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The Impact of Bank Development on Indonesian Districts' Economic Growth and Poverty Alleviation

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Abstract

This study investigates the conventional and Indonesian Islamic banks' intermediary role in enhancing economic growth and reducing poverty in 33 Indonesian districts during 2012–2020. Data panels were examined by fixed-effect analysis and cross-sectional effect. This study found that, compared to Islamic bank offices, the number of conventional bank offices has a greater effect on Indonesian GDP, while Islamic banks have an essential role in reducing poverty. Conventional bank financing positively affects economic growth and poverty alleviation. Islamic bank deposits have a strong correlation to Indonesian districts' economic growth and poverty. Meanwhile, conventional bank deposits have a greater effect on reducing poverty than GDP. Therefore, conventional and Islamic banks have a crucial role in enhancing economic growth and solving income inequality in the domestic context. This study contributes to economic literature with a practical and local government decision-making process through developing and testing a model

of economic growth and poverty determinants and offers new insights into the determinants of bank principles in a financial system.

Keywords: Indonesian bank offices, deposits, financing, economic growth, poverty reduction.

1. Introduction

The development of the global financial system directly impacts the real economy and society's well-being. It has become a critical issue with comprehensive exploration into the correlation between financial development, economic growth, and poverty reduction. The initial bank intermediary role is crucial in mobile capital to the private and productive sectors, which directly reduces the region's poverty level. In addition, with income below US$1.9 daily, 9.2% of people worldwide were living under the insufficiency line in 2017, which is equal to 689 million people. This number will surge if that line rises to $3.20 and $5.50 a day, with 24.1% and 43.6% of the population worldwide at risk of poverty, hunger, and inequality. During the COVID-19 pandemic, these numbers grew by an additional 88 to 115 million in developing countries (United Nations, 2022; World Bank, 2020). One solution to reduce these risks is to mobilize and transfer money from lenders to borrowers (Abdelkafi et al., 2023; Rahman, 2020). The banking and financial areas have a critical role in facilitating economic growth by transferring savings, promoting financing, investing in individuals and firms to enhance their production process, and stimulating the efficient distribution of resources (Herdiyani & Ismail, 2022). The intermediary financial role is to collect funds from the surplus unit and channel them to the deficit unit, facilitating a reduction in disparity between the rich and poor (Kaidi & Mensi, 2020). Furthermore, for developing countries with poverty and a high concentration of wealth, the transfer of capital and financial resources can be done without reducing the people's prosperity. In addition, the banking sector's role in economic growth and poverty alleviation is inevitable. Hence, financial institutions and governments need to collaborate to solve the economic and social problems, especially since the COVID-19 pandemic, which

caused economic downturns and rapid growth of poverty in most countries. According to the United Nations (2022), the financial sector has a crucial role in economic growth and poverty reduction toward facilitating productive financing and investment. It directly affects low-income people by making economic growth faster and providing a job market.

The studies on verification bank and business development roles (e.g., deposits, lending, and offices) in facilitating financing, which subsequently enhances gross domestic product (GDP) in the short- and long-run, found mixed results. Bank financing positively affected GDP in the short-run rather than the long-run in Cyprus (Cavosoglu et al., 2019). Meanwhile, it had less effect on the short-run in Palestine during 1996–2015 (Awad & Al-Karaki, 2019). Some studies also confirmed financial development has a positive effect on economic growth (Herdiyani & Ismail, 2023; Anwar et al., 2020) and directly reduces the poverty level among societies in 71 developing countries (Donou-Adonsou & Sylwester, 2016), as well as in districts in Italy (Coccorese & Shaffer, 2021) and some regions of Nigeria, Russia, and Bangladesh (Alaro & Alalubosa, 2019; Belitski et al., 2021; Iqbal et al., 2020). There are varied results due to different countries' economic and social conditions, banking systems, financial markets, institutional quality, assumptions, the methodology used, and the period analyzed. Hence, the method and object studies need to change and enhance the research landscape, such as how financial development improves GDP and reduces poverty.

Preliminary studies had some weaknesses, such as applying total financing and assets as a proxy as representative of the sample size. They also applied a direct method to validate the relationship between financial development, economic growth, and poverty rate without involving comprehensive capture of financial

development in economic growth and poverty reduction in the poverty-level districts of the countries. It possibly influences the strength of the results. The studies in Table 1 highlight the practical and theoretical relevance of these relationships to the current study.

Table 1: Prior studies detail

No.	Author(s)	Variables and Data	Method	Results
1.	Awad & Karaki (2019)	X = Bank lending Y = Economic growth Palestine (1996–2015)	VAR and VECM procedures	GDP has a positive effect on bank lending; bank lending has no positive effect on GDP
2.	Boukhatem & Ben Moussa (2018)	X = GDP Y = inflation rate, trade openness, financial openness 13 MENA countries (2000–2014)	Fully-modified OLS (FMOLS)	Financial system development has a positive effect on economic growth
3.	Cavusoglu, Ibrahim & Ozdeser (2019)	X = GDP Y = Financial sector output and employment North Cyprus (1977–2013)	Vector Error Correction Model (VECM)	Financial development has a sensitive role in economic growth
4.	Coccorese & Shaffer (2021)	Italy (2001–2008)	Ordinary least squares (OLS) with split and spatial model	Banks have a positive effect on GDP
5.	Donou-Adonsou & Sylwester (2016)	Y = GDP X = bank lending 71 developing countries (2002–2011)	Fixed effects two stage least squares	Banks have the possibility to reduce poverty through the transfer of resources from lenders to borrowers
6.	Guru & Yadav (2019)	Y = GDP X = Deposits and financing Brazil, Russia, India, China, and South Africa (BRICS) (1993–2014)	Generalized method of moment system estimation (SYS-GMM)	Financial intermediaries, credit to deposit ratio (CDR), and credit to private sector (CPS) have a positive effect on GDP

