Finance-growth nexus: Islamic finance development in Indonesia

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Abstract

Purpose – There are many studies related to finance-growth nexus, but existing empirical evidences still have not provided conclusive result of the nature and direction of this relationship. Moreover, there are only few studies about finance-growth nexus seen from Islamic finance perspective, especially in Indonesia. Therefore, this study aims to examine the nature of causal relationship between Islamic finance development and economic growth in Indonesia seen from the development of Islamic banking, sukuk market and Islamic stock market.

Design/methodology/approach – By using quarterly data from 2002Q3 to 2017Q4, this study uses vector autoregressive (VAR) model, then uses granger causality and impulse response function to analyze the causal relationship between Islamic finance development and economic growth and also among three main sub-sectors of Islamic finance.

Findings – This study found that Islamic banking development and Islamic stock market development support neutrality hypotheses view, while sukuk market development supports supply-leading hypotheses view. Moreover, this study also found that there are unidirectional causalities from sukuk market development to Islamic banking development and from sukuk market development to Islamic stock market development.

Research limitations/implications – This study focuses only on the development of Islamic finance viewed from a macro perspective and only looks at how the three main sub-sectors in Islamic finance develop. In addition, the results of research related to finance-growth nexus are also sensitive to the object of research, the method and the proxies of variables used.

Originality/value – To the best of the authors' knowledge, there is no study that examines the causal relationship between Islamic finance development and economic growth in Indonesia based on its three main sub-sectors simultaneously. So, this study gives empirical evidence to contribute on finance-growth nexus discussion based on three main sub-sectors of Islamic finance development in Indonesia.

Keywords Economic growth, Islamic banking, Islamic finance, Finance-growth nexus, Islamic stock market, Sukuk market

Paper type Research paper

1. Introduction

The financial sector is believed to have an important role in economic growth. The importance of financial sector development has also been widely mentioned in various studies. It was first put forward by Schumpeter (1911), who states that the development of the financial sector has a significant role in economic growth. This statement is reinforced by Bencivenga and Smith (1991), who emphasize that the development of the financial sector is a strategic factor that can foster long-term economic growth. This is because the development of the financial sector, together with its progress, can facilitate economic

growth through its various channels such as providing information on investment opportunities for fund efficiency, overseeing the company and running corporate governance, diversifying risks, raising funds, facilitating the exchange of goods and services and also managing and transferring technology (Garcia and Liu, 1999; Levine, 2005; Zhang *et al.*, 2012). These arguments are also supported by many scholars with their empirical evidences (Ahmed and Mmolainyane, 2014; Durusu-Ciftci *et al.*, 2017; Fufa and Kim, 2017; Pradhan *et al.*, 2014; Ruiz, 2017).

As time goes by and the financial sector develops, the Islamic financial sector is being seen and developed because it has characteristics that look relatively "righteous" compared to the conventional financial sector because Islamic finance uses the principle of profit sharing and risk-sharing (Ayub, 2007). The Islamic financial sector, besides aiming to provide halal alternatives in financial products, also has the same goals as the development of conventional financial sector, which is to promote economic growth of a country (Zarrouk *et al.*, 2017).

The relationship between financial sector development and economic growth have attracted great interest among economists in recent years. The finance-growth nexus topic has become an important and ever-present discussion among researchers and policy-makers. Empirical evidences from previous studies indicated a positive long-term relationship between various indicators of financial sector development and economic growth. In general, these findings indicate that well-developed financial systems can promote economic growth, in accordance with the proposition "more finance, more growth" (Law and Singh, 2014).

