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Macroeconomic Determinants of the Capital Market in Indonesia: A Comparative Analysis between *Sukuk* and Bonds Markets

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Abstract

Background: *Sukuk* is one of the Islamic financial instruments that are used to provide domestic financing for fiscal deficit. *Sukuk* could support domestic financing and ensure the impacts of the volatility of the business cycle to the promotion of economic growth in a country. The purpose of this study is to empirically explore the macroeconomic determinants of Islamic-(*sukuk*) and conventional-bond markets in Indonesia. It also attempts to assess the short- and long-run equilibrium between the macroeconomic determinants and both Islamic and conventional bonds markets in Indonesia. This is the first study to adopt the cointegration and VECM approaches to investigate empirically the sovereign *sukuk* and bonds markets in the largest Muslim populous country, Indonesia.

Methods: Focusing on the period from January 2010-November 2017, various time series analysis methods (i.e., cointegration, vector error correction model (VECM), and multivariate causality approaches) are used to explore the determinants of Islamic and conventional bonds and their short- and long-run equilibrium.

Results: The study documented that the *sukuk* market is only affected and Granger-caused by the exchange rates, while the bond market is significantly affected by the interest rates, exchange rate and price level. The finding of independence of *sukuk* market from interest rates further

confirmed that the trading of the *sukuk* in Indonesia has been in harmony with the tenets of *Shari'ah* finance principles.

Conclusion: The *sukuk* market is more stable than bonds market in the economy. Therefore, the government is recommended to maintain the stability of exchange rate in promoting the *sukuk* market, while in enhancing the development of the bonds market, the stabilization of inflation, interest rates and exchange rate should be a focus of macroeconomic policy design by the relevant authorities in Indonesia.

Keywords: *Macroeconomic Determinants, Sukuk, Bonds, VECM, Multivariate causality.*

Background

The term '*sukuk*' is derived from the word '*shakk*' that refers to a paper or a note to which is an order from a person for the payment of money with a certain amount on another person whose name is on the paper. Briefly, the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI, 2002) defines *sukuk* as a certificate of equal value, which is a proof of ownership that is distributed over an asset, right to benefit and services or ownership of a particular project or investment activity. According to Iqbal and Murakhor (2011), *sukuk* is a proportional representation of ownership of assets. It has a specific time frame with risks and rewards associated with cash flow through underlying assets in the hands of investors.

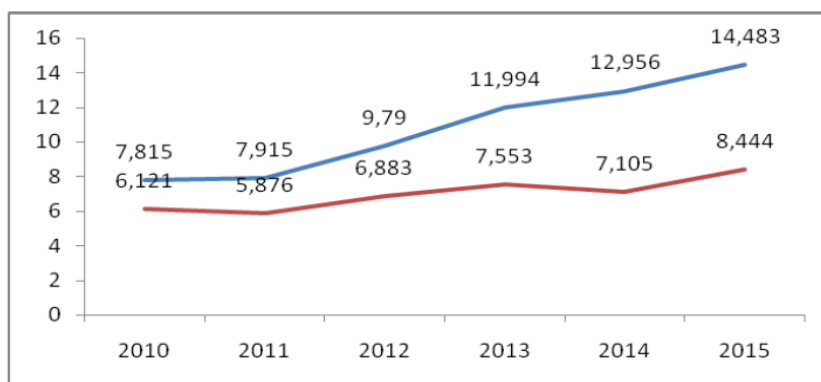
The *sukuk* instruments have been rapidly and globally growing in the Islamic financial market. The development of *sukuk* in the Islamic contemporary world market has started during the 19th century, replicating the concept of securities assets in the conventional market and adjusting it to the Islamic financial principles of contracts, which are free from *riba* (interest), *gharar* (uncertainty), and *maysir* (gambling). By the end of 1990, an asset-based *sukuk* structure was developed in Bahrain and Malaysia. Many parties are interested in this *sukuk* structure because of its potentiality for issuance as one of the instruments of Islamic capital market.

Since then, many countries have issued *sukuk* in their capital markets, not only the Muslim-majority countries, but also the Western and Asian countries whose Muslim population is a minority. These countries include Bahrain, Malaysia, Indonesia, Germany, the U.K, Kuwait, Canada, UAE, Pakistan, Qatar, Singapore, Japan, Korea, and China. However, Malaysia and Bahrain have emerged as the largest *sukuk* markets in the world. Malaysia has been seen as the model for Islamic banking and finance worldwide.