7.	Haini (2020)	X = GDP Y = Financial institution and financial market ASEAN countries (1995–2017)	General Method Moment (GMM)	Financial institutions have a greater effect on GDP than on the financial market
8.	Ho & Iyke (2018)	X = GDP Y = Domestic credit and Money/Quasi Money China (1985–2014)	Modified autoregressive distributed lad (ARDL) and unrestricted vector error correction model (VECM)	Financial development as a trigger of GDP and poverty reduction
9.	Iqbal & Alam (2019)	X = Poverty Y = Deposit and lending 544 Bangladeshi sub-districts (2010–2015)	Ordinary least squares and fixed effects models	Deposits have a greater effect than financing in reducing poverty
10.	Jeanneney & Kpodar (2011)	Y = GDP and poverty X = Credits and savings Developing countries (1966–2000)	General Method Moment (GMM)	Financial development has a crucial effect on economic growth and poverty reduction
11.	Kassim (2016)	Y = GDP X = Islamic finance Malaysia (1998–2013)	Autoregressive distributed lag (ARDL)	Islamic finances effectively channel funds into GDP
12.	Zarrouk et al. (2017)	Y = GDP X = Islamic financial development United Arab Emirates (UAE) (1990–2012)	The bivariate vector autoregressive model	Islamic financial development has a positive effect on GDP

Although the correlation between economic growth and poverty is an essential issue worldwide, few studies address this field in developing countries. Indonesia has faced a low GDP, with around 10% of 270 million people in a low-level income bracket. Hence, to connect the study of poverty and GDP nexus and financial development affecting this context in all Indonesian districts during 2012–

2020, the practical and theoretical relevance of these relationships to this study must be highlighted. Awad and Al-Karaki (2019), Cavosoglu et al. (2019), and Donou-Adonsou and Sylwester (2017) recommend future research to investigate the effect of financial development and the intermediary bank role on economic growth and reduce poverty at the district level to find a comprehensive conclusion. The aims of recent studies were to address these gaps and contribute to the debate on these relations from the banks' perspective, leading to the following questions:

RQ1. Do bank deposits, financing, and offices correlate with economic growth?

RQ2. Could bank deposits, financing, and offices reduce poverty?

Recent studies can help academicians, practitioners, and policymakers understand the actual financial development effects on GDP and poverty level by assisting in several theoretical and practical contributions more comprehensively. First, this research validates the relationship between banks' intermediary roles, GDP, and poverty reduction. Second, the literature and studies on financial development's contribution to economic and social fields are still limited. This result uncovers the banks' crucial role in economic growth and poverty in developing countries, specifically in provincial areas. It reveals to stakeholders the importance of the banking role with a detailed view of bank deposits, financing, and offices and their impact on local government and people's income, which has been neglected in earlier studies. Third, the study context of the banks has significant practical implications for enhancing the amount and quality of products and services; it makes the investors and banks willing to offer financing and investment while more concentrated on working around the productive sectors. Finally, the study provides more insights into the current state of banking practices.

2. Literature Review

Economic growth is an essential macro-economic due to the continuous increase of capital, financing, investment, and production, which possibly enhance the income of the government and people, which GDP measures (Coccorese & Shaffer, 2021; Anwar et al., 2020). Development economics has heavily validated the connection between the financial system's operation and economic growth toward mobilizing resources (e.g., capital) to productive sectors. Some studies found a strong relationship between financial development and economic growth through bank deposits, financing, and the number of offices.

Some of the theories described the process of economic development, namely, classical growth theory, neoclassical growth theory, and new growth theory. However, few studies offer a comprehensive and definite response to the fundamental questions: 1) What causes economic growth? and 2) Do banking intermediary roles correlate to economic growth and poverty reduction? Economic research has a way to go before providing definite answers to these questions. Despite the role of the bank in economic growth and poverty, it is a debatable issue in the empirical studies and theoretical framework (Beck et al., 2007; Coccorese & Shaffer, 2021; McKinnon & Shaw, 1973; Todaro & Smith, 2015). Moreover, this debatable economic issue is still a research question in some developing countries, particularly the empirical study on validating the intermediary role of banks in economic growth and poverty reduction using financial analysis of panel data.

On the other hand, Cavusoglu et al. (2019) observed that the financial sector output correlated with economic growth in North Cyprus from 1977–2013. Belitski et al. (2021) explored the relationship between business and social well-being across 115 post-Soviet cities. Using panel data over seven years (1995–2002) and from

2003–2008, the authors found that business activities significantly affected poverty reduction. Awad and Al Karaki (2019) applied time-series data from 1996–2015 and revealed that although banking has a crucial intermediary role in transferring capital, the result is insignificant in promoting GDP in Palestine due to the high level of risk. The same pattern was observed in Brazil, Russia, India, and China (BRICS) from 1993–2014, where financial intermediaries, credit to deposit ratio (CDR), and domestic credit to the private sector (CPS) were positively significant in determining economic growth (Guru & Yadav, 2019). However, compared to bigger banks, the cooperative banks, which are associated with small and local operations, had greater effects on economic growth in Italy (Coccorese & Shaffer, 2021). Interestingly, some countries apply a dual-banking system (e.g., conventional and Islamic). Hence, some scholars argue that examining the Islamic bank's role in economic growth is worthwhile.