Many studies have shown that there is a causal relationship between the development of the financial sector and the growth of the economy (Menyah *et al.*, 2014; Pradhan *et al.*, 2017). However, there are also studies that fail to prove a causal relationship between financial sector development and economic growth (Eng and Habibullah, 2011; Lucas, 1988; Mukhopadhyay *et al.*, 2011). Therefore, existing empirical studies have not provided conclusive evidence of the nature and direction of this relationship and there is no consensus among economists about the nature of this relationship. The relationship of financial sector development and economic growth has different nature in each country. It depends on the variables, models and methods used to analyze the relationship (Nyasha and Odhiambo, 2018). Briefly, there are four possible relationships emphasized in the financial literature that address the development of the financial sector and economic growth, which are supply-leading hypotheses, demand-following hypotheses, feedback hypotheses and neutrality hypotheses.

Although there are many studies on finance-growth nexus, studies on this topic based on the perspective of Islamic finance development are still few. This is certainly very interesting to discuss. Also, the information obtained from finance-growth nexus studies seen from the development of the Islamic financial sector may be useful for some countries that are developing Islamic finance, one of which is Indonesia.

Therefore, this study contributes to fill the research gap in the topic of finance-growth nexus viewed from the Islamic finance development perspective in Indonesia. In addition, this study will also discuss about the relationship between the development of Islamic finance sub-sectors in Indonesia, namely, the Islamic banking sector, sukuk market and Islamic stock market.

2. Literature review

Pradhan *et al.* (2017) states that the development of the banking sector, bond market and stock market is a major force in the financial sector development, which can stimulate

economic growth in a country. These three financial sub-sectors also have been proven to influence each other in some literature related to the development of the financial sector. Similar phenomena also happened in the development of the Islamic financial sector. The development of Islamic banking, sukuk market and Islamic stock market have contributed to economic growth based on some literature of Islamic finance development (Abd. Majid and Kassim, 2015; Abduh and Sukmana, 2013; Abedifar *et al.*, 2016; Ahmad *et al.*, 2012; Gheeraert and Weill, 2015; Kassim, 2016; Smaoui and Nechi, 2017; Zarrouk *et al.*, 2017).

Studies focusing on causality between financial sector development and economic growth attracts the attention of researchers and economists so that this research continues to be done from the beginning until now. Thus far, the causality relationship between the financial sector and economic growth remains unclear in its direction "from where to where" and "who drives whom". Previous studies have not provided conclusive evidence; there are always different results between one and the other (Pradhan *et al.*, 2017). Different views in the causality relationship between financial sector development and economic growth are divided into supply-leading hypotheses, demand-following hypotheses, feedback hypotheses and neutrality hypotheses.

2.1 The supply-leading hypotheses
In the view of supply-leading hypotheses, there is a one-way relationship derived from the development of the financial sector towards economic growth. The creation of financial institutions, financial assets and related financial services aims to encourage and stimulate entrepreneurial and investor responses in the modern sector (Patrick, 1966). Supply-leading hypotheses state that the development of the financial sector has a more important role in economic growth (Abd. Majid and Kassim, 2015; Ahmad *et al.*, 2012; Beck *et al.*, 2000; Christopoulos and Tsionas, 2004; Coşkun *et al.*, 2017; De Vita *et al.*, 2018; Durusu-Ciftci *et al.*, 2017; Enisan and Olufisayo, 2009; Lee, 2012; Levine *et al.*, 2000; Menyah *et al.*, 2014; Pradhan *et al.*, 2017, 2014; Sehrawat and Giri, 2015; Smaoui and Nechi, 2017; Zarrouk *et al.*, 2017).

2.2 The demand-following hypotheses
The demand-following hypotheses view is contrary to supply-leading hypotheses. According to this view, there is a one-way relationship derived from economic growth towards the development of the financial sector. Patrick (1966) explains that the demand-following phenomenon occurs when the creation of financial institutions, financial assets and liabilities and related financial services are the response from demand of savers, investors and activities in the real sector for the establishment of financial services. Demand-following hypotheses suggests that economic growth has a more important role in the development of the financial sector (De Vita *et al.*, 2018; Enisan and Olufisayo, 2009; Kwon and Shin, 1999; Menyah *et al.*, 2014; Pradhan *et al.*, 2015; Pradhan *et al.*, 2017, 2014; Puente-ajovín and Sanso-navarro, 2015; Tang, 2005; Zarrouk *et al.*, 2017).

