Jurnal Bisnis ***STRATEGI*** *● Vol. 27 No. 1 Juli 2018, halaman 63 – 78*
P-ISSN : 1410-1246, E-ISSN : 2580-1171

THE EFFECT OF INFLATION, USD AND YUAN EXCHANGE RATE, CRUDE OIL WTI AND ICP TO INDICES SECTORAL RETURNS IN INDONESIAN STOCK EXCHANGE

Iwan Yudianto[1], Harjum Muharam[2], Sugiono[3]

[1] *Bachelor of Management, Faculty of Economics and Business, Diponegoro University*
[2] *Master of Management, Faculty of Economics and Business, Diponegoro University*
[3] *Master of Management, Faculty of Economics and Business, Diponegoro University*

ABSTRACT

This study aimed to see whether there is an influence between macro-economic variables include changes of USD / IDR exchange rate, change of CNY / IDR exchange rate, inflation change, change of WTI crude oil and change of ICP crude oil to return of sectoral indices, represented by return of consumption index stock, return of financial index stock, return of infrastructure index stock and return of trade and service index stock. In addition, this study also tested whether there is a causal relationship of one or two directions of endogenous variables. Period in this study began from July 2009 - December 2017 (102 months). The Hypothesis testing of this study use Vector Autoregressive (VAR) method with Eviews 9 software. The result of the research concludes that the change of USD / IDR exchange rate have a significant negative effect on return of consumption index stock, return of financial index stock, return of infrastructure index stock and return of trade and services index stock. Changes of the CNY / IDR exchange rate have a significant negative effect on return of consumption index stock and return of financial index stock. Inflationary change have a significant negative effect on return of financial index stock and return of trade & service index stock. The change of crude oil WTI and ICP crude oil have no significant effect on all sectors. In the Granger causality test, it is found that the return of trade and services index stock has one way causality relationship to the return of infrastructure index stock.

Key Words*: Sectoral Indices, USD/IDR exchange rate, CNY/IDR exchange rate, Inflation, Crude Oil WTI, Crude Oil ICP, Vector Autoregression.*

I. INTRODUCTION

Capital market of investment is becoming a trend where most of the people begin to economic literacy. Many countries have their own stock exchanges, such as the Dow Jones and S & P 500 in the United States, the Nikkei in Japan, the Hang Seng in Hongkong, the SSE in Shanghai, China and the Kospi in Korea. Dynamic stock markets reflect the development and growth of the country's economy. Stock markets have a mediating role in meeting the interests of investors, corporations and governments. Fluctuating stock market indices can make a source of income for investors, especially for long-term investors.

The devaluation of the Chinese currency in 2015 greatly affects the global economy. After the announcement of the devaluation of the Chinese currency on August 11, 2015, the value of the rupiah exchange rate dropped against US Dollar by 0.42% to Rp 13,607 level. While the condition of Composite Stock Price Index (IHSG) on August 11, 2015 fell by 2.6% from the previous day to 4,622.59, and at the closing of December 30, 2015 amounted to 4593.01.

[1]*Corresponding author, Email: iwan.yu.jvy@gmail.com*

In 2015, there is oversupply of oil, due to competition between the United States and Saudi Arabia. The United States, which used to be an oil importer from Saudi Arabia, in 2013 is no longer dependent on oil from Saudi Arabia, because the United States has been able to produce its own oil, even the largest oil producer in the world. While Saudi Arabia and OPEC in the oil business competition want to suppress oil production in the United States by increasing oil production resulting in oil oversupply which make oil prices drop. Oil prices have plummeted with the slowdown in China's economy, which is the world's largest oil-consuming nation, which has resulted in a huge drop in oil demand from China.

In America, oil fields are mainly located in West Texas which has become the delivery point for crude contracts, then the average price in West Texas is taken as the standard of crude oil prices. For the reference price of crude oil in Indonesia called ICP (Indonesian Crude oil Price). ICP calculation method established by the government to accommodate the production sharing between the contractor and the government.

J.K.M Kuwornu (2012) conducted a study on the Ghana stock exchange entitled "*Effect of Macroeconomic Variabels on The Ghanaian Stock Market Returns: A Co-Integration Analysis*". The results of the study stated that the exchange rate has a significant negative effect over the long term on the index of the Ghana stock market. Inflation has a significant negative effect in the short term and has a significant long-term positive effect on the Ghana stock market index. World oil prices have a significant negative effect in the long run against the Ghana stock market index.

Siong Hok Law and Mansor H. Ibrahim (2014) conducted a study on the Malaysian stock exchange entitled "*The Response of Sectoral Returns to Macroeconomic Shock in The Malaysian Stock Market*". The results of this study indicate that the exchange rate has a significant negative and significant influence on sector indices. Inflation has a positive but insignificant effect on five sectoral indices except for financial and plantation sectors. Ramin Cooper Maysami, Lee Chuin Howe and Mohammad Atkin Hamzah (2004) conducted a study on "*Relationship between macroeconomic variabels and stock market indices: cointegration evidence from stock exchange of Singapore's all-S sector indices*", which states that Exchange rate and inflation have a positive effect against all sector indices on the Singapore Stock Exchange.

Muharam and Nurafni (2008) conducted a study on "*The Effects of Rupiah Exchange Rate and Dow Jones Industrial Average Index against Composite Stock Price Index (IHSG) on JSE*". The results stated that the exchange rate of USD / IDR has a negative effect on JCI. Sadorsky, P (1999) conducted a study entitled "*Oil Price Shocks and Stock Market Activity*", indicating that world oil prices negatively affected the SP500 Stock Exchange in the United States. Kilian and Park (2007) conducted a study entitled "*The Impact of Oil Prices Shock on the U.S. Stock Market*", indicating that world oil prices have a positive effect on the SP500 Stock Exchange in the United States.

