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Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Pacific-Basin Finance Journal

journal homepage: www.elsevier.com/locate/pacfin

Public ownership and local bank lending at the time of the Covid-19 pandemic: Evidence from Indonesia

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ARTICLE INFO

JEL codes:

G01
G21
G28

Keywords:

Government ownership
Bank loans
Credit supply
Covid-19
BPRs

ABSTRACT

This paper empirically analyzes whether the Covid-19 pandemic has brought about a significant impact on the lending of local banks and whether such impact has been different for public as compared to private local banks. Using panel data from 1344 Bank Perkreditan Rakyat (BPRs) –banks licensed to provide services within only a province's area– in Indonesia, this paper confirms the negative impact that the Covid-19 pandemic has had on local bank lending. This paper also confirms that the impact of the Covid-19 pandemic on lending has been smaller for local banks owned by majority government shareholders than for local banks owned by private shareholders, providing support to the “social” view of government intervention in the banking sector.

1. Introduction

The consequences of the Covid-19 pandemic have been severe for the global economy (Altig et al., 2020; Padhan and Prabheesh, 2021; Tisdell, 2020). Companies have been forced to adapt or change the way they operate in order to survive (Pantano et al., 2020; Seetharaman, 2020), and banks do not seem to be an exception.

Faced with the deterioration of the quality of assets and heightened uncertainty due to the Covid-19 pandemic, many banks have cut back on their lending. This raises a concern over further economic slowdowns. In this situation, public banks –banks owned by governments at some levels– are expected to play a greater role to support the economy, in particular by continuously offering lending to households and business entities in a way that is untenable for their private counterparts. To follow the “social” view of government intervention in the banking sector, public banks can help to improve social welfare by curbing market failures and stabilizing the economy through the maintenance of credit supply during economic crises (Berger and Roman, 2020; Stiglitz, 1993). Government ownership warrants the allocation of resources by banks to investments that are socially profitable, even if the investments are not financially attractive.

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<https://doi.org/10.1016/j.pacfin.2023.102072>

Received 10 September 2022; Received in revised form 29 May 2023; Accepted 2 June 2023

Available online 12 June 2023

0927-538X/© 2023 Published by Elsevier B.V.

In contrast to the relationship between lending and crisis in general (Brei and Schclarek, 2013; H.-C. Chen et al., 2022; Cull and Martínez Pería, 2013; Ivashina and Scharfstein, 2010; Meriläinen, 2016), the relationship between lending and pandemic related crisis is relatively new in the banking literature. The study by Gong et al. (2021) in 37 countries shows that higher numbers of H1N1 (Swine flu) cases are associated with larger loan spreads and smaller loan sizes. Examining the impact of past pandemics in 140 countries, such as the pandemics of Severe Acute Respiratory Syndrome (SARS), the Middle East respiratory syndrome (MERS), and Ebola, Danisman and Demir (2021) report that uncertainties caused by pandemics significantly reduce the growth of domestic credit to the private sector. In the more recent context, there have been a few studies that examine the relationship between lending and the Covid-19 pandemic (Appiah-Otoo, 2020; Beck and Keil, 2022; Colak and Öztekin, 2021; Dursun-de Neef and Schandlbauer, 2021, 2022; Hasan et al., 2021; Norden et al., 2021; C. Y. Park and Shin, 2021). Early cross-country evidence show that the Covid-19 pandemic hampers bank lending (Colak and Öztekin, 2021; Dursun-de Neef and Schandlbauer, 2021; Hasan et al., 2021; Colak and Öztekin, 2021; Dursun-de Neef and Schandlbauer, 2021; Hasan et al., 2021). Focusing on the United States data, Beck and Keil (2022) find that the number and average amount of syndicated loans drop among banks exposed directly to the Covid-19 pandemic and lockdown policies. With respect to cross-border lending flows, Park and Shin (2021) report that higher non-performing loans (NPLs) ratios at the time of the Covid-19 pandemic are associated with higher withdrawals by international investors and lower lending flows from advanced to emerging market economies.

None of the above studies covers the lending by local banks, nor do they attempt to examine whether the impact of the pandemic on lending differs for public as compared to private banks (Norden et al. (2021) is an exception). In order to fill the gap, this paper empirically analyzes whether the Covid-19 pandemic has brought about a significant negative impact on local bank lending and whether such impact has been different for public as compared to private local banks. To be more specific, this paper refers to the lending of *Bank Perkreditan Rakyat* (BPRs or People's Credit Bank) in Indonesia. BPRs are banks formally licensed to provide financial services within only a province's area.¹ Unlike commercial banks, the operation of BPRs is limited to collecting savings and time deposits, offering loans, and placing funds with other banks or with the central bank. BPRs are not allowed to collect demand deposits, offer payment services, or engage in foreign exchange activities. By the end of 2020, there were 1506 BPRs in Indonesia (excluding similar financial institutions operating based on Islamic principles). Together, these BPRs hold more than USD 10,34 billion assets or around 1% of the country's gross domestic products (GDP).²

Using panel data regression analysis, this paper provides evidence that the impact of the Covid-19 pandemic on local bank lending has been significant negative. Further, this paper provides evidence that the impact of the Covid-19 pandemic has been different for public than private local banks.

