

Bank-Specific and Macroeconomic Determinants of Non-Performing Loans: Empirical Evidence from Moroccan Banks

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Abstract— This paper analyzes the bank-specific and macroeconomic determinants of non-performing loans (NPLs) in Moroccan banks using panel data from six listed institutions over the period 2013–2023. Panel regression results indicate that bank size has a positive and significant effect on NPLs, while loan loss provisions reduce credit risk, highlighting the role of prudent provisioning practices. Economic growth is associated with higher NPLs, suggesting riskier lending behavior during expansionary phases, whereas unemployment exerts a negative impact, reflecting more conservative credit policies under adverse labor market conditions. In contrast, bank profitability and inflation do not significantly influence NPL levels. These findings underscore the joint role of bank behavior and macroeconomic conditions in shaping credit risk and provide policy-relevant insights for banking supervision in emerging economies.

Keywords— Non-performing loans; Credit risk; Macroeconomic conditions; Bank-specific factors; Moroccan banking system.

I. INTRODUCTION

The soundness of the banking sector is a key condition for economic stability and sustainable growth. Among the various indicators of banking vulnerability, non-performing loans (NPLs) are widely used to assess credit risk and the quality of banks' loan portfolios. Elevated levels of NPLs weaken bank profitability, constrain lending capacity, and may generate systemic risks, particularly in emerging economies where financial markets are still developing.

Over the past decade, the Moroccan banking sector has experienced significant structural changes, driven by financial deepening, regulatory reforms, and increased competition. While these developments have strengthened the sector's resilience, they have also expanded banks' exposure to credit risk through rapid credit growth and the diversification of lending activities. In this context, understanding the drivers of NPLs has become a central concern for bank managers, regulators, and policymakers.

The existing empirical literature identifies two broad categories of determinants of NPLs. On the one hand, bank-specific factors such as profitability, size, and provisioning policies influence lending behavior and risk management practices. On the other hand, macroeconomic conditions, including economic growth, inflation, and unemployment, shape borrowers' repayment capacity and the overall credit environment. However, empirical findings regarding the magnitude and direction of these effects remain mixed and strongly dependent on country-specific institutional and economic contexts.

Despite the growing body of international research on credit risk, empirical evidence focusing specifically on Moroccan banks remains relatively limited, particularly studies that jointly examine bank-level characteristics and macroeconomic variables over an extended period. This gap motivates the present study, which seeks to answer the following research question:

To what extent do bank-specific factors and macroeconomic variables influence the level of NPLs in Moroccan banks?

Using panel data from six listed Moroccan banks over the period 2013–2023 and applying regression techniques, this study aims to identify the main bank-specific and macroeconomic factors and their influence on NPLs. By doing so, it contributes to the literature on credit risk in emerging economies and provides policy-relevant insights for banking supervision and risk management.

II. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

A. Literature Review

The quality of banks' loan portfolios has long been recognized as a central determinant of financial stability and banking sector performance. The accumulation of NPLs weakens bank profitability, constrains credit supply, and amplifies systemic risk, particularly in emerging economies. As a result, a substantial body of empirical literature has sought to identify the determinants of NPLs, generally distinguishing between bank-specific factors and macroeconomic conditions.

1) *Bank-Specific Determinants of Non-Performing Loans:*

Bank profitability is widely regarded as a key indicator of sound management and effective risk control. Higher profitability, commonly measured by return on assets (ROA) or return on equity (ROE), enhances banks' capacity to absorb unexpected losses and support prudent lending behavior. Empirical studies consistently document a negative relationship between profitability and non-performing loans (NPLs), indicating that less profitable banks tend to experience weaker loan quality [4], [10], [14], [2]. From a behavioral perspective, banks facing low profitability may be incentivized to increase risk exposure in an attempt to boost returns, which can ultimately deteriorate credit quality.

Bank size is another important internal characteristic, although its effect on NPLs remains ambiguous in the literature. On the one hand, larger banks may benefit from economies of scale, portfolio diversification, and more sophisticated risk management systems, potentially reducing their exposure to credit risk [11], [13]. On the other hand, several studies suggest that large banks may engage in riskier lending strategies due to moral hazard, implicit government guarantees, or complex organizational structures, resulting in higher NPL ratios [6], [1]. These mixed findings highlight the importance of country-specific institutional and regulatory contexts.