II. LITERATURE REVIEW

Effects of Exchange Rate Changes on Returns of Indices Sectoral

Exchange rate indicates the ability of a country's currency exchange rate with other currencies. When the exchange rate falls, the export will increase. China as the largest importer of goods to Indonesia, certainly any policy issued by China will also affect to the Indonesian economy.

Since the Yuan Exchange Rate published by Bank Indonesia in June 2009, many companies in Indonesia are making import payments to China using Yuan exchange rate for the purchase of machinery and raw materials of the company. So the rise and fall of Yuan exchange rate against

Rupiah will affect cash flow and profitability of the company.

In research Siong Hok Law and Mansor H. Ibrahim (2014) conducted a study on the Malaysian stock exchange entitled "*The Response of Sectoral Returns to Macroeconomic Shock in The Malaysian Stock Market*" and Muharam and Nurafni (2008) conducted research on "*Exchange Rate Influence Rupiah and Dow Jones Industrial Average Indexes against Composite Stock Price Index (IHSG) on BEJ*" which states that the exchange rate has a significant negative effect on the stock index.

H1a: Changes in USD/IDR exchange rate negatively affect to return on consumer good sector.

H1b: Changes in USD/IDR exchange rate negatively affect to return on financial sector.

H1c: Changes in USD/IDR exchange rate negatively affect return on infrastructure sector

H1d: Changes in USD/IDR exchange rate negatively affect return on trade and services sector

H1e: Changes in CNY/IDR exchange rate negatively affect to return on consumer good sector.

H1f: Changes in CNY/IDR exchange rate negatively affect to return on financial sector.

H1g: Changes in CNY/IDR exchange rate negatively affect return on infrastructure sector

H1h: Changes in CNY/IDR exchange rate negatively affect return on trade and services sector

Inflation Change Influence on Returns of Indices Sectoral

High inflation will lower the purchasing power to goods and services and reduce the real income from their investments (Tandelilin, 2010). With the decreasing level of people's purchasing power, the company's revenue will decrease, so the company's profit will come down. With the decline in profits of the Company, will decrease investor interest to invest, thus will lower the stock price.

Research conducted by Chakrabarty and Sarkar (2013) on the correlation of macroeconomic indicators with the volatility of the Nifty index on the capital market in India from 1997 to 2012, concludes that inflation has a significant negative effect on the Nifty index on the capital market in India. Kim and Chul No (2013) examine the effect of inflation on stock price indices either on the aggregate level or sectoral level of stock indexes on US stock exchanges. The results of his research concluded that in general, inflation has a negative influence on the stock price index.

H2a: Changes Inflation negatively affect return on consumer good sector.

H2b: Changes Inflation negatively affect return on financial sector

H2c: Changes Inflation has a negative effect on return on infrastructure sector

H2d: Changes Inflation has a negatively affect return on trade and services sector

The Effects of Crude Oil Changes on Returns of Indices Sectoral

The decline in crude oil prices is affected by the weakening of global economic growth and the increasing production of oil producing countries. Currently, the rise in world crude oil prices is often used as a reference for global economic recovery. The increase in world oil prices will have a positive impact on mining companies, and will have a negative impact on industrial and transport companies that use oil and gas as the main fuel of the industry.

In a study conducted by J.K.M Kuwornu (2012) entitled "*Effect of Macroeconomic Variabels on the Ghanaian Stock Market Returns: A Co-integration Analysis*" shows that oil prices have a significant negative effect on stock index indices in Ghana over the long term. This study is in line with research conducted by P. Sadorsky (1999) on the US S & P 500 Stock Exchange entitled

"*Oil Price Shocks and Stock Market Activity*" which shows that oil prices have a negative effect on stock market indices in the United States.

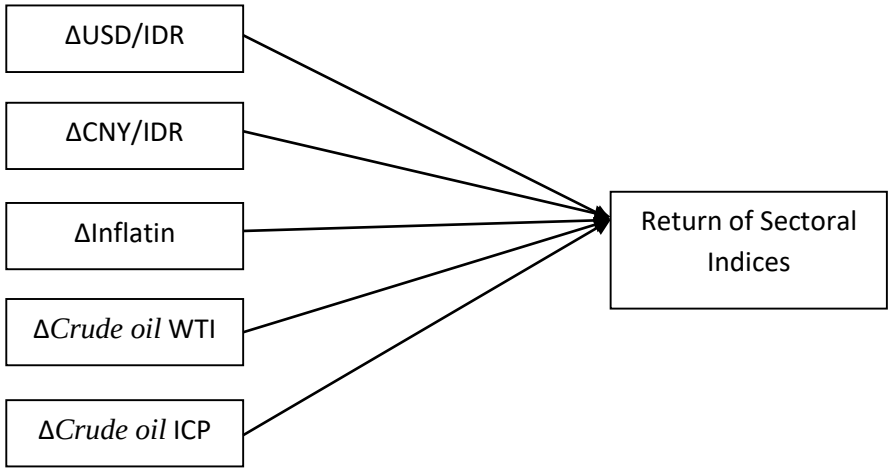
H3a: Changes in WTI price negatively affect to return on consumer good sector.
H3b: Changes in WTI price negatively affect to return on financial sector.
H3c: Changes in WTI price negatively affect return on infrastructure sector
H3d: Changes in WTI price negatively affect return on trade and services sector
H3e: Changes in ICP price negatively affect to return on consumer good sector.
H3f: Changes in ICP price negatively negatively affect to return on financial sector.
H3g: Changes in ICP price negatively negatively affect return on infrastructure sector
H3h: Changes in ICP price negatively negatively affect return on trade and services sector

Relationship between Return of Consumption Sector, Financial Sector, Infrastructure Sector and Trade and Service Sector

Vardar et al (2012) conducted a study entitled "*Long-Run and Short-Run Dynamics among the Sectoral Stock Indices: Evidence from Turkey*", on the performance analysis of sector indices at Istanbul, Turkey. In the study concluded, the banking sector affects the chemical industry sector, investment sector and telecommunications sector. The chemical industry sector has a significant effect on the trade sector, and there is a two-way causal relationship only to the investment sector with the trade sector. In a study by Constantinou et al (2005) entitled "*Cointegration, causality and domestic portfolio diversification in the Cyprus Stock Exchange*" on cointegration relations, causality and domestic portfolio diversification in the Cyprus stock exchange, it states that of the 12 existing sectoral indices, there is a causal relationship two-way banking sector with information, insurance and real estate sectors, and between development sectors with the financial services sector, fisheries and miscellaneous sectors. The causality relationship between sectoral sector returns is needed in order to develop a stock diversification strategy.

