Vector Autoregression Analysis on Inflation Rate, Interest Rate and Rupiah Exchange Rate with Indonesia Sharia Stock Index

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Keyword: ISSI, Sharia Stock, JII, Macroeconomic, VAR.

Abstract: Sector that is able to survive the financial crisis on 1998 is based on Islamic economic institutions, and its success still survive today. So, the development of Islamic financial institutions is growing rapidly in various parts of the world. One of that sector which developing significant is Islamic stocks, in Indonesia the entire Islamic stocks in gathered in the Indonesia Sharia Stock Index (ISSI). Milestone in the development of Islamic stocks themselves starting from the publication of the Jakarta Islamic Index (JII) in 2000 and then continued ISSI in 2011. Ironically ISSI which include overall sharia shares listed on Indonesia Stock Exchange is much cheaper than JII which only consists of 30 stocks, this indicates the considerable price gap. This research will try to uncover how the relationship between macroeconomic variables that exist in Indonesia using Autoregression Vector analysis (VAR) from May 2011 to February 2017. Analysis of VAR has the advantages which are multivariate, free of spurious variable endogeneity and exogeneity and can detect relationships between variables. The result of this study indicates that previous period of ISSI and BI Rate has positive influence to ISSI, while Inflation and Rupiah-Dollar exchange rate has negative influence to ISSI.

1 INTRODUCTION

Currently, the development of sharia capital market which is part of sharia financial industry very rapidly (Pasaribu, 2013), including stock and index. Implementation of sharia principles in the capital market must be sourced from the Qur'an as the highest source of law and Hadith of the Prophet Muhammad SAW. The Qur'an itself suggests the investment in general in Chapter al-Baqarah [2] verse 261.

A high price index positively reflects stocks with high returns as well. Various things affect the high stock price, besides the quality and financial health of companies that issue shares and listed in the index. There are macroeconomic factors that have a direct relationship with the development of shares in the capital market, among others are the Inflation Rate, Bank Indonesia Interest Rate (BI Rate) and Currency Exchange, in this case, Rupiah to US Dollar (Suciningtias & Khoiroh, 2015) Also, the economic condition of the concerned country (Utama & Artini, 2015), as in 1998 where the only surviving financial institutions are in the form of based sharia.

One of the Sharia-based capital market indexes used by the Indonesia Stock Exchange (IDX) is the Indonesia Sharia Stock Index (ISSI). The unfortunate thing about ISSI which covers all Sharia shares is less attractive than the Jakarta Islamic Index (JII) which although it can be said to be the only leading Sharia stocks, it just represents only 30 shares (Bursa Efek Indonesia, 2016). While the ISSI should be the benchmark of real sharia investment development (not only the best) is less well known, and the price is four times lower than JII.

2 LITERATURE REVIEW

In theory, inflation hurts investment, because inflation will create greater uncertainty (Sukirno, 2003, p. 305). The interest rate also negatively influences investment in accordance with Keynes's theory of speculate liquidity preference, depending on the interest rate of a country's savings, in which a higher expected profit will be chosen (Boediono, 2001, p. 97).

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3 METHODOLOGY

The object of this research is Inflation Rate, Interest Rate, US Dollar-Rupiah Exchange Rate and Indonesia Sharia Stock Index with 70 periods data from May 2011 to February 2017.

Data analysis is performed through a series of test using the Vector Autoregression (VAR) analyst, whose superiority to analyze data dynamically with Impulse-Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) (Widokartiko, et al., 2016). Pre-Tests also require before VAR Test (Tanjung & Devi, 2013).

4 RESULT

4.1 Pre-VAR Test

4.1.1 Stationary Test

Table 1: Stationary Test Result on Level.

