

SRIWIJAYA INTERNATIONAL JOURNAL OF DYNAMIC ECONOMICS AND BUSINESS

Macroeconomic Indicators and Stock Market Development on Economic Growth: Empirical Evidence from ASEAN Countries

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Abstract: ASEAN region takes benefit from a great financial integration; however, this region has been subjected to external economic shock. This study focused on analyzing the impact of macroeconomic indicators and stock market development on economic growth in ASEAN countries (Indonesia, Malaysia, Singapore, Thailand, The Philippines, and Vietnam) for the period from 2008 to 2018. The panel data was employed to determine how market capitalization, turnover ratio, real interest rate, and inflation have impact on economic growth in ASEAN. This study revealed that all stock market development variables have positive impact on economic growth, but the correlation between real interest rate and inflation was negative. As a result, this study recommends that ASEAN authorities should focus on stock market development as well as control macroeconomic variables prudently to boost economic growth.

Keywords: Market Capitalization, Turnover Ratio, Real Interest Rate, Inflation, Economic Growth.

Introduction

Economy in ASEAN region is experiencing rapid development occur due to large inflows of funds from real sectors and financial markets. This can be seen from the economic growth rates of ASEAN member countries that reached 4.49 percent in 2018, higher than the world economic growth in the same year as much as 3.03 percent. In addition, the development was also influenced by ASEAN capital market capitalization of \$ 2.4 trillion in 2018 which was 64 percent higher, \$ 1.4 trillion, than in 2008 in 6 ASEAN countries.

A study conducted by Azam et al. (2016) showed that the development of capital market in four Asian countries (Bangladesh, India, China and Singapore) had long-term cointegration on economic growth. A good capital market will encourage foreign investors to make foreign direct investment (FDI). According to the ASEAN Investment Report (2018), the

total FDI in ASEAN in 2017 reached \$ 137 billion, 20 percent higher than in 2016, \$ 123 billion. ASEAN is an attractive investment destination because of its high potential economic growth, relatively large market share and government policies that strongly encourage foreign investment climate [3].

The economic growth in ASEAN region is also supported by prudent macroeconomic management. Atje & Titiheruw (2016) explained that macroeconomic stability and close supervision systems encourage capital flows while preventing capital outflows. Another macroeconomic study conducted by Thanh (2015) found out that inflation had a significant negative relationship to economic recovery of five ASEAN countries for the period of 1980 - 2011. This study encourages ASEAN countries to increase economic growth by controlling inflation.

Real interest rate indicators also have an important role on economic performance. A study conducted by Moyo & Roux (2018) on Interest Rate and Economic Growth in The Southern African Development Community for the period of 1990-2015 revealed that interest rate reform had a positive relationship on economic growth through saving and investment. Furthermore, policymakers should be able to control interest rates because low interest rates may endanger economy in the long run.

A previous research linking macroeconomic variables to economic growth was conducted by Hussain & Malik (2011). The result showed that inflation, interest rates and exchange rates had significant relationship to economic growth in Pakistan. On the other hand, a research conducted by Pandya & Sisombat (2017) found out that Foreign Direct Investment (FDI) had no influence on economic growth in Australia. Another study related to the relationship of macroeconomic indicators to ASEAN economic growth conducted by Roy & Mandal (2012) explained that FDI had a relationship to economic growth in China, India, Pakistan, Sri Lanka, Indonesia, The Philippines, Singapore and Thailand, whereas in Malaysia, there is no relationship between FDI and economic growth.

A recent research that analyzed the influence of capital market development on economic growth was conducted by Osaseri & Osamwonyi (2019) in Brazil, Rusia, India, China and South Korea (BRICS) for the period from 1994 to 2015. It found out that capital market development had a positive impact on economic growth. This scientific study also provides recommendations to encourage BRICS countries whose capital market developments are still low to immediately make policies and strategies to accelerate their progress of capital markets.

This study focused on analyzing the influence of macroeconomic indicators and capital market development on economic growth by considering the relationship of capital markets and important economic activities that can help investors to understand the progress of ASEAN capital markets that are relatively vulnerable to global economic shocks [11]. This research is expected to contribute to: 1) the development of specific literature related to the relationship of capital markets and macroeconomics to economic growth in ASEAN countries and 2) present information for investors to make direct investment in ASEAN region related to several variables that can affect economic growth.

Literature Review

Macroeconomic Indicators and Economic Growth

The macroeconomic indicators in ASEAN are relatively good. It can be seen from the level of the regional economic growth in 2018 that is greater than the global economy. On the other hand, ASEAN economy still has challenges related to high interest rates and inflation in several ASEAN countries such as Indonesia and Thailand. Interest rates and inflation become important elements in controlling the stability of economic system [12]. For instance, interest rates in America have a significant influence on global financial markets [13]. The correlation between the two variables tends to be negative which means that an increase in interest rates will be responded by falling prices on the stock market and economic growth.

