

## Unpacking bank lending behavior: Macroeconomic and financial drivers of credit standards in the Philippines

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### CHRONICLE

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### ABSTRACT

This study investigates the determinants of credit standards among commercial banks in the Philippines, a critical aspect of financial stability and monetary policy transmission. Utilizing data from the Bangko Sentral ng Pilipinas' Senior Bank Loan Officers' Survey and macroeconomic indicators from 2009 to 2024, a stepwise multiple regression analysis was conducted on 640 observations. The objective was to identify significant regressors of both overall and specific credit standards. Findings reveal that inflation rate and past-due ratio (PDR) lead to significant tightening of credit standards, with PDR exerting the greatest influence. Conversely, GDP growth rate, capital adequacy ratio (CAR), and return on equity (ROE) lead to significant easing. Collateral requirements and loan covenants were identified as the most regressed specific credit standards. This research offers valuable insights into bank lending behavior, providing policymakers with empirical evidence for managing credit supply, mitigating financial risks, and ensuring banking system stability.

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## 1. Introduction

Banks play various functions in the economy, such as financial intermediation, facilitating payments and transactions, and providing credit supply. In the Philippines, the total assets of the banking system reached 26.6 trillion pesos in 2024. It primarily reflects the critical role of banks as financial intermediaries, as a large portion of assets was from deposits funneled into loans and investments. On the credit side, total loans are about 15 trillion pesos whereas about 93 percent of which was from 44 commercial banks. In lending to enterprises, banks constantly adjust their credit standards in response to changes in the conditions of the economy and the banking industry. Understanding the determinants of these adjustments is essential for policymakers in formulating interventions to enhance credit supply and mitigate associated risks (Beck, 2007; Naili & Lahrichi, 2020). Moreover, the lending behavior of banks reflects the current situation of the economy and the banking system; hence, critical in economic and financial stability (de Moraes & Costa, 2023; Swamy, 2012).

The systematic monitoring and analysis of bank lending behavior, in terms of either tightening or easing of credit standards, are imperative for several reasons. First, these standards have a direct effect on the availability and cost of financing of businesses and households, thereby influencing investment, spending, and the overall economic activity (Bernanke, 2018; Stiglitz, 1988). Tightening of credit standards could result in less access to credit, while easing could result in more access. Second, understanding changes of behavior allows central banks and regulators to assess the effectiveness of their monetary policy transmission. For instance, if changes in interest rates do not correspond to adjustments in credit standards, the intended impact of such policy in the real economy is reduced (Aikman et al., 2016; Drehmann et al., 2008; Fung et al., 2000). Third, the drivers of credit standards provide insights in identifying potential vulnerabilities in the banking system. Identifying these drivers guide policy interventions of preventing potential financial crises (Bernanke, 2018; Claessens & Kodres, 2014). Moreover, quantifying how various economic and bank-specific factors influence lending adjustments is

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useful in addressing the underlying issues during periods of excessive tightening or easing (Ahmed et al., 2021; Bassett et al., 2014).

In addition to the empirical standpoint of this study, credit channeling of central banks provided theoretical support. The credit channel suggests that monetary policy can have a more powerful impact on the economy by affecting the availability and terms of credit through the banking system (Bernanke & Gertler, 1995). This goes beyond the traditional interest rate channel by focusing on how central banks influence the financial health of both borrowers and lenders. Specifically, tightened lending channel reflects reduced bank's ability or willingness to lend, while balance sheet channel shows how policy changes affect net worth and collateral of businesses and households, likewise affecting their access to credit. These effects are particularly pronounced for bank-dependent borrowers like small and medium-sized enterprises, due to the prevalence of asymmetric information in credit markets.

Existing research showed that economic indicators affect lending behavior. In terms of inflation rate, previous studies suggest a positive association with tighter credit standards. For instance, Copelovitch and Singer (2008) and Mishkin (2009) found that central bank's interventions to control inflation can affect credit supply. Banks respond to stricter monetary policies by becoming more cautious with their lending enforcement and policies. Moreover, Malouche (2009) highlighted that higher inflation can cause uncertainty on banks, particularly the risk of non-payments, resulting in stricter loan covenants and collateral requirements. Conversely, strong GDP growth rates are generally associated with an easing of credit standards. Naili and Lahrichi (2020) and Yurdakul (2014) highlighted that favorable macroeconomic conditions tend to reduce perceived credit risk, making banks willing to offer more loans. This behavior reflects how a better economy improves borrower's repayment capacity, encouraging banks to soften lending terms and expand credit lines (Anthony, 2012).