Variable	ADF Statistic	MacKinnon Crit 5%	P-Value
Ln_ISSI	-2.198953	-3.476275	0.4824
Inflation	-2.246909	-3.477275	0.4564
BI Rate	0.347794	-3.476275	0.9985
Ln_Kurs	-1.479645	-3.476275	0.8273

Based on Table 1, the unit root test results at the level indicate that all variables are non-stationary at the critical value 5%, seen from the values of t-ADF are higher than the absolute value of MacKinnon Critical Values. In the unit root test which is non-stationary at the level, an advanced analysis should be performed at the first difference level.

Table 2: Stationary Test Result on First Difference.

Variable	ADF Statistic	MacKinnon Critical 5%	Prob
Ln_ISSI	-7.436425	-3.477275	0.0000
Inflation	-6.392958	-3.478305	0.0000
BI Rate	-5.785225	-3.477275	0.0000
Ln_Rupiah	-8.831402	-3.477275	0.0000

According to Table 2 can be seen that unit root test results at the first difference level indicate that all variables are stationary at a 5%, seen from the absolute value of t-ADF less than the absolute value of its MacKinnon Critical Values.

4.1.2 Determine the Optimum Lag

Table 3: Lag Test.

Lag	AIC	SC
0	2.860709	**2.995639**
1	-7.157419*	**-6.482768***
2	**-7.064130**	**-5.849759**

Based on Table 3 can be seen that values containing the asterisks (*) lag are most optimum. Therefore, in this study using lag 1 (one).

4.1.3 Stability Test

Table 4: Stability Test Result.

Root	Modulus
0.971061	**0.971061**
0.936366	**0.936366**
0.883529 – 0.108880i	**0.890213**
0.883529 + 0.108880i	**0.890213**

According to Table 4, the modulus values obtained do not exceed one (Lutkepohl, 1991), so it can be concluded that the VAR model is stable and can produce valid output.

4.1.4 Cointegrity Test

Table 5: Johansen Cointegrity Test Result.

Trace Stat	*Crit Value*	*Prob*
40.99040	47.85613	0.1890
19.53089	29.79707	0.4552
3.773551	15.49471	0.9209
0.788021	3.841466	0.3747

Based on Table 5 can be seen that the Johansen cointegration test results show no cointegration equation, i.e., when the trace statistic value is smaller than the critical value at the critical point of 5%. In the absence of cointegration in this equation, the model to be used in this study is Vector Auto Regression (VAR).

4.1.5 Engel-Granger Causality Test

Table 6: Causality Test Result.

Null Hypothesis	Prob
ISSI affected by Inflation	0.3428
ISSI affected by *BI rate*	0.2340
ISSI affected by Rupiah	0.0111
Inflation affected by *BI rate*	0.0031
BI rate affected by Rupiah	0.0424

Based on Table 6, the results show that at the level of probability value is below 0.05, the rupiah exchange rate affects the ISSI, and the BI rate affects the Inflation, as well as the Rupiah exchange rate influences the BI rate. Changes in the rupiah exchange rate significantly affected the ISSI price.

4.2 VAR Test and Analysis

4.2.1 Vector Autoregression Result

Table 7: VAR Test Result.

Variable	Coefficient	T-Stat
LN_ISSI (-1)	0.886953	15.6621
Inflation (-1)	-0.004205	-1.15742
BI rate (-1)	0.000188	0.02454
Ln Rupiah (-1)	0.047321	1.13692
C	0.151852	0.55536
R-squared	0.887694	-
Adj. R-squared	0.880675	-

This study uses significance with a critical value of 5% equal to ± 1.99495. Based on Table 7 can be seen that the value of an R-squared coefficient of 0.887694 means that 88.76% of ISSI variables can be explained by the variables in this study, while 11.24% is explained by other variables outside the model. And following model equation of this research that formed:

LN_ISSI = 0.886953$_{LN_ISSI\ (-1)}$
- 0.004205$_{INFLATION\ (-1)}$
+ 0.000188$_{BIRATE\ (-1)}$
+ 0.047321$_{LN_RUPIAH\ (-1)}$
+ 0.151852

4.2.2 Forecast Error Variance Decomposition Result

Table 8: FEVD ISSI Result.

