

Excess Liquidity, Moral Hazard, and Credit Risk in Indonesian Commercial Banks

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ABSTRACT

This research investigates how liquidity creation induces moral hazard behavior and affects credit quality in Indonesian commercial banks. This study examines the effect of liquidity creation, liquidity risk, and central bank policies on credit risk in Indonesian commercial banks, proxied by the non-performing loan (NPL) ratio. Using panel data from 46 banks listed on the Indonesia Stock Exchange over 2015–2024, we apply the Two-Step System Generalized Method of Moments (SYS-GMM) to address endogeneity inherent in dynamic panel models. Results indicate that liquidity creation has a significant positive effect on NPL, consistent with the moral hazard hypothesis. Liquidity risk (LDR) also significantly and positively affects NPL. Reserve requirements (GWM) and BI-Rate do not produce a direct and significant effect on NPL. Return on assets (ROA) significantly and negatively affects NPL. These results suggest that credit risk in Indonesian commercial banking is predominantly influenced by bank-level intermediation behavior rather than by macroeconomic or policy variables. The research concludes that excess liquidity conditions incentivize aggressive credit expansion without proportionate attention to borrower quality, particularly in an oligopolistic market structure with implicit state guarantees.

INTRODUCTION

Banking institutions play a central role as financial intermediaries in sustaining macroeconomic stability and growth. In executing this role, banks face two inherent tensions: maintaining adequate liquidity buffers against sudden withdrawal risks while simultaneously optimizing credit disbursement for profitability and economic support. Managing these tensions responsibly determines the quality of the credit portfolio and, ultimately, the stability of the financial system.

Credit risk, measured by the non-performing loan (NPL) ratio, is the most consequential risk arising from this intermediation function. The NPL ratio measuring problem loans (default or close to default) as a proportion of total loans is the primary indicator of credit risk and a signal of financial system stability. High NPL simultaneously deteriorates profitability, liquidity, and capitalization (Annas et al., 2024; Riani, 2021). In Indonesia, NPL peaked at 3.06 percent in 2020 amid pandemic-related economic disruption, before declining to 2.08 percent by 2024. This trajectory shaped by both credit restructuring policies and the gradual recovery of borrower repayment capacity.

The fundamental activity of commercial banking is liquidity creation, a process through which banks transform short-term, liquid liabilities such as demand deposits into long-term, illiquid assets in the form of loans, generating a net addition of liquidity to the financial system. This intermediation process is widely considered essential for economic growth, as it broadens access to credit for households and enterprises and enables productive investment. From this perspective, an increase in liquidity creation is expected to support borrower repayment capacity and, as a consequence, reducing the incidence of credit risk, measured by NPL (Vuong et al., 2023).

However, this expected negative relationship does not always hold. When banks accumulate excess internal liquidity beyond productive lending opportunities, managers face incentives to deploy idle funds through aggressive credit expansion that prioritizes volume over borrower quality (Zheng et al., 2019). Le and Pham (2021) find positive effects of liquidity creation on credit risk across Asia-Pacific banks, and Umar and Sun (2016) document a similar positive direction in Chinese banks. The same deterioration of lending standards was widely cited as a contributing factor in the buildup of systemic credit risk preceding the 2007–2008 global financial crisis. These findings point to a moral hazard mechanism that inverts the conventional intermediation narrative.

Acharya and Naqvi (2012) articulate what may be called the excess liquidity-moral hazard channel: when bank managers face abundant liquidity, volume-based compensation systems create incentives to lower credit standards, pursue riskier borrowers, and expand loan portfolios beyond what sound risk-return assessment would justify. The rational restraint that governs lending under tight liquidity conditions dissolves when idle funds create pressure for deployment. The result is an expansion in credit quantity accompanied by deterioration in credit quality ultimately reflected in rising NPL ratios. Vuong et al. (2023) further characterize this dynamic through three overlapping mechanisms: asymmetric information (lenders lack full visibility into borrower quality when expanding aggressively), moral hazard (managers reduce monitoring effort when liquidity buffers can absorb near-term losses), and adverse selection (rapid expansion attracts marginal borrowers that disciplined lenders would reject).

