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FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM INDONESIA BEFORE AND AFTER THE COVID-19 PANDEMIC

Abstract: During the COVID-19 pandemic, most countries suffered economically. Financial institution played an important role in enhancing economic growth through intermediation. However, preliminary studies focused on common aspects of financial institutions rather than the banking context, and the majority of the literature was written prior to the COVID-19 pandemic. This study examines the banking sector role in short-run and long-run contributions to economic growth from 2009 to 2021. It adopted the number of banking deposits, financing to the public, and offices as proxies to validate the relationship between Indonesian financial development and economic growth (GDP). The vector error correction model (VECM) analysis was used to examine its contribution to Indonesia's economic growth. This study found a strong short- and long-term correlation between financial development and Indonesia's economic growth. There is a bidirectional relationship between Indonesia's Islamic bank (IIB) and GDP. The relationship between the conventional bank and Indonesia's economic growth is unidirectional. Therefore, policymakers should enhance the intensified mobilization of loans obtained prudently for capital and productive projects. This study also contributes to macroeconomic and microeconomic stability through enhancing capital inflows and investments in lucrative sectors. The original value is to examine the effect of financial development before and after the COVID-19 pandemic, which detriment most countries' stability. However, future studies need to confirm banks' contributions to specific sectors such as agriculture and small-medium enterprises (SMEs) because these sectors have a strong correlation with developing countries.

Keywords: Conventional bank, Islamic bank, Indonesian economic growth, GDP, financing, deposits, ARDL, VECM

JEL Classification: E37, E66, G2

I. Introduction

Economic growth stability and positive sustainability have been the principal concern for developing countries. However, local financing resources are necessary to support the development projects and investments. The majority of developed and developing countries are heavily determined by sources of external capital such as

foreign productive investment, cross-border interbank borrowing, and concessional loans and remittances. The capital inflow and financing play an important role in improving national GDP. Besides, financial development, such as the number of offices to facilitate lenders and borrowers to intermediate banking in financing and credit, also has an essential role in improving the economy. The crucial role of the financial sector after two economic and financial crises in 1997–1998, 2007-2008 and during the COVID-19 pandemic has become an essential topic for discussion in theoretical and empirical aspects. During the COVID-19 pandemic, most countries suffered economic growth and financial downturn (Menguy, 2022).

The global economic downturn, makes some countries concerning to enhance facilitates to support production and demand of products and services, supply chain and market disruption to support distribution process, and firms and financial markets. This phenomenon pursues regulatory remedies to prevent economic troubles. The bank regulator, government, and supervisor have enforced the effective functioning of domestic banking systems in resource transformation and liquidity. However, theoretical and empirical studies have broadly debated the interconnection between intermediary banking's role and economic growth. Some scholars elaborate on the causality of financial development causing economic growth (Chebab et al., 2022; Ginevičius et al., 2019; Nuru and Gereziher, 2021). The banking sector had an essential role in attracting consumers to save their money and distributing the deposits as lending activities to provide loans for financing and investment.

There are four ways financial development affects economic growth. First, the financial system fosters productivity improvement, providing financing, provides various innovative activities (Tinta, 2022). The intermediary financial role toward deposit and financing has a significant and positive impact on economic growth (Beck et al., 2000; Levine, 1997). For instance, based on six alternative financial development indicators, the relationship between financial inclusion and economic growth is demand-following and supply-leading. It implies banking play important role to intermediate the relationship between borrowers and lenders (Anarfo et al., 2019; Haini, 2019; M. Anwar et al., 2020). During the COVID-19 pandemic, Indonesia's economic (e.g., GDP) plummeted to -7.1% until -7.5% in 2020. This trend is still elevated at -7.9% in Q1 2021. However, in Q2 2021 Indonesian GDP has been relatively gradual increase and predicted rebound by 4.4% in 2021 and accelerate to 5.0% in 2022.

Prior studies more concern across the region (Ma et al., 2020; Mhadhbi et al., 2020), for instance, the ASEAN countries (Haini, 2019; Pradhan et al., 2014), OECD countries (Mtar and Belazreg, 2020), sub-Saharan African (Akinlo et al., 2020). Financial inclusion (e.g., saving) also has crucial role to improve 179 countries during 2011-2017 (Chakraborty and Abraham, 2021). Similarly, money supply and

financing have strong correlation to economic growth in 12 low-income countries during 1980-2016, Ghana over the period 1971-2012 (Alhassan et al., 2022) and Eswatini during 1996-2018 (Fakudze et al., 2022). Meanwhile, in the Southern African Development Community (SADC) countries during 1990-2015, financial development has negative effect to economic growth (Taivan and Nene, 2016). Hence, this topic is worthwhile to validate. How about Indonesian? The lack of research focused specifically on the context in the country with dual banking systems (e.g., conventional and Islamic banks) makes the role of the financial sector inconclusive. This study seeks to address these questions and contribute to the relationship between financial development (e.g., conventional and Islamic banks) and economic growth in Indonesia. It is the primary goal of this work.

In answering these questions, this research extends the existing of literature and practical contributions. First, this research attempt to fill this gap through concentrating on both conventional and Islamic banks and combining these sectors. Preliminary studies more concern on conventional or Islamic bank. Lack of study combines conventional and Islamic bank. Hence, worthy to examine the relationship between financial development and economic growth in country which applied dual banking systems. This study used Granger and VECM to validate the bi-directional relationship between financial development and Indonesia's economic growth. However, lack of research has focused on investigating the two-way linkages between financial development and economic growth. Second, prior studies of financial development and economic growth have neglected to combine both types of banks (e.g., conventional and Islamic). This approach involving several endogenous variables explained by their delayed values on the relationship between financial development and economic growth (Levine, 1997; Levine et al., 2000; Mhadhbi et al., 2020), economic growth on financial development (Ginevičius et al., 2019; Opoku et al., 2019) using the system ARDL and VECM.

Third, this study observes the relationship between financial development and economic growth with combine financial and non-financial aspects. The latter makes it possible to control endogeneity and makes the results coherent and robust (Cheng, Hou, 2020; Kim et al., 2018). In this study, forecast variance decompositions (VDCs) and impulse response functions (IRFs) are applied to predict the effect of economic growth on financial development (FD). The financial crisis of 2008 impact has needed to examine the interdependence between these sectors and the economy. However, few studies prove this field, and the majority of the researchers elucidated these parts separately. At least two major limitations in prior studies. First, the data is cross-sectional, which lacks to solve the country-specific problems (Haini, 2019; Pradhan et al., 2014). Second, the majority derived from a bidirectional causal analysis with the likelihood of the bias of the variables. The results of the

bidirectional causality test may be invalid due to the omission of an essential variable in the causality model (Le and Tran-Nam, 2018).

Indonesia chosen in this study was motivated by three main reasons. First, Indonesia has been reformed the financial systems and combined conventional and Islamic banks. Second, Indonesia has a robust system and potential for growth in conventional and Islamic finance institutions. Lastly, since a decade ago, Indonesia's banking assets and offices are growing rapidly. However, the country's economic growth was stagnant at around 5% and worse during the COVID-19 pandemic. Hence, the government needs a solution, specifically the baking system's contribution to economic growth.

II. Conceptual Background

A. How the role of financial development on economic growth

There are four famous financial structure theories on economic activities such as which develop fundamental study to validate the relationship between financial development, financial structure and economic growth (Beck et al., 2000). However, this study examined the financial structure based on the financial system for economic growth. First, the authors concluded that financial development play important role on economic growth, meanwhile financial structure has less role in 48 countries from 1980 until 1985. In the second study, the authors concluded the financial development without specific type from the financial scheme has positive and significant effect on economic growth in 40 countries (Demirguc-Kunt and Maksimovic, 2002).

Financial development influence economic growth with regard to four economic theories namely bank-based, market-based, financial services, and law views (Levine, 2002). The author concluded financial structure has not a crucial role in economic growth, capital distribution, and personal income. Furthermore, others scholar concluded bank-based has a positive and significant effect on economic growth, development of companies, and capital budgeting efficiency across the countries and firms (Beck and Levine, 2002). They found overall finance development and legal system efficiency play important role on economic growth. Whereas, bank-based has less role to enhance some regions GDP. Scholars have produced notable results regarding financial development on economic growth as a result of education quality (Hanushek and Woessmann, 2007), population (Mason and Lee, 2022), and income equality (Levine, 2007; Topuz, 2022). In addition, the financial role of economic growth depends on the indicators that researchers adopt as proxies in their studies (Adu et al., 2013).

In Ghana (Adu et al., 2013) and Malaysia (Anwar and Sun, 2011), credit or financing of the private sector for consumption and investment has a positive effect on economic growth, whereas the stock market has a less positive effect on GDP.

As well as employment, capital inflow, inflation, and exports have a negative effect on economic growth in China (Wang et al., 2015). Similarly, financial liberalisation has a negative effect on economic growth in 10 Southern African Development Community (SADC) countries (Taivan and Nene, 2016). Grassa and Gazdar (2014) concluded that Islamic banks have a greater effect on economic banks than conventional banks in five Gulf Cooperation Council (GCC) countries. Bolbol et al. (2005) found that bank-based indicators and market-based indicators positively reinforced economic growth in Egypt. In other words, education, income distribution, and population in the economy are divided among social groups and classes, and the economic system's performance is measured.

Recently, the empirical studies, more concern on the panel of countries and individual-country studies (Ledhem and Mekidiche, 2020). One exciting assumption in the theory of economic growth is whether the institution has a positive effect on economic growth is endogenous growth theory was developed by Romer and Lucas in the 1980s (Romer, 2011); It concept greater emphasis on human capital (e.g., employees and consumer) as a lender and borrower relationship effect to economic growth toward education, knowledge, and training. Islamic banks positively affect Indonesia's economic growth and investments (M. Anwar et al., 2020). Islamic bank not only has economic goal (e.g., profit) but also has social contribution toward active in financing and social activities (Junaidi et al., 2022).

The concept of financial development role on economic growth comprises of three hypotheses, namely supply-leading, demand-following, and bi-directional of the financial deepening–growth nexus. The supply-leading hypothesis assumes the financial development positively affects economic growth as a valuable process (Haini, 2019) and is caused by the increase of rate savings and investment. Several recent studies have examined this approach through three types of economic integration, including overall integration, financial integration, and trade integration in Vietnam from 1986 to 2015 (Nguyen et al., 2019). It means that bank intermediary roles toward transfer deposits to financing has positive effect on economic growth. Similarly, in Austria, the evolution of GDP and savings from 1998 to 2016 positively influenced GDP (Ginevičius et al., 2019). This indicates that the developing countries' policy of financial reform leads to improved economic growth (Fase and Abma, 2003; Menguy, 2022). Other scholars got the same result in different regions, such as Malaysia (Gani and Bahari, 2021), Nigeria (Karimo and Ogbonna, 2017), Austria, France, and Korea (Cheng and Hou, 2020), 16 African and non-African low-income countries (Bist, 2018), China and India (Kandil et al., 2017), as well as South Asian (Munir and Shahid, 2021). Interestingly, during the financial crisis in 2008-2009, financial development consistently promotes economic growth in ASEAN countries (Haini, 2019) and Europe (Asteriou and Spanos, 2018). Similarly, from 2000–2014 in MENA (Boukhatem and Mousa, 2018) and in 22 Muslim

countries during the period 1999-2011, the financial intermediaries role of Islamic banks have positively impacted economic growth (Abedifar et al., 2016). Recently, with applied VAR, IRFs, and Granger causality, financial development positively affects economic growth in 55 OIC countries (Kim et al., 2018).

The second hypothesis is demand-following. It refers to financial development has positive and significant effect on economic growth. Third fund party has strong correlation to GDP in Denmark, Portugal, and Latvia (Ginevičius et al., 2019; Nuru and Gereziher, 2021). With applied ARDL and VECM, financial development has different effect in short and long-run to Malaysian GDP (Gani and Bahari, 2021). A unidirectional causality emerged between economic growth and financial development in OECD countries (Mtar and Belazreg, 2020). Lastly, bidirectional causality, implying a mutual or two-way causal relationship between financial development and economic growth. Several previous studies have approved this hypothesis. Deposit plays important role to enhance the amount of financing in Luxembourg, France, and United Kingdom (Ginevičius et al., 2019). The same result in ASEAN during 1961-2012 (Pradhan et al., 2014) and African countries during the periods 1980-2016, financial development and economic growth effectively worked together (Opoku et al., 2019). In addition, financial development must be supported by financial development to promote income equality and economic growth in developing countries (An et al., 2021; Nyasha, Odhiambo, 2014).

Banks, securities, or financial services could all form the foundation of a financial system (Demirguc-Kunt and Levine, 2001). The bank-based theory concentrates on the advantages of banks for economic development and expansion as well as the shortcomings and defects of the financial system based on securities. According to this hypothesis, banks might affect economic growth in developing countries more so than the securities market. The concept of a bank-based system also highlights the shortcomings and flaws of the basis system, one of which is that the securities-based system has reduced the motivation for investors to seek out information by making it public. On the other hand, banks, by developing a long-term connection with businesses, remove the interruptions brought on by inconsistent information. Therefore, as opposed to securities-based systems, bank-based arrangements may improve corporate governance and optimal allocation. Additionally, securities-based theory examines the advantages of the market's increased performance and points out the disadvantages of the bank-based system.

III. Data and research method

The recent study validates the contribution of the Indonesian bank (e.g., conventional and Islamic) to GDP toward quarterly data from 2009 to 2021 see table 1. All variables measured by the finance extended to the real economy, which is

divided by the nominal GDP. Data was obtained from each banking website and Indonesia central agency on statistics.

Table 1. *Indonesian Banks (IB) information*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Islamic bank												
SCB	11	11	11	11	12	12	13	13	14	14	14	12
SBU	23	24	24	23	23	22	22	21	20	19	19	25
SRB	150	155	158	163	163	163	166	167	165	164	167	165
Offices	2,101	2,101	2,663	2,990	2,922	2,747	2,654	2,664	2,724	2,917	2,034	2,045
Assets*	148.98	186.74	199.71	248.10	272	304	366	425	490	538	609	725
Financing*	105.33	118.95	151.06	188.56	201	220	256	287	330	366	396	415
Deposits*	117.51	126.70	150.46	187.20	222	236	285	342	380	425	476	521
Conventional Bank												
CB	122	120	120	120	119	118	116	115	115	110	107	108
CRB	1,706	1,669	1,653	1,635	1,643	1,637	1,633	1,619	1,597	1,545	1,496	1,521
Offices	19,510	20.980	23,713	26,226	27,753	40,810	41,459	41,087	40,615	39,983	40,514	40,612
Assets*	31,338	38,256	44,776	52,059	59,099	64,477	70,974	78,011	85,207	90,630	80,796	84,245
Financing*	18,889	23,601	24,218	35,722	39,952	43,515	47,141	51,210	57,228	60,922	59,515	60,126
Deposits*	24,615	29,408	29,988	39,300	44,382	47,163	51,976	57,159	61,024	65,265	62,819	65,200

SCB = Shariah commercial banks, SBU = Shariah business units, SRB = Shariah rural banks, CB = Conventional bank, CRB = Conventional rural banks, * in trillion rupiah (IDR)
Source: Indonesia's financial service authority

In this study, GDP adopted as proxy for economic growth (Abedifar et al., 2016; M. Anwar et al., 2020). Furthermore, the number of deposits, financing and offices are applied as banking intermediation role (Gani and Bahari, 2021; Ginevičius et al., 2019, Haini, 2019; Nuru and Gereziher, 2021). Therefore, the models contain four variables, including TDep, TFin, IBOff, and GDP. The study focuses on the following model.

$$GDP = f(TDep, TFin, IBOff) \quad (1)$$

Where:

GDP = Gross Domestic product;

TDep = Total Deposit third party;

TFin = Total Financing to society;

IBOff = Indonesia bank offices.

