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Sukuk Market Liquidity Determinants: A Case Study on Sovereign Sukuk in Indonesia

Farah Rizky Ariyana[1], Tika Arundina[2], Rahmatina Awaliah Kasri [3]

Abstract: *This study examines factors that significantly affect the sovereign sukuk market liquidity in Indonesia. The study uses panel regression to determine how macroeconomic factors and sukuk market characteristics influence sukuk market liquidity. The result shows that sukuk's issuance amount and the Jakarta Interbank Offered Rate have positive impacts while the inflation level, Jakarta Islamic Index and yield to maturity have negative impacts on sukuk market liquidity. In contrast, the Consumer Confidence Index, openness of the economy, and remaining maturity are not significant determinants of sukuk market liquidity. This study contributes to filling the gap of empirical studies regarding sukuk market liquidity determinants in Indonesia.*

Keywords: Sovereign Sukuk; Trading Volume; Sukuk Characteristics; Macroeconomic Factors; Islamic Financial Market
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1. Introduction

Investors in the financial market are concerned with market liquidity since it was one of the causes of the financial crisis in 2008. Said et al. (2013) stated that sukuk has been growing in the Islamic financial system, and evidence showed that it could protect the system from the crisis in 2008. A similar remark was stated by Grassa and Gazdar (2012), arguing that after the global financial crisis, the sukuk market in Gulf Cooperation Council (GCC)

[1] Corresponding author. Faculty of Economics and Business, University of Indonesia, Indonesia. *Email: farah.ariyana@hotmail.com,*
[2] Faculty of Economics and Business, University of Indonesia, Indonesia. *Email: tikarundina@gmail.com*
[3] Faculty of Economics and Business, University of Indonesia, Indonesia. *Email: unirahma@gmail.com*

countries showed steady growth compared to the bond market. However, the sukuk market lacks liquidity since the trading in the secondary market is relatively low, which has been a concern in the Islamic financial industry (Kusuma and Silva, 2014). Iqbal and Mirakhor (2011) stated that an illiquid sukuk market would hamper market growth because investors might only have limited options for portfolio diversification. Brandão-Marques et al. (2015) explained that the low level of liquidity makes the market vulnerable to shocks where the prices become less informative, less aligned with the fundamental conditions, and tend to overreact and increase the volatility. A liquid market will make the investors easy to determine the assets' prices (Amihud and Mendelson, 2001; Sharpe, 2005).

Considering that sukuk can potentially shield the financial system from crisis, it is important to maintain the liquidity in sukuk secondary market. Liquidity is one of the crucial aspects that influence investors in making their investment decisions. Huda and Nasution (2008) and Mahmood (2012) stated that illiquidity in the sukuk secondary market is caused by the tendency of investors to buy and hold their sukuk to maturity. This behaviour is driven by several factors such as the lack of quality sukuk supply to meet the investors' growing demand; sharia considerations which might restrict the trading of sukuk at values other than par; lack of infrastructure facilities to trade the sukuk instruments; and unavailability of benchmark yields to determine the price (Halim, 2012; Mahmood, 2012; Najeeb, 2013; Najeeb and Vejzagic, 2013). However, it is possible that some investors need ease in buying and selling sukuk; therefore, an adequate level of sukuk market liquidity is required. Thus, it is important to examine the factors that could increase or decrease the liquidity in sukuk secondary market.

Indonesia is one of the countries that uses sukuk as an alternative source of financing its State Budget. Indonesia's sovereign sukuk, known as Surat Berharga Syariah Negara (SBSN), is issued to finance earmarked projects and to cover the State Budget deficits. Indonesia is the largest issuer of international sovereign sukuk denominated in US Dollar. It shows that the demand for investment in Indonesia's sovereign sukuk is quite high. However, in average, data from the Ministry of Finance Indonesia showed that the trading frequency and the volume of SBSN were only 14.10% and 3.59% respectively from the total of bond and sukuk trading in the secondary market from 2009 to 2016 (Ministry of Finance, 2017).

This reflects that the trade size of the sovereign sukuk market in Indonesia is much lower than the sovereign bond market. Trading frequencies and the asset volume in the secondary market can reflect the market's level of liquidity. Therefore, it can be concluded that sovereign sukuk market in Indonesia is relatively illiquid.

This research examines the impacts of sukuk characteristics and macroeconomic factors on investors' willingness to trade in the sukuk secondary market, which will define the liquidity of the market. Most of the studies on the sukuk market focused on its significance as an alternative financial instrument as well as opportunities and challenges in developing the sukuk market. Grassa and Gazdar (2012) and Smaoui and Khawaja (2017) have studied the macroeconomic determinants of the sukuk market development. However, their studies used sukuk market capitalisation on GDP as a measure of the sukuk market development, instead of the sukuk market liquidity. Ahmad and Radzi (2011) researched the factors that influence the sustainability of conventional bonds and sukuk development in Malaysia but more specifically, from the size of the issuance. Harvey and Cosgrave (2012) discussed the liquidity risk of the sukuk market, but it was only a description of the market observation result. Najeeb et al. (2014) studied the portfolio diversification strategies for sukuk portfolios across heterogeneous investment horizons and evaluated the held-to-maturity strategies that are usually adopted by the investors. In Indonesia, Jatmiko (2014) examined the impacts of the sukuk market liquidity in Indonesia on its yield. A specific study on liquidity determinants was conducted by Said et al. (2013) in the sukuk market in Malaysia using the sukuk characteristics as independent variables.

