6th ASEAN UNIVERSITIES INTERNATIONAL CONFERENCE ON ISLAMIC FINANCE (6th AICIF)

14th - 15th November 2018
New World Makati City, Manila, Philippine

CONFERENCE PROCEEDING

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MONEY PAYMENT SYSTEM & FINANCIAL INNOVATION

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6th ASEAN Universities International Conference on Islamic Finance (AICIF), Manila, Philippines
14th & 15th November 2018

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

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Abstract

The performance of Islamic bonds or sukuk can be influenced by many factors, they are internal and external. This study aims to analyze the long and short-term effects of macroeconomic variables such as BI rate, inflation, exchange rate, changes in world gold prices and world oil prices on the performance of sukuk in Indonesia during the period 2014 to June 2017.

The approach used in this study is co-integration tests to see the long-term relationship among variables. The Vector Error Correction Model (VECM) model was used in the further analysis because the results of the stationary test obtained stationary data results at first difference and had long-term co-integration. The results show that the long-term change in return of sukuk in Indonesia is influenced by changes in exchange rates, inflation and changes in world gold prices. While in the short term, influential macroeconomic indicators are changes in the performance of sukuk in the previous one and two months, BI rate, changes in exchange rates, and changes in world gold prices. Crude oil prices do not affect the performance of sukuk in the long or short term.

Keywords: Sukuk, Exchange rate, Inflation, BI rate Oil price, Gold Price, co-integration, VECM

1. Introduction

The Islamic sharia-based financial concept has been widely accepted in the world and has become a good alternative for markets that desires sharia compliance in recent years. This has encouraged the development of Islamic financial institutions in many countries especially to the countries that have the majority population is Muslims, 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 sharia 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 letter but as proof of joint ownership between the sukuk buyer and issuer for an asset or project. The use of sukuk funds must be for halal businesses. The investor or sukuk holder will get compensation in the form of profit sharing or margin according to the type of contract used in sukuk issuance.

The amount of market interest in sukuk has caused some countries to develop sukuk as a greeting to 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 published global financial instruments, 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 has been published six times global sukuk.

The development of sukuk in Indonesia shows a positive trend even though the portion is still smaller than the conventional market. When it is seen from the issuer's side up to 2014 sukuk in Indonesia was largely dominated by sovereign sukuk, amounting to 233 Billions of Rupiah, while corporate sukuk amounted to 13 Billions of Rupiah. (Thomson Reuters Eikon). Some of the sukuk issued were dominated by the ijarah contract and the mudharabah contract.

The outstanding value of sukuk in Indonesia over the past few years shows an increase in value, but when it is seen from the growth of sukuk (sukuk CAGR / (Compound Annual Growth Rate) shows a decrease of 24% to 20% annually. Graph of Indonesia's Sukuk Value Outstanding development from Bank Indonesia sources, the Financial Service Authority (OJK), Thomson Reuters Eikon can be seen in the following figure:

Figure 1. Development of Indonesia's Sukuk Value Outstanding

Sukuk performance can be influenced by many factors. Several previous studies have been conducted to link sukuk with micro and macroeconomic factors. This research will focus more on linking the influence of macroeconomic factors on changes in the performance of sukuk in Indonesia. Research carried out by the BAPEPAM (2009) Issuer Interest Study Team on the Issuer concerning the issuer's interest in issuing sukuk is an external factor, while the factor that is considered the least influential is the internal factor. 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 research, 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.