Unlike the fast-growing of *sukuk* market in Malaysia; the market share of *sukuk* in the Indonesian capital market is relatively smaller. This fact is ironical, Malaysia with a 64.0% Muslim population in 2016 from the total population of 20,389,632 (Statistic.gov.my, 2016) has regarded *sukuk* as one of the important financial instruments compared to Indonesia, the largest Muslim populous country in the world. According to Indonesian Statistics Bureau, the number of Muslim population in Indonesia is 85% in 2016 out of a total population of 255 million (Republika, 2016). This fact implies that the perpetrators of economic activity in Indonesia are majority

Muslims, but the development of *sukuk* market in the country has been relatively slower compared to Malaysia. The development of *sukuk* market in Indonesia is illustrated in Figure 1.

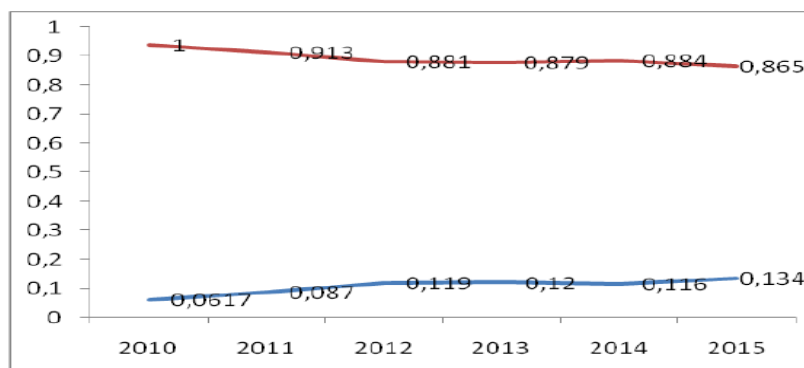
Figure 1 shows that the development of *sukuk* market in Indonesia started from 2010 for sovereign *sukuk* and it is continued to increase until 2015. Specifically, for the newly issued sovereign *sukuk*, the *sukuk* product development in Indonesia has recorded a rapid progress. However, compared to the bonds market share, *sukuk* market is still far behind.



Source: Indonesian Financial Services Authority (2016).
 Note: — Sukuk Issuers; and — Sukuk Outstanding.

Figure 1. The Development of Sukuk Market in Indonesia (2010-2015)

Furthermore, the market share of *sukuk*, as observed from Figure 2, is smaller than the bonds market. However, the development of *sukuk* market in the country has shown a positive trend, while the development of bonds market shown a declining trend. This indicates that the *sukuk* market was able to attract an increased number of investors.



Source: Indonesian Financial Services Authority (2016).
 Note: — Sukuk Market; and — Bonds market.

Figure 2. Market Share of Sukuk and Bonds Markets in Indonesia (2010 – 2015)

Sukuk is one of the Islamic Financial instruments that are used to provide domestic financing for fiscal deficit. This is one of the alternatives that a country hopes to support domestic financing as

well as ensure the impacts of the volatility of the business cycle to the promotion of economic growth in a country. Djennas (2016) argues that Islamic finance was in a stronger position in the face of various situations that vary with the crisis and recession.

As part of the modern world financial institutions, Islamic capital market mechanisms are different from those already known by economic agents in general. As one of the instruments of the Islamic capital market, *sukuk* is not only in accordance with the applicable rules of finance, but it also in compliance with the rules set forth in the Holy Qur'an and *Hadits* (Tatiana et al., 2015)

The implementation of Islamic finance in Indonesia has started since the issuance of Law No. 19 of 2008 on Sovereign *Shari'ah* Securities (SBSN) and then ratified in the SBSN Law which is an important legal basis for the development of the *sukuk* market. Two years later, the regulatory framework of the development of *sukuk* products was reinforced by the emergence of the No: 76/DSN-MUI /VI/2010 law on the SBSN *Ijarah* Asset to be leased by expanding the issuing structure (National *Shari'ah* Council, 2010). Therefore, *sukuk* is a new area of study in Indonesia.

Many studies have investigated *sukuk* from both qualitative and quantitative perspectives. For example, the synthesis of theoretical and empirical research on *sukuk* has been conducted by Zulkhibri (2015). The study critically reviews *sukuk* literature from three perspectives, namely: basic and natural theory, operational issues and structures involved in *sukuk*, and the role of *sukuk* in economic development. Overall, previous studies on the *sukuk* have been dominated by qualitative researches than the quantitative researches.