Liquidity risk, that measured by loan-to-deposit ratio (LDR), also affecting the credit risk. LDR captures the proportion of deposits deployed as loans and serves as the standard measure of liquidity risk in Indonesian banking regulation. Based on data from the Indonesian Banking Statistics published by the Otoritas Jasa Keuangan, the loan-to-deposit ratio (LDR) declined from 94.43 percent in 2019 to 77.49 percent in 2021, reflecting deposit growth that substantially outpaced credit disbursement during the pandemic. At the same time, the non-performing loan (NPL) ratio peaked at 3.06 percent in 2020. This simultaneous decline in LDR and increase in NPL suggests that weakened credit intermediation indicating that excess liquidity was not effectively channeled into productive lending.

At the macroeconomic level, Bank Indonesia deploys two policy instruments with direct relevance to banking liquidity (Rahmadany et al., 2024; Viverita et al., 2023). The first is the Giro Wajib Minimum (GWM), the mandatory reserve requirement that constrains the volume of deposits available for credit disbursement. As documented by Safuan et al. (2024), increases in the GWM exert a negative effect on bank credit across most economic sectors in Indonesia, confirming that reserve requirements operate as an effective macroprudential lever for moderating credit expansion and its associated risks. The second instrument is the BI-Rate, the

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benchmark interest rate that influences both the cost of borrowing and the behavior of bank managers under the risk-taking channel of monetary policy. Anwar et al. (2023) demonstrate that an excessively low policy rate incentivizes banks to expand credit toward lower-quality borrowers, ultimately raising NPL ratios in the long run, while Wonida and Setiastuti (2025) confirm that the combination of monetary and macroprudential policies jointly constrains risk-taking behavior in Indonesian banking.

These two instruments were deployed simultaneously and aggressively during the COVID-19 pandemic. Bank Indonesia reduced the IDR GWM ratio for conventional banks by 200 basis points to 3.5 percent effective May 2020, and progressively cut the BI-Rate to a historic low of 3.75 percent by November 2020. This GWM is the lowest level recorded at that time. These coordinated easing measures injected substantial liquidity into the banking system, generating conditions of sustained excess liquidity precisely during the period when credit quality was most vulnerable to the moral hazard dynamics identified by Acharya and Naqvi (2012).

The Indonesian banking sector offers a particularly relevant testing ground for these competing hypotheses. During and after the COVID-19 pandemic, banking liquidity expanded substantially as public deposits accumulated while credit demand contracted. The Loan-to-Deposit Ratio (LDR) fell from around 94% in 2019 to 77.49% in 2021, before recovering to 89.05% in 2024. Credit restructuring policies permitted forbearance, creating conditions where the true quality of loan portfolios was partially obscured. As restructuring programs wound down, banks faced simultaneous pressure to deploy accumulated liquidity and absorb legacy credit risk precisely the conditions under which Acharya and Naqvi (2012)'s moral hazard channel is most active.

The oligopolistic structure of the Indonesian banking market amplifies the moral hazard channel. Zuhri (2024) documents that the Indonesian banking industry exhibits a high-oligopoly market structure, with concentration ratios that make new market entry prohibitively difficult. Yударuddin et al. (2024) further confirm that larger Indonesian banks exhibit significantly higher NPL ratios, consistent with the too-big-to-fail moral hazard channel. Large banks operating under implicit government support expectations face weakened market discipline, reducing the effective penalty for imprudent credit expansion under excess liquidity conditions (Umar & Sun, 2016).

Existing studies on the relationship between liquidity creation and credit risk yield contradictory findings. Vuong et al. (2023) found that liquidity creation significantly reduces NPL in Vietnamese commercial banks, supporting the view that bank-supplied liquidity enhances borrower repayment capacity. Alaoui Mdaghri (2022) reported a similar negative relationship in banks in the MENA region. In contrast, Le and Pham (2021) and Umar and Sun (2016) found positive but statistically insignificant effects in Asia-Pacific and Chinese banks, respectively. These divergent results suggest that the direction and magnitude of the effect are shaped by country-specific characteristics including banking market structure, ownership composition, and governance quality. However, no study has simultaneously examined liquidity creation, regulatory liquidity constraints, and monetary policy instruments in shaping credit risk within a full economic cycle in Indonesia.

This study addresses these gaps by examining the simultaneous effects of liquidity creation, liquidity risk (LDR), and central bank policy instruments (GWM and BI-Rate) on

NPL in Indonesian commercial banks over 2015 to 2024, using Two-Step SYS-GMM dynamic panel estimation. The study makes three specific contributions.

