Relation between Macroeconomic Variables and ASEAN Stock Index

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Abstract
The changes in macroeconomic variables can give an effect to the fluctuation in securities trade. This phenomenon will surely give impact to the stock market index and will resulting in more trading occurred in the stock exchange market. Therefore, this study investigates the impact of macroeconomics variables to the stock index for ASEAN countries. The relationships between stock index and several macroeconomics variables are analyzed for five ASEAN countries including Malaysia, Singapore, Indonesia, Philippines and Thailand. Five macroeconomics variables which are gross domestic product, interest rate, inflation rate, exchange rate and unemployment rate are used to explain the variation of the stock index. Using yearly data and generalized least squares regressions, the results show strong significant relationships of all the macroeconomic variables to the stock index.

Keywords*: stock index; gross domestic product; interest rate; inflation rate; exchange rate; unemployment rate*

1. INTRODUCTION

The stock exchange is one of the instruments that are vital in helping the monetary advancement of a nation. It is known as an apparatus for the smooth preparation of household assets to help monetary improvement furthermore for the proficient portion of assets. The relationship between macroeconomic variables and the advancement of stock prices for specific countries have well been recorded in the writing over the span of the latest for a drawn-out period of time. A considerable measure of late studies have inspected the relationship between the stock index and macroeconomic variables for some nations including ASEAN (Nieh and Lee, (2001); Kim, (2003); Chaudhuri and Smiles, (2004); Bredina, et. al. (2005); Ratanapakorn and Sharma, (2007); Humpe and Macmillan, (2009); Rahman and Khan, (2009); Wang and Lim, 2010).

The results of this experimental research help to give better understanding to the reader whether the volatility of stock index of the Bursa Malaysia (formerly known as Kuala Lumpur Stock Exchange) that is FBMKLCI index and other ASEAN countries that are Singapore, Philippine, Thailand, and Indonesia also affected by the macroeconomic variables. These countries surely have differences in the level of economic development but there is no gap between them as the macroeconomics variables used including Gross Domestics Product (GDP), inflation rate, interest rate, exchange rate and unemployment rate. Even, there are various past researcher examine the relationship among changes in world economy and macroeconomic variables, this paper concentrates and aims to analyze the effect of macroeconomic variables on the stock index of the ASEAN market.

1.1 Problem statement of the study
The Star dated August 10, 2015 reported that the FBM KLCI going down almost 30 points at the early afternoon break brought on by the Malaysian securities exchange that went under substantial offering weight. The KLCI was the top failure among the key ASEAN markets as local issues incorporating a fall in universal saves, a powerless ringgit, a log jam in China

and a the apparition of a US financing cost trek weighed on speculator conclusion. At 12.30 pm, the KLCI was down 29.89 points or 1.78% to 1,652.76 and year-to-date it is down 6.16%. Most likely variables drive the FBM KLCI to drop in the business sector. From the previous researcher, Ibrahim (2000), Ibrahim and Aziz (2003) and Janor et. al. (2005) distinguishes the dynamic collaborations between securities exchange and monetary exercises by guessing that the share trading system is influenced by changes in macroeconomic variables. In this manner, this research aims to investigate whether this phenomenon is true or not. From the above statement, it shows that the relationship exists amid the macroeconomic variables and the FBM KLCI market index and also to the ASEAN market. So, this research will study about the effect that macroeconomic brings to those market and also what is the most influential factor that affect the market.

1.2 Literature review

Numerous observational and broad researchers have been organized on the led and lag of the correlation between the macroeconomic variables and the stock index which has constantly been researcher's main interest.

