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Linkage of Monetary Policy and Islamic Capital Market: The Case of Indonesia

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ABSTRACT

The study aims to examine the linkage of monetary policy and the Islamic stock market in Indonesia. Monetary policy variables are used in this study, namely, interest rate, exchange rate, and money supply (M2). Besides, the foreign interest rate is included as measured by FFR. At the same time, the shari'a index is used, namely Jakarta Islamic Index (JII). In the analysis, this study adopts the cointegration test, Granger causality test, and VECM. This study showed a negative long-term relationship between the variable interest rate and M2 to the JII stock price. The exchange rate variable has a positive long-term relationship with the JII stock price. While the foreign interest rate variable has a short-term relation to the JII stock price, it doesn't have a long term relationship.

Keywords: Monetary Policy, Capital Market, Jakarta Islamic Index, Linkage

INTRODUCTION

The central bank has responsibility to maintain the monetary system in a country. Monetary system is intended to maintain the national economic stability. So that economic activities have relationship with monetary policies that are implemented. One function of the monetary system is to become connector or intermediary between depositors and investor so as to encourage economic growth as planned (Firdaus and Ariyanti, 2011: 59).

Capital market is one part that is expected to be able to grow the Indonesian economy, because it is a place of investment for the community. In Indonesia, the majority of population are Muslim, so there are rules that don't contradict with shari'a compliant. Therefore, the Jakarta Islamic Index (JII) was formed with contained stocks that had fulfilled shari'a compliant. Research by Agustin and Mawardi (2014) found that the behavior of Muslim investors consider religion in stock transaction behavior prefer stocks that are included shari'a index list. This is evidenced by the tendency of increasing JII capitalization in the last 7 years.

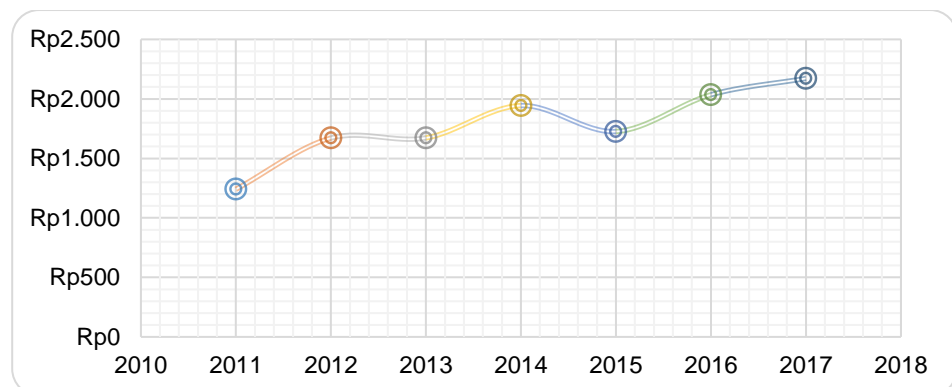


Figure 1 Jakarta Islamic Index Capitalization 2011-2017, Rp Miliar

The graph above shows investors increasing interest in investing their fund in the Islamic market. For investor, knowing the factor that influence Shari'a index is very important in making investment decisions. So that monetary situation needs to be kept in mind such as

interest rate, money supply, exchange rate to the monetary policy of foreign central bank.

According to Gujarati (2006) generally high interest rate will give a negative signal to stock price. Companies will have profits when the economy is growing and this happens when interest rate are lowered. When companies income increases, the stock price will also rise. But what needs to be considered is the relationship between interest rate and stocks on the shari'a index. This index has screening that filters everything that is contradict to sharia, so that Islamic investment should also be free from the influence of interest. The economy of each country is influenced by the development of money supply (Gottwald, 2015). Keynesian economists think that fluctuation in money supply will positively tighten future monetary policy and can have an impact on interest rate (Atgur, 2017: 2). In addition, according to Tendelilin (2000), empirical fluctuations in currency exchange rate have been shown to have ad influence on capital market condition in several countries. The strengthening of rupiah againts fereign currencies is a positive signal for the economy.

