



Fiscal Policy and Credit Growth: The Dynamic Effects of Capital Expenditure and The Moderating Role of Unemployment in Regional Development Banks in Indonesia

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ABSTRACT

This study analyzes the effect of regional fiscal policy on the credit growth of Regional Development Banks (BPDs) in Indonesia, incorporating the dynamic effects of capital expenditure and the role of the unemployment rate as a moderating variable. Using unbalanced panel data from 27 BPDs over the period 2010–2024 and a fixed effects model with Driscoll–Kraay standard errors, the results show that capital expenditure has a positive and significant effect on credit growth, both contemporaneously and in its lagged form, indicating dynamic effects. In contrast, intergovernmental fiscal transfers (TKDD) exhibit a negative effect, while inflation and the unemployment rate do not have significant direct effects. However, moderation analysis reveals that the unemployment rate strengthens the positive effect of capital expenditure on credit growth. In addition, cumulative effect testing confirms that the impact of capital expenditure increases over time. These findings highlight the importance of improving the quality of capital expenditure and strengthening coordination between regional fiscal policy and the banking sector to enhance BPD intermediation, particularly under conditions of high unemployment.

INTRODUCTION

Economic development is a key issue in economic policy, particularly in promoting prosperity, creating jobs, and reducing inequality. In recent years, global economic growth has tended to slow and become more uneven. Global inflation was recorded at 6.8% in 2023 and is projected to decline to 5.9% in 2024 and 4.5% in 2025, while global economic growth is expected to remain around 3.2% during the 2024–2025 period (IMF, 2024). These conditions are driven by geopolitical tensions, tightening monetary policy, financial market volatility, and the global economic slowdown (Fiscal Policy Agency, 2024). Amid these conditions, the Indonesian

economy has remained relatively stable, with growth of around 5% per year, reaching 5.05% in 2023 and 5.03% in 2024 (BPS, 2025). However, this stability does not fully reflect equitable development, as indicated by a Gini ratio of 0.381 in September 2024, as well as disparities between urban (0.402) and rural (0.308) areas (BPS, 2025).

Development is increasingly directed toward the regional level through fiscal decentralization. Local governments play a key role in promoting economic activity through capital expenditure, which enhances productivity, connectivity, and local economic activity (Calderón et al., 2015). Infrastructure development also reduces production costs, expands market access, and creates demand for financing, thereby stimulating financial sector activity, particularly in the banking sector (Abiad et al., 2015; Ramey, 2019). However, the effectiveness of fiscal policy is influenced by macroeconomic conditions. Inflation affects price stability and financing decisions, while unemployment reflects real sector conditions and people's ability to access financing. High inflation can suppress credit demand and increase financing risk, whereas high unemployment can weaken credit demand and increase the risk of default (Boyd et al., 2001; Bilalli et al., 2024; Ghosh, 2015; Anastasiou et al., 2016). In Indonesia, inflation has remained relatively low and stable, at 2.61% in 2023 and 1.57% in 2024, while the open unemployment rate was recorded at 5.45% in 2023 and 4.82% in 2024 (BPS, 2025).

Bank credit growth is a key indicator of the intermediation function and a driver of economic growth (Levine, 2021; Batubande et al., 2021), implying that credit dynamics are influenced not only by internal banking factors but also by fiscal policy, which stimulates economic activity and creates financing opportunities (Bonfim et al., 2023). Theoretically, public investment through capital expenditure stimulates economic activity and increases financing demand, which is transmitted through the bank lending channel mechanism, whereby banks adjust their credit supply in response to changes in economic conditions and real sector financing needs (Gambacorta & Shin, 2018). Within this framework, banks act not only as financial intermediaries but also as transmission channels through which economic policies affect the real sector. Regional Development Banks (BPDs) perform this role at the regional level by linking fiscal policy to the real sector. In addition, the effectiveness of fiscal policy is state-dependent, meaning that it varies across economic conditions and tends to be stronger during periods of economic weakness, such as when unemployment increases (Auerbach & Gorodnichenko, 2012).

In line with this theoretical framework, the relationship between regional fiscal policy and the regional banking sector has become increasingly important, given the strategic role of BPDs in the regional financial system. BPDs play a strategic role in the regional financial system through credit distribution and the mobilization of local funds. However, this role has not been fully optimal, as BPDs continue to face structural challenges, including relatively small business scale, high credit concentration, and the need to balance commercial objectives with regional development functions (Mahi et al., 2022; Nugroho & Iramani, 2023).

Previous studies have generally focused on internal banking factors, such as credit risk, liquidity, and capital (Kusumawardhani, 2023; Jessica & Chalid, 2021). In contrast, studies linking regional fiscal policy to banking credit dynamics, particularly in the case of BPDs, remain limited. Furthermore, research examining the transmission mechanism of fiscal policy to BPD credit, as well as the role of macroeconomic conditions as moderating variables, is still scarce. Based on this, the study aims to analyze the effect of local government capital expenditure on BPD credit growth and to examine the role of the unemployment rate as a moderating variable. Using panel data of BPDs over the 2010–2024 period, this study seeks to identify whether regional fiscal policy can create a credit transmission channel through the regional banking sector, as well as how its effectiveness is influenced by economic conditions.

