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Islamic bank contribution to Indonesian economic growth

Islamic bank
contribution

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Abstract

Purpose – This paper aims to examine the short run and long run of Indonesia Islamic bank (IIB) contribution to economic growth over the periods 2009: Q1 – 2019: Q4. IIB is considered which supported by the largest Muslim population in the world. Deposits, financing and offices are proxy to highlight the relationship between Islamic banks and Indonesia's economic growth.

Design/methodology/approach – Through cointegration analysis, autoregressive distributed lag (ARDL), vector error correction model (VECM), variance decompositions (VDCs) and impulse response functions (IRFs), this study investigates the Islamic bank and economic growth nexus.

Findings – A significant relationship in the short-run and long-run between IIB deposits and offices and economic growth. There is evidence of a bidirectional relationship between the Islamic bank and economic growth.

Social implications – In spite of their market share less than a conventional bank. The result proved that IB a prosperous sector and has a contribution to economic growth. This address regulator must have a dedicated unit to handle IIB legal cases should it go to the court for adjudication.

Originality/value – The study role of Islamic banking contribution to economic growth in the context of Indonesia is limited. This paper is the first study that examines empirically the effect of Indonesian Islamic banks on economic growth measured by the amount of gross domestic product (GDP), financing, offices and deposits.

Keywords Indonesia, Islamic banking

Paper type Research paper



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1. Introduction

Islamic banking is one of the fastest-growing aspects of financial institutions across the world. Their origin can be traced back to 1963 when they were first opened in Egypt for the first time (Tabash and Dhankar, 2014a). Islamic banks emerged and were mainstreamed within the global system, which directly impacts the real economy (S and P, 2017). The growth of Islamic banks is supported by the Muslim population, which is expected to be more than 25% of the world population by 2030. By this period, it is likely to increase to 6.2 million from 2.6 million in the USA. In several European countries it might increase by more than 10% of the total residents (Solomon, 2018). Therefore, the Muslim population plays a significant role in the development of Islamic financial institutions (Hassan *et al.*, 2011; Lebdaoui and Wild, 2016).

The seven countries with Muslim dominated populations can become the largest economies worldwide, including Bangladesh, Egypt, Indonesia, Iran, Nigeria, Pakistan and Turkey (Muhamad and Mizerski, 2013). Indonesia, with the largest Muslim population in the world, has a large Islamic finance market, which ranks fourth after Iran, Malaysia and Saudi in the international Islamic finance industry (Mohd. Yusof and Bahlous, 2013). Starting with only two Islamic banks in 1999, it currently has 14 full edged Islamic banks, 19 Islamic windows and 164 Islamic rural banks (OJK, 2019). For this reason, it is vital to examine the contribution of Indonesia Islamic bank (IIB) on economic growth. However, the theoretical and empirical literature shows the relationship between Islamic banking and economic growth is limited (Boukhatem and Ben Moussa, 2017), especially their financial intermediation role context (Kassim, 2016).

According to previous studies, Islamic banks have positive impacts on economic growth. For instance, it has an economic contribution through the transmission of deposit to financing and investment in Bangladesh (Chowdhury *et al.*, 2018), GCC and East Asia countries (Grassa and Gazdar, 2014; Mohd. Yusof and Bahlous, 2013), Indonesia (Abduh and Omar, 2012), Malaysia (Abd. Majid and Kassim, 2015; Furqani and Mulyany, 2009; Kassim, 2016), Middle-East and North Africa (MENA) (Goaied and Sassi, 2010), OIC countries (Farahani and Dastan, 2013; Imam and Kpodar, 2016; Kim *et al.*, 2018), Saudi Arabia (Jouini, 2016), Southeast Asia (Lebdaoui and Wild, 2016), Sub-Saharan Africa and East Asia and Pacific (Boukhatem and Ben Moussa, 2017), 22 Muslim countries (Abedifar *et al.*, 2016). Furthermore, the number of branches support banking intermediation role and economic growth (Bernini and Brighi, 2017; Jayaratne and Strahan, 1996).

