Indonesian Stock Market Volatility: GARCH Model

ENDRI ENDRI[1], ZAENAL ABIDIN[2], TORANG P. SIMANJUNTAK[3] and IMMAS NURHAYATI[4]

[1] Associate Professor, Universitas Mercu Buana, Jakarta, Indonesia; e-mail: endri@mercubuana.ac.id
[2] Associate Professor, Perbanas Institute, Jakarta, Indonesia; e-mail: zaenal @perbanas.id
[3] Assistant Professor, Universitas Darma Agung, Medan, Indonesia; e-mail: torang@darmaagung.ac.id
[4] Associate Professor Universitas Ibn Khaldun, Bogor, Indonesia; e-mail: immasnurhayati1@gmail.com

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ABSTRACT

The purpose of this paper is to examine the effect of macroeconomic variables (interest rates, inflation and exchange rates) and global stock exchanges (STI, SSE, N225, DJIA, FTSE100) on the movement of the Indonesian stock exchange (IHSG). The research data analysis method uses the GARCH model for time series data for the period January 2012 to December 2018. The results show that the BI-rate, Inflation, Exchange Rate, Straits Times Index (STI), Shanghai Stock Exhange (SSE), Shanghai Stock Exhange (SSE), Nikkei 225 (N225)), Dow Jones Industrial Average (DJIA) and Financial Times Stock Exchange 100 (FTSE100) together have a significant effect on the IHSG. Partially shows the BI-rate, Inflation, and SSE have a significant negative influence, negative N225 is not significant, while the Exchange, STI, DJIA has a significant positive effect and FTSE100 has a non-significant positive effect on the IHSG.

INTRODUCTION

The phenomenon that occurs lately is that the movement of the Indonesian stock price index which is proxied by the Composite Stock Price Index (IHSG) is related to two groups of influential factors namely; global stock exchanges and macroeconomic indicators. Changes that occur in global stock exchanges are quickly responded by Indonesian stock exchanges, so that the movements of the Indonesian stock exchanges move together with the global stock exchanges. Some world and regional stock exchanges that are considered to represent global stock movements include; Singapore Straits Times Index (STI), China Shanghai Stock Exhange Index (SSE), Japan Nikkei 225 Index (N225), United States Dow Jones Industrial Average Index (DJIA) and British Financial Times Stock Exchange 100 (FTSE100) Index. These five indices are considered capable of representing global stock indices in Asia, the United States and Europe and are able to represent the strength of the world economy that can influence the Indonesian stock market. The average movement of the Composite Stock Price Index (IHSG) for 7 years with an

index of 5 countries tends to move with the same pattern. This condition also shows that global stock exchanges are integrated with each other.
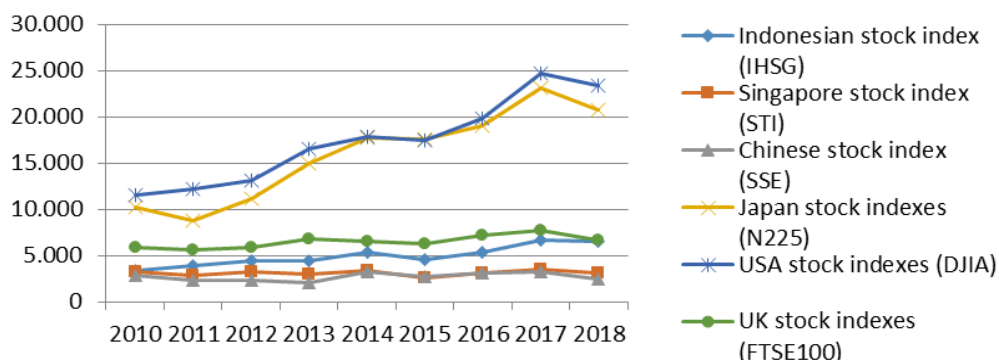
Figure 1. Average growth of the global stock price index 2010-2018

Source: Data Processed (2019)