Another important economic factor is inflation. Inflation rate reflects price movements in a certain time period. If inflation is not controlled, or tends to rise, it will cause a decrease in purchasing power [14]. The study conducted by Farid, Khan, & Warriach (2012) explained that inflation had a negative relationship to the purchasing power of people in Pakistan. Decrease in purchasing power begins with an increase of product price, so consumers should look for cheaper substitutes. A decrease in the aggregate purchasing activities will cause a decline in economic growth. Economic downturn due to the decrease in purchasing power was felt by Indonesia because more than 60 percent of Indonesia's economic growth was caused by domestic consumption. According to Behera (2014), there was a high relationship between inflation and economic growth in six South Asian countries for the period from 1980 to 2012. On the other hand, the study conducted by Anidiobu, Okolie, & Oleka (2018) on inflation analysis and its impact on economic growth in Nigeria found out that inflation had a positive relationship with the nation economic growth.

Stock Market Development on Economic Growth

Previous studies explaining the relationship between capital market developments and economic growth were conducted by Hoque & Yakob (2017); Wong & Zhou (2011). The results showed that the development of capital market had a positive relationship with economic growth. Capital market development is considered to be one of the long-term sources of funding for companies to support their productive projects. This funding access is able to better company performance and is ultimately able to drive economic growth. Policies related to increasing capital market activity and liquidity have an important role to enhance economic growth [20].

Another research conducted by Srinivasan (2014) showed that there was a causal relationship between capital market developments and economic activity in India. Furthermore, according to Reis (2008), Brazilian capital market (Bovespa) is an international investment destination that is reflected in capital market. This made Brazil as one of the top five foreign investment destination countries after they reformed and improved their capital market industry since 2003.

Methods

Data and Sample

Data were documented from World Bank annual report and Google finance over the period 2008 to 2018. We extract the data from ASEAN countries which have stock market industry, namely Indonesia, Malaysia, Singapore, Philippines, Thailand and Vietnam. A purposive sampling was applied in this research, with several considerations including 1) the value of the ASEAN stock market capitalization reached \$ 2 trillion in 2018, or grew by 68% within 10 years; 2) ASEAN play pivotal role in supporting global economy through stock market development; 3) ASEAN, with a large number of population, has the greatest potential investors; 4) ASEAN has many medium-sized companies that are potentially growing and are not yet listed as public companies.

Variable Measurement

The variable measurements in this investigation were the stock market development, namely market capitalization and turnover ratio, while macroeconomic indicators are measured by real interest rate and inflation in ASEAN countries.

Table 1. Variables to be Observed and Their Measurements

Variable	Name	Measurement	Type	Indicator
EG	Economic Growth	Measured using the value gotten from World Bank	Dependent	GDP (annual % growth rate)
MC	Market Capitalization	Measured using the value gotten from World Bank	Independent	Market capitalization / GDP (annual %)
TOR	Turnover Ratio	Measured using the value gotten from World Bank	Independent	Value of domestic share / market capitalization (annual %)
RIR	Real Interest Rate	Measured using the value gotten from World Bank	Independent	Real Interest Rate (%)
INF	Inflation	Measured using the value gotten from World Bank	Independent	Inflation, GDP deflator (annual %)

Panel Regression Analysis

This research used panel data that refers to Osaseri & Osamwonyi's research (2019) entitled "Impact of Stock Market Development on Economic Growth in BRICS". The data sourced from the World Bank from 2000 to 2018. Panel data regression was used to determine the effect of market capitalization, turnover ratio, real interest rate, and inflation on the economic growth of six ASEAN countries. The basic panel data model is:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + e$$

If the model above is associated with the variables used in this study, the formula is as follows:

$$PE_{it} = \alpha + \beta_1 MC_{it} + \beta_2 TOR_{it} + \beta_3 RIR_{it} + \beta_4 INF_{it} + e$$

Explanation:

EG is economic growth

MC is market capitalization

TOR is Turn Over Ratio

RIR is the Real Interest Rate

INF is inflation

$\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4$ are coefficients

i are five countries in ASEAN (cross section)

t shows the time period/year to t (time series)

e is error

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

1. Pooled Least Square (PLS)

This method is also known as Common Effect Model. In this method, the model assumes that the combined data shows the real condition where the intercept value of each variable is the same and the slope coefficient of the variable used is identical for all cross section units. The weakness of this model is the existence of a model incompatibility with the actual situation, where the conditions of each object are different, even one object at a time will be very different from the condition of the object at another time [23].