This study makes an important contribution to the literature by expanding the analysis of the relationship between fiscal policy and the financial sector, particularly by positioning regional banking credit as a transmission channel for regional fiscal policy, which remains relatively underexplored in empirical studies. In addition, this study provides empirical evidence on the

effect of local government capital expenditure on the credit dynamics of BPDs within a regional banking framework. It also incorporates macroeconomic conditions by examining the unemployment rate as a moderating variable, demonstrating that the effectiveness of fiscal policy is state-dependent. Thus, this study not only fills empirical gaps in the literature but also enhances understanding of fiscal policy transmission through bank credit channels and its implications for regional development policy.

Accordingly, this study examines the role of regional fiscal policy in shaping BPD credit dynamics. Specifically, it investigates whether local government capital expenditure and fiscal transfers from the central government affect BPD credit growth, and how macroeconomic conditions particularly inflation and unemployment influence these dynamics. It also tests whether the unemployment rate acts as a moderating variable in the relationship between capital expenditure and BPD credit growth.

LITERATURE REVIEW

Public Investment and Regional Development

Public investment is an important instrument for promoting regional economic development through infrastructure development, improved interregional connectivity, and greater efficiency in transaction costs. Adequate infrastructure enhances productivity, expands market access, and facilitates the mobility of goods, services, and labor. In addition, public investment generates multiplier effects by increasing demand for production inputs and labor, as well as stimulating activity in related sectors. Empirically, infrastructure investment contributes significantly to regional economic growth through both higher output and interregional spillover effects (Zhang et al., 2021; Ocolisanu et al., 2022).

Bank Lending Channel, Liquidity, and Credit Risk

Within the framework of the *bank lending channel*, banks channel funds to the real sector through credit as part of their intermediation function. Credit distribution is influenced by liquidity conditions and credit risk faced by banks. Adequate liquidity enables credit expansion, whereas credit risk, as reflected in the non-performing loans (NPL) ratio, can constrain credit distribution by deteriorating asset quality and increasing loan loss provisions. Empirically, NPL has a negative effect on credit growth and may weaken banking performance and stability (Chun & Ardaaragchaa, 2024; Arhinful et al., 2025).

Regional Development Banks and Local Fiscal Transmission

BPDs play a strategic role in regional economic development by financing local sectors and acting as a conduit for fiscal policy through credit distribution, particularly to MSMEs. The literature highlights the close link between fiscal policy and the financial sector in driving economic activity, where increased activity raises financing demand and financial inclusion expands credit access (Adam et al., 2025; Khémiri et al., 2023). Therefore, the interaction between fiscal policy, the banking sector, and financial inclusion is key to explaining credit dynamics and regional development.

Macroeconomic Conditions and Credit Dynamics

Macroeconomic conditions influence credit dynamics through changes in credit demand and credit risk. Inflation increases costs and economic uncertainty, while unemployment reflects income capacity that affects access to and repayment of credit. Empirically, deteriorating economic conditions increase non-performing loans (NPLs) and constrain credit distribution (Nkusu, 2011). This finding is reinforced by Klein (2013) and Beck et al. (2015), who show that macroeconomic stability plays a crucial role in maintaining asset quality and supporting credit expansion.

Fiscal Effect under Economic Conditions (Moderation Perspective)

The effectiveness of fiscal policy is state-dependent, varying across economic conditions and tending to be stronger during periods of high unemployment (Auerbach & Gorodnichenko, 2012; Ramey, 2019). However, the integration of fiscal policy, macroeconomic conditions, and the banking sector within a credit transmission framework remains limited. In particular, the role of Regional Development Banks (BPDs) and unemployment as a moderating variable has received little empirical attention. Therefore, this study integrates these aspects within a unified analytical framework.

Capital Expenditure and Credit Growth

Local government capital expenditure represents a form of public investment that stimulates economic activity through infrastructure development. Infrastructure enhances productivity and real sector activity, thereby increasing the demand for financing. Empirically, infrastructure investment contributes to higher output and increased financing needs in the real sector (Calderón et al., 2015).

H1: Local government capital expenditure has a positive effect on BPD credit growth.

Lagged Capital Expenditure and Credit Growth

The impact of fiscal policy is not always immediate but tends to materialize gradually over time. The process of infrastructure development, which requires time, causes economic effects to emerge in subsequent periods. This reflects the dynamic effects of public investment (Leeper et al., 2010).

H2: Lagged capital expenditure has a positive effect on BPD credit growth.