To examine cointegration among variables which examined, this study carried out Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) and refers to Narayan (2004) see table 2.

$$\Delta GDP_t = \alpha_1 + \sum_{i=1}^{*} \beta_{1-i}\ \Delta GDP_{t-1} + \sum_{i=1}^{*} \theta_{1i}\ \Delta TDep_{t-1} + \sum_{i=1}^{*} \theta_{1i}\ \Delta TFin_{t-1} + \sum_{i=1}^{*} \theta_{1i}\ \Delta IBOff_{t-1} + \varepsilon_t \quad (2)$$

IV. Results and discussion

A. Unit Root Tests

We apply an alignment of unit root tests is ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron). The first-generation panel unit root tests are (hereafter, LLC) (Levin et al., 2002), and (hereafter, IPS) panel unit root tests (Im et al., 2003). The basic equation for the first-generation panel unit root tests is:

$$\Delta\gamma_{i,t} = \mu_i + \rho_i\Delta\gamma_{i,t-1} + \sum_{j=1}^{k} \gamma_{i,j}\Delta\gamma_{i,t-j} + \in_{i,t}; i = 1,2,3\ldots N;\ = 1,2,3\ldots T \quad (3)$$

Where y i,t is the variable, i is the personal fixed effect, i is the autoregressive parameter of variables i, and i,t is the error term. LLC test assumes homogeneity of i across banks and variables. The test uses an augmented Dickey-Fuller (ADF) unit root test for each variable is a common statistical test applied to examine stationary of Time series data which observed. This step is crucial factor on time series see table 2.

Table 2. *ADF unit-root test*

	Islamic bank				Conventional bank				Islamic and conventional bank			
Variables	Level		1st level		Level		1st level		Level		1st level	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
TD	1.588	5.374	-7.104***	-7.438***	0.148	0.253	-6.928***	-6.940***	0.232	0.349	-6.870***	-6.940***
TF	1.502	1.433	-8.724***	-8.678***	0.241	0.241	-6.708***	-6.708***	0.262	0.287	-6.688***	-6.688***
TO	-0.633	-0.598	-7.253***	-7.257***	-0.928	-0.945	-6.051***	-6.077***	-0.439	-1.026	-7.258***	-6.205***
GDP	-1.563	-1.268	-7.889***	-12.350***								

Notes: *** significance at the 1 per cent level
Source: Author's calculations

It can be seen that the data series of variables gross domestic product (GDP) and Indonesia bank (e.g., conventional and Islamic) deposit, finance, and offices have stationary at level I(1) than I(0). It implies this study can continue to apply the ARDL approach.

B. The cointegration test: Bounds f-test

It means that three models, the calculated F-statistics are higher than the upper critical bounds at 1% and 5% level of significance for three models (4.1343 > 3.67, 4.0119 > 3.67, 5.110 > 4.66), respectively see table 3. It implies Indonesia banks and economic growth has strong correlation in long-run.

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

Islamic bank			Conventional bank		Islamic and conventional bank	
Sig.	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
1%	-3.57	4.66	3.65	4.66	3.65	4.66
5%	-2.92	3.67	2.79	3.67	2.79	3.67
10%	-2.60	3.20	2.37	3.20	2.37	3.20
F value = 4.1343			*F* value = 4.0119		*F* value = 5.1180	

Source: Author's calculations

C. Estimates of Long-Run Relationship

After establishing the unit root and cointegration test, the next step is to estimate the relationship between short and long-run cointegration parameters. In can be seen in table 4 that three models were estimated in this study (e.g., Islamic, conventional, and combine both the banks) of deposit, financing, offices, and GDP as indicators of financial development. Indonesia Islamic bank (IIB) financing and offices have positive and significant effect on economic growth. Whereas, Indonesia Islamic banks deposit were found to have a negative effect on the GDP in the short run, where at 1% level of significance, a change in Islamic bank deposits and financing leads to around 0.08% increase in economic growth. This pattern is slightly similar to conventional and whole Indonesian banks, with effects around 5% and 4%, respectively. Meanwhile, offices have a strong impact with a 5% change in Islamic bank branches leads to 0.90%. This is quite different from conventional and whole Indonesian banks, implying only 0.04% and 0.01% in significantly 1% and 10%. This is expected since few of the deposits and consumers in whole Indonesian banks are meant for financing in productive sectors.

Table 4. *ARDL Short run estimate of Long Run Relationship*

	Islamic bank		Conventional bank		Islamic and conventional bank	
Regressor	Coefficients	t Statistics	Coefficients	t Statistics	Coefficients	t Statistics
Deposits	0.172	1.883	0.005***	3.294	0.005***	3.339
Financing	0.233***	3.744	0.003**	2.379	0.003**	2.127
GDP	0.528***	3.546	0.686***	4.455	0.743***	4.786
Offices	0.147	4.139	0.403***	3.091	0.011*	1.897
ARDL	(1, 1, 0, 0)		(1,1, 0, 0)		(1, 1, 0, 0)	
Diagnostic	R^2 = 0.67		R^2 = 0.69		R^2 = 0.69	
Statistics	DW = 1.98		DW=2.10		DW=2.27	

Notes: ***, **, * statistical significance at 1%, 5%, 10% respectively

Source: Author's calculations

For example, the coefficient of the GDP term is equal to 0.528, 0.686, and 0.743 for Islamic, conventional and both banks, respectively. This shows that the deviation from the long-term path of Islamic banks has a positive effect on economic output is corrected by 52.8 percent, 68.6 percent from the conventional bank, and 74.3 percent from the whole bank in each period.

D. Estimates of Short Run Relationship and the ECM

Islamic bank deposits, financing and GDP has bi-directional causality see table 5. Meanwhile, economic growth to the conventional bank is a unidirectional effect. It also indicates that any deviations from long-run equilibrium take about four to three quarters for short-run adjustment to restore into long-run equilibrium.

Table 5. *Granger Causality based on Vector error correction model (VECM)*

Financial	IIB-led GDP		GDP-led IIB		CB-led Growth		Growth-led CB		IB-led Growth		Growth-led IB	
Indicators	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short	ECT_{t-1}
Total deposits	7.519**	0.131***	9.644**	0.007	1.0556	0.0101***	3.0600*	3.1455***	1.1227	0.0423***	3.0337	3.6699***

Total financing	12.07**	0.005***	0.010	0.483	1.0796	0.0089***	3.5877*	5.5155***	1.1441	0.0388***	3.6118	4.4355***
Offices	1.206	0.300**	7.258**	0.086*	0.0623	0.1540**	0.0623*	0.0004***	0.0892	0.5442	4.8650	0.0005***

Notes: *, **, *** represent statistical significance at 10%, 5% and 1% respectively. IIB = Indonesia Islamic bank, CB = conventional bank, IB = Indonesian bank (e.g., Islamic and conventional bank)
Source: Author's calculations

This study also investigates conventional and Islamic banks' contributions to Indonesia's economic growth during an uncertainty condition, which is during and after the COVID-19 pandemic (2020–2021). It can be seen in table 6 that Indonesia' Islamic bank (IIB) deposits do not have a correlation to GDP. whereas total financing and the number of offices have become economic downturn triggers. Interestingly, all indicators from conventional banking have less effect on economic growth. Contrarily, economic growth has a positive effect on enhancing conventional bank deposits and financing. Hence, from whole validation, total Indonesia' financing has a positive and significant effect on economic growth. Meanwhile, the total deposit and the number of offices have less effect on it.

Table 6. *Granger Causality during and after the COVID-19 pandemic (2000-2021)*

Indicators	IIB-led GDP	GDP-led IIB	CB-led GDP	GDP-led CB	IB-led GDP	GDP-led IB
Total deposits	0.306	1.084	2.969	0.071*	0.304	1.070
Total financing	5.918*	4.244*	3.362	0.052**	5.929***	4.272**
Offices	4.243*	2.215	0.315	0.732	0.361	1.636

Notes: *, **, *** represent statistical significance at 10%, 5% and 1% respectively. IIB = Indonesia Islamic bank, CB = conventional bank, IB = Indonesian bank (e.g., Islamic and conventional bank)
Source: Author's calculations

These results are not surprising in particular that the break of regulations inclines to affect people's self-reliance and the stability of the financial system. The results further show that domestic deposit and financing have a significantly positive effect on economic growth in normal condition. This result is consistent with the prior studies which concluded the long-run relationship shows that, ceteris paribus, a 10 percent increase in the inward deposit and financing ratio is associated with higher GDP (Abedifar et al., 2016; Anarfo et al., 2019). Furthermore, the recent study applied variance decompositions (VDCs) to confirm this result.

The VDCs were computed concurrently to assess the short-run dynamics of the relationship between economic growth and the Indonesian bank (IB). This was achieved by determining how much each variable contributed to oscillations in the others. The VDC findings shown in Table 7 provide information on the IB deposit, financing, and offices. It has been discovered that deposits have the strongest correlation with GDP. The previous conclusion that the variables under consideration demonstrate short-run dynamic causal linkages is supported by this result.

Table 7. *Variance Decomposition (VDCs)*

Period	SE	Deposit	Financing	Offices	GDP

Variance decomposition of GDP:					
2009	66.36904	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	40.09699	0.927214	13.18142	45.79438
2020	161.7665	40.78377	1.976780	18.05051	60.66703
2021	165.8977	41.87556	1.985682	19.02158	61.25857

Source: Author's calculations

In general, the processing of the impulse response function by the Cholesky decomposition enabled evaluation of the GDP reaction to IB shocks during the previous eleven years. However, the ordering factors affect how this function turns out. IB development shows an initial significant positive correlation with the GDP over the duration of the study period, with the exception of financing, as shown in Table 8. It affects the direction of economic growth over the long and short terms. This shows that the coefficients of the error correction model are all long-term stable. The approximated ARDL models are capable of making reliable predictions for both the short- and long-term relationships between the IB and economic growth.

Table 8. *Impulse response functions (IRFs)*

Period	Deposit	Financing	Offices	GDP
Impulse response functions of GDP:				
2009	0.000000	0.000000	0.000000	66.36904
2010	11.88295	12.06947	20.00873	35.17755
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
2020	39.07320	-1.805601	13.56740	26.76201
2021	39.87552	0.258355	13.89755	27.25885

V. Conclusion and implications

Based on the specified ARDL models, this study found conventional and Islamic banks have a less significant effect on the real economy in the short period toward mobilizing deposits and financing. Whereas, in the long period has a greater positive effect. During the COVID-19 pandemic, financing has played a crucial role in economic growth through the transfer of capital from depositors and borrowers. It implies that Indonesian banks should promote deposits and investment to invite people to become banking consumers as borrowers and lenders in the long-term. Based on the findings, the recent study can be drawn at least two implications. Firstly, the result of this study shown that in the short-run, Indonesia bank (e.g., conventional and Islamic) has positive role to enhance economic growth; that is, the development of the banking industry contributes significantly to promoting a higher economic growth toward accommodate savers and facilitate the financing from deposits. The increase of deposits and funds available directly stimulates financial intermediation through financial markets or the banking system.

Second, all of the variables which validated have positive and significant effect on economic growth. It proves the positive long-run correlation between financial development and economic growth. When financing and investment enter into a local economy, banking has developed the domestic financial markets. The bank is most likely to open a branch office to manage their local accommodation to promote transactions. As these creativities are beneficial for banks and clients for banks, funds are made existing to the banking sector to boost its lending potential. These banks are also more likely to demand a higher quality of products and banking services. Therefore, the inflows of deposits and financing may facilitate ways to stimulate local banking sector development.

The implication of this study is shown the causality relationship by the three indicators for the Indonesian banking institution (i.e., TDep, TFin, and IBOff). However, the banks need to design and develop longer-term instruments of financial products and services. So far, the success of the Indonesian bank development to enhance economic growth can be attributed to the conducive policy environment accorded by the Indonesian government. Besides, the government need pay attention to financial and productive sectors to fight economic downturn before and after the COVID-19 pandemic. Besides, this policy not only potentially to improve economic but also poverty alleviation.

VI. Limitations and direction for future research

Some areas that may enhance the literature could explain more detailed aspects of banking by analyzing specific variables in different economic segments and sustainable development goal (SDG) not only in economic sectors such as GDP and financial development, but also social field such as examine financial development role to poverty alleviation. This would help the identification of some sectors which have to contribute to the economic growth and poverty reduction. Moreover, future studies should consider combining regions that have implemented dual banking systems to obtain sufficient data and a human and intellectual capital (e.g., education) contribution to economic growth. There is also a need to use diverse and advanced approaches, such as GMM framework, to validate the consistency of the results toward panel or time-series data. This could provide a more apparent viewpoint for the strategy references. The future study also needs brighter on this area.

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2. Bukti konfirmasi review dan hasil review pertama (9 Agustus 2022)

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(M. Anwar et al., 2020) have confirmed that Islamic banks positively affect Indonesia’s economic growth and investments.

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World Bank, 2021, available at: https://www.worldbank.org/en/country/indonesia/publication/indonesia-economic-prospects-iep-june-2021-boosting-the-recovery. (Accessed at March, 29th 2022).

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FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM INDONESIA BEFORE AND AFTER THE COVID-19 PANDEMIC

Abstract

During the COVID-19 pandemic, most countries suffered economically. Financial institution played an important role in enhancing economic growth through intermediation. However, preliminary studies focused on common aspects of financial institutions rather than the banking context, and the majority of the literature was written prior to the COVID-19 pandemic. This study examines the banking sector role in short-run and long-run contributions to economic growth from 2009 to 2021. It adopted the number of banking deposits from the third part, financing to the public, and offices as proxies to validate the relationship between Indonesian financial development and economic growth (GDP) in the vector error correction model (VECM) analysis. The Indonesian bank's role was validated to examine its contribution to Indonesia's economic growth. Data collected from banks' annual reports. This study found a strong short- and long-term correlation between financial development and Indonesia's economic growth. There is a bidirectional relationship between Indonesia's Islamic bank (IIB) and GDP. The relationship between the conventional bank and Indonesia's economic growth is unidirectional. Therefore, policymakers should enhance the intensified mobilization of loans obtained prudently for capital and productive projects. This study also contributes to macroeconomic and microeconomic stability through enhancing capital inflows and investments in lucrative sectors. The original value is to examine the effect of financial development before and after the COVID-19 pandemic, which detriment most countries' stability. However, future studies need to confirm banks' contributions to specific sectors such as agriculture and small-medium enterprises (SMEs) because these sectors have a strong correlation with developing countries.