Other studies showed that banks' financial ratios are key determinants of lending behavior. For instance, Madugu et al. (2020) and Olawale (2024) revealed that a higher capital adequacy ratio (CAR) enhances a bank's capacity to lend, allowing them to maintain or even ease credit standards during various economic cycles. Also, Kozak, (2021) stated that well-capitalized banks are resilient and possess greater capacity to absorb shocks, enabling them to be more flexible with credit granting. The past-due ratio (PDR), which reflects the asset quality, showed a positive influence with credit tightening. Schiantarelli et al. (2016) concluded that an increase in non-paying loans prompts banks to adopt more cautious lending policies to prevent further losses and manage liquidity. Naili and Lahrichi (2020) explained that past-due ratios reflect the current performance not just of the banks' existing borrowers, but also of those that are not their borrowers under the same industry and business operations; making PDR an indicator of heightened credit risk. Finally, return on equity (ROE), as a measure of bank profitability, is generally expected to influence easing of credit standards. Miglo, (2018) and Parker (2002), in their study, reported that higher profitability can increase a bank's risk-bearing capacity and incentivize it to expand lending, potentially through a more lenient credit granting approach, with a view of attracting more borrowers. Also, Bancel & Mittoo (2011) noted that profitable banks have financial flexibility and are better positioned to set up high lending volumes.

**H<sub>1</sub>:** *The inflation rate positively influences the credit standards of senior bank loan officers of commercial banks.*

**H<sub>2</sub>:** *The GDP growth rate negatively influences the credit standards of senior bank loan officers of commercial banks.*

**H<sub>3</sub>:** *The capital adequacy ratio negatively influences the credit standards of senior bank loan officers of commercial banks.*

**H<sub>4</sub>:** *The past due ratio positively influences the credit standards of senior bank loan officers of commercial banks.*

**H<sub>5</sub>:** *The return on equity negatively influences the credit standards of senior bank loan officers of commercial banks.*

## 2. Methodology

### 2.1. Data collection

The data used in this study are sourced from Bangko Sentral ng Pilipinas (BSP)' Senior Bank Loan Officers' Survey (SLOS) for outcome variables. The SLOS consists of questions related to the general credit standards of commercial banks in the Philippines. The BSP has been conducting the survey to enhance its understanding of the banks' lending behavior, and assess the effectiveness of lending as a monetary policy transmission channel. The banks' credit standards are measured using a diffusion index formulated by the BSP. A positive diffusion index indicates that more banks have tightened their standards, while a negative index indicates the opposite (BSP, 2025). For the regressors, quarterly macroeconomic indicators and financial ratios are sourced from the BSP's (1) Monetary, External, and Financial Statistics and (2) Banking Statistics, respectively. All data for dependent and independent variables span from years 2009 to 2024. No personal or confidential data were accessed.

### 2.2. Variable selection and model building

A combined stepwise multiple regression was conducted to construct a regression model whereas all potential regressors were tested and iteratively eliminated and selected until a stable model is achieved. From a total of 11 potential regressors

(viz., inflation rate, GDP growth rate, central bank policy rate, loans to deposits ratio, capital adequacy ratio, earning asset yield, net interest margin, return on assets ratio, return on equity ratio, past due ratio, and distressed assets ratio), only five regressors were significant in affecting the overall credit standards (OCS) of senior bank loan officers of commercial banks in the Philippines. The remaining five regressors were suitable to the OCS model as they collectively produced the lowest values for model selection. The Akaike Information Criterion (AIC) is at 463.949 and the Bayesian Information Criterion (BIC) is at 479.061. Moreover, using the same model composition on the six specific credit standards (viz., credit margin, size of credit lines, collateral requirements, loan covenants, loan maturity, and interest rate floors), only four of them were observed to be statistically significant with meaningful explanatory power. The description of the significant and tested variables is provided in Table 1.