2. Fixed Effect Method

Fixed Effect Model model is a technique to estimate panel data by using dummy variables to get intercept differences. The understanding of Fixed Effect Model is based on the differences in intercepts between places of observation but the same intercepts between time (time invariant). In addition, this model also assumes that the regression coefficient (slope) remains between regions and between times. Fixed effect model arises when individual effects and correlation clarifier change pattern are non-random [23].

3. Random Effects Method

In estimating panel data with Fixed Effect Model through dummy variable technique, the model used is uncertain. Therefore, residual variable or known as Random Effect Model is used. In this model, an estimation of panel data will be chosen where residuals may be interconnected between time and between individuals. In Random Effect Model, it is assumed that each variable has a different intercept. However, it assumes that intercepts are random or stochastic variables. This model is very useful if the individual variables taken as samples are randomly selected and are representative of the population [23].

In processing panel data, the test mechanisms to determine the appropriate panel data selection methods are by comparing Random Effect Model approach with Common Effect Model approach first. If the result indicates that Common Effect Model approach is accepted, Common Effect Model approach method will be compared again with Fixed Effect Model approach method. If Common Effect Model approach method is accepted, that method will be analyzed. To determine which model to use, the following tests are going to be carried out:

Lagrange Multiplier Test

The function of this test is to choose between Random Effect Model or Common Effect Model as the right method for performing panel data regression analysis.

Table 2. LM Test Result

Lagrange Multiplier Test for Random Effects
 Null hypothesis: No effect
 Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.509662 (0.4753)	11.94016 (0.0005)	12.44983 (0.0004)
Honda	-0.713906 --	3.455454 (0.0003)	1.938567 (0.0263)
King-Wu	-0.713906 --	3.455454 (0.0003)	1.412106 (0.0790)
Standardized Honda	0.111783 (0.4555)	3.922113 (0.0000)	-0.519374 --
Standardized King-Wu	0.111783 (0.4555)	3.922113 (0.0000)	-0.987993 --
Gourierioux, et al.*	--	--	11.94016 (< 0.01)
*Mixed chi-square asymptotic critical values:			
	1%	7.289	
	5%	4.321	
	10%	2.952	

The test result above shows that Breusch-Pagan Cross-section value is 0.4753, greater than 0.05. This means that the best estimation method to be used is Common Effect Model.

Chow Test

Chow test is a test used to determine whether Common Effect Model or Fixed Effect Model that will be selected for data estimation.

Table 3. Chow Test Result

Redundant Fixed Effects Tests
 Equation: Untitled
 Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.997361	(5,56)	0.0182

Cross-section Chi-square	15.651392	5	0.0079
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From the table above, Chi-Square probability value is 0.0079. Thus, Fixed Effect Model is better or more precise than Common Effect Model.

Hausman Test

Hausman test is the final test to determine whether Random Effect Model or Fixed Effect Model that is appropriate to be used as an analysis method.

Table 4. **Hausman Test Result**

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.794751	4	0.0051

From the result of the Hausman test above, the Chi-Square value is 0.0051. Thus, Fixed Effect Model is more appropriate to be used than Random Effect Model because the Chi Square value is smaller than 0.05.

Findings

Table 5. **Regression Result**

Dependent Variable: PE
Method: Panel Least Squares
Date: 09/12/19 Time: 09:51
Sample: 2008 2018
Periods included: 11
Cross-sections included: 6
Total panel (balanced) observations: 66

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.136286	1.988863	1.074125	0.2874
MC	9.06E-12	3.21E-12	2.822848	0.0066
TOR	0.017761	0.023782	0.746845	0.4583
RIR	-0.234470	0.109118	-2.148776	0.0360
INF	-0.046395	0.106424	-0.435950	0.6645

Effects Specification

Cross-section fixed (dummy variables)				
R-squared	0.339137	Mean dependent var	4.924091	
Adjusted R-squared	0.232927	S.D. dependent var	2.345513	
S.E. of regression	2.054264	Akaike info criterion	4.416439	
Sum squared resid	236.3200	Schwarz criterion	4.748205	

Log likelihood	-135.7425	Hannan-Quinn criter.	4.547536
F-statistic	3.193075	Durbin-Watson stat	2.495856
Prob(F-statistic)	0.003482		

The panel data result estimation through Fix Effect Model above can be simplified as follows:

$$PE_{it} = 2.136286 + 9.06E-12MC_{it} + 0.017761TOR_{it} + (-0.234470)RIR_{it} + (-0.046395)INF_{it} + e$$

Based on the equation of the regression result above, the effect of each independent variable on the dependent ones can be analyzed. The average value of the random error component is 2.136286. R-squared value is 0.339137 (33.91 percent). This shows that all independent variables affect the dependent variables by 33.91 percent and the rest are influenced by variables outside the model.

