



Macroeconomic Impacts on *Sukuk* Performance in Indonesia: Co-integration and Vector Error Correction Model Approach

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Abstract

The performance of Islamic bonds or *sukuk* can be influenced by many factors, internal and external. This study aims to analyze the long and short-term effects of macroeconomic variables such as BI rate (benchmark interest rate), inflation, exchange rate, changes in world gold prices and world oil prices on the performance of *sukuk* in Indonesia for the period from 2014 to 2017. This study employed the co-integration test to examine the long-term relationship among variables. The Vector Error Correction Model (VECM) model was used in the analysis because the results of the stationary test obtained stationary data at first difference and have long-term co-integration. The results show that the long-term change in *sukuk* return in Indonesia is influenced by changes in exchange rates, inflation and changes in world gold prices. While in the short term, performance of *sukuk* is influenced by the previous performance (one and two months), BI rate, exchange rates and world gold prices. Crude oil prices has no significant effect on *sukuk* performance both in the long and short term.

Keywords: *Sukuk*, exchange rate, Inflation, BI rate, Oil price, Gold price, co-integration, VECM

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1. Introduction

The Islamic *Shari'ah*-based financial concept has been widely accepted in the world and has become a good alternative for market participants who desire *Shari'ah* compliance. This has encouraged the development of Islamic financial institutions in many countries especially the Muslims dominated countries, including Indonesia. Indonesia has great potential as a center for the development of world Islamic finance. The Islamic financial market in Indonesia is growing with the emergence of the Islamic capital market. Instruments in the *Shari'ah* capital market that are quite popular besides stocks are Islamic bonds or *sukuk*. *Sukuk* has different characteristics from bonds because *sukuk* is not a debt instrument, instead a joint ownership between the *sukuk* buyer and issuer for an asset or project. The use of *sukuk* funds must be for halal businesses. Investors or *sukuk* holders will get compensation in the form of profit sharing according to the type of contract used in *sukuk* issuance.

The preference in *sukuk* has caused some countries to develop *sukuk* as a one of the driving sources of the country's economy. The development of global Islamic finance can be an opportunity to connect global investors with the real sector and domestic finance. The Indonesian government since 2009 has regularly issued financial instruments in the global market, namely the Indonesian State Sukuk (SNI) or the Indonesian Global Sukuk. Based on data from the Ministry of Finance of the Republic of Indonesia, up to 2015, the country has issued six times global *sukuk* so far.

The development of *sukuk* in Indonesia shows a positive trend despite smaller in size compared to the conventional bond market. In term of issuer, based on 2014 data, *sukuk* in Indonesia was largely dominated by sovereign *sukuk*, amounting to Rp 233 billion, while corporate *sukuk* amounted to Rp 13 billion (OJK, 2015). Most of the *sukuk* issued were dominated by *ijarah* contract and the *mudharabah* contract. The outstanding value of *sukuk* in Indonesia over the past few years shows an increase in value, however in term of growth (CAGR), shows a decrease of 24% to 20% annually (refer Figure 1).



Figure 1: Indonesia's *Sukuk* Value Outstanding
Source: OJK

Sukuk performance can be influenced by many factors. Several previous studies have been conducted to link *sukuk* with micro and macroeconomic factors. This study will focus more on linking the influence of macroeconomic factors on changes in the performance of *sukuk* in Indonesia. The issuance of *sukuk* as an investment instrument can be used by the government to reduce macroeconomic problems, namely inflation and unemployment. *Sukuk* can also contribute to increasing economic growth. In this study, the macroeconomic factors that will be analyzed are the rate of inflation, changes in crude oil prices, oil prices, gold prices, exchange rate of IDR / USD and BI rate (benchmark interest rate).

Table 1: Indonesian Macroeconomic Indicators for 2010 to 2014

Macroeconomic Indicators	2010	2011	2012	2013	2014
Inflation	6.96%	3.79%	4.30%	8.38%	8.36%
BI rate	6.5%	6,58%	5.77%	7.02%	7.54%
Crude Oil Price (USD/barrel)	77.38	107.46	109.45	105.87	96.29
Gold Price (USD)	1,385.5	1,752	1,720	1,229.5	1,194
Foreign Exchange IDR /USD	9.010	9.068	9.652	12.170	12.385

Source: Annual OPEC Crude Oil Price; Indonesia Statistics Agency; Bank Indonesia; gold.org

From Table 1, it can be seen that macroeconomic indicators in Indonesia experienced a fairly volatile change both in terms of inflation rate, BI rate, crude oil price, and gold price. While foreign exchange has experienced a consistent increase (in Dollar against Rupiah) from 2010 to 2014. This phenomenon is interesting to study, whether changes in various macroeconomic indicators also have an impact on changes in *sukuk* performance in Indonesia. Investors in making investment decisions must pay attention to the bigger picture of the economy (Bodie, 2006). The development of *sukuk* performance will also be influenced by macroeconomic factors (Haron and Ibrahim, 2012). This is supported by (Sunarsih, 2008) who found that inflation and interest rates significantly influence the return of *mudharabah* and *ijarah sukuk* in Indonesia.