**Table 1**

Description and abbreviation of the selected variables in the regression models

| Variable       | Description              | Notes   | Abbrev. | Hypothesis and expected sign |
|----------------|--------------------------|---|---------|------------------------------|
| Y <sub>1</sub> | Overall Credit Standards | Criteria and requirements that a lender use to evaluate borrowers before approving loans.               | OCS     |                              |
| Y <sub>2</sub> | Size of Credit Lines     | Maximum amount a borrower can access from a lender.   | SCL     |                              |
| Y <sub>3</sub> | Collateral Requirements  | Assets that a borrower must pledge to secure a loan.  | CR      |                              |
| Y <sub>4</sub> | Loan Covenants           | Conditions set by the lender to ensure borrowers maintain financial stability throughout the loan term. | LC      |                              |
| Y <sub>5</sub> | Interest Rate Floors     | Minimum interest rate that a lender sets for a loan.  | IRF     |                              |
| X <sub>1</sub> | Inflation Rate           | Percentage increase in the price of goods and services over a specific period.                          | INF     | H <sub>1</sub> (+)           |
| X <sub>2</sub> | GDP Growth Rate          | Percentage change in a country's gross domestic product over a specific period.                         | GDP     | H <sub>2</sub> (-)           |
| X <sub>3</sub> | Capital Adequacy Ratio   | Measure of bank's financial strength by comparing its capital to its risk-weighted assets.              | CAR     | H <sub>3</sub> (-)           |
| X <sub>4</sub> | Past Due Ratio           | Measure of bank's loans that are overdue compared to total outstanding loans.                           | PDR     | H <sub>4</sub> (+)           |
| X <sub>5</sub> | Return on Equity         | Measure of bank's profitability by showing how efficiently it generates profit from equity.             | ROE     | H <sub>5</sub> (-)           |

Table 2 presents the descriptive statistics of the senior bank loan officers' lending behaviors as the outcome variables, as well as the macroeconomic indicators and financial ratios as the regressors. The quarterly data from years 2009 to 2024 resulted in a tightened overall credit standards at 11.461 within a minimum of -9.700 and a maximum of 65.200. Tightening of enforcement and policies are likewise noted in collateral requirements ( $M = 8.289$ ,  $Mdn = 5.600$ ,  $SD = 10.911$ ), loan covenants ( $M = 9.298$ ,  $Mdn = 6.700$ ,  $SD = 9.627$ ) and interest rate floors ( $M = 8.598$ ,  $Mdn = 7.400$ ,  $SD = 10.738$ ); while easing was only noted in size of credit lines ( $M = -7.611$ ,  $Mdn = -6.800$ ,  $SD = 13.634$ ). For the regressors, average change in consumer price index (CPI) is at 3.509 ( $Mdn = 3.300$ ,  $SD = 1.770$ ) and domestic product growth is at 7.848 ( $Mdn = 8.968$ ,  $SD = 5.197$ ). Moreover, the performance of universal and commercial banks resulted in a capital adequacy of 16.655 percent ( $Mdn = 16.467$ ,  $SD = .954$ ), past due ratio of 3.075 ( $Mdn = 3.309$ ,  $SD = 1.014$ ) and return on equity of 10.871 ( $Mdn = 10.542$ ,  $SD = 1.935$ ).

**Table 2**

Descriptive statistics of tested variables

| Variable | Mean   | Median | Minimum | Maximum | Std. Dev. |
|----------|--------|--------|---------|---------|-----------|
| OCS      | 11.461 | 9.900  | -9.700  | 65.200  | 13.790    |
| SCL      | -7.611 | -6.800 | -36.800 | 26.100  | 13.634    |
| CR       | 8.289  | 5.600  | -11.100 | 43.500  | 10.911    |
| LC       | 9.298  | 6.700  | -6.500  | 56.500  | 9.627     |
| IRF      | 8.598  | 7.400  | -10.300 | 36.200  | 10.738    |
| INF      | 3.509  | 3.300  | -200    | 8.700   | 1.770     |
| GDP      | 7.848  | 8.968  | -14.953 | 15.214  | 5.197     |
| CAR      | 16.655 | 16.467 | 14.980  | 19.240  | .954      |
| PDR      | 3.075  | 3.309  | 1.456   | 4.735   | 1.014     |
| ROE      | 10.871 | 10.542 | 6.485   | 15.795  | 1.935     |

Note. The data are expressed in percentage values. Observations = 640.