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, Indonesian Statistics Agency, Bank Indonesia, gold.org

From the data in the table above, it can be seen that macroeconomic indicators in Indonesia experienced a fairly volatile change both in terms of inflation rates, BI rate, crude oil price, and gold price. While foreign exchange is seen as a consistent increase in the dollar against the 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 big picture of the economy (Bodie, 2006). Referring to the theory, the development of sukuk performance will also be influenced by macroeconomic factors. This is supported by research results of (Sunarsih, 2008) who found that variable inflation and interest rates significantly influence the return of mudharabah and ijarah Islamic bonds 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 return to investing. (Tandelilin, Investment Analysis and Portfolio Management, First Edition, 2001). An increase in bank interest rates will reduce the price of a stock. On the basis of this theory, the researcher will use it to influence the interest rate (BI rate) on sukuk performance. Research conducted (Boutti, 2014) which attempts to analyze the performance of sukuk and bond portfolios, it shows that the sukuk index outperforms the bond and market indices. They used the ALL BOND INDEX TR TRAM index on the Malaysian market in the period 2012 to 2012.

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, political stability and others. Whereas according to (Samsul, 2006), the factors that affect the capital market includes foreign exchange rates, international economic conditions and the economic cycle of a country. (Wang, 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, finding co-integration between these variables. It means that in the long run, there is a stable relationship between these variables. But on the US stock market there is no co-integration between variables on the stock index. Research conducted by (FilusRaraga, 2012), regarding the influence of oil prices and gold prices, the exchange rate on the Composite Index in Indonesia found long-term co-integration between these variables. The study also found the influence of exchange rates on the composite index, but world gold prices and crude oil prices did not affect the index composite. 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 some previous research results, researchers are 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 was measured use the Indonesian Composite Sukuk Index (ISIXC) proxy issued by the Indonesia Bond Pricing Agency (IBPA). ISIXC is a performance benchmark and sukuk instrument movement that is published and

traded in the Indonesian capital market. The testing was carried out by co-integration approach and Vector Error Correction Mechanism (VECM) to see 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 comes 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. But a number of authors conclude that Sakk is the root word of "Chaque" in Latin which is often used in banking transactions (Nurul Huda, 2007).

Sukuk is generally known as "bonds" in accordance with Islamic sharia principles. Fatwa of the National Sharia Council No. 32 / DSN-MUI / IX / 2002 concerning Sharia bonds stated that Islamic bonds are long-term securities based on sharia principles issued by issuers to Sharia 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. Sukuk based on sharia contracts are distinguished by sales, leasing, partnership and agency-based contracts. Sales-based sukuk contracts include BBA (Ba'i Bi Tsaman ‘Ajil), murabahah, salam, and istishna. Rental based contracts are ijarah, ijarah muntahiyah bittamlik, and ijarah mawshufah fi dhimmah. Partnership-based contracts are mudaraba and musharaka. And agency-based contracts are bi istithmarwakalah (Malaysia, 2009) in ((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 sharia principles. In addition to the issuance of sukuk through special purpose vehicles (SPV), this is different from bonds that do not require the existence of SPV. Sukuk listed on the Indonesia Stock Exchange based on the issuer are divided into two, namely the corporate sukuk and state sukuk, namely State Sharia Securities (SBSN).

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. In its development investors have different preferences and characters in their behavior in 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 because most of the population is Muslim.

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 also be seen from the bond index. For Islamic bonds, the performance measurement of Islamic bonds or sukuk will 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 on certain conditions. 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 data 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 of state securities (SBN) and all corporate bonds. On November 11, 2015, IBPA and IDX re-launched INDOBex Total Return and changed its name to Indonesia Composite Bond Index. This index is calculated based on the value of total return domestic bonds which issued by Government and corporations. 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 IHSG (Indonesia Composite Index) in the stock market. Then ISIX consists of entire sharia 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 development index bonds and sukuk, it can be classified into 5 kinds:

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): it describes the overall price movement of sukuk which is calculated based on price increase / decrease without taking into account the accumulation of profit or profit sharing
3. Gross Price (GP): it describes the overall price movement of sukuk which is calculated based on the increase / decrease in the price of sukuk by taking into account the accumulated profit gain.
4. Effective Yield (EY): it describes the movement of the overall yield (yield) of sukuk which is calculated based on the increase / decrease in the sukuk yield level and has taken into account the accumulation of profit during the year.
5. Gross Yield until Redemption (GY): it describes the movement of the overall yield level of sukuk calculated based on the increase / decrease in sukuk yield, accumulated profit during the current year and the value of Sukuk duration.

