



Board Composition and Non-Performing Loans among Commercial Banks in Tanzania

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Abstract

Objective – This paper investigates the effect of board composition on non-performing loans (NPLs) for a sample of 31 commercial banks in Tanzania.

Design/methodology – A quantitative study methodology was employed using annual data covering the period of 2011-2020. The authors used a one-step generalised method of moments (GMM) approach to estimate the effect of board composition on the percentage growth of NPLs in Tanzania.

Results – The paper concludes that the number of board members with financial expertise, the board size, the audit committee, and the presence of female directors significantly negatively impact the bank's NPLs and hence aid in lowering the bank's NPLs. In contrast, an increase in board size, lagged NPLs, credit committees, independent directors, board meetings, and advances in deposit ratio significantly increases the level of NPLs, which is consistent with the agency theory.

Research Limitations/Implications – Inconsistencies in the reported variables from various databases during the study and afterwards, as well as a lack of data for some banks in specific years. Shareholders should actively establish good corporate governance in the commercial banks (CBs) they own to reduce NPLs at an acceptable rate of less than 5%. Also, the Central Banks of Tanzania should encourage CBs to implement effective corporate governance practices by enacting rules and regulations to reduce NPLs. To minimize loan losses, authorities should impose micro-prudential supervision on commercial banks' lending behavior.

Novelty/Originality – The paper includes bank size and ownership using a one-step difference and one-step system (GMM) approach to measure the effect, which is usually not the case with most studies.

Keywords: Board composition; NPLs; Commercial banks; one-step GMM

1. Introduction

Corporate governance in the banking sector refers to a collection of procedures and practices regulating interactions between a firm's stakeholders, such as corporate management, the board of directors, and shareholders (Isik & Ince, 2016). According to (Fanta, 2013), shareholders in banks provide the management with authority to make decisions and expect the management to do so in their best interests. Conflicts may occur at this point, especially if management does not act in the shareholders' best interests. To address this issue, shareholders choose a board of directors, which oversees corporate management's actions and acts on their behalf in making strategic decisions (Armeanu *et al.*, 2017). It is noted that effective corporate governance practices in commercial banks (CBs) have grown significantly in importance due to the theory that poor corporate governance and extreme risk-taking cause severe banking instability and significant losses (David & Ali, 2020; Tarchouna *et al.*, 2017). The global financial crisis, which began in 2007-2008 and was characterised by a significant rise in banks' non-performing loans (NPLs), has been attributed to some factors, including

weak governance of financial firms (especially banks) (Isik & Ince, 2016). When a creditor cannot repay their debt service, it accumulates non-performing loans (NPLs) (Ghosh & Ansari, 2018).

Additionally, during the financial crisis, NPLs negatively impacted the liquidity and profitability of these banks due to weaknesses in bank governance standards, particularly regarding how the board of directors performed their fiduciary duties (Liang *et al.*, 2013). The board of directors is responsible for decision-making processes, corporate performance, and value creation, which bear risks (Armeanu *et al.*, 2017). Following (Ciancanelli *et al.*, 2000), the bank's board of directors is answerable to its owners, depositors, borrowers, shareholders, the bank, clients, and regulators. Therefore, reducing NPLs is crucial to restoring a more stable banking system and promoting financial capability in CBs through efficient corporate governance, employing the board of directors as a significant operational channel (Kofi Akwaa-sekyi *et al.*, 2018; Ghosh & Ansari, 2018).

A vital component of the corporate governance system, which makes decisions essential for the success of the banks, is the board of directors. According to (Fama & Jensen, 1983), it is a crucial component of the internal governance system that enables monitoring of managers' decisions and actions. The board of directors can be viewed as a control mechanism that prevents problems with the agency between management and shareholders (Fama & Jensen, 1983). In a bank, the board of directors plays an essential role in overseeing and advising on the provision of resources (credit), approving risk management policies and strategies, establishing organisational structures to manage risk, approving business strategies and procedures, and ensuring that the management is capable of managing bank activities (Doğan & Ekşi, 2020). As a result, the board of directors' composition may influence the NPLs of the bank.

Unquestionably, NPLs are the most significant problem confronting emerging economies, and Tanzania is no different. For instance, the country's CBs showed that NPL increased, rising from a historically low rate of 5.4 per cent in 2011 to 11.5 per cent in 2017, more than the standard threshold of 5 per cent (BoT, 2020). NPLs are credits that banks may lose money on when borrowers or counterparties fail to keep their promises following the terms of the contract (Petra, 2005). A rising NPL level threatens the stability of any bank because it exposes the bank to several related risks, including those that could impair the bank's future income and liquidity and solvency problems. In practice, NPLs result in asset loss and profitability drain and restrict the continued operation of the credit cycle and the financial intermediation function. The dissatisfaction with the board of directors' practices in preventing inappropriate lending practices and risk-taking behaviour leads to NPLs in the banking sector. It suggests the need for empirical research on the board composition aspects at CBs.

This study uses panel data models to estimate how well certain aspects of board composition might serve as early warning signs on how the ratio of NPLs would change. Unfortunately, numerous studies based on the use of panel data in this phenomenon resulted in contradictory conclusions regarding the direction, intensity, and significance of board composition determinants of NPLs in large and small banks regardless of ownership status (Kofi Akwaa-Sekyi *et al.*, 2018; Ho *et al.*, 2016). Empirical evidence on the correlation between board size and NPLs of CBs is mixed. For example, Islam (2020) suggests that a large board size of directors helps to lower NPLs. In contrast, (Ho *et al.*, 2016) argued that a large board of directors creates free-riding problems, making it more difficult for board members to contribute to monitoring, leading to the expansion of NPLs. Independent directors (Doğan & Ekşi, 2020) argued that a higher proportion of outside directors provides the board with better opportunities to monitor managers and hence contributes to aligning managers' and shareholders' interests. A board of independence on CBs is crucial to increasing economic efficiency, ensuring investors' trust, and reducing NPLs (Saha & Chandra Kabra, 2019).

