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**RESEARCH METHODOLOGY**
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# ANALYSIS THE INFLUENCE OF MACROECONOMIC VARIABLES ON JAKARTA COMPOSITE INDEX AND SECTORAL INDEX STOCK RETURN

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### ABSTRACT
*MacroEconomic variables become an important factor in investment activity because it might influence investor decision. This study aims to analyze the short-term relationship between macroEconomic variables on JCI stock returns and sectoral index stock returns. This research used time series data and analyzed by Structural VAR method (SVAR). The results of this study indicate that the oil price and the gold price have positive effect on agricultural and mining sectors. While, the interest rate has negative effect on JCI stock return and exchange rate has negative effect on JCI stock returns and all sectors index except mining sector. Investor in agriculture and mining sector should be more consider about oil prices and gold prices movement.*

## KEYWORDS
macroEconomic variables, stock return, structural VAR.

## INTRODUCTION
Investment is one aspect in that can improve the Economics by capital market. Capital market in Indonesia as shown by trading volume in the stock market. The trading volume of Jakarta Composite Index (JCI) and sectoral index from 2007 to 2014 was increasing, but in 2008, it was decreasing (IDX 2015). This decline was caused by subprime mortgage crisis and European crisis. The aim of investors in their investment activity is to get profit that can calculated by stock return. JCI stock returns is fluctuating in every year. The highest stock return occurs in 2009, while the lowest return in 2008 (IDX 2015). The decline was also cause by the subprime mortgage crisis and European crisis in 2008.

Stock returns have a positive relationship with the risk to be received by the investors (high risk high return). Some factors that affected the risk and return, there are internally and externally factor. Prihantini (2009), Hardiningsih (2001), and Faried (2008) explained that good performance of internally factors would be increasing the stock return. Externally, there are many factors that can affect stock returns. MacroEconomic factors are among the factors should be considered by investors in making investment decision because it can be causing the fluctuations in price and stock return (Law 2014, Rachman 2012).

Research on the effect of macroEconomic variables on stock returns mostly focus in global and regional scope. El-Nader and Alraimony (2012), Namini and Nasab (2015), Fatima and Bashir (2014), Riman et al. (2014), Nantwi *et al*. (2011), Mazuruse (2014) investigated the effect of macroEconomic in global scope, while Bhatti *et al*. (2015), Zare (2015) and Law (2014) in regional scope. In general, the results of these studies indicate that macroEconomic variables have impact to the stock returns. However, according Kirui *et al.* (2014) found that macroEconomic variables do not have a significant effect on stock returns. The variety of the result is due to differences in the structure of capital markets in each country.

In Indonesia studies by Sodikin (2007), Rachman (2012), and Inspiration (2014) shows that mostly of macroEconomic variables influence the stock return. However, from found that there is difference results between macroEconomic variable, because the variance of country and sectors classified.

## REVIEW OF LITERATURE
Some research has been investigated the effect of macroEconomic variables on stock returns JCI and sectoral index stock return. Bhatti *et al.* (2015) was using Structural VAR (SVAR) and focus on four different variables: international, house property, monetary, and fiscal. Variables consist of international oil prices and gold prices. Oil price and house property has positive effect, while gold price and government spending has a negative effect on stock returns in Malaysia. Zare (2015) also showed that short-term interest rates and oil prices have a negative effect on stock prices and money supply has a positive influence on stock prices Malaysia.

According to Cankal (2015) that using SVAR method, share price in Turkey responsive to shocks in exchange rates, interest rates, and inflation. The variables consist of exchange rates, interest rates, inflation, and ISE 100 (Istanbul Stock Exchange Market). Hatipoglu *et al*. (2014) investigated stock return by using SVAR method and including variable exchange rate, gold price, interest rate, leading indicators index, GDP, BIST-100 index. The result shows that the relationship between stock prices and real variables are substantially stronger than the relationship between stock prices and key investment such as interest rates, gold investment and exchange rates.

El-Nader and Alraimony (2012), Nantwi and Kuwornu (2001), applied OLS and ARCH / GARCH shows that macroEconomic variables such as money supply, exchange rates, and interest rates have a negative effect on the Amman Stock Market (ASE). Moreover, in Ghana's Gross Domestic Product (GDP) has a positive effect on return ASE. The result indicates that there is a significant relationship between stock returns by the CPI, while oil price, exchange rates, and T-Bill have no significant effect to the stock returns in Ghana.

