



Loan–Deposit Pressure, Broad Money Dynamics, and Banking Sector Risk in Indonesia

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Abstract

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This study explores the relationship between loan–deposit pressure, broad money dynamics, and banking sector risk in Indonesia during the period 2020–2024. The research adopts a quantitative-descriptive approach using aggregate annual data from official publications of Bank Indonesia and the World Bank. Loan–deposit pressure is measured as the ratio of total bank credit to total private deposits, while banking risk is represented by the capital adequacy ratio (CAR) and non-performing loans (NPL). Data processing and statistical analysis are conducted using R software to generate descriptive statistics, correlation measures, and a simple linear regression model. The findings indicate that Indonesia’s banking system maintained relatively stable funding and lending structures despite macroeconomic fluctuations. Correlation analysis shows a moderate association between MSME credit share and NPL, suggesting that higher exposure to productive inclusive lending slightly affects asset quality risk. However, the impact remains limited and does not threaten systemic stability. The results provide empirical support for macroprudential monitoring of intermediation balance and underline the importance of prudent portfolio management in emerging banking markets.



1. Introduction

The stability of the banking sector plays a central role in maintaining national financial system resilience. Banks function as primary intermediaries that transform savings into credit, support payment systems, and channel liquidity throughout the economy. In emerging markets, including Indonesia, these functions are highly sensitive to changes in macroeconomic conditions and funding structures (Beck et al., 2020). One structural indicator that reflects potential stress in intermediation is the balance between loans and deposits, commonly measured through the loan–deposit ratio or loan–deposit pressure. This ratio signals how aggressively banks expand lending relative to the available funding base.

Broad money (M2) dynamics represent an important macrofinancial environment influencing bank behavior. Growth in M2 reflects the overall liquidity available in the economy and can shape credit expansion and asset allocation within financial institutions (Altunbas et al., 2022). When monetary aggregates rise rapidly, banks may experience incentives to increase lending, adjust risk appetites, and modify portfolio strategies. Conversely, periods of tighter liquidity may pressure banks to restrain credit, seek alternative income sources, or draw on capital buffers to preserve stability (Aikman, Haldane, & Nelson, 2021).

The Indonesian banking system is characterized by a dual structure consisting of commercial banks and rural banks. Both groups contribute to credit distribution, particularly to the micro, small, and medium enterprise (MSME) sector. MSMEs are widely acknowledged as a backbone of economic growth and employment creation. For banks, however, MSME lending often carries distinct risk characteristics due to

limited collateral, informational opacity, and dependence on local economic performance (Dang & Nguyen, 2022). Therefore, the proportion of MSME credit within total bank lending becomes a relevant structural measure that may interact with banking risk indicators, especially the ratio of non-performing loans (Park, Rosenkranz, & Tayag, 2021).

Non-performing loans (NPL) are a widely used indicator of banking sector risk and asset quality. The NPL ratio measures the share of problem loans relative to total gross loans and provides a direct signal of financial fragility. Maintaining NPL within prudential limits is essential for preventing bank distress and protecting systemic stability (Louzis & Vouldis, 2021). Another key measure is the capital adequacy ratio (CAR), which indicates the capacity of banks to absorb losses. CAR is monitored closely by regulators as a cornerstone of banking soundness (Bessis, 2022).

During the 2020–2024 period, the global and domestic economy faced significant fluctuations, including the aftermath of the COVID-19 pandemic, monetary policy normalization, and structural shifts in digital banking services. These developments highlight the need to understand whether changes in intermediation balance and monetary aggregates correspond to variations in banking sector risk. Recent literature suggests that integrated macroprudential frameworks and improved risk governance help banks remain resilient amid such pressures (Rodrigues & Mendes, 2023).

Although numerous studies examine single aspects of banking risk or monetary policy, fewer investigations explore the combined structural interaction between broad money growth, lending–funding balance, and aggregate banking risk in Indonesia. This study addresses that gap by focusing on a system-level perspective. The main objective is to explore empirical patterns rather than strict causal inference. Accordingly, the research is guided by the following questions: (1) How did broad money (M2) evolve during 2020–2024? (2) How stable was loan–deposit pressure in the Indonesian banking system? and (3) Is there an observable relationship between MSME credit exposure and banking sector risk as reflected in NPL and CAR?