Changes in interest rates can affect investment activities in the capital market. The decline in interest

rates has a positive impact on the development of the capital market because it can increase the attractiveness of the public to invest (Tandelilin, 2001). An increase in bank interest rates will reduce stock price (Sakti and Harun, 2013). On this basis, this study will incorporate the expected influence of interest rate (BI rate) on *sukuk* performance. Boutti (2014) analyze the performance of *sukuk* and bond portfolios and found that *sukuk* index outperforms the bond and market indices for the period from 2012 to 2014 in Malaysia.

According to Blanchard (2006), there are several economic factors that affect capital markets, such as the state of the global economy, the level of world energy prices and political stability. Whereas according to Samsul (2006) and Haron and Ayojimi (2018), the factors that affect the capital market includes foreign exchange rates, international economic conditions and the economic cycle of a country. Wang *et al.* (2010) explored the impact of fluctuations in crude oil prices, gold prices, and the exchange rates of several currencies against the United States, Germany, Japan, Taiwan and China stock indices. He found co-integration between these variables and concluded that in the long run, there is a stable relationship between these variables. A study conducted by Raraga (2012) found long-term co-integration between oil prices, gold prices and exchange rate on the Composite Index of Indonesia. The study also found the influence of exchange rates on the composite index, while no significant influence of world gold prices and crude oil prices on the composite index. Following this, the influence of macroeconomic variables on the stock market may also occur in the *sukuk* market. According to Manan (2009), *sukuk* is a lower-risk security than conventional bonds due to funding for prospective projects and underlying assets. However, according to Godlewski (2013) companies that issue *sukuk* will face higher financial and operational risks.

Based on the phenomenon described above and past literature, this study is interested in examining the macroeconomic influences of inflation, changes in the IDR / USD exchange rate, BI rate, crude oil prices and world gold prices on the performance of *sukuk* in Indonesia for the period 2014 to 2017. *Sukuk* performance is measured based on the Indonesian Composite Sukuk Index (ISIXC) issued by the Indonesia Bond Pricing Agency (IBPA). ISIXC is a performance benchmark for *sukuk* in Indonesian capital market. The testing is carried using the co-integration approach of Vector Error Correction Mechanism (VECM) to examine the short-term and long-term impacts.

2. Literature Review

2.1 Characteristics of *Sukuk*

The term *sukuk* has been known since the middle ages, where Muslims use it in the context of international trade. *Sukuk* derives from an Arabic term and is the plural form of '*Sakk*' which means document or certificate. *Sukuk* is used by traders at that time as documents showing financial obligations arising from trading business and other commercial activities.

Sukuk is generally known as "bonds" in accordance with Islamic *Shari'ah* principles. Fatwa of the National *Shari'ah* Council No. 32/DSN-MUI/ IX/2002 concerning *Shari'ah* bonds stated that Islamic bonds are long-term securities based on the *Shari'ah* principles issued by issuers to bondholders which require issuers to pay income to *sukuk* holders in the form of profit sharing / margins / fees and pay *sukuk* funds at maturity. From this understanding, it can be understood that *sukuk* is not only a letter of debt recognition but a letter of cooperation with a diverse scope. This diversity is influenced by the use of different *sukuk* contracts. The *Shari'ah* contracts of *sukuk* are distinguished by sales, leasing, partnership and agency-based contracts. Sales-based *sukuk* contracts include BBA (*Ba'i Bi Taman 'Aji*), *murabahah*, *salam* and *istishna*'. Rental based contracts are *ijarah*, *ijarah muntahiyah bittamlik* and *ijarah mawshufah fi dhimmah*. Partnership-based contracts are *mudaraba* and *musharakah*, while agency-based contracts are *bi istithmarwakalah* (ISRA, 2015).

Sukuk issuers have provisions not to carry out activities that contain elements of *riba*, *gharar*, and *maysir* and the use of proceeds must be in accordance with the *Shari'ah* principles. In addition to the issuance of *sukuk* through special purpose vehicles (SPV), this is different from bonds that do not require the formation of SPV. In Indonesia, *sukuk* listed on the Indonesia Stock Exchange are divided into two, namely the corporate *sukuk* and state *sukuk*.

2.2 Sukuk Performance

Investment in general is divided into two, namely investment in financial assets and investment in real assets. Investing funds in bonds or other securities is an investment in financial assets. Investors have different preferences in their behavior with regards to investment activities. Understanding of usury in Islamic law encourages the growth of financial institutions and instruments based on Islamic principles. This also encourages the strengthening of the Islamic capital market in Indonesia, being a Muslim dominated country.