Intergovernmental Fiscal Transfers (TKDD) and Credit Growth

Intergovernmental Fiscal transfers enhance the fiscal capacity of regions to stimulate economic activity through increased public spending. This expansion of economic activity raises the demand for financing and may encourage credit distribution by banks (Baskaran et al., 2016).

H3: Intergovernmental Fiscal transfers (TKDD) have a positive effect on BPD credit growth.

Inflation and Credit Growth

Inflation affects economic stability and credit distribution decisions. High inflation increases uncertainty, reduces purchasing power, and raises borrowing costs, thereby potentially depressing credit demand and credit distribution while increasing credit risk. Empirically, inflation has been shown to have a negative effect on private sector credit due to heightened uncertainty and financial market frictions (Bilalli et al., 2024).

H4: Inflation has a negative effect on BPD credit growth.

Unemployment Rate and Credit Growth

The unemployment rate reflects the weakening of economic activity and individuals' capacity to meet credit obligations. High unemployment reduces household income and weakens real sector conditions, thereby lowering credit demand and increasing the risk of default. This condition encourages banks to adopt a more cautious approach to credit distribution. Empirically, macroeconomic variables, including the unemployment rate, influence banking stability and credit activity, where higher unemployment is associated with a decline in credit supply (Ghosh, 2015).

H5: The unemployment rate has a negative effect on BPD credit growth.

The Moderating Role of Unemployment in the Relationship between Capital Expenditure and Credit Growth

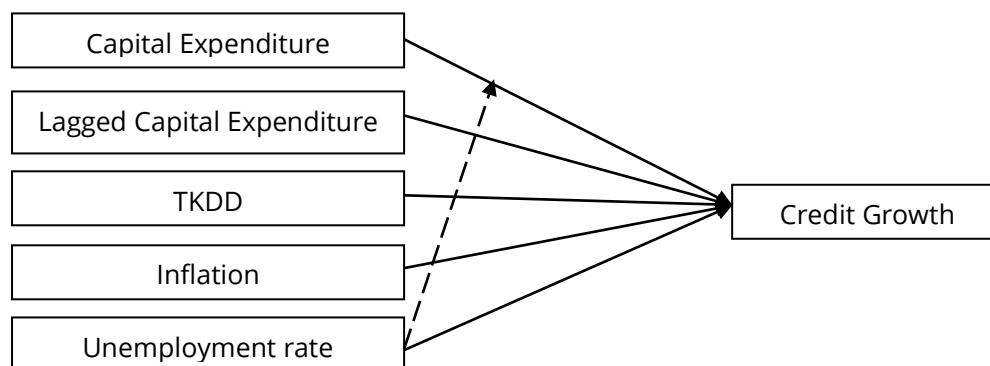
The effectiveness of fiscal policy is state-dependent, particularly during periods of high unemployment when aggregate demand weakens and credit risk rises, affecting bank lending behavior (Auerbach & Gorodnichenko, 2012; Klein, 2013). Therefore, the impact of capital expenditure on credit growth varies with economic conditions, especially the unemployment rate.

H6: The unemployment rate moderates the effect of capital expenditure on BPD credit growth.

Research Framework

This study analyzes the influence of regional fiscal policy, macroeconomic conditions, and internal banking characteristics on the credit growth of Regional Development Banks (BPDs). Capital expenditure is employed as the main explanatory variable, as it drives economic activity and increases the demand for financing (Calderón et al., 2015), while also exhibiting delayed effects captured through lagged variables (Leeper et al., 2010). Intergovernmental Fiscal Transfers (TKDD) represent regional fiscal capacity in promoting economic activity (Baskaran et al., 2016). Macroeconomic conditions are proxied by inflation and unemployment. Inflation affects economic stability and credit activity (Bilalli et al., 2024), while unemployment reflects weakened economic conditions and heightened credit risk (Ghosh, 2015).

Figure 1. Research Framework



METHODS

This study uses a quantitative explanatory approach to analyze the effects of regional fiscal policy, macroeconomic conditions, and bank-specific characteristics on the credit growth of BPDs in Indonesia. The analysis employs unbalanced panel data covering 27 BPDs over the period 2010–2024. The panel data approach allows for the combination of cross-sectional and time-series variations, resulting in a more comprehensive analysis.

This study uses secondary data from official sources. Banking data (credit, DPK, NPL, LDR, and total assets) are obtained from BPDs annual reports and publications of the Financial Services Authority (OJK). Macroeconomic data, such as inflation and unemployment rates, are obtained from the Central Statistics Agency (BPS), while regional fiscal data, Intergovernmental Fiscal Transfers (TKDD) and capital expenditure, are sourced from the Directorate General of Fiscal Balance (DJPK) and the Ministry of Finance.

In the data processing stage, financial variables are expressed in growth form or transformed into natural logarithms to reduce heteroscedasticity, improve data distribution, and enhance variance stability, thereby producing more efficient estimates (Wooldridge, 2019). The operational definitions of variables are specified to clarify the concepts, measurement methods, and data sources used in this study. Each variable is assigned a notation that is applied

consistently in the regression models and in the presentation of results. Table 1 presents the operational definitions of all variables, including the dependent, independent, control, and interaction variables employed in the research model.