As a relatively new financial instrument compared to bonds or shares, research on the potency of sukuk market liquidity to grow is still low. Studies related to the market liquidity determinants were usually done in stock or conventional bond markets. There has not been a study that thoroughly investigates market liquidity determinants of sukuk characteristics and macroeconomic factors in the sukuk market, especially in Indonesia. Finding the determinants of sukuk market liquidity would allow the industry and the government to take some useful steps and make policies that could drive sukuk market liquidity. Henceforth, sukuk could effectively be a vital instrument to keep the stability of the financial system.

Besides, this research will contribute to filling the literature gap in Islamic economics and finance.

2. Literature Review

2.1 Concepts of Sukuk and Liquidity

2.1.1 Concepts of Sukuk and Sovereign Sukuk in Indonesia

Sukuk is the plural form of Sak which means 'certificate' in Arabic (Ayub, 2007). Sukuk is a joint ownership certificate on an underlying asset. In its development, sukuk is often considered the same as bonds. However, it has a distinctive characteristic from a bond that is a debt-based investment. The difference between sukuk and bond lies in the obligation of sukuk to have an underlying asset; in the form of physical assets, projects, or usufruct that can be claimed as the investors' joint ownership (Ahmad and Radzi, 2011). These underlying assets are the sources of cash flow that will be distributed to the investors as the return. The Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) defines sukuk as certificates of equal value representing undivided shares in the ownership of tangible assets, usufruct, and services or (in the ownership of) the assets of a particular project or certain investment activities.

Governments issue sovereign sukuk as a sharia-based financial instrument that can be an alternative financial source for the State Budget to increase the supporting power of a sustainable development in Indonesia's economic sector (DJPPR, 2015). Using both foreign and domestic debt instruments is common in a country's finance management. These financing sources can be obtained from foreign loans, domestic loans, or through sovereign bond issuance consisting of Surat Utang Negara (Indonesia's conventional sovereign bond) and Surat Berharga Syariah Negara (Indonesia's sovereign sukuk). As a sharia-based instrument, sovereign sukuk issuance needs underlying assets, as well as Fatwa and Sharia Opinions from the National Sharia Board of Indonesia. The underlying assets of sovereign sukuk could be Barang Milik Negara (state-owned assets) or state projects. Sovereign sukuk are structured with several aqads which are mainly fee-based contracts such as Ijarah Sale and Lease Back, Ijarah Al-Khadamat, Ijarah Asset to be Leased and Wakalah.

2.1.2 Concepts of Liquidity

Liquidity is a broad concept and has various meanings. Harris (2003) defined liquidity as the ability to trade in a large size, in a short time, and at a low cost. Sharpe (2005) stated that liquidity is the ability of investors to change the security into cash at the same price as the previous price, assuming there is no new information since the first trade. O'Hara (1995) defined a liquid market as a market that can accommodate trading transactions with a little impact on the price. These are also supported by Gravelle (1998) and Borio (2000) who defined liquidity as a market condition where there is an ease in transacting a large size without or with low impact on the market price. Other researches defined liquidity as the ability to trade assets in a large quantity, low cost, and without changing the price (Amihud, 2002; Pastor and Stambaugh, 2003). Harris (2003) stated four dimensions of liquidity as follows:

a) Immediacy

This dimension refers to how quickly the investors can trade their assets at a certain cost. The quicker the investors can trade the assets means that the immediacy is higher. It shows that the assets have a high liquidity level.

b) Width (bid-offer spread)

This dimension refers to the transaction cost per unit to determine the width of the spread between the supply and demand prices in a transaction. The wider the spread between the bid and the offer; the more expensive the transaction cost. It implies that the assets have a low liquidity level.

c) Depth

This dimension refers to the size of transaction that can be executed with a certain cost measured in the available unit at a given price; or how big the sizes of supply and demand are in the market. The bigger the trading volume signifies that the investors will find it easier to do the transactions. It denotes that the assets have a high liquidity level.

d) Resilience

This dimension refers to how quick the asset price can get back to its equilibrium level after a shock in the market. The quicker the price can get back to its equilibrium indicates that the asset is more resilient and less vulnerable to the shock. It reveals that the assets have a high liquidity level.