The researcher found there are various specialists drove the study about currency showcases either for their country or diverse countries over the world. There are many studies investigated that stock market development is potential enough in affecting the economic growth of a country. In the stock market, a company can reduce its investment risk by gaining capital from the market and it may push up the economy growth due to lesser risk encountered. Besides that, stock market development can improve economic growth by attracting foreign investors to strengthen the linkage between foreign and domestic stock markets (Singh, 1993). Previously, it has been cited by Mysami et. al. (2004) and supported by Jayasuriya (2005) that the powerful correlation between stock index and macroeconomic variables can be used as nation's macroeconomic approaches. Moreover, stock price reflect desires without bounds exhibitions of corporate benefit. Subsequently, as indicated by Maysami et. al. (2004), on the off chance that stock file mirror these suppositions, then they should be utilized as indications of money related activities. Thus, the dynamic correlation between stock index and macroeconomic variables can be utilized to arrange a country's macroeconomic methodologies.

Chaudhuri and Smiles (2004) found a long-haul correlation between stock index and real macroeconomic exercises. Yartey (2008) additionally bolster them by examining the thought of securities exchange development in South Africa and his outcomes shows that bank credit to the private part, stock exchange liquidity, gross residential speculation, GDP per capita, and the slacked depended variable are noteworthy and effectively affect stock exchange advancement. However, Attari et. al (2013) from different countries who investigate the linkage between the economic variables on securities exchange support the result that has been conducted by Zakaria and Shamsuddin (2012). GDP insignificantly causes stock market volatility.

While in the case of New Zealand, Gan, et. al. (2006) examine the correlation between stock prices and macroeconomic variable and suggest that there is existence in a long term relationship between stock prices and the fluctuation in interest rate. In addition, this result is strongly supported by Ratanapakorn and Sharma (2007). The interest rate is different within a specified period of time and will be decided by the central bank of a country. As the interest rates increased, the number companies that borrow money from bank are reducing. Therefore, the companies need to cut down their expenses, so the amount of future cash flows will drop. In result, it will lower the company stocks. If enough number of companies decline in their stock prices, then it will affect the major stock as a whole.

The impact of macroeconomic factors towards stock index had been studied by Olweny and Omondi (2011). They conduct a research by applying EGARCH and TGARCH model to analyze the relationship between macroeconomic factors and stock market in Kenya for 10 years periods from 2001 to 2010 based on monthly data. Their results indicate that exchange rate, inflation and interest rate continuously give impact to the fluctuation in stock market. Omran and Pointon (2001) also concentrated how the inflation rate influenced the performance of the market of Egypt and they discovered a negative relationship between them. When the inflation rose, the purchasing power of buyer will be low. As a result, people cannot buy the goods because the price is too high. So, they cannot support the companies and then it will affect the price of the stocks of companies to go down because the future cash flows of the companies drop. When the number of companies is enough, the major stock index will eventually drop.

Another study, Geetha et. al. (2011) explore the relationship between stock market and exchange rate of Malaysia, United States and China by utilizing the cointegration test. Their results indicate that there is a long run cointegration relationship between the variables. Before them, Maysami and Koh (2000) found the dynamic correlations between exchange rate and Singapore securities exchanges. They presume that the conversion standard has co-incorporating relations with the Singapore's securities exchange levels changes. Mohammad et al. (2009) likewise expressed that conversion scale has essentially positive effect on Karachi securities exchange (KSE) since the liberalization in 1991 stock costs increment to a great extent.

In Lithuania, Pilinkus and Boguslauskas (2009) propose that macroeconomic variables were critical determinants at securities exchange. GDP and cash supply positively affected securities exchange costs while more often than not unemployment rate, exchange rate, and short-term loan fees adversely impacted securities exchange costs. Pilinkus (2010) considers the effects of ten noteworthy macroeconomic variables on the securities exchanges in Estonia, Latvia and Lithuania and demonstrates that the Estonian stock exchange record has a positive association with imports, the fit CPI and remote direct speculation, a negative association with genuine GDP, exports, the M1 cash supply, the unemployment rate and the government debt, and is not influenced by the exchange parity and the transient interest rate.

The remainder of this paper is organized as follows: Section 2 explain the data and methodology used in this study. Section 3 discusses the results and analysis. Finally, Section 4 is conclusion and recommendation of the study.