Table 1. Operational Definition of Variables

Variable	Notation	Type	Definition	Measurement	Unit
Credit Growth	CG	Dependent	Growth of BPD credit	$\Delta \ln(\text{Credit})$	%
Capital Expenditure	BM	Independent/ Moderation	Local government capital spending	$\Delta \ln(\text{BM})$	%
Lagged Capital Expenditure	L.BM	Independent	Capital expenditure in the previous period	$\text{BM}_{\{t-1\}}$	Log
Intergovernmental Fiscal Transfers	TKDD	Independent	Transfers from central to local government	$\Delta \ln(\text{TKDD})$	%
Inflation	INF	Independent	General price level increase	INF (%)	%
Unemployment Rate	TPT	Independent/ Moderation	Share of labor force actively seeking work	TPT (%)	%
Non Performing Loans	NPL	Control	Ratio of bad loans	NPL (%)	%
DPK Growth	DPKG	Control	Growth of customer deposits	$\Delta \ln(\text{DPK})$	%
Bank Size	SIZE	Control	Total bank assets	$\ln(\text{Aset})$	Log
Loan to Deposit Ratio	LDR	Control	Loan-to-deposit ratio	Credit/DPK	%

The selection of variables in this study is based on the operational definitions of each variable. Fiscal policy is represented by capital expenditure (BM) as an indicator of regional public investment and intergovernmental fiscal transfers (TKDD) as a proxy for fiscal capacity derived from the central government. Macroeconomic conditions are represented by inflation (INF) as an indicator of price stability and the open unemployment rate (TPT), which reflects real economic and labor market conditions. In addition, this study includes control variables such as Non-Performing Loans (NPL), growth of third-party funds (DPKG), bank size (SIZE), and the Loan-to-Deposit Ratio (LDR) to capture bank-specific characteristics, including credit risk, funding capacity, operational scale, and liquidity conditions.

Empirical Models

This study employs a panel data approach to analyze the effects of regional fiscal policy proxied by capital expenditure (BM) and intergovernmental fiscal transfers (TKDD) macroeconomic conditions, and bank-specific characteristics on BPDs credit growth. Model selection is conducted using the Chow, Hausman, and Lagrange Multiplier (LM) tests to determine the most appropriate specification among the Common Effect, Fixed Effect, and Random Effect models. To ensure the reliability of the estimates, multicollinearity is assessed using the Variance Inflation Factor (VIF), along with correlation tests among variables. Given the inclusion of interaction terms, mean-centering transformations are applied to reduce multicollinearity and improve estimation stability. The model is then estimated using Driscoll-Kraay standard errors to address heteroscedasticity, autocorrelation, and cross-sectional dependence (Driscoll & Kraay, 1998).

To enhance analytical clarity, the empirical model is specified in several stages to identify the contribution of each group of variables in explaining BPD credit growth dynamics. Model 1 (baseline model) focuses on examining the main effect of regional fiscal policy through capital expenditure (BM) and its lagged value (L.BM) on credit growth. This specification aims to capture the baseline relationship and dynamic effects of fiscal policy without the inclusion of additional control variables.

$$CG_{it} = \alpha + \beta_1 \Delta \ln BM_{it} + \beta_2 \Delta \ln BM_{it-1} + \beta_3 NPL_{it} + \beta_4 DPKG_{it} + \beta_5 SIZE_{it} + \beta_6 LDR_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Model 2 (fiscal transfer model) is developed by incorporating intergovernmental fiscal transfers (TKDD) to examine whether fiscal capacity sourced from the central government also influences credit dynamics. The inclusion of this variable allows for a distinction between the effects of local government fiscal policy and central government transfers.

$$CG_{it} = \alpha + \beta_1 \Delta \ln BM_{it} + \beta_2 \Delta \ln BM_{it-1} + \beta_3 \Delta \ln TKDD_{it} + \beta_4 NPL_{it} + \beta_5 DPKG_{it} + \beta_6 SIZE_{it} + \beta_7 LDR_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Model 3 (macroeconomic model) further incorporates macroeconomic variables, namely inflation and the unemployment rate, to control for broader economic conditions. This is important, as credit dynamics are influenced not only by fiscal policy but also by economic stability and real sector conditions that may affect both credit demand and risk.

$$CG_{it} = \alpha + \beta_1 \Delta \ln BM_{it} + \beta_2 \Delta \ln BM_{it-1} + \beta_3 \Delta \ln TKDD_{it} + \beta_4 INF_{it} + \beta_5 TPT_{it} + \beta_6 NPL_{it} + \beta_7 DPKG_{it} + \beta_8 SIZE_{it} + \beta_9 LDR_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Model 4 (moderation) incorporates the interaction between capital expenditure and the unemployment rate to test whether the effectiveness of fiscal policy is state-dependent. The use of multiple model specifications enhances the robustness of the results and strengthens the understanding of the relationship between fiscal policy, macroeconomic conditions, and BPD credit growth.