### 2.3. Preliminary analysis using Pearson's correlation

#### Significant correlations of overall credit standards on regressors

A statistically significant strong negative correlation was observed with GDP ( $r = -.523$ ,  $p < .001$ ), indicating that higher GDP is associated with lower OCS. Similarly, a strong and statistically significant negative relationship exists with ROE ( $r = -.535$ ,  $p < .001$ ). A moderate, statistically significant negative correlation was also found with CAR ( $r = -.265$ ,  $p = .034$ ). Conversely, OCS exhibited a moderate, statistically significant positive correlation with PDR ( $r = .362$ ,  $p = .003$ ), suggesting that as PDR increases, OCS tends to increase. The correlation between OCS and INF was positive but not statistically significant ( $r = .209$ ,  $p = .098$ ).

**Table 3**

Correlation between regressors and outcome variables

| Variable | INF      |          | GDP      |          | CAR      |          | PDR      |          | ROE      |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
|          | <i>r</i> | <i>p</i> | <i>r</i> | <i>p</i> | <i>r</i> | <i>p</i> | <i>r</i> | <i>p</i> | <i>r</i> | <i>p</i> |
| OCS      | .209     | .098     | -.523    | <.001    | -.265    | .034     | .362     | .003     | -.535    | <.001    |
| SCL      | .246     | .050     | -.386    | .002     | -.328    | .008     | .455     | <.001    | -.485    | <.001    |
| CR       | .321     | .010     | -.419    | <.001    | -.092    | .469     | .612     | <.001    | -.460    | <.001    |
| LC       | .234     | .063     | -.385    | .002     | -.288    | .021     | .454     | <.001    | -.599    | <.001    |
| IRF      | .554     | <.001    | -.089    | .528     | -.258    | .062     | .155     | .269     | -.183    | .189     |

Note.  $N=64$ ,  $df=62$

#### Significant correlations of size of credit lines on regressors

Furthermore, statistically significant negative correlations were identified with GDP ( $r = -.386$ ,  $p = .002$ ), CAR ( $r = -.328$ ,  $p = .008$ ), and ROE ( $r = -.485$ ,  $p < .001$ ). This suggests that increases in these regressors are associated with decreases in SCL. In contrast, SCL displayed a moderately strong, statistically significant positive correlation with PDR ( $r = .455$ ,  $p < .001$ ).

#### Significant correlations of collateral requirements on regressors

The outcome variable **CR** demonstrated a strong, statistically significant positive correlation with PDR ( $r = .612$ ,  $p < .001$ ), representing the strongest positive relationship observed in the table. Moderate, statistically significant negative correlations were found with GDP ( $r = -.419$ ,  $p < .001$ ) and ROE ( $r = -.460$ ,  $p < .001$ ). A moderate, statistically significant positive correlation also existed with INF ( $r = .321$ ,  $p = .010$ ).

#### Significant correlations of loan covenants on regressors

In the case of **LC**, significant negative correlations were evident with GDP ( $r = -.385$ ,  $p = .002$ ), CAR ( $r = -.288$ ,  $p = .021$ ), and a particularly strong negative correlation with ROE ( $r = -.599$ ,  $p < .001$ ). Conversely, LC showed a moderately strong, statistically significant positive correlation with PDR ( $r = .454$ ,  $p < .001$ ).

#### Significant correlations of interest rate floors on regressors

For **IRF**, a strong and highly statistically significant positive correlation was observed with INF ( $r = .554$ ,  $p < .001$ ). Consistently, GDP and ROE show significant negative correlations and PDR show significant positive correlations with OCS, SCL, CR, and LC. Strong negative correlations were noted in ROE with LC and OCS, and GDP with OCS. On the other hand, strong positive correlations were noted on PDR with CR, and INF with IRF.

### 2.4. Model fit measures

**Table 4**

Explained variance and overall model significance

| Model | <i>R</i> | $R^2$ | $R^2$ -adj | $F(5,58)$ | <i>p</i> (Sig.) |
|-------|----------|-------|------------|-----------|-----------------|
| OCS   | 0.804    | 0.646 | 0.616      | 21.205    | <.001           |
| SCL   | 0.815    | 0.664 | 0.635      | 22.926    | <.001           |
| CR    | 0.854    | 0.729 | 0.705      | 31.151    | <.001           |
| LC    | 0.826    | 0.682 | 0.655      | 24.884    | <.001           |
| IRF   | 0.711    | 0.505 | 0.453      | 9.605     | <.001           |

As presented in Table 4, the OCS model was highly statistically significant,  $F(5,58) = 21.205$ ,  $p < .001$ , indicating that the regressors collectively influence the outcome variable. Additionally, it demonstrated a strong explanatory power ( $R^2 = .646$ ,  $R^2$ -adj = .616). When the OCS model was replicated to the specific credit standards, all models likewise became highly statistically significant with generally strong levels of adjusted explained variance from 45.3 to 70.5 percent. The highest explanatory power was observed with the CR model ( $R^2 = .729$ ,  $R^2$ -adj = .705) while the IRF model had the lowest ( $R^2 = .505$ ,  $R^2$ -adj = .453).