H4 : There is a causality relationship between the return of consumption goods sectoral, financial sectoral, infrastructure sectoral and trade sectoral in Indonesia Stock Exchange

Figure 1
Research Model



The operational definition of the variable describes the operational notion of the variables developed in this study.

There are six variables developed, namely Sectoral Return Index, Δ USD / IDR Rate, Δ CNY / IDR Rate, ΔInflation, ΔWTI, and ΔICP.

Table 1
The Operational Definition

Variable	Definition	Formula
Return of Sectoral Indices	The difference between sectoral index value when closing on the last trading day of month t with sectoral index value when opening on the first trading day of month t	$RIS_t = \frac{(IST_t - ISB_{t-1})}{ISB_{t-1}} \times 100\%$
ΔUSD/IDR	The difference between the USD / IDR rate on the last trading day of month t with the exchange rate USD / IDR on the last trading day of the previous month.	$\Delta KRSus_t = \frac{(KRSus_t - KRSus_{t-1})}{KRSus_{t-1}} \times 100\%$
ΔCNY/IDR	The difference between the CNY / IDR exchange rate on the last trading day of month t with the exchange rate CNY / IDR on the last trading day of the previous month	$\Delta KRScny_t = \frac{(KRScny_t - KRScny_{t-1})}{KRScny_{t-1}} \times 100\%$
ΔInflation	The difference between the Consumer Price Index (CPI) in the month concerned with the Consumer Price Index (CPI) in the previous month	$\Delta INF_t = \frac{(IHK_t - IHK_{t-1})}{IHK_{t-1}} \times 100\%$
ΔWTI	The difference between the price of WTI crude oil at the end of the month t with the price of WTI crude oil on the last trading day of the previous month	$\Delta WTI_t = \frac{(WTI_t - WTI_{t-1})}{WTI_{t-1}} \times 100\%$
ΔICP	The difference between the ICP crude oil price at the end of the month t with the ICP crude oil price on the last trading day of the previous month	$\Delta ICP_t = \frac{(ICP_t - ICP_{t-1})}{ICP_{t-1}} \times 100\%$

III. METHOD

The data sources used in this study were obtained from Bloomberg and Reuters. In addition, the authors also use data sources from the internet through the website of official institutions such as Bank Indonesia website (www.bi.go.id), Biro Pusat Statistics (www.bps.go.id), Indonesian Stock Exchange (www.idx. co.id), Kustodian Sentra Efek Indonesia (www.ksei.co.id), Financial Services Authority (www.ojk.go.id), Ministry of Energy and Mineral Resources (www.esdm.go.id), and various other official sources.

Sample used in this research include:

1. Return of sector index on Indonesia Stock Exchange as dependent variable.
2. Changes of USD / IDR Rate, CNY / IDR Rate, Inflation, Crude Oil WTI and Crude ICP Oil are used as samples of macroeconomic variables. The data collection period from July 2009 to December 2017.

Data analysis used in this research is Vector Autoregressive (VAR). The steps in the VAR method include the data stationality test, model estimation, t-statistical test, f-statistic test, and observation of coefficient of determination (R2 and adjusted R2), Granger causality test, Impulse response Function (IRF) analysis and Forecast

analysis Error Variance Decomposition (FEVD).

The general model of VAR with lag 1 in this study can be formulated as follows:

$SCG_t = \alpha_1 i + \sum\beta_{1i} SCG_{t-1} + \sum\beta_{1i} SFIN_{t-1} + \sum\beta_{1i} SINF_{t-1} + \sum\beta_{1i} STRD_{t-1} + \sum\beta_{1i} \Delta CNY + \sum\beta_{1i} \Delta USD + \sum\beta_{1i} \Delta ICP + \sum\beta_{1i} \Delta WTI + \sum\beta_{1i} \Delta INFLA + \varepsilon t$

$SFIN_t = \alpha_2 i + \sum\beta_{2i} SCG_{t-1} + \sum\beta_{2i} SFIN_{t-1} + \sum\beta_{2i} SINF_{t-1} + \sum\beta_{2i} STRD_{t-1} + \sum\beta_{2i} \Delta CNY + \sum\beta_{2i} \Delta USD + \sum\beta_{2i} \Delta ICP + \sum\beta_{2i} \Delta WTI + \sum\beta_{2i} \Delta INFLA + \varepsilon t$

$SINF_t = \alpha_3 i + \sum\beta_{3i} SCG_{t-1} + \sum\beta_{3i} SFIN_{t-1} + \sum\beta_{3i} SINF_{t-1} + \sum\beta_{3i} STRD_{t-1} + \sum\beta_{3i} \Delta CNY + \sum\beta_{3i} \Delta USD + \sum\beta_{3i} \Delta ICP + \sum\beta_{3i} \Delta WTI + \sum\beta_{3i} \Delta INFLA + \varepsilon t$