This study aims to examine linkage between monetary policy and stock price of Islamic index. In addition to domestic monetary policy factor, the foreign central bank policy variable namely federal fund rate (FFR) was also included. This variable is included to determine the linkage of international variable with the condition of the Islamic capital market in Indonesia. FFR was choosed because the American banking sector has make it a benchmark for all short-term intrest rate and the London Interbank Offer Rate (LIBOR) also has make it a benchmark

The nature of the relationship between monetary policy and capital market performance is still unclear both from theoretical and empirical background, especially in developing countries (Echekoba et al., 2018: 2). In addition, in previous studies such as those conducted by Williams (2013), Bosupeng (2014), Gotwaldd (2015), Hakansson (2016) and Atgur (2017) only tested one monetary policy variable and

did not on the Islamic index. These studies also only use domestic monetary policy variables.

LITERATURE REVIEW

Interest Rate

According to the classical theory, interest is determined by two factors namely demand for capital and supply of capital. Demand for capital arises because of the desire of some members of the community to invest in a business or to invest in shares, hence the demand for money arises. While the supply of capital comes from some people who make saving and offer it to be used as capital (Firdaus and Ariyanti, 2011: 102).

According to Fama (1981) expected inflation have a negative correlation with real anticipated activities and then have a positive relationship with return on the stock market (Williams, 2013: 12). So that the relationship of interest rate with stock market price is negative. When the interest rate is increased it will be a negative signal for the company, this is because the company will experience difficulties because the company's burden will increase so that it can reduce the company's profit.

Money Supply

Money supply is amount of all money in circulation that is added with demand deposits. Generally money supply is categorized in two terms, namely M1 and M2, where M1 is transaction money, while M2 has a broader meaning. This study uses M2 to measure the relationship between money supply and Islamic stock prices. Bank Indonesia defines M2 as M1, quasi money and securities is issued by the monetary system owned by the domestic private sector with a remaining term of one year.

Relationship between money supply and stock price, Keynesian economists argue that there is a negative relationship between stock price and money supply. While real activity theorists argue that money supply and stock price have a positive relationship (Ray, 2014).

Exchange Rate

Exchange rate theory with monetary income is a combination of the quantity theory of money with the determination of exchange rate (Yuliadi, 2008: 62). The formula is mathematically,

$$M/P \cdot V(r, Y) = Y$$

Where M is the nominal amount of money, P is the price level, r is the interest rate and Y is real national income.

The earliest exchange rate determination theory is developed is Purchasing Power Parity (PPP), or often is called the inflation theory of exchange rate. This theory is based on the concept of flows in determining the exchange rate of international trade activities, when the flow of foreign exchange demand to pay for imports will be the same as the flow of foreign exchange is generated from exports (Warjiyo and Juhro, 2016: 114). In the case of multinational companies, changes in exchange rate will change the value of the company's foreign operations which is reflected in the profit and loss balance sheet (Kose et al., 2010: 127). When the profit and loss is announced by the company, investors will respond which can affect the stock price.

Previous Studies

Kose et al (2010), examined the existence and direction of the relationship between exchange rate and stock price on Turkish financial market. The Granger method was used to examine relationship between two variables. This study used daily data for the period February 2001 to November 2009 with a total of 2176 data. Exchange rates were included in this study is the exchange rates among Turkish currencies with US dollar, Euro, Japanese Yen, Pound Sterling, Swiss Franc, UFT1 and UFT2. The result showed that there is evidence of unidirectional causality between stock price and exchange rate of the Turkish currency.

Ray (2014), examined causality and long-term relationship between money supply and stock price in India with 1990 to 2011 study period. The analysis techniques were used are Cointegration test and Granger Causality test. Result of the study showed that there is a long-

term balance between money supply and stock price, beside that there is two-way causality that runs between money supply and stock price. Regression test result showed money supply has a significant positive effect on stock price, this indicate an increase in money supply leading to an increase in available liquidity to buy securities and then generate an upward movement from the price of nominal equity and vice-versa.