This paper relates to the existing works in at least three ways. First, this paper adds to the existing literature on bank behavior in the time of pandemics (Beck and Keil, 2022; Colak and Öztekin, 2021; Dursun-de Neef and Schandlbauer, 2022; Gong et al., 2021; Hasan et al., 2021). This paper is different in that it focuses on the lending of local banks and that it delves into the behavior of public as compared to private banks. Second, this paper extends the previous literature on the relationship between government ownership and bank lending (Bertay et al., 2015; Laidroo, 2016; Micco and Panizza, 2006), including those examining the lending response of public versus private banks during economic crises (Bosshardt and Cerutti, 2020; Brei and Schclarek, 2013; Cull and Martínez Pería, 2013). This paper is different in that it focuses on the lending of public versus private banks during the Covid-19 pandemic. It has been emphasized that the Covid-19 pandemic is different from previous pandemic in terms of its global spread, severity, and higher mortality rate, which induce massive government interventions. Third, this paper builds on the thin literature examining the impact of the Covid-19 pandemic on the banking system stability of developing countries (Norden et al., 2021). To the best of the authors' knowledge, this paper is the first to study the impact of the Covid-19 pandemic on bank lending in Indonesia –one of the largest developing countries– using a large, bank-level dataset.

The remainder of this paper is as follows. Section two highlights the literature. Section three provides the data and empirical strategy used in this paper. Section four presents and discusses the empirical results. Section five concludes.

2. Hypothesis development

From prior studies, it is known that there are at least three mechanisms through which the Covid-19 pandemic has negatively affected bank lending. The first mechanism is by increasing credit risk. The spread of the novel coronavirus has prompted the government to apply a lockdown policy and restrict people's movement. Ultimately, this policy affects companies' and households' earnings, worsens their balance sheets, exacerbates their debt-service burden, and leads to a spike in the probability of loans default (Kryzanowski et al., 2022; Siregar et al., 2021; Yin et al., 2022). Tölö and Virén (2021) and several other authors report that the probability of loan default is significant for lending (Huljak et al., 2020; C. Y. Park and Shin, 2021; Sánchez Serrano, 2021). Even after the government issued certain regulations allowing for credit restructuring (e.g., the Indonesian Financial Services Authority (OJK) Regulation Number 11/POJK.03/2020, which allows banks to provide new loans to debtors affected by the Covid-19 pandemic regardless of the status of existing loans), this first mechanism through which the pandemic impacts bank lending may remain important.

¹ BPRs have been called "rural banks" in several studies (Trinugroho et al., 2018a, 2018b; Wasiaturrahma et al., 2020). However, in this paper, the term "local banks" instead of "rural banks" is used to reflect the fact that they operate within a province's boundary and to avoid misunderstanding, as most BPRs are actually located in urban areas, not rural areas.

² With an assumption that USD 1 = IDR 15,000.

The second mechanism is that heightened uncertainty at the time of the pandemic has increased the likelihood of making incorrect lending decisions (Wu et al., 2020). Banks need to recognize the difference between promising borrowers who have the capacity to meet their obligations throughout the lifetime of the loans and other borrowers who have no capacity to meet their obligations due to the Covid-19 pandemic. Granting loans to borrowers who have no capacity to meet obligations will put banks in a difficult situation in the future and will threaten their stability. In this case, the banks may decide to follow a conservative approach and limit their lending (Alessandri and Bottero, 2020; Buch et al., 2015; Gozgor et al., 2019; Wu et al., 2020).

Rather than altering credit supply decisions, the third mechanism through which the Covid-19 pandemic has negatively impacted bank lending is by reducing the demand for lending. In response to heightened uncertainty at the time of the Covid-19 pandemic, companies may have decided to postpone or cancel their investments (see, e.g., Dixit and Pindyck (1994) and Gulen and Ion (2016) for related references in the past), reducing the need for business loans. This is true even after the government has issued policies allowing companies to receive subsidies (e.g., an interest rate subsidy for small and medium enterprises that are affected by the Covid-19 pandemic in Indonesia). Similarly, in response to heightened uncertainty at the time of the Covid-19 pandemic, households may have been inclined to postpone or cancel their spending (Nam et al., 2021; J. S. Park and Suh, 2019), reducing the need for consumer loans.

Based on the three mechanisms above, the first hypothesis is formulated as follows:

H1. The Covid-19 pandemic negatively impacts bank lending.

Furthermore, there are three explanations for why the impact of the Covid-19 pandemic may have been smaller on the lending of public as compared to private banks. The first explanation is that public banks are implicitly or explicitly mandated to stabilize the economy (Brei and Schclarek, 2015; Micco and Panizza, 2006). Having such a mandate, public banks are more willing to continue to maintain the supply of credit amid the Covid-19 pandemic to help with smoothing out the impact of the crisis. Likewise, public banks are more willing to bear risks and losses since their primary goals are not simply to maximize economic profits, but also to improve social welfare (Berger and Roman, 2020; Stiglitz, 1993). Thus, public banks may have curbed market failure at the time of the Covid-19 pandemic and maintained the supply of credit to help relieve the impact of the crisis.

