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Contribution of Islamic Banking Towards Economic Growth in Indonesia With Data Panel Regression Approach

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Abstract

This study uses a panel data regression approach to analyze the contribution of Islamic banking to economic growth. The variables in this study consist of one dependent variable and three independent variables. The dependent variable is Economic Growth Income. while the independent variable consists of 3 variables, namely: Total assets, third party funds and Islamic financing. The population and samples used in this study were all provinces in Indonesia in 2014-2020. In this study, the panel data regression models used are the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Selection of panel data regression estimation models using tests, namely the Chow Test and the Hausman Test. Based on the statistical methods used, the best model is obtained with the random effect model. The Fixed effect model above has an R-squared of 0.4742 or in other words the predictor variable is able to explain 47.42% of the response variable.

Introduction

The economy is one of the interesting topics to discuss from various sides, where one of the roles of the economy can create public welfare, therefore every country must try to increase its economic growth in achieving these goals. The performance of a country's economy is influenced by various factors, both micro and macro. Gross Domestic Product abbreviated as (GDP) is one indicator to see the success of a country's economy. In increasing GDP, many policy instruments have been used, one of which is through financial institutions. Where financial institutions consist of the monetary sector to become the locomotive of the real sector through capital accumulation and technological innovation. As has been done by banking institutions, which by collecting funds from the public then channeled back through credit or by way of financing to the real business sector in order to increase the ability and development of the business.

Banking in Indonesia implements a dual system, namely, the Islamic banking system and the conventional banking system. The development of Islamic banking in Indonesia can be seen from the financial aspect and service coverage.

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The financial aspect is measured by total productive assets in 2016 reaching 324,034 billion rupiah, then to 382,697 and in 2018 to 438, 336. As well as in 2019 to 484,059, and in 2020 to 550,949 billion rupiah. Meanwhile, the ratio of unproductive assets has decreased, where in 2016 it was 3.25%, in 2017 it was 2.91 and in 2020 it was 2.22% (OJK, 2020).

Based on data regarding Indonesia's GDP from 2014 to 2019, it has increased. Starting from 33,999 in 2014, then in 2015 it increased to 35,162. and in 2016 it increased to 36,469, in 2017 to 37,851, and in 2018 to 39,339, and the peak in 2019 was 40,844 thousand rupiah (BPS, 2021). The development of Islamic banking financial institutions has an impact on economic growth which has increased in this case in terms of Gross Domestic Product (GDP). Thus, the increase in the number of Islamic banks in terms of assets and the number of office networks is in line with the GDP which continues to increase every year. So it is necessary to conduct research whether Islamic banking plays a role in increasing economic growth in Indonesia.

Research on the relationship between financial intermediation and economic growth was pioneered by Mckinnon and Shaw in 1973. The study found that the increase in economic growth is strongly influenced by the organized financial structure. In 2012 Abduh and Chowdhury analyzed the relationship between Bangladesh's economic growth and Islamic banking. The results showed that there is a positive and significant relationship between economic growth and Islamic banking in Bangladesh in the short and long term. Hayati (2014) Analysed the role of Islamic banking in economic growth using the regression method with the Ordinary Least Square approach. The results showed that the role of Islamic banking on economic growth in Indonesia is still very small.

Kassim (2015) in his journal "Islamic finance and economic growth: the Malaysian experience". Stating that Islamic finance has an important role in the economic sector which effectively collects and distributes funds on investment. In addition, the contribution of Islamic banking to the real sector is carried out by collecting and distributing investment funds efficiently. Thierry et al. (2016) in his research "Causality Relationship between Bank Credit, and Economic Growth Evidence from a Time Series Analysis on a Vector Error Correction Model in Cameroon" shows that there is a one-way causal relationship between GDP and bank credit variables. In 2017 El Ayyubi, et al stated that Islamic banking financing has the greatest contribution to economic growth but there are other variables, namely third-party funds, which have no significant effect.

Huma Nawaz et al. (2019) in their research ‘Beyond finance: Impact of Islamic finance on economic growth in Pakistan’ shows that a well-functioning Islamic financial system promotes economic growth. He also found evidence of a two-way relationship between Islamic asset finance and population. This implies that population strengthens Islamic finance, and population attracts Islamic finance. Then Mifrahi and Tohirin, (2020) in their journal "how does Islamic banking support economic growth" suggest that Islamic banking financing cannot directly affect economic growth. However, indirectly through investment and consumption variables, Islamic banking can affect economic growth.