2.3 The feedback hypotheses
Feedback hypotheses is a combination of supply-leading hypotheses and demand-following hypotheses. This view sees that the causality link between financial sector development and economic growth comes from both. The development of the financial sector and growth triggers each other (Abduh and Omar, 2012; Abduh and Sukmana, 2013; Cheng, 2012; De Vita *et al.*, 2018; Enisan and Olufisayo, 2009; Menyah *et al.*, 2014; Pradhan *et al.*, 2015).

2.4 The neutrality hypotheses
In contrast to previous views, neutrality hypotheses view sees that there is no significant
causality relationship between the development of the financial sector and economic growth.
The relationship between these two is neutral. In other words, the development of the
financial sector and economic growth is independent of each other (Lucas, 1988; Menyah
et al., 2014; Mukhopadhyay *et al.*, 2011; Rousseau and Xiao, 2007; Tang, 2005).

3. Research methodology
This study does not intend to be a comprehensive study of all of the determinants of
economic growth and Islamic finance development. Rather, it examines the nature of
relationship between economic growth, Islamic banking development, sukuk market
development and Islamic stock market in Indonesia. By using vector autoregressive model
then followed by granger causality and impulse response analysis, this study tries to answer
whether economic growth, Islamic banking development, sukuk market development and
Islamic stock market development in Indonesia are granger-causes each other or not.

3.1 Proposed hypotheses
Previous studies have found that there is a causal relationship between financial sector
development and economic growth but has different outcomes in terms of banking, bond
markets and stock markets. The same result is also possible in the development of Islamic
finance seen from Islamic banking, sukuk market and Islamic stock market. Possible
causality relationships can be supply-leading, demand-following, feedback or neutral. It is
also possible to bring each Islamic financial sub-sector to influence each other. In simple
terms, all hypotheses to be tested in this study can be seen on Figure 1:

H1a, b. Islamic banking development granger-causes economic growth, *vice versa.*

H2a, b. Sukuk market development granger-causes economic growth, *vice versa.*

H3a, b. Islamic stock market granger-causes economic growth, *vice versa.*

H4a, b. Islamic banking development granger-causes sukuk market development, *vice
versa.*
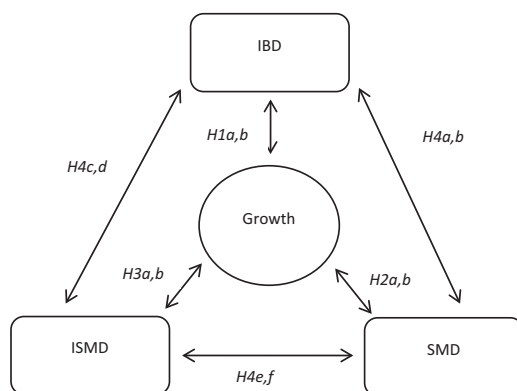
Figure 1.
Hypotheses
illustration

H4c, d. Islamic banking development granger-causes Islamic stock market development, *vice versa.*

H4e, f. Sukuk market development granger-causes Islamic stock market development, *vice versa.*

3.2 Data and variables

Data used in this study are secondary data with time period from 2002Q3 to 2017Q4 obtained from various sources, namely, Bank Indonesia, Financial Services Authority and Datastream and Eikon Thomson Reuters. Data are converted into variables that will be examined in this study. Variables to be used in this study along with definitions, data used and sources are detailed in Table I.

3.3 Analytical framework

Variables are modeled in the VAR model to analyze the causality relationship. VAR model itself is often used to answer questions in many studies related to finance-growth nexus. The VAR model in this study refers to Pradhan *et al.* (2017) and then is modified according to the needs of this study. The model is converted from the panel VAR into time series VAR in the bivariate VAR framework to avoid the problem of degree of freedom and model efficiency if using four variables at once in a VAR model with lags that may be quite a lot. The specification of these models are written above.