$STRD_t = \alpha_4 i + \sum\beta_{4i} SCG_{t-1} + \sum\beta_{4i} SFIN_{t-1} + \sum\beta_{4i} SINF_{t-1} + \sum\beta_{4i} STRD_{t-1} + \sum\beta_{4i} \Delta CNY + \sum\beta_{4i} \Delta USD + \sum\beta_{4i} \Delta ICP + \sum\beta_{4i} \Delta WTI + \sum\beta_{4i} \Delta INFLA + \varepsilon t$

For a description of the variables in the general model VAR formula in this study as follows:

SCG: Consumer good Sector
SFIN: Finance Sector
SINF: Infrastructure Sector
STRD: Trade Sector
ΔCNY: Change of CNY / IDR Rate
ΔUSD: Change of USD / IDR Rate
ΔICP: Changes in ICP crude oil prices
ΔWTI: Changes in WTI crude oil prices
ΔINFLA: Inflation Changes

Technical Analysist

In this research using data analysis process with Vector Autoregressive (VAR) method by using Eviews 9 software. Data processing begins with stationery test of data by using Augmented Dickey-Fuller (ADF Test) test and Philips-Perron Test In this research, not stationary at the level will be done with differencing process and continued by doing cointegration test. Conversely, if the data has stationary at the level it can be estimated VAR model.

IV. DATA ANALYSIST

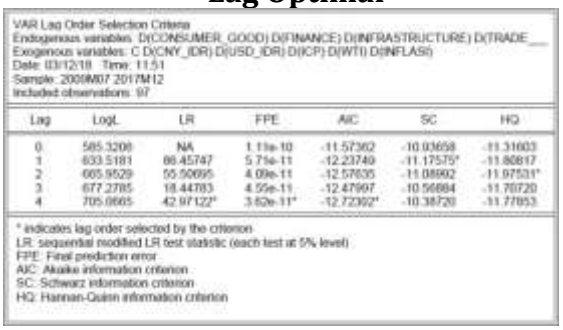
1. Stationeritas Data

In Augmented Dickey-Fuller (ADF Test) and Philips-Perron testing, the results were stationary on all variables with degree of level. This can be proved by the absolute value of t-statistic greater than the absolute value of t_McKinnon critical values that is -3,461094, and with a significant probability smaller than α = 5%, so it can be concluded that the tested data has stationary at degree level .

2. Optimal Lag

The optimal lag can be determined through several criteria, among others, Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), Final Prediction Error (FPE), Hannan-Quinn Information Criterion (HQ) and Sequential Modified LR Statistical Test (LR). The optimal lag selection criteria are lags with the lowest AIC, SIC, FPE, HQ or lag values with the largest LR values.

Table 2
Lag Optimal



VAR Lag Order Selection Criteria
Endogenous variables: D(CONSUMER_GOOD) D(FINANCE) D(INFRASTRUCTURE) D(TRADE__
Exogenous variables: C D(CNY_IDR) D(USD_IDR) D(ICP) D(WTI) D(INFLAS)
Date: 03/12/18 Time: 11:51
Sample: 2008M07 2017M12
Included observations: 97

Lag	LogL	LR	FPE	AIC	SC	HQ
0	585.3208	NA	1.11e-10	-11.57362	-10.03658	-11.31603
1	633.5181	86.45747	5.71e-11	-12.23749	-11.17575*	-11.80817
2	665.9529	55.50695	4.09e-11	-12.57635	-11.08992	-11.97531*
3	677.2785	18.44783	4.55e-11	-12.47997	-10.56884	-11.70720
4	705.0665	42.97122*	3.62e-11*	-12.72392*	-10.38720	-11.77853

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

In Table 2, it can be concluded that the optimal lag on the VAR model is lag 4, which is selected based on the largest LR value criteria and the smallest FPE and AIC values marked with asterisks (*) most than any other lag.

3. Statistics-t

a. Consumer Good Sectoral

Based on the t-statistic test, the consumer good one to four previous period, the previous one and four period finance variables, the two previous period's infrastructure variables, the exogenous variables CNY/IDR and USD/IDR have statistically absolute values greater than the value of t- table, which means a significant

effect on the variable return index consumer sector good.

In contrast, in exogenous variables ICP, WTI and Inflation have a statistically absolute value smaller than t-table value, which means no significant effect on consumer good return index variable.

b. Financial Sectoral

Based on the t-statistical test results, the previous period's finance variables, the previous three-period infrastructure variables, the four previous trade variables, the exogenous variables CNY/IDR, USD/IDR, and Inflation have a statistically absolute value greater than the t-table value, which means a significant effect on the variable return index of the finance sector.

In contrast, on exogenous variables ICP and WTI have absolute values of statistics smaller than t-table value, which means no significant effect on the return index finance variables.

c. Infrastructure Sectoral

Based on the t-statistical results, the previous four-period finance variables, the infrastructure variables one and two previous periods, the trade variables two and four previous periods, and the exogenous USD / IDR variables have a statistically absolute value greater than the t-table value. So it can be concluded have a significant effect on infrastructure sector index return variable.

In exogenous variables CNY / IDR, ICP, WTI and Inflation have a statistically absolute value smaller than the t-table value. So it can be concluded does not have a significant influence on the variable Return index of infrastructure.

d. Trade and Service Sectoral

Based on the t-statistic test, the consumer good one and the previous three periods, the previous four-period finance variables, the previous three-period infrastructure variables, the trade variables one, two and four previous periods, the exogenous USD / IDR and inflation have absolute values greater than the t-table value. So it can be concluded significant effect on trade sector index return variables.

In exogenous variables CNY/IDR, ICP, and WTI have statistically absolute values smaller than t-table values. So it can be concluded does not have a significant effect on the return trade index variables.

4. Statistics-F

Table 3
Statistics-F

Model	F - Statistics	F - Table	Note
Return Consumer good	3.368684	2,04	Significant
Return Finance	4.895709	2,04	Significant
Return Infrastructure	3.455021	2,04	Significant
Return Trade	3.748618	2,04	Significant

In the F-Statistic test, all models obtained a larger F-statistic value when compared to the F-table value of 2.04. This means that at a 95% confidence level or at a significance level of α = 5%, a significantly built VAR model is able to show the relationship between exogenous variables against endogenous variables. Thus it can be concluded that the exogen simultaneously affect the endogenous variables.