First, it identifies the excess liquidity channel of moral hazard as the primary driver of credit risk deterioration in Indonesian banking, documenting empirically that liquidity creation has a positive and significant effect on NPL in a market characterized by oligopolistic concentration and implicit state guarantees, a finding that contrasts with evidence from more competitive or privately-dominated banking systems and establishes the context-dependence of the liquidity-credit risk relationship. Second, it situates this finding within the structural features of the Indonesian banking market, specifically the dominance of large state-owned banks and the policy-driven nature of liquidity supply, which create institutional conditions that amplify the moral hazard consequences of excess liquidity in ways that are distinct from transition economies such as Vietnam where credit supply gaps provide a countervailing mechanism. Third, it evaluates the interaction between central bank policy instruments and bank-level liquidity behavior over a full economic cycle, providing evidence on whether GWM and BI-Rate are effective in directly moderating credit risk outcomes or whether their transmission operates primarily through indirect channels, a distinction with direct implications for the design of macroprudential and monetary policy in bank-dominated developing economies.

This research offers both theoretical and practical benefits. Theoretically, it contributes to the literature on bank liquidity creation and credit risk by providing empirical evidence from the Indonesian banking context, which has distinct structural characteristics including oligopolistic market concentration and the dominance of state-owned banks. It also extends the application of moral hazard theory (Acharya & Naqvi, 2012) to an emerging market setting with implicit state guarantees. Practically, this study provides valuable insights for bank supervisors and regulators in designing more effective macroprudential policies that address behavioral incentives driving aggressive credit expansion. For bank managers, the findings underscore the importance of maintaining robust credit risk infrastructure, particularly during periods of excess liquidity. For future researchers, this study offers a validated empirical framework and opens avenues for cross-country comparative studies to test the generalizability of the excess liquidity-moral hazard channel across different banking systems.

METHOD

This research used annual financial statement data from commercial banks listed on the Indonesia Stock Exchange (IDX) over 2015–2024. The IDX listing requirement ensures consistent, audited, and publicly reported financial data. Of 47 listed banks, one was excluded for incomplete data throughout the observation period, yielding a final sample of 46 banks. Three observations were identified as outliers and removed, producing 457 usable observations.

Variables

Dependent variable. Credit risk is proxied by the gross NPL ratio, which measures the proportion of non-performing loans to total loans. NPL is widely used in the literature as both an indicator of credit quality and a measure of bank risk-taking behavior (Vuong et al., 2023).

Independent variables. Liquidity creation (LC) is computed using the cat-non-fat method of Berger and Bouwman (2009), which classifies balance sheet items into liquid, semi-liquid, and illiquid categories and assigns weights of +0.5 to illiquid assets and liquid liabilities, and −0.5 to liquid assets and illiquid liabilities, scaled by total assets. This measure captures the net liquidity provided by a bank to the economy. Liquidity risk is proxied by the Loan-to-Deposit Ratio (LDR), measuring the proportion of third-party deposits deployed as loans. Central bank policy variables include GWM, measured as the mandated reserve requirement rate applicable in December of each year, and BI-Rate, measured as the benchmark interest rate in December of each year.

Control variables. Following Vuong et al. (2023) and Annas et al. (2024), we include Return on Asset (ROA), Capital Adequacy Ratio (CAR), Bank Capital Structure (CAP = total equity/total assets), Bank Size (natural log of total assets), Loan Growth (LG) and annual Inflation (INF).

Table 1 provides a complete list of variable definitions and their sources.

Variable	Label	Measurement	Reference
NPL Ratio	NPL	Non-performing loans / Total loans	Vuong et al. (2023)
Liquidity Creation	LC	Cat-non-fat / Total assets	Zheng et al. (2019); Vuong et al. (2023)
Loan-to-Deposit Ratio	LDR	Total loans / Total deposits	Safitri et al. (2023)
BI-Rate	BI	Central bank interest rate	Anwar et al. (2023)
Bank Size	SIZE	Natural logarithm of total assets	Vuong et al. (2023)
Return on Asset	ROA	Net income / Total assets	Vuong et al. (2023)
Capital Adequacy Ratio	CAR	Capital / Risk-weighted assets	Annas et al. (2024)
Bank Capital	CAP	Total equity / Total assets	Vuong et al. (2023)
Bank Size	SIZE	Natural log of total assets	Vuong et al. (2023)
Loan Growth	LG	Change in loans from prior period	Vuong et al. (2023)