Bosupeng (2014), examined the causal relationship between stock price and money supply in Bostwana Diamond Share Priece (BoD). The research data is used monthly data in periode 2011-2013 by using Vector Error Correction Model (VECM) as an analytical technique. Result of the study showed that there is no long-term relationship between money supply and stock price.

Williams (2014), examined the relationship between interest rate and stock price. The interest rate is represented by the average commercial bank lending rate set in Kenya and the stock price is proxied by stock price of the NSE 20 with weekly data from January 2004 to Desember 2013. Analysis techniques were used are time series analysis and Granger causality test. The result of his research showed that there is no relationship between interest rate and stock price. In the case of Kenya there was a pattern of abnormal changes such as 2005, 2007/2008 and 2012/2013 when stock price sharply reduced and interest rate were slightly reduced. During that period Kenya was experiencing a refrendum and general election are marked by several political instability.

Gottwald (2015), conducted research in the United State about the dependence of inflation on stock price and the dependence of money supply on stock price. Research period from 2004 to 2014 on the S&P 500 Index, and the research method was used is linear regression analysis. The result showed 83% of M1 dependence on inflation, then the S&P 500 index reacted to changes on M1 monetary aggregate.

Hakansson (2016), examined the effect of monetary policy announcement on stock price in Sweden. He researched 51 companies listed on the Nasdaq Large Cup from 2006 to 2015 using the panel data

regression method. The result of his study indicated that there is a negative relationship between tightening monetary policy and stock return, especially in exchange rate variable.

Research conducted by Atgur (2017), examined the relationship between several variables of monetary policy on stock price on Bursa Istanbul (ISBT) for the period 2006-2016. Cointegration test result showed that there is a long-term relationship between monetary policy variables and stock price in Turkey. While the Granger test showed an important relationship between the money supply (M2) and the deposit interest rate on the stock index price on ISBT 100F and return of the ISBT 100G Index.

Adam et al (2017), examined integration of the Islamic stock market between Indonesia and Malaysia, and the influence of foreign interest rate on these two market. This study used time series data on the Jakarta Islamic Index and Hijrah Shariah Index and foreign interest rate in the period August 2000 to January 2016. The result showed that there was a cointegration between Jakarta Islamic Index and Hijrah Shariah Index. The estimation of the VARX model showed that foreign interest rate only affect the Islamic stock index in Malaysia.

Echekoba et al (2018). Examined the effect of monetary policy on performance of the stock market in Nigeria. The monetary policy variables were used are cash reserve ratio, liquidity ratio and loan to deposit ratio. The analysis technique was used is Autoregressive Distributed Lag (ARDL). The result of his study showed that there is no cointegration between monetary policy variables and stock market performance. This study also found that monetary policy variables don't affect performance of the capital market, precisely the performance of capital market that influence monetary policy.

RESEARCH METHODS

Data

This study is aimed at examining the relationship between monetary policy variables and price of Islamic stock index. The monetary

policy variables are used namely interest rate (BI rate), money supply (M2), exchange rate (rupiah currencies with US dollar) and foreign interest rate policy (FFR). While the Jakarta Islamic Index (JII) is used to measure price of Islamic stock index. JII was chosen because it is the first Islamic index in Indonesia which was first launched in July 2000. This study use monthly data from each variables in the period January 2005 to Desember 2017. The type of data in this study is secondary was obtained from Yahoo Finance, BI official website and Stlouisfed.

Stationary Test

The first test is conducted to test the stationary data relate with time series data fluctuations. The purpose is to do a stationary test so that the use of data in regression does not produce spurious regression. This regression produce a high determination coefficient but there is no relationship between variables.

This study use Augmented Dicky Fuller (ADF) to test the stationary data. The ADF test result will then be compared with Mackinnon's critical value or by looking at the significance value. The formula for carrying out the ADF test is as follows (Gujarati, 2006):

$$\Delta Y_t = \alpha_0 + \gamma Y_{t-1} + \beta_t \sum_{i=1}^p \Delta Y_{t-i+1} + \varepsilon_t$$

Where Y_t is a form of first difference, α_0 is intercept, Y is the variable that is tested for stationary, β is the lag length in the model and ε is error term.