5. Coeffisient Determination (R^2 and adjusted R^2)

Table 4
Coefficient Determination

Model	R^2	adjusted R^2
Return Consumer good	48,53%	34,13%
Return Finance	57,82%	46,01%
Return Infrastructure	49,17%	34,94%
Return Trade	51,21%	37,55%

In table 4, the consumer good return has R^2 of 48.53%, which means that 48.53%

return of consumer good sectoral is influenced by variable of CNY / IDR exchange rate, USD / IDR exchange rate, ICP crude oil, crude oil WTI and inflation, as well as consumer good sector index return, financial sector index return, infrastructure sector index return, trade index return of one to four previous periods. While the rest of 51,47% return of consumer good sector influenced by other factor - factor. In the index return model of finance sector has R^2 value of 57.82%, which means that 57.82% return index of the finance sector is influenced by CNY / IDR exchange rate variables, USD / IDR exchange rate, ICP crude oil, WTI crude oil and inflation, and consumer good sector index return, financial sector index return, infrastructure sector index return, trade index index return one to four previous period. While the remaining 42.18% return index of the finance sector is influenced by other factors - factors. In the index return model, the infrastructure sector has R^2 of 49.17%, which means that 49.17% of the index return of the infrastructure sector is influenced by CNY / IDR exchange rate variables, USD / IDR exchange rate, ICP crude oil, WTI crude oil and inflation, and consumer good sector index return, financial sector index return, infrastructure sector index return, trade index index return one to four previous period. While the remaining 50.83% return index of the infrastructure sector is influenced by other factors - factors. In the trade sector index return model has R^2 value of 51.21%, which means that 51.21% of trade sector index return is influenced by CNY / IDR exchange rate variables, USD / IDR exchange rate, ICP crude oil, WTI crude oil and inflation, and consumer good sector index return, financial sector index return, infrastructure sector index return, trade index index return one to four previous period. While the rest of 48.79% return index trade index is influenced by other factors - factors.

6. Causality Granger

Granger causality test in this study was conducted at 95% confidence level or at significance level α = 5%. In addition, the Granger causality test is performed on lag 4, selected as the most optimal lag. In the Granger causality test between consumer, finance, infrastructure and trade return variables almost all got F-statistic value smaller than F-table value, only on the return of trade sector to Return of infrastructure sector obtained F-statistic value of 2.30198 greater than the F-table value of 2.04. So it can be concluded the Return of trade sector has a significant effect on the Return of infrastructure sector, while among other sector Return no significant effect.

7. Impulse response Function

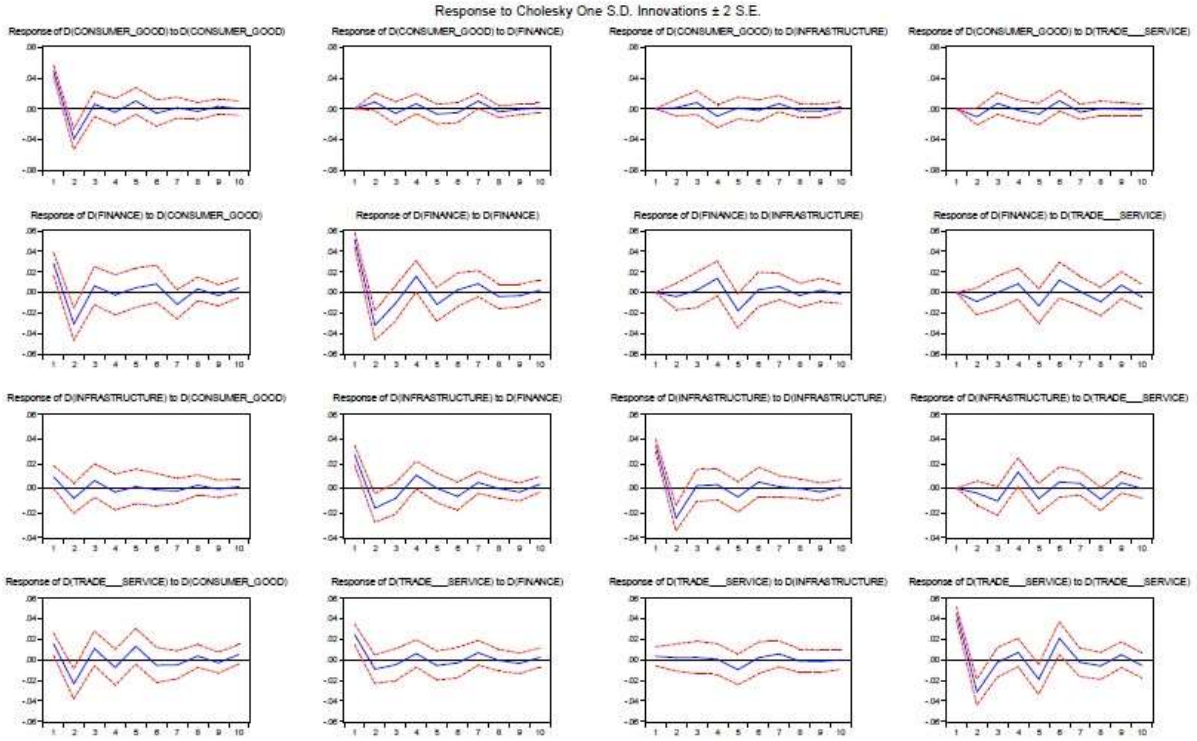
This analysis aims to observe the influence/response of endogenous variables due to changes/shocks that occur in other endogenous variables in the VAR model. The observed effects include how long the response experienced by endogenous variables occurs in other endogenous variables in the VAR model. Based on Figure 1, in the event of shocks on the return of the consumer good sector index (first left-sided image), the Return of the financial sector index, the infrastructure sector and the trade sector reach the balance point back in the 2nd and 3rd periods, and move approaching the equilibrium point (convergence).