Kassim (2016) adopted the autoregressive distributed lag (ARDL) method and found that bank financing had a significant contribution to the real economy from 1998–2013 and deposits from 1998–2017 on Malaysia's economic growth. These studies were acknowledged by the Islamic banks' intermediary role in assembling and channeling financing and investment activities as a productive channel to bridge capital from the depositor to the borrower. Anwar et al. (2020) concluded that Islamic bank deposits, financing, and offices led to economic growth from 2009–2019. Other scholars found the same pattern in the Middle East and North Africa (MENA) region (Boukhatem & Ben Moussa, 2018) and Bangladesh (Chowdhury et al., 2018). In Indonesia, the government's priority goal for financial development is to realize economic well-being through poverty reduction, income redistribution, and overall financial stability (Mohamed, 2020).

The definition of poverty comprises three important classifications (Levine, 2008). Firstly, an income of under one United States dollar a day. However, it is becoming increasingly common to draw the line at two dollars per day. This standard measure, used in developing countries, is due to no one having an income of less than two Euros in the EU and dollars in the USA. Second, income distribution has become an alternative to measure comparative poverty; it provides a relevant conception of poverty. Lastly, economic opportunity is the most difficult concept to measure poverty empirically. Nevertheless, it is the key in theory and government policy discussions (Uddin & Shafiq, 2023).

Financial development has two essential roles in enhancing the economy and reducing poverty. One works indirectly toward economic growth; the other works directly through providing capital to the poor to access financial services. It is facilitated by the bank's intermediary role (Beck et al., 2007; Dewi et al., 2023; Kheir, 2018; Levine, 2008; Todaro & Smith, 2015). In theoretical literature, scholars have typically revealed that financial development could help reduce income inequality and poverty by facilitating people's access to financial services (Ruankham & Sethapramote, 2023). It can possibly help to increase their income by mobilizing productive activities and interest earned from savings. Despite this, the evidence identified that the degree of financial intermediation positively enhances income. However, few empirical studies validate the role of finance in shaping economic opportunities for the poor.

Some studies have attempted to examine the correlation between financial development and poverty. Kheir (2018) applied autoregressive distributed lag (ARDL), concluding that financial development and financing have a solid correlation to reducing Egypt's poverty from 1980–2015. In the same pattern, the

Islamic bank had an essential role in lowering Bangladesh's poverty (Alaro & Alalubosa, 2019). However, in 544 sub-districts of Bangladesh, bank deposits significantly correlated to the poverty level rather than the financing channel from 2010–2015 (Iqbal et al., 2020). Contrarily, using the fixed-effects and two-stages, the least squares (2SLS), financial development had no significant effect on poverty alleviation in 71 developing countries from 2002–2011 (Donou-Adonsou & Sylwester, 2016). Recently, Belitski et al. (2021) used 115-panel data in ex-Soviet regions (e.g., Armenia, Azerbaijan, Belarus, Georgia, Moldova, Russia, and Ukraine) from 1995–2002 and 2003–2008. The authors found financial development has a positive effect on reducing poverty and that the local bank location facilitated business growth and reduced poverty.

Indonesia has the largest economy in Southeast Asia, is the world's fourth most populous nation, wields the tenth largest economy in purchasing power parity, and is a member of the G-20. Moreover, Indonesia has two banking institutions (e.g., commercial or rural banks) in the banking context. The system of rural banks is locally operational and does not provide a payment system. There are fundamental differences with a commercial bank. Furthermore, Indonesia has more than 120 commercial banks. It is one of the few countries to have made efforts to reform its financial systems to be integrated into one regulation to manage commercial banks (e.g., conventional and Islamic banks).

In general, the operating system between conventional and Islamic banking is quite different (Junaidi, 2021; Junaidi et al., 2023). Islamic bank operation refers to four primary principles, namely, *Mudharaba* (trust financing between capital owners and business leaders), *Musharaka* (benefits and loss-sharing partnership among capital owners), *Murabaha* (cost-plus financing in the purchase and selling

transaction), and *Ijara* (leasing), where profits and risks are equally shared between community members. Some prohibited activities include *Riba* (interest), gambling, and *Gharar* (speculative trading). It makes the operational system quite different from conventional banks. *Mudarabah* (profit sharing) is a contractual relationship between the bank (*Shahibul Maal*) and borrower (*Mudarib*) toward a profit-sharing arrangement. *Musharaka* (profit and loss sharing) is a joint venture partnership where banks and other partners provide capital and share the profit and loss on an agreed ratio. Most Islamic banks argue *Musharaka* is the closest Islamic finance alternative to interest-based financing. *Murabaha* (sale of goods with markup) is a sales-based contract where the buyer (borrower) provides the necessary information to the bank regarding its purchasing requirements (Amin, 2020). It has a direct positive effect on economic growth. Hence, the banking sector has a crucial role in transferring resources to the productive sector.

