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# Bank Loan Loss Provision Determinants in Non-Crisis Years: Evidence from African, European, and Asian Countries

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**Abstract:** Loan loss provision is an important accounting accrual in the banking sector. There have been numerous debates about the determinants of loan loss provision in several contexts. This study extends the debate by investigating the determinants of bank loan loss provision in non-crisis years for 28 countries from 2011 to 2018. The non-crisis years cover the periods after the global financial crisis and the periods before the COVID-19 pandemic while the countries consist of African, European, and Asian countries. Using the generalized linear model regression and the quantile regression methodologies, the results show that institutional quality is a significant determinant of bank loan loss provision, indicating that the presence of strong institutions decreases the size of bank loan loss provision in non-crisis years. In the regional analyses, it was found that economic growth is a significant determinant of bank loan loss provisions in African and Asian countries. Loan loss provision is higher in times of economic prosperity in African and Asian countries. Bank overhead cost is a significant determinant of bank loan loss provisions in Asian countries. Meanwhile, bank loan loss provision determinants are insignificant in European countries.

**Keywords:** financial reporting; accruals; loan loss provision; banks; income smoothing; earnings management; noninterest income; overhead costs; institutional quality; determinants

## 1. Introduction

This study examines the determinants of loan loss provision in non-crisis years.

Loan loss provision is the amount of money that a bank must set aside as protection against expected credit losses in their loan portfolios (Jia 2024; Lee et al. 2024; Dal Maso et al. 2022). Loan loss provision is the most significant and important accounting accrual in the banking industry (Bushman and Williams 2012). Loan loss provision is important to accounting standard setters because overstated loan loss provision affects the transparency of reported accounting numbers. It decreases earnings quality and financial reporting quality (Nicoletti 2018). Loan loss provision is also important to bank regulators and bank supervisors because understated loan loss provision will be insufficient to cover expected credit losses and it can increase bank fragility (Nicoletti 2018). Therefore, there is much attention on bank loan loss provision from accounting standard setters and bank supervisors.

An extensive literature investigates the determinants of bank loan loss provision. The existing literature has identified several determinants of loan loss provision. These include loan charge-offs (Basu et al. 2020), nonperforming loans (Biswas et al. 2024), capital adequacy ratio (Mnif and Slimi 2023), accounting regulation (Kilic et al. 2013), economic policy uncertainty (Ng et al. 2020; Danisman et al. 2021), and bank lending (Setiyono 2024). But the existing literature has paid little attention to the non-traditional determinants that may influence the size of bank loan loss provision, and there is little knowledge on how these non-traditional determinants might affect loan loss provision, especially in non-crisis years. Understanding how the non-traditional determinants affect bank loan loss provision is important because it can reveal other important factors that influence loan loss provision,

which have remained unknown in the literature and which policymakers need to pay more attention to.

This study examines the influence of three non-traditional determinants on bank loan loss provision particularly non-interest income, bank overhead costs, and institutional governance factors in relation to the traditional determinants of loan loss provision. Regarding non-interest income, it is argued that banks that anticipate a decline in non-interest income will decrease their loan loss provision in order to boost their interest income. Banks will do this as a way to augment any expected shortfall in their profit levels. It is also argued that banks that have high overhead costs will keep fewer loan loss provisions in order to preserve or increase their earnings. It is further argued that the presence of strong institutions is beneficial for banks because strong institutions will create the legal and institutional frameworks that will compel debtors to repay their debt or face legal consequences. Such frameworks will help banks in loan recovery, help to decrease loan default rates, and decrease the size of loan loss provisions.

This study extends the literature by examining the dynamics of the non-traditional determinants of loan loss provision in non-crisis years and along regional dimensions. In the empirical analysis, annual country-level data from 2011 to 2018 were used and the generalized linear model regression and the quantile regression methodologies were employed. The results show that institutional quality is a significant determinant of bank loan loss provision. Also, economic growth is a significant determinant of bank loan loss provisions in African and Asian countries while bank overhead cost is a significant determinant of bank loan loss provisions in Asian countries. Meanwhile, bank loan loss provision determinants are insignificant in European countries.

This study makes two important contributions to the literature. First, it contributes to the emerging literature on the non-traditional determinants of bank loan loss provision. Prior studies examined some non-traditional determinants of loan loss provision (see, for, example, Basu et al. 2020; Biswas et al. 2024; Mnif and Slimi 2023; Kilic et al. 2013; Ng et al. 2020; Danisman et al. 2021; Setiyono 2024). The present study complements these studies by examining other non-traditional determinants of loan loss provision that have not been examined in the previous literature. Secondly, this study contributes to the banking literature that investigates the determinants of LLPs under unique conditions. The present study contributes to this literature by examining the determinants of LLPs under non-crisis years.

The rest of this study is structured as follows. Section 2 presents the literature review. Section 3 presents the methodology. Section 4 presents the empirical results. Section 5 presents the conclusion of this study.