The liquidity measurement based on trade volume is suitable to quantify the width and depth dimensions of liquidity (Kamara, 1994; Alexander et al., 2000; Nurhasanah, 2011; Kapingura et al., 2015). The trading volume is illustrated as follows:

$$V = \sum P_i \text{ x } Q_i \qquad (1)$$

Where: V = volume of trade
Pi = Price of i-th instrument traded in a certain period
Qi = Quantity of instrument traded

Hotchkiss and Jostova (2007) stated that two theoretical arguments support the use of trading volume as a measure of liquidity. The first argument, the inventory paradigm, stated that inventory cost for bonds that are traded less frequently is higher and increases the bid-ask spread for the compensation (Demsetz, 1968; Ho dan Stoll, 1981; Stoll, 1989). The second argument is from Kamara (1994), who developed the measurement for immediacy risk that is directly related to trading volume. Besides, there are several reasons why trading volume is a good measurement for an emerging market (Kapingura et al., 2015). First, generally, bond trading in an emerging market is still infrequent; it is because the market players in the bond market are lower than in the stock market. The second reason is that capturing bid-ask spread would be complex because it needs sophisticated tools that have not been implemented in the emerging markets.

2.2 Determinants of Sovereign Sukuk Market

Amihud and Mendelson (1991) who examined sovereign bond liquidity in the United States and found that liquidity affected the transaction cost, which would influence the bond yield where higher bond liquidity might cause lower yields. Alexander et al. (2000) researched the bond market trading volume and found that trading

volume was positively related to the bonds' issuance amount and negatively related to the bonds' age.

Chordia, Sarkar and Subrahmanyam (2001) researched bond and stock markets and found that yield, bid-ask spread, and trade volume that reflect the liquidity of bond and stock markets codetermined each other. Besides that, monetary policy also influenced the financial market liquidity during a crisis where the increase of money supply increased the financial market liquidity.

In Thailand's bond market, Chabchitrchaidol and Panyanukul (2005) found that the trading volume of bonds was negatively correlated to the bid-ask spread; while volatility and policy uncertainty dummy were positively correlated to the bid-ask spread.

Hotchkiss and Jostova (2007) researched market liquidity determinants measured by corporate bond trading volume. They found that the factors negatively correlated to the bond trading volume are the age of bonds, absolute return, shocks in stock market return, credit risk, and interest rate risk. On the other side, the factors positively correlated to the bond trading volume are the issuance amount and liquidity autocorrelation (lagged bond volume).

Utilising latent liquidity measurement to examine the bond market liquidity in the United States, Mahanti et al. (2008) found that credit quality negatively correlated to liquidity because investors tended to keep better quality bond. In contrast, the age and maturity of the bond since the issuance negatively correlated to liquidity because bonds with longer time to maturity would be kept in a buy-and-hold position by the investors who wanted long term investments. Meanwhile, the issuance amount positively correlated to the bond market liquidity.

Using yield error to measure the illiquidity level in England's sovereign bond, Choudry (2009) found that bond maturity and swap spread negatively correlated to bond market liquidity; market confidence positively correlated, while the issuance amount and price variability did not significantly correlate to bond market liquidity.

Ahmad and Radzi (2011) studied bonds and sukuk issuance determinants in Malaysia from 1990 to 2009. This study found that foreign exchange was the major factor influencing both bond and sukuk issuance; but GDP and market liquidity only influenced the sukuk issuance. These imply that sukuk are more sensitive towards current economic condition compared to bonds.

Grassa and Gazdar (2012) examined the macroeconomic and institutional determinants of sukuk market development in five GCC economies from 2001 to 2011. It was found that GDP per capita, economy size, and oil revenues made a significant positive impact on the development of the sukuk market in GCC countries, but the institutional environment had an insignificant impact.

Said et al. (2013) studied the sukuk characteristics to examine the determinants of sukuk market liquidity by using latent liquidity in Malaysia. The study found that sukuk market liquidity positively correlated to the issuance amount and negatively correlated to coupon rate, time to maturity, and sukuk age.

Said and Grassa (2013) examined the macroeconomic factors influencing the construction of certain structures of sukuk in several countries, including Indonesia. Their study found that the economic size, trade openness, percentage of the Muslim population, and regulatory quality influenced the growth of sukuk market positively. It was also found that the financial crisis had a significant adverse effect on the growth of sukuk market.

Galliani et al. (2014) formed a robust liquidity index to study the determinants of bond market liquidity in Europe. The study found that duration, rating, issuance amount, and time to maturity encouraged the bond market liquidity.

Using LOT as a proxy, Jatmiko (2014) studied the impacts of sukuk market liquidity on the yield changes after controlling the sukuk's price variability, the age of sukuk, and macroeconomic variables. It was found that sukuk market liquidity significantly affected the yield changes in Indonesia's sukuk market.

Kapingura et al. (2015) used trading volume and bid-ask spread in South Africa's sovereign bond market to examine the macroeconomic determinants of sovereign bond market liquidity. Their study found that inflation, exchange rate volatility, REPO rate, and stock prices index negatively correlated to the bond market liquidity.

Smaoui and Khawaja (2017) studied the determinants of sukuk market development using sukuk market capitalisation as a proxy in 13 countries from 2001-2013. This study found that a combination of structural, financial, and institutional factors had a significant impact on sukuk market development. From the macroeconomic factors, it was found that larger economic size, higher proportion of Muslims in the population, better investment profile, and lower corruption were associated with larger sukuk markets, while a

higher interest rate spread was negatively related to sukuk market development.

