The Impact of Macro Economy on Stock Price Index: An Empirical Study of Five ASEAN Countries

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ABSTRACT

Objective – The objective of the study is to empirically investigate the relationship between macroeconomic variables as Gross Domestic Product (GDP), inflation, interest rates, exchange rates, foreign exchange reserves, current accounts and export-import towards the stock price index.

Methodology/Technique – The data used is monthly data for macroeconomic and the stock price index of five ASEAN countries including Indonesia, Malaysia, Singapore, Thailand and the Philippines from 2006 to 2015. The analysis uses a regression estimation of panel data and a series of chow tests i.e. the Hausman test and the LM test as the selection process, with the aim of determining the macroeconomic variables that could significantly affect the stock price index of five ASEAN countries.

Findings – The result show that of the seven macroeconomic variables affecting the stock price index, only four macroeconomic variables showed a significant effect. These are GDP, interest rates, exchange rates, and inflation. Meanwhile, three other variables (foreign exchange reserves, current accounts and export-import) did not show a significant effect.

Novelty – The study looked at the effect of deregulation on stock markets, focusing on variables that significantly influence the stock price index.

Type of Paper: Empirical.

Keywords: Stock Price Index; Macro Economics; Five ASEAN Countries.
JEL Classification: E31, G14, G15.

1. Introduction

The capital market plays an important role in shaping the economic and political development of a country. Drastic decline in stock prices in a short time and sustained fluctuating stock prices in the capital market, is likely to encourage a financial crisis and push the economy into recession. Most of the world's major capital markets were strongly influenced by the global economic crisis (Oseni & Nwosa, 2011). Kurihara (2006) showed that gross domestic product, exchange rates, interest rates, and inflation rate have a relationship and influence on bullish market conditions in the capital markets of a country.

As a form of elaboration of macroeconomic variables above, Fama (1981) showed that the rate of GDP growth has a strong positive contemporary relationship with the return of a stock price index. In addition, research conducted by Nishat and Shaheen (2004), Naka, Mukherjee, and Tufte (1998), concluded that GDP was the largest positive determinant of stock prices in emerging markets, and there was a significant relationship between GDP and stock prices.

Additionally, there is significant influence between inflation and stock market. Research conducted by Gültekin, M. and Gultekin, N. (1983), Fama (1981) and Saunders and Tress (1981) shows that the rate of nominal return on equity indices and inflation related significantly negatively with the predominantly negative regression coefficient.

In a related study, Elite Forex Signal (2013) demonstrate the relationship between foreign exchange reserves and the stock market. Ray (2012) states that foreign exchange reserves have a positive relationship to stock market capitalization although the research of Elite Forex Signal (2013) shows that this relationship is not significant. According to Kwon and Shin (1999) and Kandir (2008) there is a positive correlation between the performance of the stock market and lucrative export due to the excess volume that occurrs on corporate transactions within a country.

Research conducted by Kurihara (2006), Ologunde, Elumilade, and Asaolu (2007) showed that the level of stock market capitalization is significantly influenced by the macroeconomic environment, including current accounts and found that the prevailing current account had a positive influence on the level of stock market capitalization.

2. Literature Review

The literature surrounding understanding and conducting research about stock markets and economic variables uncovers a wide variety of models such as the research conducted by Joseph Tagne Talla (2013) in his study entitled "Impact of Macroeconomic Variables on the Stock Market Prices of the Stockholm Stock Exchange (OMXS30)". By using the linear regression test, Talla showed that high inflation and the depreciation of the Swedish Krona against the Euro significantly affected stock price movement in the Stockholm Stock Exchange (OMXS30). Inflation and exchange rates also negatively related to stock price but not significantly associated between interest rates and stock prices.

In relation to the stock markets of ASEAN countries, recent research conducted by Auzairy et al. (2011) entitled "Stock Market Deregulation, Variables Macroeconomic and Stock Market Performances" is important. The purpose of this paper is to explore the effects of deregulation of the stock market on the stock market of the ASEAN-3; Malaysia, Thailand and Indonesia. Subsequent consequences of the deregulation of the stock market is analyzed with and without the inclusion of macroeconomic variables. Thus, this study also explores the effects of macroeconomic factors such as exchange rates, interest rates, oil prices and market liquidity to stock market performance. The empirical findings support two conclusions; first, the stock market deregulation policies that were implemented during and after 1997 are not significantly effective and secondly, macroeconomic variables have a significant impact on the performance of the stock market.