## 2. Theory and Literature Review

### 2.1. Theoretical Framework

The academic debate about bank loan loss provision is deeply rooted in the positive accounting theory. The positive accounting theory argues that the accounting information reported in financial statements often reflects the accounting and non-accounting decisions taken into consideration by managers during the financial year (Watts and Zimmerman 1986), and managers' decision to alter reported accounting information is influenced by many factors such as the presence of bonus plans, loss avoidance constraints, debt covenant violation, etc. (Watts and Zimmerman 1990, 1986). The implication of the positive accounting theory for bank loan loss provision is that bank managers also have incentives to alter accounting numbers such as loan loss provision estimates if they have explicit contracts that are tied to loss avoidance, generating higher profits for shareholders or the possibility of receiving higher bonuses for good performance (Beattie et al. 1994; Ozili and Arun 2023). When this is the case, bank managers will have incentives to keep fewer loan loss provisions.

## 2.2. Literature Review

The existing literature examined some determinants of loan loss provision, but the literature has not considered non-interest income, bank overhead costs, and institutional quality to be determinants of bank loan loss provision. For instance, Luu et al. (2023) considered organizational culture to be a determinant of bank loan loss provision. Luu et al. (2023) were interested in whether banks with different organizational cultures adjust their loan loss provision in response to industry competition following the passage of the US Interstate Banking and Branching Efficiency Act (IBBEA) of 1994. They examined US banks that have four different organizational cultures: a control-dominant culture, a collaborate-dominant culture, a compete-dominant culture, or a create-dominant culture. They found that banks that have a collaborate-dominant organizational culture are less likely to exercise discretion over LLPs. In contrast, banks with compete- and create-dominant organizational cultures are more likely to exercise their discretion over LLPs. They also found that banks that have a collaborate-dominant organizational culture exhibit less income smoothing.

Ren et al. (2023) considered fluctuating economic growth targets to be a determinant of bank loan loss provision. Ren et al. (2023) examined how fluctuations in economic growth targets affect bank loan loss provision. They found that banks in prefecture-level cities that have higher economic growth targets keep more LLPs in order to deal with potential loan losses. Ozili and Arun (2023) considered foreign bank presence, bank ownership, and institutional quality to be determinants of bank income smoothing in African countries. Ozili and Arun (2023) examined whether 370 African banks use loan loss provision to smooth income and whether this behavior is influenced by foreign bank presence, ownership, and institutional quality differences across African countries. The authors found that African banks use LLPs to smooth their income, and income smoothing is persistent (i) among banks that have a widely dispersed ownership, (ii) among banks that have strong government ownership, and (iii) among banks that have weak government ownership.

Ng et al. (2020) considered economic policy uncertainty to be a determinant of bank loan loss provision. Ng et al. (2020) examined the effect of economic policy uncertainty on bank loan loss provision. They found that banks signal more expected loan losses during times of high economic policy uncertainty. Ozili (2023) considered the global financial crisis to be a determinant of bank loan loss provision. Ozili (2023) investigated whether banks use LLPs for earnings management purposes. The study examined four countries: the UK, France, South Africa, and Egypt, and found that bank income smoothing is present in the UK and Egypt and absent in France and South Africa. It was also found that banks in Egypt used LLPs to smooth income before the global financial crisis while bank income smoothing was pronounced in France during and after the financial crisis. Degryse and Huylebroek (2023) considered the government's fiscal support to be a determinant of bank loan loss provision. Degryse and Huylebroek (2023) were interested in the response of bank loan loss provisions to governments' fiscal support in 37 different countries during the COVID-19 pandemic. The sample period examined was from 2016 to 2021. The authors break down the government's fiscal support into two components: (i) direct support, which includes cash transfers, tax reliefs, and tax deferrals, and (ii) liquidity support, which includes government-backed loans and equity injections. They found that fiscal support in terms of direct support led to a decrease in bank loan loss provision while fiscal support in terms of liquidity support did not decrease bank loan loss provision.

Biswas et al. (2024) considered trade openness to be a determinant of bank loan loss provision. Biswas et al. (2024) investigate whether trade openness affects how banks use loan loss provisions to smooth earnings and how adopting the International Financial Reporting Standards (IFRS) helps to mitigate earnings smoothing. They examined 78 commercial banks in Brazil, Russia, India, China, and South Africa (BRICS) countries from 2014 to 2020 and found that trade openness led BRICS commercial banks to engage in income smoothing using LLPs while the adoption of IFRS decreased income smoothing among banks that operate in countries that have better institutional environment. Basu et al. (2020) considered loan charge-offs to be a determinant of bank loan loss provision.

Basu et al. (2020) examined whether large net loan charge-offs lead to lower nonperforming loans and higher loan loss provisions. They found that bank LLPs have a V-shaped relation with changes in nonperforming loans, and net loan charge-off was a contributing factor to the V-shaped relationship. They also found that loan loss provision is more sensitive to increases in nonperforming loans.

Mnif and Slimi (2023) considered auditor characteristics to be a determinant of bank loan loss provision. Mnif and Slimi (2023) examined how auditor characteristics affect earnings management using loan loss provisions by African banks. They examined 14 African countries from 2011 to 2016 and used discretionary LLP as a proxy for earnings management. They found that the auditor's industry specialization and tenure have a negative impact on earnings management using loan loss provisions. They show that higher total fees paid to the bank auditor lead to higher earnings management. The authors also found that industry specialist auditors are more effective in reducing incoming-increasing earnings management. Kilic et al. (2013) considered accounting regulation to be a determinant of bank loan loss provision. Kilic et al. (2013) investigated the effect of SFAS 133—Accounting for Derivative Instruments and Hedging Activities regulation—on the income smoothing behavior of US banks using loan loss provision. They found that the adoption of the SFAS 133 regulation decreased banks' ability to smooth income through derivatives, and it led banks to smooth income using loan loss provisions.