The presence of female directors may also help lower NPLs. Lee and Chung (2016) highlighted that women are essential for the bank board as they offered various perspectives on credit risk problem-solving. Also, Doldor *et al.* (2012) reported a negative correlation between female representation on supervisory boards and risk-taking. The board meeting is the period designated to the board of directors to be in office. As board meeting increases, members become more committed to the bank they serve; thus, a negative correlation is reported between a board meeting and NPLs (Roberts *et al.*, 2005). Accordingly, we expect the NPLs ratio to be lower in CBs with expert financial directors. Given the opaque and complex nature of the banking business, the presence of directors with financial expertise is a significant policy concern, especially from the perspective of credit risk reduction (Terjesen & Singh, 2008).

Likewise, the audit and credit committees could influence the level of NPLs in CBs. Board audit and credit committees that meet more often are believed to be better monitors and advisors as they put more effort into performing their duties (Kofi Akwaa-Sekyi *et al.*, 2018). Thus, we predict that more frequent board audit and credit meetings would improve board effectiveness, especially its monitoring function, thereby lowering the NPLs ratio.

The causes of NPLs have been the subject of research in the West (Doğan & Ekşi, 2020; Tarchouna *et al.*, 2017; Armeanu *et al.*, 2017); however, emerging economies like Tanzania have received little attention. Sincere attempts were made by (Ahmad, 2019) and (Mamatzakis *et al.*, 2017). Still, their research was conducted in contexts distinct from the current one, and they did not offer a complete picture of how the composition of the board of directors affected NPLs. To date, a study of this nature is not well documented in the Tanzanian context that has measured the influence of board composition on NPLs, taking advances in deposit ratios (credit), gross domestic product (GDP), loan growth, and bank value as control variables. Hence, the present study responds to this gap to broaden the scope of the existing knowledge on the subject concern. With more than 51 banks (38CBs), it is essential to analyze the relationship between board composition and NPLs. Failure of these banks due to NPLs might alter the financial system's efficiency.

Although indirect, it is nevertheless possible for board composition to have an impact through NPLs. However, the ambiguity and effective practices of corporate governance and NPLs in the banking sector raise significant concerns and justify the relevance of this study to Tanzanian policymakers. The present study is different from previous studies in many ways. First, it investigates board composition's effect on NPLs in CBs through bank size and ownership categories. Second, it examines the impact of board composition on one-step generalised method of moments (GMM) models. The model used has time-invariant effects and contains the lagged dependent variables, which some Tanzania studies did not cover regarding their methodology. The rest of the paper is presented as follows: Section two reviews both theoretical and empirical literature that describe the effect of board composition aspects on NPLs, section three describes the methodology, section four considers the results and discussion of the findings, and section five concludes and discusses policy implications.

2. Literature Review, Theoretical Frameworks and Hypothesis Development

The existing literature has suggested that banks' risk-taking ability and agency problems vary with the nature of ownership (Roberts *et al.*, 2005). Among agency problems, Fama and Jensen (1983) identify the first issue as a conflict of interest, which suggests that diversified shareholders are willing to take higher risks to increase their earnings. In contrast, managers reduce risk exposures and losses (NPLs) to save their positions and serve their benefits. The agency problem between managers and

shareholders is addressed through corporate governance strategies such as internal mechanisms through close monitoring by independent board members (Roberts *et al.*, 2005). It emphasizes that effective board monitoring reduces the moral hazard and information asymmetric problems predominant in the financial system (Roberts *et al.*, 2005), thereby decreasing opportunistic behaviour by the management, with favourable implications on the interest of the shareholders (Jensen & Meckling, 1976). The agency theory recognizes that smaller boards are more effective than larger ones regarding board size. According to the theory, boards with no more than eight members operate more effectively (Martin Lipton *et al.*, 1992).

Furthermore, Shakir (2011) stated that agency issues could develop on boards with too many members since some directors might become free riders. Still, in the case of alarming trends in NPLs around the world, there seems to be a perception of ineffective monitoring on the part of the board (Alaryan, 2017). Some factors contributing to high NPLs stem from the inadequate functioning of the board of directors and poor managerial incentives (Mamatzakis *et al.*, 2017)

Most empirical studies have used macroeconomic factors in their regression estimations on NPLs. Few studies investigated the effect of the board of directors' characteristics on credit risk, such as board size, board independence, board tenure, board gender diversity, board with financial expertise, audit and credit committees, bank value, credit, loan growth, and GDP. The results have produced conflicting findings regarding board composition's direction, intensity, and significance on NPLs. Furthermore, the outcomes are noticeable regarding the effectiveness and importance of various factors in the occurrence and movement of NPLs and terms of signs (see Alaryan, 2017; Brick & Chidambaran, 2010; Chou *et al.*, 2013; Doğan & Ekşi, 2020; Fernandes & Fich, 2009; Islam, 2020; Liang *et al.*, 2013; Petra, 2005; Saha & Chandra Kabra, 2019)

(Islam, 2020) studied the impact of board composition and activity on NPLs. The study found a negative and statistically significant impact from board size and the presence of female directors in banks. Islam (2020)'s findings are in line with the later study of (Doldor *et al.*, 2012). On the other side, (Terjesen and Singh (2008) caution against the imposition of female representation on boards, especially in countries with strong cultural resistance. They reported that female participation on board had a positive and significant relationship with NPLs. Brick and Chidambaran (2010) pointed out that female directors are less skilled than male directors; thus, they are weak in decision-making. In this situation, the increase in female directors is linked to credit risk by increasing the ratio of NPLs. Contrariwise, Wagner (2011) suggested that female directors are more oriented towards risk-taking than male directors and thus, women assume higher risk than men. To extend the previous study, Doğan and Ekşi (2020) investigated the board of directors' characteristics and their effect on credit risk and efficiency. They found evidence that board size and independent board members have a negative relationship with NPLs and the impact on asset returns. On the contrary, Ho *et al.* (2016) and Pathan (2009) found that large board sizes had a significant positive relationship with NPLs. This means that when boards are more extensive, it can become difficult for directors to express their opinions and points of view, leading to increased NPLs.