2. DATA AND METHOD

This study is executed using the secondary data. Each unrefined data will be aggregated from the site of the World Bank and Bursa Malaysia. The scope of information secured in this exploration is 21 years range from 1994 to 2014 in view of the information gathered on yearly basis namely gross domestic product (GDP), inflation rate, interest rate, exchange rate and unemployment rate. The index chosen from the ASEAN stock market are significantly five out of 10 countries from ASEAN that are from Malaysia, Singapore, Indonesia, Philippines, and Thailand. The descriptive statistics are shown in Table 1 which consists of mean, minimum, maximum and standard deviation.

Table 1: Descriptive Statistics

Variable	Mean	Std. Deviation	Min	Max
Index	410.3662	676.8893	.04	2655.89
GDP	2.15e+11	1.79e+11	6.41e+10	9.18e+11
Interest rate	4.270217	4.474287	-24.60022	13.56518
Inflation rate	4.732209	6.223081	-.8457161	58.38709
Exchange rate	.2047499	.2607305	.0000843	.8002073
Unemployment rate	4.777143	2.998437	.7	11.9

Dependent variable of ASEAN stock index obtained from:

i) Malaysia (FBMKLCI) - The FTSE Bursa Malaysia KLCI Index contains the biggest 30 organizations by full market profiting by Bursa Malaysia's Main Board. Whenever propelled, on July 6, 2009 it supplanted the Bursa Malaysia KLCI Index beginning at the end estimation of the KLCI Index on July 3 2009, additionally acquiring the full history of the KLCI Index.

ii) Singapore (FSSTI) - The Straits Times Index (STI), kept up and computed by FTSE, is the most all around perceived benchmark list and advertise indicator for Singapore. Going back to 1966, it tracks the execution of the main 30 biggest and most fluid organizations recorded on the Singapore Exchange.

iii) Indonesia (JKSE) - The Jakarta Stock Price Index is a changed capitalization-weighted file of all stocks recorded on the normal leading group of the Indonesia Stock Exchange. The file was produced with a base file estimation of 100 as of August 10, 1982.

iv) Philippines (PSEI) - The Philippine Stock Exchange PSEi Index is a capitalization-weighted record made out of stocks illustrative of the Industrial, Properties, Services, Holding Firms, Financial and Mining and Oil Sectors of the PSE. The file has a base estimation of 1022.045 as of February 28, 1990.

v) Thailand (SET) - The Bangkok SET Index is a capitalization-weighted file of stocks exchanged on the Stock Exchange of Thailand. The record was created with a base estimation of 100 as of April 30, 1975.

The first independent variable is GDP measured by annual GDP per US$ base for every country. The second independent variable is real interest rate. The third independent variable is consumer price index (CPI) represents the inflation rate for every country. The fourth independent variable is exchange rate measuring the local currency against the US$. The exchange rate is quoted in US$ units. The last variable is unemployment rate. It refers to the percentage of people who unemployed, but are available to work and seeking the jobs.

2.1 Panel Data Model
The present study applies the panel data technique and applied the following structure:

$$y_{it} = x'_{it}\beta + z'_{it}a + \varepsilon_{it}$$

or

$$y_{it} = \sum_{j=1}^{N} \alpha_i d_{ij} + x_{it}\beta + \varepsilon_{it}$$

where

$$d_{ij} = \begin{cases} 1 & if \quad i \quad = \quad j \\ 0 & otherwise \end{cases}$$

(1)

which are used to capture the individual effects (either fixed or random). y_{it} is the dependent variable ASEAN market index and X_{it} represents five independent variables - gross domestic product, inflation rate, interest rate, exchange rate and unemployment rate. Where *i,* number of contries =1, 2,…..5, *t,* number of years = 1,2,……..21. The ε is the error term.