Source: Various prior studies, reprocessed

Empirical Models

The analytical method is Two-Step System Generalized Method of Moments (SYS GMM), developed by Blundell and Bond (1998), following Vuong et al. (2023). SYS GMM is selected for three reasons: (1) the dynamic model includes lagged NPL (NPL_{t-1}) as a regressor, requiring correction for Nickell bias; (2) potential two-way endogeneity between LC, LDR, and NPL requires lagged instrument controls; (3) the structures number of observation is optimal for SYS GMM. The core model is explained below. Model validity is confirmed through the Sargan test (instrument validity), the Arellano-Bond AR(2) test (no second-order autocorrelation), and the Bond (2002) test for estimator unbiasedness.

$$\text{NPL}_{i,t} = \alpha + \beta_1 \text{NPL}_{i,t-1} + \beta_2 \text{LC}_{i,t} + \beta_3 \text{LDR}_{i,t} + \beta_4 \text{RR}_{i,t} + \beta_5 \text{BI}_{i,t} + \beta_6 \text{SIZE}_{i,t} + \beta_7 \text{ROA}_{i,t} + \beta_8 \text{CAR}_{i,t} + \beta_9 \text{CAP}_{i,t} + \beta_{10} \text{LG}_{i,t} + \beta_{11} \text{INF}_{i,t} + u_{i,t}$$

The inclusion of NPL_{i,t-1} introduces dynamic endogeneity (Nickell bias) that invalidates OLS and Fixed Effects estimators. We employ Two-Step System GMM (Blundell & Bond, 1998), which uses lagged levels and differences of endogenous variables as instruments. LC and LDR are treated as endogenous given the potential two-way relationship between credit

expansion and credit quality. We also test auxiliary specifications with LC and LDR entered separately to assess robustness.

Instrument validity is confirmed by the Sargan test ($p = 0.058$ for SYS-GMM), and the absence of second-order autocorrelation is confirmed by the Arellano-Bond AR(2) test ($p = 0.757$). The Bond (2002) consistency check verifies that the SYS-GMM coefficient on lagged NPL (0.461) falls between the OLS estimate (0.548) and the FE estimate (0.276), confirming estimator validity. All variables pass the Im-Pesaran-Shin unit root test at level. H1 posits a negative effect of LC on NPL (intermediation efficiency hypothesis) and H2 posits a positive effect of LDR on NPL (aggressive intermediation hypothesis).

RESULT AND DISCUSSION

Descriptive Statistics

Table 2 presents the descriptive statistics for all variables. The mean NPL of 3.28 percent indicates that Indonesian commercial banking remained within Bank Indonesia's prudential threshold of five percent over the observation period, though with considerable cross-bank heterogeneity, as reflected in the standard deviation of 2.44 percent and the range from zero to 22.27 percent. The mean liquidity creation ratio of 45.13 percent of total assets indicates that the sample banks collectively function as net liquidity creators, with the intermediation process generating more illiquid loan assets than liquid deposit liabilities. The wide range of LC from negative 64.25 percent to 77.97 percent reflects substantial heterogeneity in intermediation intensity across banks and periods.

Table 2. Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
NPL	457	0.0328	0.0244	0.0000	0.2227
Liquidity Creation (LC)	457	0.4513	0.2226	-0.6425	0.7797
LDR	457	0.9121	0.4559	0.0082	5.2791
GWM	457	0.0660	0.0205	0.0300	0.0900
BI-Rate	457	0.0522	0.0116	0.0350	0.0750
ROA	457	0.0070	0.0329	-0.1357	0.1264
CAR	457	0.2586	0.1643	0.0812	1.4200
CAP	457	0.1905	0.1150	0.0372	0.7210
SIZE	457	17.567	1.858	13.020	21.650
LG	457	0.1687	0.4812	-0.5820	5.1040
INF	457	0.0290	0.0183	0.0154	0.0635