Keywords: Conventional bank, Islamic bank, Indonesian economic growth, GDP, financing, deposits, ARDL, VECM

UDC Code: 330, 336, 338
JEL Classification E37, E66, G2

Introduction

Economic growth stability and positive sustainability have been the principal concern for developing countries. However, local financing resources are necessary to support the development projects and investments. The majority of developed and developing countries are heavily determined by sources of external capital such as foreign productive investment, cross-border interbank borrowing, and concessional loans and remittances. The capital inflow and financing play an important role in improving national GDP. Besides, financial development, such as the number of offices to facilitate lenders and borrowers to intermediate banking in financing and credit, also has an essential role in improving the economy. The crucial role of the financial sector after two economic and financial crises in 1997–1998, 2007-2008 and during the COVID-19 pandemic has become an essential topic for discussion in theoretical and empirical aspects. During the COVID-19 pandemic, most countries suffered economic growth and financial downturn.

Many countries have faced the pandemic, which directly affects the global economic downturn concerning production and demand of products and services, supply chain and market disruption to support distribution process, and firms and financial markets (The market watch, 2020). This phenomenon pursues regulatory remedies to prevent economic troubles. The bank regulator, government, and supervisor have enforced the effective functioning of domestic banking systems in resource transformation and liquidity. However, theoretical and empirical studies have broadly debated the interconnection between intermediary banking's role and economic growth. Some scholars elaborate on the causality of financial development causing economic growth (Cong, 2022; Ginevičius et al., 2019; Nuru, Gereziher, 2021). The banking sector had an essential role in attracting consumers to save their money and distributing the deposits as lending activities to provide loans for financing and investment.

There are four ways financial development affects economic growth. First, the financial system fosters productivity improvement, providing financing, provides various innovative activities (Rani et al., 2022; Tinta, 2022). The intermediary financial role toward deposit and financing has a significant and positive impact on economic growth (Beck et al., 2000; Levine, 1997). For instance, based on six alternative financial development indicators, the relationship between financial inclusion and economic growth is demand-following and supply-leading. It implies banking play important role to intermediate the relationship between borrowers and lenders (Anarfo et al., 2019; Haini, 2019; M. Anwar et al., 2020). During the COVID-19 pandemic, Indonesia's economic (e.g., GDP) plummeted to -7.1% until -7.5% in 2020. This trend is still elevated at -7.9% in Q1 2021. However, in Q2 2021

Indonesian GDP has been relatively gradual increase and predicted rebound by 4.4% in 2021 and accelerate to 5.0% in 2022 (World Bank, 2021).

Surprisingly lack of study examines the financial development role to people well-being toward economic growth in Indonesia. Prior studies more focus across the region (Ma et al., 2020; Mhadhbi et al., 2020), for instance, the ASEAN countries (Haini, 2019; Pradhan et al., 2014), OECD countries (Mtar, Belazreg, 2020), sub-Saharan African (Akinlo et al., 2020). Furthermore, Chakraborty and Abraham (2021) concluded financial inclusion (e.g., saving) has crucial role to improve 179 countries during 2011-2017. Similarly, money supply and financing have strong correlation to economic growth in 12 low-income countries during 1980-2016, Ghana over the period 1971-2012 (Alhassan et al., 2022) and Eswatini during 1996-2018 (Fakudze et al., 2022). Meanwhile, in the Southern African Development Community (SADC) countries during 1990-2015, financial development has negative effect to economic growth. Hence, this topic is worthwhile to validate. How about Indonesian? The lack of research focused specifically on the context in the country with dual banking systems (e.g., conventional and Islamic banks) makes the role of the financial sector inconclusive. This study seeks to address these questions and contribute to the relationship between financial development (e.g., conventional and Islamic banks) and economic growth in Indonesia. It is the primary goal of this work.

In answering these questions, this research extends the existing of literature and practical contributions. First, this research attempt to fill this gap through concentrating on both conventional and Islamic banks and combining these sectors. Preliminary studies more concern on conventional or Islamic bank. Lack of study combines conventional and Islamic bank. Hence, worthy to examine the relationship between financial development and economic growth in country which applied dual banking systems. This study used Granger and VECM to validate the bi-directional relationship between financial development and Indonesia's economic growth. However, lack of research has focused on investigating the two-way linkages between financial development and economic growth. Second, prior studies of financial development and economic growth have neglected to combine both types of banks (e.g., conventional and Islamic). This approach involving several endogenous variables explained by their delayed values on the relationship between financial development and economic growth (Levine, 1997; Levine et al., 2000; Mhadhbi et al., 2020), economic growth on financial development (Ginevičius et al., 2019; Mtar, Belazreg, 2020; Opoku et al., 2019) using the system ARDL and VECM.

Third, this study observes the relationship between financial development and economic growth with combine financial and non-financial aspects. The latter makes it possible to control endogeneity and makes the results coherent and robust (Cheng,

Hou, 2020; Kim et al., 2018). In this study, forecast variance decompositions (VDCs) and impulse response functions (IRFs) are applied to predict the effect of economic growth on financial development (FD). The financial crisis of 2008 impact has needed to examine the interdependence between these sectors and the economy. However, few studies prove this field, and the majority of the researchers elucidated these parts separately. At least two major limitations in prior studies. First, the data is cross-sectional, which lacks to solve the country-specific problems (Haini, 2019; Pradhan et al., 2014). Second, the majority derived from a bidirectional causal analysis with the likelihood of the bias of the variables. The results of the bidirectional causality test may be invalid due to the omission of an essential variable in the causality model (Le, Tran-Nam, 2018).

Indonesia chosen in this study was motivated by three main reasons. First, Indonesia has been reformed the financial systems and combined conventional and Islamic banks. Second, Indonesia has a robust system and potential for growth in conventional and Islamic finance institutions. Lastly, since a decade ago, Indonesia's banking assets and offices are growing rapidly. However, the country's economic growth was stagnant at around 5% and worse during the COVID-19 pandemic. Hence, the government needs a solution, specifically the baking system's contribution to economic growth.

2. Conceptual Background

2.1 How the role of financial development on economic growth

There are four famous financial structure theories on economic activities such as Beck et al. (2000) which develop fundamental study to validate the relationship between financial development, financial structure and economic growth. However, this study examined the financial structure based on the financial system for economic growth. First, the authors concluded that financial development play important role on economic growth, meanwhile financial structure has less role in 48 countries from 1980 until 1985. In the second study, the authors concluded the financial development without specific type from the financial scheme has positive and significant effect on economic growth. Furthermore, Demirguc-Kunt and Maksimovic (2002) found that financial systems and development strongly correlate with economic growth in 40 countries.

Levine (2002) validated how financial development effect to economic growth with regard to four economic theories: bank-based, market-based, financial services, and law views. The author concluded financial structure has not a crucial role in economic growth, capital distribution, and personal income. It indicates bank-based and market-based theories have more inclination to financial services rather than economic growth. Furthermore, others scholar concluded bank-based has a positive and significant effect on economic growth, development of companies, and capital

budgeting efficiency across the countries and firms (Beck, Levine, 2002). They found overall finance development and legal system efficiency play important role on economic growth. Whereas, bank-based has less role to enhance some regions GDP.

Recently, the empirical studies, more concern on the panel of countries and individual-country studies (Ledhem, Mekidiche, 2020; Rani et al., 2022). One exciting assumption in the theory of economic growth is whether the institution has a positive effect on economic growth is endogenous growth theory was developed by Romer and Lucas in the 1980s (Romer, 2011); It concept greater emphasis on human capital (e.g., employees and consumer) as a lender and borrower relationship effect to economic growth toward education, knowledge, and training. Furthermore, M. Anwar et al. (2020) have confirmed that Islamic banks positively affect Indonesia's economic growth and investments. Islamic bank not only has economic goal (e.g., profit) but also has social contribution toward active in financing and social activities (Junaidi, 2021, Junaidi et al., 2022).

This study is developed three hypotheses, supply-leading, demand-following, and bi-directional of the financial deepening–growth nexus. The supply-leading hypothesis assumes the financial development positively affects economic growth as a valuable process (Haini, 2019; Rani et al., 2022) and is caused by the increase of rate savings and investment. Several recent studies have examined this approach. Nguyen et al. (2019) found that the three types of economic integration, including overall integration, financial integration, and trade integration, positively affected Vietnam economic growth from 1986 to 2015. It means that bank intermediary roles toward transfer deposits to financing has positive effect on economic growth. Similarly, in Austria, the evolution of GDP and savings from 1998 to 2016 positively influenced GDP (Ginevičius et al. 2019). Similarly, nine Asian countries depend on financial development to enhance economic growth. This indicates that the developing countries' policy of financial reform leads to improved economic growth (Dyakov, 2022; Fase, Abma, 2003). Similarly, using ARDL and Granger causality, between 1980 and 2016 in Egypt (Mohieldin et al., 2019). Other scholars got the same result in different regions, such as Malaysia (Gani, Bahari, 2021), Nigeria for the range time 1970-2013 (Karimo, Ogbonna, 2017), Austria, France, and Korea in 1971-2011 (Cheng, Hou, 2020), 16 African and non-African low-income countries during the period 1995 to 2014 (Bist, 2018), China and India over the period 1970-2013 (Kandil et al., 2017), as well as South Asian (Munir, Shahid, 2021). Interestingly, during the financial crisis in 2008-2009, financial development consistently promotes economic growth in ASEAN countries (Haini, 2019) and Europe (Asteriou, Spanos, 2018). Similarly, from 2000–2014 in MENA (Boukhatem, Mousa, 2018) and in 22 Muslim countries during the period 1999-2011, the financial intermediaries role of Islamic banks have positively impacted

economic growth (Abedifar et al., 2016). Recently, Kim et al. (2018), with applied VAR, IRFs, and Granger causality, concluded that financial development positively affects economic growth in 55 OIC countries.

The second hypothesis is demand-following. It refers to financial development has positive and significant effect on economic growth. Ginevičius et al. (2019) and Nuru and Gereziher (2021) found a strong correlation between deposit and GDP in Denmark, Portugal, and Latvia. Whereas, Gani and Bahari (2021) applied ARDL and VECM, the authors found distinguish effect of financial development in short and long-run in Malaysia. Mtar and Belazreg (2020) concluded a unidirectional causality from economic growth to financial development. Lastly, bidirectional causality, implying a mutual or two-way causal relationship between financial development and economic growth. Several previous studies have approved this hypothesis. Ginevičius et al. (2019) found strong correlation between deposit and financing in Luxembourg, France, and United Kingdom. The same result in ASEAN during 1961-2012 (Pradhan et al., 2014) and African countries during the periods 1980-2016, financial development and economic growth effectively worked together (Opoku et al., 2019).

3. Data and research method

The recent study validates the contribution of the Indonesian bank (e.g., conventional and Islamic) to GDP toward quarterly data from 2009 to 2021 see table 1. All variables measured by the finance extended to the real economy, which is divided by the nominal GDP. Dara was obtained from each banking website and Indonesia central agency on statistics.

Table 1

Indonesian Banks (IB) information

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Islamic bank												
SCB	11	11	11	11	12	12	13	13	14	14	14	12
SBU	23	24	24	23	23	22	22	21	20	19	19	25
SRB	150	155	158	163	163	163	166	167	165	164	167	165
Offices	2,101	2,101	2,663	2,990	2,922	2,747	2,654	2,664	2,724	2,917	2,034	2,045
Assets*	148.98	186.74	199.71	248.10	272	304	366	425	490	538	609	725
Financing*	105.33	118.95	151.06	188.56	201	220	256	287	330	366	396	415
Deposits*	117.51	126.70	150.46	187.20	222	236	285	342	380	425	476	521
Conventional Bank												
CB	122	120	120	120	119	118	116	115	115	110	107	108
CRB	1,706	1,669	1,653	1,635	1,643	1,637	1,633	1,619	1,597	1,545	1,496	1,521
Offices	19,510	20.980	23,713	26,226	27,753	40,810	41,459	41,087	40,615	39,983	40,514	40,612
Assets*	31,338	38,256	44,776	52,059	59,099	64,477	70,974	78,011	85,207	90,630	80,796	84,245
Financing*	18,889	23,601	24,218	35,722	39,952	43,515	47,141	51,210	57,228	60,922	59,515	60,126
Deposits*	24,615	29,408	29,988	39,300	44,382	47,163	51,976	57,159	61,024	65,265	62,819	65,200

SCB = Shariah commercial banks, SBU = Shariah business units, SRB = Shariah rural banks, CB = Conventional bank, CRB = Conventional rural banks, * in trillion rupiah (IDR)

In this study, GDP adopted as proxy for economic growth (Abedifar et al., 2016; M. Anwar et al., 2020). Furthermore, the number of deposits, financing and offices are applied as banking intermediation role (Gani, Bahari, 2021; Ginevičius et al., 2019, Haini, 2019; Nuru, Gereziher, 2021). Therefore, the models contain four variables, including TDep, TFin, IBOff, and GDP. The study focuses on the following model.

$$GDP = f(TDep, TFin, IBOff) \quad (1)$$

Where:

GDP = Gross Domestic product;

TDep = Total Deposit third party;

TFin = Total Financing to society;

IBOff = Indonesia bank offices.

To examine cointegration among variables which examined, this study carried out Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) and refers to Narayan (2004) see table 2.

$$\Delta GDP_t = \alpha_1 + \sum_{i=1}^{k} \beta_{1-i}\ \Delta GDP_{t-1} + \sum_{i=1}^{k} \theta_{1i}\ \Delta TDep_{t-1} + \sum_{i=1}^{k} \theta_{1i}\ \Delta TFin_{t-1} + \sum_{i=1}^{k} \theta_{1i}\ \Delta IBOff_{t-1} + \varepsilon_t$$

4. Results and discussion

4.1 Unit Root Tests

We apply an alignment of unit root tests is ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron). The first-generation panel unit root tests are Levin et al. (2002) (hereafter, LLC), and Im et al. (2003) (hereafter, IPS) panel unit root tests. The basic equation for the first-generation panel unit root tests is:

$$\Delta\gamma_{i,t} = \mu_i + \rho_i \Delta\gamma_{i,t-1} + \sum_{j=1}^{k} \gamma_{i,j} \Delta\gamma_{i,t-j} + \in_{i,t}; i = 1, 2, 3 \ldots N; = 1, 2, 3 \ldots T$$

Where y i,t is the variable, i is the personal fixed effect, i is the autoregressive parameter of variables i, and i,t is the error term. LLC test assumes homogeneity of i across banks and variables. However, the test accounts for heterogeneity by allowing bank-specific fixed effects and time trends. The test uses an augmented Dickey-Fuller (ADF) unit root test for each variable is a common statistical test applied to examine stationary of Time series data which observed. This step is crucial factor on time series see table 2.