$$CG_{it} = \alpha + \beta_1 \Delta \ln BM_{it} + \beta_2 \Delta \ln BM_{it-1} + \beta_3 TPT_{it} + \beta_4 (BM \times TPT)_{it} + \beta_5 \Delta \ln TKDD_{it} + \beta_6 INF_{it} + \beta_7 NPL_{it} + \beta_8 DPKG_{it} + \beta_9 SIZE_{it} + \beta_{10} LDR_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Estimation of Short-Term and Cumulative Effects

Since the empirical model employs a distributed lag specification, the effect of capital expenditure on credit growth occurs not only in the current period but also in subsequent periods through its lagged values. Therefore, the cumulative effect of capital expenditure is calculated by combining the coefficients of the contemporaneous and lagged variables using a linear combination (*lincom*) approach in the econometric estimation. Mathematically, the total effect of capital expenditure on credit growth is expressed as:

$$\beta_{total} = \beta_1 + \beta_2$$

This approach allows for a more comprehensive assessment of both the short-term effect and the cumulative impact of fiscal policy on BPD credit growth dynamics.

RESULTS

This section presents the empirical findings and discusses the results in addressing the research hypotheses. The analysis begins with descriptive statistics, followed by panel data model selection tests and regression analysis to examine the effects of regional fiscal policy, macroeconomic conditions, and bank-specific characteristics on BPD credit growth, as well as the moderating role of the unemployment rate.

Descriptive Statistics

Descriptive statistics are used to provide an initial overview of the characteristics of the data employed in this study. This analysis includes BPD credit growth, BM, TKDD, INF, TPT, as well as internal bank characteristics, NPL, LDR, DPKG, and SIZE. The descriptive statistics are presented in terms of mean, minimum, maximum, and standard deviation to describe the data distribution and the variation across variables during the observation period.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
CG	372	11.153	9.905	-34.249	55.546
BM	378	5.265	23.184	-149.359	87.130
TKDD	378	7.728	12.251	-49.711	95.327
INF	405	4.145	2.519	-0.180	11.900
TPT	405	5.169	2.139	0.880	14.000
NPL	399	2.601	2.342	0.010	22.270
LDR	399	87.815	13.976	9.290	146.770
DPKG	372	10.850	14.591	-77.134	61.971
SIZE	399	9.619	0.927	7.045	12.121

Source: Stata 17 data analysis

According to Table 2, CG variable has an average of 11.153% with a standard deviation of 9.905, indicating that BPDs credit growth is generally positive, albeit with considerable variation across banks and periods. BM and TKDD also exhibit substantial variation, with averages of 5.265 and 7.728 and standard deviations of 23.184 and 12.251, respectively, reflecting differences in fiscal capacity across regions. From a macroeconomic perspective, INF averages 4.145% with moderate variation, suggesting relatively stable price conditions during the study period. TPT has an average of 5.169% with relatively low variation, indicating fairly stable labor market conditions.

Regarding bank-specific characteristics, the average NPL ratio of 2.601% remains within a relatively safe range, although high maximum values indicate elevated credit risk in some banks. The average LDR of 87.815% suggests a relatively strong intermediation function, albeit with notable variation. Third-party fund growth (DPKG) averages 10.850 with high variation, while bank size (SIZE) is relatively stable, with an average of 9.619 and low variation.

Model selection

The selection of the panel data model is conducted using three tests, namely the Chow test, the Lagrange Multiplier (LM) test, and the Hausman test. The results of the Chow test indicate that the Common Effects Model (CEM) or pooled OLS is rejected for all performance indicators (ROA, ROE, NIM, and BOPO), implying that the Fixed Effects Model (FEM) is more appropriate ($p = 0.0000$). Subsequently, the LM test is applied to evaluate whether the Random Effects Model (REM) is preferred over the CEM. Meanwhile, the Hausman test is used as the primary basis for selecting between the FEM and REM, with the results indicating that the FEM is the most appropriate specification for all estimated models. Based on these results, all

estimations in this study, including both the baseline models and the moderation models with interaction terms, are conducted using the Fixed Effects Model.

Correlation Test Between Variables

Correlation tests are conducted to identify the direction and strength of the relationships among the variables, as well as to provide an initial assessment of potential multicollinearity issues. This analysis is important to ensure that the correlations among independent variables are not excessively high, which could compromise the stability of the regression estimates. The results of the correlation analysis are presented in Table 3.