The results of prior studies remain inconclusive because some show that Islamic banking does not significantly affect on economic development in Bangladesh (Hye and Islam, 2012), Malaysian (Hachica and Amar, 2015), MENA countries (Kar *et al.*, 2011) and Turkey (Yüksel and Canöz, 2017) and UAE (Zarrouk *et al.*, 2017). In regions with a dual banking system, Islamic bank has experienced less participation in the structuring of production (Boukhatem and Ben Moussa, 2017). This study focuses on the economic contribution of Islamic banking in countries with a significant percentage of the Muslim population and the dual banking system. It supplements previous studies with contributions to the economic literature. Specifically, it provides insight into understanding the effect of IIB on economic growth with combine financial and non-financial indicators.

This paper consists of six sections, each handling different aspects. Section 1 discusses the introduction, in which the background and rationale of the study are outlined. Section 2 covers the review of literature, specifically, the impact of Islamic banks and financial development on economic growth. It also captures the background of Islamic banking in Indonesia. Section 3 discusses the detail of the data and research methodology used.

Section 4 reports the findings and discussion. Section 5 outlines the conclusion and finally, Section 6 covers the direction and any suggestions for future research.

2. Literature review

Islamic banking has been considered as an alternative solution to the conventional banking system in terms of allocating, investing and mobilizing funds to firms. It enhances financing in the real economy as the leading investment depositors and income distributors (Kassim, 2016). There are four important roles of an Islamic bank as inter-mediation finance to economic growth. This includes contributing to financing morally acceptable projects, encouraging lending, promoting financial stability and stimulating saving (Imam and Kpodar, 2016). It is supported by Islamic banking-sharing instruments, which are predominantly equity-based and directly pursue the bi-directional causal relationship with economic growth (Chowdhury *et al.*, 2018; Kassim, 2016). Islamic banks promote economic activities, including offering capital ventures in the real economy, which is more efficient compared to pure lending. Furthermore, they have a more positive impact on economic growth. Essentially, five approaches were applied in examining the causal relationship studies between Islamic banking and economic growth in previous studies.

The first approach is supply-leading, where an Islamic bank fosters economic growth as a productive input (Samargandi *et al.*, 2014). This approach has been examined by several recent studies. Abd. Majid and Kassim (2015) and Kassim (2016) focused on the role of Islamic banking and financial institutions (IBFIs) on economic growth in Malaysia from 1997 to 2013. They used autoregressive distributed lag (ARDL), vector error correction model (VECM) and variance decompositions (VDCs). These studies established that the positive transmission of total deposits (TD) to gross domestic product (GDP) is significantly influenced by intermediation rather than the efficient resource allocation of Islamic banks. Similarly, Hachica and Amar (2015) examined the nexus of Malaysia Islamic banks on economic growth quarterly from 2001 to 2011. The indicator "PRIVATE" represented the total Islamic bank financing, while the ratios "PRIVIS" and "INVIS" were measured by the GDP and gross fixed capital formation (GFCF). In the long run, the impact of Islamic bank finance on economic growth was less important than in the short-run.

According to Ali and Azmi (2017), in OIC countries from 2007-2013, Islamic banks positively impacted economic growth. Similarly, Lebdaoui and Wild (2016) established that Islamic bank assets and deposits in the long-run have positively influenced economic growth in Southeast Asia from 2000 to 2012. The large size of Islamic banking was associated with higher economic growth toward Sharī'ah-compliant in mobilizing resources to the financial sector. Grassa and Gazdar (2014) concluded that in Middle-East countries Islamic deposits positively influence economic growth 1996-2001. Similarly, from 2000-2014 in MENA (Boukhatem and Ben Moussa, 2017) and 22 Muslim countries in 1999-2011, Islamic banks as financial intermediaries positively impacted economic growth (Abedifar *et al.*, 2016). Using annual data from 52 countries from 1990-2010 shows smaller Islamic banking facilitates economic growth through capital accumulation, financing and better access to deposits (Imam and Kpodar, 2016).