Khudari (2017) studied the role of economic and financial factors in enhancing the sukuk market. This study found that the ratios of exports to GDP, Foreign Direct Investment net outflows to GDP, and gross saving to GDP as well as oil revenues are significant determinants of sukuk market development. On the other hand, inflation negatively affects sukuk market development.

This study conducted a test on the independent variables to determine the factors that influence sukuk market liquidity. Based on studies regarding market liquidity determinants in sukuk, a hypothesis for each independent variable can be developed.

2.2.1 Concepts of Sukuk and Sovereign Sukuk in Indonesia Macroeconomic Variables

a. Inflation

Inflation is an increase in the price of goods and services measured by the Consumer Price Index. A high level of inflation indicates that consumers have a low purchasing power, and it will reduce their willingness to invest, including in bonds or sukuk market. Therefore, it can be predicted that inflation will have a negative impact on sukuk market liquidity (Kucuk, 2010; Kapingura et al., 2015)

H4: Inflation will negatively correlate to sukuk market liquidity.

b. Jakarta Interbank Offered Rate (JIBOR)

JIBOR is a benchmark interest rate for financial transactions. It serves as a reference for floating interest rate, derivative products, and Rupiah denominated financial instrument valuation. An increase in the benchmark interest rate indicates a contractionary monetary policy, which will result in high yields and low bond prices. Therefore, it can be predicted that JIBOR will have a negative impact on sukuk market liquidity. (Chordia, Sarkar, and Subrahmanyam, 2001; Anderson and Lavoie, 2004; Kucuk, 2010; Kapingura et al., 2015)

H5: JIBOR will negatively correlate to sukuk market liquidity.

c. Jakarta Islamic Index (JII)

JII is a stock price index based on the stocks that fulfil the sharia principles. It is intended to guide investors willing to place their

funds in sharia-compliant assets. JII can be a used as a benchmark to evaluate the performance of a sharia-based stock investment. However, stock is a substitute investment of bond or sukuk; so that the increasing performance in stock may cause the investors to shift from bond or sukuk to stocks. Therefore, it can be predicted that JII will have a negative impact on sukuk market liquidity. (Chordia, Sarkar, and Subrahmanyam, 2001; Kewal, 2012; Kapingura et al., 2015)

H6: JII will negatively correlate to sukuk market liquidity.

d. Consumer Confidence Index (CCI)

CCI shows the public optimism level of a country's economy from the consumer viewpoint. Studies found that the Consumer Confidence Index of a country gives a positive impact on the country's stock market liquidity; while other studies found codetermination between stock and bond market liquidity. Therefore, it can be predicted that CCI will have a positive impact on sukuk market liquidity (Chordia, Sarkar, and Subrahmanyam, 2001; Diaz and Skinner, 2001; Choudry, 2010)

H7: CCI will positively correlate to sukuk market liquidity.

e. Openness of the Economy

A country's economic openness is interpreted as the extent of a country's external trade; it represents the strategic choices of isolation and cooperation of the country. It is typically measured by the ratio of export values to GDP. Several studies showed the significance of the openness degree of economy in determining market development. Therefore, it can be predicted that the openness of the economy will give a positive impact on sukuk market liquidity (Said and Grassa, 2013; Khudari, 2017)

H8: Openness of the economy will positively correlate to sukuk market liquidity.

2.2.1 Sukuk Characteristics

a. Issuance Amount

A higher issuance amount of bonds and sukuk means that it will be traded more frequently. On the other hand, lower issuance amount of bonds and sukuk tend to be locked in a buy-and-hold portfolio and not traded in the secondary market. Therefore, it can be predicted that higher issuance amount of sovereign sukuk will

positively affect the liquidity in the secondary market. (Alexander et al., 2000; Hong and Warga, 2000; Hotchkiss, Warga, and Jostava, 2002; Mahanti et al. 2008; Said et al., 2013; Galliani et al., 2014)

H1: The issuance amount of sukuk will positively correlate to sukuk market liquidity.

b. Yield to Maturity

When an outstanding bond's yield to maturity is high, its price will decline. This will make the bondholders keep the ownership instead of selling their bonds at a lower price, causing a supply shortage in the market. Therefore, it can be predicted that an increase in yield to maturity negatively affects the sukuk market liquidity (Amihud and Mendelson, 1991; Chen, 2007).

H2: Sukuk's yield to maturity will negatively correlate to sukuk market liquidity.

c. Remaining Maturity

Bonds with a longer remaining time to maturity tend to be traded more frequently than those with a shorter remaining time to maturity. This implies that bond or sukuk market liquidity increases just after the issuance and falls as the bonds or sukuk reach maturity. Therefore, it can be predicted that the remaining time to maturity will positively influence the sukuk market liquidity. (Alexander et al., 2000; Mahanti et al., 2008; Kucuk, 2010; Said et al., 2013)

H3: Sukuk's remaining time to maturity will positively correlate to sukuk market liquidity.