Table 3. Correlation Test Between Variables

Variable	CG	BM	TKDD	INF	TPT	NPL	LDR	DPKG	SIZE
CG	1.0000								
BM	0.2967* ** 0.0000	1.0000							
TKDD	0.1160* * 0.0253	0.2871 *** 0.0000	1.0000						
INF	0.3245* ** 0.0000	0.3293 *** 0.0000	0.0331 0.5209	1.0000					
TPT	-0.0652 0.2098	0.0732 0.1558	-0.0309 0.5491	0.0908 * 0.0679	1.0000				
NPL	- 0.3965* ** 0.0000	- 0.1229* * 0.0176	-0.0423 0.4154	- 0.0795 0.1130	0.2306* ** 0.0000	1.0000			
LDR	0.0484 0.3515	- 0.0974* 0.0601	- 0.03888 0.4548	0.0745 0.1372	-0.0614 0.2210	-0.0080 0.8732	1.000 0		
DPKG	0.4242* ** 0.0000	0.1571 *** 0.0024	0.1871* ** 0.0003	0.0874 * 0.0925	-0.0279 0.5922	- 0.2672** * 0.0000	- 0.3157* ** 0.000 0	1.0000	
SIZE	- 0.2645* ** 0.0000	- 0.1081* * 0.0369	- 0.1369** * 0.0081	- 0.2971* ** 0.0000	0.2596* ** 0.0000	0.1314* ** 0.0086	- 0.2693* ** 0.0000	- 0.1543* ** 0.0028	1.00 00

Source: Stata 17 data analysis

The correlation table shows that BM variable is positively and significantly correlated with BPD credit growth (0.297), indicating that increased public investment has the potential to stimulate financing activity through higher economic activity. The growth of third-party funds (DPKG) also shows a relatively strong positive correlation (0.424), confirming the importance of funding capacity in supporting credit expansion.

In contrast, Non-Performing Loans (NPL) are negatively correlated (-0.397), suggesting that higher credit risk may constrain credit supply. Meanwhile, inflation and TKDD exhibit relatively weaker relationships, indicating that BPD credit dynamics are more influenced by bank-specific factors than by macroeconomic conditions.

Multicollinearity test

Multicollinearity is assessed using the Variance Inflation Factor (VIF). The results show that all variables have VIF values ranging from 1.14 to 1.38, with mean VIF values of 1.24 in the baseline model and 1.21 in the model with interaction. These values are well below the conventional threshold of 10, indicating that the model does not suffer from serious multicollinearity issues (Gujarati & Porter, 2009).

Regression Estimation Results

To examine the effects of regional fiscal policy and macroeconomic conditions on BPD credit growth, the analysis employs a panel data model with Fixed Effects estimation and Driscoll-Kraay standard errors. The estimation results are presented in Table 4.

Table 4. Regression Estimation Results

Variable	Baseline Model		Fiscal Transfer Model		Macroeconomic Model		Moderation Model	
	Koef.	Prob.	Koef.	Prob.	Koef.	Prob.	Koef.	Prob.
BM	0.0467	0.030**	0.0578	0.025**	0.0591	0.024**	0.0597	0.005***
L.BM	0.0614	0.018**	0.0617	0.012**	0.0603	0.015**	0.0616	0.019**
TKDD	-	-	-	0.060*	-0.1152	0.052*	-0.1251	0.035**
			0.1102					
INF	-	-	-	-	-0.1072	0.758	-0.0969	0.781
TPT	-	-	-	-	-0.3213	0.342	-0.4618	0.119
BM × TPT	-	-	-	-	-	-	0.0222	0.004***
NPL	-1.8726	0.000***	-	0.000***	-1.8555	0.000***	-1.8028	0.000***
			1.8694					
LDR	0.2306	0.001***	0.2195	0.001***	0.2226	0.001***	0.2348	0.001***
DPKG	0.02284	0.024**	0.2458	0.015**	0.2477	0.015**	0.2502	0.014**
SIZE	3.0297	0.247	2.7566	0.301	3.1115	0.269	2.6038	0.381

Source: Stata 17 data analysis

Note: *** p<0.01, ** p<0.05, * p<0.10

According to Table 4, capital expenditure (BM) has a positive and significant effect on BPD credit growth across all models, both contemporaneously and in its lagged form (L.BM), at the 1% and 5% significance levels. This indicates that H1 and H2 are supported. In contrast, TKDD exhibits a negative and significant effect, leading to the rejection of H3. In terms of macroeconomic conditions, inflation (INF) and the unemployment rate (TPT) do not have significant effects on credit growth; therefore, H4 and H5 are not supported. However, the interaction between BM and TPT shows a positive and significant effect in the moderation model (1%), indicating that H6 is supported. Regarding the control variables, NPL has a negative and significant effect (1%), LDR has a positive and significant effect (1%), and DPKG has a positive and significant effect (5%), while bank size (SIZE) does not have a significant effect.

Linear Combination Test (Lincom)

To capture the cumulative effect of capital expenditure, a linear combination test (lincom) is used to combine the coefficient of BM and its lag.

