on economic growth. Gold is a safe alternative investment when a country's economy experiences uncertainty. This phenomenon often increase the demand for gold when economic performance is considered as not good. In other words, when the price of gold rises, the economic growth will decline.

The results of this study strengthen previous literatures related to the correlation between capital market development and commodity prices on economic growth. In addition, the output of this study can be used as useful information for investors, especially in making consideration before making investment decision in ASEAN countries. Furthermore, this study can also be used as a reference as one of the considerations for making policies, especially in anticipating commodity prices fluctuation that is hardly to predict.

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