3. Methods

3.1. Data Source

The data used in this study are gathered from various sources. Sovereign sukuk related data includes the sukuk identity; date of issuance; maturity date; issuance amount; coupon rate; and monthly trading volume and are obtained from the Ministry of Finance. The price and yield to maturity of the sovereign sukuk are obtained from the Bloomberg database. The inflation and JIBOR data are obtained from Bank Indonesia, while JII data are obtained from Google Finance. The openness of the economy is measured by the percentage of the country's exports to its GDP, and the exports and GDP data are obtained from Indonesia's Badan Pusat Statistik

(Statistics Indonesia). Indonesia's Consumer Confidence Index data are obtained from Euromonitor.

3.2. Techniques of Analysis and Model Specification

This study uses a quantitative approach in the form of descriptive and explanatory research using panel regression. Independent variables are regressed against the dependent variable to find the impacts and the significance of the independent variables to the dependent variable. The unit of analysis used in this research is the sovereign sukuk that were issued by the Government of Indonesia and outstanding in the Indonesian domestic market during January 2010 to December 2016. The types of sovereign sukuk used are the ones that are tradable in the secondary market, Rupiah denominated, and have coupon rates; those are Islamic Fixed Rate (IFR), Project Based Sukuk (PBS), and Sukuk Ritel (SR). The sovereign sukuk samples used are 21 out of 52 series of sovereign sukuk outstanding in the secondary market until December 2016. The data are arranged into monthly periods to form 84 observation periods.

To measure sukuk market liquidity as a dependent variable, there are eight independent variables used as sukuk market liquidity determinants, namely issuance amount; yield to maturity; remaining maturity; inflation; Jakarta Interbank Offered Rate (JIBOR); Jakarta Islamic Index (JII); Consumer Confidence Index (CCI); and openness of the economy. These variables are chosen through literature study with adjustments based on the relevance and data availability. Table 1 shows the operational definition, unit, variable forms of the sukuk characteristics, and macroeconomic factors as well as the hypothesis in this research. To equalise the distribution of values among the variables, the data are transformed into their natural logs (ln). This modification is needed because the values of each variable have different units. The regression model is as follows:

$$lnVolume_{i,t} = \alpha_0 + \alpha_1 lnIssuance_{i,t} + \alpha_2 lnYTM_{i,t} + \alpha_3 lnRemainingMaturity_{i,t} + \alpha_4 lnInflasi_t + \alpha_5 lnJIBOR_t + \alpha_6 lnJII_t + \alpha_7 lnCCI_t + \alpha_8 lnOpenness_t + \varepsilon_{i,t} \quad (2)$$

Where,
: Sovereign sukuk market liquidity using trading volume as a proxy (*i*) in period (*t*)
: Issuance amount of sovereign sukuk (*i*) in period (*t*)
: *Average daily YTM* of the sovereign sukuk (*i*) in period (*t*)
: Remaining time until the sovereign sukuk reach its maturity(*i*) in period (*t*)
: Inflation level in Indonesia in period (*t*)
: Jakarta Interbank Offered Rate (Overnight) in period (*t*)
: Jakarta Islamic Index in period (*t*)
: *Consumer Confidence Index* in period (*t*)
: Ratio of export to GDP of Indonesia in period (*t*)

3.3. Variable Measurements

The sukuk characteristics examined in this research are sukuk's issuance amount to represent the supply of sukuk in the market (Alexander et al., 2000; Hong and Warga, 2000; Hotchkiss, Warga and Jostava, 2002; Mahanti et al., 2008; Said et al., 2012; Galliani et al., 2014); yield to maturity (YTM) to represent the return of sukuk in the market (Amihud and Mendelson, 1991; Chen, 2007); and remaining time to maturity to represent the age of the sukuk and the time taken until the sukuk matures (Alexander et al., 2000; Mahanti et al., 2008; Kucuk, 2010; Said et al., 2012).

The macroeconomic factors examined in this research are: inflation level to represent the price level and public purchasing power (Kucuk, 2010; Kapingura et al., 2015); Jakarta Interbank Offered Rate (JIBOR) to represent the market interest rate (Chordia, Sarkar, and Subrahmanyam, 2001; Anderson and Lavoie, 2004;

Kucuk, 2010; Kapingura et al., 2015); Jakarta Islamic Index (JII) to represent the Islamic stock market index (Chordia, Sarkar, and Subrahmanyam, 2001; Kewal, 2012; Kapingura et al., 2015); Consumer Confidence Index (CCI) to represent the publics' level of optimism for the country's economy (Chordia, Sarkar, and Subrahmanyam, 2001; Diaz and Skinner, 2001; Choudry, 2010); and the openness of the economy which will be measured by exports per GDP (Said and Grassa; 2013; Khudari, 2017).

The unit of analysis in this study is the sovereign sukuk. Kamara (1994) and Choudhry (2010) stated that the investigation of market liquidity determinants should be focused on the sovereign instruments since the corporate instruments have some issues such as credit rating that might influence the results. Bonds with lower credit rating are likely traded more frequently for speculation purposes; it could mislead the study in concluding that bonds with lower quality have a higher level of liquidity (Mahanti et al., 2008). Sovereign instruments have complete yield curves because the government issues the instruments regularly.