Table 2

ADF unit-root test

	Islamic bank				Conventional bank				Islamic and conventional bank			
Variables	Level		1st level		Level		1st level		Level		1st level	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
TD	1.588	5.374	-7.104***	-7.438***	0.148	0.253	-6.928***	-6.940***	0.232	0.349	-6.870***	-6.940***
TF	1.502	1.433	-8.724***	-8.678***	0.241	0.241	-6.708***	-6.708***	0.262	0.287	-6.688***	-6.688***
TO	-0.633	-0.598	-7.253***	-7.257***	-0.928	-0.945	-6.051***	-6.077***	-0.439	-1.026	-7.258***	-6.205***
GDP	-1.563	-1.268	-7.889***	-12.350***								

Notes: *** significance at the 1 per cent level

It can be seen that the data series of variables gross domestic product (GDP) and Indonesia bank (e.g., conventional and Islamic) deposit, finance, and offices have stationary at level I(1) than I(0). It implies this study can continue to apply the ARDL approach.

4.2 The cointegration test: Bounds f-test

It means that three models, the calculated F-statistics are higher than the upper critical bounds at 1% and 5% level of significance for three models (4.1343 > 3.67, 4.0119 > 3.67, 5.110 > 4.66), respectively see table 3. It implies Indonesia banks and economic growth has strong correlation in long-run.

Table 3

Bounds F-Test statistic for long run relationship

	Islamic bank		Conventional bank		Islamic and conventional bank	
Sig.	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
1%	-3.57	4.66	3.65	4.66	3.65	4.66
5%	-2.92	3.67	2.79	3.67	2.79	3.67
10%	-2.60	3.20	2.37	3.20	2.37	3.20
	F value = 4.1343		*F* value = 4.0119		*F* value = 5.1180	

4.3 Estimates of Long-Run Relationship

After establishing the unit root and cointegration test, the next step is to estimate the relationship between short and long-run cointegration parameters. In can be seen in table 4 that three models were estimated in this study (e.g., Islamic, conventional, and combine both the banks) of deposit, financing, offices, and GDP as indicators of financial development. Indonesia Islamic bank (IIB) offices has positive and significant effect on economic growth. Whereas, Indonesia Islamic banks deposit and financing were found to have a weak effect on the GDP in the short run, where at 1% level of significance, a change in Islamic bank deposits and financing leads to around 0.08% increase in economic growth. This pattern is slightly similar to conventional and whole Indonesian banks, with effects around 5% and 4%, respectively. Meanwhile, offices have a strong impact with a 5% change in Islamic bank branches leads to 0.90%. This is quite different from conventional and whole

Indonesian banks, implying only 0.04% and 0.01% in significantly 1% and 10%. This is expected since few of the deposits and consumers in whole Indonesian banks are meant for financing in productive sectors.

Table 4

ARDL Short run estimate of Long Run Relationship

	Islamic bank		Conventional bank		Islamic and conventional bank	
Regressor	Coefficients	t Statistics	Coefficients	t Statistics	Coefficients	t Statistics
Deposits	-0.172*	-1.883	0.0005***	3.2947	0.0005***	3.3389
Financing	0.233***	3.744	0.0003**	2.3794	0.0003**	2.1271
GDP	0.528***	3.546	0.6860***	4.4552	0.7431***	4.7860
Offices	-0.147	4.139	0.0403***	3.0910	0.0114*	1.8974
ARDL	(1, 1, 0, 0)		(1,1, 0, 0)		(1, 1, 0, 0)	
Diagnostic	$R^2 = 0.67$		$R^2 = 0.69$		$R^2 = 0.69$	
Statistics	DW = 1.98		DW=2.10		DW=2.27	

Notes: ***, **, * statistical significance at 1%, 5%, 10% respectively

For example, the coefficient of the GDP term is equal to 0.513, 0.686, and 0.743 for Islamic, conventional and both banks, respectively. This shows that the deviation from the long-term path of Islamic banks has a positive effect on economic output is corrected by 51.3 percent, 68.6 percent from the conventional bank, and 74.3 percent from the whole bank in each period.

4.4 Estimates of Short Run Relationship and the ECM

Islamic bank deposits, financing and GDP has bi-directional causality see table 5. Meanwhile, economic growth to the conventional bank is a unidirectional effect. The value of the ECTs confirms the relationship among variables which examined in the long-run between 0.004 to 0.67. It also indicates that any deviations from long-run equilibrium take about four to three quarters for short-run adjustment to restore into long-run equilibrium.

Table 5

Granger Causality based on Vector error correction model (VECM)

Financial	IIB-led GDP		GDP-led IIB		CB-led Growth		Growth-led CB		IB-led Growth		Growth-led IB	
Indicators	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short	ECT_{t-1}
Total deposits	7.519**	-0.131***	9.644**	-0.007	1.0556	-0.0101***	3.0600*	-3.1455***	1.1227	-0.0423***	3.0337	-3.6699***
Total financing	12.07**	-0.005***	0.010	-0.483	1.0796	0.0089***	3.5877*	-5.5155***	1.1441	0.0388***	3.6118	-4.4355***
Offices	1.206	-0.300**	7.258**	0.086*	0.0623	0.1540**	0.0623*	0.0004***	0.0892	0.5442	4.8650	0.0005***

Notes: *, **, *** represent statistical significance at 10%, 5% and 1% respectively. IIB = Indonesia Islamic bank, CB = conventional bank, IB = Indonesian bank (e.g., Islamic and conventional bank)

These results are not surprising in particular that the break of regulations inclines to affect people's self-reliance and the stability of the financial system. The results further show that domestic deposit and financing have a significantly positive effect on economic growth. This result is consistent with Abedifar et al. (2016), and Anarfo et al. (2019). The long-run relationship shows that, ceteris paribus, a 10 percent

increase in the inward deposit and financing ratio is associated with higher GDP. Furthermore, the recent study applied variance decompositions (VDCs) to confirm this result.

Table 6

Variance Decomposition (VDCs)

Period	SE	Deposit	Financing	Offices	GDP
Variance decomposition of GDP:					
2009	66.36904	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	40.09699	0.927214	13.18142	45.79438
2020	161.7665	40.78377	1.976780	18.05051	60.66703
2021	165.8977	41.87556	1.985682	19.02158	61.25857

Table 7

Impulse response functions (IRFs)

Period	Deposit	Financing	Offices	GDP
Impulse response functions of GDP:				
2009	0.000000	0.000000	0.000000	66.36904
2010	11.88295	12.06947	20.00873	35.17755
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
2020	39.07320	-1.805601	13.56740	26.76201
2021	39.87552	0.258355	13.89755	27.25885

5. Conclusion and implications

Based on the specified ARDL models, this study found conventional and Islamic banks have a less significant effect on the real economy in the short period toward mobilizing deposits and financing. Whereas, in the long period has a greater positive effect. It implies that Indonesian banks should promote deposits and investment to invite people to become banking consumers as borrowers and lenders in the long-term. Based on the findings, the recent study can be drawn at least two implications. Firstly, the result of this study shown that in the short-run, Indonesia bank (e.g., conventional and Islamic) has positive role to enhance economic growth; that is, the development of the banking industry contributes significantly to promoting a higher economic growth toward accommodate savers and facilitate the financing from deposits. The increase of deposits and funds available directly stimulates financial intermediation through financial markets or the banking system.

Second, all of the variables which validated have positive and significant effect on economic growth. It proves the positive long-run correlation between financial development and economic growth. When financing and investment enter into a local economy, banking has developed the domestic financial markets. The bank is most likely to open a branch office to manage their local accommodation to promote transactions. As these creativities are beneficial for banks and clients for banks, funds are made existing to the banking sector to boost its lending potential. These banks are also more likely to demand a higher quality of products and banking services. Therefore, the inflows of deposits and financing may facilitate ways to stimulate local banking sector development.

The implication of this study is shown the causality relationship by the three indicators for the Indonesian banking institution (i.e., TDep, TFin, and IBOff). However, the banks need to design and develop longer-term instruments of financial products and services. So far, the success of the Indonesian bank development to enhance economic growth can be attributed to the conducive policy environment accorded by the Indonesian government. Besides, the government need pay attention to financial and productive sectors to fight economic downturn before and after the COVID-19 pandemic. Besides, this policy not only potentially to improve economic but also poverty alleviation.

6. Limitations and direction for future research

Some areas that may enhance the literature could explain more detailed aspects of banking by analyzing specific variables in different economic segments and sustainable development goal (SDG) not only in economic sectors such as GDP and

financial development, but also social field such as examine financial development role to poverty alleviation. This would help the identification of some sectors which have to contribute to the economic growth and poverty reduction. Moreover, future studies should consider combining regions that have implemented dual banking systems to obtain sufficient data and a human and intellectual capital (e.g., education) contribution to economic growth. There is also a need to use diverse and advanced approaches, such as GMM framework, to validate the consistency of the results toward panel or time-series data. This could provide a more apparent viewpoint for the strategy references. The future study also needs brighter on this area.

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4. Bukti konfirmasi review dan hasil review Kedua (11 Oktober 2022)

[[ER] Editoí Decision

External

Inbox

Kotlyaíova Svetlana Nikolaevna <noíeply@economyofíegions.oíg> I'ue, Oct 11, 2022,

Aryati Arfah:

We have reached a decision regarding your submission to Economy of Regions, "FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM INDONESIA BEFORE AND AFTER THE COVID-19 PANDEMIC ".

Our decision is: Revisions Required

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM INDONESIA BEFORE AND AFTER THE COVID-19 PANDEMIC

The paper has been reviewed and needs revising. Please, consider the reviewers' comments, edit the article and send it to ekonomika_regiona@mail.ru.
All introduced changes should be highlighted in yellow. Here are the reviewers' comments:

1. In the theoretical part, the author presents a wide range of works confirming the influence of the banking sector on the economic development of various countries, but the works confirming the inverse relationship are completely ignored. In addition, there are works in the scientific literature that note the negative impact of financial development (banking sector) on economic growth (GDP). The author should finalize the theoretical review in the work and show the conflicting views of researchers on this issue.
2. The author of the article substantiated that banks have a significant impact on economic growth (GDP), but did not show the specifics of this impact before and after the Covid-19 pandemic. In the section of the article devoted to the analysis of the obtained models, the aspect of the coronavirus infection pandemic is not considered at all. The author should have built two models of the relationship between economic growth (GDP) and financial development, which would assess the role of banks in the economic development of Indonesia before and after the coronavirus pandemic.
3. The author should check the consistency of the conclusions in the text of the article with the ARDL model, the results of which are presented in Table 4. The regression coefficients that the author describes after this table do not match the results of the ARDL model. In addition, the author makes an incorrect conclusion about the positive impact of the offices of Islamic banks on Indonesia's GDP. According to the results of the ARDL model in Table 4, Islamic bank offices have a negative impact on GDP because the regression coefficient is negative (-0.172). It is necessary to check again the correspondence of the conclusions to the results presented in the table. Perhaps the wrong table was erroneously presented in the work.

Fill in the table with comments

Remark	Author's comment

5. Bukti konfirmasi submit revisi kedua, respon kepada reviewer, dan artikel yang diresubmit
(20 Oktober 2022)

Manuscíipt íevised FINANCIAL DEVELOPMEN I' AND ECONOMIC GROWI'H: EVIDENCE FROM INDONESIA BEFORE AND AFI'ER I'HE COVID-19 PANDEMIC

External

Inbox

A

Aíyati Aífah <aíyati.aífah@umi.ac.id>

I'hu, Oct 20, 2022, 4:16 PM

to ekonomika_íegiona

Dear Editor(s)

We would like to thank the Editor and Reviewers for their detailed and helpful feedback regarding our manuscript, and for providing us with the opportunity to revise our manuscript. We have revised the manuscript according to the Reviewers' recommendations. We did our best to give diligent and thoughtful consideration to each of the issues raised by the Reviewers in revising the paper. If there were specific ways, you would like us to address any remaining concerns, please let us know.

Sincerely
Authors

Dear Editor(s)

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Remark	Author's comment
1. In the theoretical part, the author presents a wide range of works confirming the influence of the banking sector on the economic development of various countries, but the works confirming the inverse relationship are completely ignored. In addition, there are works in the scientific literature that note the negative impact of financial development (banking sector) on economic growth (GDP). The author should finalize the theoretical review in the work and show the conflicting views of researchers on this issue.	Response: Thank you so much for your positive comment. The theoretical part has revised as suggested. We also add some references to support our study framework.
2. The author of the article substantiated that banks have a significant impact on economic growth (GDP), but did not show the specifics of this impact before and after the Covid-19 pandemic. In the section of the article devoted to the analysis of the obtained models, the aspect of the coronavirus infection pandemic is not considered at all. The author should have built two models of the relationship between economic growth	Response: Thank you so much for your positive comment. We add table 6 to support result study during 2020-2021.

(GDP) and financial development, which would assess the role of banks in the economic development of Indonesia before and after the coronavirus pandemic.	
3. The author should check the consistency of the conclusions in the text of the article with the ARDL model, the results of which are presented in Table 4. The regression coefficients that the author describes after this table do not match the results of the ARDL model. In addition, the author makes an incorrect conclusion about the positive impact of the offices of Islamic banks on Indonesia's GDP. According to the results of the ARDL model in Table 4, Islamic bank offices have a negative impact on GDP because the regression coefficient is negative (-0.172). It is necessary to check again the correspondence of the conclusions to the results presented in the table. Perhaps the wrong table was erroneously presented in the work.	Response: Thank you so much for your positive comment. We have double check to confirm consistency between the table and description.

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM INDONESIA BEFORE AND AFTER THE COVID-19 PANDEMIC

Abstract

During the COVID-19 pandemic, most countries suffered economically. Financial institution played an important role in enhancing economic growth through intermediation. However, preliminary studies focused on common aspects of financial institutions rather than the banking context, and the majority of the literature was written prior to the COVID-19 pandemic. This study examines the banking sector role in short-run and long-run contributions to economic growth from 2009 to 2021. It adopted the number of banking deposits from the third part, financing to the public, and offices as proxies to validate the relationship between Indonesian financial development and economic growth (GDP) in the vector error correction model (VECM) analysis. The Indonesian bank's role was validated to examine its contribution to Indonesia's economic growth. Data collected from banks' annual reports. This study found a strong short- and long-term correlation between financial development and Indonesia's economic growth. There is a bidirectional relationship between Indonesia's Islamic bank (IIB) and GDP. The relationship between the conventional bank and Indonesia's economic growth is unidirectional. Therefore, policymakers should enhance the intensified mobilization of loans obtained prudently for capital and productive projects. This study also contributes to macroeconomic and microeconomic stability through enhancing capital inflows and investments in lucrative sectors. The original value is to examine the effect of financial development before and after the COVID-19 pandemic, which detriment most countries' stability. However, future studies need to confirm banks' contributions to specific sectors such as agriculture and small-medium enterprises (SMEs) because these sectors have a strong correlation with developing countries.

Keywords: Conventional bank, Islamic bank, Indonesian economic growth, GDP, financing, deposits, ARDL, VECM

UDC Code: 330, 336, 338
JEL Classification E37, E66, G2

Introduction

Economic growth stability and positive sustainability have been the principal concern for developing countries. However, local financing resources are necessary to support the development projects and investments. The majority of developed and developing countries are heavily determined by sources of external capital such as foreign productive investment, cross-border interbank borrowing, and concessional loans and remittances. The capital inflow and financing play an important role in improving national GDP. Besides, financial development, such as the number of offices to facilitate lenders and borrowers to intermediate banking in financing and credit, also has an essential role in improving the economy. The crucial role of the financial sector after two economic and financial crises in 1997–1998, 2007-2008 and during the COVID-19 pandemic has become an essential topic for discussion in theoretical and empirical aspects. During the COVID-19 pandemic, most countries suffered economic growth and financial downturn.