The study of *sukuk* from qualitative aspect focusing on the trading contracts and their *Shari'ah* issues (Rachmawati & Mumin, 2015). Endri (2009) explores the problem of corporate *sukuk* by using the Analytical Process Network (ANP) method. The analysis of *sukuk* regulations in Indonesia and its comparative development, opportunities and challenges with the Malaysian *sukuk* market was studied by Jarkasih and Rusydiana (2009). The study of *sukuk* using quantitative method is carried out by Fahrian and Septarita (2016), Rini (2012), and Akbarullah (2011). These studies empirically analyzed the influence of *sukuk* on economic growth and the impact of the issuance of *sukuk* to the performance of Islamic banking and their determinants.

Wahyudi and Sani (2014) investigated the effects of macroeconomic variables on Islamic and global financial markets. They found that the Jakarta Islamic Index (JII) is a more suitable measure of fiscal policy barometer in Indonesia, while the Islamic Money Market Index (SBIS) is a suitable instrument for monetary policy. The stock market reacted neutrally to the announcement of conventional bonds issues, but reacted negatively to the announcement of the *sukuk* issue (Godlewski et al., 2013).

Studies on the relationship between macroeconomic variables and Islamic capital market has been investigated by Majid (2016), focusing on short- and long-term relationships of the stock returns in Indonesia. The study found that the Islamic stock markets are cointegrated with macroeconomic variables. This study only investigates the Islamic stock market, but it does not

examine the bonds. Yusof and Majid (2007), Majid and Yusof (2009), Majid and Kassim (2010), Majid and Hasin (2014), Bahloul et al. (2016), and Majid and Kassim (2016) assessed the impact of macroeconomic variables including the monetary policy variables on the Islamic stock returns in Malaysia and their dynamic interactions. Yusof et al. (2009) comparatively investigated monetary policy shocks and Islamic financial institutions in Malaysia and Bahrain, They documented that the conventional stock indices returns and monetary policy variables influenced the development of emerging Islamic stock indices.

Majdoub et al. (2016) investigates the cointegration between conventional and Islamic stock prices, and found cointegration among the markets, except with the UK market. Comparative studies between Islamic and conventional stock markets of Malaysia are also investigated by Yusof and Majid (2016). They found the cointegration between the Islamic stock markets and macroeconomic determinants. Said and Grassa (2013) investigated the effect of macroeconomic factors on the *sukuk* structure. The GDP per-capita, Muslim people, economy measure, and open trading with its regulation quality positively affected the development of *sukuk* market.

The government of Indonesia uses sovereign *sukuk* as one of fiscal instruments. *Sukuk* is a new product in the Indonesian capital market based on Islamic concept. Comparing to the conventional bonds market that has been existed since 1880s in the country, the *sukuk* market that started its establishment in 1997 has showing tremendous growth rate. Thus, it is interesting to investigate the underlying macroeconomic factors contributing toward the developments of both conventional and Islamic bond markets with a comparative treatment. Specifically, this study empirically compares the effects of macroeconomic determinants on the bond and *sukuk* markets in Indonesia from the short- and long-run perspectives. This study is believed to be among the first study adopting the cointegration and Vector Error Correction Model (VECM) to explore the macroeconomic determinants of bond and *sukuk* markets in Indonesia.

The rest of study is structured in the following sequences. Section 2 discusses the empirical framework of the time series analysis models of the VECM. Section 3 discusses the findings and its implication. Finally, Section 4 concludes the study.

Empirical Framework

The data used in this study is monthly data from January 2010 to December 2016, obtained from publications of institutions/agencies such as Indonesian Financial Services Authority, Central Bank of Indonesia, Indonesian Statistic Bureau, and *Shari'ah* Capital Markets. The reason for selecting the sampling period of the monthly for *sukuk* issuance is due to the data availability, where the sovereign *sukuk* begins at the end of 2009. In this study, the effects of macroeconomic determinants on the *sukuk* and bonds markets are comparatively explored.

The *sukuk* market is measured by the SBSN (Sovereign *Sukuk* of Islamic *Shari'ah* Securities), while the conventional bonds market is measured using the state bonds. The macroeconomic determinants investigated in this study comprise inflation (INF), exchange rate (ER) and the interest rate (Blrate). These variables were chosen by considering the real business cycle research

as the basis for building a general equilibrium model and the main features of macroeconomic fluctuations (Romer, 2012).