Kirui *et al.* (2014) using TGARCH method that shows the volatility of macroEconomic variables such as Gross Domestic Product (GDP), inflation, T-Bill, and exchange rate have no significant effect to the stock return in Kenya. On the other hand, Jeved & Akhtar (2012) using GARCH, and found that of money supply has a positive effect, while exchange rate and used term structure had a negative effect on the risk in the stock market. Yasmina (2014) using GARCH conclude that macroEconomic variables have no impact to the at all stock return volatility in Tunisia financial markets.

## OBJECTIVES OF THE STUDY

The main objectives of this paper are:

1. To analyze the effect of macroEconomic variables on JCI and sectoral index stock return listed on the Indonesian Stock Exchange.
2. To analyze changes in the response of stock returns JCI and sectoral index stock return caused by macroEconomic variables.
3. To analyze the contribution of macroEconomic variables in influencing the JCI and sectoral index stock return.

## HYPOTHESES

Based on the previous research, the hypothesis of this research are:

1. The depreciate of exchange rate has negative effect on JCI and Sectoral index stock return
2. The inflation has negative effect on JCI and Sectoral index stock return
3. The oil price has negative effect on JCI and Sectoral index stock return
4. The gold price has negative effect on JCI and Sectoral index stock return
5. The interest rate has negative effect on JCI and Sectoral index stock return
6. The money supply has negative effect on JCI and Sectoral index stock return
7. The fiscal deficit has negative effect on JCI and Sectoral index stock return
8. The goverment debt has negative effect on JCI and Sectoral index stock return
9. The trade balance has positive effect on JCI and Sectoral index stock return

## RESEARCH METHODOLOGY

### DATA DESCRIPTION

The data used in this research is secondary data quarterly time series from January 2000 to December 2014. The data used is shows in Table 1.

**TABLE 1: TYPE AND SOURCE OF DATA**

| Variable | Unit | Data Source |
|---|---|---|
| JCI Closing price | Rupiah | Bloomberg |
| Sectoral index closing price | Rupiah | Bloomberg |
| Inflation | % | Bank Central of Indonesia |
| Exchange rate | IDR/USD | Bank Central of Indonesia |
| Interest rate | % | Bank Central of Indonesia |
| Money supply | Billion Rupiah | Bank Central of Indonesia |
| Oil price | USD/Barrel | indexmundi |
| Gold price | USD/Troy Ounce | indexmundi |
| Fiscal deficit | % to PDB | Bank Central of Indonesia |
| Goverment debt | Trillion Rupiah | Ministry of Finance Republic of Indonesia |
| Trade balance | US $ | Statistics Indonesia |

## METHODOLOGY

**a. Pre-estimation test**

Before applying SVAR method, there are some step of pre-estimation test. Data including root test, stability VAR, and determining the optimal lag.

**b. Structural Vector Autoregression (SVAR)**

SVAR method used in research as appropriate for time series data and appropriate to address the problems that have been formulated. This research also applied Impulse Response Function (IRF) and analysis of Forecast Error Variance Decomposition (FEDV).

**c. SVAR Model**

The research model was adopted from Ali *et al.* (2014). The general form of Structural VAR (p) is presented in the following:

$$A_0 Y_t = c_0 + \sum_{i=0}^{p} A_i Y_{t-1} + \varepsilon_t \quad (1)$$

Where $Y_t$ is a column vector of variables, $A_0$ is the square matrix of simultaneous coefficients, $A_i$ is the squared matrix of auto-regression coefficients, and $\varepsilon_t$ is the column vector of structural disturbances. The general form model in equation (1) will be converted into reduced form model by multiply the equation by $A_0^{-1}$ and shown as:

$$Y_t = a_0 + \sum_{1}^{p} B_i Y_{t-1} + e_t \quad (2)$$

In this equation, $Y_t$ includes variables (lnoil, lngold, lninflasi, fiskal, lnm2, birate, lnkurs, lndebt, lntrade, lnrtn). So that, $\varepsilon_t = A_0\, e_t$, $B_i = A_0^{-1} A_i$ and $a_0 = A_0^{-1} c_0$. We imposed appropiate restrictions on to acquire structural disturbances. The short run restrictions are imposed in the model in the following way:

$$\begin{bmatrix} \varepsilon_{lnoil} \\ \varepsilon_{lngold} \\ \varepsilon_{lninflasi} \\ \varepsilon_{fiskal} \\ \varepsilon_{lnm2} \\ \varepsilon_{birate} \\ \varepsilon_{lnkurs} \\ \varepsilon_{lndebt} \\ \varepsilon_{lntrade} \\ \varepsilon_{lnrtn} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{21} & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{31} & \alpha_{32} & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{51} & \alpha_{52} & \alpha_{53} & \alpha_{54} & 1 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{61} & \alpha_{62} & \alpha_{63} & \alpha_{64} & \alpha_{65} & 1 & 0 & 0 & 0 & 0 \\ \alpha_{71} & \alpha_{72} & \alpha_{73} & \alpha_{74} & \alpha_{75} & \alpha_{76} & 1 & 0 & 0 & 0 \\ \alpha_{81} & \alpha_{82} & \alpha_{83} & \alpha_{84} & \alpha_{85} & \alpha_{86} & \alpha_{87} & 1 & 0 & 0 \\ \alpha_{91} & \alpha_{92} & \alpha_{93} & \alpha_{94} & \alpha_{95} & \alpha_{96} & \alpha_{97} & \alpha_{98} & 1 & 0 \\ \alpha_{101} & \alpha_{102} & \alpha_{103} & \alpha_{104} & \alpha_{105} & \alpha_{106} & \alpha_{107} & \alpha_{108} & \alpha_{109} & 1 \end{bmatrix} \begin{bmatrix} e_{lnoil} \\ e_{lngold} \\ e_{lninflasi} \\ e_{fiskal} \\ e_{lnm2} \\ e_{birate} \\ e_{lnkurs} \\ e_{lndebt} \\ e_{lntrade} \\ e_{lnrtn} \end{bmatrix}$$

Where ($\varepsilon_{lnoil}$, $\varepsilon_{lngold}$, $\varepsilon_{lninflasi}$, $\varepsilon_{fiskal}$, $\varepsilon_{m2}$, $\varepsilon_{birate}$, $\varepsilon_{kurs}$, $\varepsilon_{lndebt}$, $\varepsilon_{lntrade}$, $\varepsilon_{rtn}$) are showing the structural disturbances from oil prices, gold price, inflation, deficit of fiscal balance, lnm2 money supply, interest rate, exchange rate, government debt, trade balance, and stock returns respectively. As proxy of stock return, we used JCI stock return and sectoral indexes stock return consist of the agricultural sector (LNPERTANIAN), mining (LNPERTAMBANGAN), basic industry and chemical (LNINDDASAR), consumer goods industry sector (LNKONSUMSI), financial sector (LNKEUANGAN), sector property, real estate, and construction sector (LNPROPERTI), infrastructure, utilities, and transportation sector (LNINFRASTRUKTUR), trade, services and investment sector (LNPERDAGANGAN) as well as the manufacturing sector (LNMANUFAKTUR). On the other hand, $e_{lnoil}, e_{lngold}, e_{inflasi}, e_{fiskal}, e_{lnm2}, e_{birate}, e_{lnkurs}, e_{lndebt}, e_{lntrade}, e_{lnrtn}$ are the residual of reduced of equations that measure the unexpected movement of variables separately with the information given in the system.

## RESEARCH RESULT

***Test Pre-estimation***

Before applying the SVAR method, we need to do the pre-estimation test. Unit root test shows that all variables used in this study is not stationary at level, so that needs to be done on a first difference stationary test indicating the entire data stationary at first difference. Therefore, the data used in this study is first difference then be processed using SVAR. Lag used in this study is 0, which is based on Schwarz information criterion (SC) shown in Appendix 1. VAR stability test indicates the range of modulus values generated on the system equation VAR model for JCI stock returns and sectoral index stock return shows a stable state.

***Structural VAR***

Table 2 presents the influence between macroEconomic variables and return in JCI and sectoral index. Oil prices, gold prices, interest rates, and the exchange rate have an influence on JCI and sectoral index stock returns.