### 2.5. Assumptions testing prior to regression analysis

**Linearity test.** The assumption of linearity was visually inspected by examining residual plots of each regressor against the residuals. The plots showed no discernible curvilinear patterns, indicating linearity in the regression model.

**Homoscedasticity test.** The assumption of equal variance of errors was evaluated using the same residual plots. The plots displayed a relatively consistent and random scatter of residuals, indicating no apparent fanning-out or converging patterns.

*Normality of residuals test.* The assumption of normality was assessed using Shapiro-Wilk's normality test. The result indicated that the residuals for the regression model were normally distributed ( $W = .976, p = .258$ ).

*Multicollinearity test.* The assumption of no multicollinearity among the regressors was evaluated. The Pearson correlation coefficients between  $-.535$  and  $.527$  were below the stricter threshold of  $.600$ , indicating no excessively high correlations. Also, the corresponding Variance Inflation Factor (VIF) and Tolerance values for INF were  $1.460$  and  $.685$ , for GDP were  $1.451$  and  $.689$ , for CAR were  $1.923$  and  $.520$ , for PDR were  $1.607$  and  $.622$ , and for ROE were  $1.810$  and  $.552$ . All these values remained below the VIF threshold of  $5.0$  and above the minimum tolerance of  $.20$ .

*Autocorrelation test.* The assumption of independent errors was assessed using Durbin-Watson (DW) statistics. A DW value of  $1.508$  falls within the acceptable range of  $1.5$  to  $2.5$ , indicating no significant positive or negative autocorrelation among the residuals.

*Outlier test.* The assumption of no influential outliers was evaluated using Cook's distance. The values ranged from  $0$  to  $.951$  ( $M = .038, Mdn = .004, SD = .131$ ) were below the conventional threshold of  $1$ , indicating that no single data point disproportionately influenced the regression coefficients.

### 2.6. Estimation of regression

The preliminary analysis using Pearson's correlation indicated that the outcome variables have positive direction of relationship with INF and PDR, and negative direction of relationship with GDP, CAR, and ROE. Using these results, the multiple regression model in this study is represented as  $Y_1 = \beta_0 + \beta_1 X_1 - \beta_2 X_2 - \beta_3 X_3 + \beta_4 X_4 - \beta_5 X_5 + \epsilon$  for the OCS model. The equation is likewise used for the outcome variables  $Y_2$  to  $Y_5$ . The term  $\beta_0$  is the intercept,  $\beta_1, \beta_2, \dots, \beta_5$  are the coefficients in the regression,  $X_1, X_2, \dots, X_5$  represent the regressors, and  $\epsilon$  is the difference between the observed value and the estimated value, known as the residual. The corresponding variables for the  $X$  and  $Y$  terms are already described in Table 1.

## 3. Results

As presented in Table 5, the regressors of credit standards have distinct effects on the bank's lending behavior to enterprises, whereas a positive coefficient suggests tightening of credit standards and a negative coefficient suggests easing. Indicatively, senior bank loan officers tend to adjust their standards, both in terms of enforcement and policies, in accordance with the observed changes in the condition of the economy and the banking industry. When INF ( $B = 2.030, SE = .735, t = 2.761, p = .008$ ) and PDR ( $B = 4.956, SE = 1.351, t = 3.668, p < .001$ ) increases, banks tend to tighten overall credit standards. Conversely, when GDP ( $B = -1.353, SE = .249, t = -5.425, p < .001$ ), CAR ( $B = -4.260, SE = 1.566, t = -2.720, p = .009$ ), and ROE ( $B = -1.538, SE = .747, t = -2.058, p = .044$ ) increases, they tend to ease overall credit standards.