In this study, inflation is measured by changes in consumer price index. Inflation is a measure of the stability of price in a country, one of the determinants of investment. It is also very important to look at the changes in the exchange rate of the Indonesian Rupiah (IDR) and interest rate, as the national economy of Indonesia is opened to the fluctuations of the activity of international economies.

In estimating the influences of macroeconomic determinants on the *sukuk* and bond market in Indonesia, two models are proposed. One is exploring the macroeconomic determinants of the *sukuk* market, and the other is exploring the macroeconomic determinants on the conventional bonds. The VECM models adopted in the study are as follows:

$$\text{SBSN} = f(\text{INF}, \text{ER}, \text{Blrate}) \dots\dots\dots (1)$$

$$\text{ON} = f(\text{INF}, \text{ER}, \text{Blrate}) \dots\dots\dots (2)$$

Where SBSN is the market of *sukuk* (Sovereign *Sukuk*), ON is the conventional bond market, INF is the inflation rate, ER is the Indonesian Rupiah exchange rate against the dollar, and Blrate is the interest rate of the Central Bank of Indonesia.

Ensuring the stationarity of a data is very important when the research using time series data analysis. Non-stationary will produce non-robust findings that describe the relationship between two or more variables that seem statistically significant, but in fact, it is not necessarily significant. Thus, this study utilizes the unit root test of constant and trend model to check for stationarity. Two unit root tests are used in this study, namely the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. To find out whether the time series data of SBSN, ON, ER, INF, and Blrate are stationary or not, the study estimates the model proposed by Gujarati (2009), as follows:

$$y_t = \rho y_{t-1} + \varepsilon_t \quad -1 \leq \rho \leq 1 \dots\dots\dots (3)$$

where ε_t is the *stochastic error term*, y is time series macroeconomic variables, ρ is the estimated values of macroeconomic variables. If the value of $\rho = 1$, in the case of unit roots, that is the data is non-stationary at level $I(0)$, then the data must be tested at the first difference or $I(1)$. If the first difference data, y_t is non-stationary, it should be regressed on the lag one period, y_{t-1} . If the $\rho = 1$ of the first difference data, then the data is non-stationary.

Before formulating the equation model, the optimum lag should be determined for both *sukuk* and bonds market. Lag serves to explain how long the influence of a variable on the other variables. In addition, the optimum lag test would eliminate the problem of autocorrelation in the estimation system. Therefore, by using optimal lag it is expected that the autocorrelation problem would not exist.

In the framework of cointegration, two or more non-stationary variables are found to be cointegrated when their combination are linear as time goes by, although it can happen when each variable is non-stationary. If the time series variable is cointegrated then there is a stable relationship in the long run. Following Moosa & Vaz (2016), the long-term relationships among variables could be formulated as below:

$$y_t = a + bx_t + \varepsilon_t \dots\dots\dots (4)$$

To identify whether the time series is stationary or non-stationary, it can be done through regression analysis. According to Granger's Representation Theorem, the cointegration belongs to the Error Correction Model (ECM) model, which means that if $x_t \sim I(1)$, $y_t \sim I(1)$, $\varepsilon_t \sim I(0)$, then ECM equation could be written as follows:

$$\Delta y_t = \alpha + \sum_{i=1}^k \beta_i \Delta y_{t-1} + \sum_{i=0}^k \gamma_i \Delta x_{t-1} + \phi \varepsilon_{t-1} + \varphi t \dots\dots\dots (5)$$

where $\phi < 0$ must have a valid negative or the ECM value must be negative and statistically significant. This means that the cointegration is convergent. The ECM model is adopted to further analyze the results of cointegration tests, which presents the existence of long-term equilibrium among the variables in the system. According to Gujarati & Porter (2009), the ECM is consistent with the concept of cointegration, known as the Granger Representation Theorem.

The cointegration test used in this study is based on the trace statistic of Johansen approach. If the trace statistic is greater than the critical value at the confidence level ($\alpha = 5\%$) or the probability value (p -value) is smaller than $\alpha = 5\%$, then the cointegration is documented. If the non-stationary variables are cointegrated, thus the VECM is adopted. The VECM is a special case of the Vector Autoregression (VAR) model.