In economic development, Indonesia has a 20-year development plan spanning from 2005 to 2025 with different phases and priorities. 2020 to 2024 is the last stage of the long-term strategy, cultivating the country's human capital and competitiveness in the global market. However, the COVID-19 pandemic challenged the achievement of this goal. According to the central bureau of statistics (BPS), Indonesia has been challenged with sluggish economic growth from 2009–2019, slightly over 5% (BPS, 2019). However, in 2021, Indonesian economic growth was projected to rebound to 6.6% after plummeting to 2.2& in 2020 (Bank of Indonesia, 2021). Furthermore, the COVID-19 pandemic made poverty in Indonesia rise from 9.78 to 10.19% in 2020. This number is equal to the increase in the number of low-income people from 26.42 to 27.55 million out of a population of 270.2 million.

3. Data and Methodology

GDP and poverty are fundamentally sluggish in responding to the banking intermediary role, directly correlating with banking activities' current and past value. Therefore, in this study, the measurement of variables during 2012–2020 was used for regression analysis. They were extracted from the conventional and Islamic banks in 33 Indonesian districts (Table 2). The primary data source is the bank scope and districts' economic databases provided by central bureau of statistics (BPS) and the Indonesian financial services authority (OJK). This study applied panel data. Panel data have several advantages: greater degrees of freedom, lower collinearity levels, and improved efficiency of estimates. In addition, panel data help overcome the inherent multicollinearity between the independent variables.

The indicators were run separately for each endogenous variable. Hence, some extra classifications were also considered. We tested whether the Indonesian bank (e.g., conventional and Islamic) deposits, financing, and offices in the districts positively affected GDP and reduced poverty, which was captured by the geographical coverage of bank operation and economy. It is possible to influence specific circumstances in which financial development is more effective in reducing poverty and enhancing the economy. Although this approach consumes data, it aims to assess whether districts with initial high GDP and financing are likely to reduce poverty faster than districts with lower levels of GDP and funding.

Table 2: Indonesia's banks

Banks	Number of banks	Number of offices
Conventional banks:		
Commercial banks	109	1,506
Rural banks	30,733	5,913

Islamic banks:		
Commercial banks	14	2,522
Shariah business unit	20	723
Shariah rural bank	163	627

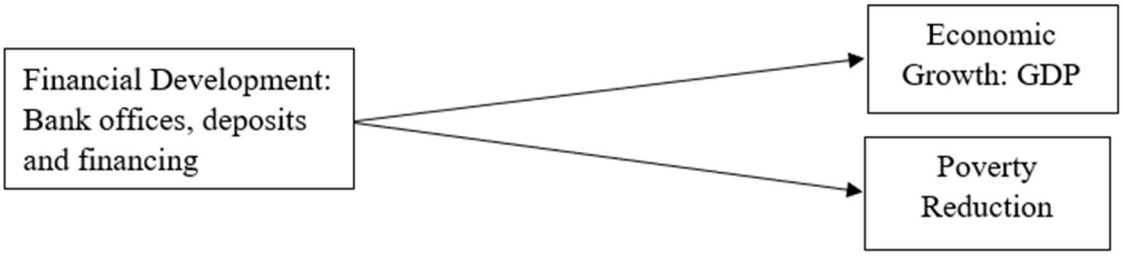
4. Methodology

This study applied panel data and the poverty level measured by the average per capita income. A second available poverty indicator, less than $1 a day, is based on the 2012 purchasing power parity (PPP) exchange rate (World Bank, 2020); it is the most popular measure of poverty. Furthermore, the database also provided information on poverty indicators and the impact of financial development on poverty reduction. It added to the robustness of the variables examined in the analysis. In this study, we also validated the role of financial products to enhance GDP and reduce the poverty rate. Two indicators commonly measure the GDP, namely, the GDP ratio to liquid assets and the GDP ratio to the amount of financing by financial intermediaries (private or state-owned intermediaries) to the private sector. These indicators capture different aspects of financial development. The proxies of the study have a robust statistical model toward applying panel data and can uncover specific current situations and characteristics of banking and economics in developing countries. The research and statistical modeling technique significantly clarified the banking sector's role in economic development and poverty alleviation in Indonesian districts.

Firstly, the ability of financial institution roles to provide capital, financial services, and saving openings is still relevant to validate the financial development effect. The second, excluding credit to the public sector, makes measuring the role

of financial intermediaries more accurate in channeling funds to productive agents and possibly the poor (Beck et al., 2007). A shortcoming of the private credit ratio is that it does not account for government and state-owned enterprises' credit. To address this issue, we use the total domestic credit provided by the banking sector to GDP as an alternative indicator that has a crucial role for the poor. Some state-owned enterprises provide essential public services that are critical for the well-being of the poor. Therefore, excluding bank credit from the public sector may lead to a downward bias in the effect of financial development on the poor. On the other hand, credit to the public sector does not necessarily translate into more pro-poor spending or improved public services. It is helpful to summarize the channels through which, theoretically, financial development is likely to affect the well-being of the poor and derive the equation to be estimated. The number of bank offices, deposits, and financing positively impact economic growth. In addition, financial institutions have the intermediary role to enhance economic growth and reduce poverty. Therefore, following previous studies related to the topic, we have adopted the potential factors as predictor variables to avoid bias. Thus, the general model is estimated within the endogenous growth frame. Figure 1 illustrates those interactions.