Overall, previous studies show that organizational culture (Luu et al. 2023), economic growth target (Ren et al. 2023), ownership structure (Ozili and Arun 2023), economic policy uncertainty (Ng et al. 2020), the global financial crisis (Ozili 2023), government's fiscal support (Degryse and Huylebroek 2023), trade openness (Biswas et al. 2024), loan charge-off (Basu et al. 2020), auditor characteristics (Mnif and Slimi 2023), and accounting regulation (Kilic et al. 2013) are determinants of bank loan loss provision. But previous studies have not considered non-interest income, bank overhead costs, and institutional quality to be determinants of bank loan loss provision, and there is very little understanding of how these non-traditional determinants might affect loan loss provision, particularly in non-crisis years. Understanding how these non-traditional determinants affect bank loan loss provision is important because it can reveal other crucial factors that bank managers should take into account in their loan loss provisioning decisions. Therefore, the present study fills this gap in the literature by examining additional non-traditional determinants of bank loan loss provision and examining these determinants in non-crisis years to determine their effect on bank loan loss provision. This study also examines the effect of the non-traditional determinants on bank loan loss provision along regional dimensions.

## 3. Methodology

### 3.1. The Sample

Country-level data were extracted for 42 countries. A total of 14 out of the 42 countries had insufficient data. Some countries had missing data for the dependent variable (LLP), some had missing data for the majority of the crucial determinants, and others reported fewer than three years of data, which are too few and affect the quality of the data. Therefore, these countries, 14 of them, were excluded from the analysis. The final sample yields 28 countries. The countries are Argentina, Brazil, Cambodia, Cameroun, China, Democratic Republic of Congo, Cote d'Ivoire, Egypt, Georgia, Ghana, India, Indonesia, Japan, Kenya, Korea Republic, Malaysia, Mexico, Netherlands, Nigeria, Pakistan, Philippines, Russia, Singapore, Tanzania, Thailand, United Kingdom, United States, and Vietnam. The data were obtained from the World Bank's Global Financial Development Indicators (GFDIs), the World Development Indicators (WDIs), and the World Governance Indicators (WGIs) databases from 2011 to 2018 (see Table 1 for variable description and source). The sample period covers only the non-crisis years. This means that the sample excludes the pre-2010 years, which were affected by the global financial crisis and the aftershocks of the crisis as well as the post-2019 years, which were affected by the COVID-19 pandemic event.

**Table 1.** Descriptions and sources of the variables used in this study.

| Variable | Indicator Name | Description | Source | Expected Sign |
|---|---|---|---|---|
| LLP | Loan loss provision to gross loan ratio (%) | It is the ratio of total loan loss provision to total loan in the bank portfolio | GFDI | |
| CAR | Bank regulatory capital to risk-weighted assets (%) | It is the ratio of total regulatory capital to its assets held, weighted according to the risk of those assets. | GFDI | - |
| NII | Bank noninterest income to total income (%) | Bank's income that has been generated by noninterest related activities as a percentage of total income (net-interest income plus noninterest income). | GFDI | + |
| NPL | Bank nonperforming loans to gross loans (%) | The ratio of defaulting loans (payments of interest and principal past due by 90 days or more) to total gross loans (total value of loan portfolio) | GFDI | + |
| GDPR | Economic growth | Annual change in gross domestic product in percentage | WDI | - |
| ISI | Institutional quality | The simple average of the six world governance indicators: voice and accountability index; political stability and absence of violence/terrorism index; government effectiveness index; regulatory quality index; rule of law index; control of corruption index. | WGI | - |
| COST | Bank overhead costs to total assets | Operating expenses of a bank as a share of the value of all assets held. | GFDI | - |

Source: World Bank WDI, GFDI, and WGI.

### 3.2. Model Specification and Estimation Techniques

Four models were used in this study. The models are a variation of the model used in Luu et al. (2023), Ren et al. (2023) and Ozili and Arun (2023). The first model, Equation (1), estimates the determinants of bank loan loss provision in the full sample. The second model, Equation (2), estimates the determinants of bank loan loss provisions in African countries. The third model, Equation (3), estimates the determinants of bank loan loss provision in European countries. The fourth model, Equation (4), estimates the determinants of bank loan loss provisions in Asian countries.

In the model, the LLP variable is the dependent variable. The CAR variable is the regulatory capital ratio. The NII variable is the non-interest income ratio of banks. The NPL variable is the nonperforming loan to gross loan ratio. The GDPR variable is the annual rate of growth in real gross domestic product. The ISI variable measures institutional quality. The COST variable is the overhead cost of banks. $\varepsilon$ is the error term while $i,t$ is the subscript for country and year. The AFR variable is the binary variable representing the African countries in the sample. The EUR variable is the binary variable representing the European countries in the sample. The ASN variable is the binary variable representing the Asian countries in the sample.