This research method that will be used is the regression analysis method The most common regression model in statistics is usually a single equation model the use of panel data regression so that the model can accommodate how the development of Islamic banking with economic growth in each province in Indonesia. Thus this study will examine how the contribution of Islamic banking to economic growth in 2016-2020 in Indonesia with a panel data regression approach.

Literature Review

Islamic Banking

Islamic banking is a financial institution that operates according to the principles of Islamic law in providing financing and other services whose management procedures refer to the provisions in the Al-Quran and hadith. Banking performance is a description of the achievements of the bank in its operations, concerning aspects of marketing, finance, technology and human resources, collecting and distributing funds. The financial performance of a bank is a description of its financial condition in a certain period concerning aspects of raising funds and channeling funds as measured using indicators of profitability, capital adequacy, and liquidity (Jumingan, 2006)

Islamic banking in carrying out its duties must be in accordance with sharia principles. The sharia principles referred to are the rules of agreement between banks and other parties based on Islamic law for depositing funds and financing business activities, as well as other activities whose contracts are in accordance with sharia, including mudharabah financing in accordance with the principle of profit sharing, musyarakah financing in accordance with the principle of equity participation, the principle of murabahah (sale and purchase) of goods for profit or ijarah financing in accordance with the principle of pure goods lease without options, as well as the principle of ijarah wa itiqan with the option of transferring ownership of the leased goods from the bank to other parties (UU RI No. 21 2008).

Economic Growth

The economic growth of a country can be seen from the supply of goods experiencing a continuous increase, there are technological advances in the provision of various types of goods in meeting needs, the use of technology is carried out widely and efficiently for adjustments in the institutional and ideological fields so that the resulting innovations can be utilized appropriately (M.L. Jhingan, 2016).

The economic growth of a country or region is influenced by several factors. Classical economists categorize them into seven factors as follows: availability of capital goods, quality of labor, technological development, financial capability, managerial capability, entrepreneurship, and mastery of information (Prathama Rahardja and Mandala Manurung, 2015).

The banking sector on economic development there are four commonly used paths, namely the substitution effect occurs due to the law of deminishing marginal utility, interest rate effect, wealth effect and public expectation effect (Aulia Pohan, 2008). Joseph A. Schumpeter (1912) said that the importance of the banking system and the growth of the level of national income to economic development. This is done by identifying productive investment sectors and financing these sectors. According to Ali rama (2011) there are four possible approaches that can be used in explaining the causal relationship between finance and growth, as follows:

1. The finance-led growth hypothesis or supply-leading view. In general, this theory assumes that the financial sector will drive economic growth.
2. The growth-led finance hypothesis or the demand-following view. This view considers that the development of the financial sector will follow economic growth as well as entrepreneurial activity (enterprise) to encourage growth in the financial sector.
3. The bidirectional causality view. This view states that a country with a well-developed financial sector will encourage a high level of economic expansion through technological advancement and product and service innovation. This will then create a high level of demand for banking products and services.

4. The independent hypothesis. This view states that there is no relationship between the financial sector and economic growth.

Based on this description, it can be concluded that these factors support economic growth and development in Indonesia, the point is that the role of finance is very decisive and this is what needs to be done and become a banking contribution to economic growth in Indonesia.

Panel Data Regression

Time series data is data whose objects cover several time periods (annual, quarterly, monthly, and daily). Cross section data is data that consists of several or many objects in a certain period of time. Combining time series data with cross section data is called panel data. Panel data is data obtained from cross section data and observed repeatedly on the same object and different times (Gujarati, 2009).

In general, panel data regression model according to Gujarati and Porter (2009)

$$Y_{it} = \beta_{it} + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_j X_{jit} + \varepsilon_{it}$$

There are three estimation methods used in panel data regression, namely common, fixed, and random effect models Common Effect Model.