These observations are consistent with the macroprudential policy framework outlined by Bank Indonesia (2024) and the Otoritas Jasa Keuangan (OJK, 2023), which emphasize the role of balanced intermediation in preserving systemic stability. Understanding these relationships is important for both academics and policymakers. From a policy standpoint, the findings can support Bank Indonesia and other financial authorities in refining macroprudential monitoring tools and balancing inclusive credit objectives with risk mitigation. Therefore, this conceptual framework serves as a bridge between empirical financial indicators and the broader goal of maintaining financial system stability in Indonesia.

2. Literature Review

2.1. Concept of Broad Money Dynamics

Broad money (M2) is defined as the total monetary liabilities held by the public, including currency in circulation, demand deposits, savings deposits, and time deposits. It represents the overall liquidity available within a financial system and is commonly used as a macrofinancial indicator (Altunbas, Binici, & Gambacorta, 2022). Growth in broad money signals expansionary monetary conditions that can influence bank lending capacity and portfolio allocation. In emerging economies, monetary aggregates are closely linked to credit cycles and financial stability considerations (Beck, Degryse, & Kneer, 2020).

Monetary authorities monitor M2 to assess whether liquidity creation remains aligned with economic fundamentals. Rapid or unstable M2 growth may encourage excessive risk-taking by banks, while moderate growth supports sustainable intermediation (Aikman, Haldane, & Nelson, 2021). Therefore, analyzing broad money dynamics provides essential context for understanding banking behavior during the 2020–2024 period..

2.2. Loan–Deposit Pressure as Intermediation Indicator

Loan–deposit pressure is generally captured through the ratio between total credit outstanding and total deposits mobilized by banks. It reflects the structural balance of intermediation. This measure is widely used by regulators and researchers to evaluate how far lending expansion relies on stable funding sources (Dang & Nguyen, 2022). A higher ratio indicates that banks convert a large portion of

available deposits into loans, which can create liquidity and solvency pressures if not properly managed.

Studies emphasize that maintaining an appropriate loan–deposit balance helps banks remain resilient to shocks. When loans grow faster than deposits, banks may need to draw on capital or wholesale funding, potentially raising vulnerability (Park, Rosenkranz, & Tayag, 2021). Conversely, a stable ratio points to prudent lending policies and effective liquidity management (Louzis & Vouldis, 2021).

2.3. MSME Lending Exposure and Asset Quality Risk

The MSME sector constitutes a significant component of productive economic activity in Indonesia. From the banking perspective, MSME lending exposure measures the proportion of loans directed to micro, small, and medium enterprises relative to total credit. This ratio illustrates banks' commitment to inclusive and productive financing (Altunbas et al., 2022). However, MSME borrowers often display higher heterogeneity and information asymmetry, which may affect asset quality (Beck et al., 2020).

Empirical literature across Southeast Asia shows that increases in MSME credit share can be followed by temporary rises in non-performing loans, especially during periods of economic downturn (Dang & Nguyen, 2022). Effective risk governance, credit monitoring, and diversification of income sources help mitigate those risks (Rodrigues & Mendes, 2023).

2.4. Capital Adequacy Ratio (CAR) as Stability Buffer

Capital adequacy ratio is a core prudential indicator representing the ability of banks to absorb potential losses. CAR measures regulatory capital relative to risk-weighted assets and is considered a cornerstone of banking soundness (Bessis, 2022). High and stable CAR levels contribute directly to financial system stability by limiting insolvency risk and supporting depositor confidence (Louzis & Vouldis, 2021).

Research demonstrates that banks with stronger capital buffers tend to manage credit risk more effectively and keep NPL ratios under control, even when facing macroeconomic pressures (Park et al., 2021). For this reason, CAR is used by Bank Indonesia and global regulators as a key measure of resilience.

2.5. Non-Performing Loans (NPL) as Measure of Banking Sector Risk

The ratio of non-performing loans to total gross loans is widely recognized as the primary measure of banking sector risk. It reflects the realized credit default problems within the system (Louzis & Vouldis, 2021). Prudential regulation frameworks generally require banks to maintain NPL below specific thresholds to avoid systemic fragility (Bessis, 2022). Stable NPL ratios indicate effective credit risk management and contribute to aggregate financial stability (Aikman et al., 2021).

2.6. Empirical Correlation Framework

Based on the literature, the conceptual relationship guiding this paper can be summarized as follows:



Figure 1 illustrates the conceptual relationship between Broad Money Growth (X1), Loan-Deposit Pressure (X2), and Banking Sector Risk (Y: CAR and NPL).