Regarding the estimation techniques, the models are estimated using the generalized linear model (GLM) regression. The GLM regression estimation is used to account for potential nonlinearity between the response variable and predictors through a link function and when the response variable is not normally distributed (Thompson and Baker 1981). The study also used the quantile regression method as a robustness test. The quantile regression is used because it is less affected by outliers in the data, and it makes no assumptions about the distribution of the target variable (Koenker 2005).

$$LLP_{i,t} = \beta_0 + \beta_1 CAR_{i,t} + \beta_2 NII_{i,t} + \beta_3 NPL_{i,t} + \beta_4 GDPR_{i,t} + \beta_5 ISI_{i,t} + \beta_6 COST_{i,t} + \varepsilon \tag{1}$$

$$LLP_{i,t} = \beta_0 + \beta_1 CAR_{i,t} + \beta_2 NII_{i,t} + \beta_3 NPL_{i,t} + \beta_4 GDPR_{i,t} + \beta_5 ISI_{i,t} + \beta_6 COST_{i,t} + \beta_7 AFR_{i,t} + \beta_8 AFR*CAR_{i,t} + \beta_9 AFR*NII_{i,t} + \beta_{10} AFR*NPL_{i,t} + \beta_{11} AFR*GDPR_{i,t} + \beta_{12} AFR*ISI_{i,t} + \beta_{13} AFR*COST_{i,t} \tag{2}$$

$$LLP_{i,t} = \beta_0 + \beta_1 CAR_{i,t} + \beta_2 NII_{i,t} + \beta_3 NPL_{i,t} + \beta_4 GDPR_{i,t} + \beta_5 ISI_{i,t} + \beta_6 COST_{i,t} + \beta_7 EUR_{i,t} + \beta_8 EUR*CAR_{i,t} + \beta_9 EUR*NII_{i,t} + \beta_{10} EUR*NPL_{i,t} + \beta_{11} EUR*GDPR_{i,t} + \beta_{12} EUR*ISI_{i,t} + \beta_{13} EUR*COST_{i,t} \tag{3}$$

$$LLP_{i,t} = \beta_0 + \beta_1 CAR_{i,t} + \beta_2 NII_{i,t} + \beta_3 NPL_{i,t} + \beta_4 GDPR_{i,t} + \beta_5 ISI_{i,t} + \beta_6 COST_{i,t} + \beta_7 ASN_{i,t} + \beta_8 ASN * CAR_{i,t} + \beta_9 ASN * NII_{i,t} + \beta_{10} ASN * NPL_{i,t} + \beta_{11} ASN * GDPR_{i,t} + \beta_{12} ASN * ISI_{i,t} + \beta_{13} ASN * COST_{i,t} \quad (4)$$

### 3.3. Justifying the Variables Included in the Model and the Hypotheses

The LLP variable is the dependent variable. It is measured as the loan loss provision divided by gross loans, and it is the most significant accrual in the banking sector (Mahieux et al. 2023; Ozili 2023; Tran et al. 2020; Hou et al. 2021; Kim et al. 2020; Bratten et al. 2020).

The CAR variable is the regulatory capital ratio. The literature shows that banks with low regulatory capital ratios will increase loan loss provisions to compensate for their low regulatory capital levels (Luu et al. 2023). This implies a negative relationship between the regulatory capital ratio and bank loan loss provision. Therefore, the hypothesis for CAR is stated below.

**H1.** *The regulatory capital ratio has a negative impact on bank loan loss provision.*

The NII variable is the non-interest income ratio of banks. Banks that anticipate a low level of non-interest income will decrease loan loss provisions in order to boost their interest income and as a way to augment any expected shortfall in profit levels (Conti et al. 2023; Ozili 2017). Therefore, a positive relationship between non-interest income and bank loan loss provision is expected. Therefore, the hypothesis for NII is stated below.

**H2.** *The non-interest income ratio has a positive impact on bank loan loss provision.*

The NPL variable is the nonperforming loan to gross loan ratio. The literature shows that banks will increase the size of loan loss provisions when they expect rising loan default rates (Degryse and Huylebroek 2023). This implies a positive relationship between nonperforming loans and bank loan loss provision. Therefore, the hypothesis for NPL is stated below.

**H3.** *The nonperforming loan ratio has a positive impact on bank loan loss provision.*

The GDPR variable represents the annual rate of growth in real gross domestic product. Generally, banks will keep higher loan loss provisions during bad economic times and keep fewer loan loss provisions in periods of economic prosperity (Ozili and Arun 2023). This signals procyclical loan loss provisioning, and it implies a negative relationship between economic growth and bank loan loss provision. Therefore, the hypothesis for GDPR is stated below.

**H4.** *The economic growth rate has a negative impact on bank loan loss provision.*

The ISI variable measures institutional quality. High institutional quality, or the presence of strong institutions, is beneficial for banks because strong institutions will create the legal and institutional frameworks that will compel debtors to repay their debt or face legal consequences. Such frameworks will help banks in loan recovery, thereby reducing loan defaults and reducing the size of loan loss provision (Kanagaretnam et al. 2014). This implies a negative relationship between institutional quality and bank loan loss provision. Therefore, the hypothesis for ISI is stated below.