The second explanation for why the impact of the Covid-19 pandemic on lending may have been smaller for public as compared to private banks is that public banks are less vulnerable and face less pressure with respect to liquidity. On the one hand, the liabilities of public banks are implicitly guaranteed. Public banks have extra liquidity from their government shareholders (Brei and Schclarek, 2015) and are more likely to be recapitalized if the Covid-19 pandemic becomes severe. On the other hand, public banks have a more stable deposit base (Andries and Billon, 2010; Brei and Schclarek, 2015). They suffer fewer potential withdrawals from their depositors, as public banks are perceived to be safer than private banks. This has helped public banks uphold their liquidity and maintain the supply of credit during the Covid-19 pandemic.

While the first and second explanations above are pertinent to banks in general, the third explanation is more specific to the case of local banks (i.e., the types of banks that become the focus of the current paper). The impact of the Covid-19 pandemic on lending may have been smaller for public as compared to private banks because public local banks tend to have a stronger relationship with borrowers than private local banks. Public local banks have been found to be oriented more toward long-term business loans that are suitable for small and medium enterprises (SMEs) (Luna-Martinez & de Luna-Martinez and Vicente, 2012). Facing long maturity, public local banks need to maintain their support to borrowers, especially during economic slowdowns. By continuing to offer lending at the time of the Covid-19 pandemic, public local banks have secured their relationship with borrowers, as well as their long-term investments.

Empirical studies by Bosshardt and Cerutti (2020), Cull and Martínez Pería (2013), Bertay et al. (2015) and Brei and Schclarek (2013) confirm that the lending activity of public banks act counter-cyclically to smooth the supply of credit over the ups and downs of the economy. While several other studies report no difference between public and private banks (e.g. Cull and Martínez Pería (2013), Laidroo (2016) and Zins and Weill (2018)), the second hypothesis is formulated as follows:

H2. The impact of the Covid-19 pandemic on lending has been smaller for public than private local banks.

3. Data and empirical strategy

The data in this paper come from each bank's financial reports available on the website of the Indonesia Financial Services Authority. The sample comprises an unbalanced panel from 196 public and 1148 private BPRs over the period between the first quarter of 2018 and the third quarter of 2021. Only banks with no missing values throughout the pre- and during the Covid-19 pandemic are included.

The analysis in this paper is conducted using regressions, where the dependent variable is the quarter-to-quarter percentage growth of loans granted by BPRs to households and non-banking firms deflated by the consumer price index (CPI). The first key independent variable is a dummy variable capturing the impact of the Covid-19 pandemic on loan growth. Its value equals 1 for the periods between the second quarter of 2020 and the third quarter of 2021, and 0 otherwise. Even though Indonesia's first Covid-19 case was confirmed in early March 2020, it is assumed that the impact of the Covid-19 pandemic began to take place only after the next three weeks, when business activities were halted and the government started to impose restrictions to contain the spread of the coronavirus. The second key independent variable is a public local bank dummy whose value equals 1 for BPRs that are owned by majority provincial and/or local government shareholders, and 0 otherwise. The third key independent variable is an interaction term between the previous two dummies. It seizes the possible different impact of the Covid-19 pandemic on the loan growth of public as compared to private BPRs. If

Table 1
Variable descriptions.

Variable name	Variable descriptions	Sources
Real loans growth	Quarter-to-quarter percentage growth of CPI-deflated loans granted by a local bank	Fin. reports
Provincial real GDP growth	Quarter-to-quarter percentage growth of provincial real gross domestic products	BPS
Change in provincial CPI	Quarter-to-quarter percentage change in the consumer price index	BPS
D. Covid-19 pandemic	Dummy, taking the value 1 for the periods between the second quarter of 2020 and the first quarter of 2021 and 0 otherwise	–
Log new Covid-19 cases pc.	Natural logarithm of three-monthly, province-specific number of new Covid-19 cases per capita	M. of Health
D. public banks	Dummy, taking the value 1 for local banks owned by majority provincial and/or local government shareholders and 0 otherwise	Fin. reports
Lag. gross NPL over loans	Lagged ratio of gross non-performing loans to a local bank's total loans	Fin. reports
Lag. real deposit growth	Lagged quarter-to-quarter percentage growth of CPI-deflated deposits	Fin. reports
Lag. loans over total assets	Lagged ratio of loans to a local bank's total assets	Fin. reports
Lag. equity over total assets	Lagged ratio of equity to a local bank's total assets	Fin. reports
Lag. liquid over total assets	Lagged ratio of cash to a local bank's total assets	Fin. reports
Lag. log real total assets	Natural logarithm of a local bank's real total assets	Fin. reports
Lag. returns on equity	Earnings before interest and taxes over a local bank's equity	Fin. reports

the coefficient of this interaction term is significant, then there is evidence to support the hypothesis that the impact of the Covid-19 pandemic on lending differs for public as compared to private BPRs.