Islamic capital market products that are quite popular for investors other than stocks are Islamic bonds or *sukuk*. Measurement of stock performance generally can be seen from the movement of the stock price index, and then the performance measurement of bonds can be measured from the bond index. For Islamic bonds, the performance measurement of Islamic bonds or *sukuk* can be seen from the *Sukuk* Index. The *Sukuk* Index is an indicator to measure the movement and the development of *sukuk* price or yield. The *sukuk* index can also describe movement (trends) in *sukuk* markets. The *sukuk* Index in Indonesia was launched by the Indonesia Bond Pricing Agency (IBPA). IBPA has the role and function of conducting an assessment and determination of the fair price of debt securities in Indonesia on a daily basis. Reasonable market price on these securities are used by the financial industry as a reference for debt securities transactions, asset valuation, auctions for government debt securities, references in audit activities, as well as a reference in assessing portfolio performance.

There are several types of indexes published by IBPA including Indonesia Bond Indexes (INDOBEX), Indonesia Composite Bond Index (ICBI), and Indonesia *Sukuk* Index (ISIX). INDOBEX of government bonds include the state securities (SBN) and all corporate bonds. The aim of ICBI is to be the main reference and the most reliable benchmark of Indonesia bond market performance that has an equivalent role to the IHSG (Indonesia Composite Index) in the stock market. ISIX consists of entire *Shari'ah* government and corporate bonds that meet the criteria for indexing.

In general, *Sukuk* Index also becomes a barometer of *sukuk* market performance. The index performance is an important benchmark for investors and portfolio managers. In the development of bonds and *Sukuk* Index, it can be classified based on the following:

1. Total Return (TR): it describes the overall rate of return of *sukuk* which is calculated based on the increase or decrease in *sukuk* prices, the accumulation of margin gains and the acquisition of annual coupons which are reinvested.
2. Clean Price (CP): the overall price movement of *sukuk* which is calculated based on price increase or decrease without taking into account the accumulation of profit or profit sharing
3. Gross Price (GP): the overall price movement of *sukuk* which is calculated based on the increase or decrease in the price of *sukuk* by taking into account the accumulated profit.
4. Effective Yield (EY): the movement of the overall yield (yield) of *sukuk* which is calculated based on the increase or decrease in the *sukuk* yield level and taken into account the accumulation of profit during the year.
5. Gross Yield until Redemption (GY): describes the movement of the overall yield level of *sukuk* calculated based on the increase or decrease in *sukuk* yield, accumulated profit during the current year and the value of *sukuk* duration.

2.3 Impact of Macroeconomic Variables on *Sukuk* Index

Macroeconomic variables which are expected to influence the performance of *sukuk* in this study consist of inflation, BI rate, changes in foreign exchange rates, changes in crude oil prices and changes in world gold prices.

2.3.1 The Effect of Inflation on *Sukuk* Index

Inflation is generally defined as a relative increase in the general price level. Inflation can occur if the amount of money or deposits is much in circulation compared to the amount of goods and services offered, causing a loss of national currency trust and widespread symptoms to exchange for goods (Winardi, 1995). According to Llewlyn (2002), in relation to the role of the money supply, inflation can arise due to structural theory,

where inflation is not only a monetary factor but also caused by structural phenomena which is a common experience in developing countries.

Inflation can affect the performance of *sukuk*. When the price of goods rises, *sukuk* issuer will increase the return offered so that it can replace the decline in purchasing power. In condition of rising prices, investors have a tendency to sell securities, including *sukuk*, while prospective investors will hold their funds to invest in financial assets because of the needs in the real sector. *Sukuk* issuers are willing to provide higher profits and according to Yuliana (2010), inflation and interest rates affect the return of *mudharabah* and *ijarah sukuk* in Indonesia. Meanwhile, Mehra (1998) who conducted a study on inflation rate in the United States between 1962 and 1996, found that in the long run, the permanent movement of real inflation was related to the permanent movement of bond interest rate. The announcement of future inflation is the most influential on long-term bond issues (Campbell, 1993).

2.3.2 The Effect of BI Rate on *Sukuk* Index

The benchmark interest rate from the central bank (BI Rate) reflects the monetary policy stance of Bank Indonesia (BI) to the public. The BI rate announcement will be implemented in BI monetary operations through managing liquidity in the money market to achieve the operational goals of monetary policy (Wibisono, 2010). Monetary contraction will have a negative impact on both stock and bond prices. The fall in bond prices will attract investors to invest because the return obtained at maturity will increase (Prastowo, 2007). Bond return or yields have an inverse relationship with bond prices, which is very much related to market interest rate. In line with this opinion, Tandelilin (2010) stated that interest rates can be used to forecast bond prices or stocks. If interest rate increases, the stock or bond prices will go down. Haron and Ibrahim (2012) also found the influence of interest rates on *sukuk* market development in Malaysia based on their study for the period from 2000 to 2009.

2.3.3 The Effect of Exchange Rates on *Sukuk* Index

Other macroeconomic variable that can be used to assess a country's economic strength is exchange rates. In general, the exchange rate is determined by the exchange rate policy adopted by a country. The OIC Fiqh Council recommends that Muslim countries control the money market and regulate their activities related to foreign exchange transactions in accordance with the *Shari'ah* principles and to avoid economic disasters (Ayub, 2009). The foreign exchange rate movement will determine price movements and trade in the bond market. Indonesia adheres to the floating exchange rate system where the exchange rate is determined by market forces. If exchange rate fluctuations are unstable, the bond trade will also be affected (Rahardjo, 2004). According to Wibisono (2010), exchange rate has a positive influence on the yield of government bonds within one, five and ten years. Ahmad and Mat Radzi (2011) found that *sukuk* issuers place a premium on economic factors such as GDP, foreign exchange rate and international liquidity in issuing *sukuk*.