The second approach is demand-following, which means that financial development follows economic growth. An expansion of the financial system is increased following real economic growth (Kar *et al.*, 2011). Hassan *et al.* (2011) established that there is a one-way causality from growth to finance for the two poorest regions such as Sub-Saharan Africa and East Asia and Pacific. Furqani and Mulyani (2009) examined the relationship between Islamic banking and economic growth in Malaysia for the period 1997 to 2005 using the cointegration test and VECM. The study established that in the short-run, Islamic banking

led to fixed investment. In the long-run, there is a bidirectional relationship between Islamic banking and fixed investment. Also, there is evidence supporting demand following GDP and Islamic banking, where increases in GDP causes Islamic banking to develop and not vice versa.

The third approach relates to bidirectional causality, implying a mutual or two-way causal relationship between an Islamic bank and economic growth. This hypothesis has been approved by several previous studies. In developing countries, specifically low and middle-income classification, a positive relationship between financial and economic growth and vice versa occurred in most regions during 1973-2008 (Hassan *et al.*, 2011). Similarly, Jouini (2016) established that the evolution of GDP and savings from 1980 to 2012 had a cointegration between the Islamic bank savings and economic growth in Saudi Arabia. The study suggested that the authorities need to formulate policies that promote economic growth and savings to increase their performances. Similarly, in Qatar and UAE during the periods 1990-2010, Islamic banks' financing and economic growth effectively worked together in 1990-2010 (Tabash and Dhankar, 2014a, 2014b). Using quarterly data from 2003 to 2010, the financing of Islamic banking has a bi-directional relationship with economic growth in Indonesia (Abduh and Omar, 2012). This means Islamic banks in Indonesia, UAE and Qatar have proven to be effective financial intermediaries in the transmission of deposits to productive sectors.

Farahani and Dastan (2013) used quarterly data of 2000-2010 to validate the relationship between Islamic banks and economic growth in OIC countries. The study used the bound testing approach of cointegration, VECM, ARDL and vector autoregressive model (VAR). The results showed that both in the short and long-run, Islamic banks have positive effects on economic growth and vice versa. Similarly, using panel data for the period 1980-2007, Karim *et al.* (2011) concluded that there is a bi-direction relationship between financial development and economic growth in MENA countries. This implies that financial and real sectors often interrelate.

The fourth approach is no causal relationship between an Islamic bank and economic growth. According to Zarrouk *et al.* (2017), there was no causality direction between Islamic financial sector development and economic growth in UAE during 1990-2012. This is because there was no financial development in the UAE. In general, Islamic finance depends largely on economic growth. The empirical study in Turkey between 2005 and 2016 shows that Islamic banks do not have a significant effect on economic growth (Yüksel and Canöz, 2017). This is attributed to the small Islamic banking in the country. Therefore, Islamic banking in Turkey should be developed to contribute to GDP growth and industrial development.

The fifth approach is a negative relationship between Islamic financial development and economic growth. Hye and Islam (2012) established that financial development hurts economic growth in Bangladesh. The study recommended the formulation of effective financial sector policies to promote economic growth. Similarly, in Nigeria, financial development negatively impacted economic growth between 1960 and 2010 (Adeniyi *et al.*, 2015). Narayan and Narayan (2013) examined the impact of the financial sector development on economic growth for a panel of 65 developing countries. The study concluded that there is a negative relationship between bank financing and economic growth in MENA countries. Samargandi *et al.* (2014) reviewed the relationship between financial sector development and economic growth in Saudi Arabia from 1968-2010. Using the ARDL and bounds test technique, the study established that financial development hurts economic growth.

There are varied results due to the economic conditions in different countries that differ due to the banking system, financial market, institutional quality, level of socio-economic

development, the methodology used and period analyzed. Moreover, previous studies had various limitations, including adopting total financing (TF) as a proxy instead of the size of the Islamic bank. They also applied a direct method to validate the relationship between Islamic bank financing and economic growth without involving other growth determining factors such as branches, deposits and financing simultaneously. Undeniably, this may have affected the robustness of their results. Various useful indicators can be used to estimate the ability of Islamic banks to mobilize investment and saving (Imam and Kpodar, 2016; Jayaratne and Strahan, 1996). For instance, in the Italy and USA, the bank size, which is measured by the number of branches, positively bank intermediation. It is the main financial sector reform that affects economic growth. Furthermore, the bank's size improves efficiency, as larger banking benefits from the wide branch Bernini and Brighi (2017) and Jayaratne and Strahan (1996).