Fernandes and Fich (2009) reported a significant negative correlation between financial expertise and the level of NPLs. If each supervisory board member possesses financial experts will be capable of assessing the main aspects of the bank's overall policy and forming a balanced and independent opinion about the entire credit risk involved. Fernandes and Fich's (2009) results are supported by Marius Andrieş *et al.* (2017), who argued that board members' lack of financial expertise was positively related to realized losses of NPLs. Research on board meetings has mixed results in corporate governance research. As board meetings increase, members become more committed to the bank they serve; thus, a negative relationship is reported between

board meetings and NPLs. Controversial findings were reported by Roberts *et al.* (2005), who found a positive relationship between board meetings and NPLs. Thus, with time, a long staying board may develop familiarity with management, which might affect their attentiveness.

The results on the relationship between audit and credit committees on NPLs are different. The research reports a negative correlation (e.g., Chou *et al.*, 2013; Islam, 2020), a positive relationship Ho *et al.* (2016) and no relationship (e.g., Isik & Riza Ince, 2016; Liang *et al.*, 2013) between the frequency of committee meetings and NPLs. For example, focusing on board meetings, Brick and Chidambaran (2010) find that number of boards, committee meetings and audit independence are negatively associated with NPLs. Chou *et al.* (2013) also document a negative relationship between audit and credit meetings on NPLs.

2.1. Control variables

The study employed bank and country-related control variables to establish a causal relationship between variables of interest to avoid research bias (Kofi Akwaasekyi *et al.*, 2018). The bank composition affecting the monitoring and performance of NPLs for this study advances in deposit ratios (credit), loan growth, and bank size. For instance, large banks with substantial bank size negatively affect bank risk-taking (see., Biekpe, 2011; Pathan, 2009). Country-specific factors include GDP. Selma Messai and Jouini (2013) found a negative and significant relationship between GDP and NPLs. The negative sign of GDP implies that an increase in economic conditions increases the ability of the borrower to repay the debt due to the rise in income. We, therefore, control these variables in our model.

Furthermore, the literature postulates a positive correlation between the lagged dependent variable and NPLs. (Dao *et al.*, 2020) reported that a shock to NPLs of the previous year would likely have a prolonged effect on the banking system. The result of (Dao *et al.*, 2020)'s disagrees with the results of (Doğan & Ekşi, 2020), who find that the lagged NPLs affect NPLs negatively. Generally, the literature reviewed shows inconsistent board composition and NPL results. All in all, further research is needed to gain deeper insight into this area, given the different opinions expressed by various researchers. Therefore, based on the literature, it is hypothesised that:

- H1. Board size and NPLs have a negative association.
- H2. Independent directors and NPLs have a negative relationship.
- H3. The number of board members with financial expertise negatively relates to NPLs.
- H4. There is a negative relationship between the number of board meetings and NPLs.
- H5. The Number of audit meetings and NPLs has a negative association.
- H6. The Number of credit committee meetings and NPLs has a negative relationship.
- H7. The female directors and NPLs have a negative relationship.
- H8. There is a negative relationship between bank value and NPLs.
- H9. There is a negative relationship between loan growth and NPLs.
- H10. There is a negative relationship between credit and NPLs.
- H11. There is a negative relationship between GDP and NPLs.

3. Data and Methodology

3.1. Data, sample, and variables

This study investigates the relationship between board composition and non-performing loans in Tanzania commercial banks. The study's methodology was a

quantitative research design. Accordingly, we use data from 31 commercial banks operating in Tanzania. Data on these banks were obtained from the audited financial reports of specific CBs for 2011–2020. As our data cover all banks operating in the marketplace, they represent the total population of Tanzania banks. The study's variables, banks, and period were chosen based on the available data and the study's focus on the expansion of NPLs in Tanzania that surpassed the permissible limit of not more than 5.0 per cent. The base year used was 2011, as the average percentage of NPLs in the country increased from 5.4 per cent at the end of 2011 to 9.3 per cent in 2020 (BoT, 2020).

3.2. Measurement and Operational Variable Definition

According to the research, explanatory variables for board composition include the board size, independent directors, directors with financial experts, board meetings, audit meetings, credit committee meetings, and female directors. The ratio of NPLs to all loans is a dependent variable. Furthermore, the study included the advance-to-deposit (credit), bank value, credit, loan growth, and GDP as control variables. The lagged NPLs were also considered as part of the independent variable. Table 1 provides the name of the variable and a description.

Variables	Acronym	Description
Dependent variable		
Non-performing loans	NPL	Non-performing loans/total loans (%).
Test variables		
The previous period of NPL	NPL-1	The first lag of bank NPLs to total gross loans.
Board size	BS	The natural logarithm of the number of directors on the CBs board.
Independent directors	IND-DIR	The percentage of total directors who are independent (%)
Audit Committee	AUDC	The number of annual meetings of the audit committee.
Ln (No.fin.expert)	FEXP	The natural logarithm of the number of directors with financial expertise.
Credit committee	CC	The number of annual meetings of the credit committee.
Female directors	FE-DIR	The natural logarithm of the number of women directors representative.
Board meetings	BM	A number of annual meetings of the board.
Control variables		
Advances in deposit ratios	CREDIT	Scaled by the bank's deposit, this indicator of bank riskiness depicts how the bank uses deposits.
Gross domestic product	GDP	Annual change in GDP growth.
Loan growth	LG	Indicator of portfolio growth.
Bank value	BV	The natural logarithm of a bank's total assets.