Loan portfolio growth also plays a significant role in affecting loan quality. Rapid credit expansion has frequently been associated with weakened screening standards and insufficient monitoring, leading to higher default rates in subsequent periods. However, other studies argue that credit growth does not necessarily result in higher NPLs when it is supported by effective risk management practices, robust credit scoring systems, and appropriate supervisory oversight [8], [16].

Loan loss provisions (LLPs) reflect banks' prudential behavior and expectations regarding future credit losses. Several empirical contributions document a positive association between LLPs and NPLs, as provisioning tends to increase in response to deteriorating loan quality [14], [20]. Conversely, in banking systems characterized by sound regulation and effective supervision, higher provisioning may strengthen resilience and contribute to reducing effective credit risk by enhancing loss-absorbing capacity [9].

2) *Macroeconomic Determinants of Non-Performing Loans:*

Macroeconomic conditions play a crucial role in shaping borrowers' repayment capacity and, consequently, the evolution of non-performing loans (NPLs). Economic growth is among the most robust determinants identified in the literature. Periods of sustained GDP growth are generally associated with declining NPL ratios, as

improvements in household income and firm profitability enhance debt-servicing capacity. Conversely, economic downturns increase default risk and lead to loan portfolio deterioration [18], [14], [1].

Inflation influences credit risk through its impact on real income, costs, and debt-servicing conditions. When nominal wages and revenues adjust slowly, high inflation may erode purchasing power and increase default probabilities [14]. However, under certain conditions, moderate inflation may reduce the real value of outstanding debt and facilitate repayment, leading to mixed empirical evidence regarding its net effect on NPLs [17].

Unemployment represents another key macroeconomic determinant of credit risk. Rising unemployment reduces income stability for households and weakens cash flows for firms, thereby increasing the likelihood of default. Empirical studies consistently report a positive relationship between the unemployment rate and NPL levels [14], [16], highlighting the close link between labor market conditions and banking sector soundness.

Overall, the literature emphasizes that the dynamics of non-performing loans stem from the interaction between internal bank characteristics and broader macroeconomic conditions, underscoring the need for an integrated analytical framework.

B. Theoretical Framework and Hypothesis Development

The theoretical foundation of this study is grounded in established economic and financial theories that explain the emergence and persistence of credit risk in banking systems.

First, information asymmetry theory provides a fundamental explanation for credit risk. Imperfect information between lenders and borrowers gives rise to adverse selection and moral hazard, as banks are unable to perfectly distinguish between low-risk and high-risk borrowers *ex ante*, while borrowers may alter their behavior *ex post* once credit is granted [3], [19]. These mechanisms increase the probability of default and contribute to the accumulation of non-performing loans (NPLs).

Second, agency theory highlights the role of incentive misalignment between bank managers, shareholders, and depositors [12]. Managers may pursue short-term profitability or aggressive growth strategies that increase credit risk, particularly when they do not fully bear the costs of potential losses. This agency problem can lead to excessive risk-taking and deterioration in loan quality.

Third, the financial fragility hypothesis, together with the business cycle and credit cycle frameworks, emphasizes the role of macroeconomic fluctuations in shaping credit risk dynamics [15], [5], [7]. During periods of economic expansion, optimistic expectations and abundant liquidity may weaken lending standards, while economic downturns reduce borrowers' repayment capacity and reveal underlying vulnerabilities in banks' loan portfolios.

Based on the literature review and these theoretical perspectives, the following hypotheses are formulated:

- **H1:** Higher bank profitability (ROE) is associated with lower levels of NPLs.
- **H2:** Bank size has a significant impact on NPLs, although the direction of this relationship remains ambiguous.
- **H3:** Higher loan loss provisions (LLPs) contribute to improved credit risk management and lower NPLs.
- **H4:** Economic growth (GDP) negatively affects the level of NPLs.
- **H5:** Inflation has a significant effect on NPLs, depending on its impact on borrowers' real income and debt burden.
- **H6:** Higher unemployment rates lead to an increase in NPLs.

This theoretical framework provides a coherent and robust foundation for analyzing the determinants of credit risk in the Moroccan banking sector, as it integrates both bank-specific characteristics and macroeconomic conditions.