2.2 Hypothesis
Some general hypotheses are appropriate as follows:
H_1 : There is significant relationship between ASEAN stock market and GDP.
H_2 : There is significant relationship between ASEAN stock market and inflation rate.
H_3 : There is significant relationship between ASEAN stock market and interest rate.
H_4 : There is significant relationship between ASEAN stock market and exchange rate.
H_5 : There is significant relationship between ASEAN stock market and unemployment rate.

3. ANALYSIS AND RESULTS

3.1 Random Effect GLS Regression Model
Table 2: Random Effect GLS Regression Model

lgindex	Coef.	Std. Err.	z	P > |z|	[95% Conf. Interval]	
lggdp	-1.420156	.2594422	-5.47	0.000	-1.928653	-.9116584
interest	-1.473408	.0423905	-3.48	0.001	-.2304246	-.064257
inflation	-.2170528	.0324617	-6.69	0.000	-.2806766	-.153429
exchange	6.240542	.7106998	8.78	0.000	4.847596	-.153429
unemployment	-.1372003	.0586831	-2.34	0.019	-.252217	-.0221836
_cons	41.44224	6.833103	6.06	0.000	28.0496	54.83488

From the Table 2, it is found that GDP is significant and has negative relationship with stock index. Significant at 1% which achieved 99% of confidence level explanatory variables affect the ASEAN market index. Therefore, it could explain that a 1% increase in GDP, it will decrease by 1.4202 in stock index. As the GDP increase, the stock index will depreciate and cause a stock market to collapse. It is in line with finding research by Attari et.al (2013) that also indicates this negative relationship.

For the inflation, there is significant and negative relationship between inflation and the stock index. Based on Ceteris paribus, a 1% increase in trade, it will increase 0.2171 in stock index. The significant finding is supported by Omran and Pointon (2001). Unemployment rate seems to have negative significant relationship with stock index. It indicates that a 1% increase in unemployment rate will increase 0.1372 in stock index. The outcome is consistent with empirical study explored by Pilinkus and Boguslauskas (2009), and Pilinkus (2010) as their study indicates the negative relationship. It shows that when the total of labor workforce is increasing, the stock index or price will also increase because the people has more money for the investment in the stock, thus will support economic development of a country.

The interest rate has critical and negative association with the stock index. The figure in Table 1 shows that a 1% increase in interest rate, it will decrease 0.1473 in stock index. This result tally with previous literature, Ratanapakorn and Sharma (2007) who additionally

discovered negative relationship for their study as they actualized the Granger causality approach with a specific end goal to analyze the connections between the US Stock Price Index (S&P 500) and the interest rate. Besides that, exchange rate have positive relationship and significant with the stock index. The coefficient indicates a 1% increase in exchange rate; it will increase by 6.2405 in stock index. This significant result is in line with Mohammad et al. (2009). This is because the stock index moves along with the exchange rates over the years as the currency used is in the same base. Thus, all of the hypothesis 1, 2, 3, 4 and 5 are accepted for their significance toward the stock index.

4. CONCLUSIONS AND RECOMMENDATIONS

The finding of this study clearly indicated that all the independent variables which are Macroeconomics variables (GDP; interest rate; inflation rate; exchange rate; unemployment rate) are significantly related towards ASEAN market index. Obviously, the discoveries in accordance with the past researchers revealed that the greater part of the independent variable shows to a great degree strong illustrative force towards the dependent variable. The exchange rate is seen to be outstandingly critical with the p-estimation of the z-test to 0.000 and the other macroeconomic variables additionally exhibit noteworthy relationship. Along these lines, it can be inferred that this study thus accepting all hypotheses 1, 2, 3, 4 and 5.

In the long run, future researchers need to consider and pick the macroeconomic variables for the investigation about this topic that will give the genuine effect to the stock index. Along these lines, the future researcher can change by utilizing different variables, for example, industrial production, oil price or gold price. The other variables may give a superior comprehension about this issue. Future specialist ought to likewise make an exploration on this issue by picking different nations or different locales, for example, European or American. This is because different regions provide different level of economy for a country and the result may vary for different regions.

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