According to Gujarati & Porter (2009), the VAR model has the following advantages in analyzing time series data: i). The VAR model is more a-theoretical (it has no theoretical basis) since it does not take advantage of the information or the previous theory; ii) Therefore, the model is often referred to the non-structural model; iii) The VAR model is more focused on forecasting, thus it is considered to be less appropriate for policy analysis; iv) Selections of the number of lag used in equations stand its own problems; v) All the variables in the VAR model must be stationary; and vi) The coefficients are difficult to interpret. Thus, the VAR model can be written as follows:

$$\Delta Y_t = \mu_i + \sum_{i=1}^n A_i \Delta Y_{t-1} + \varepsilon_t \dots\dots\dots (6)$$

Where Y is the vector ($n \times 1$), μ is a constant. A is a parameter, Δ is the operator difference and ε_t is an error term. The VAR model does not have the ability to analyze long-term phenomena. If the variables are cointegrated, thus the study uses the VECM analysis. VECM has the ability to analyze both short-and long-term phenomena as well as examine the consistency of empirical models to the economic theory and it becomes one of the solutions to the non-stationary time-series problem in econometric analysis. The VECM equation is written by including the error correction term (ECT) value in the regression equation as below:

$$\Delta Y_t = \mu_i + \sum_{i=1}^n A_i \Delta Y_{t-1} + \sum_{i=1}^n \lambda \Theta_{t-1} + v_t \dots\dots\dots (7)$$

Similar to the VAR model, Y is the vector (n x 1), A and λ are parameters used, Δ is operator difference and εt is an error term. The difference is that there is Θ which is an error correction term. The value of ECT must be negative, meaning that the regression results of the variables studied are convergent and show the presence of long-run equilibrium among the variables.

Specifically, the two common forms of VECM used to test the effects of macroeconomic variables on the *sukuk* market and bonds market can be re-written, as follows:

$$SBSN_t = \alpha_1 + \gamma_1 \sum SBSN_{t-i} + \gamma_2 \sum INF_{t-i} + \gamma_3 \sum ER_{t-i} + \gamma_5 \sum BRate_{t-i} + \Theta_{t-1} + \varepsilon_t \dots\dots (8)$$

$$ON_t = \alpha_1 + \gamma_1 \sum ON_{t-i} + \gamma_2 \sum INF_{t-i} + \gamma_3 \sum ER_{t-i} + \gamma_4 \sum BRate_{t-i} + \Theta_{t-1} + \varepsilon_t \dots\dots\dots (9)$$

where SBSN is the sovereign *sukuk*, ON is the sovereign bonds, INF is the inflation, ER is the exchange rate, and Birate is the interest rate, α is the constant, γ1, γ2, γ3 are the estimated macroeconomic determinants, and Θ is the error correction terms (ECT).

To find out how the dynamic causalities between macroeconomic variables as a proxy of the economy and the *sukuk* market or bonds market, the multivariate Granger causality tests is used (Granger, 1969). The Wald test is utilized to test for these causalities within the VECM framework. Briefly, the Granger causality is tested using the following equations:

$$Y_t = \mu_{1s_t} + \sum_{j=1}^p a_{js_t} y_{t-j} + \sum_{j=1}^p b_{js_t} x_{t-j} + \varepsilon_{1t} \dots\dots\dots (10)$$

$$X_t = \mu_{2s_t} + \sum_{j=1}^p c_{js_t} y_{t-j} + \sum_{j=1}^p d_{js_t} x_{t-j} + \varepsilon_{2t} \dots\dots\dots (11)$$

Where the variable Y is said to Granger-cause X, if X can be predicted with the previous value, then if X is affected by Y previously called Granger-cause, assuming other variables are considered fixed. In other words, the effect of X on Y is measured by X_{t-1} on Y_t in the Equation (10). Likewise, the effect of Y on X is explained by Y_{t-1} on X_t in the Equation (11). The number of lag from 1 to p is determined by the optimal lag-length criteria.

Results and Discussion

Each time series data to be used in the regression must be stationary. Using the test of stationarity of the ADF and PP with include in test equation by intercept and trend, the study found that all the macroeconomic variables non-stationary at the level, but they become stationary at the first difference. They were showed by P-value in Table 1. Thus, this study used the first difference data due to its stationary.

Table 1. Results of Unit Roots Tests

Variable	ADF		PP	
	I(0)	I(1)	I(0)	I(1)
SBSN	0.9875	0.0000***	0.9654	0.0000***
ON	0.6907	0.0000***	0.6960	0.0000***
INF	0.1967	0.0000***	0.3922	0.0000***
ER	0.5024	0.0000***	0.5033	0.0000***
Blrate	0.9920	0.0000***	0.9721	0.0000***

Note: ***, **, and * indicate significance at the levels of 1%, 5%, and 10%.