**H5.** *Institutional quality has a negative impact on bank loan loss provision.*

The COST variable is the overhead cost of banks. It is expected that banks that have high overhead costs will seek to decrease their loan loss provision in order to preserve or increase their earnings (Ozili and Arun 2023). This implies a negative relationship between

institutional quality and bank loan loss provision. Therefore, the hypothesis for COST is stated below.

**H6.** *The overhead cost ratio has a negative impact on bank loan loss provision.*

The AFR, EUR, and ASN binary variables were introduced into the model. The AFR binary variable is equal to one if the country is an African country and it is zero if the country is not an African country. The EUR binary variable is equal to one if the country is a European country and it is zero if the country is not a European country. The ASN binary variable is equal to one if the country is an Asian country and it is zero if the country is not an Asian country. These three binary variables interact with each LLP determinant to determine their effect on bank loan loss provision in each region.

## 4. Empirical Results

This section presents the empirical results. It presents the correlation results. Thereafter, it presents the baseline results, the regional results, and the robustness test results.

### 4.1. Correlation Analysis

The Pearson correlation result, reported in Table 2, shows that the LLP variable is significant and positively correlated with the NII, NPL, and COST variables. This correlation result indicates that high levels of non-interest income, nonperforming loans, and overhead costs are significantly correlated with higher bank loan loss provision. The correlation result also shows that the AFR variable is significant, and positively correlated with the LLP variable, which suggests that LLP is higher in African countries. In contrast, the LLP variable is significant and negatively correlated with the CAR, GDPR, and ISI variables in Table 2. This correlation result indicates that high levels of regulatory capital ratio, positive economic growth, and institutional quality are significantly correlated with fewer bank loan loss provisions. The correlation result also shows that the ASN and EUR variables are significant, and negatively correlated with the LLP variable, which suggests that LLP is lower in Asian and European countries.

**Table 2.** Pearson correlation matrix for the variables.

| Variable | LLP | CAR | NII | NPL | GDPR | ISI | COST | AFR | ASN | EUR |
|---|---|---|---|---|---|---|---|---|---|---|
| LLP | 1.000 | | | | | | | | | |
| | ----- | | | | | | | | | |
| CAR | −0.281 *** | 1.000 | | | | | | | | |
| | (0.00) | ----- | | | | | | | | |
| NII | 0.131 * | −0.125 * | 1.000 | | | | | | | |
| | (0.08) | (0.09) | ----- | | | | | | | |
| NPL | 0.121 * | −0.180 ** | 0.060 | 1.000 | | | | | | |
| | (0.10) | (0.01) | (0.42) | ----- | | | | | | |
| GDPR | −0.162 ** | 0.085 | −0.447 *** | 0.025 | 1.000 | | | | | |
| | (0.02) | (0.25) | (0.00) | (0.73) | ----- | | | | | |
| ISI | −0.250 *** | 0.201 *** | 0.161 ** | −0.412 *** | −0.156 ** | 1.000 | | | | |
| | (0.00) | (0.00) | (0.03) | (0.00) | (0.03) | ----- | | | | |
| COST | 0.133 * | 0.017 | 0.489 *** | 0.355 *** | −0.122 * | −0.294 *** | 1.000 | | | |
| | (0.07) | (0.82) | (0.00) | (0.00) | (0.10) | (0.00) | ----- | | | |
| AFR | 0.006 | −0.012 | −0.003 | 0.644 *** | 0.097 | −0.378 *** | 0.362 *** | 1.000 | | |
| | (0.92) | (0.87) | (0.96) | (0.00) | (0.19) | (0.00) | (0.00) | ----- | | |
| ASN | −0.342 *** | 0.006 | −0.426 *** | −0.534 *** | 0.397 *** | 0.132 * | −0.553 *** | −0.511 *** | 1.000 | |
| | (0.00) | (0.92) | (0.00) | (0.00) | (0.00) | (0.07) | (0.00) | (0.00) | ----- | |
| EUR | −0.168 ** | 0.035 | 0.374 *** | −0.042 | −0.246 *** | 0.404 *** | 0.223 *** | −0.226 *** | −0.346 *** | 1.000 |
| | (0.02) | (0.63) | (0.00) | (0.57) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | ----- |

***, **, * represent statistical significance at the 1%, 5% and 10% levels.

### 4.2. Baseline Full Sample Result: Bank Loan Loss Provision Determinants

The GLM regression estimation results are reported in Table 3. The CAR variable is negatively significant, indicating that a higher bank regulatory capital ratio leads to a significant decrease in bank loan loss provision. This implies that banks with higher regulatory capital ratios will keep fewer loan loss provisions. This result is consistent with the findings of Luu et al. (2023), who also found a negative relationship between regulatory capital ratio and bank loan loss provision. The NII variable is insignificant, indicating that bank non-interest income does not have a significant effect on banking sector's loan loss provisions. The NPL variable is also insignificant, indicating that bank nonperforming loans do not have a significant effect on banking sector's loan loss provisions. This result is inconsistent with the findings of Degryse and Huylebroek (2023) and Ozili and Arun (2023), who found a positive effect of NPL on LLP. The COST variable is also insignificant, indicating that the cost overhead of banks does not have a significant effect on loan loss provisions in the banking sector. The GDPR variable is negative and significant, indicating that bank loan loss provisions are significantly higher during times of economic recession. This is due to procyclical provisioning, which occurs when banks keep fewer provisions in good economic times and keep higher provisions in bad economic times. This result is consistent with Ozili and Arun (2023), who found a negative relationship between economic growth and bank loan loss provision. The ISI variable is negative and significant, indicating that high institutional quality leads to a significant decrease in loan loss provision. This implies that the presence of strong institutions in a country is beneficial for banks because it helps in decreasing the size of loan loss provision in the banking sector.