The baseline regression equation in this paper is similar to that of [Brei and Schclarek \(2013\)](#). It takes the form

$$L_{i,j,t} = \beta_0 + \beta_1 C_t + \beta_2 P_{i,j,t} + \beta_3 C_t P_{i,j,t} + \beta_4 X_{i,j,t} + \beta_5 M_{j,t} + \beta_6 D_{j,t} + \varepsilon_{i,t} \quad (1)$$

where $L_{i,j,t}$ denotes the dependent variable, that is, the quarterly growth of CPI-deflated loans granted by BPR i in province j at the end of time t . C_t denotes a dummy for the Covid-19 pandemic, $P_{i,j,t}$ denotes a dummy for public BPRs, and $C_t P_{i,j,t}$ denotes an interaction term between the dummy for the Covid-19 pandemic and the dummy for public BPRs. $X_{i,j,t}$ denotes a vector of BPR-specific control variables, $M_{j,t}$ denotes a vector of macroeconomic and industry-specific control variables in province j where a BPR operates at time t , and $D_{j,t}$ denotes a vector of dummy control variables. β denotes the parameters to be estimated and ε denotes the error term.

The vector of BPR-specific control variables consists of the ratio of gross non-performing loans (NPLs) to total loans, the quarter-to-quarter percentage growth of real deposits, and the ratio of loans to total assets. The ratio of gross NPLs to total loans measures credit risk. Its expected coefficient is negative. Larger gross NPLs imply riskier assets in the loan portfolio, inducing banks to reduce lending ([Aydin, 2008](#); [Laidroo, 2016](#); [C. Y. Park and Shin, 2021](#)). The coefficient of the growth of real deposits is expected to be positive. Higher deposit growth increases banks' funding and induces them to increase lending ([Bosshardt and Cerutti, 2020](#)). The ratio of loans to total assets measures the extent to which banks have been loaned up ([Bertay et al., 2015](#)). The higher this ratio, the more exposed banks are to default risk, reducing their tendency to provide lending. The expected coefficient of this ratio is, therefore, negative.

Further, the vector of BPR-specific control variables comprises the ratio of equity to total assets, the ratio of liquid assets to total assets, the natural logarithm of real total assets, and returns on equity. The ratio of equity to total assets measures banks' capitalization. [Calem and Rob \(1999\)](#) report that banks take larger risks in lending at both low and high capitalization levels. It is, therefore, likely that the relationship between equity over total assets and lending is nonlinear. To deal with this issue, [Brei and Schclarek \(2013\)](#) control for the squared value of equity over total assets along with equity over total assets. In the current paper, only the latter is controlled for as the two variables are found to be highly correlated. The ratio of liquid assets to total assets reflects the ability of banks to sustain their lending activities. However, it may also reflect banks' inability to transform their liquid assets into earning assets ([Bertay et al., 2015](#)). The coefficient of the ratio of liquid assets to total assets can, therefore, be negative or positive. The natural logarithm of real total assets measures the size of banks. Despite the potential significance of bank size for lending, the expected coefficient of the natural logarithm of real total assets is ambiguous ([Brei and Schclarek, 2013](#); [Ehrmann and Worms, 2004](#); [Gambacorta, 2005](#)). The relationship between return on equity and lending is expected to be positive. Profitability signals sound financial performance and may induce banks to increase lending ([Aydin, 2008](#); [Kim and Sohn, 2017](#); [Nguyen and Dang, 2021](#)).

To deal with outliers, the dependent variable and the BPR-specific control variables are winsorized at the 1st and 99th percentiles. In addition, to mitigate potential endogeneity issues, all the BPR-specific control variables are lagged by one period. Following the strategy used by [Brei and Schclarek \(2013\)](#), these variables are also demeaned and as such their coefficients can be interpreted in terms of the average BPR.

The vector of macroeconomic and industry-specific control variables consists of the quarter-to-quarter percentage growth of provincial real GDP and the three-monthly percentage change in provincial CPI. The importance of real GDP growth for bank lending has been highlighted in several previous studies, including those examining the procyclicality of credit growth ([Bertay et al., 2015](#); [G. Chen and Wu, 2014](#); [Meriläinen, 2016](#); [Sarath and Van Pham, 2015](#); [Zins and Weill, 2018](#)). In addition to the ups and downs of the economy in general, real GDP growth can also be seen as a proxy for the change in the demand for lending. Its expected coefficient is positive. By contrast, the coefficient of the percentage change in provincial CPI is expected to be negative ([Zins and Weill, 2018](#)).

Table 2
Descriptive statistics.

Variable name	N obs.	Mean	Std. dev.	Min.	Max.
Real loans growth	20,092	1.476	8.216	-19.006	39.141
Provincial real GDP growth	20,092	0.675	3.153	-15.715	13.409
Change in provincial CPI	20,092	0.523	0.755	-6.260	4.939
D. Covid-19 pandemic	20,092	-	-	0.000	1.000
Log new Covid-19 cases pc.	20,092	-13.362	5.677	-20.096	-3.486
D. Public local banks	20,092	-	-	0.000	1.000
Lag. returns on assets	20,092	0.000	0.075	-0.459	0.164
Lag. gross NPL over loans	20,092	0.000	0.087	-0.122	0.353
Lag. real deposits growth	20,092	-0.023	11.141	-35.476	55.658
Lag. loans over total assets	20,092	0.000	0.126	-0.447	0.239
Lag. equity over total assets	20,092	0.000	0.148	-0.200	0.561
Lag. liquid over total assets	20,092	0.000	0.010	-0.011	0.052
Lag. log real total assets	20,092	0.001	1.164	-2.624	3.201

N obs. = Number of observations; Std. dev. = Standard deviation; Min. = Minimum value; Max = Maximum value.