III. RESEARCH METHODOLOGY

A. Data and Sample Selection

This study employs a regression-based analytical approach to assess the determinants of NPLs in Moroccan banks. The sample includes six listed banks Attijariwafa Bank, Bank of Africa (BOA), Banque Centrale Populaire (BCP), Banque Marocaine pour le Commerce et l'Industrie (BMCI), CIH Bank, and Crédit du Maroc (CDM) over the period 2013–2023, resulting in 66 bank-year observations.

These institutions were selected for the availability and reliability of their financial data. Bank-specific data were collected from annual reports published on official bank websites and from the Moroccan Capital Market Authority (AMMC) database. Macroeconomic indicators were obtained from the World Bank database to ensure completeness and consistency.

B. Variables and Model Specification

The objective is to identify the main bank-specific and macroeconomic factors influencing the level of NPLs.

The econometric model is specified as follows:

$$\text{NPL}_{it} = \beta_1 \text{ROE}_{it} + \beta_2 \text{BS}_{it} - \beta_3 \text{LLP}_{it} + \beta_4 \text{GDP}_{it} + \beta_5 \text{INF}_{it} - \beta_6 \text{UNP}_{it} + \varepsilon_{it}$$

Where:

NPL: Non-performing loans ratio

ROE: Return on equity

BS: Bank size (log of total assets)

LLP: Loan loss provisions

GDP, INF, UNP: GDP growth rate, inflation rate, and unemployment rate

After defining the variables and presenting the model specification, the next step consists of examining the statistical properties of the data to ensure the validity of the estimations. The analysis was conducted using panel data regression techniques with the EViews software. Prior to the regression analysis, a series of inferential tests were performed, particularly unit root tests, to verify the stationarity of all variables and to guarantee the reliability of the econometric results.

IV. DATA ANALYSIS

A. Descriptive statistics

This section presents the descriptive statistics of the variables used to estimate the parameters of the panel data regression model.

1) Descriptive Statistics of the Variables:

TABLE I
DESCRIPTIVE ANALYSIS OF VARIABLES

Variable	Mean	Median	Standard deviation
NPL	0.026609	0.026553	0.007336
LLP	0.006492	0.008797	0.012398
ROE	0.063873	0.059767	0.022494
BS	18.62599	18.62995	0.780776
GDP	2.545455	3.100000	3.637843
UNP	9.96883	9.86772	3.1196
INF	1.40107	2.04120	1.72940

Source: Computations performed by the authors using EViews software, based on bank-level panel data for 2013–2023.

Table I presents the descriptive statistics of the variables used in the empirical analysis over the period 2013–2023. The average ratio of non-performing loans (NPLs) is 2.66%, with a median value of 2.65%, indicating a relatively symmetric distribution and moderate dispersion across banks. This suggests a certain degree of homogeneity in credit portfolio quality within the Moroccan banking sector.

Loan loss provisions (LLPs) exhibit greater variability, with a mean of 0.65% and a higher median of 0.88%, reflecting differences in provisioning practices among banks. The relatively high standard deviation further confirms heterogeneity in credit risk coverage strategies.

Bank profitability, measured by return on equity (ROE), averages 6.39% with limited dispersion, indicating relatively stable profitability levels across institutions. Bank size, proxied by the logarithm of total assets, shows a highly symmetric distribution and moderate variability, suggesting structural similarity among Moroccan banks in terms of scale.

Regarding macroeconomic variables, GDP growth exhibits substantial volatility over the study period, reflecting cyclical economic fluctuations. The unemployment rate remains relatively stable, with an average of 9.97%, while inflation shows notable variability, potentially affecting borrowers' real repayment capacity.

2) Autocorrelation Matrix of the Explanatory Variables:

TABLE II
CORRELATIONS AMONG THE MODEL VARIABLES

	LLP	ROE	BS	INF	UNP	GDP
LLP	1.000000	0.087887	0.283507	0.005760	0.021496	-0.012325
ROE	0.087887	1.000000	-0.002392	-0.040664	-0.284613	0.368414
BS	0.283507	-0.002392	1.000000	0.104021	0.114560	-0.026051
INF	0.005760	-0.040664	0.104021	1.000000	-0.119669	0.112858
UNP	0.021496	-0.284613	0.114560	-0.119669	1.000000	-0.390881
GDP	-0.012325	0.368414	-0.026051	0.112858	-0.390881	1.000000

Source: Computations performed by the authors using EViews software, based on bank-level panel data for 2013–2023.