Figure 1: Research framework



This method assumes that the previous bank operation may influence the Indonesian districts' current economic growth and poverty rate. Therefore, the model for this study is specified below:

$$LnGDP_{i,t} = \alpha_0 + \alpha_1 * IBO_{i,T} + \alpha_2 * LnDep_{i,T} + \alpha_3 * LnFin_{i,T} + \mu_i + \varepsilon_{it} \quad (1)$$

$$LnPov_{i,t} = \alpha_0 + \alpha_1 * IBO_{i,T} + \alpha_2 * LnDep_{i,T} + \alpha_3 * LnFin_{i,T} + \mu_i + \varepsilon_{it} \quad (2)$$

We use two dependent variables: gross domestic product (GDP) and the number of people classified as being in poverty by the central bureau of statistics (BPS). Where *i* is the Indonesian districts, *t* is the year of poverty and Indonesian districts' GDP (economic growth), and *T* is the period of measure of the other variables (average over five non-overlapping years—the year of the dependent variables (e.g., GDP and poverty) measure and the eight previous years). We use three sets of banking variables: IBO is the number of bank offices, Dep represents the consumer's deposits, and Fin is the number of Indonesian banks financing to third parties, commonly in the investment and consumption sector. μ is an unobserved district-specific effect, and Ɛ is the error term.

5. Results

The bank measures, i.e., offices, deposit, and financing (Table 3), have minimum values of 4.96%, 7.89%, and 8.18% and maximum values of 8.72%, 15.09%, and 14.59%, respectively. Although economic growth is positive, the poverty value ranges from a minimum of 2.11 to a maximum of 7.91. The number of people who live with a low income is still high, with the value from 2.11% to 7.91% of the population, respectively. The high mean value indicates the Indonesian banks' (IB) role in Indonesian districts' economic growth and poverty reduction. It implies a positively skewed and kurtosis distribution of bank financial development, which is investigated in this study (Wooldridge, 2020). It is supported by the results seen in Table 4, which show a positive and significant correlation among the examined variables.

Table 3: Descriptive statistics

Variables	N	Mean	St. Dev	Min	Max	Skewness	Kurtosis
Deposits	297	10.70	1.38	7.89	15.09	0.68	3.78
Financing	297	10.73	1.30	8.18	14.59	0.79	3.90
Offices	297	6.70	0.90	4.96	8.72	0.56	3.07
GDP	297	10.37	0.59	9.21	12.28	1.34	5.25
Poverty	297	4.83	1.30	2.11	7.91	1.33	5.25

Table 4: Correlation matrix

Variables	Branches	Deposits	Financing	GDP	Poverty
Branches					
Deposits	0.951**				
Financing	0.950**	0.974**			
GDP	0.355**	0.495**	0.441**		
Poverty	0.868**	0.797**	0.818**	0.750**	

Note: Significant at *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

First, we ran regressions using ordinary least squares (OLS) estimation of the relationship between banking variables, GDP, and poverty. Second, we ran fixed effect reversals to account for district-specific effects and address the questions of heterogeneity data, measurement errors, and omitted variables. Third, we used the cross-sectional analysis to exploit variations in offices, deposits, and financing to GDP and poverty levels across the Indonesian districts. The choice of district samples is motivated by two considerations to mitigate selection bias: 1) All the banks had at least one office for each district, which gave homogeneity to the observed variables, and 2) Economic growth and income variation were less within the bank deposits, financing, and offices. Thus, the profit motive of offices development is weaker in the district sample. Aggarwal et al. (2011) and Iqbal et al.

(2020) used cross-district and sub-district data to show that remittances promote financial inclusion and reduce poverty; it avoided the sample instrument's bias. Hence, this was the procedure for selecting the empirical panel model. Normally, researchers apply three-panel data analysis approaches: common, fixed effects, and the random-effects model. However, a precondition test is needed before choosing the best model. To conclude, the best empirical model using panel data should be conducted in several testing steps.

Panel data analysis initially examines the process of model selection among the three models of common, fixed effects, and random effects. The random-effects models have additional assumptions. The fixed-effect model assumes that the constant term's differences can capture unobservable factors across units and observation periods. Hence, in fixed effects, the estimated model has different intercepts due to other observations and periods. Also, the random unobserved impact is not correlated with the explanatory variables. This factor affects the intercepts as residual random effects. A random-effects model is widely preferred because it covers the data characteristics based on cross-unit and periodical methods through random effects of its error. In this model, the estimation results do not lose degrees of freedom, as is seen in common and fixed effects. Model selection among these three approaches will be conducted using the F test and Hausman test. The *F* test is used to choose a better model between common and fixed effects based on the Hausman criterion. It is widely accepted that fixed and random results can be used to compare and test this assumption (Pesaran, 2015; Wooldridge, 2020).

This paper estimates three empirical models (Table 5). The estimation results confirm that all independent variables are significant for two empirical models. The models also result in high *F* statistics and coefficient of determination, indicating a

proper estimation method. Based on *F* and chi-square statistics, it can be concluded that the fixed effects model is better than the common model (Pesaran, 2015; Wooldridge, 2020). The next step is to assess whether the panel data model follows a fixed-effects or random-effects model. The result of the Hausman test based on chi-square shows the corresponding effect is statistically significant. The test concludes that the fixed effects model is appropriate for this analysis. Furthermore, the random-effects model often requires extensive data. A limited number of data eliminates a large portion of the total variation. Finally, the effect of bank deposits, financing, and offices on GDP and poverty is based on a fixed-effects model.