Indonesian stock price movements are also influenced by a number of macroeconomic indicators, among them; interest rates, inflation and exchange rates. An increase in interest rates causes investors to divert their funds to money market instruments that provide higher and safer yields, thereby causing share prices to decline. In line with interest rates, an increase in the inflation rate causes share prices to fall because consumers reduce demand for goods so that corporate profits are reduced. Depreciation in the exchange rate of the rupiah against the US dollar tends to cause share prices to be corrected, because investors in the Indonesian stock market are dominated by foreign investors, so that when foreign currencies strengthen they tend to exit the stock market by selling large shares. Previous studies related to the influence of macroeconomic variables on stock price movements find that any changes that occur in macroeconomic variables are quickly responded to by stock prices. Theoretically, stock prices have a very strong relationship with a country's macroeconomic variables. Based on a simple discount model, the fundamental value of a company's shares is the same as the present value of expected dividends in the future, so future dividends must ultimately reflect economic activity. Thus, information about the dynamic relationship between macroeconomic variables and stock prices is very important to know for investors in the capital market and policy makers.

1. LITERATURE REVIEW

Previous studies examining the effect of global stock exchanges and macroeconomic variables on stock price movements have been conducted by many researchers, but they still give different results. Oseni and Nwosa (2011) tested the effect of volatility in macroeconomic variables, namely real GDP, inflation, and interest rates on stock market volatility for the period 1986 to 2010 in Nigeria. Using the AR (k)-EGARCH (p, q) and LA-VAR Granger Causality test, the results show that there is a causal relationship between stock market volatility and real GDP volatility, while there is no causal relationship between interest rates and inflation volatility, and volatility stock market. Zakaria and Shamsuddin (2012) examined the relationship between volatility of the stock market returns in Malaysia with five macroeconomic volatility selected (IPI proxy for GDP, CPI proxy for INF, ER, IR and M2) based on monthly data from January 2000 to June 2012 using the GARCH model (1,1) and bivariate, and multivariate VAR Granger causality test together with regression analysis. The results of the VAR bivariate VAR causality test show that only the volatility of CPI and IR significantly Granger causes volatility in the stock market returns. The results of both tests show that the volatility of macroeconomic variables as a group also does not cause volatility changes in stock

market returns. The results of the regression analysis show that only the volatility of the money supply is significantly related to stock market volatility. Samadi et al. (2012) examined the relationship between Tehran's stock market returns and macroeconomic variables; exchange rates, world gold prices, inflation, liquidity and oil prices using monthly data for the period 1979 to 1989. Using the GARCH model it was found that the variable gold prices, inflation and exchange rates affect stock returns while oil prices and liquidity have no effect. Mlambo et al. (2013) using the GARCH model (1,1) tested the effect of exchange rate volatility and stock market performance for South Africa based on data during the period 2000 - 2010. The findings prove that the relationship is weak between exchange rate volatility and the stock market.

Hunjra et al. (2014) examined the effect of interest rates, exchange rates, and GDP and inflation rates on share prices in Pakistan based on eleven years of monthly data ranging from January 1, 2001 to December 31, 2011. Using the Granger causality and cointegration test methodology, the results of the study revealed that there is no relationship between the dependent variable and explanatory variables in the short run. On the other hand the results show that there is a strong relationship in the long run. Oluseyi (2015) examined the relationship between stock price volatility and volatility of macroeconomic variables (IPI, CPI, M2, ER and interest rates) in Nigeria using monthly data for the period January 1990 to December 2014. The results of the VAR Granger bivariate causality test and Regression analysis showed that ER and CPI volatility significantly causes Granger's volatility in stock prices. The GARCH model (1.1) reveals exchange rate volatility, interest rates and money supply that affect stock price volatility in Nigeria. Jareño and Negrut (2016) who analyzed the relationship between the US stock market and some relevant US macroeconomic factors, such as gross domestic product, consumer price index, industrial production index, unemployment rate and long-term interest rates. All relevant factors show a statistically significant relationship with the stock market except for the consumer price index. Sichoongwe (2016) examines the impact of exchange rate volatility on returns to Zambian stock market shares using the GARCH approach (1,1). Empirical findings reveal that stock market returns are negatively related to exchange rate volatility.