In the case of shocks on the Return of the financial sector index (second left-hand picture), the Return of consumer good sector index, the infrastructure sector and the trade sector reach the balance point back in the 3rd and 4th periods, and move closer to the equilibrium point (convergence). In the event of shocks on the Return of the infrastructure sector index (second right-hand picture), the consumer sector good, the financial sector and trade sector returns reached the balance point back in the 4th

and 5th periods, moving closer to the equilibrium point (convergence).

At the time of the shocks on the trade sector index return (first right-hand picture), the consumer sector good, the financial sector and the infrastructure sector returns to the balance point back in the 3rd and 4th periods, moving closer to the equilibrium point (convergence), so it can be concluded that the shocks between endogenous variables do not provide permanent effect or only temporary.

Figure 2 ***Impulse response*** **Function**



8. Forecast Error Variance Decomposition (FEVD)

This analysis is conducted to determine the amount of contribution percentage of each variables endogenous variables due to the presence of certain shocks in the VAR model. FEVD analysis is conducted on each model of Return index of consumer good, finance, infrastructure and trade. In the consumer sector good model, the first period of 100% shocks The return of consumer good sector is influenced by itself. In the second period of the shocks, 95.60% The return of the consumer good sector was influenced by itself, 1.91% influenced by the Return of the finance sector, 0.04% influenced by the Return of infrastructure sector and 2.45% influenced by the Return of trade sector. In the third period onwards the effect of Return index finance, infrastructure and trade increasingly strong.

In the financial sector model, the first period of shocks, 77.10% The return of finance sector affected by itself and by 22.90% influenced by the Return of consumer good sector. In the second period of shocks, 66.85% Return on finance sector influenced by itself, 31.48% influenced by the Return of consumer good sector, 0.29% influenced by Return of infrastructure sector and 1.38% influenced by Return trade sector. In the third and subsequent periods of influence from the consumer good index return, infrastructure and trade are getting stronger.

In the infrastructure sector model, the first period of shocks, 59.57% Infrastructure sector return influenced by itself, by 4.28% influenced by the Return of consumer good sector, by 36.15% influenced by the Return

of the finance sector. In the second period of shocks, 60.76% Return on infrastructure sector influenced by itself, 5.15% influenced by the Return of consumer good sector, 33.55% influenced by the Return of the finance sector and 0.55% influenced by the Return of trade sector. In the third period onwards the influence of consumer index, goodness, finance and trade returns are getting stronger. In the trade sector model, the first period of shocks, 70.26% of the trade sector's return is influenced by itself, by 8.30% influenced by the consumer sector good return of 21.03% influenced by the return of the finance sector and by 0.42% influenced by the Return of infrastructure sector. In the second period of the shocks, 66.94% Return on trade sector influenced by itself, 17.35% influenced by the Return of consumer good sector, 15.35% influenced by Return on finance sector and 0.37% influenced by Return of infrastructure sector. In the third and subsequent periods, the effects of consumer, finance and infrastructure returns are strengthened.

9. The Final VAR Model

Based on the optimal lag determination, the t-statistic test and the F-statistic test have been performed, the final VAR model equation obtained through this research is as follows:

$SCG_t = -0.000246 - 0.874721SCG_{t-1} - 0.562794SCG_{t-2} - 0.521501SCG_{t-3} - 0.215906SCG_{t-4} + 0.249371SFIN_{t-1} + 0.249659SFIN_{t-4} + 0.363425SINF_{t-2} - 0.223770STRD_{t-1} + 1.409474\Delta CNY - 1.369907\Delta USD + \varepsilon t$

$SFIN_t = 0.001222 - 0.269367SCG_{t-1} - 0.296737SCG_{t-3} - 0.482272SFIN_{t-1} - 0.380608SFIN_{t-2} - 0.319103SFIN_{t-3} + 0.494869SINF_{t-3} - 0.296734STRD_{t-2} - 0.310769STRD_{t-4} + 1.957259\Delta CNY - 1.921653\Delta USD + \varepsilon t$

$SINF_t = -0.000504 + 0.239301SFIN_{t-4} - 0.685830SINF_{t-1} - 0.361019SINF_{t-2} - 0.345451STRD_{t-2} - 0.186928STRD_{t-4} - 1.059494\Delta USD + \varepsilon t$

$STRD_t = -0.0000875 - 0.327311SCG_{t-1} - 0.344661SCG_{t-3} + 0.328145SFIN_{t-4} + 0.387451SINF_{t-3} - 0.693651STRD_{t-1} - 0.581406STRD_{t-2} - 0.495563STRD_{t-4} - 1.282437\Delta USD - 0.001404\Delta INFLA + \varepsilon t$

Hypotheses

Hypothesis testing in this study was done by comparing the t-statistical value of output VAR estimation with t-table value. The t-statistic value will determine the level of significance between the two variables tested. If the t-statistic value is greater than the t-table value, then the independent variable is partially significant to the dependent variable. Conversely, if the t-statistic value is smaller than the t-table value, the partially independent variable has no significant effect on the dependent variable.