Table 1: Operationalisation of Independent Variables and the Hypothesis

Variable	Definition	Unit	Variable Form	Hypothesis
Issuance Amount	The nominal values of sukuk issuance at the initial time and each re-opening	Rupiah	Ln (*Issuance Amount*)	Positive
Yield to Maturity	The return that can be obtained by investors who held the sukuk until maturity	Percentage	Ln (*Yield to Maturity*)	Negative
Remaining Maturity	Remaining time until the maturity date	Month	Ln (Tenor)	Positive
Inflation	The increase in price level measured by the Consumer Price Index	Percentage	Ln (Inflation)	Negative
JIBOR	Uncollateralised loan indication interest rate for interbank money market	Percentage	Ln (JIBOR)	Negative

Jakarta Islamic Index	The average price index for shares that comply with sharia criteria	Index value	Ln (JII)	Negative
Consumer Confidence Index	Optimism level on the economy shown by saving and spending activities	Index value	Ln (CCI)	Positive
Openness of the Economy	The degree of a country's engagement in external trade	Percentage	Ln (Openness)	Positive

4. RESULT AND DISCUSSION

4.1 Descriptive Statistics

A descriptive statistics analysis was conducted on the overall sovereign sukuk market; a separated descriptive statistics analysis on each type of sukuk – which has different characteristics – was done due to the time differences of initial issuance and maturity of the sukuk series.

The descriptive statistics analysis concluded that Sukuk Ritel owns the highest average trading volume. Sukuk Ritel also has the highest average issuance rate but the lowest average YTM. The average remaining maturity of Sukuk Ritel is the shortest compared to other types of sukuk because Retail Sukuk were issued with a relatively short tenor. In terms of macroeconomic factors, the inflation level during the outstanding period of Retail Sukuk, from March 2014 to December 2016, was the lowest compared to previous periods. JIBOR and JII in this period had the highest average compared to previous periods. CCI in this period made the lowest average compared to previous periods; while the openness of the economy showed the highest average compared to previous periods.

The initial analysis showed that the determinants of sukuk market liquidity mainly related to the characteristics of the sukuk. Sukuk with a high issuance amount and low YTM average have a high trading volume. This result is in line with the research hypothesis. However, sukuk with the short remaining maturity have higher liquidity, which is not in line with the hypothesis developed.

Conclusions on macroeconomic factors cannot be taken through descriptive statistics analysis because there is no clear pattern yet.

To draw a more deterministic conclusion, a panel regression was done on the overall sovereign sukuk markets; the descriptive statistics shows that there is no significant difference between variables in each type of sovereign sukuk. So, it is assumed that the whole sovereign sukuk markets can be regressed in one model. In addition, the number of observations would be too small if the regression was done separately.

A correlation analysis was performed to predict the relationship between the dependent and independent variables. This analysis can also be used to see if there is any correlation between independent variables that show multicollinearity among the independent variables. Table 2 shows the correlation matrix between variables in the overall markets used in this study. Among the independent variables, no correlation is too large or above 0.75, which indicates a multicollinearity problem (Brooks, 2008). However, there is a high correlation of 0.70 between the yield to maturity variable and JIBOR. Therefore, a VIF test was conducted to see if any variable has a VIF above 10. VIF values above 10 indicate a multicollinearity problem (Woolridge, 2009).

Table 2: Correlation between variables in overall sukuk markets

	VOLUME	ISSUANCE	YTM	REMAINING MATURITY	INFLATION	JIBOR	JII	CCI	OPEN-NESS
VOLUME	1.00000								
ISSUANCE	0.01848	1.00000							
YTM	-0.05534	-0.02668	1.00000						
REMAINING MATURITY	-0.19826	-0.05641	0.34416	1.00000					
INFLATION	-0.03896	-0.04294	0.33149	0.08600	1.00000				
JIBOR	0.00680	-0.00642	0.70099	0.00559	0.41031	1.00000			
JII	0.13094	0.06534	-0.13461	-0.08406	-0.12952	-0.18682	1.00000		
CCI	-0.01905	0.00654	-0.16489	0.04148	-0.00929	-0.17869	0.40498	1.00000	
OPENNESS	0.02970	0.05017	0.04463	-0.04449	-0.11840	-0.09964	0.20353	0.18014	1.00000

4.2. Sovereign Market Liquidity Determinants

Running a Chow test determines the best selection of panel model; whether choosing a Pooled Least Square or Fixed Effect Model. If the Chow test decides to choose the Fixed Effect Model, then running a Hausman test is needed to choose between the Fixed Effect Model and Random Effect Model. The result of the Chow

test[4] rejects H0 on the sovereign sukuk market liquidity model, which means the best model is the Fixed Effect Model. The result of the Hausman[5] test is also the rejection of H0 on the sovereign sukuk market liquidity model; therefore, it can be concluded that the best model is the Fixed Effect Model. The regression output result using the Fixed Effect Model for sukuk market liquidity determinants model is presented in Table 3.