Recent research by Jamaludin et al. (2017) examines the impact of macroeconomic and stock market variables on the 3 countries' stock market based on monthly data from January 2005 to December 2015. The findings show that interest rates and inflation have a positive effect on stock price movements and for the money supply has no effect on prices shares on the Indonesian stock exchanges of Singapore, and Malaysia. Khan and Khan (2018) analyzed the effect of various macroeconomic variables on Pakistan stock prices using monthly data from May 2000 - August 2016. The results showed that the Karachi Stock Exchange price in the long run was significantly affected by the money supply, exchange rate, and interest rates. In the short run all variables are insignificant except the exchange rate which has a negative effect on stock prices. Chanrashekar (2018) also explores the role of macroeconomic variables and stock prices for developing economic perspectives involving two countries, namely; India and Brazil. This study uses monthly data from 2000M1-2016M08. Empirical findings confirm that the long-term relationship between variables and causality is unidirectional. The results also reveal that GDP, inflation, exchange rates, interest rates and stock prices play an important role in economic development.

Related to the influence of global stock market movements on the domestic stock market, several studies have been carried out in the form of linkages in the stock market, integration or interdependence. The stock market is said to be integrated when there is a correlation between markets. Wang (2014) investigated the joint movements of six East Asian Stock Exchanges before and during the 2007-2009 global financial crisis proving that the market was less adaptive to US stock market shocks after the crisis. Tripathi and Sethi (2012) examine the relationship between Indian stock markets and emerging markets. Endri (2010) investigated the relationship between the stock markets in ASEAN-5 countries that are classified as developing stock markets, namely Indonesia, Singapore, Malaysia, Thailand, and the Philippines with the world's strong stock markets, namely the US stock market and the strong Asian stock market, namely Japanese stock

markets are both classified as developed stock markets by applying the multivariate cointegration model. Cointegration test results show the ASEAN-5 stock market and the US and Japan stock markets are co-integrated with each other during the full period and stronger during the pre-crisis period. In addition, these results also indicate that emerging stock markets are very sensitive to the movements of developed countries' stock markets, particularly the US stock market. Do (2011) analyzes the integration of six ASEAN stock markets (Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam) with four international stock markets (US, ASEAN Bloc, Asia and the world) and channel interactions between domestic and international stock markets. The results showed that the channel of integration / segmentation / interaction between domestic and international markets. Kapoor and Singh (2013) examined the cointegration of the Asian Capital Markets and found opportunities to diversify to potential investors in Pakistan, India, Bangladesh and China.

Adas and Tussupova (2016) examined the impact of the global financial crisis on the movements of the Chinese, Japanese, Indian and US stock markets using the E-GARCH model based on daily stock price data for the period from 6 January 2006 to 22 April 2011. The results showed that the stock market The United States has a strong influence on the Chinese, Japanese and Indian stock markets, but not vice versa. Indian stock markets experience an abundance of volatility from all stock markets. The Japanese stock market only accepts an abundance of volatility from the US stock market. Shahzad (2016) also proves that the South Asian stock market is closely interrelated with each other, as well as developed / European markets which are also interrelated. The US stock market not only has an impact on European stock markets, but also has a strong influence on the South Asian stock market. The strong influence of the US stock market on the stock markets of other countries, especially developing stock markets is also evidenced by many other studies.

Research that conducts a combination of global stock exchange factors and macroeconomic variables on the movement of a country's stock prices, among others, is carried out by; Chanharat et al. (2007); Hasan and Zaman (2015); Robiyanto (2019). Chanharat et al. (2007) examined the impact of several stock price indexes and macroeconomic variables on the Thai stock market using the GARCH-M model and monthly data (1988M1-2004M12). The results found that (a) changes in the prices of shares in Singapore, Malaysia and Indonesia before the 1997 crisis, and changes in share prices in Singapore, the Philippines and Korea after 1997 affected the price of shares in the Thai stock market; (b) changes in oil prices have a negative effect only before 1997; (c) volatility clustering and the GARCH-M model were present only before 1997; and (d) the stock market outside the region has no direct impact on the Thai stock market. Hasan and Zaman (2017) tested the volatility of the Bangladesh stock market returns in response to the volatility of macroeconomic variables using the Dhaka Dhaka Stock Exchange (DSE) monthly index data and four macroeconomic variables (Call Money Rate, Crude Oil Prices, Exchange Rates and SENSEX from Bombay Stock Exchange) from January 2001 to December 2015. The results of the GARCH-S model reveal that DSE returns volatility is significantly influenced by macroeconomic variables, such as exchange rates and SENSEX. Robiyanto et al. (2019) examined the effect of macroeconomic variables: Dow Jones Industrial Average, USD / IDR, and world oil prices on the Composite Stock Price Index (IHSG) during the period 2005-2016 using the GARCH model (1.1) showing that Dow Jones Industrial Average and world crude oil prices have a positive effect on the IHSG while USD / IDR has a negative effect on the IHSG