Source: S&P Capital IQ Pro, processed with R Studio

The mean NPL of 3.28% indicates that the banking sector remained within the regulatory ceiling of 5%, yet the standard deviation of 2.44% and a maximum of 22.27% reveal substantial heterogeneity in credit quality across banks. The mean liquidity creation of 0.4513 confirms that sampled banks are on average net liquidity creators, adding more liquidity to the economy through credit than they absorb through deposits. The relatively high standard deviation (0.2226) reflects meaningful variation in intermediation intensity. The mean LDR of 0.9121 approaches Bank Indonesia's upper guideline of 92%, signaling an aggressive aggregate intermediation stance. The strong negative Pearson correlation between LC and Bank Capital (CAP) at -0.644 provides preliminary support for the financial fragility hypothesis (Berger &

Bouwman, 2009): banks with weaker capital tend to create more liquidity, implying that the most aggressive liquidity creators are also the most vulnerable to credit deterioration.

Main Regression Results

Table 3. Two-Step System GMM Regression Results

Variable	Coefficient	Std. Error	p-value	Result
NPL (t-1)	0.4673	0.0710	0.0000***	Significant positive
Liquidity Creation (LC)	0.0354	0.0134	0.0083***	Significant positive
LDR	0.0113	0.0051	0.0265**	Significant positive
GWM	-0.1820	0.1650	0.2697	Not significant
BI-Rate	0.0190	0.4590	0.9673	Not significant
ROA	-0.2862	0.1216	0.0188**	Significant negative
SIZE	0.0018	0.0031	0.5630	Not significant
CAR	-0.0103	0.0175	0.5560	Not significant
CAP	0.0241	0.0281	0.3920	Not significant
LG	-0.0023	0.0030	0.4470	Not significant
INF	0.0830	0.1210	0.4920	Not significant
Sargan p-value	0.2376			Instruments valid
AR(2) p-value	0.7308			No serial correlation
Wald test p-value	0.0000			Model significant

*** $p < 0.001$; ** $p < 0.05$; * $p < 0.10$. Dependent variable: NPL ratio.

Source: S&P Capital IQ Pro, processed with R Studio

Persistence of Credit Risk

The coefficient on lagged NPL of 0.4673 ($p < 0.001$) is positive and significant effect on NPL. This result indicates that nearly half the variation in current-period NPL is attributable to prior-period NPL, confirming that credit risk in Indonesian commercial banking is strongly persistent and does not resolve quickly within a single year. Significant lagged NPL reflects several structural features of the Indonesian banking environment and consistent with Vuong et al. (2023) who reported a comparable persistence coefficient in Vietnamese banks. It also confirms that the dynamic panel specification with lagged NPL is the appropriate modeling framework for this research question. The strong persistence of credit risk also has implications for the interpretation of the other estimated coefficients. Because NPL is self-perpetuating across periods, any factor that raises NPL in the current period sets in motion a multi-period deterioration cycle.

Effect of Liquidity Creation on Credit Risk

Liquidity creation has a significant positive effect on NPL, which does not support Hypothesis H1. The positive direction of the result contradicts the economic-enhancing hypothesis underlying H1, which predicted that liquidity creation would reduce NPL by supporting borrower repayment capacity (Vuong et al., 2023; Alaoui Mdaghri, 2022). Instead, the finding is consistent with the moral hazard hypothesis of Acharya and Naqvi (2012), as well as empirical evidence from Umar and Sun (2016) for Chinese banks and Le and Pham (2021) for Asia-Pacific banks, indicating that in Indonesian commercial banks, higher liquidity creation is associated with deteriorating rather than improving credit quality.

The underlying mechanism is consistent with the moral hazard channel described in the theoretical review. As Indonesian banks accumulate internal liquidity, whether through sustained deposit inflows or pandemic-era policy relaxations, managers face pressure to deploy available funds through credit disbursement in order to generate income and meet intermediation targets. In an environment where compensation structures are linked to lending volume and where implicit state guarantees reduce the perceived cost of credit losses for government-owned banks, the rational response is to expand credit beyond what prudential underwriting standards would support.

The contrast with the findings of Vuong et al. (2023) for Vietnam is attributable to structural differences between the two banking systems. Vietnam's banking sector in the post-2008 period was characterized by a pronounced credit supply gap, in which even moderate levels of liquidity creation were channeled toward genuinely creditworthy borrowers with limited alternative financing options, thereby supporting repayment capacity and reducing NPL. In contrast, the Indonesian banking market is considerably more saturated, particularly in the corporate segment dominated by large BUMN banks. This interpretation aligns with the financial fragility hypothesis of Fungacova et al. (2021) and the capital-moderating evidence of Zheng et al. (2019), who showed that undercapitalized banks are most vulnerable to the risk-amplifying consequences of excess liquidity.