Table 2: Sukuk Market Liquidity Determinants
Dependent Variable: ln Volume

Independent Variable	Coefficient	t-Statistic
Intercept	50.56	1.40
lnIssuance	0.22***	5.24
lnYTM	-15.78***	-4.14
lnRemainingMaturity	1.89	1.62
lnInflation	-2.05*	-1.69
lnJIBOR	9.53***	2.81
lnJII	-11.54***	-2.69
lnCCI	2.77	0.34
lnOpenness	1.63	0.43
Adjusted R-square	37.41%	
F-statistic	21.17***	
Durbin-Watson	1.68	
Observation	946	

*** Significance at 1%
** Significance at 5%
* Significance at 10%

In general, the F-statistics show that the model used to examine the determinants of sukuk market liquidity can explain the variations in the dependent variables; this model has 1% significance level. The independent variables explain the variations in the sovereign sukuk trade volume by 37.41%.

The correlation matrix shows that there is no independent variable that correlates at 0.75. Although there is a considerable value of the correlation between the yield to maturity and JIBOR, the results of the Variance Inflation Factor test indicate that there is no variable which has a VIF above 10. Therefore, it can be concluded that the variables in this model are free from multicollinearity problems. In addition, Durbin-Watson statistics shows a value of 1.68 which means there is no autocorrelation

[4] Cross-section Chi-square Prob 0.0000
[5] Cross-section random Prob 0.0017

according to Field (2009); because it is still within the range of 1.5-2.5. So, it is deduced that there is no problem with multicollinearity and autocorrelation in the model.

Having done the regression process, the Indonesian sovereign sukuk market liquidity determinant model can be written as follows:

$$lnVolume_{i,t} = 50{,}56 + 0{,}22lnIssuance_{i,t} - 15{,}78lnYTM_{i,t} - 2{,}05lnInflasi_t + 9{,}53lnJIBOR_t - 11{,}54lnJII_t + \varepsilon_{i,t} \quad (3)$$

The regression results in Table 3 shows that five out of eight independent variables that significantly affected the trading volume of the sovereign sukuk markets. The five independent variables include lnIssuance (issuance amount) which is significant at 1% level, lnYTM (average yield to maturity) which is significant at the 1% level, lnInflation (inflation rate) with the significance level of 10%, lnJIBOR (interest rate JIBOR) at a significance level of 1%, and lnJII (Jakarta Islamic Index) which is significant at the 1% level. The independent variables that did not significantly affect the sovereign sukuk trading volume during the observation period are lnRemainingMaturity (remaining maturity), lnCCI (Consumer Confidence Index) and lnOpenness (openness of the economy).

The sukuk issuance amount variable positively influences the sovereign sukuk trade volume (H1 is accepted). The regression coefficient indicates that a 1% increase in the amount of sukuk issuance can increase the country's sukuk trade volume by 0.223%. This result is in line with studies stating that the number of bond or sukuk issuance could positively correlate to the liquidity of the bond or sukuk markets (Alexander et al., 2000; Hong and Citizens, 2000; Hotchkiss, Citizens and Jostava, 2002; Mahanti et al., 2008; Said et al., 2013; Galliani et al., 2014). The coefficient indicates that the sukuk issuance amount has a significant yet small effect on the trading volume. This is due to the trend of sukuk issuance, in which re-openings or reissuances of the sovereign sukuk are generally done several times during the sukuk outstanding period; and the frequency of the issuances will decline as the sukuk reach their maturity date. In addition, there was no re-opening for Sukuk Ritel, which had the highest average trading volume. Therefore, the

movement of the sovereign sukuk trading volume was not influenced by the issuance amount since it was no longer re-opened.

The yield to maturity variable negatively influences the sovereign sukuk trade volume (H2 is accepted). The regression coefficient indicates that a 1% increase in average yield to maturity can reduce the volume of sukuk trade by 15,786%. This result is in line with studies reporting that yield to maturity negatively affected the bond market liquidity (Amihud and Mendelson, 1991; Chen, 2007). Of all independent variables, yield to maturity has the greatest impact on trading volume. The tumbling price level caused by the increase of yield to maturity will make the holders reluctant to sell their sukuk. In addition, when the yield to maturity earned increases, the sukuk holders will hold the ownerships until the maturity date.

The inflation rate variable negatively influences the sovereign sukuk trade volume (H4 is accepted). The regression coefficient indicates that a 1% increase in the inflation rate can decrease the sovereign sukuk trade volume by 2,054%. This result is in line with previous studies confirming that inflation negatively affected the liquidity of the bond or sukuk markets (Kucuk, 2010; Kapingura et al., 2015). When inflation occurred, or there was an increase in the price of goods, the consumers' purchasing power would decrease. Inflation will reduce the public interest to invest, including in sovereign sukuk, so the increase of inflation will reduce the volume of sovereign sukuk trade.