2.3 Impact of macroeconomic variables on the Sukuk Index

Macroeconomic variables which are strongly suspected to affect 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 addition to quantity theory (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. This often happens in developing countries that are generally still in an agrarian pattern.

Inflation can affect the performance of sukuk. When the price of goods rises, the sukuk issuer will increase the return offered so that it can replace the decline in people's purchasing power. In conditions of rising prices, investors have a tendency to sell securities owned, including sukuk, while prospective investors will hold their funds to invest their funds in financial assets because of the needs in the real sector. Sukuk publishers are willing to provide higher profits Research conducted (Yuliana, 2010) shows that inflation and interest rates affect the return of mudharabah and ijarah sharia bonds in Indonesia. Meanwhile, (Mehra, 1998) who conducted research into the inflation rate in the United States in the second quarter of 1962 until the fourth quarter of 1996 found that in the long run, the permanent movement of real inflation was related to the permanent movement of the bond interest rate. The announcement of future inflation is the factor that most influences long-term bond issues (John Y Campbell, 1993).

2.3.2 The Effect of the BI rate on the 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 but have a relationship with the interest rate. In line with this opinion, (Tandelilin, 2010) stated that interest rates can be used to forecast bond prices or stocks. If the interest rate will increase, the stock or bond prices will go down.

2.3.3 The Effect of Exchange Rates on the Sukuk Index

Other macroeconomic variables that can be used to assess a country's economic strength are exchange rates. In general, the exchange rate of a currency is determined by the exchange rate policy adopted by each country. The OIC Fiqh Council recommends that Muslim governments control the money market and regulate their activities related to foreign exchange transactions in accordance with sharia principles and avoid economic disasters (Ayub, 2009). The foreign exchange rate movement will determine price movements and trade in the bond market. In Indonesia adheres to the floating exchange rate system where the exchange rate is determined by market balance and strength. If the exchange rate fluctuations are unstable, the bond trade is also affected (Rahardjo, 2004).

According to his research stated that the exchange rate has a positive influence on the yield of government bonds within one, five and ten years (Wibisono, 2010). Research conducted by (Wahida Ahmad, 2011) provides findings that sukuk issuers place a premium on current economic factors such as GDP, forex and international liquidity (reserves less gold) in issuance sukuk while conventional bonds as an important factor in its issuance..

2.3.4 The Effect of World Oil Prices on the Sukuk Index

Crude oil needs which are increasing along with the emergence of new industrial countries will directly affect the crude oil prices. If this is related to economic activity, 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. This will have an impact on the acceptance and welfare of the community. Furthermore, it will have an impact on the economy.

The results of the research conducted by (Siti Aisiyah Suciningtias, 2015), it is found that oil prices have a significant effect on the Sharia Stock Index in Indonesia. Likewise the findings of (FilusRaraga, 2012) show 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. Research of (Ivan HannoeriadiArdiansyah, 2017) shows that oil prices have a negative and significant 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), rising oil prices caused an increase in the cost of production of goods and services. This increase in production costs will trigger inflation. An increase in the inflation rate will cause people's real income to decrease so that it will reduce the desire to invest. The descent of the community's desire to make this investment will have an impact on investment in the capital market. These findings are in line with research of (Othman, 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, 2010). History records that countries during the stock market decline period, gold always shows a better trend. Research conducted by (Moore, Gold Prices and a Leading Index Inflation, 1990), it was found empirically that, from 1970 to 1988, the price of gold and the price of shares / bonds had a negative correlation, namely when the gold price increased, the stock / bond market is decreasing. But this result is different from the findings of (Twite, 2002) showed that gold prices have a positive effect on the Australian capital market.