Table 5: Estimates results model

Variables	Common Effects Model		Fixed Effects Model		Randon Effects Model	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-5.607	-13.242***	3.484	10.110***	2.472	7.382***
Branches	0.856	6.354***	-0.100	-2.361**	-0.036	-0.853
Financing	0.458	4.327***	0.118	2.272**	0.054	1.084
Deposits	-8.910	-7.292***	0.070	1.008	0.189	2.821**
R2	0.776		0.793		0.197	
Chi Square	0.795		0.891		0.277	
F Statistic	338.10		1204.40		24.023	
Chou Test			329.62***			
Hausman Test					76.06***	

Significant at *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

We control a district's development extent in Eq. (1) and Eq. (2). However, using panel data, we cannot control the omitted variable bias that stems from unobserved characteristics at the district level correlated with a bank office placement, the number of deposits, and financing. There are time-invariant omitted

variables in the error term (μ) that influence both the dependent variables (e.g., GDP and poverty) of our interest (e.g., the banking role). Banking services, GDP, and poverty strongly correlate because of their response to unobserved omitted variables. Fixed effects analysis can mitigate the omitted variable bias.

GDP and poverty are slow-moving variables that take time for alteration; therefore, the effect of financial development and intermediating banking roles is appropriately studied over time. We examined the GDP and poverty change over time concerning economic development and banking roles using fixed-effect models. This analysis also involved two models with two dependent variables (e.g., GDP and poverty) and three independent variables (e.g., the number of Indonesian bank deposits, financing, and offices). The data of variables refers to a population for annual data in each district. The empirical results of fixed effects are presented in Table 6.

It can be seen that compared to conventional bank financing, which has a positive effect on the Indonesian districts' poverty reduction, the number of deposits has a less significant role. Interestingly, the conventional bank offices had a negative effect on Indonesia's GDP, meaning the bank expansion was less effective in enhancing GDP. It is possibly caused by the financing fund being moved to an unproductive sector. Furthermore, Islamic bank deposits strongly correlate with poverty reduction. The same pattern occurred with Islamic banks, where the number of offices was opposite to GDP. In addition, Islamic bank financing has not significantly affected economic growth and poverty reduction. Indonesian banks (e.g., offices and funding) have a crucial role in economic growth and poverty reduction. These findings are consistent with the prior studies on economic growth (e.g., Boukhatem & Ben Moussa, 2018; Coccorese & Shaffer, 2020; Anwar et al.,

2020; Tabash, 2019; Zarrouk et al., 2017) and poverty reduction (e.g., Alaro & Alalubosa, 2019; Iqbal et al., 2020; Jeanneney & Kpodar, 2011; Kheir, 2018). These findings contrasted with the results of Iqbal et al. (2020) and Donou-Adonsou and Sylwester (2016), which concluded that bank development (e.g., financing) was less significant to poverty reduction.

Table 6: Panel regression result

	Conventional Bank		Islamic Bank		Conventional and Islamic Bank	
Variables	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Offices	-4.740	8.995	-0.000	-0.001	-4.635	1.560
	(-2.924)***	(1.079)	(-1.343)	(-7.276)***	(-2.850)***	(1.700)*
lnDeposit	0.067	0.266	0.080	0.203	5.215	0.140
	(0.967)	(7.451)***	(2.521)**	(10.604)***	(-0.479)	(3.329)***
lnFinancing	0.111	0.062	0.017	-0.018	0.160	0.228
	(2.163)**	(2.340)**	(0.491)	(-0.839)	(7.407)***	(18.554)***
R2	0.994	0.992	0.993	0.987	0.993	0.990
F Statistic	1217.94	935.79	1102.77	609.95	1213.21	771.97

Notes: Model 1: Bank offices, deposits, and financing effect to reduce poverty; Model 2: Bank offices, deposits, and financing effect to GDP. Significant at *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$.

As a final point, concerning enhancing people's income and poverty elimination, financial development and fiscal capacity indicators used in this empirical model can explain the determinants of GDP and poverty rate in Indonesian districts. The empirical estimation using the fixed effects model exhibits the various effects of its intercept due to cross-section and period time. Table 7 presents empirical estimates that contain heterogeneity effects due to cross-section units. Based on these estimates, Indonesian bank development (e.g., offices, deposits, and financing) has a more significant impact on poverty reduction than its contribution to economic growth. However, it can be seen in Table 7 that the bank's most crucial

role has concentrated on Java Island rather than in the four significant regions (e.g., Sumatera, Borneo, Sulawesi, and East Indonesia).