2. RESEARCH METHODS

Data on Composite Stock Price Index (IHSG) as the dependent variable is sourced from the Indonesia Stock Exchange. For independent variable data consisting of macroeconomic variables, namely; interest rates, inflation and exchange rates are sourced from Bank Indonesia, while global stock exchanges, represented by the United States stock exchanges (DJIA), the United Kingdom

(FTSE100), Japan (N225), China (SSE), and Singapore (STI) are sourced from Yahoo finance. The type of research data is the time series collected monthly from January 2012 to December 2018 with a total of 84 months of observation.

The Autoregressive Conditional Heteroscedasticity (ARCH) model was first popularized by Engle in 1982. In 1986 it was perfected by Bollerslev who introduced the GARCH model (Bollerslev, 1986). Bollerslev (1986) states that residual variants depend not only on past period residuals but also residual variants of past periods. For the GARCH Model (p, q), in general, var (ϵ_t) can be represented by the form:

$IHSG_t = \beta_0 + \beta_1 BIrate_{1t} + \beta_2 INFi_{2t} + \beta_3 FOREX_{3t} + \beta_4 STI_{4t} + \beta_5 SSE_{5t} + \beta_6 N225_{6t} + \beta_7 DJIA_{7t} + \beta_8 FTSE100_{8t} + \epsilon_t$ (1)

$\sigma^2_t = \alpha_0 + \alpha_1 \epsilon^2_{t-1} + ... + \alpha_p \epsilon^2_{t-p} + \lambda_1 \sigma^2_{t-1} + ... + \lambda_q \sigma^2_{t-q}$ or written with:

$$\sigma^2_t = \alpha_0 + \sum_{i=1}^{p} a_i \epsilon^2_{t-1} + \sum_{i=1}^{q} \lambda_1 \sigma^q_{t-1} \qquad (2)$$

And for the conditional variance σ^2_t, where:

σ^2_t = Residual variant at time t
α_0 = Constant residual variant
$\alpha_1 \epsilon^2_{t-1}$ = Previous period residual volatility (ARCH component)
$\lambda_1 \sigma^2_{t-1}$ = Residual variants in the previous period (GARCH component)

From the model above, it can be seen that the magnitude of var (ϵt), besides being assumed to depend on ϵ2, also depends on σ2t in the past.

3. RESULTS AND DISCUSSION

Descriptive statistics show the amount of data, the maximum value, the minimum value, the average value and the standard deviation of each dependent variable (X) and the independent variable (Y). The results of descriptive statistical data processing are as the following table.

Table 1. Descriptive Statistics of Dependent and Independent Variables

	Variable	Data	Mean	Median	Maximum	Minimum	Std. Dev.
Y	IHSG	84	4,380.35	4,450.08	5,518.67	2,549.03	721.78
X1	BIrate	84	0.0665	0.0665	0.0780	0.0480	0.0078
X2	INF	84	0.0544	0.0497	0.0879	0.0279	0.0162
X3	FOREX	84	10,929.24	10,103.50	14,657.00	8,508.00	1,901.38
X4	STI	84	3,059.91	3,053.57	3,487.39	2,629.11	214.23
X5	SSE	84	2,679.74	2,638.15	4,611.74	1,979.21	566.81
X6	N225	84	13,553.01	13,817.70	20,585.24	8,434.61	3,899.11
X7	DJIA	84	14,736.28	15,012.59	19,762.60	9,774.02	2,761.20
X8	FTSE100	84	6,169.58	6,236.35	7,142.80	4,916.90	550.87

Source: Data processed (2019)