Table 1.
Variable names
and description

3.3 Empirical Model

The One-step generalised method of the moment's panel data model proposed by (Arellano & Bover, 1995) is the econometric model used to examine the effect of

board composition on NPLs. Previous studies on panel data (e.g., (Doğan & Ekşi, 2020b; Tarchouna *et al.*, 2017) have also used dynamic panel data. Short macro panels with endogenous factors can be handled well by one-step GMM, which also helps correct endogeneity-related discrepancies and bias brought on by missing variables in cross-sectional estimates (Tarchouna *et al.*, 2017). We use the Arellano and Bover generalised method of moments (GMM) approach that can deal with the problem of correlation between the lagged dependent variable and the error term described in equation 3 below.

The empirical specification used to investigate the association between board composition and NPL results was as follows:

$$NPL_{i,t} = \alpha + \beta \sum_{j=1}^{12} BoardCompi,t + \varphi Control_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where $i = 1 \dots 31$ banks, $t = 2011 \dots 2020$, α is the constant, β , φ , are coefficients to be estimated, and ε is the error term. Board Comp represents the board composition affecting NPLs, and control defines the control variables. Therefore, this study employed eight board composition variables in the model (see equation 2).

$$Borad\ Comp = f(NPL-1, BS, IND-DIR, AUDC, FEXP, CC, BM, FE-DIR) \quad (2)$$

An extended model which contains all variables used is found below (see equation 3).

$$NPL_{i,t} = \alpha + \beta_1 NPL-1_{i,t} + \beta_2 BS_{i,t} + \beta_3 IND-DIR_{i,t} + \beta_4 AUDC_{i,t} + \beta_5 FEXP_{i,t} + \beta_6 CC_{i,t} + \beta_7 BM_{i,t} + \beta_8 FE-DIR_{i,t} + \varphi CREDIT_{i,t} + \varphi GDP_{i,t} + \varphi LG_{i,t} + \varphi BV_{i,t} + \varepsilon_{i,t} \quad (3)$$

We perform the Sargan test of over-identification constraints to examine the overall validity of the instruments employed in our model. This test provides a statistic distributed χ^2 under the null hypothesis of the validity instruments (Arellano & Bover, 1995). It's essential to use the Sargan test to make sure the GMM estimators are reliable. The Arellano-Bond autocorrelation tests AR (1), and AR (2), the first-order and the second-order autocorrelation of the residuals in the differenced equation are also used given the GMM estimator's assumption that there is no serial correlation between error terms. The null hypothesis that no second-order autocorrelation of the residuals in the differenced equation is rejected implies that the error components are serially correlated at the level and may, thus, indicate that the GMM estimator is inconsistent (Arellano & Bover, 1995). According to the Arellano-Bond technique, one should reject AR (1) 's null hypothesis and accept AR's (2).

3.4. Panel unit root test

The finding of the data set's unit root tests is shown in Table 2. Choi (2001) used Fisher-type and Levin-Lin-Chu unit root tests to analyse the level and then differentiate to determine the order of integration of each variable. The results show that audit committees were not stationary at this level. Yet, upon the first differencing, these non-stationary variables became stationary. The unit root test has two implications. First, the presence of a unit implies that the estimating technique cannot use Ordinary Least Squares (OLS). Using OLS as an econometric approach for an estimate when a panel has a unit root test may result in an over- or underestimating of the parameter's value and the parameter's sign being in the incorrect location. Second, the economic implication is that a unit root in a data panel causes a long-term shock (Adusei, 2018).

Table 2.
Panel Unit Root
Test

Variables	Fisher-type unit-root test		Levin-Lin-Chu unit-root test	
	Statistic	p-value	Statistic	p-value
NPLs	122.5683	0.0000	-4.6636	0.0000
NPLs-1	113.7443	0.0001	-5.2442	0.0000
BS	105.9735	0.0004	5.6000	1.0000
IND-DIR	100.0127	0.0016	-2.6947	0.0035
No. FEXP	123.2221	0.0000	-	-
No. BM	14.1402	1.0000	7.0336	1.0000
No. CC	30.3735	0.9998	5.0694	1.0000
No. AUDC	29.4870	0.9999	3.6176	0.9999
FE-DIR	15.6676	0.9932	4.2022	1.0000
PGROWTH	124.8351	0.0000	-	-
BV (Total assets)	299.7988	0.0000	-14.6811	0.0000
CREDIT	212.5111	0.0000	-21.9294	0.0000
GDP	572.0579	0.0000	3.7409	0.9999

Note: *, **, and *** represent 1%, 5%, and 10% significance levels, respectively

4. Results and Discussion

4.1. Descriptive Statistics of Variables

Tables 3 (a) and 3 (b) present descriptive statistics for the variables overview and across bank size and ownership categories. The table display each variable's mean, minimum, maximum, and standard deviation.

Table 3a.
Overall
Descriptive
Statistics of
Variables

Variables	Mean	Std	Min	Max
NPLs	1.81	1.03	-2.66	4.19
NPLs-1	1.67	1.11	-2.30	4.17
BS	7.48	2.15	4	13
IND-DIR	3.61	1.25	1	7
No. FEXP	3.11	1.27	1	7
No. BM	1.57	0.35	1.39	4.48
No. CC	3.55	1.06	2	12
No. AUDC	3.58	1.01	2	10
FE-DIR	0.86	1.09	0	4
BV (Total assets)	13.88	3.84	0	20.85
PGROWTH	2.82	1.38	-2.41	7.80
CREDIT	4.36	0.45	2.03	5.93
GDP	6.6	0.92	4.8	7.9

Table 3b.
Descriptive
Statistics of
Variables
across Panel A
(Bank size) and
Panel B (bank
ownership)