Period	ISSI	INF	BIRATE	RUPIAH
1	100.00	0.00	0.00	0.00
5	96.89	2.66	0.00	0.45
10	89.89	7.69	0.01	2.41
15	84.71	10.09	0.01	5.19
20	81.97	10.38	0.01	7.64
25	80.43	10.19	0.02	9.36
30	79.48	10.10	0.03	10.39
35	78.91	10.07	0.07	10.96
40	78.60	10.04	0.10	11.26
45	78.42	10.00	0.13	11.44
50	78.32	9.96	0.16	11.55

Based on the FEVD results in Table 8 shows that in the first-period variability and fluctuation of ISSI variables can be explained 100% by the variable itself. Until the end of the period, it is the most influential variable to the ISSI changes itself with the contribution amount at the end of the time reaches 78, 32%. Then followed by the variable Rupiah-US Dollar Exchange Rate which each period has increased gradually so that at the end of the period influences 11.55%. And the BI rate variable since the fifth period of the trend has decreased significantly which then began to increase step-by-step until at the end of the period has an effect of 0.16% against ISSI. Meanwhile, the Inflation variable from 1 to 20 trend periods has increased but after that until the end of the trend period has decreased until it reaches its influence value is only 9,96%.

4.2.3 Impulse-Response Function Result and ISSI previous period to ISSI Analysis

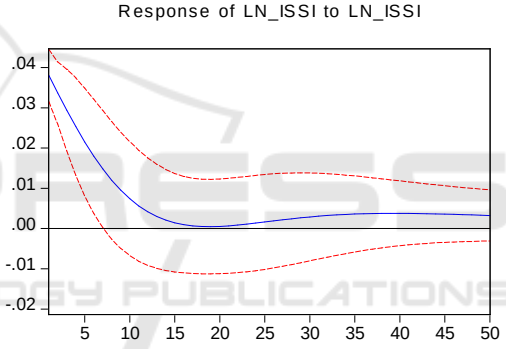

Figure 1: IRF ISSI Previous Period to ISSI Result.

Definite previous period ISSI significant positive relation to ISSI according to Demand Function which is the price of a good following consumer expectation about price in the future (Ahman & Rohmana, 2012, pp. 61-64).

Meanwhile, the IRF ISSI to ISSI result in Figure 1 shows that ISSI changes were positively responded by ISSI at the beginning of the period, which then decreased quite sharply, although still in the positive zone. It is due to investors' risk expectations, which ISSI is a collection of sharia stocks in DES and most are still in the form of Penny Stocks shares, the possibility of newbie investors just starting count the risk after buying stocks in ISSI.

4.2.4 Impulse-Response Function Result and Inflation Rate to ISSI Analysis

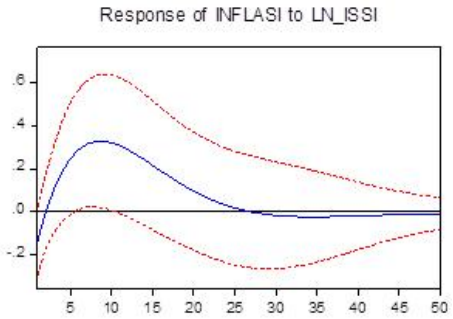

Figure 2: IRF Inflation to ISSI Result.

The insignificant negative relationship between Inflation to ISSI by existing theory proposed by Sukirno (2003, p. 305). It is happening because income rises as inflation also rise, which then affects producers who have to raise production costs and are charged to customers to cover the cost of adding wages to employees. Besides, high inflation also triggers higher interest rates (Amalia, 2010, p. 110), as the amount of money in circulation increases but the number of goods are fixed (Prabowo, 2013, p. 21).

Meanwhile, from IRF Inflation to ISSI result in Figure 2 shows that Inflation changes responded negatively by ISSI in the early period, which then increased to positive. That is due to the increase in money velocity as inflation rises the purchasing power of the people, including the purchasing power of the portfolio, but then again has a negative impact until the end of the period.