Growth with IBD:

$$\text{Growth}_t = \alpha_{1j} + \sum_{j=1}^{k} \beta_{1j}\text{Growth}_{t-j} \sum_{j=1}^{k} \beta_{1j}\text{IBD}_{t-j} + \varepsilon_{1t} \tag{1}$$

$$\text{IBD}_t = \alpha_{2j} + \sum_{j=1}^{k} \beta_{2j}\text{IBD}_{t-j} + \sum_{j=1}^{k} \beta_{2j}\text{Growth}_{t-j} + \varepsilon_{2t} \tag{2}$$

Growth with SMD:

Variables	Definition	Data	Source
Economic growth (Growth)	Real GDP per capita growth rate	Real GDP Population	Bank Indonesia
Sukuk market development (SMD)	Growth rate of "Ratio of value of sukuk outstanding to nominal GDP"	Value of sukuk outstanding Nominal GDP	Eikon Thomson Reuters and Bank Indonesia
Islamic stock market development (ISMD)	Growth rate of "Ratio of value of traded stock to islamic stock market capitalization"	Market capitalization of all Islamic stock listed on JII Value of traded stock on JII	Datastream Thomson Reuters
Islamic banking development (IBD)	Growth rate of "Ratio of total financing from Islamic banking to nominal GDP"	Total financing from Islamic banking Nominal GDP	Islamic Banking Statistic Otoritas Jasa Keuangan and Bank Indonesia

Table I.
Variables details

$$\text{Growth}_t = \alpha_{1j} + \sum_{j=1}^{k} \beta_{1j}\text{Growth}_{t-j} \sum_{j=1}^{k} \beta_{1j}\text{SMD}_{t-j} + \varepsilon_{1t} \tag{3}$$

$$\text{SMD}_t = \alpha_{2j} + \sum_{j=1}^{k} \beta_{2j}\text{SMD}_{t-j} + \sum_{j=1}^{k} \beta_{2j}\text{Growth}_{t-j} + \varepsilon_{2t} \tag{4}$$

Growth with ISMD:

$$\text{Growth}_t = \alpha_{1j} + \sum_{j=1}^{k} \beta_{1j}\text{Growth}_{t-j} \sum_{j=1}^{k} \beta_{1j}\text{ISMD}_{t-j} + \varepsilon_{1t} \tag{5}$$

$$\text{ISMD}_t = \alpha_{2j} + \sum_{j=1}^{k} \beta_{2j}\text{ISMD}_{t-j} + \sum_{j=1}^{k} \beta_{2j}\text{Growth}_{t-j} + \varepsilon_{2t} \tag{6}$$

IBD with SMD:

$$\text{IBD}_t = \alpha_{1j} + \sum_{j=1}^{k} \beta_{1j}\text{IBD}_{t-j} \sum_{j=1}^{k} \beta_{1j}\text{SMD}_{t-j} + \varepsilon_{1t} \tag{7}$$

$$\text{SMD}_t = \alpha_{2j} + \sum_{j=1}^{k} \beta_{2j}\text{SMD}_{t-j} + \sum_{j=1}^{k} \beta_{2j}\text{IBD}_{t-j} + \varepsilon_{2t} \tag{8}$$

SMD with ISMD:

$$\text{SMD}_t = \alpha_{1j} + \sum_{j=1}^{k} \beta_{1j}\text{SMD}_{t-j} \sum_{j=1}^{k} \beta_{1j}\text{ISMD}_{t-j} + \varepsilon_{1t} \tag{9}$$

$$\text{ISMD}_t = \alpha_{2j} + \sum_{j=1}^{k} \beta_{2j}\text{ISMD}_{t-j} + \sum_{j=1}^{k} \beta_{2j}\text{SMD}_{t-j} + \varepsilon_{2t} \tag{10}$$