2.3.4 The Effect of World Oil Prices on *Sukuk* Index

The demand on crude oil which are increasing along with the emergence of new industrial countries will directly affect the crude oil prices, hence the price of oil will affect the economy of a country. For oil-producing countries (exporters), rising oil prices illustrate the transfer of welfare from oil-importing countries to oil-exporting countries and this will have an impact on the economy of a country.

Suciningtias (2015) found that oil prices have a significant effect on the *Shari'ah* Stock Index in Indonesia. Likewise the findings of Raraga (2012) recorded a co-integration of oil prices with the Indonesia Composite Index. Sadorsky (2003) revealed that rising oil prices have a negative effect on stock prices and oil prices have a negative impact on the growth of corporate *sukuk* in Indonesia. He argued that the increase in crude oil prices could affect inflation from the supply side (cost push inflation) as rising oil prices caused increase in the cost of production of goods and services, subsequently will trigger inflation. An increase in the inflation rate will cause real income to decrease and that it will reduce the desire to invest. These findings are in line with Othman *et al.* (2015).

2.3.5 The Effect of World Gold Prices on *Sukuk* Index

Gold is an instrument that attracts investors because the level of risk is considered relatively small. Gold is considered to be able to maintain its value well and can also be used to hedge inflation (Wang *et al.*, 2010). History records that during the period of stock market decline, gold always show a better trend. A study conducted by (Moore, 1990) found that, from 1970 to 1988, the price of gold and the price of shares and bonds had a negative correlation, namely when the gold price increased, the shares and bonds markets decreased. This finding however is in contrast with Twite (2002) who found that gold prices have a positive effect on the Australian capital market.

3. Research Methods

This study uses secondary data consisting of Indonesia Composite *Sukuk* Index - Total Return (ISIXC-TR) from 2014 to June 2017 issued by the Indonesia Bond Pricing Agency (IBPA) to measure *sukuk* performance. *Sukuk* performance measurement uses the change of value from period t to the period $t-1$ of ISIX-TR. Other data are inflation rates obtained from the Indonesian Central Statistics Agency (BPS), BI rate, world crude oil prices (USD per barrel) and world gold prices (USD). Oil and gold prices are based on the changes in prices of period t with prices in period $t-1$. Data are in monthly time series starting from January 2014 to June 2017. Changes (Δ) on variables used is formulated as follows following Haron and Ayojimi (2019).

$$\Delta_x = \frac{(X_t - X_{t-1})}{X_{t-1}} * 100$$

where X-value represents ISIX-TR, exchange rate, crude oil price and world gold price.

In this study, the exchange rate is the exchange rate of the Rupiah against USD (closing month end rate), sourced from website <https://id.investing.com/currencies/usd-idr-historical-data>. The world oil prices used are crude oil (petroleum) prices on the average spot market for Brent, Dubai and West Texas Intermediate. Oil price data (end of month closing price) is obtained from www.indexmundi.com. World gold price data (monthly closing price) is obtained from the World Gold Council and can be accessed via <https://www.gold.org/data/gold-price>. In econometrics, variables that are co-integrated are said to be in the long-term equilibrium conditions (Nachrowi, 2006). If the data is stationary in the level process, then the ordinary VAR (unrestricted VAR) model can be obtained. But if the data is stationary in the differentiation process and co-integrated between the variables, then VECM testing is needed to prove it. The VECM model is a restricted VAR model due to co-integration or long-term relationships between variables in VAR estimation. The use VECM model to quantify the long-run relationship has been established in past studies (Valadkhani, 2013; Ayojimi and Haron, 2018). The stages of the research methodology can be described as follows:

1. Descriptive statistics from research data
2. Stationary ADF test

In the time-series statistical model, time series variables need to be tested first for its stationary, namely by examining whether there is a root unit in the model (called integrated data) or otherwise. To examine the stationary data, this study employs the ADF Augmented Dickey and Fuller test. Non-stationary data will cause spurious regression.

3. Johansen Co-integration Test

Co-integration theory was proposed by Engle and Granger (1987), namely non-stationary variables because they contain trends (variables have co-integration relationships), meaning there is a stable long-term relationship between variables. This study adopted the maximum co-integration likelihood estimation proposed by Johansen to test whether there is co-integration between variables, and to examine the number

of vector co-integration group (Widarjono, 2017). The statistical method used by (Wang *et al.*, 2010) are as follows:

- a) The diagonal elements and trace test with statistical test is as follows:

$$\lambda_{\text{trace}}(r) = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i)$$

H1: rank (P) > r; is the number of independent vector matrix groups, namely the number of Eigen values that are different from 0; T is the number of samples; r is the number of vector groups that are co-integrated; is the estimated value for the Eigen value i ; n is the number generated from the Eigen value that meets the chi-square and under chi-square distributions.