This study adds to the existing literature in several ways by linking deposits, financing, the number of IIB offices and other essential variables to economic growth. It helps solve the problem of data unavailability characterizing developing countries. Compared to previous studies on growth-finance nexus in the countries with the full Islamic system, studies on countries with dual banking systems such as Indonesia are still considered not comprehensive to predict economic conditions. A few studies on the dual banking systems are worth highlighting. However, the major goal of this work is to assess Islamic bank contribution to economic growth in Indonesia.

The choice to study the case of Indonesia was motivated by three main reasons. First, Indonesia has been one of the first countries to have made efforts to reform its financial systems to be integrated into one regulation to manage conventional and Islamic banks. Second, relative to other countries with integrated Islamic finance, Indonesia has a powerful system and potential for growth in Islamic finance institutions. Lastly, IIB assets and offices are growing rapidly with conventional banks as shown in Table 1. However, according to the central bureau of statistics, Indonesian faced relatively low economic growth between 2009 and 2019, with just over 5% (BPS, 2019). There is a need for an in-depth study of the relationship between banking systems and economic growth. Therefore, this research provides empirical evidence of the contribution of Islamic banking on Indonesia's economic growth.

3. Data and research method

This study empirically examines the contribution of the IIB to economic growth. It uses quarterly time series data from 2009 to 2019 and refers to Imam and Kpodar (2016) and Levine *et al.* (2000) in explaining economic growth with a set of control variables. Islamic banking development is measured by the finance extended to the real economy, which is divided by the nominal GDP. Although this indicator gives an idea of the size of the Islamic banking sector, it is reasonable to assume that the larger the sector, the better it performs. However, this is a common hypothesis made for conventional and Islamic banking in past studies. The data are collected from the Indonesian central bureau of Statistics (BPS) and quarterly Islamic statistical bulletin of bank Indonesia from financial services authority (OJK).

GDP is a common proxy for representing the income level of a particular country within a certain time. Study about finance-growth nexus often use GDP as the principal variable reflecting economic growth. The number of deposits, financing and offices are used as a representation of IIB intermediation performance, while economic indicators include the level of business activity during an accounting period. Therefore, the models contain four variables, including TD, TF, IBO and GDP. The study focuses on the following one model:

Table 1.
IIB data and
indicators

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Islamic banks											
SCB	6	11	11	11	11	12	12	13	13	14	14
SBU	25	23	24	24	23	23	22	22	21	20	19
SRB	139	150	155	158	163	163	163	166	167	165	164
Offices	1,223	2,101	2,101	2,663	2,990	2,922	2,747	2,654	2,664	2,724	2,917
Assets*	94,324	148,98	186,736	199,71	248,10	272,34	304,00	365,66	424,18	489,69	538,322
Financing*	54,334	105,33	118,949	151,06	188,56	200,18	219,76	255,76	286,92	329,74	366,380
Deposits*	58,768	117,51	126,699	150,46	187,20	221,89	235,98	285,16	341,71	379,97	425,290
Employees	15,443	20,264	27,660	31,578	43,054	50,522	60,918	59,969	60,365	59,389	61,460

Sources: Indonesian financial services authority (OJK), SCB = Shari'ah commerce banks, SBU = Shari'ah business units; SRB = Shari'ah rural banks; * in trillion rupiahs (IDR)

$$GDP = f(TD, TF, IBO) \tag{1}$$

Islamic bank contribution

where:

GDP = Gross domestic product;

TD = Total deposit;

TF = Total financing; and

IBO = Islamic bank offices.