The global economic downturn, makes some countries concerning to enhance facilitates to support production and demand of products and services, supply chain and market disruption to support distribution process, and firms and financial markets[1]. This phenomenon pursues regulatory remedies to prevent economic troubles. The bank regulator, government, and supervisor have enforced the effective functioning of domestic banking systems in resource transformation and liquidity. However, theoretical and empirical studies have broadly debated the interconnection between intermediary banking's role and economic growth. Some scholars elaborate on the causality of financial development causing economic growth (Cong, 2022; Ginevičius et al., 2019; Nuru, Gereziher, 2021). The banking sector had an essential role in attracting consumers to save their money and distributing the deposits as lending activities to provide loans for financing and investment.

There are four ways financial development affects economic growth. First, the financial system fosters productivity improvement, providing financing, provides various innovative activities (Rani et al., 2022; Tinta, 2022). The intermediary financial role toward deposit and financing has a significant and positive impact on economic growth (Beck et al., 2000; Levine, 1997). For instance, based on six alternative financial development indicators, the relationship between financial inclusion and economic growth is demand-following and supply-leading. It implies banking play important role to intermediate the relationship between borrowers and

[1] The market watches. (2020). Available at: https://www.marketwatch.com/press-release/global-development-boards-market-2020-size-share-growth-trends-and-forecast-2026-business opportunities-and-future-investments-2020-06-17-91974236-1916287672 (Date of access: 07.09.2021).

lenders (Anarfo et al., 2019; Haini, 2019; M. Anwar et al., 2020). During the COVID-19 pandemic, Indonesia's economic (e.g., GDP) plummeted to -7.1% until -7.5% in 2020. This trend is still elevated at -7.9% in Q1 2021. However, in Q2 2021 Indonesian GDP has been relatively gradual increase and predicted rebound by 4.4% in 2021 and accelerate to 5.0% in 2022[2].

Prior studies more concern across the region (Ma et al., 2020; Mhadhbi et al., 2020), for instance, the ASEAN countries (Haini, 2019; Pradhan et al., 2014), OECD countries (Mtar, Belazreg, 2020), sub-Saharan African (Akinlo et al., 2020). Financial inclusion (e.g., saving) also has crucial role to improve 179 countries during 2011-2017 (Chakraborty, Abraham, 2021). Similarly, money supply and financing have strong correlation to economic growth in 12 low-income countries during 1980-2016, Ghana over the period 1971-2012 (Alhassan et al., 2022) and Eswatini during 1996-2018 (Fakudze et al., 2022). Meanwhile, in the Southern African Development Community (SADC) countries during 1990-2015, financial development has negative effect to economic growth (Taivan, Nene, 2016). Hence, this topic is worthwhile to validate. How about Indonesian? The lack of research focused specifically on the context in the country with dual banking systems (e.g., conventional and Islamic banks) makes the role of the financial sector inconclusive. This study seeks to address these questions and contribute to the relationship between financial development (e.g., conventional and Islamic banks) and economic growth in Indonesia. It is the primary goal of this work.

In answering these questions, this research extends the existing of literature and practical contributions. First, this research attempt to fill this gap through concentrating on both conventional and Islamic banks and combining these sectors. Preliminary studies more concern on conventional or Islamic bank. Lack of study combines conventional and Islamic bank. Hence, worthy to examine the relationship between financial development and economic growth in country which applied dual banking systems. This study used Granger and VECM to validate the bi-directional relationship between financial development and Indonesia's economic growth. However, lack of research has focused on investigating the two-way linkages between financial development and economic growth. Second, prior studies of financial development and economic growth have neglected to combine both types of banks (e.g., conventional and Islamic). This approach involving several endogenous variables explained by their delayed values on the relationship between financial development and economic growth (Levine, 1997; Levine et al., 2000; Mhadhbi et al., 2020), economic growth on financial development (Ginevičius et al.,

[2] World Bank, 2021, available at: https://www.worldbank.org/en/country/indonesia/publication/indonesia-economic-prospects-iep-june-2021-boosting-the-recovery. (Date of access: 29.03.2022).

2019; Mtar, Belazreg, 2020; Opoku et al., 2019) using the system ARDL and VECM.

Third, this study observes the relationship between financial development and economic growth with combine financial and non-financial aspects. The latter makes it possible to control endogeneity and makes the results coherent and robust (Cheng, Hou, 2020; Kim et al., 2018). In this study, forecast variance decompositions (VDCs) and impulse response functions (IRFs) are applied to predict the effect of economic growth on financial development (FD). The financial crisis of 2008 impact has needed to examine the interdependence between these sectors and the economy. However, few studies prove this field, and the majority of the researchers elucidated these parts separately. At least two major limitations in prior studies. First, the data is cross-sectional, which lacks to solve the country-specific problems (Haini, 2019; Pradhan et al., 2014). Second, the majority derived from a bidirectional causal analysis with the likelihood of the bias of the variables. The results of the bidirectional causality test may be invalid due to the omission of an essential variable in the causality model (Le, Tran-Nam, 2018).

Indonesia chosen in this study was motivated by three main reasons. First, Indonesia has been reformed the financial systems and combined conventional and Islamic banks. Second, Indonesia has a robust system and potential for growth in conventional and Islamic finance institutions. Lastly, since a decade ago, Indonesia's banking assets and offices are growing rapidly. However, the country's economic growth was stagnant at around 5% and worse during the COVID-19 pandemic. Hence, the government needs a solution, specifically the baking system's contribution to economic growth.

2. Conceptual Background

2.1 How the role of financial development on economic growth

There are four famous financial structure theories on economic activities such as which develop fundamental study to validate the relationship between financial development, financial structure and economic growth (Beck et al., 2000). However, this study examined the financial structure based on the financial system for economic growth. First, the authors concluded that financial development play important role on economic growth, meanwhile financial structure has less role in 48 countries from 1980 until 1985. In the second study, the authors concluded the financial development without specific type from the financial scheme has positive and significant effect on economic growth in 40 countries (Demirguc-Kunt, Maksimovic, 2002).

Financial development influence economic growth with regard to four economic theories namely bank-based, market-based, financial services, and law views (Levine, 2002). The author concluded financial structure has not a crucial role in

economic growth, capital distribution, and personal income. Furthermore, others scholar concluded bank-based has a positive and significant effect on economic growth, development of companies, and capital budgeting efficiency across the countries and firms (Beck, Levine, 2002). They found overall finance development and legal system efficiency play important role on economic growth. Whereas, bank-based has less role to enhance some regions GDP. Scholars have produced notable results regarding financial development on economic growth as a result of education quality (Hanushek, Woessmann, 2007), population (Mason, Lee, 2022), and income equality (Levine, 2007; Topuz, 2022). In addition, the financial role of economic growth depends on the indicators that researchers adopt as proxies in their studies (Adu et al., 2013).

In Ghana (Adu et al., 2013) and Malaysia (Anwar, Sun, 2011), credit or financing of the private sector for consumption and investment has a positive effect on economic growth, whereas the stock market has a less positive effect on GDP. As well as employment, capital inflow, inflation, and exports have a negative effect on economic growth in China (Wang et al., 2015). Similarly, financial liberalisation has a negative effect on economic growth in 10 Southern African Development Community (SADC) countries (Taivan, Nene, 2016). Grassa and Gazdar (2014) concluded that Islamic banks have a greater effect on economic banks than conventional banks in five Gulf Cooperation Council (GCC) countries. Bolbol et al. (2005) found that bank-based indicators and market-based indicators positively reinforced economic growth in Egypt. In other words, education, income distribution, and population in the economy are divided among social groups and classes, and the economic system's performance is measured.

Recently, the empirical studies, more concern on the panel of countries and individual-country studies (Ledhem, Mekidiche, 2020; Rani et al., 2022). One exciting assumption in the theory of economic growth is whether the institution has a positive effect on economic growth is endogenous growth theory was developed by Romer and Lucas in the 1980s (Romer, 2011); It concept greater emphasis on human capital (e.g., employees and consumer) as a lender and borrower relationship effect to economic growth toward education, knowledge, and training. Islamic banks positively affect Indonesia's economic growth and investments (M. Anwar et al., 2020). Islamic bank not only has economic goal (e.g., profit) but also has social contribution toward active in financing and social activities (Junaidi, 2021, Junaidi et al., 2022).

The concept of financial development role on economic growth comprises of three hypotheses, namely supply-leading, demand-following, and bi-directional of the financial deepening–growth nexus. The supply-leading hypothesis assumes the financial development positively affects economic growth as a valuable process (Haini, 2019; Rani et al., 2022) and is caused by the increase of rate savings and

investment. Several recent studies have examined this approach through three types of economic integration, including overall integration, financial integration, and trade integration in Vietnam from 1986 to 2015 (Nguyen et al., 2019). It means that bank intermediary roles toward transfer deposits to financing has positive effect on economic growth. Similarly, in Austria, the evolution of GDP and savings from 1998 to 2016 positively influenced GDP (Ginevičius et al., 2019). This indicates that the developing countries' policy of financial reform leads to improved economic growth (Dyakov, 2022; Fase, Abma, 2003). Other scholars got the same result in different regions, such as Malaysia (Gani, Bahari, 2021), Nigeria (Karimo, Ogbonna, 2017), Austria, France, and Korea (Cheng, Hou, 2020), 16 African and non-African low-income countries (Bist, 2018), China and India (Kandil et al., 2017), as well as South Asian (Munir, Shahid, 2021). Interestingly, during the financial crisis in 2008-2009, financial development consistently promotes economic growth in ASEAN countries (Haini, 2019) and Europe (Asteriou, Spanos, 2018). Similarly, from 2000–2014 in MENA (Boukhatem, Mousa, 2018) and in 22 Muslim countries during the period 1999-2011, the financial intermediaries role of Islamic banks have positively impacted economic growth (Abedifar et al., 2016). Recently, with applied VAR, IRFs, and Granger causality, financial development positively affects economic growth in 55 OIC countries (Kim et al., 2018).

The second hypothesis is demand-following. It refers to financial development has positive and significant effect on economic growth. Third fund party has strong correlation to GDP in Denmark, Portugal, and Latvia (Ginevičius et al., 2019; Nuru, Gereziher, 2021). With applied ARDL and VECM, financial development has different effect in short and long-run to Malaysian GDP (Gani, Bahari, 2021). A unidirectional causality emerged between economic growth and financial development in OECD countries (Mtar, Belazreg, 2020). Lastly, bidirectional causality, implying a mutual or two-way causal relationship between financial development and economic growth. Several previous studies have approved this hypothesis. Deposit play important role to enhance the amount of financing in Luxembourg, France, and United Kingdom (Ginevičius et al., 2019). The same result in ASEAN during 1961-2012 (Pradhan et al., 2014) and African countries during the periods 1980-2016, financial development and economic growth effectively worked together (Opoku et al., 2019). In addition, financial development must be supported by financial development to promote income equality and economic growth in developing countries (An et al., 2021; Nyasha, Odhiambo, 2014).

Banks, securities, or financial services could all form the foundation of a financial system (Demirguc-Kunt, Levine, 2001). The bank-based theory concentrates on the advantages of banks for economic development and expansion as well as the shortcomings and defects of the financial system based on securities. According to this hypothesis, banks might affect economic growth in developing

countries more so than the securities market. The concept of a bank-based system also highlights the shortcomings and flaws of the basis system, one of which is that the securities-based system has reduced the motivation for investors to seek out information by making it public. On the other hand, banks, by developing a long-term connection with businesses, remove the interruptions brought on by inconsistent information. Therefore, as opposed to securities-based systems, bank-based arrangements may improve corporate governance and optimal allocation. Additionally, securities-based theory examines the advantages of the market's increased performance and points out the disadvantages of the bank-based system.

3. Data and research method

The recent study validates the contribution of the Indonesian bank (e.g., conventional and Islamic) to GDP toward quarterly data from 2009 to 2021 see table 1. All variables measured by the finance extended to the real economy, which is divided by the nominal GDP. Data was obtained from each banking website and Indonesia central agency on statistics.

Table 1

Indonesian Banks (IB) information

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Islamic bank												
SCB	11	11	11	11	12	12	13	13	14	14	14	12
SBU	23	24	24	23	23	22	22	21	20	19	19	25
SRB	150	155	158	163	163	163	166	167	165	164	167	165
Offices	2,101	2,101	2,663	2,990	2,922	2,747	2,654	2,664	2,724	2,917	2,034	2,045
Assets*	148.98	186.74	199.71	248.10	272	304	366	425	490	538	609	725
Financing*	105.33	118.95	151.06	188.56	201	220	256	287	330	366	396	415
Deposits*	117.51	126.70	150.46	187.20	222	236	285	342	380	425	476	521
Conventional Bank												
CB	122	120	120	120	119	118	116	115	115	110	107	108
CRB	1,706	1,669	1,653	1,635	1,643	1,637	1,633	1,619	1,597	1,545	1,496	1,521
Offices	19,510	20.980	23,713	26,226	27,753	40,810	41,459	41,087	40,615	39,983	40,514	40,612
Assets*	31,338	38,256	44,776	52,059	59,099	64,477	70,974	78,011	85,207	90,630	80,796	84,245
Financing*	18,889	23,601	24,218	35,722	39,952	43,515	47,141	51,210	57,228	60,922	59,515	60,126
Deposits*	24,615	29,408	29,988	39,300	44,382	47,163	51,976	57,159	61,024	65,265	62,819	65,200

SCB = Shariah commercial banks, SBU = Shariah business units, SRB = Shariah rural banks, CB = Conventional bank, CRB = Conventional rural banks, * in trillion rupiah (IDR)
Source: Indonesia's financial service authority

In this study, GDP adopted as proxy for economic growth (Abedifar et al., 2016; M. Anwar et al., 2020). Furthermore, the number of deposits, financing and offices are applied as banking intermediation role (Gani, Bahari, 2021; Ginevičius et al., 2019, Haini, 2019; Nuru, Gereziher, 2021). Therefore, the models contain four variables, including TDep, TFin, IBOff, and GDP. The study focuses on the following model.

$$GDP = f(TDep, TFin, IBOff) \quad (1)$$

Where:

GDP = Gross Domestic product;

TDep = Total Deposit third party;

TFin = Total Financing to society;

IBOff = Indonesia bank offices.