- b) The maximum Eigen value test with statistical test is as follows:

$$\lambda_{\text{max}}(r, r + 1) = -T \ln(1 - \hat{\lambda}_{r+1})$$

H1 : rank (P) = r + 1; T is the number of samples; r is the number of vector groups that are co-integrated; is the estimated value for the Eigen value i that meets the chi-square distribution.

4. Estimation of Vector Correction Mechanism (VECM)

Based on the Granger Representation Theorem, between the co-integrated variables, the nature of short-term relationships between variables is expressed in the form of error correction model (ECM) or VECM. This model is a time series data analysis that is used for variables that have dependencies which are often referred to as co-integration. The VECM method is used to balance the short-term economic relations of variables that have long-term economic balance. The VECM model of this study can be described as follows:

$$\Delta ISIXC_{TR} = \alpha_0 + \alpha_1 \Delta INFL + \alpha_2 \Delta BI_{rate} + \alpha_3 \Delta FOREX + \alpha_4 \Delta OIL + \alpha_5 \Delta GOLD + \alpha_5 u_{t-1} + e_t$$

u_{t-1} is lag 1 co-integration error, or is mathematically written:

$$u_{t-1} = \Delta ISIXC_{TR(t-1)} - \alpha_0 - \alpha_1 INFL_{t-1} - \alpha_2 BI_{rate(t-1)} - \alpha_3 \Delta FOREX_{t-1} - \alpha_4 \Delta OIL_{t-1} - \alpha_5 \Delta GOLD_{t-1}$$

where $\Delta ISIXC_{TR}$ is total return from *Sukuk* Index; INFL is inflation rate; BI rate is interest rate set by Bank Indonesia; $\Delta FOREX$ is changes in foreign exchange; ΔOIL is changes in world oil prices and $\Delta GOLD$ is changes in world gold prices.

4. Findings

4.1 Description of Research

This study covers the period from January 2014 to June 2017 (42 observations). Graphs of changes in the variables used during the study period are as follows:

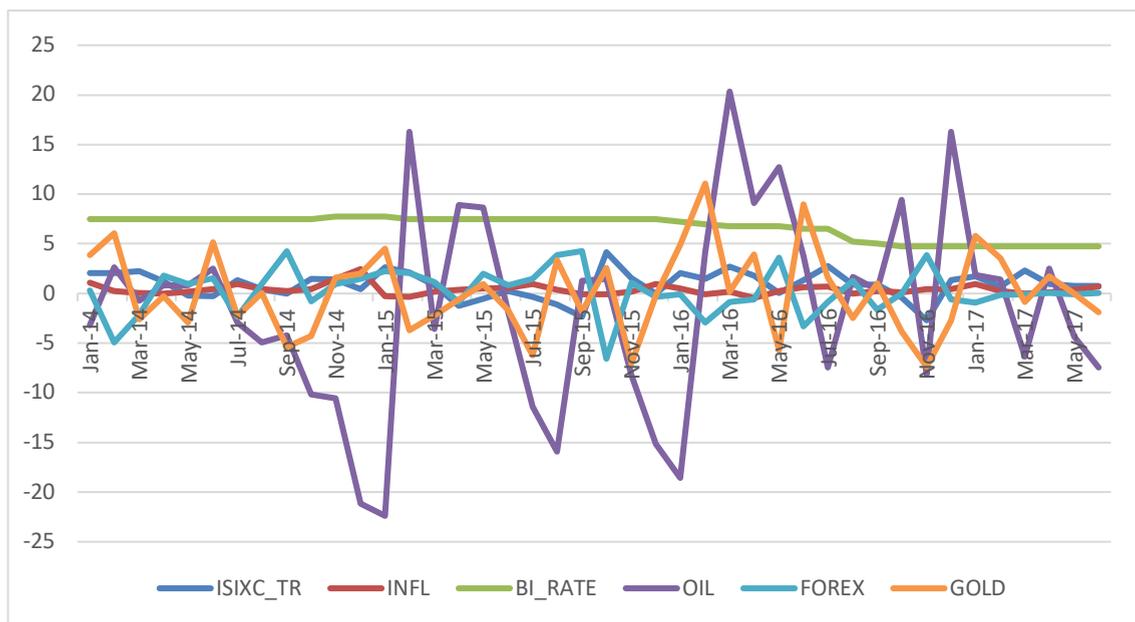


Figure 2: Changes in the *Sukuk* Index (ISIXC-TR), BI Rate, Inflation, Foreign Exchange, Crude Oil Prices, and Gold Prices (Period 2104 - June 2017)

Based on Figure 2, it shows that the change in *Sukuk* Index return is relatively small during the study period. The biggest is the fluctuation of changes in world oil prices which are relatively sharply up and down. The lowest decline occurred in January 2015 which fell to 22.39% compared to the previous month (drop from USD 60.7 per barrel to USD 47.11 per barrel). While the highest change in crude oil prices occurred in March 2016 (from USD 31.03 per barrel in February 2016 to USD 37.34 per barrel). Changes in gold prices were also relatively volatile, although not as high as the crude oil price. The lowest fluctuation was followed by gold prices and changes in the IDR exchange rate against the USD. The following is the complete data description during the observation period:

Table 2: Descriptive Statistics (Changes) in *Sukuk* Index Return, Inflation Rate, BI rate, Exchange Rate of IDR / USD, World Crude Oil Prices and World Gold Prices

	ISIXC TR	INFL	BI RATE	FOREX	GOLD	OIL
Mean	0.842143	0.398571	6.696429	0.241667	0.158183	-1.468333
Median	0.890000	0.315000	7.500000	0.035000	-0.099332	-0.195000
Maximum	4.160000	2.460000	7.750000	4.270000	11.07214	20.34000
Minimum	-2.700000	-0.450000	4.750000	-6.570000	-7.382075	-22.39000
Std. Dev.	1.363384	0.515376	1.173300	2.270992	4.185803	9.767935
Skewness	-0.333631	1.650472	-0.912241	-0.589078	0.370650	-0.033654
Jarque-Bera	1.199326	55.82769	7.453009	4.174337	0.982196	0.028607
Probability	0.548997	0.000000	0.024077	0.124038	0.611954	0.985798
Observations	42	42	42	42	42	42

From Table 2, it can be seen that the average change in all variables of the study shows positive numbers, except for changes in world prices which show an average negative change of -1.46% per month. The average change in return from the *Sukuk* Index is 0.84% per month during the study period.

4.2 Augmented Dickey Fuller Test (ADF) Stationary Test

ADF stationary test results are as follows:

Table 3: ADF Stationary Test

Variable	ISIXC-TR	BI RATE	INFL	FOREX	OIL	GOLD
Intercept prob.	-8.015112 (0.0000)	-5.213606 (0.0000)	-5.827811 (0.0000)	-7.291260 (0.0000)	8.926227 (0.0000)	-6.923840 (0.0000)
Trend & Intercept prob.	-7.910498 (0.0000)	-5.375601 (0.0004)	-5.750848 (0.0002)	-7.242536 (0.0000)	-8.809116 (0.0000)	-6.807421 (0.0000)

From Table 3, all variables are stationary at 1% and 5% significance based on the ADF test (first difference), means that the model does not contain unit root.

4.3 Johansen Co-integration Test

To find out the long-term relationship between variables, Johansen co integration is used with lag length 2. This co-integration test is used to test the relationship between variables in time series data. Following is the co-integration test results:

Table 4: Co-integration Test Results

Hypothesized	Trace stat	Critical value 5%	Prob**	Max-Eigen Stat.	Critical value 5%	Prob**
None	172.4999**	117.7082	0.0000	88.07728**	44.49720	0.0000
At most 1	84.42264	88.80380	0.0993	37.10952	38.33101	0.0686
At most 2	47.31312	63.87610	0.5381	16.15966	32.11832	0.9042
At most 3	31.15346	42.91525	0.4353	14.93741	25.82321	0.6401
At most 4	16.21605	25.87211	0.4753	11.50529	19.38704	0.4625
At most 5	4.710765	12.51798	0.6383	4.710765	12.51798	0.6383

Table 4 shows that the statistical trace value of 172.499 which is greater than the critical value of 117.707, while Eigen value is 88.077 also greater than the critical value of 44.49 ($p = 5\%$). Thus it can be concluded that the variables BI rate, inflation, foreign exchange, changes in oil prices and changes in gold prices to *sukuk* return changes are co-integrated ($p=5\%$).

4.4 Results of VECM Estimates: Macroeconomic Influence on the Performance of *Sukuk* Index

The VECM estimation results obtained a short-term and long-term relationship between *sukuk* return changes, BI rate, inflation, changes in exchange rates, changes in world oil prices and changes in gold prices. In this estimation, the exogenous variable is the *sukuk* return change (ISIXC_TR), while other variables are endogenous variable. The results of the VECM equation of the variables with lag 2 are shown in the following Table 5.

Table 5: VECM Estimation Results for Indonesian *Sukuk* Index Performance

Variables	Coefficient	T-statistic	Result
Long Term Model			
ISIXC_TR(-1)	1.000000		
BI_RATE(-1)	0.031256	[0.41844]	No Significant
FOREX(-1)	0.877598	[9.09853]	Significant at 1%
GOLD(-1)	-0.147548	[-2.83152]	Significant at 1%
INFL(-1)	-3.363843	[-8.63256]	Significant at 1%
OIL(-1)	-0.004709	[-0.28832]	No Significant
C	-0.123637	-0.123637	
Short Term Model			
CointEq1	-0.312893	[-1.32228]	Significant at 10%
D(ISIXC_TR(-1))	-0.404931	[-1.67085]	Significant at 10%
D(ISIXC_TR(-2))	-0.308193	[-1.32962]	Significant at 10%
D(BI_RATE(-1))	0.621668	[0.47002]	No Significant
D(BI_RATE(-2))	1.857563	[-1.32962]	Significant at 10%
D(FOREX(-1))	0.149022	[0.88074]	No Significant
D(FOREX(-2))	0.222639	[1.57128]	Significant at 10%
D(GOLD(-1))	0.020083	[1.57128]	Significant at 10%
D(GOLD(-2))	0.092488	[1.44732]	Significant at 10%
D(INFL(-1))	-0.706689	[-0.98407]	No Significant
D(INFL(-2))	-0.616848	[-0.75648]	No Significant
D(OIL(-1))	0.011011	[0.32473]	No Significant
D(OIL(-2))	0.005514	[0.19821]	No Significant
C	0.111737	[0.41841]	
R-squared	0.540757		
Adj. R-squared	0.301951		
F-statistic	2.264416		