The data required are collected to provide empirical evidence on the long-run integration between IIB and economic growth, as well as to determine the dynamic causal link between IIB deposits, financing, offices and economic growth (GDP). The unit root test for all variables is carried out using augmented Dickey–Fuller (ADF) and Phillips–Perron (PP). The power of the unit root tests is typically very low, although there is a switch in the distribution function of the test statistics, obviating uncertainty (Narayan, 2004). Table 2 shows the summary of the unit root test, which leads to the mixture of I(0) and I(1) of underlying regressors. Therefore, the ARDL testing could be effectively conducted. Its model is divided into the following:

$$\Delta GDP_t = \alpha_1 + \sum_{i=1}^k \beta_{1-i} \Delta GDP_{t-1} + \sum_{i=1}^k \theta_{1i} \Delta TD_{t-1} + \sum_{i=1}^k \theta_{1i} \Delta TF_{t-1} + \sum_{i=1}^k \theta_{1i} \Delta IBO_{t-1} + \varepsilon_t$$

Once the same order of integration at the first-difference level was confirmed, the VECM estimation was used to empirically examine the short and long-run causal relationships between variables. The ARDL bounds testing approach was used to examine this relationship, though it was initially introduced by Pesaran *et al.* (2001). This approach is formed by an autoregressive part plus a regression with distributed optimal lags, which is one and uses the akaike information criteria (AIC) in this study. The sample size is 44, and therefore, this method can be effectively used. The ARDL approach can be applied regardless of the stationary properties of the variables. It allows for inferences on long-run estimates and strengthens the results for a smaller sample size of cointegration analysis.

The presence of cointegration suggests that the variables have long-term relationships, even though they may drift apart in the short-run. Consequently, there must be at least one direction of causation in the Granger sense, either unidirectional or bidirectional causality. However, the asymptotic distribution of the *F*-statistic is not standard for the bound test. Therefore, the computed *F*-statistic is evaluated using the critical values established by Pesaran *et al.* (2001). These critical values are of two sets, the lower bound, which assumes all the variables to be I(0) and the upper bound, which considers all the variables to be I(1).

Levels Variable	First difference			
	ADF	PP	ADF	PP
<i>TD</i>	-2.116311	-2.116311	-6.712833***	-6.723387***
<i>TF</i>	-1.414281	-1.613531	-5.513330***	-5.523142***
<i>IBO</i>	-1.944028	-1.348207	-4.388365***	-4.324502***
<i>GDP</i>	-4.590910***	-4.219206***	-8.369861***	-11.98563***

Notes: ***Denotes significance at the 1% level; the lag lengths included in the models are based on the AIC; the above tests of ADF and PP are based on a model with constant and trend

Table 2. ADF unit root test

Following [Engle and Granger \(1987\)](#), to determine the dynamic causal link between Islamic finance and economic growth, the error correction vector model (VECM) should be pursued.

This study also generates a VDCs approach to explore the dynamic interaction between an Islamic bank and the Indonesian GDP. Consequently, the out-of-sample causality between the variables in the VAR system can be determined. The method measures the percentage of the forecast error variance of the variable explained by other aspects. Precisely, it indicates the relative impact that one variable has on another. Also, it provides information on how a variable of interest responds to shocks or innovations in other variables ([Abd. Majid and Kossim, 2015](#)).

Although VDCs provide information on the relative strength of each random innovation in selected variables to GDP, the impulse response functions (IRFs) are further examined to trace the direction of transmission of Islamic banking development to economic growth. This method is also used to assess the responses of GDP to the shocks of IIB over 11 years. Primarily, IRFs does not require the orthogonalization of shocks. It is also invariant to the ordering of the selected variables. Therefore, to stimulate the equations, the impulse response function proposed by [Pesaran and Shin \(1998\)](#) is used.

4. Results and discussion

From [Table 2](#), the ADF and PP test shows that all series are non-stationary at a level and stationary at first difference. This means that all variables of the same order integrated and the time series data cannot be rejected on varying levels in a logarithm form. For this reason, they are integrated into order one I(1). The cointegration analysis is conducted, as they are all integrated in the same order as required. This is a precondition for cointegration to the ARDL bounds testing.