**a. The influence of oil prices on JCI and sectoral index stock returns**

The oil price has a positive effect on stock returns for agriculture and mining sectors. The increase of stock returns in mining sector due to companies, which producing oil. So when oil price rises, would be increasing the profit of the company. According Papiez (2014) and Nazlioglu *et al.* (2012) shows the influence of the agricultural sector on oil price changes on agriculture. The high correlation occurred between agriculture and oil prices are the biofuels industry (Bakhat and Wurzburg 2013). In Indonesia, one of the largest biofuel contribution is derived from palm oil that is about 34% (World Growth 2011). The rapid growth of palm oil industry has a major contribution in the world biofuel market, so that, it is causing the world's palm oil trade increase because of the world demand of oil. An increasing demand of biofuel would make the company to fulfill it by increasing their supply. So that, it would be increasing company's profit. According to Thobarry (2009), the increasing of company's profits will boost the stock price followed by the increase in stock returns.

**b. The influence of gold price on JCI and sectoral index stock return.**

Gold prices variable have a positive effect on stock returns of agriculture, and mining sector. The increase in the mining sector due to a metal mining sub-sector and other minerals consist of companies that produce gold, so the increasing of gold prices will boost profits of companies. The gold price has a positive effect on agricultur stock return because high gold price is causing investor to choose agriculture sector in stock market for their investment.

**TABLE 2: RESULT OF *STRUCTURAL* VAR MODEL**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Oil price | 0.069 | 0.459** | -0.344 | -0.042 | 0.458** | -0.467* | -0.226 | -0.423* | -0.004 | -0.212 |
| Gold price | 0.155 | 1.100** | -0.224 | -0.356 | 1.162** | -0.105 | -0.016 | -0.026 | 0.272 | 0.104 |
| Inflation | 0.038 | 0.103 | -0.255 | -0.095 | -0.079 | 0.049 | -0.052 | -0.188 | -0.139 | -0.069 |
| Fiscal deficit | 12.888 | 39.72 | -11.587 | 16.921 | 63.629 | 3.117 | 35.356 | -46.523 | 36.644 | 10.808 |
| Money supply | 0.251 | 0.479* | 0.452 | 0.496 | 0.227 | 0.197 | 0.237 | 0.836* | 0.339 | 0.443 |
| Interest rate | -5.759** | -4.790 | 3.885 | 5.223 | -2.625 | 2.569 | 2.478 | 6.047 | 1.014 | 2.164 |
| Exchange rate | -0.833** | -1.194** | -3.569** | -3.381 | -1.254** | -4.620** | -2.469** | -4.093** | -1.970** | -2.857** |
| Government debt | 0.389 | 0.026 | -2.369 | -1.007 | -0.426 | -2.774 | 0.088 | -2.181 | 0.09 | -0.786 |
| Trade balance | -0.088* | -0.132* | -0.011 | 0.067 | -0.156 | 0.136 | 0.052 | -0.029 | -0.110 | -0.032 |

** = signifikan pada taraf 5%

Desription:

(1) JCI stock index
(2) Agriculture stock index
(3) Finance stock index
(4) Trade, services and investment stock index
(5) Mining stock index
(6) Property, real estate, and construction stock index
(7) Consumer goods industry stock index
(8) Chemical and basic industry stock index
(9) Infrastructure, utility, and transportation stock index
(10) Manufacture stock index

**a. The influence of interest rate on JCI and sectoral index stocks return**

Interest rates variable has a negative effect on JCI stock returns showed that the lower interest rates, JCI stock returns will increase, and vice versa. This result is similar with previous research conducted by Rachman (2012), and Witcaksono (2010). According to Kewal (2012), if the company has a debt, the high interest rates can lead to high pay interest on the debt of the company. Increasing of pay such interest may lead to decreasing of profit companies that ia declineing the stock returns (Riantani and Tambunan 2013).