Notes: The t-table obtained with the number n sample = 42 and the total number of variables = 6, with df value is 36. The t-table value at 1%, 5% and 10% are 2.028, 2.79 and 1.306, respectively.

The coefficient of determination test results show that the macroeconomic indicators have a significant contribution to changes in the return of *sukuk* in Indonesia by 30.19%.

4.5 Performance Analysis of *Sukuk* Index in the Long Term

Based on the VECM estimation results, in the long run, the variable exchange rate has a positive effect at 1% on the coefficient value 0.8787. While changes in gold prices and inflation rates have a negative significant effect at 1% on changes in the *Sukuk* Index return. The coefficient of change in the price of gold is -0.1475 and the inflation coefficient is -3.346. This means that if there is an increase in the IDR / USD exchange rate at the first lag of 1% it will cause an increase in the long-term *Sukuk* Index return by 0.88%. The pattern of changes in the *Sukuk* Index and changes in exchange rates can be described in Figure 3.

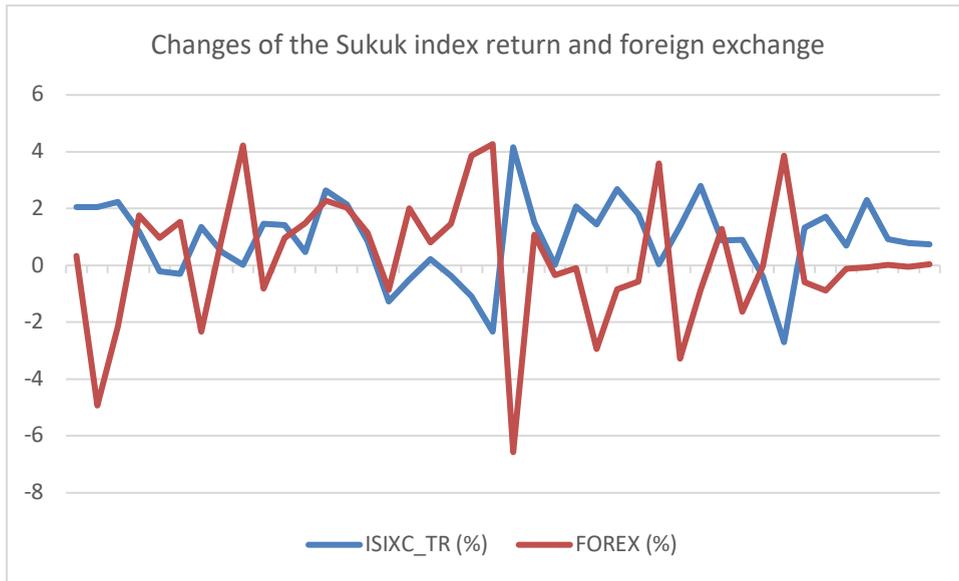


Figure 3: Changes of the *Sukuk* Index Return and Foreign Exchange

The graph above illustrates the changes in *sukuk* return and exchange rates tend to fluctuate, although in some periods there is opposite movement but in many other periods changes in exchange rates are in line with changes in *sukuk* return. Changes in the exchange rate become an important instrument that investors will pay attention to in investing because Indonesia adheres to the floating exchange rate system so that the stability of the exchange rate needs to be one of the concerns of the Financial Services Authority (OJK) in Indonesia.

Meanwhile changes in gold prices and inflation rates affect changes in *sukuk* return in the opposite direction and are significant at 1% in the long run. The increase in world gold price by 1% in the long run will reduce the *sukuk* return index by 0.15%. Gold is one instrument that investors are interested in as a form of investment in the long term. When investors realize a potential increase in gold prices in the long run, they tend to choose to invest in gold compared to *sukuk*. Vice versa, if gold prices decline, investors will opt for *sukuk* as choice of investment. Traditional views believe that gold can provide effective protection for investments from various changes in economic conditions, especially changes in inflation. These results are consistent with the research by Moore (1990) which found a negative correlation between gold prices and stock and bond prices.

The increase in inflation by 1% caused a decrease in *sukuk* return by 3.36% in the long run. Inflation is the tendency of rising prices of goods and services. The price increase has caused a decline in purchasing power and reduced the allocation of funds placed on securities including *sukuk*. The pattern of *sukuk* return, gold prices and inflation rates can be described in Figure 4.