Table 5. Linear Combination Test (Lincom)

Model	Coefisien	Std. Error	t-stat	p-value
Baseline Model	0.1081	0.0388	2.79	0.016**
Fiscal transfer Model	0.1195	0.1195	2.89	0.014**
Macroeconomic Model	0.1195	0.0421	2.84	0.015**
Moderation Model	0.1213	0.0367	3.30	0.006***

Source: Stata 17 data analysis

According to Table 5, the results of the linear combination test (lincom) indicate that the combined coefficients of the variables tested have a positive and statistically significant effect across all models. The estimated coefficients range from 0.1081 to 0.1213, with significance levels between 5% and 1%. In detail, the Baseline Model shows a coefficient of 0.1081 ($p = 0.016$), the Fiscal Transfer Model 0.1195 ($p = 0.014$), the Macroeconomic Model 0.1195 ($p = 0.015$), and the Moderation Model 0.1213 ($p = 0.006$). These results indicate that the combined effect of the variables is consistent and significant in explaining BPD credit growth.

DISCUSSION

Effect of Capital Expenditure (BM) and Its Lag (L.BM) on BPD Credit Growth

The results indicate that increases in local government capital expenditure stimulate economic activity, which in turn raises the demand for bank credit. Infrastructure development and public investment enhance productivity and real sector activity, thereby creating financing needs for businesses and encouraging credit expansion. These findings are consistent with Calderón et al. (2015), who show that infrastructure investment contributes to higher productivity and economic output, and with Lantemona et al. (2020) and Syukri (2021), who find that government spending plays a role in promoting economic activity and regional economic growth. This result is also supported by Anitasari and Soleh (2015), who show that government spending influences regional economic growth. The resulting expansion in economic activity increases financing needs and encourages greater credit distribution by banks.

Furthermore, the significance of the lagged capital expenditure variable (L.BM) indicates the presence of dynamic effects of fiscal policy. The impact of public investment does not only appear in the current period but also persists into subsequent periods. This finding is consistent with Leeper et al. (2010), who argue that fiscal policy has gradual effects and requires time to exert its full impact on the economy. Thus, capital expenditure in the previous period continues to contribute to higher credit growth in subsequent periods. This result is also supported by Abiad et al. (2016), who show that increased public investment enhances economic output and stimulates private sector investment, with effects that persist over the medium and long term. These findings reinforce the presence of dynamic effects of public investment, indicating that capital expenditure in previous periods continues to influence credit growth in subsequent periods.

Effect of Intergovernmental Fiscal Transfers (TKDD) on BPD Credit Growth

These findings indicate that fiscal transfers do not directly stimulate regional bank credit. Although transfers are expected to enhance fiscal capacity and economic activity, their impact is often limited by the dominance of non-productive spending, consistent with the flypaper effect (Dick-Sagoe et al., 2022).

Moreover, transfers may create a substitution effect, reducing reliance on bank financing and thereby suppressing credit growth (Suprianik, 2023). Weak institutional quality can further lead to inefficiencies and fiscal dependence, limiting their effectiveness (Nakatani, 2025). Overall, TKDD has an indirect effect and depends largely on the quality of regional expenditure.

Effect of Inflation and Unemployment on BPD Credit Growth

The results show that inflation does not significantly affect BPD credit growth, indicating that stable inflation did not exert substantial pressure on credit distribution. Although inflation theoretically influences consumption and investment, its impact is conditional on economic stability (Statovci & Balaj, 2024). This finding differs from Sari (2022), likely due to differences in research scope, as KUR is more sensitive to inflation than aggregate BPD credit.

Additionally, BPD credit distribution is more influenced by structural factors and local policies than short-term macroeconomic fluctuations, resulting in stable credit demand under low inflation. Similarly, unemployment has no significant effect, suggesting limited transmission from labor market conditions to the banking sector (Hidayah & Meylianingrum, 2024; Rizki & Wahyudi, 2025). Overall, BPD credit growth is driven more by structural and fiscal factors than by macroeconomic variables.

Moderating Effect of Unemployment on the Relationship between Capital Expenditure and BPD Credit Growth

This finding indicates that unemployment strengthens the effect of capital expenditure on credit growth, meaning its impact becomes greater during periods of high unemployment. This reflects state-dependent fiscal effects, where capital expenditure is more effective in stimulating economic activity and financing demand under weak economic conditions (Auerbach & Gorodnichenko, 2012; Chen et al., 2024). Public investment also supports job creation and income, further increasing credit demand (Moszoro, 2024).

These results suggest that unemployment not only signals economic weakness but also conditions under which fiscal stimulus becomes more effective. In this context, capital expenditure acts as a compensatory tool for weak private demand, amplifying its impact on credit growth (Klein, 2013). Overall, the $BM \times TPT$ interaction confirms that the effect of capital expenditure on BPD credit growth is stronger at higher unemployment levels.