**Table 3.** Bank loan loss provision determinants: generalized linear model (GLM) regression estimation.

| Variables | Coefficient | *p*-Value |
| --- | --- | --- |
| C | 134.676 *** | 0.000 |
| CAR | −3.182 *** | 0.004 |
| NII | 0.250 | 0.492 |
| NPL | −0.308 | 0.730 |
| GDPR | −2.816 * | 0.057 |
| ISI | −20.063 *** | 0.004 |
| COST | 0.423 | 0.806 |
| LR statistic | 31.76 | |
| Prob(LR statistic) | 0.000 | |

***, * represent statistical significance at the 1% and 10% levels.

### 4.3. Bank Loan Loss Provision Determinants in African Countries

The GLM regression estimation results are reported in column 1 of Table 4. The AFR*CAR variable is insignificant, indicating that the bank regulatory capital ratio does not have a significant effect on the banking sector's loan loss provisions in African countries. The AFR*NII variable is also insignificant, indicating that the bank's non-interest income does not have a significant effect on the banking sector's loan loss provisions in African countries. The AFR*NPL variable is positive and significant, indicating that higher nonperforming loans lead to a significant increase in bank loan loss provisions in African countries. This result is consistent with Ozili and Arun (2023), who found a significant positive relationship between nonperforming loans and bank loan loss provisions in African countries. The AFR*GDPR variable is also positive and significant, indicating that bank loan loss provisions are significantly higher during times of economic prosperity in African countries. This might be due to counter-cyclical provisioning, which requires African banks to keep higher loan loss provisions in good economic times so that the high provision that was set aside during the good economic times could be used as a safety buffer during times

of economic downturns in African countries. Notwithstanding, this result is inconsistent with Ozili and Arun (2023), who found a negative relationship between economic growth and bank loan loss provisions in African countries. The AFR*ISI variable is insignificant, indicating that institutional quality does not have a significant effect on the banking sector's loan loss provisions in African countries. The AFR*COST variable is also insignificant, indicating that the cost overhead of banks does not have a significant effect on the banking sector's loan loss provisions in African countries.

**Table 4.** Bank loan loss provision determinants: generalized linear model (GLM) regression estimation.

| Variables | (1) Coefficient (*p*-Value) | (2) Coefficient (*p*-Value) | (3) Coefficient (*p*-Value) |
|---|---|---|---|
| C | 162.82 *** (0.00) | 128.114 ** (0.00) | 162.405 *** (0.00) |
| CAR | −3.640 *** (0.00) | −3.922 *** (0.00) | −3.207 ** (0.04) |
| NII | 0.332 (0.38) | 0.676 * (0.10) | 0.351 (0.44) |
| NPL | −4.085 *** (0.00) | −0.806 (0.40) | −1.400 (0.17) |
| GDPR | −5.344 *** (0.00) | −2.839 * (0.06) | −2.822 * (0.08) |
| ISI | −41.769 *** (0.00) | −19.187 ** (0.02) | −13.709 * (0.08) |
| COST | −0.107 (0.95) | 3.520 (0.14) | −2.116 (0.26) |
| AFR | −43.838 (0.65) | | |
| AFR*CAR | −1.049 (0.72) | | |
| AFR*NII | −0.604 (0.65) | | |
| AFR*NPL | 7.984 *** (0.00) | | |
| AFR*GDPR | 7.347 * (0.05) | | |
| AFR*ISI | 34.689 (0.28) | | |
| AFR*COST | −6.639 (0.27) | | |
| EUR | | −70.704 (0.69) | |
| EUR*CAR | | 3.489 (0.68) | |
| EUR*NII | | −0.817 (0.61) | |
| EUR*NPL | | 4.054 (0.75) | |
| EUR*GDPR | | 3.886 (0.68) | |

**Table 4.** *Cont.*

| Variables | (1) Coefficient (*p*-Value) | (2) Coefficient (*p*-Value) | (3) Coefficient (*p*-Value) |
|---|---|---|---|
| EUR*ISI | | 13.973 (0.78) | |
| EUR*COST | | −2.536 (0.76) | |
| ASN | | | −39.061 (0.44) |
| ASN*CAR | | | 0.044 (0.98) |
| ASN*NII | | | −0.955 (0.18) |
| ASN*NPL | | | −5.390 * (0.07) |
| ASN*GDPR | | | 11.851 *** (0.00) |
| ASN*ISI | | | 14.516 (0.37) |
| ASN*COST | | | −13.317 * (0.05) |
| LR statistic | 59.53 | 122.66 | 101.51 |
| Prob(LR statistic) | 0.000 | 45.16 | 0.000 |