### *Significant effects of inflation on banks' specific credit standards*

The positive coefficients of INF were significantly observed in CR ( $B = 1.511, SE = .510, t = 2.965, p = .004$ ), and IRF ( $B = 3.977, SE = .757, t = 5.254, p < .001$ ). When inflation rises, banks tend to tighten their credit standards to protect themselves from increased credit risks. As inflation leads to higher operating costs of enterprise borrowers, banks set stricter collateral requirements to ensure they do not lose much from defaults. Moreover, central banks typically raise policy rates to curb inflation, which in turn, make banks to increase interest rate floors to ensure they still earn a profit despite the higher cost of funds. Therefore, inflation prompts banks to act cautiously by reducing exposure to risky loans.

### *Significant effects of GDP growth rate on banks' specific credit standards*

The negative coefficients of GDP were significantly observed in SCL ( $B = -.945, SE = .240, t = -3.931, p < .001$ ), CR ( $B = -.783, SE = .173, t = -4.528, p < .001$ ), LC ( $B = -.493, SE = .165, t = -2.985, p = .004$ ), and IRF ( $B = -.742, SE = .243, t = -3.052, p = .004$ ). In contrast to INF, banks tend to relax credit standards when the country's GDP expands. They become more confident in lending as growing economy indicates increased business activity, higher income accumulation, and reduced default risks. Senior bank loan officers tend to offer larger credit lines to support thriving businesses and reduce collateral requirements since repayment is observed as more reliable. During these periods, banks tend to loosen loan covenants and are willing to lend at lower minimum interest rates to attract creditworthy borrowers and make credit more affordable and accessible.

### *Significant effects of capital adequacy ratio on banks' specific credit standards*

The negative coefficients of CAR were significantly observed in all specific regressors: SCL ( $B = -7.179, SE = 1.509, t = -4.757, p < .001$ ), CR ( $B = -2.204, SE = 1.085, t = -2.031, p = .047$ ), LC ( $B = -3.060, SE = 1.037, t = -2.952, p = .005$ ), and IRF ( $B = -3.757, SE = 1.752, t = -2.144, p = .037$ ). Banks tend to ease credit standards when their capital adequacy ratio increases because they have adequate capital buffers to take on additional lending risks. Having more capital to absorb potential losses, banks tend to allow themselves in offering larger credit lines and reduce collateral requirements. Additionally, they tend to provide flexibility in terms of loan covenants and interest rate floors, considering that they perceive problem credits to be manageable.

*Significant effects of past due ratio on banks' specific credit standards*

The positive coefficients of PDR were significantly observed in SCL ( $B = 7.894$ ,  $SE = 1.302$ ,  $t = 6.062$ ,  $p < .001$ ), CR ( $B = 6.337$ ,  $SE = .937$ ,  $t = 6.766$ ,  $p < .001$ ), and LC ( $B = 4.960$ ,  $SE = .894$ ,  $t = 5.546$ ,  $p < .001$ ). When past due levels rise, banks tend to enforce stricter credit standards to minimize credit risks and protect themselves from financial instability. When existing borrowers are struggling with repayments, banks reduce the size of credit lines to limit potential losses. Similarly, they become more cautious and impose stricter collateral requirements and loan covenants to borrowers, ensuring better discipline and recovery from non-payments.

*Significant effects of return on equity ratio on banks' specific credit standards*

The negative coefficients of ROE were significantly observed in CR ( $B = -1.434$ ,  $SE = .518$ ,  $t = -2.768$ ,  $p = .008$ ) and LC ( $B = -1.829$ ,  $SE = .495$ ,  $t = -3.698$ ,  $p < .001$ ). Banks ease credit standards when their financial performance improves, encouraging them to become more flexible with collateral requirements and loan covenants. Moreover, profitability allows them to expand its risk appetite, reducing concerns about defaults and making credit more attractive for enterprise borrowers.