The objective of this study is to empirically investigate the relationship between macroeconomic variables as Gross Domestic Product (GDP), inflation, interest rates, exchange rates, foreign exchange reserves, current accounts and export-import, towards the stock price index. The data used is monthly data for macroeconomic and stock price index of five ASEAN countries including Indonesia, Malaysia, Singapore, Thailand and the Philippines from 2006 to 2015.

3.Methodology

3.1 Data and Variables

The population used in this study is the macro data from five ASEAN countries; Indonesia, Malaysia, Singapore, Philippines and Thailand. The samples used in this study use saturated sampling techniques so that all of the population sample is used in the study.

This type of data extracted from this research is secondary data in the form and type of explanatory research. In determining monthly data from 2006 to 2015, the eight variables used consisted of seven independent variables and one dependent variable. The independent variables in this study were Gross Domestic Product (GDP) X1, inflation (INF) X2, Exchange Rate (EXCH) X3, Interest Rate (INT) X4, Foreign Exchange Reserves (CD) X5, Current Account (CA) X6 and Export-Import (EXIM) X7. The dependent variable in this study is the stock price index of the five ASEAN countries (Y).

3.2 Specification Model

This study uses data panel analysis techniques consisting of several variables such as the cross section but it also has elements of time such as time series data. Data processing tools used in this study included eviews. There are three techniques that can be used in the estimation technique of the panel data regression model (Widarjono, 2010 p.9):

a) Common effect model using the least squares method or the so-called OLS (Ordinary Least Square) that incorporates all the usual data time series with cross section by the following equation:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$$

Where: i=1,2….,N;t=1,2,….T,

b) Fixed Effect Model. In this approach, the data panel model has an intercept which may vary for each individual and time, where each unit cross section is fixed in a time series. The mathematical model of panel data using a fixed effect approach is as follows:

$$Y_{it} = \alpha + \beta X_{1t} + \gamma_2 W_{2t} + \gamma_3 W_{3t} + \cdots + \gamma_N W_{NT} + \sigma_2 Z_{it} + \\ \sigma_3 Z_{i3} + \ldots + \sigma_T Z_{iT} + \varepsilon_{it}$$

c) Random Effect Model by estimating panel data where disturbance variables may be interconnected across time and between individuals. This model has a different intercept random effect that was accommodated by the error terms of each sample. The random effect model uses the following equation:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}; \qquad \varepsilon_{it} = u_i + v_t + w_{it}$$

There are many studies that discuss the effect of macroeconomic variables on stock price index using results extracted from the use of a multiple regression model. This research contributes novelty as it uses macroeconomic variables such as GDP, inflation, interest rates, and the exchange rate of the five ASEAN countries in a comprehensive manner, selecting the variable that is considered a leading indicator of the movement stock price index with a panel regression, thus obtaining a multiple linear regression model (Fahrmeir et al, 2013).

4. Result and Discussion

The selection process conducted on the 7 (seven) independent variables is conducted based on the relevance and significance of the influence of these variables on the dependent variable (Stock Price Index for ASEAN:5 countries).

Table 1. Common Effect Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CA	2.086859	10.18967	0.204802	0.8386
CD	3.618199	3.680615	0.983042	0.3306
EXCH	0.300191	0.071187	4.216919	0.0001
EXIM	-3.658265	7.413211	-0.493479	0.6240
GDP	92.86684	12.73938	7.289746	0.0000
INF	-8.678949	33.92937	-0.255795	0.7992
INT	-25224.01	7131.359	-3.537054	0.0009
C	1862.169	553.8602	3.362164	0.0015
Weighted Statistics				
R-squared	0.637978	Mean dependent var		3870.636
Adjusted R-squared	0.584060	S.D. dependent var		2974.669
S.E. of regression	1241.845	Sum squared resid		72482468
F-statistic	11.83234	Durbin-Watson stat		0.559352
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	-0.005527	Mean dependent var		2636.815
Sum squared resid	1.42E+08	Durbin-Watson stat		0.145735