To examine cointegration among variables which examined, this study carried out Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) and refers to Narayan (2004) see table 2.

$$\Delta GDP_t = \alpha_1 + \sum_{i=1}^{k} \beta_{1-i}\ \Delta GDP_{t-1} + \sum_{i=1}^{k} \theta_{1i}\ \Delta TDep_{t-1} + \sum_{i=1}^{k} \theta_{1i}\ \Delta TFin_{t-1} + \sum_{i=1}^{k} \theta_{1i}\ \Delta IBOff_{t-1} + \varepsilon_t \quad (2)$$

4. Results and discussion

4.1 Unit Root Tests

We apply an alignment of unit root tests is ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron). The first-generation panel unit root tests are (hereafter, LLC) (Levin et al., 2002), and (hereafter, IPS) panel unit root tests (Im et al., 2003). The basic equation for the first-generation panel unit root tests is:

$$\Delta\gamma_{i,t} = \mu_i + \rho_i \Delta\gamma_{i,t-1} + \sum_{j=1}^{k} \gamma_{i,j}\Delta\gamma_{i,t-j} + \epsilon_{i,t}; i = 1, 2, 3 \ldots N;\ = 1, 2, 3 \ldots T \quad (3)$$

Where y i,t is the variable, i is the personal fixed effect, i is the autoregressive parameter of variables i, and i,t is the error term. LLC test assumes homogeneity of i across banks and variables. The test uses an augmented Dickey-Fuller (ADF) unit root test for each variable is a common statistical test applied to examine stationary of Time series data which observed. This step is crucial factor on time series see table 2.

Table 2

ADF unit-root test

	Islamic bank				Conventional bank				Islamic and conventional bank			
Variables	Level		1st level		Level		1st level		Level		1st level	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
TD	1.588	5.374	-7.104***	-7.438***	0.148	0.253	-6.928***	-6.940***	0.232	0.349	-6.870***	-6.940***
TF	1.502	1.433	-8.724***	-8.678***	0.241	0.241	-6.708***	-6.708***	0.262	0.287	-6.688***	-6.688***
TO	-0.633	-0.598	-7.253***	-7.257***	-0.928	-0.945	-6.051***	-6.077***	-0.439	-1.026	-7.258***	-6.205***
GDP	-1.563	-1.268	-7.889***	-12.350***								

Notes: *** significance at the 1 per cent level

Source: Author's calculations

It can be seen that the data series of variables gross domestic product (GDP) and Indonesia bank (e.g., conventional and Islamic) deposit, finance, and offices have

stationary at level I(1) than I(0). It implies this study can continue to apply the ARDL approach.

4.2 The cointegration test: Bounds f-test

It means that three models, the calculated F-statistics are higher than the upper critical bounds at 1% and 5% level of significance for three models (4.1343 > 3.67, 4.0119 > 3.67, 5.110 > 4.66), respectively see table 3. It implies Indonesia banks and economic growth has strong correlation in long-run.

Table 3

Bounds F-Test statistic for long run relationship

	Islamic bank		Conventional bank		Islamic and conventional bank	
Sig.	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
1%	-3.57	4.66	3.65	4.66	3.65	4.66
5%	-2.92	3.67	2.79	3.67	2.79	3.67
10%	-2.60	3.20	2.37	3.20	2.37	3.20
	F value = 4.1343		*F* value = 4.0119		*F* value = 5.1180	

Source: Author's calculations

4.3 Estimates of Long-Run Relationship

After establishing the unit root and cointegration test, the next step is to estimate the relationship between short and long-run cointegration parameters. In can be seen in table 4 that three models were estimated in this study (e.g., Islamic, conventional, and combine both the banks) of deposit, financing, offices, and GDP as indicators of financial development. Indonesia Islamic bank (IIB) financing and offices have positive and significant effect on economic growth. Whereas, Indonesia Islamic banks deposit were found to have a negative effect on the GDP in the short run, where at 1% level of significance, a change in Islamic bank deposits and financing leads to around 0.08% increase in economic growth. This pattern is slightly similar to conventional and whole Indonesian banks, with effects around 5% and 4%, respectively. Meanwhile, offices have a strong impact with a 5% change in Islamic bank branches leads to 0.90%. This is quite different from conventional and whole Indonesian banks, implying only 0.04% and 0.01% in significantly 1% and 10%. This is expected since few of the deposits and consumers in whole Indonesian banks are meant for financing in productive sectors.

Table 4

ARDL Short run estimate of Long Run Relationship

	Islamic bank		Conventional bank		Islamic and conventional bank	
Regressor	Coefficients	t Statistics	Coefficients	t Statistics	Coefficients	t Statistics
Deposits	-0.172	-1.883	0.005***	3.294	0.005***	3.339
Financing	0.233***	3.744	0.003**	2.379	0.003**	2.127
GDP	0.528***	3.546	0.686***	4.455	0.743***	4.786
Offices	-0.147	4.139	0.403***	3.091	0.011*	1.897
ARDL	(1, 1, 0, 0)		(1,1, 0, 0)		(1, 1, 0, 0)	
Diagnostic	R^2 = 0.67		R^2 = 0.69		R^2 = 0.69	

Statistics	DW = 1.98	DW=2.10	DW=2.27

Notes: ***, **, * statistical significance at 1%, 5%, 10% respectively
Source: Author's calculations

For example, the coefficient of the GDP term is equal to 0.528, 0.686, and 0.743 for Islamic, conventional and both banks, respectively. This shows that the deviation from the long-term path of Islamic banks has a positive effect on economic output is corrected by 52.8 percent, 68.6 percent from the conventional bank, and 74.3 percent from the whole bank in each period.

4.4 Estimates of Short Run Relationship and the ECM

Islamic bank deposits, financing and GDP has bi-directional causality see table 5. Meanwhile, economic growth to the conventional bank is a unidirectional effect. It also indicates that any deviations from long-run equilibrium take about four to three quarters for short-run adjustment to restore into long-run equilibrium.

Table 5

Granger Causality based on Vector error correction model (VECM)

Financial	IIB-led GDP		GDP-led IIB		CB-led Growth		Growth-led CB		IB-led Growth		Growth-led IB	
Indicators	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short run	ECT_{t-1}	Short	ECT_{t-1}
Total deposits	7.519**	-0.131***	9.644**	-0.007	1.0556	-0.0101***	3.0600*	-3.1455***	1.1227	-0.0423***	3.0337	-3.6699***
Total financing	12.07**	-0.005***	0.010	-0.483	1.0796	0.0089***	3.5877*	-5.5155***	1.1441	0.0388***	3.6118	-4.4355***
Offices	1.206	-0.300**	7.258**	0.086*	0.0623	0.1540**	0.0623*	0.0004***	0.0892	0.5442	4.8650	0.0005***

Notes: *, **, *** represent statistical significance at 10%, 5% and 1% respectively. IIB = Indonesia Islamic bank, CB = conventional bank, IB = Indonesian bank (e.g., Islamic and conventional bank)
Source: Author's calculations

This study also investigates conventional and Islamic banks' contributions to Indonesia's economic growth during an uncertainty condition, which is during and after the COVID-19 pandemic (2020–2021). It can be seen in table 6 that Indonesia' Islamic bank (IIB) deposits do not have a correlation to GDP. whereas total financing and the number of offices have become economic downturn triggers. Interestingly, all indicators from conventional banking have less effect on economic growth. Contrarily, economic growth has a positive effect on enhancing conventional bank deposits and financing. Hence, from whole validation, total Indonesia' financing has a positive and significant effect on economic growth. Meanwhile, the total deposit and the number of offices have less effect on it.

Table 6

Granger Causality during and after the COVID-19 pandemic (2000-2021)

Indicators	IIB-led GDP	GDP-led IIB	CB-led GD P	GDP-led CB	IB-led GDP	GDP-led IB
Total deposits	0.306	1.084	2.969	0.071*	0.304	1.070
Total financing	5.918*	4.244*	3.362	0.052**	5.929***	4.272**
Offices	4.243*	2.215	0.315	0.732	0.361	1.636

Notes: *, **, *** represent statistical significance at 10%, 5% and 1% respectively. IIB = Indonesia Islamic bank, CB = conventional bank, IB = Indonesian bank (e.g., Islamic and conventional bank)
Source: Author's calculations

These results are not surprising in particular that the break of regulations inclines to affect people's self-reliance and the stability of the financial system. The results further show that domestic deposit and financing have a significantly positive effect on economic growth in normal condition. This result is consistent with the prior studies which concluded the long-run relationship shows that, ceteris paribus, a 10 percent increase in the inward deposit and financing ratio is associated with higher GDP (Abedifar et al., 2016; Anarfo et al., 2019). Furthermore, the recent study applied variance decompositions (VDCs) to confirm this result.

The VDCs were computed concurrently to assess the short-run dynamics of the relationship between economic growth and the Indonesian bank (IB). This was achieved by determining how much each variable contributed to oscillations in the others. The VDC findings shown in Table 7 provide information on the IB deposit, financing, and offices. It has been discovered that deposits have the strongest correlation with GDP. The previous conclusion that the variables under consideration demonstrate short-run dynamic causal linkages is supported by this result.

Table 7

Variance Decomposition (VDCs)

Period	SE	Deposit	Financing	Offices	GDP
Variance decomposition of GDP:					
2009	66.36904	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	40.09699	0.927214	13.18142	45.79438
2020	161.7665	40.78377	1.976780	18.05051	60.66703
2021	165.8977	41.87556	1.985682	19.02158	61.25857

Source: Author’s calculations

In general, the processing of the impulse response function by the Cholesky decomposition enabled evaluation of the GDP reaction to IB shocks during the previous eleven years. However, the ordering factors affect how this function turns out. IB development shows an initial significant positive correlation with the GDP over the duration of the study period, with the exception of financing, as shown in Table 8. It affects the direction of

economic growth over the long and short terms. This shows that the coefficients of the error correction model are all long-term stable. The approximated ARDL models are capable of making reliable predictions for both the short- and long-term relationships between the IB and economic growth.

Table 8

Impulse response functions (IRFs)

Period	Deposit	Financing	Offices	GDP
Impulse response functions of GDP:				
2009	0.000000	0.000000	0.000000	66.36904
2010	11.88295	12.06947	20.00873	35.17755
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
2020	39.07320	-1.805601	13.56740	26.76201
2021	39.87552	0.258355	13.89755	27.25885

Source: Author's calculations

5. Conclusion and implications

Based on the specified ARDL models, this study found conventional and Islamic banks have a less significant effect on the real economy in the short period toward mobilizing deposits and financing. Whereas, in the long period has a greater positive effect. During the COVID-19 pandemic, financing has played a crucial role in economic growth through the transfer of capital from depositors and borrowers. It implies that Indonesian banks should promote deposits and investment to invite people to become banking consumers as borrowers and lenders in the long-term. Based on the findings, the recent study can be drawn at least two implications. Firstly, the result of this study shown that in the short-run, Indonesia bank (e.g., conventional and Islamic) has positive role to enhance economic growth; that is, the development of the banking industry contributes significantly to promoting a higher economic growth toward accommodate savers and facilitate the financing from deposits. The increase of deposits and funds available directly stimulates financial intermediation through financial markets or the banking system.

Second, all of the variables which validated have positive and significant effect on economic growth. It proves the positive long-run correlation between financial development and economic growth. When financing and investment enter into a local economy, banking has developed the domestic financial markets. The bank is most likely to open a branch office to manage their local accommodation to promote transactions. As these creativities are beneficial for banks and clients for banks, funds are made existing to the banking sector to boost its lending potential. These banks are also more likely to demand a higher quality of products and banking services. Therefore, the inflows of deposits and financing may facilitate ways to stimulate local banking sector development.

The implication of this study is shown the causality relationship by the three indicators for the Indonesian banking institution (i.e., TDep, TFin, and IBOff). However, the banks need to design and develop longer-term instruments of financial products and services. So far, the success of the Indonesian bank development to enhance economic growth can be attributed to the conducive policy environment accorded by the Indonesian government. Besides, the government need pay attention to financial and productive sectors to fight economic downturn before and after the COVID-19 pandemic. Besides, this policy not only potentially to improve economic but also poverty alleviation.

6. Limitations and direction for future research

Some areas that may enhance the literature could explain more detailed aspects of banking by analyzing specific variables in different economic segments and sustainable development goal (SDG) not only in economic sectors such as GDP and financial development, but also social field such as examine financial development role to poverty alleviation. This would help the identification of some sectors which have to contribute to the economic growth and poverty reduction. Moreover, future studies should consider combining regions that have implemented dual banking systems to obtain sufficient data and a human and intellectual capital (e.g., education) contribution to economic growth. There is also a need to use diverse and advanced approaches, such as GMM framework, to validate the consistency of the results toward panel or time-series data. This could provide a more apparent viewpoint for the strategy references. The future study also needs brighter on this area.

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Best regards,
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Financial Development and Economic Growth: Evidence from Indonesia Before and After the COVID-19 Pandemic[1]

Abstract. During the COVID-19 pandemic, most countries suffered economically. Financial institutions play an important role in enhancing economic growth through intermediation. However, preliminary studies focused on common aspects of financial institutions rather than the banking context, and the majority of the literature was written prior to the COVID-19 pandemic. This study examines the banking sector's role in short-run and long-run contributions to economic growth from 2009 to 2021. Indicators of the number of banking deposits, offices and public financing were used as proxies to validate the relationship between Indonesian financial development and economic growth (gross domestic product) in the vector error correction model (VECM). The Indonesian bank's contribution to the country's economic growth was examined. Data were collected from banks' annual reports. This study found a strong short- and long-term correlation between financial development and Indonesia's economic growth. There is a bidirectional relationship between Indonesia's Islamic Bank (IIB) and GDP. The relationship between the conventional bank and Indonesia's economic growth is unidirectional. Therefore, policymakers should enhance the intensified mobilisation of loans obtained for capital and productive projects. This study also shows that macroeconomic and microeconomic stability can be improved by enhancing capital inflows and investments in lucrative sectors, as the research goal was to examine the effect of financial development before and after the COVID-19 pandemic, which detriments most countries' stability. However, future studies need to confirm banks' contributions to specific sectors such as agriculture and small and medium enterprises due to their strong correlation with developing countries.

Keywords: conventional bank, Islamic bank, Indonesian economic growth, GDP, financing, deposits, ARDL, VECM

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ИССЛЕДОВАТЕЛЬСКАЯ СТАТЬЯ

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Финансовое развитие и экономический рост Индонезии до и после пандемии COVID-19

Аннотация. Пандемия COVID-19 негативно повлияла на экономическое развитие большинства стран. Финансовые институты, выступая в качестве посредников, играют важную роль в ускорении экономического роста. Однако предыдущие работы исследовали финансовые организации в общем, не учитывая банковский контекст. Кроме того, большинство исследований было выполнено до пандемии COVID-19. В статье рассматривается краткосрочное и долгосрочное влияние банковского сектора на экономическое развитие Индонезии в период 2009-2021 гг. Показатели количества вкладов, количества банковских офисов, а также общественного финансирования были использованы в качестве переменных для анализа взаимосвязи между финансовым развитием и экономическим ростом (валовым внутренним продуктом). С этой целью авторы использовали векторную модель коррекции ошибок. Проведенная на основе данных годовых отчетов оценка влияния индонезийских банков на экономический рост страны выявила краткосрочную и долгосрочную корреляцию между финансовым развитием и экономическим ростом Индонезии. Между исламским банком Индонезии и ВВП существует двухсторонняя взаимосвязь, а между традиционным банком и экономическим ростом — односторонняя. Таким образом, следует позволить банкам выдавать больше кредитов на инвестиционные и производственные проекты. Исследование финансового развития до и после пандемии COVID-19 показало, что макро- и микроэкономическая стабильность может быть восстановлена путем увеличения притока капитала и инвестиций в прибыльные секторы. В дальнейшем необходимо проанализировать влияние банков на конкретные секторы, такие как сельское хозяйство и малый и средний бизнес, играющие важную роль в развивающихся странах.