Linear Combination Test (Lincom)

These findings indicate that the effect of capital expenditure is not only direct but also persistent and stronger when intertemporal effects are taken into account. Economically, local government capital expenditure primarily allocated to infrastructure development and public investment can stimulate local economic activity. These development projects encourage the involvement of various sectors and ultimately generate financing demand, which is channeled through the banking sector.

This finding is consistent with the literature showing that public investment has multiplier effects on economic activity and the financial sector. Calderón et al (2015) demonstrate that infrastructure investment enhances productivity and expands private sector activity. This aligns with the *public investment and regional development* framework, in which capital expenditure increases economic capacity and stimulates real sector activity, thereby raising financing demand and credit growth. In addition, these results support the *bank lending channel theory*, which posits that increased economic activity leads to higher credit demand and strengthens the intermediation function of banks. In this context, BPDs play a strategic role due to their institutional and geographical proximity to local governments, making them more responsive in channeling financing to sectors affected by fiscal policy.

Furthermore, these findings reinforce the perspective of *regional development banks and local fiscal transmission*, where BPDs function not only as financial intermediaries but also as transmission channels of fiscal policy to the real sector. Thus, capital expenditure not only stimulates economic activity but also promotes financial sector development through increased credit. Overall, these results confirm that capital expenditure has a significant and sustained impact on BPD credit growth.

CONCLUSION

This study aims to examine the effect of regional fiscal policy on BPD credit growth, as well as to analyze the role of macroeconomic conditions, particularly the unemployment rate as a moderating variable in this relationship. Using panel data of BPDs over the 2010–2024 period, several key findings are identified.

First, local government capital expenditure has a positive and statistically significant effect on BPD credit growth. This finding indicates that increased public investment stimulates regional economic activity, which in turn raises demand for financing from the business sector. In addition, lagged capital expenditure also shows a positive and significant effect, confirming the dynamic nature of fiscal policy, whereby its impact persists beyond the current period. Second, intergovernmental fiscal transfers (TKDD) exhibit a negative and statistically significant effect on BPD credit growth, although at a relatively lower level of significance. This suggests that fiscal transfers from the central government do not directly stimulate regional banking credit expansion. This may reflect the allocation of transfers toward non-productive expenditures or the presence of a substitution effect in financing.

Third, macroeconomic variables namely inflation and the unemployment rate do not have statistically significant effects on BPD credit growth. This indicates that, in the context of regional banking, credit dynamics are more strongly influenced by structural factors and fiscal policy than by short-term macroeconomic fluctuations. Fourth, the moderation results show that the unemployment rate strengthens the effect of capital expenditure on credit growth. This finding implies that the effectiveness of fiscal policy is state-dependent, meaning that fiscal policy becomes more effective under weaker economic conditions.

Overall, this study confirms that regional fiscal policy, particularly through capital expenditure is a key instrument in promoting regional banking intermediation. Moreover, the findings highlight that the effectiveness of fiscal policy is conditional on underlying economic conditions. Therefore, the integration between fiscal policy and macroeconomic conditions is essential for enhancing the effectiveness of BPD credit distribution in supporting regional economic development.

Policy Implication

The results show that local government capital expenditure plays an important role in promoting BPD credit growth, making the quality and composition of spending key to increasing economic activity and demand for real sector financing. In contrast, TKDD have not been optimal in promoting credit growth, indicating the need for improvements in planning and allocation to better target productive activities.

For BPD, these findings highlight the importance of its role as a regional development agent, particularly through enhancing responsiveness to financing opportunities arising from fiscal activities and strengthening risk management. At the same time, stronger synergy between fiscal policy and the financial sector is needed, supported by authorities such as OJK and Bank Indonesia through policies that enhance capital, digitalization, and operational efficiency.

Moreover, the moderating role of the unemployment rate suggests that the effectiveness of fiscal policy is conditional. In periods of high unemployment, policies should focus on job creation and economic recovery, whereas under more stable conditions, they should be directed toward long-term productivity improvements. Overall, these findings underscore the importance of integrating fiscal policy, economic conditions, and the banking sector to promote more effective BPD intermediation and support inclusive and sustainable regional economic growth.

LIMITATION

This study has several limitations that should be considered when interpreting the results. First, the analysis uses aggregate data at the BPD level, which may not fully capture heterogeneity across individual banks. As a result, variations in credit behavior among banks may not be identified in detail, and the findings tend to reflect general regional banking conditions. Second, the measurement of fiscal policy is limited to capital expenditure and intergovernmental fiscal transfers (TKDD), which may not fully represent the overall dynamics of regional fiscal policy. This limitation may lead to an incomplete estimation of the broader effects of fiscal policy on credit growth. Third, the study does not explicitly address potential endogeneity issues that may arise from the two-way relationship between fiscal policy and credit growth. This may affect the validity of the estimated coefficients; therefore, the results should be interpreted with caution. Given these limitations, future research is encouraged to use more disaggregated data at the bank level, expand fiscal policy indicators, and apply more robust methodological approaches to better address potential endogeneity biases.

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