**b. The influence of exchange rate on JCI and sectoral index stocks return**

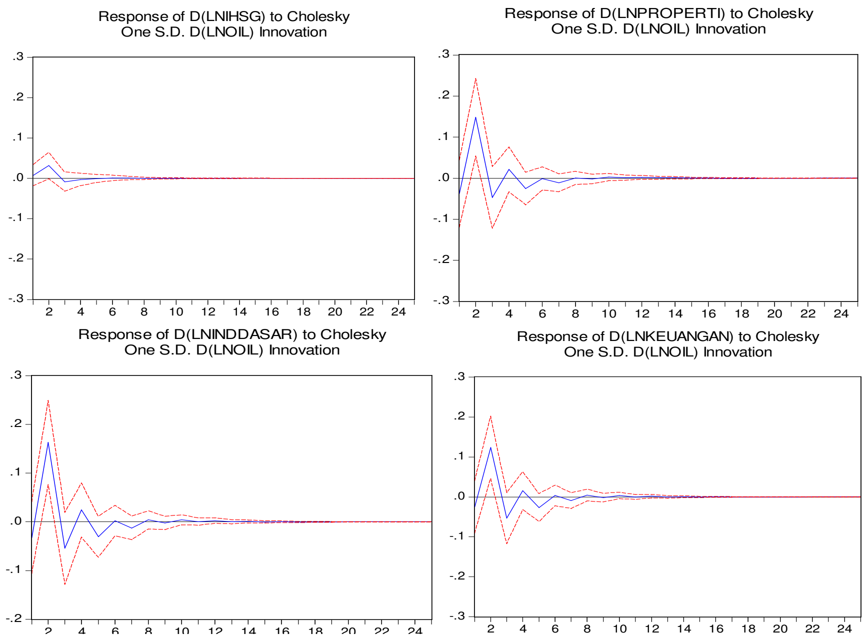
Exchange rates variable has a negative effect on JCI stock returns and all sectoral index stock returns except in trade, services and investment sector. It shows that the depreciation of the Rupiah to US Dollar would increase the JCI stock returns and all sectoral index stock returns, and to the contrary. Exchange rate depreciation would be decreasing the relative price of export and would be increasing export competitiveness. Furthermore, it would be increasing volume of export (Kewal 2012). So that, it would improving the cash flow of export oriented companies, and later increase its profit.

***Impulse Response Function (IRF)***

**a. Response of JCI and sectoral index stock returns to oil prices shock**

Response JCI stock returns and sectoral index stock returns to shocks in oil prices during the quarter 25 is presented in Figure 1. Generally, Oil price shocks is increasing of one standard deviation in the first quarter occurred JCI stock returns and index of agriculture sector, mining sector, trade, services and investment sector, and infrastructure sector about 1.3% to 3.78%. While, oil price shocks are decreasing of the standard deviation in the first quarter occurred in the stock return in basic industry and chemical sector, consumer goods industry sector, property sector and manufacturing sector with about 0.3% to 7.68%. Agriculture stock return is the fastest sector that stable in response of oil price shocks in sixth quarter and finance stock return is the longest sector that stable in response of oil price shock in 14$^{th}$ quarter.