***, **, * represent statistical significance at the 1%, 5%, and 10% levels.

### 4.4. Bank Loan Loss Provision Determinants in European Countries

The GLM regression estimation results are reported in column 2 of Table 4. The EUR*CAR variable is insignificant, indicating that the bank regulatory capital ratio does not have a significant effect on the banking sector's loan loss provisions in European countries. The EUR*NII variable is also insignificant, indicating that bank non-interest income does not have a significant effect on the banking sector's loan loss provisions in European countries. The EUR*NPL variable is also insignificant, indicating that bank nonperforming loans do not have a significant effect on the banking sector's loan loss provisions in European countries. The EUR*GDPR variable is also insignificant, indicating that the state of the economy does not have a significant effect on the banking sector's loan loss provisions in European countries. The EUR*ISI variable is also insignificant, indicating that institutional quality does not have a significant effect on the banking sector's loan loss provisions in European countries. The EUR*COST variable is also insignificant, indicating that the cost overhead of banks does not have a significant effect on the banking sector's loan loss provisions in European countries.

### 4.5. Bank Loan Loss Provision Determinants in Asian Countries

The GLM regression estimation results are reported in column 3 of Table 4. The ASN*CAR variable is insignificant, indicating that the bank regulatory capital ratio does not have a significant effect on the banking sector's loan loss provisions in Asian countries. The AFR*NII variable is also insignificant, indicating that bank non-interest income does not have a significant effect on the banking sector's loan loss provisions in Asian countries. The ASN*NPL variable is negative and significant, indicating that higher nonperforming loans lead to a significant decrease in bank loan loss provisions in Asian countries. This result is inconsistent with Degryse and Huylebroek (2023) and Ozili and Arun (2023), who found a significant positive relationship between nonperforming loans and bank loan

loss provisions. The ASN*GDPR variable is positive and significant, indicating that bank loan loss provisions are significantly higher during times of economic prosperity in Asian countries. This might be due to counter-cyclical provisioning, which requires Asian banks to keep higher loan loss provisions in good economic times so that the high provision that was set aside during good economic times could be used as a safety buffer during times of economic downturns in Asian countries. Notwithstanding, this result is inconsistent with Ozili and Arun (2023), who found a negative relationship between economic growth and bank loan loss provision. The AFR*ISI variable is insignificant, indicating that institutional quality does not have a significant effect on the banking sector's loan loss provisions in Asian countries. The ASN*COST variable is negative and significant, indicating that the high overhead cost of banks leads to a significant decrease in bank loan loss provisions in Asian countries. This result is expected because Asian banks that have excessive overhead costs will seek to decrease their loan loss provision to preserve or increase their earnings.

*4.6. Robustness Test: Quantile Regression Estimation*

This section re-estimates the models using the quantile regression method and examines whether the quantile regression results are robust and consistent with the GLM regression results.

In the baseline results, only the ISI variable is statistically significant both in the GLM and the quantile regression estimation results in Table 3 and in column 1 of Table 5. The ISI variable is significant and negative, which confirms that the presence of strong institutions in a country is beneficial for banks because it helps to decrease the size of loan loss provision in the banking sector. Meanwhile, the CAR, NII, NPL, GDPR, and COST variables are not robust because they do not report the same sign and significance both in the GLM and the quantile regression estimations.

**Table 5.** Bank loan loss provision determinants: quantile regression estimation.

| Variables | (1) Coefficient (*p*-Value) | (2) Coefficient (*p*-Value) | (3) Coefficient (*p*-Value) | (4) Coefficient (*p*-Value) |
|---|---|---|---|---|
| C | 69.395 *** (0.00) | 65.531 ** (0.01) | 69.312 ** (0.02) | 146.348 *** (0.00) |
| CAR | −0.389 (0.52) | −0.313 (0.63) | −0.832 (0.27) | −1.976 (0.13) |
| NII | 0.073 (0.79) | 0.095 (0.84) | 0.425 (0.31) | 0.134 (0.79) |
| NPL | 3.098 *** (0.00) | 1.470 (0.20) | 1.323 (0.20) | −0.996 (0.77) |
| GDPR | −3.303 (0.18) | −5.392 ** (0.02) | −5.552 ** (0.04) | −6.501 *** (0.00) |
| ISI | −11.967 ** (0.02) | −15.910 *** (0.00) | −21.490 ** (0.01) | −28.793 * (0.10) |
| COST | 0.220 (0.85) | 7.180 * (0.07) | 5.003 (0.13) | −1.708 (0.45) |
| AFR | | 69.933 (0.17) | | |
| AFR*CAR | | −1.664 (0.24) | | |
| AFR*NII | | 0.116 (0.86) | | |
| AFR*NPL | | 1.395 (0.39) | | |