Table 7: Cross section effect result

No.	Districts	Conventional Bank		Islamic Bank		Indonesian Bank	
		Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Java Island						
1.	West Java	2.783	-0.949	2.890	-0.180	2.852	0.770
2.	Banten	0.951	-0.402	1.026	-0.223	0.989	-0.231
3.	Jakarta	0.626	0.183	0.847	1.139	0.843	0.313
4.	Yogyakarta	0.883	-0.345	0.826	-0.461	0.900	-0.242
5.	Central Java	2.479	-0.862	2.544	-0.377	2.521	-0.720
6.	East Java	2.272	-0.692	2.376	-0.011	2.349	-0.485
	Sumatera Island						
7.	Bengkulu	-0.087	0.011	-0.182	-0.327	-0.141	-0.174
8.	Jambi	-0.053	0.290	-0.076	0.172	-0.077	0.241
9.	NAD	0.301	-0.220	0.152	-0.486	0.265	-0.262
10.	North Sumatera	1.471	-0.490	1.570	-0.188	1.508	-0.336
11.	West Sumatera	0.036	-0.100	-0.019	-0.258	0.012	-0.143
12.	Riau	0.207	-0.647	0.210	0.620	0.220	0.733
13.	South Sumatera	1.003	0.133	1.012	-0.140	1.006	-0.078
14.	Bangka Belitung	-1.548	0.420	-1.681	0.098	-1.556	0.410
15.	Riau Island	-0.287	0.850	-0.288	0.837	-0.275	0.945
16.	Lampung	0.536	-0.217	0.553	-0.282	0.517	-0.251
	Borneo Island						
17.	South Kalimantan	-0.672	-0.117	-0.723	-0.272	-0.681	-0.100
18.	West Kalimantan	-0.479	-0.313	-0.472	-0.335	-0.482	-0.278
19.	East Kalimantan	-0.249	1.571	-0.220	1.654	-0.222	1.708
20.	Central Kalimantan	0.956	0.259	-0.973	0.115	-0.980	0.197
	Sulawesi Island						
21.	Central Sulawesi	-0.425	0.215	-0.460	0.007	-0.467	0.086

22.	South Sulawesi	0.100	-0.257	1.160	-0.154	0.097	-0.225
23.	North Sulawesi	-0.644	0.135	-0.538	0.231	-0.674	0.050
24.	Gorontalo	-1.508	0.249	-1.603	-0.167	-1.594	-0.085
25.	West Sulawesi	-1.159	0.345	-1.300	-0.103	1.110	0.055
26.	South East Sulawesi	-0.718	0.265	-0.774	0.037	-0.750	0.164
	East Indonesia						
27.	West Nusa Tenggara	1.151	-0.425	1.068	-0.680	1.110	-0.532
28.	Bali	-0.333	-0.219	-0.183	0.080	-0.309	-0.094
29.	East Nusa Tenggara	-0.054	-0.817	0.086	-0.634	-0.069	-0.852
30.	Maluku	-0.722	-0.320	-0.766	-0.539	-0.736	-0.374
31.	Papua	-1.111	0.321	-1.066	0.356	-1.094	0.410
32.	North Maluku	-2.051	0.072	-2.210	-0.380	-2.094	-0.096
33.	West Papua	-1.745	1.046	-1.783	0.854	-1.752	1.020

Notes: Model 1: Bank offices, deposits, and financing effect to reduce poverty; Model 2: Bank offices, deposits, and financing effect to GDP.

6. Discussion

This study uncovers specific factors determining developing countries' economic growth and poverty rates. It is critical and relevant to confirm the correlation between financial development, GDP, and income in the banking sector. Financial products (e.g., deposits, financing, and offices) have an essential role in influencing financing. Interestingly, the funding level aligns with some regions' prosperous economic and poverty levels. This finding is consistent with the prior studies on economic growth (e.g., Awad & Al Karaki, 2019; Boukhatem & Ben Moussa, 2018; Coccorese & Shaffer, 2021; Anwar et al., 2020; Tabash, 2019; Zarrouk et al., 2017) and poverty reduction (e.g., Alaro & Alalubosa, 2019; Iqbal et al., 2020; Jeanneney & Kpodar, 2011; Kheir, 2018). This finding contrasts with the results of Iqbal et al. (2020) and Donou-Adonsou and Sylwester (2016), which

concluded that bank development (e.g., financing) was less significant in poverty reduction. The results suggest that banks enhance the funding quality to the productive sector, directly correlating with the people's income in districts with crowded populations and other districts with fewer people, therefore improving the intermediary role and equality of financial access services. It will guide the people to access consumption and the productive sector to enhance their income.

Indonesian banks' financial development can statistically increase the community's level of wealth and reduce poverty regarding the intermediary role toward providing capital access and financing schema for the private sector. It means that high poverty rates in Indonesian districts positively correlate with the people's chance to access capital and financing. Theoretically, financial development and financing positively correlate with GDP and the poverty rate, so this finding is not debatable (Donou-Adonsou & Sylwester, 2016; Kassim, 2016; Anwar et al., 2020; Tabash, 2019). The people's income is one crucial fiscal variable in the district government, reflecting local budgetary capacity. It is expected that this variable will support the welfare rate of society. Contrarily, the number of Indonesian bank offices has no significant effect on reducing poverty, which indicates that increasing financial development in some Indonesian regions fails to enhance the local government and people's income.

7. Conclusion

This study attempts to analyze financial development in the deposits, financing, and offices, which may influence GDP and poverty reduction in 33 Indonesian districts based on annual data from 2012–2020, using a data panel examined by fixed-effect analysis and cross-sectional effect. This study found that, compared to Islamic bank offices, the number of conventional bank offices has a

greater effect on Indonesian GDP. Meanwhile, Islamic banks have an essential role in reducing poverty. Conventional bank financing also positively affects economic growth and poverty alleviation. Islamic bank deposits have a strong correlation with Indonesian districts' economic growth and poverty. Meanwhile, conventional bank deposits have a greater effect on reducing poverty than GDP. It means that overall, conventional and Islamic banks have a crucial role in enhancing economic growth and solving the problem of income inequality in the local and domestic context. It is possible to avoid the income gap or to make the rich richer. This policy is in line with the World Bank's suggestions.