1. The Common Effect Model (CEM)

   Common Effect Model (CEM) approach is the simplest technique for estimating panel data by simply combining time series data with cross section data. The following is the CEM equation (Gujarati & Porter, 2012: 239).

$$Y_{it} = \alpha + X_1\beta_1 + X_2\beta_2 + \cdots + X_k\beta_k + \mu_{it}$$

   This model assumes that it only consists of a constant or it can be interpreted that there are no specific individual effects. According to Srihardianti, et al (2016) to estimate the parameters of the CEM model, there are several estimation methods that can be used, namely if the data is homoscedasticity and there is no cross-sectional correlation then the estimation that can be used is Ordinary Least Square (OLS), if it is heteroscedasticity and there is no cross-sectional correlation then the estimation that can be used is Weighted Least Square (WLS), if the data is heteroscedasticity and there is cross-sectional correlation then the estimation that can be used is Seemingly Uncorrelated Regression (SUR), and if it is heteroscedastic and there is a correlation between time in the residuals then the estimation that can be used is Feasible Generalized Least Square (FGLS) with autoregressive (AR).

2. The Fixed Effect Model (FEM)

   Fixed Effect Model approach is one approach to estimating parameters in panel data regression by assuming that the slope coefficient is constant but the intercept value is not constant. Differences in intercept values can be located between time or between individuals. The FEM model between individuals can be expressed in the following equation (Greene, 2002: 287).

$$Y_i = \alpha_0 + D_i\alpha_i + X_i\beta + \mu_i$$

   According to Srihardianti, et al (2016) in estimating the parameters of the fixed effect model can use several estimation methods in accordance with the assumptions of the variance-covariance matrix structure of the residuals. The parameter estimation method is the same as the estimation method used in the CEM model, but the FEM

model does not use Feasible Generelized Least Square (FGLS) with an autoregressive (AR).

3. The Random Effect Model (REM)

   Random Effect Model approach is one approach to estimating parameters in panel regression with the assumption that the intercept value for each individual is a random variable / REM uses residuals that are considered to have a relationship between cross section and time series data.

$$Y_{it} = \alpha i + X_{it}^{'}\beta + \mu_{it}$$

Hypotheses

The role and contribution of Islamic banking takes a very strategic step towards the economic growth of the Indonesian people by increasing its three capacities, namely in terms of financing, assets and deposits. Based on this brief review, the paradigm chart in this study can be described as shown below:

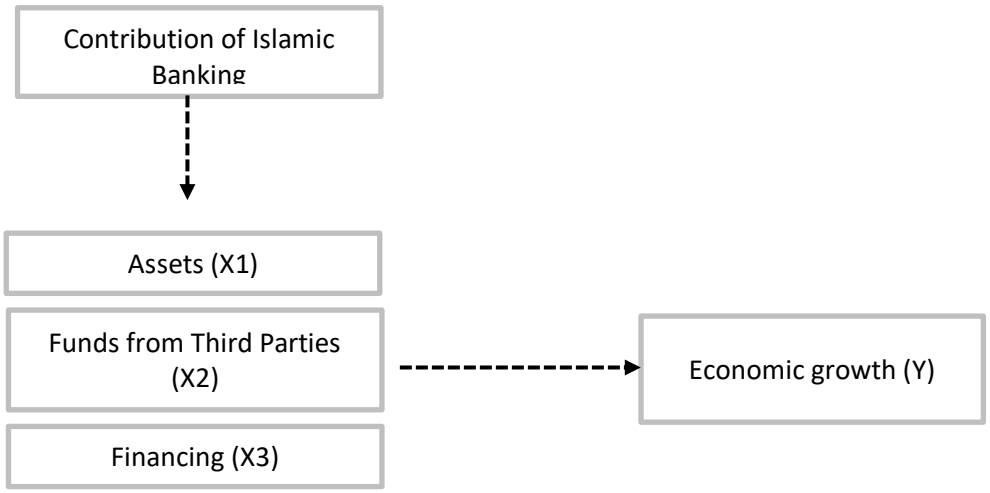

Figure 1. The research model developed

Based on the theory of previous research and conceptual framework, the hypotheses of this study are:

H1: Total assets of Islamic banking have a significant effect on economic growth

H2: Third party funds collected by Islamic banks have a significant effect on economic growth.

H3: Financing provided by Islamic banks has a significant effect on economic growth.

Research Methods

This research uses secondary data with the panel data method, which combines cross section and time series data. For time series data using annual data starting from 2016 to 2020. While cross section data uses data from 33 provinces in Indonesia. The data collection in this study comes from the Indonesian Central Bureau of Statistics, Bank Indonesia, and the Financial Services Authority. Panel data regression is designed to capture the influence of unobserved data. Panel data analysis will pay attention to different intercept models to capture the diversity of dependent data or response variables.