Cointegration Test

Co-integration test is used to estimate the long-term balance between variables is tested. That means this technique is used to estimate the long-term balance between monetary policy variables and price of the Islamic stock index.

This study use the Johansen Cointegration test to examine the long-term balance among variables. Cointegration test is seen using the trace test which is a test to measure the amount of cointegration vector in time series data by using the cointegration matrix rank test (Atmaja et al., 2015). Trace test is obtained by the following formula:

$$\lambda trace(r) = -T \sum_{i=r+1}^n \ln(1 - \lambda_i)$$

Where r is a rank that indicated the number of cointegration vector, T is the number of observations and λ_i is the eigen value estimate resulting from the matrix estimation.

VECM test

This test is a derivative method of VAR. VECM specification restores the long-term relationship of endogenous variables to be convergen into their cointegration relationship, but still allows the existence of short-term dynamics (Basuki and Prawoto, 2016). The standard of VECM is obtained from the VAR model with reduced $xt-1$ (Sitanggang and Hidayat, 2013: 73). To estimate long-term and short-term relationships can is observed by comparing t statistics with t tables.

RESULTS

Stationary Test Result

Table 1 shows the result of stationary data test using Augmented Dickey Fuller (ADF) is based on the Schwarz information criteria in determining lag length. This technique is used to determine the unit root in time series data. Data is said to be stationary if the mean, variant and covariance do not change as the period of observation changes. Table 1 shows all the variables are used in this study stationary at the 2nd difference level. These results are shown with a probability value below 5%, which means all the variables that are used do not contain unit root.

Table 1. Augmented Dickey Fuller (ADF) Unit Root Test

Series	Prob.	Lag	Max Lag	Obs
D(JII,2)	0.0000	5	13	148
D(BI_RATE,2)	0.0000	0	13	153
D(KURS,2)	0.0000	13	13	140
D(M2,2)	0.0000	10	13	143
D(FFR,2)	0.0000	6	13	147

Optimal Lag Determination

Before conducting the cointegration test, it must first determine the optimal lag to estimasi the time required from the influende of each variables with its past variables. Optimal lag length testing is very important for eliminating autocorrelation problems (Pantas, 2017). In determining the optimal lag, this study uses criteria that have Final Prediction Error (FPE) or the number of criteria from Akaike Information Criterion (AIC) Swartz Information Criterion (SIC) and Hannan-Quin Criterion (HQ) that the smallest among the various lag are submitted (Ajija et al., 2011). Table 2 shows the criteria with an asterisk (*) in FPE at number 3, so that the optimal lag length is used in this study is 3 for cointegration and other test.

Table 2. Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4774.050	NA	7.68e+21	64.58176	64.68302	64.62290
1	-3399.202	2638.223	9.19e+13	46.34056	46.94811	46.58741
2	-3291.645	199.1247	3.01e+13	45.22494	46.33876*	45.67748*
3	-3259.302	57.69366	2.74e+13*	45.12570*	46.74582	45.78395
4	-3243.953	26.34176	3.14e+13	45.25612	47.38252	46.12007
5	-3219.061	41.03759	3.17e+13	45.25759	47.89027	46.32724
6	-3192.074	42.66979	3.12e+13	45.23073	48.36970	46.50608
7	-3168.792	35.23717	3.26e+13	45.25395	48.89920	46.73501
8	-3137.148	45.75501*	3.05e+13	45.16417	49.31571	46.85093

Cointegration Test Results

After determining the optimal lag, then cointegration test is conducted to see the long-term balance between monetary policy variables and stock prices of JII. If the Trace Statistics value is greater than the critical value or the probability value is smaller than α 5%, there is cointegration in the tested variable. Table 3 shows that the Trace Statistics 99.69497 is greater than the Critical value 69.81889 with a probability value of 0.000, which means there is at least one equation that has cointegration. Table 4 shows the result of the maximum Eigenvalue test of the Trace statistic value with a value of

30,71633 greater than the critical value of 27,58424 with probability of 0,0191 which means that is in this study there is one equation that is cointegration. This shows the existence of a long-term relationship of each variables are tested.