In testing this hypothesis if the coefficient of VAR estimation results are positive then it can be concluded that the independent variable has a positive effect on the dependent variable. Conversely if the coefficient of VAR estimation results are negative then it can be concluded that the independent variable has a negative effect on the dependent variable

Table 5
Hyphotheses

Hyphotheses	Independen Variable	Dependen Variable	Impact	Note	Conclucion
H1a	ΔUSD/IDR	Consumption	Negative	Significant	√
H1b	ΔUSD/IDR	Finance	Negative	Significant	√
H1c	ΔUSD/IDR	Infrastructure	Negative	Significant	√
H1d	ΔUSD/IDR	Trade & Service	Negative	Significant	√

H1e	ΔCNY/IDR	Consumption	Positive	Significant	X
H1f	ΔCNY/IDR	Finance	Positive	Significant	X
H1g	ΔCNY/IDR	Infrastructure	Positive	Unsignificant	X
H1h	ΔCNY/IDR	Trade & Service	Positive	Unsignificant	X
H2a	ΔInflation	Consumption	Positive	Unsignificant	X
H2b	ΔInflation	Finance	Negative	Significant	√
H2c	ΔInflation	Infrastructure	Negative	Significant	√
H2d	ΔInflation	Trade & Service	Negative	Significant	√
H3a	ΔWTI	Consumption	Positive	Unsignificant	X
H3b	ΔWTI	Finance	Negative	Unsignificant	X
H3c	ΔWTI	Infrastructure	Positive	Unsignificant	X
H3d	ΔWTI	Trade & Service	Negative	Unsignificant	X
H3e	ΔICP	Consumption	Negative	Unsignificant	X
H3f	ΔICP	Finance	Negative	Unsignificant	X
H3g	ΔICP	Infrastructure	Positive	Unsignificant	X
H3h	ΔICP	Trade & Service	Positive	Unsignificant	X
H4	There is a causality relationship between the return of consumption goods sectoral, financial sectoral, infrastructure sectoral and trade sectoral in Indonesia Stock Exchange		One Way	the return of trade sector to the return of infrastructure sector.	√

There are 21 proposed hypotheses, 8 hypotheses are accepted and 13 hypotheses are declared rejected. At USD/IDR exchange rate changes have a significant negative impact on the consumption sector, finance, infrastructure and trade. The change in CNY/IDR exchange rate has a significant positive effect on the consumption and financial sectors, and has no significant positive effect on the infrastructure and trade sectors.

Inflationary changes have a positive and insignificant effect on the consumption good sector, and have a significant negative effect on the financial sector, infrastructure and trade. In the change of WTI crude oil have no significant positive effect on consumption good sector and infrastructure, and negatively significant effect on financial sector and trade. The change in ICP crude oil has negatively insignificant effect on the consumption good and financial sectors, and positively insignificant to the infrastructure and trade sectors. In addition the results of Granger causality test states there is a causal relationship between sectoral return in the form of one-way causality relationship that is on the return of trade sector to the return of infrastructure sector.

V. CONCLUSIONS, SUGGESTIONS, AND LIMITATIONS

Conclusions

1. The variable of USD / IDR exchange rate changes has a significant negative effect on all endogenous variables studied, ie in return of the consumer goods sector, return of the financial sector, return of the infrastructure sector and return of the trade and service sector.
2. CNY / IDR exchange rate variables have a significant positive effect on return of the consumer goods sector and return of the financial sector. On the other hand, CNY / IDR exchange rate changes have positive but not significant effect return of the infrastructure sector and return of the trade and service sector.
3. Inflation change variables have positive and insignificant effect on the return of the consumer goods sector. On the other hand, changes in inflation have a negative and significant effect return of the financial sector, return of the

infrastructure sector and return of the trade and service sector.

4. Variable change of WTI crude oil have positive and insignificant effect on return of the consumer goods sector and return of the infrastructure sector. On the other hand, the change of WTI crude oil has negative and insignificant effect on return of the financial sector and return of the trade and service sector.
5. Variable change of ICP crude oil have positive and insignificant effect on return of the infrastructure sector and return of the trade and service sector.. On the other hand ICP crude oil changes have negative and insignificant effect on return of the consumer goods sector and return of the financial sector.
6. Based on the results of Granger causality test states there is a causal relationship between sectoral sector returns in the form of one-way causal relationship that is on return of the trade and service sector to return of the infrastructure sector.

Limitation Of Research

Some limitations in this study include:

1. This research uses only five macroeconomic variables, which include USD / IDR exchange rate, CNY / IDR exchange rate, inflation, WTI crude oil and ICP crude oil as independent variable (exogenous).
2. The period of variable data in this research only 102 months, ie from July 2009 until December 2017, because the data of CNY/IDR was officially issued by Bank Indonesia in June 2009, so in the calculation of change of exchange rate CNY / IDR can only start in July 2009.
3. There are results that have not been in accordance with the existing theoretical concepts that cause the hypothesis is rejected, where the possibility of things caused by economic conditions in Indonesia are different characteristics with other countries.

Suggestions for Future Research

With some limitations of research in this study, the following proposed future research agenda that could be a reference include:

1. Using other foreign exchange rate variables such as Euro exchange rate and Pound Sterling exchange rate.
2. Using other stock index returns, such as LQ45 and Compass 100 as dependent variable (endogenous).
3. Extend the study period to obtain better and more accurate expected information.
4. Conduct separate research for macroeconomic variables of crude oil with longer data and different research models, to ascertain whether it is true that crude oil has no significant effect on stock returns.