Table 1. Summary of Operational Variables

Type of Variable	Name	Variable Definition	Hypothesis (Expected Sign)	Source of Data
Dependent	Economic growth	measured by real gross regional domestic product at constant prices.		Annual Reports from the BPS

Independent	Assets (X1)	Assets This variable is measured by summing up cash, placements with BI, placements with other banks, financing provided, investments, allowance for possible losses on productive assets, fixed assets and inventory.	Asset has significant influence of economic growth	Annual Reports from the OJK
Independent	Funds from Third Parties (X2)	Third Party Funds are variables measured by summing up savings, current accounts, and deposits that customers invest in Islamic banking	Funds from Third Parties has significant influence of economic growth	Annual Reports from the OJK
Independent	Funds from Third Parties has significant influence of economic growth (X3)	Financing is a variable that is measured by calculating the total financing provided by Islamic banks to customers whose data is obtained from the financial statements of the Islamic banks concerned.	Funds from Third Parties has significant influence of economic growth has significant influence of economic growth	Annual Reports from the OJK

The stages of analysis that will be used in achieving the research objectives are as follows:

1. Collecting research data
2. Describe the characteristics of economic growth
3. Establishing CEM, FEM and REM Models
4. Conducting Chow Test to choose CEM or FEM
5. Conducting Hausman Test to choose REM or FEM.
7. Perform Modeling with the selected approach
8. Testing residual assumptions
9. Interpreting the panel data regression model
10. Conclusion

Results and Discussion

Identifikasi model regresi data panel yang terbaik dan mengetahui faktor yang mempengaruhi Pertumbuhan ekonomi menggunakan analisis regresi data panel. Pada penelitian ini model regresi data panel yang digunakan, yaitu Common Effect Model (CEM), Fixed Effect Model (FEM), dan Random Effect Model (REM).

Common Effect Model (CEM)

The common effect model only combines a combination of time and cross section data without looking at the differences between time and individuals, so it can be done with OLS. The common effect model of economic growth is as follows.

Table 2. Common Effect Model

Variable	Coefficient	t-Statistics	P-value
Intecept	121390	6.4416	0,0000
X_1	-0.0072	-0.0723	0.9424
X_2	77.81	8.1992	0.0000
X_3	-45.797	-6.3101	0.0000

Source: (Data processing)

$$Y_{it} = 121390X_1 - 0,0072X_2 + 45,797X_3$$

The common effect model above has an R-squared of 0.66466 or in other words, the predictor variables in this study were able to explain 66.47% of the response variable.

Based on Table 2. It can be seen that the X2 variable has a p-value of 0.000 when compared with the significance value, the p-value (0.000) < p-value (0.05) so it can be said that the Islamic bank financing variable has a significant effect on the model as well as X3 has a p-value of 0.000 when compared with the significance value, the p-value (0.000) < p-value (0. 05) so it can be said that third party funds have a significant effect on the model while the Islamic bank asset variable (X1) has a p-value of 0.9424 when compared with the significance value, the p-value (0.942) > p-value (0.05) so it can be said that the Islamic banking asset variable has no significant effect on the model.

Based on the cem model, it can be seen that one of the predictor variables has a positive sign, this indicates that the Islamic banking financing variable has a positive effect on economic growth, so that if Islamic banking financing increases by 1%, economic growth will increase by 77.8% assuming other variables are constant, while the total assets and third party funds variables have a negative sign so that if total assets increase by 1%, it will reduce economic growth by 0.007%. with the assumption that other variables are constant. and if third party funds increase by 1%, it will reduce economic growth by 45.8%. with the assumption that other variables are constant.

Fixed Effect Model (FEM)

The fixed effect model assumes that the intercept of each province is different with the slope remaining the same between provinces. To explain this, the following is the Fixed effect model of economic growth.

Table 3. Fixed Effect Model

Variable	Coefficient	t-Statistics	P-value
X1	-0,0423	-2.,3452	0.020
X2	-23,0696	-11,1552	0.000
X3	22,3137	12,7976	0.000

Source: (Data processing)

$$Y_{it} = -0,0423X_1 - 23,0696X_2 + 22,314X_3$$

The Fixed Effect Model above has an R-squared of $0,4742$ or in other words, the predictor variables in this study were able to explain $47,42\%$ of the response variable. Based on Table 3, together the predictor variables affect economic growth, this is indicated by a p-value of 0.000 or less than 0.05, in other words, simultaneously the predictor variables have a significant effect on the model.