IBD with ISMD:

$$\text{IBD}_t = \alpha_{1j} + \sum_{j=1}^{k} \beta_{1j}\text{IBD}_{t-j} \sum_{j=1}^{k} \beta_{1j}\text{ISMD}_{t-j} + \varepsilon_{1t} \tag{11}$$

$$\text{ISMD}_t = \alpha_{2j} + \sum_{j=1}^{k} \beta_{2j}\text{ISMD}_{t-j} + \sum_{j=1}^{k} \beta_{2j}\text{IBD}_{t-j} + \varepsilon_{2t} \tag{12}$$

The procedure for estimating and analyzing these models follow four steps. First, unit root test has to be done to make sure that all variables are stationary. If these variables are not

stationary at level, then the first difference of these variables will be used, but the test have to be done again to make sure all of these variables are stationary. The models also have to be "corrected" or converted to vector error correction model (VECM) if the variables are co-integrated. Therefore, co-integration test have to be done too if these variables are stationary at first difference. Second, the selection of lag numbers should be taken into account in estimating the VAR model. Choosing optimum lag is a must because VAR model is very sensitive to lags. Too few lags allow for potential errors in model specifications, whereas too much lag will consume the degree of freedom (Gujarati and Porter, 2009). Optimal lag selection can be seen from various criteria, such as LR test statistic (LR), Final Prediction Error (FPE), Akakike Criterion (AIC), Schwarz Criterion (SC) and dan Hannan–Quinn criterion (HQ). Third, every models have to satisfy the stability condition for analyze the impulse response function. Fourth, every estimated VAR model will be analyzed using granger causality and impulse response function.

4. Results
4.1 Unit root test, optimum lag selection and stability condition check
Based on the unit root test with Augmented Dicky–Fuller Test in Table II, each variable can be said stationary at level because it is proven statistically does not have a unit root.

Every models in this study follow the suggestion from Akaike Information Criterion (AIC) for selecting optimum lags, except SMD-ISMD VAR model because the majority of criteria suggest to use 0 lag on that model. So LR criteria will be used for that model for an exception. Every models also satisfy the stability condition by using these lags.

4.2 Granger causality and impulse response function
Granger causality test between the development of Islamic financial sub-sector and economic growth in Table III shows that there is only unidirectional causality from sukuk market development towards economic growth. The relationship between the other variables show insignificant results.

Variables	Probability	Stationarity
Growth	0.0037***	Stationary
IBD	0.0000***	Stationary
ISMD	0.0000***	Stationary
SMD	0.0000***	Stationary
Note: *, ** and ***, respectively, indicate significant at 10, 5 and 1% signifinance level		

Table II.
Augmented Dicky–Fuller test

			Lag			
Criteria	Growth-IBD	Growth-SMD	Growth-ISMD	IBD-SMD	SMD-ISMD	IBD-ISMD
LR	3	5	5	3	4	5
FPE	1	5	1	3	0	1
AIC	1	5	1	3	0	1
SC	1	1	1	0	0	1
HQ	1	1	1	1	0	1

Table III.
Criteria and lags

Granger causality test between the development of Islamic financial sub-sector in Table IV shows that there are two unidirectional causalities (Table V): first, the causality relationship derived from sukuk market development towards the Islamic banking development; and then from sukuk market development towards the Islamic stock market development. These findings indicate that the development of sukuk market in Indonesia has some influences on the development of Islamic banking sector and Islamic stock market.

Furthermore, impulse response function analysis is done to see the nature of the relationship between variables that have granger causality. The relationship between these variables can be either negative or positive.