Effect of Liquidity Risk on Credit Risk

The loan-to-deposit ratio has a significant positive effect on NPL, supporting Hypothesis H2 and consistent with Saliba et al. (2023) and Safitri et al. (2023). This result indicates that banks operating with a higher ratio of loans to deposits face greater credit risk, which is consistent with the credit volume channel: as the loan portfolio expands relative to the deposit base, banks inevitably extend credit to a broader range of borrowers, including those at the margin of creditworthiness, thereby increasing the probability of non-performance.

The LDR finding complements the liquidity creation result by capturing the same behavioral dynamic from the liability side of the balance sheet rather than the asset side. High LC indicates aggressive deployment of balance sheet capacity into illiquid loan assets; high LDR indicates that this deployment has reached or exceeded the limit of stable deposit funding. Together, these two variables triangulate the primary structural driver of credit risk in Indonesian banking: excessive credit expansion relative to available capital and funding resources.

Effect of Central Bank Policy on Credit Risk

Reserve requirements (GWM) produce a negative but statistically insignificant effect on NPL (coefficient = -0.1820; $p = 0.2697$), failing to support Hypothesis H3a. This result indicates that GWM does not directly and significantly affect credit quality outcomes in Indonesian commercial banks over the observation period. The absence of a significant effect is attributable to the capacity of banks to adjust their funding mix in response to GWM changes without substantially altering credit disbursement behavior. When Bank Indonesia increased GWM requirements in 2022 and 2023 following the pandemic-era relaxation, large banks with diversified funding access offset the reduction in deployable deposits through interbank borrowing and bond issuance, maintaining credit volumes and insulating NPL from the direct

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effect of the policy change. This result is consistent with Wonida and Setiastuti (2025), who found that macroprudential policy alone does not significantly influence bank risk-taking, and that its effect materializes only through coordinated interaction with monetary policy.

BI-Rate produces a positive but statistically insignificant effect on NPL (coefficient = 0.0190; $p = 0.9673$), failing to support Hypothesis H3b. Although the positive sign is directionally consistent with H3b, which predicted that higher BI-Rate would increase NPL by reducing borrower debt service capacity and potentially encouraging risk-taking behavior, the effect does not reach statistical significance.

These findings collectively suggest that macroprudential and monetary policy instruments affect credit risk in Indonesia primarily through indirect channels with significant temporal lags rather than through direct and contemporaneous changes in bank behavior. Effective credit risk management therefore requires policy coordination that addresses both the supply of bank liquidity and the incentive structures governing its deployment, rather than relying on individual instrument adjustments.

Effect of Control Variables

Among the control variables, only ROA has results statistically significant effect on NPL. The negative relationship indicates that banks with higher profitability maintain lower levels of credit risk, consistent with the findings of Jiang and Zheng (2024) and Vuong et al. (2023). Profitable banks possess greater capacity for credit risk management, including investment in credit analytics, monitoring systems, and risk-adjusted pricing capabilities. Also, profitable banks have reduced incentives to pursue volume-driven lending strategies to meet performance targets, which affect negatively to NPL. The non-significance of Bank Size, CAR, CAP, Loan Growth, and Inflation suggests that in this sample and period, the primary determinants of credit risk are behavioral, reflecting management quality and intermediation intensity, rather than structural or macroeconomic in nature.

CONCLUSION

This study finds that liquidity creation and liquidity risk (LDR) both significantly worsen credit quality (NPL) in Indonesian commercial banks from 2015 to 2024, supporting a moral hazard explanation in which excess liquidity encourages banks to expand credit without adequately screening borrowers, while central bank tools like reserve requirements (GWM) and the BI-Rate show no significant direct effect, likely because their influence works through indirect, delayed channels not captured in annual data; credit risk is also highly persistent over time, and profitability (ROA) stands out as the one factor that meaningfully reduces NPL, pointing to management quality as more decisive than bank size, capital, or macroeconomic conditions. These findings suggest that regulators cannot rely on monetary and macroprudential policy alone to control credit risk and should instead build early-warning systems around liquidity creation and LDR levels, while bank managers should treat liquidity abundance as a risk rather than a safety net, since growing credit without stronger borrower-screening capacity leads to lasting NPL problems. The study is limited by its use of annual data, which may miss the 12–18-month lag in monetary policy transmission, and by the lack of analysis on how ownership, capital adequacy, or bank size might shape these effects gaps future research should address using higher-frequency data and broader samples, including

non-listed and Islamic banks.