Descriptive statistical analysis results obtained in general the highest BIrate level of 7.80% and the lowest of 4.80%. The lowest inflation rate was 2.79% and the highest was 8.79%. The lowest exchange rate is IDR 8,508 per USD and the highest exchange rate is IDR 14,657 per USD. The lowest STI index was 2,629.11 and the highest was 3,487.39. The lowest SSE index was 1,979.21

and the highest was 4,611.74. The lowest N225 index was 8,434.61 and the highest was 20,585.24. The lowest DJIA index was 9,774.02 and the highest was 19,762.60. The lowest FTSE100 index was 4,916.90 and the highest was 7,142.80. For IHSG in 2010-2016 the highest number was 5,518.67 which occurred in February 2015 while the lowest lift was 2,549.03 which occurred in January 2010. The average value of IHSG was 4,450.08 with a standard deviation of 721.78. Stationerity testing is done with a unit root test using the Augmented Dickey Fuller (ADF) test based on a comparison between the ADF probability value with a significance level of 5%. If the ADF probability value is <5%, then H0 is rejected, it means that the residual data is stationary and if the reverse residual data is not stationary. Stationary test results with the ADF test at the level level showed that all of the research variable data were not stationary because they had a ADF probability value of> 5%. Testing the first difference level (1st difference level) shows that all research data is stationary.

Table 2. Augmented Dickey Fuller Stationary Test Results (ADF)

Variable	Unit Root test	ADF test Statistic	Test critical values			Probability
			1% level	5% level	10% level	
IHSG	Level	-2.276438	-3.511262	-2.896779	-2.585626	0.1820
	1st Difference	-8.711825	-3.512290	-2.897223	-2.585861	0.0000
BIrate	Level	-1.448228	-3.513344	-2.897678	-2.586103	0.5546
	1st Difference	-4.125330	-3.513344	-2.897678	-2.586103	0.0015
Inflation	Level	-2.028987	-3.513344	-2.897678	-2.586103	0.2741
	1st Difference	-6.801452	-3.513344	-2.897678	-2.586103	0.0000
Forex	Level	-0.252790	-3.511262	-2.896779	-2.585626	0.9263
	1st Difference	-9.691173	-3.512290	-2.897223	-2.585861	0.0000
STI	Level	-2.704921	-3.511262	-2.896779	-2.585626	0.0775
	1st Difference	-9.556792	-3.512290	-2.897223	-2.585861	0.0000
SSE	Level	-2.286095	-3.512290	-2.897223	-2.585861	0.1789
	1st Difference	-6.538024	-3.513344	-2.897678	-2.586103	0.0000
N225	Level	-0.498695	-3.511262	-2.896779	-2.585626	0.8853
	1st Difference	-8.342727	-3.512290	-2.897223	-2.585861	0.0000
DJIA	Level	-0.664458	-3.511262	-2.896779	-2.585626	0.8491
	1st Difference	-7.818697	-3.513344	-2.897678	-2.586103	0.0000
FTSE100	Level	-1.378899	-3.512290	-2.897223	-2.585861	0.5888
	1st Difference	-10.525940	-3.512290	-2.897223	-2.585861	0.0001

Source: Data processed (2019)

To determine the selected GARCH model, the Akaike Information Criterion (ACI) and Schwartz Criterion (SC) tests were tested. This study simulates four GARCH models to choose the best model. AIC and SC calculation results show that the best model is the GARCH model (1,1) because it has the lowest AIC and SIC values, which is equal to; 13.37522 and 13.72248.

Table 3. Results of GARCH Model Selection with AIC and SC Test

Variable	GARCH (1,1)	GARCH (1,2)	GARCH (2,1)	GARCH (2,2)
AIC	13.37522	13.37547	13.40885	13.43860
SC	13.72248	13.75167	13.78505	13.84374

Source: Data processed (2019)