Ключевые слова: традиционный банк, исламский банк, экономический рост Индонезии, ВВП, финансирование, вклады, модель авторегрессии и распределённого лага, векторная модель коррекции ошибок

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Introduction

Economic growth, stability, and positive sustainability have been the principal concerns for developing countries. However, local financing resources are necessary to support the development projects and investments. The majority of developed and developing countries heavily depend on sources of external capital such as foreign productive investment, cross-border interbank borrowing, and concessional loans and remittances. Capital inflow and financing play an important role in improving the national gross domestic product (GDP). Besides, financial development, such as the number of offices to facilitate lenders and borrowers to intermediate banking in financing and credit, also has an essential role in improving the economy. The crucial role of the financial sector after two economic and financial crises in 1997–1998, 2007–2008, and during the COVID-19 pandemic has become an essential topic for discussion in both theoretical and empirical aspects. During the COVID-19 pandemic, most countries suffered economic and financial downturns.

The global economic downturn made some countries concerned about enhancing the facilitation of production and demand of products and services, supply chain and market disruption to support distribution processes, and firms and financial markets[1]. This phenomenon pursues regulatory remedies to prevent economic troubles. The bank regulator, government, and supervisor have enforced the effective functioning of domestic banking systems in resource transformation and liquidity. However, theoretical and empirical studies have broadly debated the interconnection between intermediary banking's role and economic growth. Some scholars elaborated on the causality between financial development and economic growth (Cong, 2022; Ginevičius et al., 2019; Nuru & Gereziher, 2021). The banking sector had an essential role in attracting consumers

[1] The market watches. (2020). Retrieved from: https://www.marketwatch.com/press-release/global-development-boards-market-2020-size-share-growth-trends-and-forecast-2026-business opportunities-and-future-investments-2020-06-17-91974236-1916287672 (Date of access: 07.09.2021).

to save their money and distributing the deposits as lending activities to provide loans for financing and investment.

The financial system fosters productivity improvement by providing financing and various innovative activities (Rani et al., 2022; Tinta, 2022). The intermediary financial role towards deposits and financing has a significant and positive impact on economic growth (Beck et al., 2000; Levine, 1997). For instance, based on six alternative financial development indicators, the relationship between financial inclusion and economic growth is demand-following and supply-leading. It implies that banking plays an important role in facilitating the relationship between borrowers and lenders (Anarfo et al., 2019; Haini, 2019; Anwar et al., 2020). During the COVID-19 pandemic, Indonesia's economy (e. g., GDP) plummeted to –7.1 % until –7.5 % in 2020. This trend was still elevated at –7.9 % in Q1 2021. However, in Q2 2021, Indonesian GDP was expected to rebound by 4.4 % in 2021 and to accelerate to 5.0 % in 2022[1].

Prior studies raised more concerns across the regions (Ma et al., 2020; Mhadhbi et al., 2020), for instance, the Association of Southeast Asian Nations (ASEAN) countries (Haini, 2019; Pradhan et al., 2014), Organisation for Economic Co-operation and Development (OECD) countries (Mtar & Belazreg, 2020), and sub-Saharan African countries (Akinlo et al., 2020). Financial inclusion (e. g., saving) also played a crucial role in improving 179 countries during 2011–2017 (Chakraborty & Abraham, 2021). Similarly, money supply and financing had a strong correlation with economic growth in 12 low-income countries during 1980–2016, in Ghana over the period 1971–2012 (Alhassan et al., 2022), and in Eswatini during 1996–2018 (Fakudze et al., 2022). Meanwhile, in the countries of the Southern African Development Community (SADC) during 1990–2015, financial development had a negative effect on economic growth (Taivan & Nene, 2016). Hence, this topic is worthwhile to validate.

How about Indonesia? The lack of research focused specifically on the context of a country with dual banking systems (e. g., conventional and Islamic banks) makes the role of the financial sector inconclusive. The present study seeks to address these questions and contribute to the research on relationship between financial development (e. g., conventional and Islamic banks) and economic growth in Indonesia. It is the primary goal of this work.

In answering these questions, this research extends the existing literature and practical contributions. First, the study attempts to fill this gap by concentrating on both conventional and Islamic banks and combining these sectors. Preliminary studies focus more on either conventional or Islamic banks. Very few studies combine conventional and Islamic banking. Hence, it is important to examine the relationship between financial development and economic growth in a country that has a dual banking system. This study used Granger causality and vector error correction model (VECM) to validate the bidirectional relationship between financial development and Indonesia's economic growth. However, there is a lack of research focused on investigating the two-way linkages between financial development and economic growth.

Second, prior studies on financial development and economic growth have neglected to combine both types of banks (e. g., conventional and Islamic). This approach involves several endogenous variables explained by their delayed values on the relationship between financial development and economic growth (Levine, 1997; Levine et al., 2000; Mhadhbi et al., 2020), economic growth on financial development (Ginevičius et al., 2019; Mtar, & Belazreg, 2020; Opoku et al., 2019) using the systems autoregressive distributed lag model (ARDL) and VECM.

Third, this study observes the relationship between financial development and economic growth with a combination of financial and non-financial aspects such as the number of offices and employees. It makes the results coherent and robust (Cheng & Hou, 2020; Kim et al., 2018). In this study, forecast variance decompositions (VDCs) and impulse response functions (IRFs) are applied to predict the effect of economic growth on financial development (FD). The financial crisis of 2008 required the examination of the interdependence between these sectors and economy. However, few studies examine this field, and the majority of the researchers elucidated these parts separately. There are at least two major limitations in prior studies. First, the used cross-sectional data lacks the ability to solve country-specific problems (Haini, 2019; Pradhan et al., 2014). Second, the majority of previous studies are derived from a bidirectional causal analysis with the likelihood of the bias of the variables. The results of the bidirectional causality test may be invalid due to the omission of an essential variable in the causality model (Le & Tran-Nam, 2018).

[1] World Bank (2021). Retrieved from: https://www.worldbank.org/en/country/indonesia/publication/indonesia-economic-prospects-iep-june-2021-boosting-the-recovery. (Date of access: 29.03.2022).

Indonesia was selected for analysis in the present study. The choice was motivated by three main reasons. First, Indonesia has reformed its financial systems and combined conventional and Islamic banks. Second, Indonesia has a robust system and potential for growth in conventional and Islamic finance institutions. Third, in the last decade, Indonesia's banking assets and offices have been growing rapidly. However, the country's economic growth was stagnant at around 5 % and worse during the COVID-19 pandemic. Hence, the government needs a solution, specifically the baking system's contribution to economic growth.

2. Conceptual Background

There are four famous financial structure theories on economic activities, such as those that develop fundamental studies to validate the relationship between financial development, financial structure, and economic growth (Beck et al., 2000). However, this study examined the financial structure based on the financial system for economic growth. First, the authors concluded that financial development played an important role in economic growth, while financial structure had a lesser role in 48 countries from 1980 until 1985. In the second study, the authors concluded that financial development without a specific type of financial scheme has a positive and significant effect on economic growth in 40 countries (Demiurgic-Kunt & Maksimovic, 2002).

Financial development influences economic growth with regard to four economic theories: bank-based, market-based, financial services, and legal views (Levine, 2002). The author concluded that financial structure does not have a crucial role in economic growth, capital distribution, or personal income. Furthermore, other scholars concluded that bank-based lending has a positive and significant effect on economic growth, the development of companies, and capital budgeting efficiency across countries and firms (Beck & Levine, 2002). They found that, overall, financial development and legal system efficiency play an important role in economic growth, whereas bank-based approach has a smaller impact on the enhancement of some regions' GDP. Scholars have produced notable results regarding financial development and economic growth as a result of education quality (Hanushek & Woessmann, 2007), population (Mason & Lee, 2022), and income equality (Levine, 1997; Topuz, 2022). In addition, the financial role of economic growth depends on the indicators that researchers adopt as proxies in their studies (Adu et al., 2013).

In Ghana (Adu et al., 2013) and Malaysia (Anwar & Sun, 2011), credit or financing of the private sector for consumption and investment has a positive effect on economic growth, whereas the stock market has a less positive effect on GDP. This indicator, as well as employment, capital inflow, inflation, and exports have a negative effect on economic growth in China (Wang et al., 2015). Similarly, financial liberalisation has a negative effect on economic growth in 10 Southern African Development Community (SADC) countries (Taivan & Nene, 2016). Grassa and Gazdar (2014) concluded that Islamic banks have a greater effect on economic banks than conventional banks in five Gulf Cooperation Council (GCC) countries. Bolbol et al. (2005) found that bank-based indicators and market-based indicators positively reinforced economic growth in Egypt. In other words, education, income distribution, and population in the economy are divided among social groups and classes, and the economic system's performance is measured.

Recently, the empirical studies have focused more on the panel of countries and individual-country studies (Ledhem & Mekidiche, 2020; Rani et al., 2022). One assumption in the theory of economic growth is whether the institution has a positive effect on economic growth. Endogenous growth theory was developed by Romer and Lucas in the 1980s (Romer, 2011). It places greater emphasis on human capital (e. g., employees and consumers) as a lender and borrower relationship effect to economic growth towards education, knowledge, and training. Islamic banks positively affect Indonesia's economic growth and investments (Anwar et al., 2020). Islamic banks not only have economic goals (e. g., profit) but also have social contributions towards financing and social activities (Junaidi, 2021; Junaidi et al., 2023).

The concept of financial development's role in economic growth comprises three hypotheses, namely supply-leading, demand-following, and bidirectional, of the financial deepening-growth nexus. The supply-leading hypothesis assumes that financial development positively affects economic growth as a valuable process (Haini, 2019; Rani et al., 2022) and is caused by the increase in rate savings and investment. Several recent studies have examined this approach through three types of economic integration, including overall integration, financial integration, and trade integration, in Vietnam from 1986 to 2015 (Nguyen et al., 2019). It means that banks as intermediaries transferring deposits to financing have a positive effect on economic growth. Similarly, in Austria, the evolution of GDP and savings from 1998 to 2016 positively influenced GDP (Ginevičius et al., 2019). This indi-

cates that the developing countries' policy of financial reforms leads to improved economic growth (Dyakov, 2022). Other scholars got the same result in different regions, such as Malaysia (Gani & Bahari, 2021), Nigeria (Karimo & Ogbonna, 2017), Austria, France, and Korea (Cheng & Hou, 2020), 16 African and non-African low-income countries (Bist, 2018), China and India (Kandil et al., 2017), as well as South Asia (Munir & Shahid, 2021). Interestingly, during the financial crisis in 2008–2009, financial development consistently promoted economic growth in ASEAN countries (Haini, 2019) and Europe (Asteriou & Spanos, 2018). Similarly, in Middle East and North Africa from 2000 to 2014 (Boukhatem & Mousa, 2018) and in 22 Muslim countries during the period 1999–2011, the financial intermediary role of Islamic banks has positively impacted economic growth (Abedifar et al., 2016). Recently, with applied VAR, IRFs, and Granger causality, it was revealed that financial development positively affects economic growth in 55 Organisation of Islamic Cooperation (OIC) countries (Kim et al., 2018).

The second hypothesis is demand-following. It refers to financial development having a positive and significant effect on economic growth. The third fund party has a strong correlation to GDP in Denmark, Portugal, and Latvia (Ginevičius et al., 2019; Nuru & Gereziher, 2021). With applied ARDL and VECM, financial development has different effects in the short and long run on Malaysian GDP (Gani & Bahari, 2021). A unidirectional causality between economic growth and financial development in OECD countries was described (Mtar & Belazreg, 2020). Lastly, bidirectional causality implies a mutual or two-way causal relationship between financial development and economic growth. Several previous studies have approved this hypothesis. Deposits play an important role in enhancing the amount of financing in Luxembourg, France, and the United Kingdom (Ginevičius et al., 2019). In ASEAN during 1961–2012 (Pradhan et al., 2014) and African countries in the period 1980–2016, financial development and economic growth effectively worked together (Opoku et al., 2019). In addition, financial development must be supported to promote income equality and economic growth in developing countries (An et al., 2021; Nyasha & Odhiambo, 2014).

Banks, securities, or financial services could all form the foundation of a financial system (Demirgüç-Kunt & Levine, 2001). The bank-based theory concentrates on the advantages of banks for economic development and expansion as well as the shortcomings and defects of the financial system based on securities. According to this hypothesis, banks might affect economic growth in developing countries more so than the securities market. The concept of a bank-based system also highlights the shortcomings and flaws of the basis system, one of which is that the securities-based system has reduced the motivation for investors to seek out information by making it public. On the other hand, banks, by developing a long-term connection with businesses, remove the interruptions brought on by inconsistent information. Therefore, as opposed to securities-based systems, bank-based arrangements may improve corporate governance and optimal allocation. Additionally, securities-based theory examines the advantages of the market's increased performance and points out the disadvantages of the bank-based system.

3. Data and research method

The recent study validates the contribution of the Indonesian bank (e. g., conventional and Islamic) to GDP based on quarterly data from 2009 to 2021 (see Table 1). All variables measured by finance extend to the real economy, which is divided by the nominal GDP. Data were obtained from banks' websites and Indonesian Central Agency of Statistics.

In this study, GDP was adopted as a proxy for economic growth (Abedifar et al., 2016; Anwar et al., 2020). Furthermore, the number of banking deposits, offices and public financing are considered as intermediaries (Gani & Bahari, 2021; Ginevičius et al., 2019; Haini, 2019; Nuru & Gereziher, 2021). Therefore, the models contain four variables TDep, TFin, IBOff, and GDP. The study focuses on the following model.

$$GDP = f(TDep, TFin, IBOff) \quad (1)$$

where *GDP* = Gross domestic product, *TDep* = Total banking deposits, *TFin* = Total public financing, *IBOff* = Indonesian bank offices.