REFERENCES

- Acharya, V., & Naqvi, H. (2012). The seeds of a crisis: A theory of bank liquidity and risk taking over the business cycle. *Journal of Financial Economics*, 106(2), 349–366.
- Alaoui Mdaghri, A. (2022). How does bank liquidity creation affect non-performing loans in the MENA region? *International Journal of Emerging Markets*, 17(7), 1635–1658.
- Annas, M., Humairoh, H., & Endri, E. (2024). Macroeconomic and bank-specific factors on non-performing loan: evidence from an emerging economy. *Calitatea*, 25(199), 155–161.
- Fungacova, Z., Turk, R., & Weill, L. (2021). High liquidity creation and bank failures. *Journal of Financial Stability*, 57, 100937.
- Jiang, T., & Zheng, Y. (2024). Indicators of non-performing loan: does efficiency matter? *Technological and Economic Development of Economy*, 30(1), 129–147.
- Le, T. D., & Pham, X. T. (2021). The inter-relationships among liquidity creation, bank capital and credit risk: evidence from emerging Asia-Pacific economies. *Managerial Finance*, 47(8), 1149–1167.
- Long, X., Wang, Y., Zhang, J., & Liu, Z. (2022). Can central bank mitigate the effects of the COVID-19 pandemic on the macroeconomy? *Emerging Markets Finance and Trade*, 58(1), 1–16. <https://doi.org/10.1080/1540496X.2021.1976354>
- Otoritas Jasa Keuangan. (2016). Peraturan Otoritas Jasa Keuangan Nomor 18 Tahun 2016 Tentang Penerapan Manajemen Risiko Bagi Bank Umum.
- Otoritas Jasa Keuangan. (2024). Statistik Perbankan Indonesia Desember 2024. Jakarta: OJK.
- Rahmadany, A. N., Risfandy, T., Achsanta, A. F., & Rifai, B. (2024). Liquidity and credit risks during the COVID-19 pandemic: evidence from a dual banking system. *Journal of Islamic Accounting and Business Research*.
- Riani, R. (2021). Does COVID-19 Pandemic Affect Bank Credit Risk? A Panel Data Analysis. *Ekonomi Islam Indonesia*, 3(1).
- Safitri, R., Andriana, I., & Sulastri, S. (2023). Determinants of Non-Performing Loans (NPL) in banking companies listed on the Indonesia Stock Exchange. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, 7(3), 1092–1098.
- Saliba, C., Farmanesh, P., & Athari, S. A. (2023). Does country risk impact the banking sectors' non-performing loans? Evidence from BRICS emerging economies. *Financial Innovation*, 9(1), 86.
- Umar, M., & Sun, G. (2016). Non-performing loans (NPLs), liquidity creation, and moral hazard: Case of Chinese banks. *China Finance and Economic Review*, 4(1), 10.
- Viverita, V., Bustaman, Y., & Danarsari, D. N. (2023). Liquidity creation by Islamic and conventional banks during the Covid-19 pandemic. *Heliyon*. <https://doi.org/10.1016/j.heliyon.2023.e15136>
- Vuong, N. T. P., Hoang, T. H. V., & Ha, D. T. T. (2023). Liquidity creation and bank risk-taking: Evidence from a transition market. *Cogent Economics & Finance*, 11(1), 2199904.
- Yudaruddin, R., et al. (2024). Liquidity and credit risk in Indonesia: The role of FinTech development. *SAGE Open*. doi:10.1177/21582440241245248.
- Zheng, Y., Cheung, A., & Cronje, T. (2019). The moderating role of capital on the relationship

\

between bank liquidity creation and failure risk. *Journal of International Financial Markets, Institutions and Money*, 63, 101137.

Zuhri, S. (2024). Analysis of the banking industry in Indonesia through the Structure-Conduct-Performance approach. *Journal of Economics Research and Policy Studies*, 4(2), 314–329.