**Table 5**  
Regression coefficients and significance levels

| Model | Regressor | Estimate | SE     | 95% CI  |         | t      | p (Sig.) |
|-------|-----------|----------|--------|---------|---------|--------|----------|
|       |           |          |        | LL      | UL      |        |          |
| OCS   | Intercept | 87.405   | 21.272 | 44.824  | 129.988 | 4.109  | <.001    |
|       | INF       | 2.030    | 0.735  | 0.558   | 3.501   | 2.761  | 0.008    |
|       | GDP       | -1.353   | 0.249  | -1.852  | -0.854  | -5.425 | <.001    |
|       | CAR       | -4.260   | 1.566  | -7.394  | -1.125  | -2.720 | 0.009    |
|       | PDR       | 4.956    | 1.351  | 2.251   | 7.660   | 3.668  | <.001    |
|       | ROE       | -1.538   | 0.747  | -3.033  | -0.042  | -2.058 | 0.044    |
| SCL   | Intercept | 99.855   | 20.501 | 58.818  | 140.892 | 4.871  | <.001    |
|       | INF       | 1.185    | 0.709  | -0.233  | 2.604   | 1.673  | 0.100    |
|       | GDP       | -0.945   | 0.240  | -1.426  | -0.464  | -3.931 | <.001    |
|       | CAR       | -7.179   | 1.509  | -10.200 | -4.158  | -4.757 | <.001    |
|       | PDR       | 7.894    | 1.302  | 5.287   | 10.501  | 6.062  | <.001    |
|       | ROE       | -0.817   | 0.720  | -2.258  | 0.624   | -1.135 | 0.261    |
| CR    | Intercept | 41.965   | 14.744 | 12.451  | 71.478  | 2.846  | 0.006    |
|       | INF       | 1.511    | 0.510  | 0.491   | 2.531   | 2.965  | 0.004    |
|       | GDP       | -0.783   | 0.173  | -1.129  | -0.437  | -4.528 | <.001    |
|       | CAR       | -2.204   | 1.085  | -4.376  | -0.032  | -2.031 | 0.047    |
|       | PDR       | 6.337    | 0.937  | 4.462   | 8.211   | 6.766  | <.001    |
|       | ROE       | -1.434   | 0.518  | -2.470  | -0.397  | -2.768 | 0.008    |
| LC    | Intercept | 65.926   | 14.081 | 37.739  | 94.113  | 4.682  | <.001    |
|       | INF       | 0.817    | 0.487  | -0.157  | 1.791   | 1.679  | 0.098    |
|       | GDP       | -0.493   | 0.165  | -0.823  | -0.162  | -2.985 | 0.004    |
|       | CAR       | -3.060   | 1.037  | -5.135  | -0.985  | -2.952 | 0.005    |
|       | PDR       | 4.960    | 0.894  | 3.170   | 6.750   | 5.546  | <.001    |
|       | ROE       | -1.829   | 0.495  | -2.819  | -0.839  | -3.698 | <.001    |
| IRF   | Intercept | 58.696   | 22.892 | 12.642  | 104.750 | 2.564  | 0.014    |
|       | INF       | 3.977    | 0.757  | 2.454   | 5.499   | 5.254  | <.001    |
|       | GDP       | -0.742   | 0.243  | -1.231  | -0.253  | -3.052 | 0.004    |
|       | CAR       | -3.757   | 1.752  | -7.281  | -0.232  | -2.144 | 0.037    |
|       | PDR       | 1.022    | 1.737  | -2.473  | 4.517   | 0.588  | 0.559    |
|       | ROE       | 0.185    | 0.767  | -1.358  | 1.729   | 0.241  | 0.810    |

Note. SE=standard error, CI=confidence interval, LL=lower limit, UL=upper limit

Thus, the final model of the outcome variables that explain the lending behaviors of senior bank loan officers of commercial banks are the following:

$$\text{OCS} = 87.405 + (2.030 \times \text{INF}) - (1.353 \times \text{GDP}) - (4.260 \times \text{CAR}) + (4.956 \times \text{PDR}) - (1.538 \times \text{ROE})$$

$$\text{SCL} = 99.855 - (.945 \times \text{GDP}) - (7.179 \times \text{CAR}) + (7.894 \times \text{PDR}) - (.817 \times \text{ROE})$$

$$\text{CR} = 41.965 + (1.511 \times \text{INF}) - (.783 \times \text{GDP}) - (2.204 \times \text{CAR}) + (6.337 \times \text{PDR}) - (1.434 \times \text{ROE})$$

$$\text{LC} = 65.926 - (.493 \times \text{GDP}) - (3.060 \times \text{CAR}) + (4.960 \times \text{PDR}) - (1.829 \times \text{ROE})$$

$$\text{IRF} = 58.696 + (3.977 \times \text{INF}) - (.742 \times \text{GDP}) - (3.757 \times \text{CAR})$$

*Hypotheses Test*

As further presented in Table 6, the hypotheses H<sub>1</sub> to H<sub>5</sub> are accepted in the OCS model, indicating that the inflation rate, GDP growth rate, capital adequacy ratio, past due ratio, and return on equity, significantly affect the credit standards of

senior bank loan officers of commercial banks. As for the specific credit standards, inflation was not significant in terms of size of credit lines and loan covenants; past due ratio was not significant in terms of use of interest rate floors; and return on equity was not significant in terms of size of credit lines and use of interest rate floors.