Variable	PANEL A: BANK SIZE							
	Small (n=168)				Large (n=142)			
	Mean	Std	Min	Max	Mean	Std	Min	Max
NPLs	1.8	1.2	-2.7	4.2	1.8	0.8	-1.3	3.9
LPLs-1	1.8	1.3	-1.6	4.2	1.6	0.9	-2.3	3.9
BS	6.6	1.8	4	12	8.5	2.1	5	13
IND-DIR	3.3	1.2	1	6	3.9	1.3	1	7
No. FEXP	2.7	1.1	1	7	3.6	1.3	1	6
No. BM	4.8	1.7	4	12	5.9	3.3	4	88
No. CC	3.3	0.5	2	6	3.9	1.4	3	12
No. AUDC	3.4	0.7	2	6	3.8	1.3	3	10
FE-DIR	0.4	0.3	0	1.1	0.7	0.4	0	1.4
BV (Total assets)	11.5	2.9	0	13.5	16.8	2.6	13.5	20.9
PGROWTH	3.1	1.4	-0.1	7.5	2.5	1.3	-2.4	7.8
DEP	4.4	0.5	2.0	5.9	4.3	0.4	2.4	5.5
GDP	6.6	0.9	4.8	7.9	6.6	0.9	4.8	7.9

Variable	PANEL B: BANK OWNERSHIP							
	Local (n = 130)				Foreign (n = 180)			
	Mean	Std.	Min	Max	Mean	Std.	Min	Max
NPLs	1.8	0.9	-2.3	3.9	1.8	1.1	-2.7	4.2
NPL-1	1.6	1.1	-1.6	3.9	1.7	1.1	-2.3	4.2
BS	7.9	2.5	5	13	7.1	1.8	4	12
IND-DIR	3.7	1.4	1	7	3.6	1.1	1	6
No. FEXP	3.3	1.6	1	6	3.0	1.0	1	7
No. BM	1.7	0.5	1.4	4.5	1.4	0.2	1.4	2.3
No. CC	3.9	1.4	3	12	3.2	0.6	2	6
No. AUDC	3.8	1.3	2	10	3.4	0.7	2	6
FE-DIR	1.4	1.1	0	4	0.5	0.8	0	4
BV (Total assets)	13.7	4.9	0	20.8	14.0	2.9	10.4	20.4
PGROWTH	2.9	1.3	-0.0	7.8	2.7	1.4	-2.4	6.4
CREDIT	4.4	0.4	2.3	5.6	4.3	0.4	2.0	5.9
GDP	6.6	0.9	4.8	7.9	6.6	0.9	4.8	7.9

Note: tables 3(a) and 3 (b) present the descriptive statistics overview across bank size and ownership for the variables in the study. The variable definitions are provided in Table 1.

The study employed the mean to represent the data set’s central tendency and the standard deviation to explain the data’s dispersion. The data set’s proxies for bank value had the most significant mean ranges for bank size, ownership, and overall, at 16.8, 14.0, and 13.88, respectively. The most outstanding mean values and comparatively high levels of dispersion were found in the variable of size (total assets), with a standard deviation of 3.84. Furthermore, No. Board meetings in large banks had the value of a standard deviation of 3.3, whereas total assets in local and small banks had standard deviation values of 4.9 and 2.9, respectively. Variables: board size, indirect directors, financial experts, board meetings, credit and audit committees, loan growth, credit, and GDP measurements all showed standard deviations between 0.3 and 2.15 and values between 0.5 and 8.5. The bank’s female board directors showed the lowest degree of dispersion (0.5) with a standard deviation of 0.3.

4.2 Pearson Correlation Analysis

The inflation factors (VIFs) and Pearson correlation coefficients are shown in Table 4. Independent variables are related to the NPLs (dependent variable). NPLs discovered to be firmly and negatively associated with Bank value. In contrast, it is found that there is a negative and statistically significant correlation coefficient between NPLs and loan growth, GDP, female directors, and audit committees. In addition, NPLs and board size, indirect directors, financial experts, credit committees, and board meetings show positive and statistically significant correlations. For instance, board size is positively associated with NPLs, suggesting that bigger banks have larger boards with more outside board members. Hence, directors may find it more challenging to convey their thoughts and points of view when boards get larger (Doğan & Ekşi, 2020).

A higher board may also lead to issues with free-riding, making it more challenging for members to contribute to monitoring. Larger boards can “engender greater focus, participation, and genuine interaction and debate,” according to agency theory, but they can also “increase caution in monitoring management” (Roberts *et al.*, 2005). Like indirect directors, they may adversely affect banks’ profitability through their monitoring and advisory roles, especially those lacking the necessary firm-specific knowledge, which could be a drawback for indirect members (Haan & Vlahu, 2016).

High correlation coefficients, however, could result in an issue with multicollinearity among the explanatory factors. As a result, we use the VIF as a multicollinearity indicator. The current study provides that the VIF values of all explanatory variables range from 1.03 to 2.97, which is far below the allowed upper limit of 10 (Isik & Ince, 2016).

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Variables	BV	NPLs	NPL-1	PGROWTH	GDP	BS	IND- DIR	FE- DIR	No. FEXP	No. CC	No. AUDC	No. BM	CREDIT	VIFs
BV	1													2.97
NPLs	-	1.0												-
	0.07													
NPL-1	-	1.0	1.0											
	0.07													
LG	0.0	-0.13	-0.14	1.0										1.07
GDP	0.06	-0.10	-0.10	-0.04	1.0									1.03
BS	0.10	0.03	0.03	-0.13	-	1.0								1.06
					0.02									
IND-DIR	-	0.03	0.03	-0.19	0.03	0.70	1.0							2.41
	0.02													
FE-DIR	0.21	-0.04	-0.04	0.01	0.02	0.43	0.33	1.0						1.38
No. FEXP	0.20	0.05	0.05	-0.12	-	0.68	0.60	0.47	1.0					2.23
					0.04									
No. CC	-	0.01	0.01	-0.03	0.03	0.38	0.21	0.31	0.37	1.0				2.09
	0.04													
No. AUDC	-	-0.01	-0.01	-0.02	-	0.33	0.16	0.25	0.38	0.69	1.0			2.06
	0.01				0.02									
No. BM	0.05	0.02	0.02	-0.02	0.03	0.20	0.15	0.19	0.18	0.08	0.16	1.0		1.08
CREDIT	-	0.18	0.18	-0.08	-0.10	0.13	0.15	0.04	0.12	0.04	-0.01	-0.06	1.0	1.08
	0.06													