The bounds test approach to co-integration is adopted, as shown in [Table 3](#), for all models. The results of *F*-statistics in the lag length 1 are higher than 3.02, the upper critical bounds at 10% and level of significance at 4.0781, 3.2753 and 3.0864, respectively. Consequently, there is strong statistical evidence of the existence of a long-run relationship between the variables in this study. This suggests that Islamic banks' deposits, financing and offices in Indonesia have long-run equilibrium relationships with the real economy. The cointegration equations show that all variables have long-run equilibriums with tendencies to move together.

According to [Engle and Granger \(1987\)](#), in case the variables are co-integrated, a VECM or a level VAR can be used. However, using VAR in level may be spurious and misleading, suppose the log level variables are non-stationary. The findings that the variables are non-stationary and co-integrated suggest the use of the VECM. In case the *F*-statistic exceeds the upper bound level, the *H0* is rejected, showing the existence of cointegration. In contrast, in case the *F*-statistic falls below the bound level, the *H0* cannot be rejected, showing no cointegration exists.

Level of significance (%)	I(0)	I(1)	Variables	<i>F</i> -value
1	4.94	5.58	<i>Deposit</i>	4.0781*
5	3.62	4.16	<i>Financing</i>	3.2753*
10	3.02	3.51	<i>Offices</i>	3.0864*

Table 3.
Bounds *F*-test
statistic for a long-
run relationship

Notes: The relevant critical value bounds are taken from [Narayan \(2005\)](#); and [Pesaran et al. \(2001\)](#). * Denote that *F*-statistics significant at the 10% level and k = 1

In the second stage, the long-run ARDL [1, 1, 1, 0] model estimates are selected based on the AIC criteria. The computed *F*-statistics for each variable is reported in Table 4 along with the critical values. The test outcome of the lag length 1 and significance levels in the 1% was found. Based on the findings of the ARDL method in Table 5, Islamic banking TDs, financing and the number of offices have positive contributions to the Indonesian economy. Although the market share of Islamic banking was approximately 6% at the end of 2019 (OJK, 2019), the distinct nature of its financing, which is interest-free, is documented to boost the real sector. Moreover, less volatility, either during the normal or crisis period, is also documented to promote the economic growth of the country. This means to improve the economic growth of the country, there is a need to further enhance efficiency and develop the Islamic banking industry.

Once the long-run association between economic growth and measures of IIB's development are explored, the Granger causality test is tested using the first-differenced variables based on the VECM. This enables the distinction between the short- and long-run causalities. The documented cointegration among the variables suggests a long-run association. Although it implies causality, it does not reveal the directions of causation among them. Table 5 shows the Granger causalities between the focus variables, specifically economic growth (GDP) and indicators for IIB development (i.e. TD, TF and IBO).

Table 5 shows the findings of the Granger causality between the IBFIs and economic growth based on VECM. In this analysis, the short and long-run causality is depicted by the *F*-statistics and *t*-statistics, respectively. It is vital to note that the variables are significant at least at 10% to Indonesia's economic growth and vice versa. This confirms the existence of the long-run relationship between economic growth and the IIB's development as shown in the earlier ARDL results. The coefficients value indicates that deviations from the long-run equilibrium require short-run adjustments to restore. Technically, the significant value implies that any deviations from the long-run equilibrium relationships in the economy are mainly caused by the changes in GDP and IIB. These variables bear the brunt of the short-run adjustments to the long-run equilibrium.