3. Research Methods

The type of data used in this study is 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) and published in the 2015 Indonesia Bond Market Directory until 2018 to measure the performance of sukuk. This sukuk performance measurement uses the change value from period t with the period t-1 of ISIX-TR data. 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 price data in this study also use data changes in prices of period t with prices in period t-1. Forms of data are monthly time series starting from January 2014 to June 2017. Sukuk performance data in this study using ISIXC-TR changes. Data on foreign exchange rates, crude oil prices and world gold price data use changes in exchange rates, changes in crude oil prices and changes in gold prices (Δ), which can be formulated as follows:

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

Where: X-value of ISIX-TR, exchange rate, crude oil price, world gold price.

In this study, the exchange rate used is the exchange rate of the Rupiah against USD. The exchange rate data is used using the closing month end rate. The data is accessed from the 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 obtained from www.indexmundi.com uses the end of month closing price. World gold price data is obtained from the World Gold Council and can be accessed via https://www.gold.org/data/gold-price. The world gold price data used is monthly closing price.

In econometrics, variables that are co-integrated are said to be long-term equilibrium conditions (Nachrowi D Nachrowi, 2006). Variables that have a long-term relationship do not mean that in the short term equilibrium also occurs. If the data is stationary in the level process, then the ordinary VAR (unrestricted VAR) model can be obtained (Vector Otoregression). But if the data is stationary in the differentiation process and co-integrated between the variables, then VECM testing is needed to prove it. This VECM model is a restricted VAR model due to co-integration or long-term relationships between variables in VAR estimation.
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, stationary data, namely by looking at whether there is a root unit in the model (called integrated data) or not. To see the stationary data in this study using ADF Augmented Dickey and Fuller, 1979). Non-stationary data will cause spurious regression. (Nachrowi D Nachrowi, 2006)

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). That is, there is a stable long-term relationship between variables. In this study, it is adopted maximum co-integration likelihood estimation proposed by Johansen to test whether there is co-integration between variables, and to find the number of vector co-integration group (Widarjono, 2017). The statistical method used by (Wang, 2010) is as follows:

a. The diagonal elements and trace test. The statistical test is as follows:

$$\lambda_{trance}(r) = -T \sum_{i=r+1}^{n} ln\left(1 - \hat{\lambda}_1\right)$$

H1: rank (P) > r; Ð 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 examination distributions.

b. The maximum Eigen value test, The statistical test is as follows:

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

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 and is below the test results.

4. Estimation of Vector Correction Mechanism (VECM)
Based on Granger Representation Theorem, if between co-integrated variables, the nature of short-term relationships between variables is expressed in the form of error correction model (ECM) or it can also be a Vector Error Correction Model (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: $\Delta ISIXC_{TR}$ - total return from sukuk index;

INFL - inflation rate;
BI_rate - the interest rate set by Bank Indonesia;
$\Delta FOREX$ - changes in foreign exchange;

ΔOIL - changes in world oil prices ;
ΔGOLD - changes in world gold prices

4. Findings

4.1 Description of Research

This research was conducted in the period January 2014 to June 2017 so that there were 42 observations. Graphs of changes in changes in the variables used during the study period are as follows:

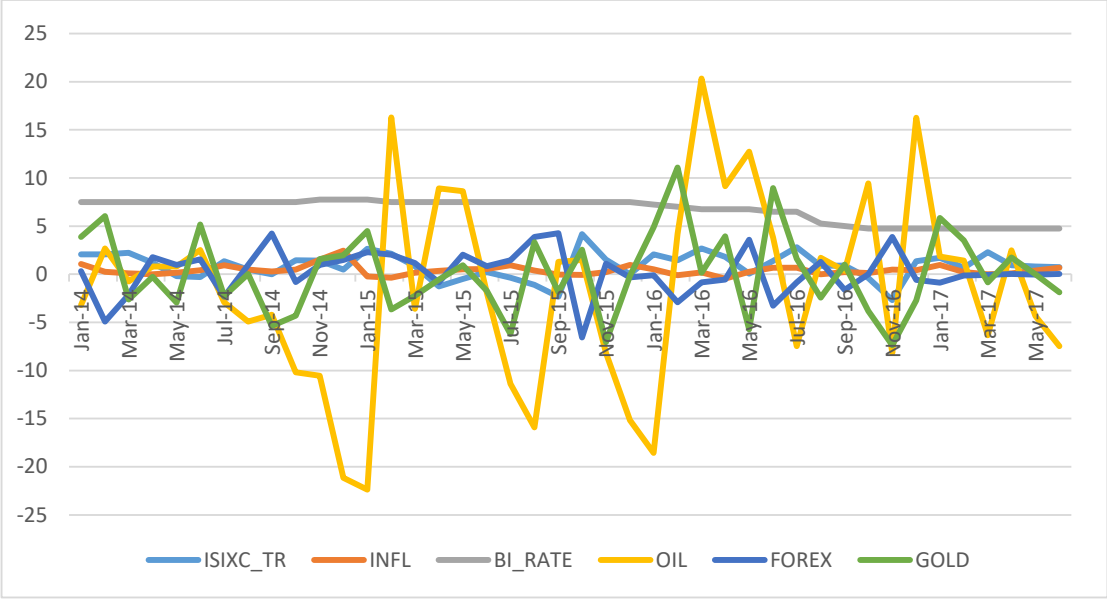

Figure 2. Changes in the sukuk index (ISIXC-TR), BI rate, inflation, in foreign exchange, crude oil prices, and gold prices,period 2104 to June 2017

Source: secondary data processed

Looking at the graph above, it can be seen that the change in the sukuk return index 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, 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 fluctuations in crude oil price. The lowest was followed by gold prices and changes in the IDR exchange rate against the USD. The lowest change in world oil prices on relatively stable fluctuations is the change in inflation and the BI rate. The following is the complete data description during the observation period:

Table 2. Descriptive Statistics Changes in Sukuk Return Index, 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

Source: data processing output from Eviews

From the data above, it can be seen that the average change in all variables of the study shows a positive number, 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% every month during the study period.

4.2 Augmented Dickey Fuller Test (ADF) Stationary Test

The irregularity of the data will cause spurious regression false estimation results, where the resulting coefficient of determination is large and the regression coefficient is significant but the durbin watson value is low (Nachrowi D Nachrowi, 2006). The ADF stationary test results obtained results, when the first variable tested, the BI rate turned out to indicate that the variable is not significant at the original level because the probability is 0.798 greater than α 1%, 5% and 10% means that the unit root means that the variable is not stationary. Thus, it continued again with a stationary test at the first difference-trend & intercept level. The results of the first difference test show that the BI rate has a probability of 0,000 so that it is significant and has been stationary (not containing the root unit). If one variable is stationary at the first difference level, then all variables must be stationary at the first difference level as well. (Shocrul R. Ajija, 2011). 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)

Source: data processing output from Eviews

From the table above shows that all variables are significant and stationary at an error rate of 1% and 5% by using the ADF test first difference means that the model does not contain the 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 table of 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

Source: data processed from the E views output

From the table above shows that the statistical trace value of 172.499 is greater than the critical value of 117.707, Eigen value is 88.077 also greater than the critical value of 44.49 at the level of 5%. Thus it can be concluded that the variable BI rate, Inflation, foreign exchange, changes in oil prices and changes in gold prices to sukuk return changes are co-integrated at a 5% significance level. The estimation model can be further interpreted.

4.4 Results of VECM Estimates: Macroeconomic influence on the performance of the sukuk index in Indonesia

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), the other variable is the endogenous variable. The results of the VECM equation of the variables with lag 2 are shown in the following table:

Table 5. VECM Estimation Results for Indonesian Sukuk Index Performance Equations

Variables	Coefficient	T-statistic	Result
Long termModle			
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 TermModle			
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		

Source: data processed from the Eviews output

Note that the t-table obtained with the number n sample 42 and the total number of variables 6, obtained df value is 36. Then the t-table value at 1% alpha is 2.028, at alpha level 5% is 2.79 and at alpha 10% is 1,306. The coefficient of determination test results show that these macroeconomic indicators have a significant contribution to changes in the return of sukuk in Indonesia by 30.19%.