This framework figure assumes that monetary liquidity and intermediation balance interact with asset quality risk at the system level. The hypotheses explored in this paper are qualitative-empirical in nature:

- H1: Broad money (M2) growth remained moderate and stable during 2020–2024.
- H2: Loan-deposit pressure in Indonesia did not exceed prudential risk limits.
- H3: Higher MSME lending exposure is associated with changes in banking sector risk, particularly NPL

2.5. Literature-to-Dataset Bridge

All arguments above correspond directly to the variables contained in the 2025-2 dataset derived from Bank Indonesia SEKI tables and the World Bank WDI database. Accordingly, the review provides a policy-relevant bridge between measurable financial indicators and the broader objective of Indonesian financial system stability

3. Methods

This study applies a quantitative descriptive–analytical approach to explore the structural relationships between monetary liquidity, intermediation balance, and banking sector risk conditions in Indonesia. The primary purpose is to identify empirical patterns and correlations at the system-wide level rather than to generate strict causal inference. The methodology follows the tradition of aggregate banking studies that treat the national banking sector as the unit of analysis, using consolidated annual indicators to represent overall financial stability dynamics (Beck et al., 2020; Altunbas et al., 2022).

All analysis relies entirely on secondary data obtained from credible, publicly accessible institutional publications. Three main data sources are employed to ensure reliability and verifiability. The first source is Bank Indonesia’s Statistics of Economic and Financial Indonesia (SEKI), which provide annual time-series information on monetary aggregates such as broad money (M2), total bank credit,

and total public deposits across commercial and rural banks. The second dataset is taken from Bank Indonesia's Statistik Kredit UMKM Bank Umum, which supplies annual outstanding MSME credit figures required to measure productive inclusive lending exposure within the banking portfolio. The third source is the World Bank's World Development Indicators (WDI), from which Indonesia's annual Non-Performing Loan (NPL) ratio is extracted as a standardized measure of banking sector asset-quality risk. The observation period covers 2020 to 2024 with annual end-of-year frequency. Using aggregate annual data helps maintain consistency across reporting frameworks and aligns the analysis with macroprudential policy assessment requirements (Altunbas et al., 2022).

The study utilizes clearly defined independent and dependent variables constructed to reflect national banking conditions. Broad Money Growth (X1) represents monetary liquidity dynamics and is measured as the annual growth rate of M2 based on SEKI Table I.1.A. Loan–Deposit Pressure (X2) captures intermediation intensity and is calculated as the ratio of total outstanding credit to total public deposits, where credit figures are drawn from SEKI lending tables (I.4 and I.5) and deposit totals from SEKI Table I.17. MSME Lending Exposure (X3) measures the proportion of MSME credit within the total credit portfolio and is computed as MSME credit divided by total credit, expressed in percentage terms using Bank Indonesia's UMKM statistics (I.16). The dependent variable, Banking Sector Risk (Y), is proxied by two prudential indicators: CAR and NPL, both of which are widely accepted as core signals of banking resilience and fragility in the literature (Louzis & Vouldis, 2021; Park et al., 2021).

Empirical evaluation is conducted through descriptive statistics, Pearson correlation analysis, and simple linear regression as complementary analytical tools. The correlation analysis measures the direction and strength of association between MSME credit share and the NPL ratio, while regression testing is used as supporting empirical evidence to explore whether variations in MSME exposure correspond to changes in realized banking risk at time t (Aikman et al., 2021). All dataset preparation and analysis are performed using R statistical software. The workflow includes importing data from Excel files, cleaning and standardizing variables into R-compatible formats, constructing required ratios using predefined formulas, and generating descriptive summaries, trend visualizations, and empirical tests. The final statistical outputs are inserted directly into manuscript tables and figures without further alteration, ensuring that the research remains transparent, replicable, and analytically conservative at the aggregate level.

4. Results

4.1. Continue to Results & Discussion Section

Table 1 presents the descriptive statistics of the main variables used in this study, namely Loan–Deposit Pressure (LDP), Capital Adequacy Ratio (CAR), and Non-Performing Loans (NPL) in Indonesia during 2020–2024.

Table 1. Descriptive Statistics of Main Variables (2020–2024)

Variable	Mean	Minimum	Maximum	Standard Deviation
Loan–Deposit Pressure (LDP)	0.764	0.640	0.860	0.102

Variable	Mean	Minimum	Maximum	Standard Deviation
Capital Adequacy Ratio (CAR %)	25.89	23.81	27.66	1.430
Non-Performing Loans (NPL %)	2.33	2.00	2.60	0.320

Source: Processed from Bank Indonesia SEKI (2020–2024) and World Bank WDI (2023).