Table 3. Cointegration test(Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.287447	99.69497	69.81889	0.0000
At most 1 *	0.184064	48.52098	47.85613	0.0432
At most 2	0.077959	17.80465	29.79707	0.5805
At most 3	0.035555	5.548640	15.49471	0.7481
At most 4	0.000544	0.082107	3.841466	0.7744

Table 4. Cointegration test (Max-Eigen)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.287447	51.17399	33.87687	0.0002
At most 1 *	0.184064	30.71633	27.58434	0.0191
At most 2	0.077959	12.25601	21.13162	0.5226
At most 3	0.035555	5.466533	14.26460	0.6821
At most 4	0.000544	0.082107	3.841466	0.7744

VECM Test Result

After the cointegration test, VECM test can be done because there is a cointegration between are tested variables. VECM is able see the long-term relationship of endogenous variables in order to converge into its cointegration relationship, but still allow the existence of short-term dynamics (Pantas, 2017). To determine the significance or not the influence of lag of a variable in the system, both the effect of lag of a variable on the variable itself and on other variables can be known throuh the significance test of estimation results of VECM. The significance value of VECM can be known by comparing the t-statistic value with the t-table value. The t-table value is 1,975799 which is obtained from df 156-7 with a significance value 5%. Table 5 shows that

interest rate, exchange rate and M2 have long-term relationship with the stock price of the JII. While variable of the foreign interest rate policy as measured by FFR does not have a significant relationship with stock price of the JII. Interest rate and money supply have a negative relationship with the stock price of JII, while the exchange rate has a positive relationship with the JII stock price. Table 5 also shows the coefficient value of each variables that shows changes in the JII stock price when monetary policy is applied. This means that when the interest rate is raised by 1% the JII stock price will decrease by 26,13%, when the rupiah exchange rate strengthens 1 rupiah againsts dollar, the JII stock price will raise 0,07% and when the money supply increase by 1 billion then JII stock price will decrease by 0,0002%.

Table 5. VECM Estimation

Cointegrating Eq:	CointEq1
JII(-1)	1.000000
BI_RATE(-1)	-26.13336 (5.81903) [-4.49102]
KURS(-1)	0.069001 (0.00729) [9.46626]
M2(-1)	-0.000236 (1.3E-05) [-17.7013]
FFR(-1)	1.969032 (4.75649) [0.41397]
C	-366.4788

Granger Causality Test Result

Causality test aims to test the direction of causal relationship of each variables are tested, to test the causality of this study using Granger causality test. For decision making in the Granger causality

test is compared t-statistic with t-table or by looking at the probability value of each relationship with a significance level of 5%. Table 6 shows the causal relationship of each monetary policy variables to the JII stock price. The result of this study indicate that there is only a unidirectional relationship among variables of interest rate, exchange rate and M2 againts JII stock price, and JII stock price does not affect any monetary policy variables in this study. While the foreign interest rate variable have not direction al all with the JII stock price. Interpretive structural modeling is an onward design methodology utilized to recognize, examine and summarize several correlations among factors which explain a problem, issue, or model (Sage, 1977). ISM give a means where either academicians and researchers can enforce order and generate models about factors of a system by expanding the intricacy of the correlation among them (Warfield, 1974).

Table 6. Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
BI_RATE does not Granger Cause JII	153	1.09315	0.3541
JII does not Granger Cause BI_RATE		3.13809	0.0273
KURS does not Granger Cause JII	153	0.92780	0.4290
JII does not Granger Cause KURS		5.38598	0.0015
M2__MILYAR_ does not Granger Cause JII	153	2.06313	0.1077
JII does not Granger Cause M2__MILYAR_		5.13443	0.0021
FFR does not Granger Cause JII	153	0.48952	0.6901
JII does not Granger Cause FFR		2.07007	0.1067

Impulse Response Function (IRF)