Table 4.
ARDL Estimate of a long-run relationship

Regressor	Coefficients	<i>t</i> -statistics
Deposits	0.0095***	5.0960
Financing	-0.0123***	-5.2999
Offices	0.2459***	0.0103

Note: ***Statistical significance at 1% level, ARDL (1, 1, 1, 0)

Table 5.
Granger causality based on VECM

Financial Indicators	IIB-led growth		Growth-led IIB	
	Short-run	<i>Long run</i> _{<i>t</i>-1}	Short-run	<i>Long run</i> _{<i>t</i>-1}
TDs	3.7747 (0.059)**	-0.0118 (0.000)***	8.965 (0.005)***	-0.0078 (0.003)***
TF	0.2194 (0.642)	0.01191 (0.001)***	3.218 (0.080)*	0.0098 (0.004)***
Offices	3.0999 (0.996)	-0.5045 (0.058)**	0.475 (0.495)	0.0054 (0.166)

Note: ***, **, and *denote significance at the 10, 5 and 1 per cent levels, respectively

The results show that IIB has a significant influenced GDP and vice versa, as opposed to IBO. This is contrary to a previous study, which showed that Islamic banks have more significant impacts in the short run than in the long run (Hachica and Amar, 2015). However, it supports prior studies on bidirectional causality between Islamic banks and economic growth (Abduh and Omar, 2012; Farahani and Dastan, 2013; Kar *et al.*, 2011). The study also showed that TD and GDP in the short and long run can run together. This is in line with Jouini (2016), which showed that Islamic bank deposits had a positive impact on economic growth in Saudi Arabia. However, it is contrary to the finance-led hypothesis or supply-leading view of Islamic bank deposits to GDP (Abd. Majid and Kassim, 2015; Kassim, 2016).

From the lagged dynamic terms, the long-run changes in the IIB are in part responsible for future changes in Indonesia's economic growth. Besides, each variable has a crucial impact on growth through IIB's financial intermediation role. This finding confirms the positive long-run stable association between economic growth and banking' development (Bernini and Brighi, 2017; Jayaratne and Strahan, 1996; Levine *et al.*, 2000). Table 1 shows that TD and financing and the number of offices of the IIB are moving together in the long run. Islamic banking encourages the development of the real economic sector by increasing financing and the number of offices, which utilize funds more efficiently and productively. IIB financing facilitates access to financial resources to stimulate Indonesia's economic growth. Furthermore, the quality of the contribution of IIB is improved by direct investment inflow. It is also argued that deposit, financing and the offices of IIB provided to the private and public sectors enhance real output.

The implication of the finance-driven growth causality as indicated by the three indicators for the IIB shows that IBFs are probably effective in channeling and transferring the financial resources between surplus and deficit units in the economy. The success of the IIBs' development to enhance economic growth can be attributed to the conducive policy environment championed by the Indonesian Government. This is meant to promote and strengthen the contribution of IIBs to economic performance.

VDCs were computed simultaneously to assess the short-run dynamics of the relationship between IIB and economic growth. This was achieved by determining the relative importance of each variable in generating fluctuations in other variables. The results of VDCs shown in Table 6 provide detailed information of the IIB deposit, financing and offices. They a significant proportion around 0%–40%, 0%–2% and 0%–13%, respectively, to the variations of Indonesian economic growth (GDP) forecast error variance.

Period	SE	Deposit	Financing	Offices	GDP
<i>VDCs of GDP</i>					
2009	66.36904 (0.059) **	0.000000	0.000000	0.000000	100.0000
2010	79.55838	2.230881	2.301467	6.325094	89.14256
2011	92.13548	16.80861	1.752384	13.93899	67.50002
2012	104.1656	28.27132	1.804531	13.77888	56.14527
2013	112.4978	30.64290	1.563673	12.75833	55.03510
2014	119.0594	31.73856	1.406942	12.73022	54.12427
2015	125.6751	34.05743	1.265701	13.19195	51.48492
2016	132.4228	36.46562	1.165964	13.29097	49.07745
2017	138.6537	37.99607	1.075831	13.17526	47.75284
2018	144.4049	39.05800	0.995204	13.13627	46.81053
2019	149.9589 (0.996)	40.09699	0.927214	13.18142 (0.495)	45.79438

Table 6.
VDCs

This finding support earlier finding of short-run dynamic causalities among the variables examined in the study.