Table 3
Multicollinearity diagnostics.

	GGDP	DCPI	DC19	DGOW	ROA	NPL	GRTD	TLTA	EQTA	LATA	LRTA
GGDP	1.000										
DCPI	-0.115	1.000									
DC19	-0.078	-0.244	1.000								
DGOW	0.008	-0.002	-0.001	1.000							
ROA	0.009	-0.004	-0.001	0.002	1.000						
NPL	-0.007	0.005	-0.000	-0.027	-0.394	1.000					
GRTD	0.003	-0.003	0.002	0.013	0.041	-0.113	1.000				
TLTA	0.000	-0.001	-0.001	0.061	0.151	-0.133	-0.046	1.000			
EQTA	0.017	0.012	0.001	0.027	0.026	0.060	-0.061	-0.071	1.000		
LATA	-0.000	-0.003	0.000	0.104	-0.124	0.121	-0.036	-0.018	0.083	1.000	
LRTA	-0.008	-0.004	-0.000	0.216	0.271	-0.261	0.033	0.129	-0.445	-0.277	1.000

GGDP = Provincial real GDP growth; DCPI = Change in provincial CPI; DC19 = D. Covid-19 pandemic; DGOW = D. public local banks; ROA = Lag. returns on assets; NPL = Lag. gross NPL over loans; GRTD = Lag. real deposits growth; TLTA = Lag. loans over total assets; EQTA = Lag. equity over total assets; LATA = Lag. liquid assets over total assets; LRTA = Lag. log real total assets.

The vector of dummy control variables comprises province dummies, year dummies, and quarter dummies. The province dummies account for province-level heterogeneities that are time-invariant over the whole period of analysis. The year dummies capture possible calendar time effects and some other forms of cross-sectional dependence, while the quarter dummies account for seasonal variation in the data. Table 1 provides a brief description of the variables used in this paper and their sources. (See Table 2.)

The parameters in eq. (1) are estimated using the dynamic system GMM estimators (Arellano and Bover, 1995; Blundell and Bond, 2000). These estimators allow for the inclusion of the lagged dependent variable as an independent variable. These estimators also concede the potential dynamics of BPRs' loan growth (for example, due to targets that are set in earlier periods) and address the possible endogeneity between loan growth and BPR-specific control variables. To ensure that the estimators are consistent and to guarantee that the instruments used in the regressions are valid, the standard Arellano-Bond test for zero autocorrelation and the Hansen test of overidentification are implemented.

4. Results and discussion

Table 3 presents the results from multicollinearity diagnostics. In general, the coefficients of correlation between different independent variables are fairly low. This relieves concerns about possible multicollinearity issues.

4.1. Baseline regression results

Table 4 presents the results from regressions estimating the impact of the Covid-19 pandemic on the growth of loans across both public and private BPRs. In columns 1–3, each regression includes a constant, lagged dependent variable, the percentage growth of provincial real GDP, the percentage change in provincial CPI, a dummy for the Covid-19 pandemic, a dummy for public BPRs, province dummies, year dummies, and quarter dummies. In addition, the regression in column 2 includes four BPR-specific control variables, that is, returns on assets, the ratio of gross NPLs to total loans, the growth of real deposits, and the ratio of loans to total assets. In column 3, three other BPR-specific control variables are added into the regression, that is, the ratio of equity to total assets, the ratio of liquid assets to total assets and the natural logarithm of real total assets. The results in these columns show that the coefficient of the Covid-19 pandemic dummy is negative and significant at the 1% level. By contrast, the coefficient of the dummy for public BPRs is not

Table 4
Results from baseline regressions.