Source: Data Processed

From the above calculation, through the test of common effect, it can be concluded that the GDP (GDP), Exchange Rate (EXCH) and Interest Rate (INT) variables have a significant influence on the stock price index of the five ASEAN countries. As each country has a smaller probability value of alpha (0.05), the variable inflation, foreign exchange reserves (CD), Current account (CA) and the Export-Import (EXIM), with effect common test, produces no significant effect on the composite stock index of the five ASEAN countries.

Table 2. Fixed Effect Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CA	-5.819316	4.673846	-1.245081	0.2198
CD	-13078.76	8171.404	-1.600553	0.1168
EXCH	0.280647	0.063361	4.429358	0.0001
EXIM	1.013441	5.135014	0.197359	0.8445
GDP	81.30650	20.86589	3.896622	0.0003
INF	-45.79829	21.30728	-2.149420	0.0373
INT	6.475261	2.693422	2.404102	0.0206
C	1705.512	384.9743	4.430197	0.0001
Cross-section fixed (dummy variables)				
Weighted Statistics				
R-squared	0.906943	Mean dependent var		3785.532
Adjusted R-squared	0.883138	S.D. dependent var		2219.450
n	681.2737	Sum squared resid		19957753
F-statistic	38.09846	Durbin-Watson stat		1.569418
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.815446	Mean dependent var		2636.815
Sum squared resid	26021608	Durbin-Watson stat		0.688926

From the calculation using the fixed effect test, it can be concluded that the Growth Domestic Product (GDP), Inflation (INF), Exchange Rate (EXCH) and Interest Rate (INT) variables have a significant influence on the level of joint-stock index in the 5 ASEAN countries. The probability value is less than alpha (0.05), while the International Reserves (CD), Current account (CA) and the Export-Import (EXIM) variables, with a fixed effect test, showed in no significant effect on the composite stock index in the five ASEAN countries.

Based on the results of the Chow test using Eviews9, the results are as follows: (1) Based on comparison of F-count the F-table; F-count value (4.43) > F-table (2.98), then H_0 rejected and Ha accepted, meaning that the model used is the Fixed Effect. (2) Based on the probability of cross-section F with alpha (0.05); A probability value cross-section F (0.0000) <alpha value (0.05), then H_0 rejected and Ha accepted, meaning that the model used is the fixed effect. To determine the influence of the GDP, INF, EXCH and INT against INDEX, panel data regression analysis was performed. The results of using the fixed effect model are shown below.

Table 3. Data Panel Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXCH	0.478076	0.014427	33.13804	0.0000
PDB	13.27604	3.004526	4.418679	0.0000
INF	-56.23924	6.360746	-8.841611	0.0000
INT	-161.4381	17.55164	-9.197890	0.0000
C	2411.956	71.72623	33.62725	0.0000

Source: Data Processed

Based on the above table it can be obtained panel data regression equation as follows:
$$INDEX = 2411.956 + 0.478076\, EXCH + 13.27604\, PDB - 56.23924\, INF - 161.4381\, INT$$

5. Conclusion

This study, using regression analysis of panel data on the stock price index in the ASEAN five countries, with the dependent variable and seven macroeconomic variables as independent variables, aims to determine the relationship and influence of those variables. Through using the Common Effect and Fixed Effect Models, with a panel data regression that is testing chow (chow test), Hausman test (Hausman test), and the LM test (LM test) during the selection stage, it can be said that the calculation of the fixed effect model was considered most appropriate because, based on the probability of cross-section with alpha F (0,05), a probability value cross-section F (0.0000) <alpha value (0.05), then H_0 rejected and Ha accepted, means that the model used is the fixed effect. Only four macroeconomic variables showed a significant effect. These are GDP, interest rates, exchange rates, and inflation. Meanwhile, three other variables (foreign exchange reserves, current accounts and export and import) did not show a significant effect.

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