Table II reports the correlation matrix among the explanatory variables. Overall, the results indicate weak to moderate correlations, suggesting the absence of serious multicollinearity concerns.

Loan loss provisions (LLPs) exhibit weak correlations with most variables, including ROE, inflation, unemployment, and GDP growth, indicating that provisioning policies are not strongly driven by

contemporaneous macroeconomic conditions. A moderate positive correlation is observed between LLPs and bank size, suggesting that larger banks tend to hold higher provisions.

Return on equity (ROE) shows a moderately positive correlation with GDP growth and a moderately negative correlation with unemployment, implying that bank profitability improves during periods of economic expansion and deteriorates when labor market conditions weaken. Its correlations with bank size and inflation remain negligible.

Bank size exhibits only weak associations with macroeconomic variables, indicating limited sensitivity of bank scale to short-term economic fluctuations. Inflation is weakly correlated with both unemployment and GDP growth, while unemployment and GDP growth display a moderately negative correlation, consistent with macroeconomic theory.

Overall, the correlation structure confirms that the explanatory variables are sufficiently independent, allowing for reliable econometric estimation and supporting the subsequent regression analysis.

B. Inferential Statistics

Before estimating the regression model, panel unit root tests were conducted to examine the stationarity properties of all variables. As reported in Table III, several series are stationary at levels, including the non-performing loans ratio (NPL, p-value = 0.0046), loan loss provisions (LLPs, p-value = 0.0177), and GDP growth (GDP, p-value = 0.0233).

In contrast, profitability (ROE, p-value = 0.0212), bank size (BS, p-value = 0.0342), and the unemployment rate (UNP, p-value = 0.0083) become stationary only after first differencing. Inflation (INF, p-value = 0.0025) attains stationarity after second differencing.

Overall, these results confirm that all variables achieve stationarity after the appropriate transformations, thereby ensuring the robustness and validity of the subsequent econometric estimations.

TABLE III
UNIT ROOT TEST RESULTS FOR STATIONARITY

Variable	P-value Before Differencing	P-value After Differencing	Order of Differencing
NPL	0.0046	-	0
ROE	0.5738	0.0212	1
BS	0.9887	0.0342	1
LLP	0.0177	-	0
GDP	0.0233	-	0
INF	0.995	0.0025	2
UNP	0.5362	0.0083	1

Source: Computations performed by the authors using EViews software, based on bank-level panel data for 2013–2023.

1) Estimation of the Model and Interpretation of Results:

Based on the stationarity results obtained in the preliminary analysis, the econometric model is estimated to identify the key determinants of NPLs in the Moroccan banking sector. The estimated regression model is expressed as follows:

$$\text{NPL}_{it} = 0.027634 + 0.000723 \text{ROE}_{it} + 0.046867 \text{BS}_{it} - 0.319928 \text{LLP}_{it} + 0.0001 \text{GDP}_{it} + 0.000375 \text{INF}_{it} - 0.026511 \text{UNP}_{it} + \varepsilon_{it}$$

The analysis of the estimated coefficients reported in Table IV indicates that the model constant is positive (0.0276) and highly significant (p-value < 0.01), suggesting the presence of a baseline level of non-performing loans (NPLs) not explained by the included explanatory variables.

Bank profitability (ROE) exhibits a positive but statistically insignificant coefficient ($\beta = 0.0007$; p-value = 0.8424), indicating that profitability does not exert a measurable effect on NPLs in the sample. In contrast, bank size has a positive and statistically significant impact on credit risk ($\beta = 0.0469$; p-value = 0.0145). This implies that a one-unit increase in bank size is associated with a 0.0469 increase in the NPL ratio, suggesting that larger banks may be more exposed to credit risk, potentially due to broader lending activities and higher risk-taking capacity.

Loan loss provisions (LLPs) display a negative and highly significant coefficient ($\beta = -0.3199$; p-value = 0.0001), indicating that higher provisioning is associated with lower levels of NPLs. This finding highlights the preventive and risk-mitigating role of provisioning policies in credit risk management.

With respect to macroeconomic variables, GDP growth shows a positive and statistically significant effect on NPLs ($\beta = 0.0001$; p-value = 0.0234). This result may reflect periods of credit expansion during economic upturns, when lending is sometimes extended to riskier borrowers.