4.5 Performance Analysis of the Sukuk Index In The Long Term

Based on the VECM estimation results in the long run, the results show that 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 return index. 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 return index of 0.88%. To see empirically the pattern of changes in the sukuk index and changes in exchange rates can be described as follows:

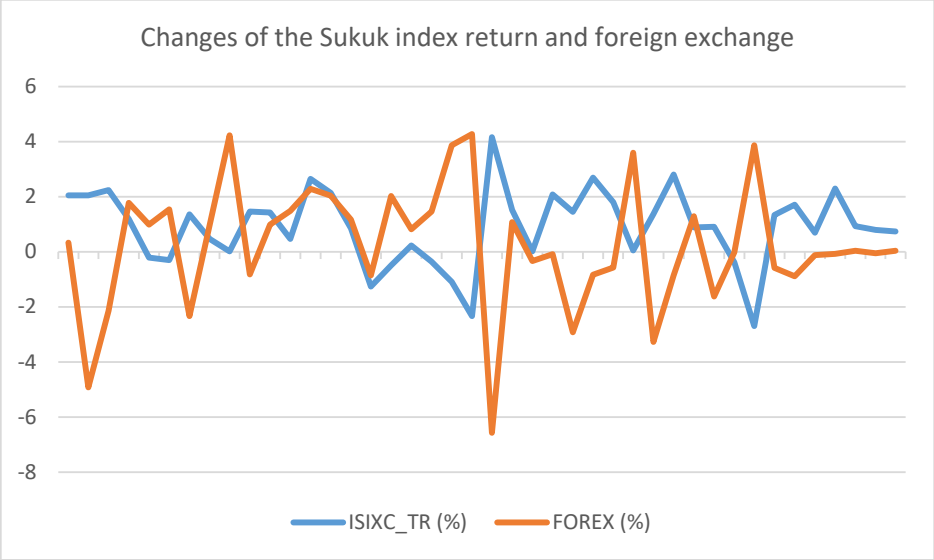

Figure 3. Changes of the Sukuk Index Return and Foreign Exchange

The graph above illustrates the changes in sukuk return and exchange rates tend to fluctuate, although in some periods the opposite moves 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 see 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 see sukuk as an investment choice to be chosen. 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 research (Moore, 1990) which found a negative correlation between gold prices and stock / bond prices.

The increase in inflation by 1% caused a decrease in the return of sukuk by 3.36% in the long run. Inflation is the tendency of rising prices of goods at the same time. The price increase has caused a decline in people's purchasing power and reduced the allocation of funds placed on securities including sukuk. The empirical pattern of sukuk return changes, gold prices, and inflation rates can be described as follows:

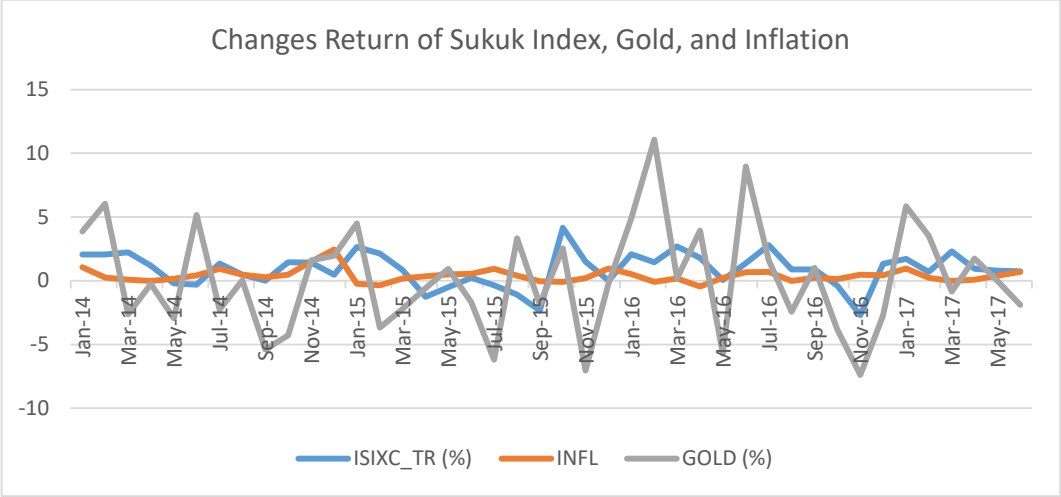

Figure 4 : Changes Return of Sukuk Index, Gold Prices, and Rate of Inflation in Indonesia at period. 2104 to June 2017

The graph above illustrates that the volatility of changes in world gold prices is greatest when compared to changes in the sukuk return index and inflation rate. Changes in inflation every month if seen from the graph above looks more stable, but both have the same negative effect on changes in the sukuk return index. BI_rate and changes in world crude oil prices in this study do not affect to the performance of the sukuk index in the long run. The signals issued by the Central Bank 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 the Sukuk Index in the Short Term

The results of the Johansen co-integration test that has been carried out in the previous period shows that between the variables of the study there is co-integration or balance between variables in length. In the short term the conditions that occur are not necessarily the same. A Vector Error Correction Model (VECM) test is conducted to observe the conditions in the short term. From the VECM estimation results from table 5 above, the results show that the change in the sukuk return index at lag 1 and lag 2 has a significant negative effect on the 10% error. 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 at 10% error. 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 at a 10% error. 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 from the results of this study have a positive influence on changes in sukuk return both in lag 1 and lag 2 at 10% error. In the first lag, the gold price increase of 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 from the results of this study turned out to have no significant effect on changes in sukuk return both at lag 1 and lag 2. Conclusion the influence of inflation is different from the results of long-term testing which shows the results that inflation has a long-term impact, but not in short. 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.

5. Conclusion

Based on the empirical findings that have been described previously, it can be explained some conclusions that between variable changes in sukuk performance, BI rate, inflation rate, changes in foreign exchange, changes in gold prices and world oil prices have co-integration or balance relations in the long run. Long-term testing results obtained from macroeconomic indicators that influence the changes in sukuk return are changes in exchange rates, inflation and changes in gold prices. The exchange rate has a positive influence, while inflation and gold prices have a negative impact on changes in the return of sukuk. While the policies of the Central Bank of Indonesia through the BI rate and changes in world crude oil prices have no effect on changes in sukuk returns.

In the short-term analysis results are obtained where crude oil prices also do not affect the performance of sukuk. While the BI rate and exchange rate for the period of t-2 months have a positive effect on changes in the return of sukuk in period t. Gold prices in the short term have a positive effect on changes in sukuk return in Indonesia. While inflation does not affect the change in the performance of sukuk in the short term, but it gives a longer influence in the negative direction.

From the research results, it can be input for investors to pay attention to exchange rate movements and world gold prices because both variables have both short and long-term effects. While the government is important to maintain the inflation rate according to the target to be achieved and maintain the stability of the foreign exchange (IDR/USD) because it affects the performance of sukuk in the long term. Investors need to pay attention to changes in inflation in the long term based on predictions of expert forecasting because these variables only affect the return of sukuk in the long term.

This study links macroeconomic indicators in influencing the performance of sukuk using the VECM approach. This model is a theoretical one because it does not utilize previous theories. So this model is often called a non-structural model (Nachrowi D Nachrowi, 2006). Therefore, the results of the conclusions from this study are more appropriate for model forecasting but not appropriate for policy analysis.

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