	Full Sample: Public and Private Banks			Sub-sample: Public Banks Only			Sub-sample: Private Banks Only		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lag. dependent variable	0.149*** (0.017)	0.141*** (0.019)	0.144*** (0.019)	0.144*** (0.041)	0.120*** (0.038)	0.117*** (0.039)	0.156*** (0.019)	0.141*** (0.021)	0.150*** (0.020)
Provincial real GDP growth	0.131*** (0.019)	0.140*** (0.018)	0.143*** (0.019)	0.136*** (0.051)	0.146*** (0.048)	0.150*** (0.047)	0.128*** (0.020)	0.136*** (0.020)	0.139*** (0.020)
Change in provincial CPI	-1.379*** (0.080)	-1.381*** (0.080)	-1.366*** (0.082)	-1.251*** (0.230)	-1.156*** (0.220)	-1.155*** (0.216)	-1.393*** (0.085)	-1.405*** (0.086)	-1.394*** (0.088)
D. Covid-19 pandemic	-2.564*** (0.277)	-2.607*** (0.277)	-2.597*** (0.277)	-1.866*** (0.614)	-2.023*** (0.611)	-1.947*** (0.571)	-2.659*** (0.308)	-2.708*** (0.306)	-2.668*** (0.308)
D. Public local banks	0.057 (0.176)	0.043 (0.294)	2.029 (1.363)						
Lag. returns on assets		1.051 (1.568)	1.121 (1.586)		0.306 (3.667)	-1.012 (3.911)		0.981 (1.663)	1.240 (1.697)
Lag. gross NPL over loans		-52.138*** (4.723)	-54.388*** (4.487)		-36.429*** (11.508)	-38.217*** (9.967)		-53.260*** (4.973)	-57.267*** (4.728)
Lag. real deposit growth		0.015 (0.010)	0.020** (0.010)		0.014 (0.016)	0.018 (0.017)		0.014 (0.011)	0.020* (0.011)
Lag. loans over total assets		-18.059*** (3.122)	-17.061*** (3.136)		-12.720** (5.635)	-18.122** (7.440)		-19.788*** (3.418)	-19.157*** (3.436)
Lag. equity over total assets			-6.535 (5.930)			23.084 (15.470)			-8.405 (5.936)
Lag. liquid over total assets			7.565 (23.885)			28.654 (36.766)			-6.699 (27.006)
Lag. log real total assets			-2.128 (1.428)			0.512 (2.152)			-2.136 (1.433)
N observations	20,092	20,092	20,092	2938	2938	2938	17,154	17,154	17,154
N banks	1344	1344	1344	196	196	196	1148	1148	1148
N instruments	48	54	60	34	46	55	47	53	59
AR(2) test (p-value)	0.200	0.228	0.254	0.307	0.196	0.217	0.107	0.146	0.129
Hansen test (p-value)	0.291	0.198	0.122	1	0.823	0.502	0.442	0.332	0.110

The dependent variable in the regressions above is the quarter-to-quarter percentage growth of CPI-deflated loans granted by a local bank. Each regression includes a constant, province dummies, year dummies, and quarter dummies. The values reported for each variable are coefficients and heteroskedasticity-autocorrelation-robust standard errors. *, **, and *** denotes significance at the 10, 5, and 1% level.

Table 5
Results from regressions with an interaction term.

	Full Sample: Public and Private Banks		
	(1)	(2)	(3)
Lag. dependent variable	0.149*** (0.017)	0.141*** (0.019)	0.144*** (0.019)
Provincial real GDP growth	0.130*** (0.019)	0.140*** (0.018)	0.142*** (0.019)
Change in provincial CPI	-1.381*** (0.080)	-1.384*** (0.080)	-1.369*** (0.082)
D. Covid-19 pandemic	-2.669*** (0.284)	-2.740*** (0.282)	-2.705*** (0.286)
D. Public local banks	-0.231 (0.229)	-0.319 (0.324)	1.664 (1.390)
D. Covid-19 * D. Pub. banks	0.719** (0.310)	0.910*** (0.342)	0.743** (0.362)
Lag. returns on assets		1.081 (1.567)	1.144 (1.585)
Lag. gross NPL over loans		-52.057*** (4.722)	-54.376*** (4.488)
Lag. real deposit growth		0.016 (0.010)	0.020** (0.010)
Lag. loans over total assets		-18.157*** (3.131)	-17.185*** (3.147)
Lag. equity over total assets			-6.262 (5.995)
Lag. liquid over total assets			7.606 (23.889)
Lag. log real total assets			-2.056 (1.433)
N observations	20,092	20,092	20,092
N banks	1344	1344	1344
N instruments	49	55	61
AR(2) test (p-value)	0.198	0.222	0.247
Hansen test (p-value)	0.291	0.179	0.185

The dependent variable in the regressions above is the quarter-to-quarter percentage growth of CPI-deflated loans granted by a local bank. Each regression includes a constant, province dummies, year dummies, and quarter dummies. The values reported for each variable are coefficients and heteroskedasticity-autocorrelation-robust standard errors. *, **, and *** denotes significance at the 10, 5, and 1% level.

statistically significant at any standard level.

In columns 4–6, only public BPRs are included in the sub-sample. It can be seen that, regardless of the BPR-specific control variables added, the coefficient of the dummy for the Covid-19 pandemic is negative and significant at the 1% level. Taking other variables constant, the growth of public BPRs' loans is lower during the Covid-19 pandemic. In columns 4–6, only private BPRs are included in the sub-sample. The results suggest that the coefficient of the dummy for the Covid-19 pandemic is negative and significant at the 1% level. Holding other variables constant, the growth of private BPRs' loans is also lower during the Covid-19 pandemic.

Overall, the results presented in Table 4 conform to the finding by Colak and Öztekin (2021) and Norden et al. (2021) that banks reduce their lending amid the Covid-19 pandemic. The results also conform to the finding by Danisman and Demir (2021) that pandemics hamper domestic credit.

Table 5 presents the results from regressions similar to those columns 1–3 in Table 4, but with an interaction term between the Covid-19 pandemic dummy and the dummy for public BPRs. The coefficient of the Covid-19 pandemic dummy now represents the impact on banks' loan growth of the Covid-19 pandemic that does not depend on public versus private ownership status. Meanwhile, the coefficient of the dummy for public BPRs represents the effect that such a variable has on banks' loan growth that is not subject to the occurrence of the Covid-19 pandemic.