To examine cointegration among variables, the research performed Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests and refers to Narayan (2004) (Table 2).

$$\Delta GDP_t = \alpha_1 + \sum_{i=1}^{k} \beta_{1-i} \Delta GDP_{t-1} + \sum_{i=1}^{k} \theta_{1i} \Delta TDep_{t-1} + \\ + \sum_{i=1}^{k} \theta_{1i} \Delta TFin_{t-1} + \sum_{i=1}^{k} \theta_{1i} \Delta IBOff_{t-1} + \varepsilon_t, \quad (2)$$

4. Results and discussion

4.1. Unit root tests

This study applied an alignment of ADF and PP unit root tests. The first-generation panel unit root tests are Levin-Lin-Chu (hereafter, LLC)

Table 1

Data on Indonesian Banks (IB)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Islamic Banks												
SCB	11	11	11	11	12	12	13	13	14	14	14	12
SBU	23	24	24	23	23	22	22	21	20	19	19	25
SRB	150	155	158	163	163	163	166	167	165	164	167	165
Offices	2,101	2,101	2,663	2,990	2,922	2,747	2,654	2,664	2,724	2,917	2,034	2,045
Assets*	148.98	186.74	199.71	248.10	272	304	366	425	490	538	609	725
Financing*	105.33	118.95	151.06	188.56	201	220	256	287	330	366	396	415
Deposits*	117.51	126.70	150.46	187.20	222	236	285	342	380	425	476	521
Conventional Banks												
CB	122	120	120	120	119	118	116	115	115	110	107	108
CRB	1.706	1.669	1.653	1.635	1.643	1.637	1.633	1.619	1.597	1.545	1.496	1.521
Offices	19,510	20,980	23,713	26,226	27,753	40,810	41,459	41,087	40,615	39,983	40,514	40,612
Assets*	31.338	38.256	44.776	52.059	59.099	64.477	70.974	78.011	85.207	90.630	80.796	84.245
Financing*	18.889	23.601	24.218	35.722	39.952	43.515	47.141	51.210	57.228	60.922	59.515	60.126
Deposits*	24.615	29.408	29.988	39.300	44.382	47.163	51.976	57.159	61.024	65.265	62.819	65.200

SCB = Shariah commercial banks, SBU = Shariah business units, SRB = Shariah rural banks, CB = Conventional bank, CRB = Conventional rural banks, * in trillion rupiah (IDR).
Source: Indonesia's financial service authority.

Table 2

ADF unit root test

Variables	Islamic bank				Conventional bank				Islamic and conventional bank			
	Level		1st level		Level		1st level		Level		1st level	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
TD	1.588	5.374	–7.104***	–7.438***	0.148	0.253	–6.928***	–6.940***	0.232	0.349	–6.870***	–6.940***
TF	1.502	1.433	–8.724***	–8.678***	0.241	0.241	–6.708***	–6.708***	0.262	0.287	–6.688***	–6.688***
TO	–0.633	–0.598	–7.253***	–7.257***	–0.928	–0.945	–6.051***	–6.077***	–0.439	–1.026	–7.258***	–6.205***
GDP	–1.563	–1.268	–7.889***	–12.350***								

Notes: *** significance at the 1 per cent level.
Source: Author's calculations.

(Levin et al., 2002) and Im-Pesaran-Shin (hereafter, IPS) panel unit root tests (Im et al., 2003). The basic equation for the first-generation panel unit root tests is:

$$\Delta\gamma_{i,t} = \mu_i + \rho_i \Delta\gamma_{i,t-1} + \sum_{j=1}^{k} \gamma_{i,j} \Delta\gamma_{i,t-j} + \epsilon_{i,t};$$

$$i = 1, 2, 3, \ldots, N; t = 1, 2, 3, \ldots, T, \quad (3)$$

where γ is the GDP growth rate, i is the personal fixed effect and the autoregressive parameter of variables, and t is the error term. The LLC test assumes homogeneity of i across banks and variables. The test uses an augmented Dickey-Fuller (ADF) unit root test for each variable, which is a common statistical test applied to examine the stationary time series data observed. This step is a crucial factor in time series (Table 2).

It can be seen that the data series of variables gross domestic product (GDP) and Indonesian bank (e. g., conventional and Islamic) deposits, finance, and offices are stationary at level I(1) rather than I(0). It implies that the ARDL approach can be further applied.

4.2. The cointegration test: Bounds f-test

It means that for three models, the calculated F-statistics are higher than the upper critical bounds at the 1 % and 5 % level of significance for the three models (4.1343 > 3.67, 4.0119 > 3.67, 5.110 > 4.66), respectively (see Table 3). It implies

Table 3

Bounds F-Test statistic for the long-run relationship

Sig., %	Islamic bank		Conventional bank		Islamic and conventional bank	
	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
1	–3.57	4.66	3.65	4.66	3.65	4.66
5	–2.92	3.67	2.79	3.67	2.79	3.67
10	–2.60	3.20	2.37	3.20	2.37	3.20
	F-value = 4.1343		*F*-value = 4.0119		*F*-value = 5.1180	

Source: Author's calculations.

that Indonesian banks and economic growth have a strong long-term correlation.

4.3. Estimates of the long-run relationship

After unit root and cointegration tests, the next step is to estimate the relationship between short- and long-run cointegration parameters. It can be seen in Table 4 that three models were estimated in this study (e. g., Islamic, conventional, and both banks combined) where banking deposits, public financing, offices, and GDP are seen as indicators of financial development. Indonesian Islamic bank (IIB) financing and offices have a positive and significant effect on economic growth. At the same time, Indonesian Islamic bank deposits were found to have a negative effect on GDP in the short run, where, at the 1 % level of significance, a change in Islamic bank deposits and financing leads to an approximately 0.08 % increase in economic growth. This pattern is slightly similar to conventional and all Indonesian banks, with effects of around 5 % and 4 %, respectively. Meanwhile, bank offices have a strong impact, with a 5 % change in Islamic bank branches leading to 0.90 %. This is expected since few of the deposits and consumers in the whole Indonesian banking system are meant for financing productive sectors.

For example, the coefficients of GDP equal to 0.528, 0.686, and 0.743 for Islamic, conventional, and both banks, respectively. This shows that the deviation from the long-term path of Islamic banks has a positive effect on economic output and is corrected by 52.8 percent, 68.6 percent from the conventional bank, and 74.3 percent from the whole banking system in each period.

4.4. Estimates of the short-run relationship and the ECM

Islamic bank deposits, financing, and GDP have bidirectional causality (Table 5). Meanwhile, the relationship between the conventional bank and Indonesia's economic growth is unidirectional. It

Table 4

ARDL short-run estimate of the long-run relationship

	Islamic bank		Conventional bank		Islamic and conventional bank	
Regressor	**Coefficients**	***t* Statistics**	**Coefficients**	***t* Statistics**	**Coefficients**	***t* Statistics**
Deposits	–0.172	–1.883	0.005***	3.294	0.005***	3.339
Financing	0.233***	3.744	0.003**	2.379	0.003**	2.127
GDP	0.528***	3.546	0.686***	4.455	0.743***	4.786
Offices	–0.147	4.139	0.403***	3.091	0.011*	1.897
ARDL	(1, 1, 0, 0)		(1,1, 0, 0)		(1, 1, 0, 0)	
Diagnostic	$R^2 = 0.67$		$R^2 = 0.69$		$R^2 = 0.69$	
Statistics	$DW = 1.98$		$DW = 2.10$		$DW = 2.27$	

Notes: ***, **, * statistical significance at 1 %, 5 %, 10 % respectively.
Source: Author's calculations.

Table 5

Granger causality based on vector error correction model (VECM)

Financial	**IIB-led GDP**		**GDP-led IIB**		**CB-led Growth**		**Growth-led CB**		**IB-led Growth**		**Growth-led IB**	
Indicators	**Short run**	ECT_{t-1}	**Short run**	ECT_{t-1}	**Short run**	ECT_{t-1}	**Short run**	ECT_{t-1}	**Short run**	ECT_{t-1}	**Short run**	ECT_{t-1}
Total deposits	7.519**	–0.131***	9.644**	–0.007	1.0556	–0.0101***	3.0600*	–3.1455***	1.1227	–0.0423***	3.0337*	–3.6699***
Total financing	12.07**	–0.005***	0.010	–0.483	1.0796	0.0089***	3.5877*	–5.5155***	1.1441	0.0388***	3.6118*	–4.4355***
Offices	1.206	–0.300**	7.258**	0.086*	0.0623	0.1540**	0.0623*	0.0004***	0.0892	0.5442	4.8650**	0.0005***

Notes: *, **, *** represent statistical significance at 10 %, 5 % and 1 % respectively. IIB = Indonesia Islamic bank, CB = conventional bank, IB = Indonesian bank (e. g., Islamic and conventional bank).
Source: Author's calculations.

Table 6

Granger causality during and after the COVID-19 pandemic (2000–2021)

Indicators	**IIB-led GDP**	**GDP-led IIB**	**CB-led GDP**	**GDP-led CB**	**IB-led GDP**	**GDP-led IB**
Total deposits	0.306	1.084	2.969	0.071*	0.304	1.070
Total financing	5.918***	4.244*	3.362	0.052**	5.929***	4.272**
Offices	4.243**	2.215	0.315	0.732	0.361	1.636

Notes: *, **, *** represent statistical significance at 10 %, 5 % and 1 % respectively. IIB = Indonesia Islamic bank, CB = conventional bank, IB = Indonesian bank (e. g., Islamic and conventional bank).
Source: Author's calculations.

also indicates that any deviations from long-run equilibrium take about four to three quarters for short-run adjustment to restore into long-run equilibrium.

This study also investigates conventional and Islamic banks' contributions to Indonesia's economic growth under uncertainty, which is during and after the COVID-19 pandemic (2020–2021). It can be seen in Table 6 that Indonesian Islamic bank (IIB) deposits do not have a correlation with GDP, whereas total financing and the number of offices have become economic downturn triggers. Interestingly, all indicators from conventional banking have less effect on economic growth. Contrarily, economic growth has a positive effect on enhancing conventional bank deposits and public financing. Hence, in general, total financing in Indonesia has a positive and significant effect on economic growth. Meanwhile, the total deposit and number of offices have less effect on it.

These results are not surprising, in particular that the break of regulations is likely to affect people's self-reliance and the stability of the financial system. The results further show that domestic deposits and public financing have a significant positive effect on economic growth in normal conditions. This result is consistent with prior studies, which concluded that the long-run relationship shows that, ceteris paribus, a 10 percent increase in the inward deposit and financing ratio is associated with higher GDP (Abedifar et al., 2016; Anarfo et al., 2019). Furthermore, the recent study applied variance decompositions (VDCs) to confirm this result.

The VDCs were computed concurrently to assess the short-run dynamics of the relationship between economic growth and the Indonesian bank (IB). This was achieved by determining how much each variable contributed to oscillations in the others. The VDC findings shown in Table 7 pro-

Table 7

Variance Decomposition (VDCs)

Period	SE	Deposits	Financing	Offices	GDP
Variance decomposition of GDP:					
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
2020	161.7665	40.78377	1.976780	18.05051	60.66703
2021	165.8977	41.87556	1.985682	19.02158	61.25857

Source: Author's calculations.

Table 8

Impulse response functions (IRFs)

Period	Deposits	Financing	Offices	GDP
Impulse response functions of GDP:				
2009	0.000000	0.000000	0.000000	66.36904
2010	11.88295	12.06947	20.00873	35.17755
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
2020	39.07320	–1.805601	13.56740	26.76201
2021	39.87552	0.258355	13.89755	27.25885

Source: Author's calculations.

vide information on the IB deposits, public financing, and offices. It has been discovered that deposits have the strongest correlation with GDP. The previous conclusion that the variables under consideration demonstrate short-run dynamic causal linkages is supported by this result.

In general, the processing of the impulse response function by the Cholesky decomposition enabled the evaluation of the GDP reaction to IB shocks during the previous eleven years. However, the ordering factors affect how this function turns out. IB development shows an initial significant positive correlation with GDP during the examined period, with the exception of public financing, as shown in Table 8. It affects the direction of economic growth over the long and short terms. This shows that the coefficients of the error correction model are all long-term stable. The approximated ARDL models are capable of making reliable predictions for both the short- and long-term relationships between the IB and economic growth.

5. Conclusion and implications

In Indonesia, financial institutions are essential for ensuring that business transactions go smoothly because deposit money banks are effective at guaranteeing that money flows to various business partners. In addition, the banks are expected to raise money and meet both short-term and long-term financial demands given their position as the only player in the financial market. Numerous econometric techniques are used in the study to identify the structural break in the financial sector's output before and after the COVID-19 epidemic in Indonesia. This time frame coincides with the global financial crisis and economic collapse. This study discovered that conventional and Islamic banks have a less substantial impact on the actual economy in the short term when it comes to mobilising deposits and public financing based on the defined ARDL models. However, over the long term, it has a more favourable impact.

In general, the projected results confirm earlier findings by demonstrating that financial and institutional development has a favourable and considerable impact on Indonesia's economic growth. Though conventional and Islamic banks play distinct roles in the short and long term, the estimated findings demonstrate that financial institutions are important and beneficial to economic growth. On the one hand, these results are consistent with the theory that the impacts of financial development on GDP are diminishing (Tinta, 2022; Wang et al., 2015). However, earlier studies that found financial institutions to be stronger in the long-run (Anwar et al., 2020; Opoku et al., 2019) can be used to explain why financial development and institutions have little impact on economic growth. On the other hand, the financial institutions' major effects imply that the Indonesian economy needs to continue to integrate and strengthen its financial sector if it is to support economic growth. In addition, the analysis confirms several earlier empirical studies (Munir & Shahid, 2021; Nguyen et al., 2019) on a beneficial and important influence of law on economic growth. Even more intriguingly, the regulator supports financial development because the relationship between financial institutions and businesses and their use of banks as intermediaries is important and promotes economic expansion. This backs up earlier empirical research that emphasises the beneficial interplay between institutions and finance in the economy.

During the COVID-19 pandemic, financing has played a crucial role in economic growth through the transfer of capital from depositors and borrowers. It implies that Indonesian banks should promote deposits and investment to invite people to become banking consumers as borrowers and lenders in the long term. Based on the findings, the recent study has at least two implications. First, the result of this study shows that, in the short run, Indonesian banks in general (e. g., conventional and Islamic banks combined) have a positive role in enhancing economic growth; that is, the development of the banking industry contributes significantly to promoting higher economic growth towards accommodating savers and facilitating the financing of deposits. The increase in deposits and funds available directly stimulates financial intermediation through financial markets or the banking system.

Second, all of the variables that were validated had a positive and significant effect on economic growth. It proves the positive long-run correlation between financial development and economic growth. When public financing and investment enter a local economy, banking develops the domestic financial markets. The bank is most likely to open a branch office to manage their local accommodations and promote transactions. As these activities are beneficial for banks and their clients, funds are made available to the banking sector to boost its lending potential. These banks are also more likely to demand a higher quality of products and banking services. Therefore, the inflows of deposits and financing may facilitate ways to stimulate local banking sector development.

The implication of this study is shown by the causality relationship between the three indica-

tors for the Indonesian banking institution (i. e., TDep, TFin, and IBOff). However, the banks need to design and develop longer-term instruments for financial products and services. So far, the success of the Indonesian banks' development to enhance economic growth can be attributed to the conducive policy environment accorded by the Indonesian government. Besides, the government needs to pay attention to the financial and productive sectors to fight the economic downturn before and after the COVID-19 pandemic. Besides, this policy has the potential to improve not only economics but also poverty alleviation.

6. Limitations and direction for future research

The research may be expanded to include the explanation of some banking aspects in more detail by analysing specific variables in different economic segments and the sustainable development goals (SDGs) not only in economic sectors such as GDP and financial development but also in social fields such as examining the role of financial development in poverty alleviation. This would help in the identification of sectors that have to contribute to economic growth and poverty reduction.

Moreover, future studies should consider combining regions that have implemented dual banking systems to obtain sufficient data and examine the contribution of human and intellectual capital (e. g., education) to economic growth. There is also a need to use diverse and advanced approaches, such as the GMM framework, to validate the consistency of the results towards panel or time-series data. This could provide a more apparent viewpoint for the strategy references.

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