**FIGURE 1: THE RESULT RESPONSE OF JCI AND SECTORAL INDEX STOCK RETURNS TO OIL PRICES SHOCK**

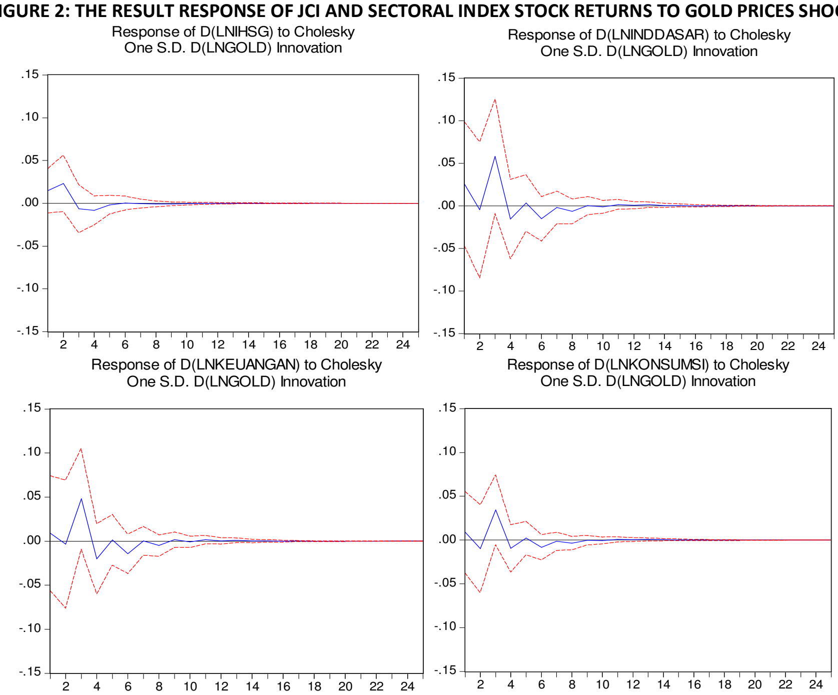



*Complete results are available from the authors upon request

**b. Response of JCI and the sectoral index stock returns to gold prices shocks**

Response JCI stock returns and sectoral index stock returns to price shocks of gold price during the 25 quarters is presented in Figure 2. Generally, gold price shocks on JCI stock returns and sectoral index led to an increasing of one standard deviation at the first quarter on the return of JCI and all stock in sectoral index about 0.27% to 7.49%. Agriculture stock return is the fastest sector that stable in response of oil price shocks in fifth quarter and mining stock return is the longest sector that stable in response of oil price shock in 9th quarter.

**FIGURE 2: THE RESULT RESPONSE OF JCI AND SECTORAL INDEX STOCK RETURNS TO GOLD PRICES SHOCK**

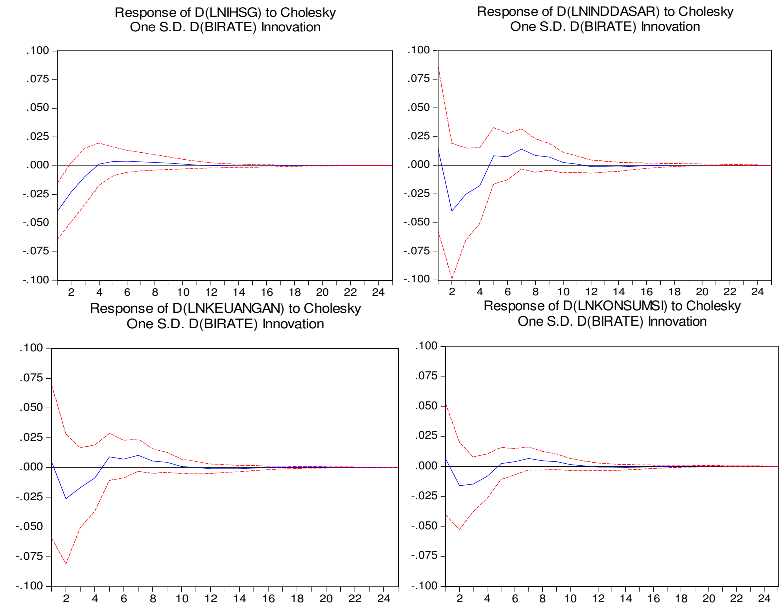



*Complete results are available from the authors upon request

**c. Response of JCI and the sectoral index stock returns to interest rate shocks**

Response JCI stock returns and sectoral index to shocks interest rate for 25 quarters is presented Figure 3. Generally, interest rate shocks is increasing of one standard deviation in the first quarter occurred finance sector, consumer goods industry sector, trade, services, and investment sector, basic industry and chemical sector, and manufaktur sector with about 0.1% to 1.4%. While, interest rate shocks is decreasing of the standard deviation in the first quarter occurred JCI stock returns and index of agriculture sector, mining sector, property, real estate, and construction building sector, and infrastructure, utility and transportation sector about 0.3% to 3.99%. finance stock return is the fastest sector that stable in response of interest rate shocks in 10th quarter and basic industry and chemical stock return is the longest sector that stable in response of interest rate shock in 15th quarter.