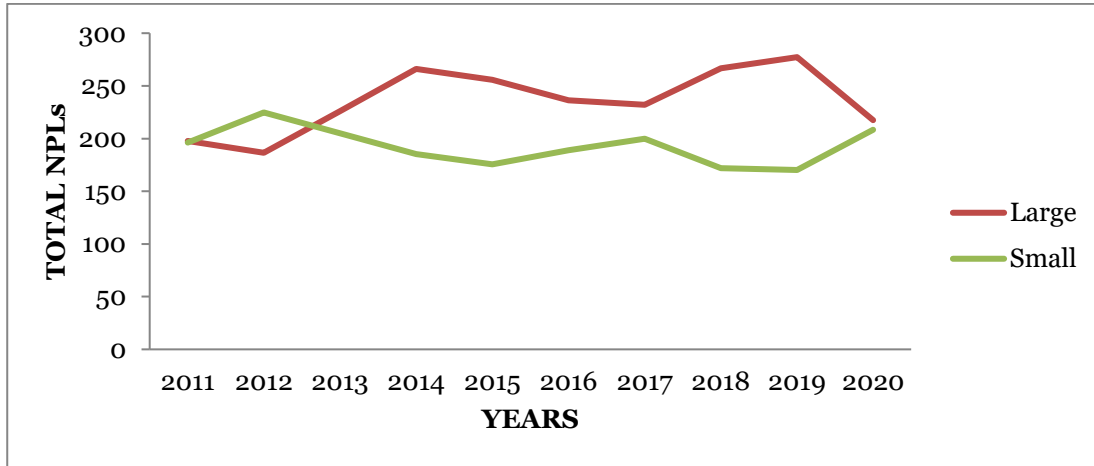
Note: table 4 presents the correlation matrix for variables in the study. The variable definitions are provided in Table 1.

4.3. Bank Category

Commercial banks were characterised as small or large depending on the level of their assets. Assets between 711,259 and 75,591 million TZS are held by 22 small and nine large banks, respectively (BoT, 2020). There were 31 commercial banks (CBs) in action, 13 banks being locally owned and 18 owned by foreign entities. Figures 1 and 2 depict trends in non-performing loans among Tanzanian CBs from 2011 to 2020 by bank size and ownership categories.

4.3.1. NPLs Trends by bank size

Figure 1 presents NPL trends for bank size category among CBs in Tanzania from 2011 to 2020.



Board Composition and Non-Performing Loans Among Commercial Banks in Tanzania

Figure 1. NPL trends for bank size category among CBs in Tanzania from 2011 to 2020.

According to Figure 1, small banks had a growing trend of NPLs, while large banks depicted a decreased level of NPL in 2020. The increased level of NPLs is attributed to the following factors: striving for market share by offering loans with lax screening requirements and diminished incentive programs designed to encourage borrowers to pay their debts (Warue, 2013).

4.3.2. NPLs Trends by Bank Ownership

Figure 2 describes the trends of NPLs per CBs ownership between 2011 and 2020.

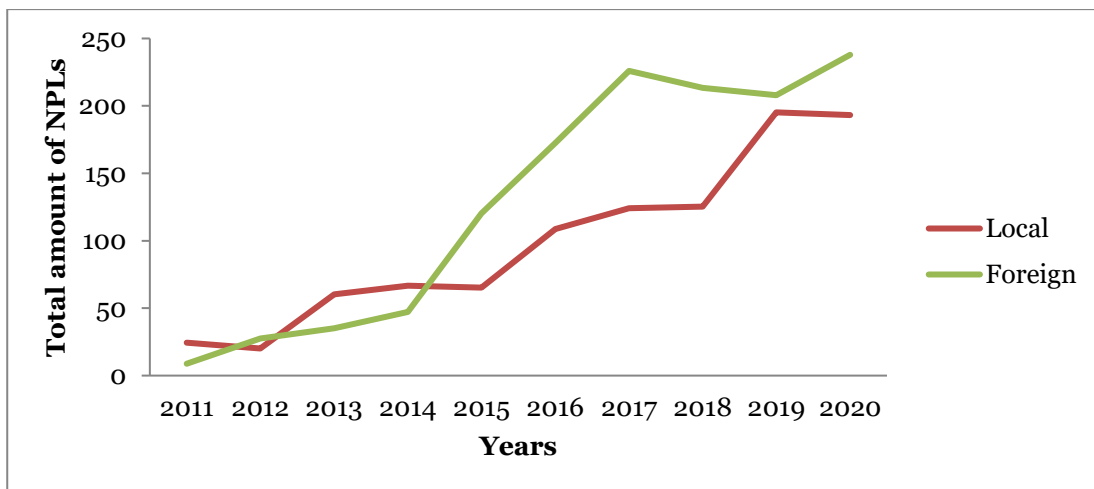


Figure 2. The trends of NPLs per CBs ownership between 2011 and 2020.

From Figure 2, trend lines for NPLs performance under bank ownership categories display that foreign banks had the highest NPLs, followed by Locally owned banks. Both local and foreign banks showed an overall rise in NPLs. The struggle to gain market share may have contributed to the increase of NPLs by employing techniques

with lesser encouragement to persuade borrowers to pay debts regardless of their financial situation. This scenario was similar to observations made in bank size analysis, as shown in Figure 1.

4.4 Regression Results

The one-step GMM estimator is chosen over the two-step GMM because it has a lower chance of bias for smaller sample sizes. Table 5 shows the one-step difference and one-step system GMM estimate results for the dynamic model in Eq (3).