The impact of a shock from one variable to another can be explained through IRF. IRF analysis can see the response to the long-term dynamics of each variables if there is a certain shock. To see the shock variable is used a graph where the horizontal axis is the period in years, while the vertical axis is the response in lag. Figure 2

illustrates that JII responds to an increase in interest rate variable shock. Continuous increase begins at period 4 after the period 1 to 3 experience stagnation against interest rate variable shock. While in exchange rate variable shock, JII responds negatively which begins at period 5 and so on after the previous period JII only responds stagnantly to exchange rate variable shock. In the money supply variable shock, the response of JII tends to stagnate until period 6, then at period 7 and so on there is a slight positive response of JII from variable shock of the money supply. JII only negatively responds to FFR variable shock at period 4 to 8.

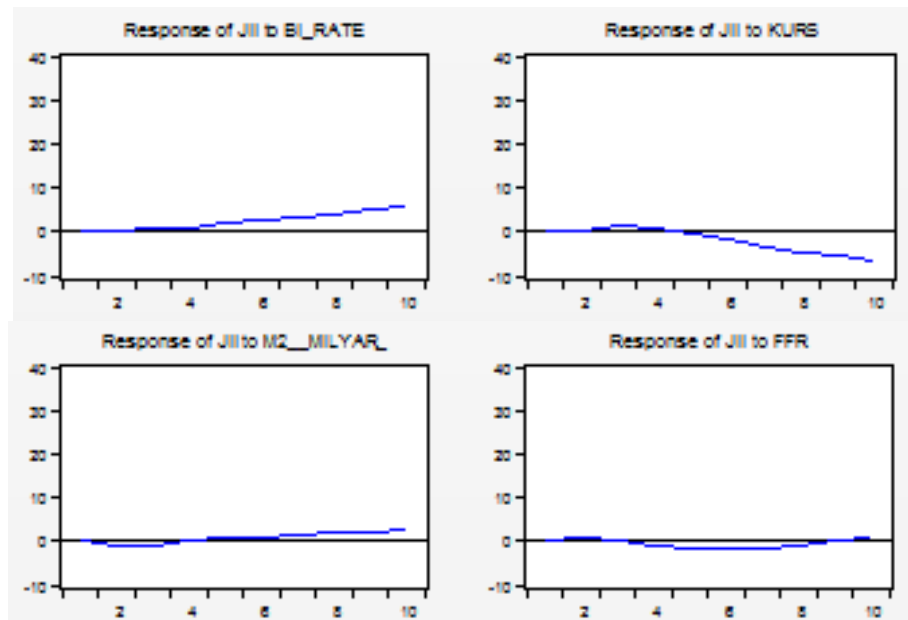


Figure 2 Impulse Response Function (IRF)

Variance Decomposition (VD)

VD analysis is used to see the variable contribution due to the variable shock in the VAR model. Table 7 shows the results of the VD analysis in this study. In the short-term is shown by period 3 shows that the JII variable shock causes fluctuations of 99,67% to itself, the interest rate variable shock causes a fluctuation of 0,25% against the JII, exchange rate variable shock causes 0,05 to JII fluctuation, M2

variable shock 0,0004% of JII and FFR variable shock 0,03% againts JII fluctuation. This means that in the short-term relationship the shock of monetary policy variables is not too large in influencing the fluctuation in JII stock prices. In the long-term relationship is shown period 10, JII variable shock affects the fluctuation of 93,41% againts itself, interest rate variable shock 2,45%, exchange rate variable shock 3,23%, money supply variable shock 0,8% and FFR shock 0,11%. In the long-term relationship, the exchange rate variable shock most influence fluctuation of JII stock price. However, if seen from the overall period, the shock of monetary variables are included in this study are quite small affecting the fluctuations in JII stock price.