Unit root test of the ADF assumed that disturbance variable is non-autocorrelation. Different to the ADF test, the determination of lag-length in the PP test is based on the truncation lag q of the Newey-West. The number of q indicates the period that has autocorrelation. In short, both tests are used to detect the stationarity of data, thus both the ADF and PP tests are used in the study.

In order to determine the optimal lag number used in the stationary tests, the study used the Akaike Information Criterion (AIC), Final Prediction Error (FPE), Schwarz Information Criterion (SIC), and Hannan-Quinn Criterion (HQC). Based on those criteria, the optimal lag for the *sukuk* market is equal to lag = 6, while for conventional bonds market is equal to lag = 1.

Furthermore, a cointegration test is conducted to determine whether there is a long-run equilibrium among the variables. The findings of cointegration test for both *sukuk* and bonds markets are reported Table 2. As observed from Table 2, both *sukuk* and bonds markets are found to be cointegrated with the macroeconomic variables. This is evidenced by the existence of a critical value that is smaller than the statistical value of both Trace and Max-Eigen tests. The finding of cointegration between the *sukuk* and conventional bonds markets and macroeconomic determinants are similar to the study by Majid & Yusof (2009), who found the cointegration between macroeconomic variables and Islamic stock market in Malaysia. This finding implies that there is a long-run equilibrium between the macroeconomic variables and both *sukuk* and conventional bonds markets. Since the variables are moving towards the long-run equilibrium, thus to predict a variable, we could refer to the movements of other variables in the models.

The finding of cointegration indicates that the proper model to estimate the short- and long-run relationships among the variables is the VECM approach. To identify the long-run relationship could be found through the findings from cointegration estimation, while the short-run relationship is identified using the statistical Wald test. From the statistical Wald test, the multivariate Granger causalities could also be measured. Through these tests, there is a possibility of a variable to have a one-way and two-way causality.

Table 2. Findings from the Johansen Cointegration Test

t-Statistic	Critical Value
-------------	----------------

Null Hypotheses	Trace	Max-Eigen	Trace	Max-Eigen
Sukuk Market				
$r = 0^*$	61.8576	28.2057	47.8561	27.5843
$r \leq 1^*$	33.6519	16.2832	29.7971	21.1316
$r \leq 2^*$	17.3687	13.0423	15.4947	14.2646
$r \leq 3^*$	4.3263	4.3263	3.8415	3.8415
Bonds Market				
$r = 0^*$	153.2520	61.3193	47.8561	27.5843
$r \leq 1^*$	91.9327	43.7294	29.7971	21.1316
$r \leq 2^*$	48.2032	29.0639	15.4947	14.2646
$r \leq 3^*$	19.1394	19.1394	3.8415	3.8415

Note: * indicates significance at the 5% level.

Prior to the estimation, in the VECM equation model, we have to find the residual value of each dependent variable to get the ECT. In the VECM equation, the ECT variable with lag 1 is estimated with the other variables. If the estimated value of ECT is negatively significance at the 1%, 5%, or 10% levels, thus it shows that any short-run disequilibrium would be cleared in the long-run with the speed of adjustment equal to the value of estimated ECT.

Table 3 reports the findings for the ECM model, showing the effect of macroeconomic determinants on the *sukuk* market. As observed in the table, the study found that the *sukuk* market is influenced negatively by the exchange rate at the 1% - 5% significant level in lag 1 and 5 but positively at the 10% significant level in lag 6. This shows that if the exchange rate is increased by IDR1,000, then the *sukuk* would decrease by IDR12,800 at a previous month and IDR16,824 at five previous months. Nonetheless if the exchange rate is increased by IDR1,000, then the *sukuk* would increase by IDR11,241 at six previous months. When the IDR appreciates, the demand for the Indonesian *sukuk* would decline, vice versa for 1 and 5 previous months but not for 6 previous months. Our finding, however, contradicts the finding by Bahloul et al. (2017) who only money supply significantly affected the Islamic capital market, especially during the high volatility regime.

Table 4 reports the results for the ECM model, displaying the effect of macroeconomic determinants on the bonds market. The study discovered that the bonds market is influenced negatively by inflation, exchange rate and interest rate at the 10% significant level in the future. In addition, the bonds market is influenced positively by itself of a previous month at the 5% significant level. This finding is similar to Majdoub et al. (2016) found that the interest rates are associated with prices in the stock market. Yusof and Majid (2016) who examined the stock market transmission in Malaysia documented that stability in interest rates had an insignificant effect on the volatility of the Islamic stock market. Majid (2016) also found an insignificant effect of interest rates on the Indonesian stock markets.