Based on the FEM model, it can be seen that one of the predictor variables has a positive sign, this indicates that the variable, namely the third party funds variable of Islamic banks so that if the third party funds of Islamic banks increase by 1%, economic growth will increase by 22.31% assuming other variables are constant. Meanwhile, the variables of total Islamic banking assets and Islamic bank financing have a negative sign so that if the total assets of Islamic banking increase by 1%, it will reduce economic growth by 0.04%. as well as Islamic bank financing. if financing increases by 1%, it will reduce economic growth by 23.07%. with the assumption that other variables are constant.

Random Effect Model (REM)

The random effect model estimates panel data where the disturbance variables may be interconnected over time and between individuals. The following is the model formed with the random effect approach.

Table 4. Random Effect Model

Variable	Coefficient	t-Statistics	P-value
Intecept	263570	7.5175	0.0000
X1	-0,0459	-2.0582	0.0396
X2	-22,422	-8.8048	0.0000
X3	23,214	10.9778	0.0000

Source: (Data processing)

$$Y_{it} = 0,0423X_1 - 23,0696X_2 + 22,314X_3$$

The Random Effect Model above has an R-squared of 0.4100 or in other words, the predictor variables in this study were able to explain $41,00\%$ of the response variable.

Based on Table 4, it can be seen that variable X1 has a p-value of 0.039 when compared with the significance value, the p-value (0.0481) < p-value (0.05) so it can be said that the Islamic bank financing variable has a significant effect on the model while the variable Total Islamic banking assets (X1) and third party funds (X2) have no significant effect on the model. From the model above, it can be seen that the predictor variable X3 (financing) has a positive sign, this indicates that the third party fund variable has a positive effect on economic growth so that if Islamic banking deposits increase by 1% then economic growth will increase by 23.21% assuming other variables are constant, and if Islamic bank financing increases by 1% then economic growth will increase by 70.73% assuming other variables are constant. Meanwhile, the total asset variable has a negative sign so that if the total asset increases by 1% it will reduce economic growth by 0.05%, assuming other variables are constant. Likewise, the Islamic banking financing variable has a negative sign so that if Islamic bank financing increases by 1%, it will reduce economic growth by 22.42%, assuming other variables are constant.

Pemilihan Model Regresi Data Panel

The determine the best model to use in panel data regression, there are several estimation models that can be used. Selection of panel data regression estimation models using three tests, namely the Chow Test and Hausman Test.

1. Chow-Test

   The Chow test aims to choose the best model between CEM and FEM. The value of $F_{(32,195;0.05)}$= 1.68. The decision taken is that H_0 is rejected because the value of Fcount> $F_{(32.195;0.05)}$. Likewise, if you look at the P-value of 0.000 or (2.2×10^{-16}) < α (0.05) it shows that the FEM model is better than the CEM model for modeling economic growth.

2. Hausman-Test

   The Hausman test is a test that aims to determine the best estimation model between REM and FEM with the following hypothesis (Asteriou & Hall, 2007). The value of $\chi^2(3,0.05)$ = 7.815. The decision taken is to fail to reject H0 because the value of $\chi^2(hitung) > \chi^2(3,0.05)$. Likewise, the P-value is 0.00001 < α (0.05). This indicates that the FEM model is better than the REM model for modeling economic growth.

Residual Assumption Testing

Assumption tests are carried out on the best model, namely the random effect model.

1. Normality Test

Normality assumption testing is carried out to determine whether the residuals of the panel data regression model are normally distributed. The JB = 295.52 value is compared to the chi-square table with df 3 of 7.185 so it can be concluded that reject H_0 or the residuals are not normally distributed. According to Gozali 2014, the normal assumption test can be ignored if the sample size we use is large. Classical assumption testing should be more emphasised on heteroscedasticity and autocorrelation which can lead to invalid statistical conclusions.