In each column, the coefficient of the Covid-19 pandemic dummy is negative and significant at the 1% level. By contrast, the coefficient of the dummy for public BPRs is not statistically significant at any standard level. The coefficient of the interaction term between the Covid-19 pandemic dummy and the dummy for public BPRs is positively signed and significant at the 1% level. Thus, despite the absence of a difference between public and private BPRs' loan growth over the whole period of analysis, the impact of the Covid-19 pandemic on loan growth is smaller for public as compared to private local banks.

These results, while pertinent to the unparalleled Covid-19 pandemic, are in line with the finding by Cull and Martínez Pería (2013) that public banks' loans growth exceeds that of private banks during the 2008–2009 crisis in Latin America. The results are also partially in line with the finding by Brei and Schclarek (2013) that the growth of public banks' loans increases in response to crises, while private banks' loans growth decreases.

Table 6
Results from regressions with an alternative measure of the Covid-19 pandemic.

	Full Sample: Public and Private Banks			Sub-sample: Public Banks Only			Sub-sample: Private Banks Only		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lag. dependent variable	0.151*** (0.017)	0.143*** (0.019)	0.146*** (0.019)	0.146*** (0.041)	0.123*** (0.038)	0.119*** (0.039)	0.158*** (0.019)	0.143*** (0.021)	0.152*** (0.020)
Provincial real GDP growth	0.140*** (0.019)	0.152*** (0.019)	0.155*** (0.019)	0.145*** (0.055)	0.159*** (0.051)	0.163*** (0.050)	0.137*** (0.020)	0.147*** (0.020)	0.151*** (0.020)
Change in provincial CPI	-1.337*** (0.080)	-1.339*** (0.080)	-1.323*** (0.082)	-1.207*** (0.231)	-1.107*** (0.220)	-1.107*** (0.215)	-1.353*** (0.085)	-1.364*** (0.086)	-1.353*** (0.087)
Log new Covid-19 cases pc.	-0.271*** (0.047)	-0.301*** (0.047)	-0.305*** (0.047)	-0.152 (0.113)	-0.201* (0.114)	-0.195* (0.106)	-0.286*** (0.052)	-0.315*** (0.051)	-0.318*** (0.052)
D. Public local banks	0.057 (0.176)	0.050 (0.295)	2.051 (1.363)						
Lag. returns on assets		1.079 (1.569)	1.140 (1.585)		0.324 (3.668)	-0.981 (3.919)		1.020 (1.663)	1.271 (1.696)
Lag. gross NPL over loans		-51.985*** (4.738)	-54.070*** (4.494)		-36.183*** (11.444)	-37.867*** (9.945)		-53.098*** (4.993)	-56.967*** (4.737)
Lag. real deposit growth		0.015 (0.010)	0.020** (0.010)		0.014 (0.017)	0.017 (0.017)		0.014 (0.011)	0.020* (0.011)
Lag. loans over total assets		-18.442*** (3.125)	-17.391*** (3.140)		-13.016** (5.640)	-18.359** (7.446)		-20.145*** (3.422)	-19.462*** (3.442)
Lag. equity over total assets			-6.707 (5.932)			23.142 (15.492)			-8.378 (5.938)
Lag. liquid over total assets			8.345 (23.799)			27.535 (36.724)			-5.724 (26.911)
Lag. log real total assets			-2.145 (1.427)			0.543 (2.151)			-2.094 (1.434)
N observations	20,092	20,092	20,092	2938	2938	2938	17,154	17,154	17,154
N banks	1344	1344	1344	196	196	196	1148	1148	1148
N instruments	48	54	60	34	46	55	47	53	59
AR(2) test (p-value)	0.163	0.167	0.201	0.344	0.222	0.240	0.0871	0.106	0.0994
Hansen test (p-value)	0.371	0.233	0.128	1.000	0.905	0.499	0.486	0.256	0.124

The dependent variable in the regressions above is the quarter-to-quarter percentage growth of CPI-deflated loans granted by a local bank. Each regression includes a constant, province dummies, year dummies, and quarter dummies. The values reported for each variable are coefficients and heteroskedasticity-autocorrelation-robust standard errors. *, **, and *** denotes significance at the 10, 5, and 1% level.

Table 7

Results from regressions with an alternative measure of the Covid-19 pandemic and an interaction term.

	Full Sample: Public and Private Banks		
	(1)	(2)	(3)
Lag. dependent variable	0.151*** (0.017)	0.144*** (0.019)	0.146*** (0.019)
Provincial real GDP growth	0.139*** (0.019)	0.151*** (0.019)	0.154*** (0.019)
Change in provincial CPI	-1.339*** (0.080)	-1.341*** (0.080)	-1.326*** (0.082)
Log new Covid-19 cases pc.	-0.281*** (0.048)	-0.313*** (0.047)	-0.315*** (0.047)
D. Public local banks	0.994*** (0.384)	1.200** (0.493)	2.910** (1.383)
Log NCC pc. * D. Pub. banks	0.070*** (0.027)	0.086*** (0.029)	0.070** (0.032)
Lag. returns on assets		1.101 (1.568)	1.154 (1.585)
Lag. gross NPL over loans		-51.899*** (4.740)	-54.060*** (4.496)
Lag. real deposit growth		0.015 (0.010)	0.020** (0.010)
Lag. loans over total assets		-18.543*** (3.133)	-17.524*** (3.151)
Lag. equity over total assets			-6.352 (6.020)
Lag. liquid over total assets			8.478 (23.806)
Lag. log real total assets			-2.058 (1.435)
N observations	20,092	20,092	20,092
N banks	1344	1344	1344
N instruments	49	55	61
AR(2) test (p-value)	0.163	0.166	0.197
Hansen test (p-value)	0.373	0.198	0.194