4.2.5 Impulse-Response Function Result and BI Rate to ISSI Analysis

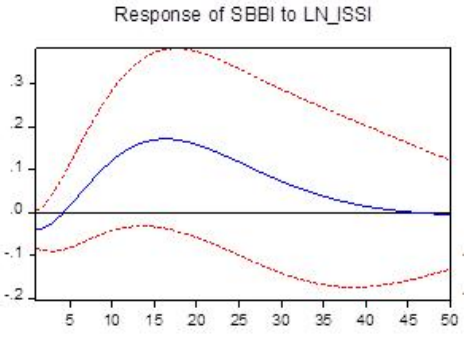

Figure 3. IRF BI Rate to ISSI Result.

The insignificant positive relationship between BI Rate and ISSI was influenced by the new replacement rate BI 7-day Repo Rate, which was applied to improve economic growth in Indonesia (Kompas.com, 2016).

Meanwhile, from the IRF of BI Rate to ISSI in Figure 3 shows that the BI Rate change was responded negatively by ISSI in the early period, which then increased to positive. This is due in October 2012 to May 2013 the BI Rate is decreasing and resulted in an increase in investment according to Keynes theory, that people will choose to speculate if the current interest rate (felt) low and will reinvest if the current interest rate (felt) high (Boediono, 2001, p. 97), And the line continues to decline even still in positive zones.

Another interesting thing from expert opinion and stock market observers as well as the owner of PT Avere Mitra Investama that is Teguh Hidayat. He is stating that when BI 7-Day Repo Rate is applied, banking stocks are falling, but not for long, investors rebuying the Blue Chip shares besides banking stocks (Hidayat, 2016), And when the BI 7-Day Repo Rate officially became the new benchmark interest rate in August 2016 (Bank Indonesia, 2016), shortly after that in October 2016 the ISSI price peaked during May 2011-February 2017 period.

4.2.6 Impulse-Response Function Result and Rupiah Exchange Rate to ISSI Analysis

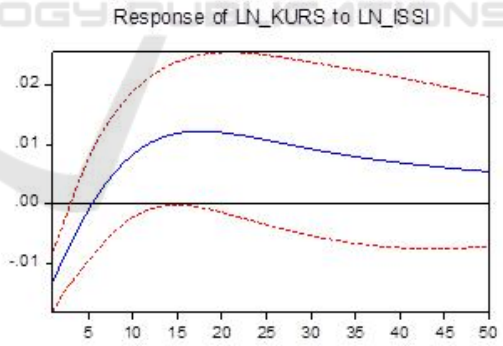

Figure 4: IRF ISSI to Rupiah Exchange Rate Result.

The insignificant positive relationship between Rupiah exchange rate and ISSI is defined when the Rupiah exchange rate depreciates and causes the Rupiah's nominal value to increase, resulting in the decreasing ISSI price, also when the Rupiah Exchange appreciates and causes the Rupiah's nominal value to decline, impacting the ISSI price increase.

It is happening because of the rising cost of imported raw materials and equipment required by

the company resulting in increased production costs. In other words, the weakening of the Rupiah exchange rate hurts the national economy which ultimately degrades stock performance in the stock market (Wiyani & Wijayanto, 2005).

Meanwhile, from the IRF Rupiah Exchange Rate to ISSI in Figure 4 shows that ISSI positively responded the change in the Rupiah Exchange Rate in the early period which then declined even still in the positive zone. That is due to the appreciation of the Rupiah-Dollar Exchange Rate at the beginning of the time but then depreciates until the end of the period.