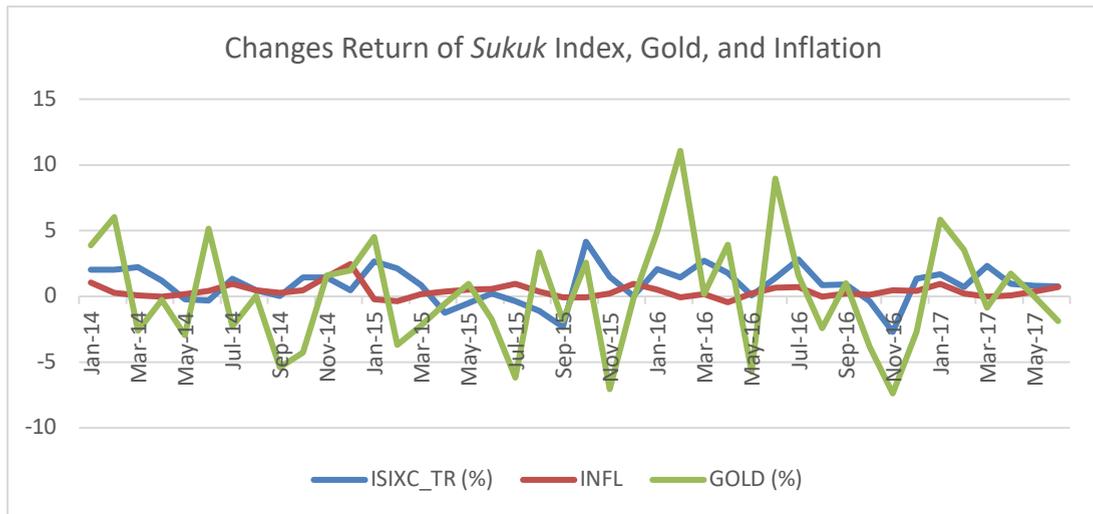


Figure 4: Changes Return of *Sukuk* Index, Gold Prices and Rate of Inflation in Indonesia (2104 – 2017)

Figure 4 illustrates that the volatility of changes in world gold prices is the highest compared to changes in the *sukuk* return and inflation rate. Changes in inflation looks more stable, but both have the same negative effect on changes in *sukuk* return. BI rate and changes in world crude oil prices do not affect the performance of *sukuk* return in the long run. The signals issued by the Central Bank of Indonesia through interest rate policies that usually serve as a reference for banks and other financial institutions did not affect the changes in the performance of the *sukuk* index. *Sukuk* in Indonesia is dominated by state *sukuk* and the contract structure used is dominated by *ijarah* and *mudharabah* contracts affected by changes in the interest rate. Similarly, changes in world oil prices turned out to be insufficiently effective in providing changes in the performance of *sukuk* in the long term.

4.5 Performance Analysis of *Sukuk* Index in the Short Term

The results of the Johansen co-integration test shows that there is co-integration between variables. Nevertheless, in the short term the conditions that occur are not necessarily the same. A VECM test is conducted to observe the condition in the short term. From the VECM estimation results (Table 5), it shows that the change in the *Sukuk* Index return at lag 1 and lag 2 has a significant negative effect ($p=10\%$). In the first lag, the increase in the change in return of *sukuk* by 1% in the previous month will cause a decrease in the return of *sukuk* by 0.4% in the following month. While in the second lag, the increase in the change in return of 1% at $t-2$ months will decrease the return of *sukuk* by 0.31% on month t .

The BI rate indicator does not significantly affect the change in *sukuk* performance on lag 1 but has a positive effect on the second lag ($p=10\%$). The increase in the BI rate at $t-2$ months will increase *sukuk* return by 1.85% on month t . Changes in the exchange rate also have a significant positive effect on lag 2 ($p=10\%$). The increase in the exchange rate at $t-2$ months will increase the return of *sukuk* by 0.22% on month t . Changes in gold prices in the short term have a positive influence on changes in *sukuk* return both in lag 1 and lag 2 ($p=10\%$). In the first lag, the gold price increase by 1% will increase *sukuk* return by 0.02% in the following month, while a 1% increase at $t-2$ months will increase *sukuk* return by 0.09% on month t .

Inflation and oil prices turned out to have no significant effect on changes in *sukuk* return both at lag 1 and lag 2. The influence of inflation is different from the results of long-term testing which shows that inflation has a long-term impact, but not in the short term. While changes in oil prices obtained consistent results which have no effect on changes in *sukuk* return, both in lag 1, lag 2 and in the long run.

4. Conclusion

This study has policy implication. Based on the empirical findings, it can be concluded that, BI rate, inflation rate, changes in foreign exchange, changes in gold prices and world oil prices have co-integration in the long run with *sukuk* performance. Investors should pay attention to exchange rate movements and world gold prices because both variables have both short and long-term effects on *sukuk*. Investors also need to pay attention to changes in inflation because of its influence on *sukuk* return in the long term.

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