Table 7. Variance Decomposition JII

Period	S.E.	JII	BI_RATE	KURS	M2	FFR
1	25.81582	100.0000	0.000000	0.000000	0.000000	0.000000
2	37.03528	99.83412	0.092533	0.025790	0.005918	0.041641
3	45.95102	99.67089	0.247237	0.047968	0.003851	0.030054
4	52.19739	99.37679	0.502530	0.059454	0.035501	0.025725
5	56.63856	98.89661	0.787391	0.182072	0.104422	0.029507
6	59.86134	98.19739	1.123954	0.454051	0.183281	0.041329
7	62.28064	97.25671	1.483130	0.908396	0.293536	0.058229
8	64.13580	96.11574	1.836385	1.532423	0.438272	0.077179
9	65.60561	94.82431	2.163659	2.311609	0.603975	0.096448
10	66.81643	93.41367	2.449751	3.232262	0.790243	0.114075

DISCUSSION

The result showed that there is a negative relationship between interest rate and stock price of the Islamic index. This result is consistent with the researches are conducted by Atgur (2017) and Pantas (2017), but it is different from the research is conducted by William (2014). Existence of a long-term relationship between interest rate and Islamic stock price can occur because companies are still dependent on bank loans, so that when interest rate increase will increase the burden on companies that have an impact on the decline

in performance. This can also to negative investor sentiment that considers the Islamic capital market when interest rate change. JII is a sharia stock index that has been screened with one of its goals not to be involved with interest. With the result of this study it is expected that the sharia screening institution will take a policy to reduce the company's dependence on interest. At present, the interest-based debt ratio is still permissible at 45% of total asset, this ratio perhaps is reduced even further to free the sharia index from the linkage of interest rate.

The exchange rate has a positive relationship with the sharia stock price both short and long term. The result of this study is consistent with were conducted by Kose et al (2010) who examined the relationship of exchange rate and stock market in Turkey, but difference to Hakansson (2016) who researched in Sweden. Of the companies that are consistently listed on the JII, there are at least 10 companies engage in export activities. A country's currency can affect export-import activities. When the exchange rate strengthens, it will increase the trade balance which has an impact on increasing the probability of companies that carry out export-import activities. Increase corporate profitability will be a positive signal for investor. Beside that, exchange rate stability can have an impact on a country's economy, so that when the exchange rate is stable it will lead to economic stability. When a country's economy is stable, foreign investors will be interested to investing in the country.

Money supply in this study has a negative relationship with the stock price of the sharia index. This result is consistent with the researches conducted by Gottwald (2015) and Atgur (2017), but this result of this study is different from those of Ray (2014) and Bosupeng (2014). Money supply is influenced by interest rate, when interest rate is low, loans from banks will increase which causes the money supply to increase. But in Indonesia, loans from banks are not used by debtor to invest in the financial sector but in the real sector, so that the money supply will support the real sector more than the financial sector.

Indonesian banking data shows that the priority of financing is on working capital both conventional and Islamic Banks. While foreign interest rate don't have a long-term relationship with the sharia stock price. The result of this study is different from the research was conducted by Ibrahim (2009) in Malaysia. This mean that the sharia stock price has not sensitivity to foreign interest rate.

CONCLUSION

The sharia Islamic stock market is created to meet the need of muslim investors in investing according to sharia compliance. Stocks included in the sharia index have been screened with sharia compliant provisions. Monetary policy is indicated to affect stock prices. This study examines the relationship between monetary policy and sharia stock price as measured by JII. Based on the results of the analysis is conducted, the result of this study can be summerized as follows.

The result of cointegration testing show that there is a long-term relationship between monetary policy variables and JII stock price. Intrest rate and M2 have a negative long-term relationship with the JII stock price, and the exchange rate has a positive long-term relationship. While foreign intrest rate don't have a long-term relationship with the JII stock price. Direction of the relationship of each variables shows only monetary plicy variables that affect JII stock price, but JII stock price don't affect monetary policy. The shock of the long-term exchange rate variable affect the fluctuation of JII stock price by 2.23% hich is the biggest variable shock affecting the fluctuations in JII stock price.

The existence of short-term and long-term relationship of monetary policy to JII stock price, it is expected that monetary policy will be taken precisely because the capital market is a financial intitution that is expected to be able to improve the country's economy. In addition, there is a need to tighten the screening of Islamic stocks so that the condition of the Islamic capital market don't depend too much on adjusting interest rate.

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