Table 5.
Baseline
model:
Explanatory
variables:
NPLs

Variables	Difference GMM			System GMM		
	Coefficient	Std.Error	P-value	Coefficient	Std.Error	P-value
NPL-1	0.717	0.021	0.000	0.746	0.009	0.000
BS	0.014	0.013	0.281	0.024	0.007	0.004
IND-DIR	0.364	0.167	0.030	0.024	0.054	0.655
No. FEXP	-0.051	0.019	0.010	-0.015	0.009	0.124
No. BM	0.000	0.001	0.763	-0.001	0.001	0.571
No. CC	0.630	0.229	0.007	0.101	0.067	0.136
No. AUDC	-0.008	0.013	0.023	-0.010	0.009	0.281
FE-DIR	-0.061	0.065	0.349	-.047	0.021	0.028
PGROWTH	-0.027	0.011	0.017	-0.002	0.008	0.849
BV (Total assets)	-0.064	0.087	0.463	-0.056	0.023	0.013
CREDIT	1.813	0.661	0.007	0.667	0.231	0.004
GDP	0.008	0.012	0.527	-0.004	0.010	0.710
Test for AR(1)	z = -1.26 [0.207]			z = -0.42 [0.675]		
Test for AR(2)	z = 0.27 [0.784]			z = 0.94 [0.348]		
Sargan test	chi2(44) = 82.50 [0.000]			chi2(71) = 222.15 [0.000]		

=* p<0.05 ** p<0.01 *** p<0.001”

Overall results on the panel data for both the difference and system estimators show a strong and positive relationship between the lagged NPL and the present NPL rate. This conclusion is predicted because NPLs indicate a high level of persistence. This shows that the banking system would probably be affected considerably if NPLs were substantially increased. As a result, the first hypothesis was not verified. The board size has a strong positive impact on the growth rate of NPLs, and the H2 hypothesis is not supported, considering that when boards are more extensive, it can become difficult for directors to express their opinions and points of view, leading to increased NPLs. The finding aligns with the literature of Ho *et al.* (2016) but contrasts with the results of Alaryan (2017).

The results also show that independent directors have a positive and statistically significant relationship with NPLs, and that hypothesis (H3) is not supported. A similar finding was presented by (Petra & Petra, 2006). This is a significant finding, especially regarding independent directors' limited participation in business operations and is not exposed to the bank's day-to-day activities. The results contrasted the previous research (see., Saha & Kabra, 2019; Alaryan, 2017). The financial expert has a strong negative impact on the growth rate of NPLs. This is expected and supports the H4 hypothesis, considering that directors with financial experience typically lower the NPLs of banks. The results support a study by Marius Andries *et al.* (2017) that revealed a positive correlation between realized losses and bank board members' lack of financial expertise.

Another explanation for this study is that board meetings and GDP were positive but not statistically significant in impact on NPLs. This unexpected outcome contradicts

the H5 and H12 assumptions. The finding does not speak of the attitude of banks towards risk-taking activities in cases of favourable GDP. The H6 hypothesis is supported by the negative and statistically significant parameter estimate for the board's audit committee meetings. This is expected because banks with more audit tasks perform better in lowering the amount of NPLs. The explanation is that independent audit committees' boards perform better in oversight and value creation (see., Isik & Ince, 2016). Since findings are consistent with the study (Wagner, 2011), a board-independent audit team increases the efficiency of operations, which means a decrease in NPLs.

The control variables of bank values, portfolio growth, and credit were also mixed in explaining bank NPLs variations. For instance, they have a significant negative influence on NPLs. This means that banks with substantial total assets can enjoy higher profitability and possibly offer benefits in terms of bank NPLs. The finding is consistent with the literature (Biekpe, 2011; Hu *et al.*, 2004). Furthermore, the results suggest a negative relationship between portfolio growth and NPLs. This implies that the bank's ability to control borrowers' solvency improves with the degree of its concentration on credit activities, supporting the H10 assumption. The results conform with the study (Taktak, 2010). Advances in the ratio of the deposit have a positive and significant relationship with NPLs. This surprising result did not support the H11 hypothesis. This outcome supports the notion that managers, boards, and shareholders make the overwhelming decisions, while depositors and bondholders provide the bulk of the capital (Becht *et al.*, 2012). Since the depositors were not included in the decision-making process, it is possible that the board's ability to manage the situation was compromised.

4.5 Robustness checks

Regression analyses are performed on dynamic panel data to establish the cross-sectional influences on the relationship between board composition and NPLs. One-step difference and one-step system GMM were employed to test for the robustness and consistency of the outcomes across bank size and ownership categories (see Tables 6 and 7). The results in Tables 6 and 7 show significant and consistent influences on NPLs, as in Table 5 (baseline model). Such variables are lagged NPLs, financial experts, audit committees, female directors, portfolio growth, bank size, and advances to deposit ratios. According to the overall results of the panel data, the governance dimensions in credit committees are not statistically significant on bank ownership in explaining the variations in the NPLs. This supports the H7 hypothesis, even if it is insignificant. It means that whether banks have more or fewer credit committees simultaneously will not influence the decision of the bank to realise a high or low level of NPLs. Similar outcomes about negative and insignificant GDP were discovered under bank ownership (see Table 7).

The independent directors on bank ownership have a strong negative impact on the growth rate of NPLs and support the H3 hypothesis. This is expected given that independent non-executive directors improve monitoring of management decisions, safeguarding the interests of shareholders and other stakeholders, and preserving the reputation of banks, which are likely to reduce agency problems, as (Fama & Jensen, 1983) and (Jensen & Meckling, 1976) described. In the same vein, many studies, such as (Lee & Chung, 2017), (Liang *et al.*, 2013) and (Pathan 2009), also support the role of independent directors in reducing the rate of non-performing loans (NPLs), even though (Alaryan, 2017), (Petra & Petra, 2006) found a positive correlation between the number of independent directors on bank boards and NPLs. They argued that including independent directors may endanger the efficient operation of a board of directors. This is because independent directors do not have enough exposure to the bank's daily activities because of their limited involvement with corporate activities. Board size is negatively related to NPLs, supporting the H2 hypothesis on the small banks. This indicates that larger boards may contribute to higher efficiency through additional

expertise in exercising, monitoring, and advisory functions. This finding was contradicted by (Haan & Vlahu, 2016). Finally, the board meeting is negatively associated with NPLs in bank size and ownership categories. The H5 hypothesis was supported by these findings, which were as expected. According to the results, board meetings that meet more frequently serve as better monitors and advisors since they exert more effort to carry out their tasks. This is consistent with the research results mentioned (Islam, 2020). The study by (Chou *et al.*, 2013) reported the controversial conclusions of these observations.