Table 3. Findings of Long-run Equilibrium based on the ECM of Sukuk market

Parameter	Estimate	Std. Error	t-Statistic
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Constant	6454.118***	2151.674	2.9996
DSBSN(-1)	-0.2467	0.1424	-1.7319
DSBSN(-2)	0.0004	0.1424	0.0028
DSBSN(-3)	0.0532	0.1381	0.3854
DSBSN(-4)	-0.0008	0.1411	-0.0060
DSBSN(-5)	-0.0051	0.1516	-0.0339
DSBSN(-6)	-0.1414	0.1380	-1.0248
DINF	1496.153	2165.198	0.6910
DINF(-1)	-845.7624	2413.065	-0.3505
DINF(-2)	3386.810	2528.645	1.3394
DINF(-3)	-2071.034	2492.850	-0.8308
DINF(-4)	-1568.035	2550.430	-0.6148
DINF(-5)	1475.063	2480.470	0.5947
DINF(-6)	-1629.982	2302.407	-0.7079
DER	-2.3232	5.9812	-0.3884
DER(-1)	-12.8503**	5.8424	-2.1995
DER(-2)	-2.1454	5.8668	-0.3657
DER(-3)	-6.0524	6.0390	-1.0022
DER(-4)	7.8034	6.1885	1.2609
DER(-5)	-16.8248***	5.9782	-2.8144
DER(-6)	11.2414*	6.3761	1.7630
DBIRATE	-8551.975	8960.621	-0.9544
DBIRATE(-1)	-7117.117	9611.055	-0.7405
DBIRATE(-2)	9744.118	8653.962	1.1260
DBIRATE(-3)	6483.237	8093.354	0.8011
DBIRATE(-4)	-1838.761	8105.663	-0.2268
DBIRATE(-5)	-1426.218	7698.022	-0.1853
DBIRATE(-6)	-4854.448	7072.222	-0.6864
ECTSBSN(-1)	-0.1142	0.1169	-0.9773
R-squared	0.5531		
Adjusted R-squared	0.3411		
Durbin-Watson stat	1.9715		
F-statistic	2.6084		
Prob (F-statistic)	0.0010		

Note: ***, **, and * indicate significance at the levels of 1%, 5%, and 10%, respectively.

Additionally, our study finds a long-run equilibrium in the *sukuk* market and bonds market, but they did not convergent in the long run, evidenced by the insignificant negative value of the ECT. In the *sukuk* market, the value of estimated ECT of -0.1142 indicates the speed of adjustment of any short-run disequilibrium in the *sukuk* market in Indonesia to be cleared in the long-run within the next 8.8 months. This further implies that in regulating the *sukuk* market, the policy maker could focus on managing the price and exchange rates stability as well as the sustainability of economic growth of the country.

Table 4. Findings of Long-run Equilibrium based on the ECM of Bonds market

Parameter	Estimate	Std. Error	t-Statistic
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Constant	8855.863***	1608.477	5.5057
DON(-1)	0.2714**	0.1094	2.4808
DINF	-2836.301*	1664.584	-1.7039
DINF(-1)	173.0751	1725.675	0.1003
DER	-7.6717*	4.2394	-1.8096
DER(-1)	3.4544	4.1272	0.8370
DBIRATE	-9697.789*	5438.083	-1.7833
DBIRATE(-1)	5426.327	5356.336	1.0131
ECTON(-1)	-0.0020	0.0175	-0.1135
R-squared	0.2180		
Adjusted R-squared	0.1436		
Durbin-Watson stat	2.0761		
F-statistic	2.9272		
Prob (F-statistic)	0.0062		

Note: ***, **, and * indicate significance at the levels of 1%, 5%, and 10%, respectively.

Comparing the findings between the *sukuk* and bonds markets of the macroeconomic determinants in Tables 3 and 4, we notice that the *sukuk* market is strongly influenced by the exchange rate, while the bonds market is strongly influenced by the interest rate, exchange rate and inflation. These different empirical evidences confirm the distinctive natures need to be emphasized for promoting capital markets of *sukuk* and bonds in Indonesia. The *sukuk* market is influenced by changes in relative prices of two countries (nominal exchange rate), while the bonds market is affected by interest rate, price fluctuation and exchange rate. Similar to the *sukuk* market, the bonds market also has long-run equilibrium with the slower speed of adjustment of -0.0020 (or 0.20%).