Based on Figure 2, economic growth responded negatively to the shock on sukuk market development from the second to the fifth period with the greatest response in the fifth period with value of −0.2 per cent. After that, economic growth responded positively to the shock effect. The shock effect began to disappear in the 14th period. On the other hand, the development of the sukuk market responded positively to the shock of economic growth. The effects of the shock have been responded from the first period with value of 3 per cent and began to disappear in the 12th period. Statistically, there is only one granger causality derived from the development of the sukuk market towards economic growth so that the relevant IRF analysis is only the one in the left figure.

According to Figure 3, Islamic banking development responded positively to the shock on sukuk market development and peaked at 2 per cent in the fourth period. The shock effect began to disappear in the 14th period. On the other hand, the sukuk market development responded sharply to Islamic banking development positively at the beginning of the period with value of 5.6 per cent; then the effect is slowly disappearing. Statistically, there is only unidirectional causality derived from the development of the sukuk market

| Variables | | | |
From	To	Probability	Causality
IBD	Growth	0.5593	Does not exist
Growth	IBD	0.5492	Does not exist
SMD	Growth	0.0019***	Exist
Growth	SMD	0.6292	Does not exist
ISMD	Growth	0.3633	Does not exist
Growth	ISMD	0.4593	Does not exist

Note: *, ** and ***, respectively, indicate significant at 10, 5 and 1% signifinance level

Table IV. Granger causalities between Islamic finance development and economic growth

| Variables | | | |
From	To	Probability	Causality
IBD	SMD	0.5629	Does not exist
SMD	IBD	0.0018***	Exist
ISMD	SMD	0.5234	Does not exist
SMD	ISMD	0.0308**	Exist
IBD	ISMD	0.2060	Does not Exist
ISMD	IBD	0.8842	Does not Exist

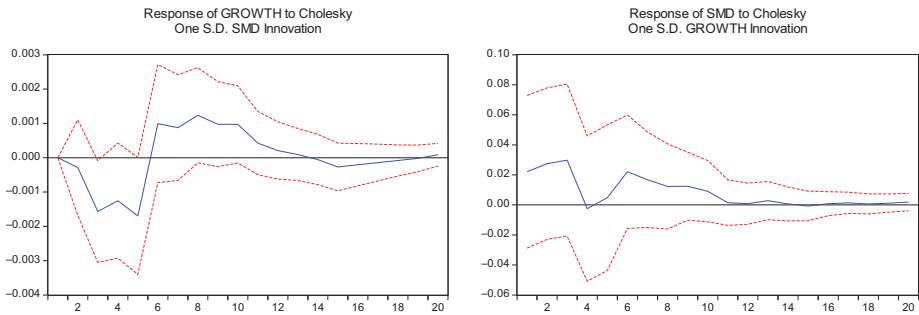Note: *, ** and ***, respectively, indicate significant at 10, 5 and 1% signifinance level

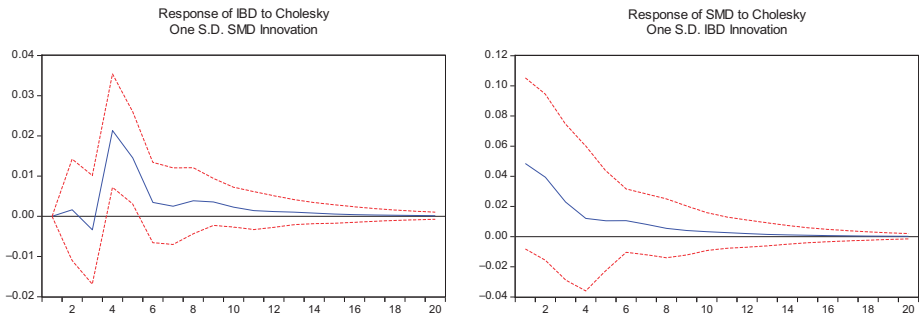Table V. Granger causalities between Islamic financial sub-sectors

towards the development of Islamic banking so that the relevant analysis is only IRF analysis on the left side of the picture.