Estimates of the GARCH (1,1) model indicate that all macroeconomic variables used in this study significantly influence the IHSG movement, where the Birate and Inflation variables are negative and the exchange rate is positive. For global stock exchanges, except for the UK stock exchanges which affect the movement of the Indonesian stock exchanges. The United States and Singapore stock exchanges have positive effects, while the Japanese and Chinese stock exchanges have negative effects. The results of the calculation of the F-test value in the GARCH (1,1) model resulted in 105,8621 with a probability value of 0.0000 at a confidence level of 99 percent (α = 1%), which means H0 is rejected, meaning that all variables are independent of macroeconomic factors (BIrate, Inflation , Exchange rates) and global stock exchanges (STI index, SSE, N255, DJIA, FTSE100) in the GARCH (1,1) model together significantly influence JCI movement. For testing the goodness of fit with the coefficient terminated R^2 adjusted from the GARCH (1,1) (1.1) gives a value of 0.9100 which means that the entire independent variable, consisting of; BIrate, Inflation, Exchange Rate, STI index, SSE, N225, DJIA and FTSE100 are able to explain fluctuations in the movement of the Indonesian stock market (IHSG) by 91 percent, while the remaining 9 percent is explained by other factors not included in the GARCH (1,1) model.

Table 4. Model GARCH (1,1) Results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-2173.266	625.6737	-3.4734810	0.000500
Birate	-9284.358	3470.924	-2.674896	0.007500*
INFLATION	-8179.945	1651.448	-4.9531940	0.000000*
FOREX	0.115638	0.045336	2.5506990	0.010800*
STI	1.236903	0.157301	7.8633010	0.000000*
SSE	-0.102871	0.047684	-2.1573590	0.031000**
N225	-0.057001	0.030630	-1.8609610	0.062700***
DJIA	0.234851	0.034945	6.7205570	0.000000*
FTSE100	0.022515	0.103404	0.2177380	0.827600
R-squared	0.9186460	Mean dependent var		4380.3480
Adjusted R-squared	0.9099680	S.D. dependent var		721.77870
S.E. of regression	216.57230	Akaike info criterion		13.375220
Sum squared resid	3517768.0	Schwarz criterion		13.722480
Log likelihood	-549.75920	F-statistic		105.86210*
Durbin-Watson stat	0.6613450	Prob(F-statistic)		0.0000000

Source: Data processed (2019)

* Significance of 1% level

** Significance of 5% level

*** Significance of 10% level

Based on the results of the GARCH (1,1) model, the equation model of the GARCH (1,1) model can be written as follows.

IHSG = -2173.266 - 9284.358 BIrate - 8179.945 INF+ 0.116 FOREX + 1.237 STI - 0.103 SSE - 0.057 N225 + 0.235 DJIA + 0.023 FTSE100

While the results of the variance equation from the GARCH (1,1) model in the following table.

Table 5. Results of the GARCH(1,1) Model Variance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	22891.60	9433.716	2.426573	0.015200
RESID(-1)^2	0.914184	0.415874	2.198225	0.027900
GARCH(-1)	-0.272482	0.128310	-2.123617	0.033700

Source: Data processed (2019)

So based on the results of the GARCH (1,1) model, the GARCH (1,1) model variance equation can be written as follows.

$$\sigma_t^2 = 22891.60 + 0.914\,\varepsilon_{t-1}^2 - 0.272\,\sigma_{t-1}^2$$

From the GARCH (1,1) variance model equation shows a constant value of 22,891.60. ARCH coefficient of 0.914 for the volatility reaction to market movements which shows a fairly intensive number of market movements. The GARCH coefficient of -0.272 for each period of movement that occurs in a variant which indicates the variant does not require a long time to return.

Based on empirical findings show that macroeconomic variables, in the form of; interest rates, inflation and exchange rates have a significant effect on the IHSG movement. The variable interest rates and inflation have a negative effect, while the exchange rate has a positive effect. The negative influence of interest rates on stock prices shows that when interest rates rise, investors look for investment alternatives such as bonds, so demand for shares decreases and stock prices will fall. The research results are in line with the findings of Peiro (2015). An increase in interest rates causes the discount rate to increase, which means a final decrease in the present value of future cash flows that negatively impacts stock prices. While several other studies found a positive relationship with interest rates. They explain the reason when the Federal Reserve raises interest rates more (less) than expectations then it is considered bad news (good) for the stock market, it means that the influence of interest rates is positive, but bad news has a strong impact on the stock market.