Table 5. Findings from Multivariate Causality on the Sukuk Market

Dependent Variable	F-Stat				T-Stat
	DSBSN	DINF	DER	DBIRATE	ECT _{t-1}
DSBSN	-	0.5463 (0.7958)	3.2856*** (0.0051)	0.6714 (0.6953)	-0.1142 (0.3324)
DINF	0.5634 (0.7825)	-	0.7279 (0.6489)	0.5407 (0.8002)	-0.3236** (0.0132)
DER	1.6056 (0.1517)	1.0767 (0.3897)	-	1.5804 (0.1591)	-0.3019*** (0.0033)
DBIRATE	5.1964*** (0.0001)	1.3329 (0.2512)	2.5199** (0.0245)	-	-0.2581*** (0.0024)

Note: ***, **, and * indicate significance at the levels of 1%, 5%, and 10%. The number in brackets (.) is the *p*-value.

Next, to examine the multivariate causalities among the variables, the study uses the Granger causality by Wald test. As reported in Table 5, the causality test conducted for the short-run equilibrium in the *sukuk* market indicates that there is a unidirectional causal relationship running from the exchange rate to the *sukuk* market in Indonesia. The results of this test corroborate our earlier estimation results from Table 3, showing a significant effect of exchange rates on the *sukuk* market. Moreover, the study also finds a unidirectional causality from *sukuk* and exchange rate to interest rate. As for the bonds market model in Table 6 is showed that there are no

causalities between macroeconomic variables to bonds market, but the interest rate and bonds market have a unidirectional to exchange rate.

Table 6. Findings from Multivariate Causality on the Bonds Market

Dependent Variable	F-Stat				T-Stat
	DON	DINF	DER	DBIRATE	ECT _{t-1}
DON	-	1.4852 (0.2323)	1.9856 (0.1437)	1.8618 (0.1617)	-0.0020 (0.9099)
DINF	1.7450 (0.1801)	-	1.1496 (0.3217)	0.6787 (0.8002)	-0.1748*** (0.0087)
DER	2.8880* (0.0612)	1.7770 (0.1754)	-	2.7849* (0.0674)	-0.1927*** (0.0073)
DBIRATE	1.5041 (0.2281)	1.2954 (0.2792)	0.9624 (0.3862)	-	-0.1240*** (0.0058)

Note: ***, **, and * indicate significance at the levels of 1%, 5%, and 10%. The number in brackets (.) is the *p*-value.

From our findings of multivariate causality, it indicates that the exchange rate to be an important factor caused the changes in the capital market of Indonesia. Managing the Indonesian exchange rate is seen as a pivotal economic policy to develop the *sukuk* market in a big-open national economy since the sovereign *sukuk* are traded internationally.

Conclusion

The purpose of this study is to empirically investigate the short- and long-run relationships between the macroeconomic variables of exchange rate, inflation, and interest rate and the *sukuk* and bond markets in Indonesia over the period from January 2010-November 2017, with a comparative treatment. The macroeconomic determinants investigated in this study reflected the real business cycle research as the basis for building a general equilibrium model and the main features of macroeconomic fluctuations (Romer, 2012).

Based on the cointegration test, the study found that the *sukuk* and bonds markets were cointegrated with the macroeconomic variables. In the long-run, the *Sukuk* market is influenced only by the exchange rate, while the bonds market is influenced by the changes in the interest rate, exchange rate, and price level. The finding of independence of the *sukuk* market from interest rate further confirmed that the trading of the sovereign *sukuk* in Indonesia has been in harmony with the tenets of *shari'ah* financial principles. As for the multivariate causality test, the study found that the exchange rate as an important determinant of the *sukuk* market. Moreover, the study also found a causal relationship running from bond market and interest rate to the exchange rate.

These empirical findings contribute to the government of Indonesia in enhancing the capital market through the designation of proper macroeconomic policies. Managing the stability of Indonesian exchange rate is viewed as a pivotal economic policy to promote the *sukuk* market in

the big-open Indonesian economy since the sovereign *sukuk* issued by the Islamic capital market are traded internationally.

This study only explored the macroeconomic variables of interest rate, exchange rate and inflation as well as the forex market of the Indonesian Rupiah fluctuation against the US dollar, thus the implication of the findings for further enhancing the *sukuk* market is only limited to the currency policies. Further study might consider more variables to be included in the model and investigate worldwide *sukuk* markets to arrive at a more comprehensive and conclusive empirical findings on the importance of macroeconomic policy in promoting the *sukuk* markets globally.

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