Based on Figure 4, the sukuk market development had a volatile response to the shock on Islamic stock market and the effect began to disappear in the tenth period. Similarly, the Islamic stock market development also had a volatile response to the shock on sukuk market development and the effect began to disappear in the 11th period. Statistically, there is only unidirectional causality derived from the development of the sukuk market towards the development of the Islamic stock market so that the relevant analysis is only IRF analysis on the right side of the picture.
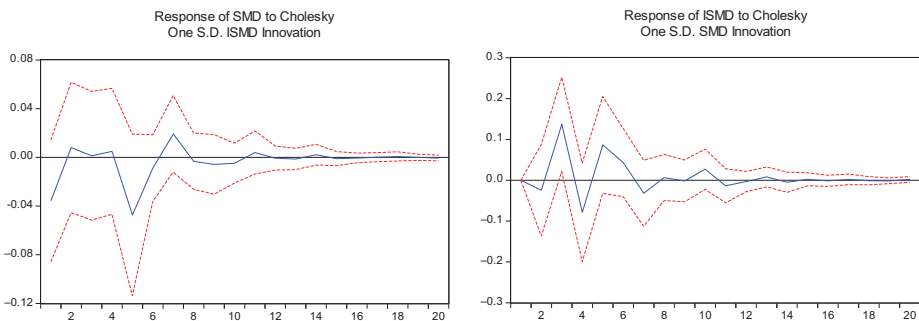
Figure 2.
Impulse response between sukuk market development and economic growth

Response of GROWTH to Cholesky
One S.D. SMD Innovation

Response of SMD to Cholesky
One S.D. GROWTH Innovation

Figure 3.
Impulse response between Islamic banking development and sukuk market development

Response of IBD to Cholesky
One S.D. SMD Innovation

Response of SMD to Cholesky
One S.D. IBD Innovation

Figure 4.
Impulse response between sukuk market development and Islamic stock market development

Response of SMD to Cholesky
One S.D. ISMD Innovation

Response of ISMD to Cholesky
One S.D. SMD Innovation

5. Discussion

5.1 Causality between Islamic banking development and economic growth
In the causal relationship between economic growth and Islamic banking development,
economic growth and Islamic banking development does not granger causes each other.
These findings suggest that economic growth and Islamic banking development are
independent of each other so that these findings support neutrality hypotheses. The same
result was also found in a previous study; Tang (2005) found that the banking sector
development in Indonesia has no causal relationship with its economic growth. In principle,
the financing provided by Islamic banks should be followed by real activity so that the
output in the economy can increase as well. The absence of causal relationship between
Islamic banking development and economic growth in Indonesia may occur for two reasons.
First, Islamic banking in Indonesia does not have high penetration or market share in the
banking sector in Indonesia and it is still far from conventional banking so that the effects of
Islamic banking development is "not felt yet" in macro perspective. Second, Islamic banking
development in Indonesia may indeed be in line with Tang (2005) on the development of the
banking sector in Indonesia.

5.2 Causality between sukuk market development and economic growth
In the relationship between economic growth and sukuk market development, there is
unidirectional causality that comes from sukuk market development towards economic
growth of Indonesia. Indonesia's economic growth responded negatively to the shock on the
sukuk market development at the beginning of the period. But after several periods,
Indonesia's economic growth shows positive response. These findings suggest that the
sukuk market development in Indonesia is supporting supply-leading hypotheses.
The negative economic growth response at the beginning of the period may be because
the sukuk market in Indonesia is dominated by government sukuk which is the
government's long-term financing instrument and the purpose of its issuance is to cover the
budget deficit. This is in line with the finding of Puente-ajovín and Sanso-navarro (2015)
which states that government debt has a negative causal relationship with economic
growth. The more government debt that is remain outstanding will slow economic growth,
but when the economy is slowing down, the government needs to issue debt to finance its
budget deficit. Positive responses in subsequent periods may be because of projects
underlying the issuance of government sukuk already operating and the project is
productively run. Sukuk does not directly boost Indonesia's economy, but sukuk can boost
economic growth through these government projects so that economic growth will be felt
during some period after sukuk is issued and the project is completed.