2. Multicollinearity

Multicollinearity test can be seen from the correlation between independent variables. An indication of multicollinearity between independent variables if there is a correlation above 0.80

Table 5. Multicollinearity

	X1	X2	X3
X1	1	0.9848	0.9918
X2	0.9848	1	0.9961
X3	0.9918	0.9961	1

Source: (Data processing)

The correlation value between the two variables is seen above 0.8 so that there is an indication of multicollinearity between independent variables, but it is seen that the correlation value reaches 0.9

3. Heteroscedasticity

Heteroscedasticity usually occurs in cross section data. Since panel data regression has these characteristics, there is a possibility of heteroscedasticity. Of the three panel data regression models, only CE and FE allow heteroscedasticity to occur, while RE does not occur. This is because CE and FE estimation still use the Ordinary Least Square (OLS) approach while RE has used Generalize Least Square (GLS) which is one of the regression handling techniques. By using the Breusch_Pagan Test, the BP value is 71.652 with a p-value of 0.000. Based on the test above, it can be seen that the p-value <0.05 so that it rejects H0, or in other words, there is a case of heteroscedasticity in the residual model of the fixed effect model

4. Autocorrelation

Autocorrelation test is used to see the relationship between time before and time after in time series data. The autocorrelation test is done with the Breusch-Godfrey/Wooldridge test. Based on the processing results with the help of R software, chisq = 64.311, and p-value= 0.0000. Based on the above test, it can be seen that the p-value < 0.05, thus rejecting H_0, or in other words, there is a case of autocorrelation in the residual model of the fixed effect model.

Discussion

Based on the results of the panel data regression model analysis, obtained using the Chow test and Hausman test, the best model is the Fixed Effect Model presented in the equation:

$$Y_{it} = -0,0423X_1 - 23,0696X_2 + 22,314X_3$$

The Fixed Effect Model above has an R-squared of 0,4742 or in other words, the predictor variables in this study were able to explain 47,42% of the response variable.

Based on the FEM model, it can be seen that one of the predictor variables has a positive sign, this indicates that the variable, namely the third party funds variable of Islamic banks so that if the third party funds of Islamic banks increase by 1%, economic growth will increase by 22.31% assuming other variables are constant. Meanwhile, the variables of total Islamic banking assets and Islamic bank financing have a negative sign so that if the total assets of Islamic banking increase by 1%, it will reduce economic growth by 0.04%. as well as Islamic bank financing. if financing increases by 1%, it will reduce economic growth by 23.07%. with the assumption that other variables are constant.

Based on the Fixed Effect Model, it is found that the variables of deposits, deposits, and total assets of Islamic banking have a significant effect on economic growth. This is in accordance with research conducted by Abduh and Omar (2012) that there is a positive and significant relationship between economic growth and Islamic banking in Bangladesh in the short and long term. Then in accordance with research conducted by Hayati (2014) where the role of Islamic banking on economic growth in Indonesia is still very small.

Based on research conducted by Kasim (2015) Islamic finance has an important role in the economic sector which effectively collects and distributes funds on investment. In addition, the contribution of Islamic banking to the real sector is carried out by collecting and distributing investment funds efficiently. Likewise, Research by El Ayyubi et al (20217) where there is a significant effect of Islamic banking on economic growth. And Islamic banking financing contributes the most in influencing economic growth but third party funds have no significant effect.

Conclusion

Based on the results of the panel data regression model analysis, using the Chow test and Hausman test, the best model selected is the Fixed Effect Model (FEM). The FEM results indicate that the predictor variables in this study explain 47.42% of the response variable, suggesting a fairly strong relationship between the studied variables and economic growth. One key finding is that third-party funds from Islamic banks have a positive impact on economic growth, where a 1% increase in third-party funds could increase economic growth by 22.31%. Conversely, a 1% increase in total assets and Islamic bank financing reduces economic growth by 0.04% and 23.07%, respectively.

These findings align with previous studies, such as those by Abduh and Omar (2012) and Hayati (2014), which show that the relationship between Islamic banking and economic growth is significant, although the role of Islamic banking in Indonesia remains relatively small. The study also supports the findings of Kasim (2015) and El Ayyubi et al. (2017), emphasizing the importance of Islamic finance in the economic sector, particularly in effectively collecting and distributing funds. However, there is a divergence from El Ayyubi et al.'s research, where Islamic bank financing is found to contribute the most to economic growth, while third-party funds have no significant effect. These findings underscore the complexity and dynamics of the role of Islamic banking in the economy, warranting further analysis to understand the various factors influencing this relationship.

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