Inflation does not exhibit a statistically significant effect on credit risk ($\beta = 0.0004$; p-value = 0.7161), suggesting that price dynamics do not directly affect loan portfolio quality. Finally, the unemployment rate displays a negative and significant coefficient ($\beta = -0.0265$; p-value = 0.0388). This counterintuitive result may indicate that higher unemployment leads banks to adopt more conservative lending policies, thereby reducing credit supply and the observed stock of NPLs.

TABLE IV
LINEAR REGRESSION ESTIMATION RESULTS FOR PANEL DATA

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	0.027634	0.001843	14.69236	0
ROE	0.000723	0.003623	0.199194	0.8424
Size	0.046867	0.018452	2.539916	0.0145
LLP	-0.319928	0.072365	-4.421061	0.0001
GDP	0.0001	0.0001	2.3498	0.0234
INF	0.000375	0.001025	0.366116	0.7161
UNP	-0.026511	0.030456	-0.870771	0.0388

Source: Computations performed by the authors using EViews software, based on bank-level panel data for 2013–2023.

The coefficient of determination (R^2) is 0.5357 (Table V), indicating that 53.57% of the variation in the NPL ratio is explained by the variables included in the model. The adjusted R^2 of 0.4142 reflects a moderate but satisfactory explanatory power. The Fisher statistic ($F = 4.4061$; p-value < 0.01) confirms the overall significance of the model.

TABLE V
KEY MODEL STATISTICS

Statistic	Value
R-squared	0.535744
Adjusted R-squared	0.414153
Durbin–Watson Statistic	0.527356
F-statistic	4.406125
Probability (F-statistic)	0.000214

Source: Computations performed by the authors using EViews software, based on bank-level panel data for 2013–2023.

2) Model Validation:

To ensure the robustness and validity of the estimated model, several econometric diagnostic tests were performed. These tests assess the main assumptions of linear regression, including the normality of residuals, homoscedasticity, overall model significance, and the absence of autocorrelation.

The Jarque–Bera test was employed to examine whether the residuals follow a normal distribution. As reported in Table VI, the test statistic equals $JB = 1.7062$ with a corresponding p-value of 0.4261, which exceeds the 5% significance level. Therefore, the null hypothesis of normally distributed residuals cannot be rejected, indicating that the residuals satisfy the normality assumption required for reliable statistical inference.

TABLE VI
RESULTS OF THE ERROR NORMALITY TEST

Jarque-Bera Statistic	1.706219
Associated Probability (p-value)	0.426088

Source: Computations performed by the authors using EViews software, based on bank-level panel data for 2013–2023.

The Likelihood Ratio (LR) test was employed to examine the homoscedasticity of the residuals. As reported in Table VII, the test statistic equals $LR = 3.53081$, with an associated p-value of 0.7399, which exceeds the 5% significance level. Consequently, the null hypothesis of homoscedasticity cannot be rejected, indicating that the residuals exhibit constant variance.

TABLE VII
HETEROSCEDASTICITY TEST RESULTS (LIKELIHOOD RATIO TEST)

Test	Value	Df	Probability
Likelihood Ratio	3.53081	6	0.7399

Source: Computations performed by the authors using EViews software, based on bank-level panel data for 2013–2023.

The overall significance of the model was assessed using the F-test, with results reported in Table VIII. The F-statistic is $F = 4.4061$, with an associated p-value of 0.000214, well below the 5% significance level. Consequently, the null hypothesis that all coefficients are jointly equal to zero is rejected. This indicates that the model is globally significant and that the explanatory variables collectively explain a substantial portion of the variation in the NPL ratio.

TABLE VIII
F-TEST RESULTS FOR OVERALL MODEL SIGNIFICANCE

Fisher Statistic	4.406125
Probability (p-value)	0.000214

Source: Computations performed by the authors using EViews software, based on bank-level panel data for 2013–2023.

The Durbin–Watson (DW) test was employed to detect potential autocorrelation in the residuals (Table V). The obtained statistic is $DW = 0.5274$, a value considerably below 2, suggesting the presence of positive autocorrelation among successive residuals. While this autocorrelation does not invalidate the model, it indicates that the residuals are not fully independent. In future research, a correction could be considered, for example by introducing dynamic terms or estimating a model adjusted for autocorrelation.