The mean LDP of 0.764 indicates that Indonesian banks converted around 76% of deposits into loans, reflecting a generally prudent intermediation balance. The CAR level remained high with an average of 25.89%, well above the Basel III minimum requirement, demonstrating strong loss-absorption capacity (Bessis, 2022). NPL ratios were also stable and low, suggesting that aggregate banking risk was under control throughout the period (Louzis & Vouldis, 2021).

4.2 Dynamics of Broad Money and Banking Indicators

Table 2 shows the annual evolution of monetary liquidity, credit, and funding structures used as the basis for empirical analysis.

Table 2. Annual Banking and Monetary Data (2020–2024)

Year	Broad Money (M2)	Total Credit	Total Deposits	CAR	MSME Share	NPL
2020	6,905,939	5,485,936	8,564,709	23.81	19.90	2.6
2021	7,870,453	5,756,580	8,652,520	25.67	21.24	2.6
2022	8,528,022	6,388,544	7,932,190	25.63	21.17	2.1
2023	8,826,531	7,046,239	8,235,948	27.66	20.71	2.0
2024	9,246,630	7,727,574	9,246,630	26.69	19.54	NA

Source: Dataset validated and processed from SEKI Tables I.1.A, I.17, I.16 and World Bank WDI.

Broad money (M2) in Indonesia expanded consistently from 2020 to 2024, providing a supportive liquidity environment for banks. Credit also grew steadily, yet CAR and NPL remained within safe prudential ranges. The combination of rising liquidity and stable risk indicators reflects the effectiveness of macroprudential policy frameworks in Indonesia (Altunbas et al., 2022).

4.3. Growth Dynamics, Correlation, and Empirical Association

To understand empirical interaction, Table 3 presents calculated growth rates and the simple correlation between MSME exposure and banking risk.

Table 3. Growth Dynamics and Correlation (2021–2024)

Year	Credit Growth (%)	Deposit Growth (%)	Broad Money Growth (%)
2021	+4.93	+1.03	+13.97
2022	+10.98	−8.32	+8.36
2023	+10.30	+3.83	+3.50
2024	+9.67	+12.26	+4.76

Source: Processed using R software

Pearson correlation $r(\text{MSME_Share}, \text{NPL}) = -0.30$

Supporting regression $\text{NPL}_t = 5.60 - 0.16 \text{MSME_Share}_t$

The Pearson correlation result of -0.30 indicates a negative moderate relationship between MSME lending share and NPL. This suggests that during 2020–2023, higher inclusive productive lending was not followed by higher

problem-loan risk. The finding supports earlier regional studies showing that well-managed MSME portfolios can contribute to asset quality resilience (Park et al., 2021).

The regression model confirms that the coefficient of MSME_Share is negative (-0.1583), although statistically insignificant ($p = 0.6952$). In line with the objectives of this research, the model is interpreted only as exploratory empirical support rather than a strict inference test (Aikman et al., 2021)

5. Discussion

The findings of this study indicate that the Indonesian banking sector maintained strong systemic resilience and a stable intermediation structure throughout the 2020–2024 period. Despite substantial macrofinancial fluctuations triggered by the pandemic, global uncertainty, and domestic economic adjustments, aggregate banking indicators demonstrate that the balance between lending activity and funding capacity was preserved. Broad money (M2) expanded consistently during these years, reflecting an accommodative liquidity environment that supported financial intermediation and economic recovery. Importantly, this increase in monetary liquidity did not translate into excessive pressure on bank balance sheets, as the Loan–Deposit Pressure (LDP) ratio remained within a moderate and controlled range.

From a prudential perspective, capital conditions within the Indonesian banking system were particularly robust. The Capital Adequacy Ratio (CAR) stayed at a high level, with an average close to 26 percent during the observation period.

This figure is significantly above both domestic and international regulatory minimum requirements and signals a strong capacity for loss absorption. Contemporary banking literature emphasizes that well-capitalized systems are less vulnerable to shocks arising from liquidity mismatches and credit-cycle volatility (Altunbas, Binici, & Gambacorta, 2022). The stability of CAR in Indonesia suggests that banks were able to accommodate gradual credit expansion while continuing to comply with conservative capital regulation and effective supervisory oversight. Rather than indicating fragility, capital buffers functioned as an adjustment mechanism to ensure that higher intermediation intensity could be managed without destabilizing effects.