The negative effect of inflation on stock prices indicates that varying inflation rates produce more uncertainty and thus the demand for minimum returns will also increase which will reduce market valuations as evidenced by; Mehr-un-Nisa and Nishat (2011) for Pakistan and Bekhet and Mugableh (2012) for Malaysia. Wongbangpo and Sharma (2002) also found a negative relationship between inflation and share prices in five Asian countries, namely Indonesia, Malaysia, Singapore, the Philippines, and Thailand.

The positive effect of the exchange rate with the IHSG movement is in line with the findings of Hasan and Zaman (2017). With the traditional approach which states that exchange rate depreciation can increase the country's external competitiveness and improve the trade balance and real output. As a result, the company's profitability increases with an increase in the exchange rate or depreciation and thus the stock price volatility increases. This result also implies that international trade plays an important role in Indonesia and especially for companies listed on the stock market. Another explanation reveals that the exchange rate in the stock market is important for the performance of fund portfolios. Diamandis and Drakos (2011) concluded positive effects for exchange rates on stock prices. This positive effect can be explained by the fact that local companies become more competitive with depreciation which leads to an increase in their exports thereby increasing share prices. Negative effects were found by Bekhet and Mugableh (2012). According to the international market, the demand for these goods has increased and more cash flow has entered the country. At the same time currency depreciation also makes imported goods expensive, so if a country is highly dependent on imports of production inputs, currency depreciation will negatively affect the economy. international markets, so that demand for these goods increases and more cash flow into the country. At the same time currency depreciation also

makes imported goods expensive, so if a country is highly dependent on imports of production inputs, currency depreciation will negatively affect the economy.

Estimation results show that global stock markets, except for the UK stock exchanges, have an effect on the IHSG movement. The United States and Singapore stock exchanges have positive effects, while the Japanese and Chinese stock exchanges have negative effects. Zuhri and Endri (2008) found that the American stock market influenced the movements of the Indonesian stock market. The results of this study are in line with the findings of Kabir and Masih (2014) stating the Nikkei 225 has a positive effect on Malaysian stock prices, research by Vardhan and Sinha (2015) states that US stock prices have a positive effect on stock prices in India. Vardhan and Sinha (2015) proved that the foreign stock prices of the United States (Dow Jones Industrial Average (DJIA) and Japan (Nikkei 225) were able to influence stock prices in India and Estonia.

CONCLUSION

The movement of stock prices in the Indonesian stock exchange is strongly influenced by changes that occur in both macroeconomic variables and changes in global stock exchanges. Any changes that occur in macroeconomic variables will have an impact on the movement of Indonesian stock prices. This is due to the fact that the price of shares formed is a reflection of investor expectations of earnings and dividends that are much influenced by changes in economic conditions. The research highlights three indicators of macroeconomic variables that affect stock prices, namely; interest rate, inflation, and exchange rate. The interest rate and inflation affect stock prices negatively, while the exchange rate affects positively. The results are in line with the research hypothesis and support many previous studies that the interest rate and inflation have a negative effect, and the exchange rate has a positive effect.

The influence of global stock exchanges on the movement of Indonesian stock exchanges, many studies prove that the US and UK stock markets affect the global stock market, the stock markets of Japan and China affect the Asian stock market, and Singapore affects the ASEAN stock market. Indonesia is an open economy, so the Indonesian stock market is influenced by the stock markets of other countries both globally and regionally. In addition, the five research sample countries, namely: the United States, the United Kingdom, Japan, China, and Singapore are Indonesia's main trade partners. The study is based on the hypothesis that the five global stock exchanges that serve as the research sample, namely: the stock exchanges of the United States, Britain, Japan, China, and Singapore positively affect the Indonesian stock market. Empirical findings prove that the US and Singapore stock exchanges have a positive effect, while Japan and China stock exchanges have a negative effect. While the UK stock exchange cannot influence the movements of the Indonesian stock market. The results of the study also confirm many previous studies that the United States stock exchange globally has a strong influence, while the Singapore stock exchange for the ASEAN region. This is due to the fact that the United States financial markets have become the world's financial epicenter, while Singapore is for ASEAN countries. Japan and China stock exchanges have the opposite and weak impact on Indonesian stock exchanges, because indeed the two countries are more focused on foreign direct investment rather than portfolio investment.

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