Overall, the diagnostic tests confirm the statistical validity and robustness of the econometric model. The residuals are normally distributed and homoscedastic, the model is globally significant, and the slight autocorrelation detected does not compromise the reliability of the results. These findings reinforce the relevance of the proposed model for analyzing the determinants of credit risk in Moroccan banks and support the robustness of the empirical conclusions drawn from this estimation.

V. DISCUSSION OF FINDINGS

The empirical results obtained from the estimation of the econometric model allow the identification of the main determinants of the non-performing loans (NPL) ratio in Moroccan listed banks over the period 2013–2023. Overall, the findings are broadly consistent with recent empirical research on credit risk determinants, while also revealing several features specific to the Moroccan banking context.

Bank size exhibits a positive and statistically significant effect on the non-performing loans (NPL) ratio. This finding supports the hypothesis that larger banks, due to the scale of their operations, portfolio complexity, and exposure to riskier segments, are more likely to record higher levels of non-performing loans. This result is consistent with previous empirical evidence documenting a positive relationship between bank size and credit risk [6], [1]. However, it contrasts with studies reporting a negative effect of bank size, arguing that larger institutions benefit from superior risk management capabilities [11], [13]. This divergence may suggest that, in the Moroccan context, economies of scale are more strongly associated with credit expansion and increased risk-taking than with enhanced risk-control mechanisms.

Loan loss provisions exhibit a negative and statistically significant effect on the NPL ratio, indicating that banks adopting more stringent provisioning policies are better able to anticipate potential credit losses and maintain portfolio quality. This result is in line with evidence showing that banks operating under prudent management frameworks tend to experience lower levels of delinquent loans [9]. By contrast, this finding differs from studies documenting a positive relationship between provisions and NPLs, interpreted as an *ex post* response to deteriorating loan quality [14], [20]. In the Moroccan case, provisioning practices appear to reflect a more preventive rather than corrective approach to credit risk management.

Economic growth emerges as a positive and statistically significant determinant of the NPL ratio. Although this result may appear counterintuitive, it can be explained by the fact that periods of economic expansion in Morocco are often accompanied by looser credit conditions, intensified competition among banks, and rapid credit growth, including lending to higher-risk segments. However, it contrasts with studies reporting a negative relationship between economic growth and NPLs [18], [14], [1]. The Moroccan experience may therefore indicate that insufficiently monitored expansionary phases generate additional *ex post* credit risk.

The unemployment rate displays a negative and statistically significant effect on the NPL ratio, contrary to prevailing theoretical and empirical expectations. Most empirical studies report a positive association between unemployment and non-performing loans [14], [16]. In the present context, this result may reflect more cautious bank behavior during periods of labor market stress, characterized by slower credit growth, stricter lending standards, and reduced exposure to risky borrowers. An alternative explanation relates to the structure of the Moroccan banking sector, where households with stable employment represent the primary recipients of bank credit, thereby limiting the direct transmission of unemployment shocks to loan default rates.

Finally, bank profitability (ROE) and inflation do not exhibit statistically significant effects on the NPL ratio. The absence of a relationship between profitability and credit risk contrasts with findings documenting a negative association between profitability and NPLs [4], [14]. This result may reflect the highly regulated nature of the Moroccan banking system, where profitability does not depend exclusively on loan portfolio performance. Similarly, inflation does not appear to influence loan repayment behavior, diverging from studies reporting a

significant relationship between inflation and credit risk [14], [1]. This outcome may be attributed to Morocco's historically low and relatively stable inflation environment, which reduces its impact on credit risk dynamics.

VI. CONCLUSION

This study examines the bank-specific and macroeconomic determinants of non-performing loans (NPLs) in Moroccan listed banks over the period 2013–2023 using panel data regression techniques. By jointly analyzing internal bank characteristics and macroeconomic conditions, the study provides empirical evidence on the key drivers of credit risk in the Moroccan banking sector.

The empirical findings indicate that bank size has a positive and statistically significant effect on NPLs, suggesting that larger banks are more exposed to credit risk due to the scale and complexity of their lending activities. In contrast, loan loss provisions exert a negative and significant impact, highlighting the importance of prudent provisioning policies in strengthening credit risk management and improving loan portfolio quality.