The JIBOR variable has a positive influence on the sovereign sukuk trade volume (H5 is not accepted). The regression result coefficient shows that a 1% increase in JIBOR can increase the sovereign sukuk trade volume by 9,528%. This is not in line with the established research hypothesis. However, this result can be indirectly justified. As market interest rates increase, investors in stocks will switch to other instruments giving higher yields. One of the substitute instruments of stock is bond or sukuk so that shareholders can switch to bond or sukuk (Kewal, 2012). In addition, Siahaan (2007) found that the interest rate of Bank Indonesia Certificates (SBI rate) has a positive impact on bond prices in Indonesia; and the increase of bond prices will increase the volume of trade. Indirectly, the SBI rate positively affects the volume of bond trading in Indonesia. This can be seen when the shareholders choose another investment instrument. They prefer bonds or sukuk due to the high yield rate of bonds and sukuk. The

yield to maturity of sovereign sukuk is always higher than JIBOR interest rate. When the yield to maturity offered is always higher than the increase of JIBOR interest rate, the sovereign sukuk trade volume will remain relatively high because the sovereign sukuk will be more attractive than other instruments.

The JII variable has a negative influence on the sovereign sukuk trade volume (H6 is accepted). The coefficient of regression result indicates that 1% increase in JII can decrease the volume by 11,538%. The impact of JII on the volume of sukuk trade is quite large. This supports the notion that sharia stocks and sukuk substitute each other as sharia-based investment instruments. This result is in line with previous studies stating that the stock price index negatively influenced the liquidity of the bond or sukuk markets (Chordia, Sarkar, and Subrahmanyam, 2001; Diaz and Skinner, 2001; Choudry, 2010). In addition, the results of the coefficients can explain the indirect positive impact of JIBOR on the sovereign sukuk trade volume. The increase of market interest rates will raise the capital cost of the firms, reducing the profit shared to the shareholders. This might shift the investors' decisions from stocks to other instruments such as bonds that cause the stock price index to decline (Alam, 2009; Witjaksono, 2010; Kewal, 2012).

However, the remaining maturity of the sukuk, the level of Consumer Confidence Index, and openness of the economy do not have any significant impact on sukuk market liquidity (H3, H7 and H8 are not accepted).

5. CONCLUSIONS AND RECOMMENDATIONS

This study aims to find the factors that determine the liquidity of the sukuk markets in Indonesia during the period of January 2010 to December 2016. From the results of data processing and analysis, several conclusions are made as follows:

In terms of sukuk characteristics, the issuance amount of each series of sovereign sukuk has a positive impact on liquidity; which means that the increasing number of sovereign sukuk will increase their trading volume in the secondary market. Yield to maturity of sovereign sukuk negatively affects the liquidity. This is due to the falling price when yield to maturity is high which causes the sukuk holders to prefer to retain ownership rather than sell. The

remaining maturity of sovereign sukuk has no significant impact on liquidity.

In terms of macroeconomic factors, inflation negatively affects the sovereign sukuk market liquidity. This is because the nominal interest rates will escalate when inflation increases. A rise in the nominal interest rate can increase the yield to maturity, which affects the propensity of the sukuk holders to hold their sukuk. In addition, a low stable inflation rate enhances people's purchasing power will raise public interest to invest so that the sukuk trade volume can increase. JIBOR positively relates to the liquidity of the sovereign sukuk markets in Indonesia. It means that higher JIBOR levels will increase the trading volume of sovereign sukuk. The high rate of sovereign sukuk yields makes investors interested to buy sovereign sukuk despite an increase in market interest rates. The Jakarta Islamic Index negatively relates to the sovereign sukuk market liquidity in Indonesia, indicating that the sharia shares and sovereign sukuk are substitute investment instruments. The Consumer Confidence Index has no significant impact on liquidity.

This study aims to find the determinants of Indonesia's sovereign sukuk market liquidity. Characteristics of the sovereign sukuk and the macroeconomic conditions during the observation period have been examined. Accordingly, this study generates empirical evidence that can support the sovereign sukuk market players and the policymakers in making decisions. This study also contributes to filling the research gap on Islamic financial market literature, specifically sukuk market liquidity.

Having confirmed the factors that determine the liquidity of sovereign sukuk markets in Indonesia, several recommendations are proposed. (1) For the government as a sovereign sukuk issuer, since sukuk issuance amount positively affects the sovereign sukuk market liquidity, it is recommended to add the issuance amount and the variations of sovereign sukuk to attract investors' interest in sukuk investments. However, increasing the issuance amount must be supported by the replenishment of underlying assets or projects. The descriptive statistics show that Sukuk Ritel has the highest trading volume due to its retail investor basis. Therefore, it is highly recommended to increase the issuance of Sukuk Ritel. To directly affect the trading volume, Indonesia's Ministry of Finance could also impose a policy that requires financial institutions such as Islamic banks and securities firms to be the primary dealers of sovereign sukuk. (2) For the central bank, keeping the inflation level

low and stable is recommended since inflation influences the purchasing power and thus the decision to invest. (3) For investors, sovereign sukuk can substitute Islamic stocks when there is a decrease in the Islamic stocks price index. Moreover, the public can contribute to developing the country's infrastructure by investing in sovereign sukuk.

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