**FIGURE 3: THE RESULT RESPONSE OF JCI AND SECTORAL INDEX STOCK RETURNS TO INTEREST RATE SHOCK**

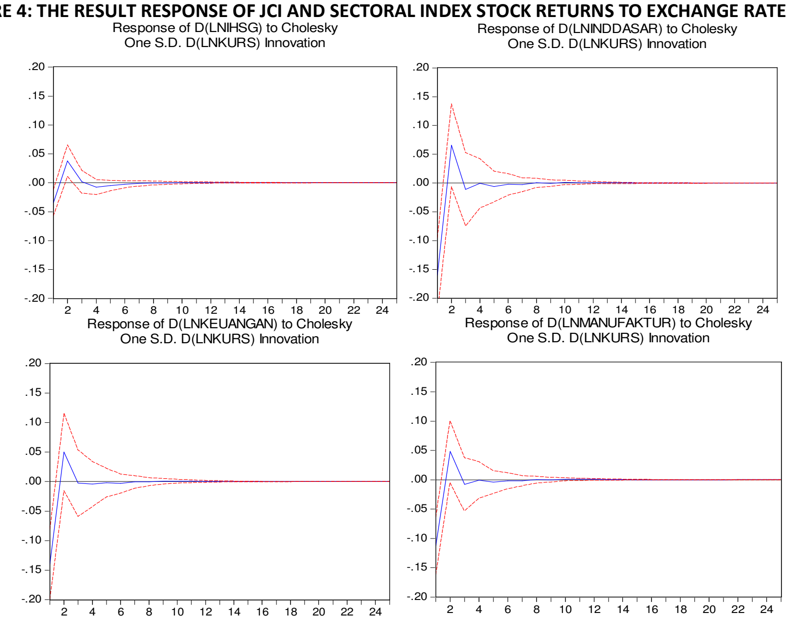



*Complete results are available from the authors upon request

**d. Response of JCI and the sectoral index stock returns to the exchange rate shocks**

Response JCI stock returns and sectoral index to exchange rate shocks during for 25 quarters is presented in Figure 4. Generally, exchange rate shocks resulted in a decreasing in the stock return of JCI and all sectoral index about 3.4% to 17.7%. Infrastructure, utility, and transportation stock return is the fastest sector that stable in response of exchange rate shocks in fourth quarter and trade, services, and investment stock return is the longest sector that stable in response of exchange rate shock in 7th quarter.

**FIGURE 4: THE RESULT RESPONSE OF JCI AND SECTORAL INDEX STOCK RETURNS TO EXCHANGE RATE SHOCK**

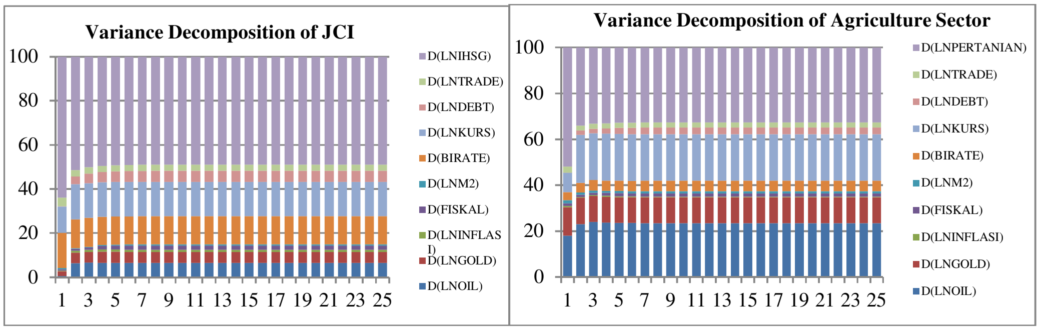



*Complete results are available from the authors upon request

***Forecast Error Variance Decomposition (FEVD)***

Figure 5 shows the result variance decomposition of JCI and sectoral index stock returns. The results of variance decomposition JCI stock returns can be seen in the first quarter to quarter 25. In the first quarter, variability of JCI stock return is itself about 63.95%. The large variability in the first period is interest rate and exchange rate in the amount 15.91% and 11.91%.