Market capitalization variable has a significant effect on economic growth with a probability value of 0.0066, smaller than 0.05. The value of market capitalization coefficient is 9.06E-12 shows that each increase in market capitalization variable by one percent will increase the dependent variable by 9.06E-12 percent. The growing importance of financial markets in ASEAN countries has recently opened a new opportunity to capital inflow for international investor and boost domestic economy. The linkage between market capitalization and economic growth can be traced by looking at the growth of stock price in ASEAN countries. Based on Word Bank data in 2018, there was an increase in market capitalization in ASEAN around 68%, reached \$2 trillion within ten years. This growth rate reflects the positive perception of international investors regarding financial conditions, particularly the ASEAN capital market, as well as boosting capital inflow into ASEAN and ultimately encouraging economic growth in ASEAN countries. This research is in line with empirical studies conducted by Dokmen (2015) and Sattar (2019).

Turnover ratio has a probability value of 0.4583, greater than 0.05. This indicates that turnover ratio variable does not have a significant effect on economic growth and each increase in turnover ratio variable by one percent will result in an increase in the dependent variables by 0.017761 percent. The stock market turnover ratio indicates the liquidity of a capital market. The stock market liquidity can be traced from transaction activities that occur in the capital market. It means that the low turnover ratio in the stock market reflects the low level of liquidity. Although the high level of turnover ratio does not always reflect the development of a country's stock market, so the contribution of turnover ratio to economic growth is not too significant. Empirical evidence conducted by Ayemere (2014) states that the turnover ratio has no significant effect on economic growth in Nigeria.

Real interest rate variable shows a significant effect on the dependent variable with a probability value of 0.0360, smaller than 0.05. The coefficient value is -0.234470 which indicates that each increase in real interest rate variable by one percent will cause a decrease in the dependent variable by 0.234470 percent. The interest rate is an essential variable for investors to make investments. Furthermore, high-interest rates have the potential to create relatively high capital costs, making the production of goods or services challenging to compete in the global market. On the other hand, international investors often make interest rates as one indicator before investing. The lower and stable interest rates of a

country will encourage higher capital inflows. ASEAN countries, which are mostly developing countries, tend to have higher interest rates compared to developed countries so that it can become an inhibiting factor for global investors to allocate their money into ASEAN countries, which will ultimately drawback economic growth. This can be proven from the results of research conducted by Etale (2016) and Salami (2018) explaining that high interest rates have a negative and significant relationship to economic growth in Negeria and Turkey.

Inflation variable also has insignificant effect on the dependent variable because the probability value is 0.6645, greater than 0.05. The coefficient value of inflation variable is -0.046395 which indicates that each increase in inflation variable by one percent will cause a decrease in the dependent variable by 0.046395 percent. Inflation stability is an essential variable for the economy. The inflation rate must be controlled to stabilize public purchasing power. Uncontrolled inflation can increase product prices, decrease people's purchasing power, reduce demand for goods and services, reduce company income, and can affect economic growth in the long run. In addition, the large population of ASEAN countries must continue to boost income per capita and maintain the stability of inflation. The income per capita target that has been reached could not have an optimal impact if accompanied by high inflation. In other words, high inflation can reduce purchasing power and negatively impact economic growth [29]; [30]; [31].

All in all, the independent variables significantly influence the independent variables with a Prob (F-statistic) of 0.003482, smaller than 0.05.

No	Variable	Relationship	Significance Level
1	Market Capitalization	Positive	Significant
2	Turnover Ratio	Positive	Not Significant
3	Real Interest Rate	Negative	Significant
4	Inflation	Negative	Not Significant

Conclusion

Today, the movement of capital market cannot be separated from fluctuations in commodity prices and global macroeconomic variables. By understanding the importance of the relationship between macroeconomic variables and capital market developments on economic growth in ASEAN is expected to be important information for investors and policy makers. Policies can influence economic growth, especially in diversifying the risk of financial assets and taking intermediary steps to minimize losses from fluctuations in world commodity prices.

The results of this study indicate that market capitalization has a positive and significant relationship to economic growth. Increased capital market capitalization reflects the development of capital inflows into a country. This capital allocation can be used for various purposes including developing businesses at a relatively more effective cost compared to financing from the banking sector. Another result found out that turnover ratio also has a positive and significant relationship to economic growth. In other words, turnover ratio and economic growth have the same direction which means that if capital market turnover ratio is high it would be followed by increased economic growth. Capital

market turnover ratio is also considered as an indicator of the development of the capital market.

Both macroeconomic variables (real interest rate and inflation) have a negative relationship with economic growth. Every increase in these two macroeconomic variables will cause a decline in economic growth. Increased real interest rates and inflation will result in reduce product competitiveness which in turn can reduce people purchasing power. An increase in real interest rates and inflation, in the aggregate, will cause decline in economic growth, especially for countries that the economic growth largely rely on domestic consumption.

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