**Table 5.** *Cont.*

| Variables | (1) Coefficient (*p*-Value) | (2) Coefficient (*p*-Value) | (3) Coefficient (*p*-Value) | (4) Coefficient (*p*-Value) |
|---|---|---|---|---|
| AFR*GDPR | | 5.287 * (0.08) | | |
| AFR*ISI | | 24.807 (0.21) | | |
| AFR*COST | | −15.638 *** (0.00) | | |
| EUR | | | −11.954 (0.86) | |
| EUR*CAR | | | 0.318 (0.92) | |
| EUR*NII | | | −0.566 (0.40) | |
| EUR*NPL | | | 2.253 (0.61) | |
| EUR*GDPR | | | 5.966 (0.14) | |
| EUR*ISI | | | 20.006 (0.29) | |
| EUR*COST | | | −3.783 (0.37) | |
| ASN | | | | −90.952 ** (0.02) |
| ASN*CAR | | | | 1.006 (0.51) |
| ASN*NII | | | | −0.50 (0.67) |
| ASN*NPL | | | | 1.558 (0.67) |
| ASN*GDPR | | | | 6.142 ** (0.02) |
| ASN*ISI | | | | 18.903 (0.31) |
| ASN*COST | | | | 8.896 ** (0.04) |
| Adjusted R2 | 17.65 | 21.47 | 20.81 | 23.68 |
| Quasi LR statistic | 93.11 | 157.38 | 122.66 | 155.44 |

***, **, * represent statistical significance at the 1%, 5% and 10% levels.

In the African countries' interaction analysis, only the AFR*GDPR variable is statistically significant both in the GLM and the quantile regression estimation results in column 1 of Table 4 and column 2 of Table 5. The AFR*GDPR variable is significant and positive, which confirms that bank loan loss provisions are significantly higher during times of economic prosperity in African countries. This might be due to counter-cyclical provisioning, which requires African banks to keep higher loan loss provisions in good economic times so that the high provision that was set aside in good times could be used as a safety buffer during times of economic downturns in African countries. Meanwhile, AFR*CAR, AFR*NII,

AFR*NPL, AFR*ISI, and AFR*COST variables are not robust because they do not report the same sign and significance both in the GLM and the quantile regression estimations.

In the European countries' interaction analysis, none of the variables are significant in column 2 of Table 4 and column 3 of Table 5. This indicates that the EUR*CAR, EUR*NII, EUR*NPL, EUR*ISI, EUR*GDPR, and EUR*COST variables are insignificant, indicating that all the variables have no impact on bank loan loss provision in European countries.

In the Asian countries' interaction analysis, the ASN*GDPR and ASN*COST variables are statistically significant both in the GLM and the quantile regression estimation results in column 3 of Table 4 and column 4 of Table 5. The ASN*GDPR variable is significant and positive, which confirms that bank loan loss provisions are significantly higher during times of economic prosperity in Asian countries. This might be due to counter-cyclical provisioning which requires Asian banks to keep higher loan loss provisions in good economic times so that the high provision that was set aside during good times could be used as a safety buffer during times of economic downturns in Asian countries. Meanwhile, ASN*CAR, ASN*NII, ASN*NPL, and ASN*ISI variables are not robust because they do not report the same sign and significance both in the GLM and quantile regression estimations.

## 5. Conclusions

This study examined the determinants of bank loan loss determinants in non-crisis years in African countries, European countries, and Asian countries from 2011 to 2018. The GLM estimation method and the quantile regression method were used in the empirical analysis.

It was found that institutional quality is a significant determinant of bank loan loss provision. In the regional analyses, it was found that economic growth is a significant determinant of bank loan loss provisions in African and Asian countries, while bank overhead cost is a significant determinant of bank loan loss provisions in Asian countries. Meanwhile, bank loan loss provision determinants are insignificant in European countries.

The implication of the findings is that both internal and external factors can affect bank loan loss provision. Secondly, policymakers need to pay close attention to how institutional quality, the state of the economy, and bank overhead costs affect the size of reported loan loss provisions. Ignoring these factors could lead to inaccurate loan loss provision estimates in banks.

The findings of this study have several policy recommendations. One, policymakers should strengthen existing institutions in order to decrease loan default rates and decrease the size of loan loss provisions. Two, it is recommended that bank managers should strive to lower their overhead costs in order to reduce the size of reported loan loss provision. Three, it is recommended that bank managers should consider undertaking countercyclical provisioning so that they can have sufficient loan loss reserves that could serve as a buffer to absorb unexpected and expected loan losses during bad economic times. Four, it is recommended that policymakers should ensure that there is positive economic growth while bank supervisors should assist the banking sector in lowering their overhead costs since it has been established in this study that there is a passthrough from bank overhead costs to loan loss provisions. A good place to start in helping banks to lower their overhead costs is for regulators to reduce the huge cost of regulatory compliance. Five, it is recommended that accounting setters should consider the role of the state of the economy and bank overhead costs in influencing bank accruals, which are subject to manipulation by bank managers.

The limitation of this study is that the determinants of bank loan loss provisions were not examined for individual banks. Rather, they were examined at the country level. Examining the determinants of bank loan loss provisions for individual banks may offer additional insights that are not captured in this study. Another limitation of this study is the short sample period from 2011 to 2018. The narrow period was intended to capture the non-crisis years and avoid the crisis years, which were the pre-2010 years and the post-2019 years. Another limitation is that the methodologies used in this study may have been

responsible for the many insignificant results obtained in the analysis, especially for the European countries in the sample.

Future research can extend this study by investigating the determinants of bank loan loss provisions using bank-level data. Future research can re-examine this topic by using a longer sample period. Future research can extend this study by examining other non-traditional determinants of loan loss provisions that may offer new insights. Finally, future research can extend this study by investigating the determinants of bank loan loss provisions in other regions that were not examined in this study.

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