The results have shown the banks' intermediary role as reflected by fiscal transfer, which plays an essential role in increasing GDP and poverty alleviation in the Indonesian districts. However, it can be seen that both conventional and Islamic banks have the strongest contribution in the region with a dense population, including Java, followed by Sumatera Island. In Borneo (Kalimantan), Sulawesi, and the East Indonesia region, financial development has less effect on economic growth and poverty alleviation. It implies, besides providing financial access to individual or small-medium enterprises (SMEs), that it is potentially against the poverty channel, specifically to finance and investment in the sector. The financial sector (e.g., conventional and Islamic banks) and government need to shift the financing approach from the consumptives sector to the productive sector. It facilitates access to financial services to enhance competitiveness and innovation. It can also reduce unemployment rates. In other words, the financial industry can provide financial services and investment in the private sector, which are conducted more efficiently and effectively. On the other hand, the offices need to emphasize mobile real-sector programs and poverty alleviation to meet their goals.

The findings suggest that academics should strategically entice the discussions of essential topics regarding banking development, economic growth, and poverty reduction. In the education context, this study's results allowed the analysis of specific cases, such as low economic growth and failure to combat the poverty rate. Furthermore, the bank can also be treated as an enlightening financial role that allows people to obtain capital and financing. It should provide economic value and encourage them to enhance their income. Hence, the present study contributes to the literature from several aspects. First, this study better understands the specific relationship between banking development (e.g., deposits, financing, and offices) to promote economic growth and poverty reduction. This study reveals that the intermediary role of banks has a crucial role in developing countries (e.g., district level) toward expanding their operation and financing. Second, this study investigated that financing plays a mediating role in bank development (e.g., offices and deposits) to enhance economic growth and poverty alleviation. Few studies have identified this issue.

Moreover, several studies were examined separately that indicate mediation was not fully completed (Alaro & Alalubosa, 2019; Boukhatem & Ben Moussa, 2018; Donou-Adonsou & Sylwester, 2016; Iqbal et al., 2020; Kheir, 2018; Anwar et al., 2020; Tabash, 2019; Zarrouk et al., 2017), suggesting that bank development is a foundational level to offer financing and investment decisions that have been established systematically. It will strengthen the relationships between consumers, governments, and banks.

The findings suggest that the government and banking managers should strategically entice the discussions of essential topics regarding banking development, economic growth, and poverty reduction toward transferring deposits

to financing in the productive sector. Hence, the findings of this study provide several managerial implications. First, the banks operating in the districts show a strong foundation in strengthening the local economy in developing countries. The more products and services banks provide for the people, the more they have a sense of belonging and engage in financing. However, deposit and financing are not the only variables, as they also play a significant role in influencing their decision-making process. The role of financing as a mediator between bank development and economic growth, which also reduces poverty levels, indicates that the people are aware of what the bank offers as they continue to maintain their relationships with banks. In other words, the quality of products and services will reinforce with high confidence their awareness of and attitudes toward intimate relationships with banks. More specifically, the people's interaction with bank scholars will influence their beliefs, and this approach significantly impacts their choice. Therefore, bank managers must enhance their employees' skills, especially in banking (e.g., deposits and financing), to assist their customers' decision-making.

The Indonesian financial services authority (OJK), as regulators, must control banking operations as one of the leading essential indicators in strengthening the relationship between the people and banking. In this regard, the regulators are expected to have a pivotal role in establishing precise regulation and supervision mechanisms with economic and social value. Additionally, a comprehensive tool and intensive coordination are essential to support banking sustainability and success in enhancing economic and poverty alleviation. This approach can influence the quantity and quality of economic growth and foster poverty reduction in Indonesia.

There are some limitations to this research. First, in this study conducted in the Indonesian banking field, the results cannot be generalized. Future studies need to expand to cover sub-districts across the country. More sample sizes, regions, and geographical areas are encouraged to find a better conclusion. Second, it only considered the situational factors of financing roles to economic growth and poverty reduction in Indonesian districts. Future research should also investigate internal factors (i.e., local government, economics, and particular financial risk) and external factors (i.e., bank operation, organizational comparability, and relationships between banks and people). Finally, although this research supported the proposed framework, it was restricted to financial development, financing, GDP, poverty in Indonesian districts, and their interrelationships from prior studies. Future research should focus more on the relationship between banks (e.g., conventional and Islamic) and their role in economic growth and sub-district poverty. Applying distinguished methods, such as autoregressive distributed lag (ARDL), panel vector autoregression model (PVAR), and panel ordinal least square (POLS), is needed to confirm the long-run relationship among variables. Additionally, the vector error correction model (VECM), the Granger causality test, variance decomposition, and impulse response are also needed to examine the financial products' relation to economic growth and reduced poverty in the short and long run.

The government understands the importance of the relationship between variables to develop economic and productive sectors during normal conditions and the COVID-19 pandemic to reduce poverty and income inequality. Future studies must confirm the relationship between economic growth, income inequality, corruption, the people's education level, government expenditure, social capital, and minimum wage. Future studies should also confirm the correlation between

financial development and small-medium enterprises (SMEs) to enhance economic growth and people's income. Hence, the result of the study will provide comprehensive insight to stakeholders across the countries and better determine the actions of bank managers.

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