Log NCC pc. is the abbreviated version of the log new Covid-19 cases pc. The dependent variable in the regressions above is the quarter-to-quarter percentage growth of CPI-deflated loans granted by a local bank. Each regression includes a constant, province dummies, year dummies, and quarter dummies. The values reported for each variable are coefficients and heteroskedasticity-autocorrelation-robust standard errors. *, **, and *** denotes significance at the 10, 5, and 1% level.

4.2. Robustness test results

It has been mentioned that the first key independent variable in this paper is a dummy variable capturing the impact of the Covid-19 pandemic on loan growth. Its value is equal to 1 for the periods between the second quarter of 2020 and the third quarter of 2021, and 0 otherwise. The question that may be raised is whether the results in this paper hold if the impact of the Covid-19 pandemic is captured by any other proxy. To cope with such a question, the regressions in Tables 4 and 5 are re-estimated with an alternative key independent variable, that is, the natural logarithm of the three-monthly, province-specific number of new Covid-19 cases per capita. Tables 6 and 7 summarize the results.

In Table 6, columns 1–3, where public and private BPRs are both covered as the sample, the coefficient of the natural logarithm of the number of new Covid-19 cases per capita is always negative and statistically significant at the 1% level. Meanwhile, the coefficient of the dummy for public BPRs is not statistically significant. In columns 4–6, where public BPRs are covered as the sample, the coefficient of the natural logarithm of the number of new Covid-19 cases per capita is always negative, albeit statistically significant only in columns 5 and 6. In columns 7–9, where private BPRs are covered as the sample, the coefficient of the natural logarithm of the number of new Covid-19 cases per capita is always negative and significant at the 1% level.

In Table 7, the coefficient of the natural logarithm of the number of new Covid-19 cases per capita is always negative and statistically significant at the 1% level. The coefficient of the dummy for public BPRs is positive and significant. The coefficient of the interaction term between the natural logarithm of the number of new Covid-19 cases per capita and the dummy for public BPRs is also positive and significant. Thus, it is affirmed that the growth of public and private BPRs' loans is, in general, lower during the Covid-19 pandemic. It is also affirmed that, despite the overall significant reducing impact of the Covid-19 pandemic on the growth of BPRs' loans, the impact is smaller for public BPRs than for private BPRs.

Further tests (available with the authors upon request) indicate that the results in this paper are robust. Including new control variables, or excluding previously insignificant control variables, does not alter the findings. Likewise, estimating the parameters in eq. (1) using alternative estimators, particularly the random effect (RE) estimators or the Hausman and Taylor (1981) estimators, does not qualitatively change the main findings.

Lastly, it is acknowledged that the coefficient of the dummy for public BPRs is not significant in Tables 4 and 5, raising the question of whether the statistical significance of the interaction term between the Covid-19 pandemic dummy and the dummy for public BPRs is driven solely by the Covid-19 pandemic dummy. To deal with this question, the Wald's joint significance test between the dummy for public banks and its interaction term with the dummy for the Covid-19 pandemic is implemented. The results (available with the authors upon request) provide evidence that the significance of the interaction term between the Covid-19 pandemic dummy and the dummy for public banks is not driven by the Covid-19 pandemic dummy.

5. Conclusion

This paper analyzes whether the Covid-19 pandemic has brought about a significant impact on the lending of local banks (BPRs) in Indonesia and whether such impact has been different for public and private local banks. From the results, it can be concluded that the impact of the Covid-19 pandemic on the lending of local banks has indeed been significant. Further, it can be concluded that the impact of the Covid-19 pandemic on lending has been smaller for public than private local banks. These conclusions are robust and not subject to the choices of proxy for the Covid-19 pandemic, regression estimators, and control variables.

This paper gives some insights into the severity of the impact of the Covid-19 pandemic on the banking industry. This paper also lends some support to the "social" view of government intervention in the banking sector (Berger and Roman, 2020; Stiglitz, 1993). Public banks have helped to stabilize the economy, particularly by reducing less of their lending relative to the reduction in the lending of private banks amid the Covid-19 pandemic. From a policy point of view, the finding in this paper suggests that different strategies may be needed to induce public and private banks to increase their supply of credit during pandemics.

CRedit authorship contribution statement

Akhmad Akbar Susanto: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Danes Quirira Octavio:** Data curation, Writing – original draft. **Tastaftiyan Risfandy:** Writing – review & editing. **Dyah Titis Kusuma Wardani:** Writing – review & editing.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pacfin.2023.102072>.

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