Generally, the impulse response function processed in the Cholesky decomposition helped assess the responses of the GDP to the shocks of IIB over the 11 years. However, the result of this function depends on the ordering variables (Hassan *et al.*, 2011). As shown in Table 7, in the short run, Islamic banking sector development, except for financing, has an instantaneous significant positive correlation with the GDP during the period of study. It contributes to the changes in economic growth in the short and long run. This implies that all coefficients in the error correction model are stable over time. The estimated ARDL models are good in estimating the short and long-run relationships between the Islamic bank and Indonesia's economic growth.

5. Conclusion

Using a series of statistical tests, this study examined the short-run and long-run relationship between IIB and economic growth from 2009:Q1 to 2019:Q4. Also, it empirically investigated the Granger causality between IIB's development and economic growth using the ARDL and VECM. It re-examined the model in level form and generated VDCs and IRFs to further assess their relative-strength relationships to effectively conclude.

Based on the specified ARDL models, there is a bidirectional relationship between IIB deposit and economic growth in both the short and long-run. This finding is consistent with the tenets of Islamic finance, which states Islamic banking provides an efficient channel for productive resources to be transmitted for economic growth through its intermediation role. This means Islamic banking effectively facilitates the transmission of funds to the real economy. The linkage between deposits, financing and offices to economic growth is simultaneously in the long run.

The results of the VDCs and IRFs provide further support to the earlier findings. Both the TDs, financing and offices of the IIB play significant roles in explaining the variations in economic growth. There is a need to enhance the development of IBFIs to enhance economic growth.

The result implies that developing the Islamic banking and finance industry should be prioritized by policymakers in promoting economic growth. Continuously providing a conducive environment for IIB growth may facilitate economic development in the short and long run. The Indonesian Government should continue to promote Islamic banking due to its role in economic growth and resilience in crisis. This can be achieved by increasing the

Period	Deposit	Financing	Offices	GDP
IRFs of GDP:				
2009	0.000000	0.000000	0.000000	66.36904
2010	11.88295	12.06947	20.00873	35.117755
2011	35.85623	-1.756916	27.98078	9.366464
2012	40.50554	-6.858668	17.65787	19.02600
2013	28.46963	-1.447214	10.93569	29.54794
2014	24.91767	1.241475	13.77906	26.59091
2015	29.66699	-0.687007	16.70455	21.43516
2016	31.86571	-2.133827	15.71976	21.78233
2017	30.16876	-1.538133	14.22135	23.96440
2018	28.98261	-0.837105	14.36500	24.10156
2019	29.53302	-0.990552	14.99723	23.16880

Table 7. IRFs

current asset ratio, the number of Islamic banks and the quality of the IIB. This would include measures such as further improvement of the Islamic financial infrastructure and increasing the intellectual capital of the employees in the future. Providing conducive legal regulation would also be supportive in the long-run development of the industry.

Second, as the number of Indonesia Islamic financial institutions significantly increases currently, there is a need to have sufficient skill to manage them, especially the competent Shari'ah personnel and advisers, apart from trained Islamic bankers and competent scholars. It is vital to specifically pursue and recruit potential students with specific Islamic banking and finance skills such as *Fiqh Muamallah context*. IIB intermediation leads to economic benefits and increases managers' entrepreneurial skills. It reduces agency costs, which brings a positive impact on both the economy and the development of society. However, IIB needs to adopt current financial technology to improve its products and services.

6. Limitations and direction for future research

Several areas may refine the literature in this subject, including undertaking a more robust analysis using an extended period. More detailed aspects of Islamic financing could be explored by analyzing specific financing in various economic sectors. This would allow the identification of the specific sectors contributing to the economic growth. Future research should consider combining countries that have implemented a pure Islamic and dual banking system to collect adequate data. There is also a need to use different and advanced methods such as ARCH-GARCH, ARIMA and GMM framework to determine the robustness and consistency of the results. This could, perhaps, provide a clearer perspective for the policy recommendations. This may involve examining several countries developing the Islamic banking and finance industry for comparison and more enriching policy recommendations. Future research should shed more light on this topic, especially to the causes of heterogeneity amongst countries based on size, structure and depth of different financial systems with Islamic banks around the world.

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