5 CONCLUSION

Based on the result of research, previous period ISSI has a positive influence on ISSI; Inflation rate hurts ISSI, BI Rate has a positive impact on ISSI and Rupiah-Dollar Exchange Rate hurts ISSI. The implication and suggestion of this research are that the theory used is still conventional because the Islamic theory of investment is few and debatable despite the existence of its MUI Fatwa. Besides, the BI Rate that is explicitly forbidden by Islam is still included because as a counter from the investment according to Liquidity Preference theory by Keynes. And the little research data because it follows the new ISSI itself was published in May 2011. Also, the most influencing variables are the previous period ISSI because ISSI affected by investor predicted value to the future price.

REFERENCES

Ahman, E., Rohmana, Y., 2012. *Teori Ekonomi Mikro, Suatu Pengantar.* Bandung: Rizqi Press.

Amalia, F., 2010. *Bahan Ajar (Diktat) Mata Kuliah: Ekonomi Makro.* Jakarta: s.n.

Bank Indonesia, 2016. *Data BI Rate.* [Online] Available at: http://www.bi.go.id/id/moneter/bi-rate/data/Default.aspx

Boediono, 2001. *Ekonomi Moneter.* 3 penyunt. Yogyakarta: BPFE.

Bursa Efek Indonesia, 2016. *Indeks Saham Syariah.* [Online] Available at: http://www.idx.co.id/id-id/beranda/produkdanlayanan/pasarsyariah/indekssahamsyariah.aspx

Hidayat, T., 2016. *Mengenal BI 7-day Rate, dan Dampaknya ke Perbankan.* [Online] Available at: http://www.teguhhidayat.com/2016/04/mengenal-bi-7-day-rate-dan-dampaknya.html

Kompas.com, 2016. *"BI 7 Day Repo Rate" Diberlakukan Hari Ini, Apa Dampaknya?.* [Online] Available at: http://ekonomi.kompas.com/read/2016/08/19/103000626/.BI.7.Day.Repo.Rate.Diberlakukan.Hari.Ini.Apa.Dampaknya.

Lutkepohl, H., 1991. *Introduction To Multiple Time Series Analysis.* Berlin: Springer-Verlag.

Pasaribu, R. B. F. & M., 2013. Analisis Pengaruh Variabel Makroekonomi Terhadap Indeks Saham Syariah Indonesia. *Jurnal Ekonomi dan Bisnis*, 7(2), pp. 117-128.

Prabowo, D., 2013. *Analisis Pengaruh Inflasi, Sertifikat Bank Indonesia Syariah (SBIS), dan Jumlah Uang Beredar (JUB) terhadap Indeks Syariah yang Terdaftar di Indeks Saham Syariah Indonesia (ISSI),* Jakarta: s.n.

Suciningtias, S. A., Khoiroh, 2015. *Analisis Dampak Variabel Makro Ekonomi terhadap Indeks Saham Syariah Indonesia (ISSI).* s.l., s.n., pp. 398-412.

Sukirno, S., 2003. *Makroekonomi: Teori Pengantar.* Jakarta: Raja Grafindo Persada.

Tanjung, H., Devi, A., 2013. *Metodologi Penelitian Ekonomi Islam.* Jakarta: Gramata Publishing.

Utama, I. W. A. B., Artini, L. G. S. A., 2015. Pengaruh Indeks Bursa Dunia pada Indeks Harga Saham Gabungan Bursa Efek Indonesia. *Jurnal Manajemen, Strategi Bisnis dan Kewirausahaan*, Februari, 9(1), pp. 65-73.

Widokartiko, B., Achsani, N. A., Beik, I. S., 2016. Dampak Kinerja Internal dan Kondisi Makro Ekonomi terhadap Profitabilitas pada Perbankan. *Jurnal Aplikasi Bisnis dan Manajemen*, Mei, 2(2), pp. 161-171.

Wiyani, W., Wijayanto, A., 2005. Pengaruh Nilai Tukar Rupiah, Tingkat Suku Bunga Deposito dan Volumen Perdagangan Saham Terhadap Harga Saham. *Jurnal Keuangan dan Perbankan*, 9(3), pp. 884-903.