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Vector Autoregression Estimates				
Date: 03/12/18 Time: 11:54				1,66216
Sample (adjusted): 2009M12 2017M12				
Included observations: 97 after adjustments				
Standard errors in ( ) & t-statistics in [ ]				
	D(CONSUMER_GOOD)	D(FINANCE)	D(INFRASTRUCTURE)	D(TRADE___SERVICE)
D(CONSUMER_GOOD(-1))	-0.874721	-0.269367	-0.058400	-0.327311
	(0.13297)	(0.15680)	(0.12059)	(0.14469)
	[-6.57852]	[-1.71794]	[-0.48428]	[-2.26223]
D(CONSUMER_GOOD(-2))	-0.562794	-0.182556	0.138942	-0.199868
	(0.15117)	(0.17826)	(0.13710)	(0.16450)
	[-3.72287]	[-1.02407]	[1.01342]	[-1.21504]
D(CONSUMER_GOOD(-3))	-0.521501	-0.296737	-0.011442	-0.344661
	(0.14913)	(0.17585)	(0.13525)	(0.16227)
	[-3.49705]	[-1.68742]	[-0.08460]	[-2.12401]
D(CONSUMER_GOOD(-4))	-0.215906	-0.161824	-0.020931	-0.077172
	(0.11929)	(0.14067)	(0.10819)	(0.12981)
	[-1.80989]	[-1.15036]	[-0.19347]	[-0.59452]
D(FINANCE(-1))	0.249371	-0.482272	0.092872	0.088696
	(0.14002)	(0.16511)	(0.12699)	(0.15236)
	[1.78100]	[-2.92089]	[0.73136]	[0.58216]
D(FINANCE(-2))	0.051065	-0.380608	0.037326	0.070632
	(0.15129)	(0.17840)	(0.13721)	(0.16462)
	[0.33753]	[-2.13342]	[0.27204]	[0.42905]
D(FINANCE(-3))	0.211261	-0.319103	0.015439	0.015758
	(0.14537)	(0.17143)	(0.13184)	(0.15819)
	[1.45322]	[-1.86143]	[0.11710]	[0.09961]
D(FINANCE(-4))	0.249659	-0.026939	0.239301	0.328145
	(0.12407)	(0.14630)	(0.11252)	(0.13500)
	[2.01232]	[-0.18413]	[2.12678]	[2.43070]
D(INFRASTRUCTURE(-1))	0.062090	-0.096415	-0.685830	0.130376
	(0.15640)	(0.18443)	(0.14184)	(0.17018)
	[0.39700]	[-0.52278]	[-4.83522]	[0.76610]
D(INFRASTRUCTURE(-2))	0.363425	-0.005809	-0.361019	0.279969
	(0.19218)	(0.22663)	(0.17430)	(0.20912)
	[1.89102]	[-0.02563]	[-2.07129]	[1.33878]
D(INFRASTRUCTURE(-3))	0.222404	0.494869	-0.078239	0.387451

	(0.18790)	(0.22158)	(0.17041)	(0.20446)
	[1.18362]	[2.23338]	[-0.45911]	[1.89497]
D(INFRASTRUCTURE(-4))	0.025048	0.057790	-0.211777	0.012845
	(0.16155)	(0.19050)	(0.14651)	(0.17579)
	[0.15505]	[0.30336]	[-1.44547]	[0.07307]
D(TRADE___SERVICE(-1))	-0.223770	-0.191986	-0.088736	-0.693651
	(0.12058)	(0.14219)	(0.10936)	(0.13121)
	[-1.85572]	[-1.35016]	[-0.81141]	[-5.28653]
D(TRADE___SERVICE(-2))	-0.140784	-0.296734	-0.345451	-0.581406
	(0.13163)	(0.15522)	(0.11937)	(0.14323)
	[-1.06958]	[-1.91175]	[-2.89384]	[-4.05934]
D(TRADE___SERVICE(-3))	-0.083492	-0.123459	-0.096978	-0.208912
	(0.13686)	(0.16139)	(0.12412)	(0.14892)
	[-0.61006]	[-0.76499]	[-0.78132]	[-1.40284]
D(TRADE___SERVICE(-4))	-0.163107	-0.310769	-0.186928	-0.495563
	(0.11777)	(0.13888)	(0.10681)	(0.12815)
	[-1.38493]	[-2.23768]	[-1.75009]	[-3.86698]
C	-0.000246	0.001222	-0.000504	8.75E-05
	(0.00504)	(0.00594)	(0.00457)	(0.00548)
	[-0.04872]	[0.20558]	[-0.11032]	[0.01595]
D(CNY_IDR)	1.409474	1.957259	1.002938	1.217207
	(0.70611)	(0.83266)	(0.64039)	(0.76834)
	[1.99611]	[2.35062]	[1.56615]	[1.58420]
D(USD_IDR)	-1.369907	-1.921653	-1.059494	-1.282437
	(0.69622)	(0.82100)	(0.63142)	(0.75758)
	[-1.96764]	[-2.34064]	[-1.67796]	[-1.69281]
D(ICP)	-0.030138	-0.033195	0.009881	0.021635
	(0.08119)	(0.09574)	(0.07363)	(0.08835)
	[-0.37121]	[-0.34672]	[0.13419]	[0.24490]
D(WTI)	0.035181	-0.018863	0.014896	-0.015461
	(0.07520)	(0.08868)	(0.06820)	(0.08183)
	[0.46782]	[-0.21271]	[0.21841]	[-0.18894]
D(INFLASI)	0.000191	-0.001451	-0.000611	-0.001404
	(0.00075)	(0.00088)	(0.00068)	(0.00082)
	[0.25534]	[-1.64223]	[-0.89911]	[-1.72186]
R-squared	0.485393	0.578201	0.491716	0.512103
Adj. R-squared	0.341303	0.460098	0.349397	0.375492
Sum sq. resids	0.184414	0.256438	0.151682	0.218352
S.E. equation	0.049587	0.058474	0.044971	0.053957

F-statistic	3.368684	4.895709	3.455021	3.748618
Log likelihood	166.2292	150.2385	175.7059	158.0362
Akaike AIC	-2.973798	-2.644092	-3.169194	-2.804870
Schwarz SC	-2.389843	-2.060137	-2.585239	-2.220915
Mean dependent	-0.000732	2.76E-05	-0.000713	-0.000646
S.D. dependent	0.061098	0.079580	0.055754	0.068278
Determinant resid covariance (dof adj.)		1.60E-11		
Determinant resid covariance		5.71E-12		
Log likelihood		705.0665		
Akaike information criterion		-12.72302		
Schwarz criterion		-10.38720		