5.3 Causality between Islamic stock market development and economic growth
In the relationship between economic growth and the Islamic stock market development,
both of them do not granger causes to each other. Economic growth does not trigger Islamic
stock market development in Indonesia and vice versa. Therefore, it can be said that these
findings support neutrality hypotheses. This finding is different from the findings in
Malaysia. Abduh and Sukmana (2013) found that Islamic stock markets and economic
growth affect each other in the long run as well as in the short term. The difference with the
findings in this study may occur because the number of capital market investors in
Indonesia is still relatively fewer than the capital market investors in Malaysia. In addition,
the Indonesian people have a consumptive nature so that the investment rate is lower than
the consumption.

5.4 Causality among Islamic financial sub-sector
In the relationship between the Islamic financial sub-sector development, there are two unidirectional causalities. First, it is derived from the sukuk market development towards the Islamic banking development, then from sukuk market development towards Islamic stock market development. The development of Islamic banking and Islamic stock market are independent of each other. Uniquely, these findings show that the development of sukuk market can trigger the development of Islamic banking. This finding is different from the finding of Smaoui *et al.* (2017), who state that the development of the sukuk market is a substitute of the development of the banking system. The most logical reason for explaining this phenomenon is when the number of sukuk outstanding is increasing, the society or companies borrow money from the Islamic bank to buy the sukuk so that the total financing by Islamic banks also increases. Furthermore, the development of the sukuk market may affect the development of the Islamic stock market. The existence of growth or addition of outstanding sukuks will make the liquidity of Islamic stock market to be volatile. This may happen because investors will sell their stocks then buy sukuk to restructure and diversify their investment portfolio to get optimal risk and return.

6. Conclusion
This study aims to analyze the causal relationship between the Islamic finance development and economic growth in Indonesia. The relationship is analyzed separately according to the development of Islamic financial sub-sector, namely, Islamic banking, sukuk market and Islamic stock market. In addition, this study also tries to see the causal relationship among the development of Islamic financial sub-sector.

Based on findings in this study, it can be concluded several things about the causal relationship between the development of Islamic finance and economic growth in Indonesia and the causal relationship between the development of the Islamic financial sub-sector. The Islamic banking development and economic growth in Indonesia does not indicate any causal relationship between them. Islamic stock market development and economic growth does not show any causality relationship between them. There is a unidirectional causality derived from the sukuk market development towards economic growth. Then the economic growth responded negatively to sukuk market development at the beginning of the period but responded positively at some future periods over the sukuk market development. There is unidirectional causality from sukuk market development towards the Islamic banking development, then the Islamic banking development shows a positive response. There is a unidirectional causality of the sukuk market development towards the Islamic stock market development, then the development of the Islamic stock market shows a volatile response. The development of sharia banking and Islamic stock market has no causal relationship, so it can be said that they are independent of each other.

Overall, this study supports supply-leading hypotheses on sukuk market development. On the other hand, this study also supports neutrality hypotheses on the development of the sharia banking sector and the Islamic stock market for Indonesia's economic growth. Some development of Islamic financial sub-sector also has the possibility of influencing the development of other Islamic financial sub-sector.

7. Recommendation
This study focuses only on the development of Islamic finance which is viewed from a macro perspective and only looks at how the development of the main sub-sector in Islamic finance. In addition, the results of research related to finance-growth nexus also sensitive to

the object of research, the method and the proxies of variables used (Nyasha and Odhiambo, 2018). Therefore, further research is needed with attention to these following points:

- examining the development of Islamic finance in micro perspective and include other Islamic financial sub-sector components such as BPRS, Takaful and other Islamic financial institution; and

- conducting similar research with different object of research, time frame, as well as methods and proxies of variables to ensure robustness of the results of this study.

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