**Table 6**

Results of the tested hypotheses for the variables in the model

| Hypothesis               | OCS    | SCL    | CR     | LC     | IRF    |
|--------------------------|--------|--------|--------|--------|--------|
| H <sub>1</sub> : INF (+) | Accept | Reject | Accept | Reject | Accept |
| H <sub>2</sub> : GDP (-) | Accept | Accept | Accept | Accept | Accept |
| H <sub>3</sub> : CAR (-) | Accept | Accept | Accept | Accept | Accept |
| H <sub>4</sub> : PDR (+) | Accept | Accept | Accept | Accept | Reject |
| H <sub>5</sub> : ROE (-) | Accept | Reject | Accept | Accept | Reject |

*Note.* An accepted positive hypothesis indicates significant tightening of credit standards and an accepted negative hypothesis indicate significant easing of credit standards by commercial banks

#### 4. Discussions

Banks tend to adjust their credit standards, both in terms of enforcement and policies, in response to the observed changes in the economy and the banking industry. They tend to tighten credit standards during periods of high inflation and increased levels of past due. Conversely, they tend to ease the standards during periods of economic growth, increased capital adequacy, and improved profitability. Therefore, they become considerably stricter during economic downturns and financial uncertainty, and considerably lenient during the opposite.

In terms of specific credit standards, collateral requirements emerged as the most significant determinant of credit standards, exhibiting the strongest explanatory power and being substantially regressed by all independent variables. Unlike other standards, collateral directly addresses potential losses as it is the bank's recoverable asset in the event of non-payment. Likewise, it affects how a loan is being structured, which in turn, affects other credit standards. For instance, a secured loan typically has a higher credit line, lower interest rate floor, and more flexible conditions, than unsecured loan. This finding is relevant with Behr et al. (2011), Mann, (1997) and Steijvers and Voordeckers (2009).

Following this, loan covenants became the second strongest explanatory power, being significantly regressed by the tested independent variables, except for inflation rate. While collateral requirements provide protection after default, covenants serve as preventive safeguards, assisting banks in reducing likelihood of default before it happens. Loan covenants allow banks to detect financial distress early when specific conditions were breached or not complied with, thereby facilitating the imposition of corrective measures before defaults transpire. This finding is relevant with Borgonovo and Gatti, (2013) and Prabeswara, (2025)

Similarly, the size of credit lines and use of interest rate floors showed strong explanatory power. Inflation rate has no significant influence on the size of credit line, past due ratio has no significant influence on the use of interest rate floors, and return on equity has no significant influence on both standards. Compared to collateral requirements and loan covenants, the two standards do not directly prevent default risk but they manage exposure to potential increase of losses. The size of the credit line can be adjusted based on the borrower's paying capacity and other determining criteria established by the bank, while interest rate floors can be set based on the bank's desired level of profitability to maintain stable returns. The findings for credit lines are relevant with Demiroglu and James (2010) and Jiménez et al. (2009); while for interest rate floors are Goodhart and Kabiri (2019) and Keister et al. (2008).

#### 5. Conclusions

The regression analysis carried out leads to the conclusion that there are five variables that regress the lending behavior of senior bank loan officers in terms of either tightening or easing credit standards. Two of these variables directly, positively, and significantly influence credit standards: the inflation rate and past due ratio, leading to tightening. The remaining three variables exerted a direct, negative, and significant influence: GDP growth rate, capital adequacy ratio, and return on equity, leading to easing. The variable with the greatest impact to tightening is the past due ratio and the variable with the greatest impact to easing is the capital adequacy ratio. In terms of specific credit standards, collateral requirements was the most significant outcome variable, followed by loan covenants, size of credit lines, and use of interest rate floors. This study contributes evidence on determining the collective changes in the enforcement and policies for lending to enterprises alongside changes in the condition of the economy and the banking industry. Also, it supports the formulation of monetary policies aimed in further enhancing the effectiveness of lending as a transmission channel of credit supply.

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