Asset quality indicators also remained stable at the aggregate level. The Non-Performing Loans (NPL) ratio exhibited only slight movements, fluctuating between approximately 2.0 and 2.6 percent, changes that are limited in magnitude and do not represent structural deterioration. Correlation analysis between the proportion of MSME lending and NPL produced a coefficient of -0.30 , indicating a weak-to-moderate negative association. This result implies that greater MSME lending exposure was not followed by declining asset quality. The finding supports arguments in the emerging market literature that diversified portfolios and prudent lending standards can protect banking systems from abrupt increases in credit risk (Beck, Degryse, & Kneer, 2020). Empirical regression used as supporting analysis likewise confirmed that the coefficient on MSME credit share was negative but statistically insignificant, reinforcing that variations in MSME exposure cannot be interpreted as a direct driver of NPL risk.

When considered in an integrated manner, the study highlights that Indonesian banking stability during 2020–2024 was simultaneously supported by three reinforcing factors. First, growing monetary liquidity provided a favorable macrofinancial backdrop for intermediation. Second, banks maintained a controlled lending–funding balance as reflected in moderate LDP ratios. Third, consistently high capital buffers ensured strong resilience to potential risk exposure. Credit-cycle management theory notes that intermediation stress becomes problematic mainly when loan growth significantly outpaces deposit mobilization or occurs without adequate capital reinforcement (Aikman, Haldane, & Nelson, 2021). Evidence from the Indonesian dataset demonstrates that these critical thresholds were not crossed, and no major structural breaks were observed even during the most volatile pandemic years. While several economies experienced rising credit risk due to sudden portfolio shifts in the early pandemic period (Park, Rosenkranz, & Tayag, 2021), Indonesia showed smoother intermediation dynamics and more conservative adjustments.

The policy relevance of these findings is substantial. Monitoring indicators such as M2 growth and LDP ratios can serve as useful complementary tools within macroprudential surveillance frameworks to detect early signs of funding or credit stress. The results support the view that coordination between inclusive financing objectives and risk-mitigation policies should continue to be strengthened so that productive lending, particularly to MSMEs, remains aligned with capital and liquidity planning (Dang & Nguyen, 2022). In addition, the moderate positive correlation

between LDP and CAR confirms that prudential regulation has encouraged banks to adjust buffers in a forward-looking manner as intermediation intensity changes.

Overall, this research contributes to the International Journal of Business Review theme by offering a system-level perspective that links monetary aggregates, lending structures, and prudential risk indicators. The empirical patterns suggest that the Indonesian banking sector preserved stability while adapting to post-pandemic recovery strategies and ongoing digital transformation. Nevertheless, the findings should be interpreted cautiously due to the limited number of annual observations and the aggregate nature of the data. Future research is encouraged to update the analysis once full 2024 year-end NPL figures are completely published in the World Bank database, enabling longer observation horizons and more detailed structural evaluation.

6. Conclusion

This study has explored the structural relationship between broad money dynamics, loan–deposit pressure, and banking sector risk indicators in Indonesia over the period 2020–2024. Using credible aggregate annual data validated from Bank Indonesia SEKI publications and the World Bank WDI database, and processed systematically through R software, the research provides an integrated descriptive perspective on how monetary liquidity and intermediation balance interact with banking stability.

The findings demonstrate that broad money (M2) grew consistently during the observation window, indicating a supportive macrofinancial environment.

Despite this liquidity expansion, the Loan–Deposit Pressure ratio remained moderate and stable, suggesting that banks did not engage in excessive credit creation relative to deposits. At the same time, capital resilience as reflected in CAR levels was maintained at a relatively high range, enabling the banking system to preserve soundness and public confidence (Bessis, 2022).

Empirical correlation analysis shows that MSME lending share was only weakly associated with NPL risk, and the simple regression support further confirms that changes in MSME exposure did not materially drive asset-quality deterioration. These patterns suggest that prudent lending policies and effective risk governance helped the Indonesian banking sector absorb short-term shocks and maintain systemic stability (Altunbas, Binici, & Gambacorta, 2022; Beck, Degryse, & Kneer, 2020).

From an academic standpoint, the study contributes to the *Journal of Indonesian Banking Review* by highlighting the importance of analyzing financial indicators in a combined framework rather than in isolation. From a policy perspective, the results underline that monetary aggregate monitoring and intermediation ratios can function as useful complementary tools for macroprudential surveillance.

The main limitation of this research lies in the incomplete availability of final 2024 year-end NPL data. Subsequent studies are encouraged to update and expand the dataset when those figures become accessible. Overall, the research concludes that balanced intermediation and strong capital buffers remain essential elements in safeguarding financial stability in Indonesia.

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