FIGURE 5: THE RESULT VARIANCE DECOMPOSITION OF JCI AND SECTORAL INDEX STOCK RETURNS




*Complete results are available from the authors upon request

The result of the decomposition of the variance in sectoral index stock returns are divided into three sector, that is primary sector (agriculture and mining), secondary sector (basic industry and chemical, consumtion goods industry sector, and manufacturing sector) and the tertiary sector (property, real estate and building construction sector, infrastructure, utility, and transportation sector, financial sector, and the trade, services and investment sector). The largest contribution is caused by the shock from stock returns each sectoral index itself. In the primary sector, the first quarter the variability of primary sector is the stock return of the agricultural and mining sector itself that is equal to 51.92% and 59.83%. the large of variability are oil price, exchange rates and gold prices are respectively 17.98%, 8.26% and 12.45%. In the secondary sector and the tertiary sector, the larges contribution is itself. The other large contribution is giving by exchange rate and oil price around 26.46% to 32.66% and -23.94% to 1.04%. Based on this analysis, international variables, such as exchange rates, oil price and gold price have a large impact to sectoral index stock returns. This is due to mostly traders in the Indonesian Stock Exchange are foreign investors in the amount of 64% (KSEI 2015).

## SUGGESTION

Based on the result of this research, there are some managerial implication that can be considered are as follows:

a. For investors, they need should be considering about the condition of macroEconomic and stock return for all sectors in stock market. MacroEconomic factors that must be considered including oil price, gold prices, and exchange rate. In addition, investor also need to monitors the movement of oil prices and gold prices. This is necessary because when oil price and gold price declined by the decreasing of oil prices and gold price will lead to lower stock returns of agriculture and mining sectors. Therefore, when a decline in oil prices and gold prices as well as rising interest rates and exchange rate is increasing then they should sell shares of agriculture and mining. In contrary, if there is an increasing in oil prices and gold prices as well as lower interest rates and the exchange rate then investor should buy shares of agriculture and mining as well as the investors who are interested in the property sector stocks, real estate, and construction and basic industry sectors and chemical should sell the stock.

b. For issuers, should pay attention to the influence of macroEconomic factors, especially the oil price, the gold price and the exchange rate. If there is a shocks on these variables, the listed companies in the sectoral index on the Indonesia Stock Exchange should to hedging to anticipate and minimize losses in the event of shocks to the variable.

## CONCLUSION

MacroEconomic variables which have short-term impact to JCI stock returns and sectoral index stock returns are oil prices, gold prices, interest rate, and exchange rate. Oil prices and gold price variables have a positive effect on stock returns of agriculture sector and mining sectors. Interest rates variable has negative effect on JCI stock return and exchange rate has negative effect on JCI stock returns and sectoral index stock returns except trade, services and investment sector.

MacroEconomic shock is causing different responses depend on JCI stock returns and sectoral index stock returns. Overall, shocks in macroEconomic variables that affect JCI stock returns and sectoral index stock returns are the oil price, gold price, interest rat, and exchange rate. FEVD found that the three largest contributions on the JCI stock return are exchange rate and interest rates. While the three largest contribution to the sectoral index stock return are exchange rate, oil prices, and gold price.

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## APPENDIX

**APPENDIX 1: RESULT OF OPTIMAL LAG TEST**

| | Lag (*Schwarz information criterion* (SC)) | | | | |
|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 |
| LNIHSG | **-36.45324** | -34.26356 | -30.90293 | -27.95460 | -30.30076 |
| LNPERTANIAN | **-35.44084** | -32.95271 | -29.67818 | -26.46229 | -27.21188 |
| LNKEUANGAN | **-34.40790** | -32.13032 | -29.58287 | -26.75489 | -27.92426 |
| LNPERDAGANGAN | **-34.52988** | -32.31978 | -29.37328 | -26.23643 | -27.28122 |
| LNPERTAMBANGAN | **-35.19239** | -32.42313 | -29.16268 | -26.20010 | -26.84660 |
| LNPROPERTI | **-34.06444** | -31.73139 | -29.05082 | -25.83490 | -27.67259 |
| LNKONSUMSI | **-35.11443** | -32.78903 | -29.90253 | -26.85446 | -26.90099 |
| LNINDDASAR | **-34.2156** | -31.99511 | -29.32906 | -26.22762 | -27.28367 |
| LNINFRASTRUKTUR | **-35.54970** | -33.10449 | -29.82951 | -26.17815 | -28.42671 |
| LNMANUFAKTUR | **-34.78300** | -32.50050 | -29.60714 | -26.64812 | -26.70442 |

Note: **Bold** entries are the minimum number of optimal lag

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