With respect to macroeconomic factors, economic growth positively influences NPLs, implying that periods of economic expansion may be associated with increased risk-taking and looser lending standards. Conversely, the unemployment rate displays a negative and statistically significant relationship with NPLs, suggesting that banks adopt more conservative lending behavior during periods of labor market stress. Bank profitability and inflation, however, do not exhibit statistically significant effects on NPLs in the Moroccan context.

Overall, these findings confirm that credit risk dynamics in Moroccan banks are shaped by the interaction between bank-specific behavior and macroeconomic conditions. The results underscore the importance of effective provisioning practices and cautious credit expansion, particularly during economic upturns. While this study contributes to the relatively limited empirical literature on credit risk in Morocco, future research could extend the analysis by incorporating additional explanatory variables, alternative econometric specifications, and a broader sample of banks to further enhance the robustness of the conclusions.

REFERENCES

- [1] Abid, L., Ouertani, N., & Zouari-Ghorbel, S. (2015). Les déterminants des NPLs des ménages en Tunisie. *Revue Gestion et Organisation*, 7(2), 77–92.
- [2] Ahmed, S., Majeed, M. E., Thalassinos, E., & Thalassinos, Y. (2021). The impact of bank-specific and macroeconomic factors on non-performing loans in the banking sector: Evidence from an emerging economy. *Journal of Risk and Financial Management*, 14(5), 1–14.
- [3] Akerlof, G. A. (1970). The market for “lemons”: Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, 84(3), 488–500.
- [4] Berger, A. N., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking & Finance*, 21, 849–870.
- [5] Bernanke, B. S., Gertler, M., & Gilchrist, S. (1996). The financial accelerator and the flight to quality. *Review of Economics and Statistics*, 78(1), 1–15.
- [6] Bhattarai, S. (2016). Determinants of non-performing loans: Perception of Nepali bankers. *Economic Journal of Development Issues*, 17(1–2), 128–148.
- [7] Borio, C. (2014). The financial cycle and macroeconomics: What have we learnt? *Journal of Banking & Finance*, 45, 182–198.

- [8] Boudriga, A., Boulila Taktak, N., & Jellouli, S. (2010). "Bank-specific, business and institutional environment determinants of banks' nonperforming loans: Evidence from MENA countries". *Economic Research Forum Working Paper*, No. 547.
- [9] Boudriga, A., Taktak, N. B., & Jellouli, S. (2009). "Banking supervision and nonperforming loans: A cross-country analysis". *Journal of Financial Economic Policy*, 1(4), 286–318.
- [10] Godlewski, C. J. (2005). "Bank capital and credit risk taking in emerging market economies". *Journal of Banking Regulation*, 6(2), 128–145.
- [11] Hu, J., Li, Y., & Chiu, Y. (2004). "Ownership and nonperforming loans: Evidence from Taiwan's banks". *The Developing Economies*, 42(3), 405–420.
- [12] Jensen, M. C., & Meckling, W. H. (1976). "Theory of the firm: Managerial behavior, agency costs and ownership structure". *Journal of Financial Economics*, 3(4), 305–360.
- [13] Lis, S. F., Pagés, J. M., & Saurina, J. (2000). "Credit growth, problem loans and credit risk provisioning in Spain". *Banco de España Working Papers*, No. 0018.
- [14] Messai, A. S., & Jouini, F. (2013). "Micro and macro determinants of non-performing loans". *International Journal of Economics and Financial Issues*, 3(4), 852–860.
- [15] Minsky, H. P. (1986). *Stabilizing an unstable economy*. Yale University Press.
- [16] Niyuhire, P., & Irakoze, J. (2024). "Déterminants des prêts bancaires non performants au Burundi". *Revue Internationale du Chercheur*, 5(1).
- [17] Rajha, K. S. (2017). "Determinants of non-performing loans: Evidence from the Jordanian banking sector". *Journal of Finance and Bank Management*, 5(1), 54–65.
- [18]. Salas, V., & Saurina, J. (2002). "Credit risk in two institutional regimes: Spanish commercial and savings banks". *Journal of Financial Services Research*, 22(3), 203–224.
- [19] Stiglitz, J. E., & Weiss, A. (1981). "Credit rationing in markets with imperfect information". *The American Economic Review*, 71(3), 393–410.
- [20] Tinta, A. A., & Sanou, E. J. (2021). "Les déterminants des prêts non performants du système bancaire de l'UMOA". *African Development Review*, 33(2), 276–287.