Table 6.
Estimation
results of board
composition
variables and
NPL by bank
size

Variables	One-step difference GMM		One-step system GMM	
	Small Coeff(P- value)	Large Coeff(P- value)	Small Coeff(P- value)	Large Coeff(P- value)
NPLs-1	0.644(0.0000)	0.726(0.000)	0.766(0.000)	0.724(0.000)
BS	-	-0.019(0.324)	-	0.007(0.489)
	0.006(0.899)		0.236(0.006)	
IND-DIR	0.586(0.005)	0.030(0.402)	.017(0.550)	0.007(0.668)
No. FEXP	-0.060(0.124)	-0.034(0.180)	-	-
			0.029(0.262)	0.005(0.002)
No. BM	0.024(0.151)	-0.000(0.904)	-0.191(0.001)	0.000(0.896)
No. CC	0.670(0.037)	-	-	0.004(0.627)
		0.0288(0.455)	0.021(0.703)	
No. AUDC	-	-0.019(0.299)	0.027(0.367)	-
	0.008(0.004)			0.018(0.138)
FE-DIR	-0.859(0.521)	-0.147(0.058)	-0.761(0.021)	-
				0.020(0.611)
PGROWTH	-0.274(0.001)	-0.048(0.004)	0.402(0.000)	-
				0.012(0.283)
BV (Total assets)	0.009(0.256)	-0.006(0.642)	-	-
			0.063(0.000)	0.004(0.050)
CREDIT	-0.102(0.349)	-0.073(0.560)	-	0.026(0.002)
			0.091(0.400)	
GDP	.011(0.742)	0.011(0.461)	-	0.021(0.131)
			0.018(0.583)	
Test for AR(1)	Z= -2.55 (0.011)	z = -2.46 (0.014)	z = - 1.29(0.198)	z = 1.58 (0.115)
Test for AR(2)	Z= 1.04 (0.298)	z = 0.01 (0.992)	z = 0.66(0.508)	z = 0.07(0.945)
Sargan test	chi2(11) = 19.04 (0.060)	chi2(24) = 43.65 (0.008)	chi2(24) = 34.33 (0.079)	chi2(41) = 153.10 (0.000)

Table 7.
Estimation
results of board
composition
variables and
NPL by bank
ownership

Variables	one-step difference GMM		one-step system GMM	
	Foreign Coeff(P- value)	Local Coeff(P- value)	Foreign Coeff(P- value)	Local Coeff(P- value)
NPLs-1	0.798(0.000)	0.772(0.000)	0.670(0.000)	0.791(0.000)
BS	0.006(0.907)	0.019(0.239)	0.038(0.502)	0.024(0.045)
IND-DIR	0.018(0.818)	-0.043(0.034)	0.031(0.794)	-0.030(0.049)
No. FEXP	-0.500(0.095)	-0.246(0.012)	-0.281(0.027)	-0.181(0.000)
No. BM	0.130(0.116)	0.001(0.355)	-0.275(0.004)	-0.002(0.128)
No. CC	-0.023(0.709)	-0.013(0.719)	-0.054(0.571)	-0.019(0.073)
No. AUDC	0.097(0.234)	0.009(0.590)	0.027(0.698)	-0.134(0.036)
FE-DIR	-0.533(0.058)	0.070(0.363)	-0.100(0.628)	-0.077(0.037)

PGROWTH	-0.211(0.081)	-0.162(0.006)	-0.233(0.005)	-0.372(0.000)
BV (Total assets)	.001(0.970)	0.012(0.156)	0.004(0.784)	-0.010(0.054)
CREDIT	-0.088(0.666)	-0.172(0.056)	0.161(0.637)	0.349(0.044)
GDP	0.055(0.207)	-0.009(0.520)	-.039(0.535)	-0.008(0.548)
Test for AR (1)	Z=0(0)	z = - 2.68(0.007)	z = - 0.84(0.399)	Z = - 2.84(0.004)
Test for AR (2)	Z=0(0)	z = 2.21(0.027)	z = - 0.74(0.457)	Z = 1.03(0.302)
Sargan test	chi2(5) = 18.94(0.002)	chi2(29) = 43.05(0.045)	chi2(15) = 34.16(0.003)	chi2(44) = 60.28(0.052)

5. Conclusions, Implications and Limitations

This study examined the effect of board composition on NPLs of commercial banks in Tanzania from 2011 to 2020. The GMM is employed to determine the impact of board composition on NPLs by controlling for GDP, CREDIT, Bank value, and portfolio growth. We find that NPLs are negatively related to financial experts, audit committees, female directors, the board size, bank size and loan growth. The presence of these variables helps lower NPLs.

One significant policy conclusion is that having a large board of directors, such as individuals with relevant experience and competence, will likely monitor credit risk management. Therefore, given their range of operations, they were advised to consider expanding their boards and hiring qualified directors to lower their credit risk. The study also discovered a significant and favourable correlation between lagged NPL, the size of the board, independent board directors, the frequency of credit committee meetings, credit, and NPLs. These variables' favourable effects improve Tanzania's NPLs for CBs. Agency theory provides solid support for our findings. To address the severe NPLs difficulties in the banking industry, recent regulations, policies, and directives by the Tanzanian Parliament, the central bank of Tanzania, and bank regulatory bodies are supported by this research.

Our research has practical applications. Particularly in emerging and developed economies, NPLs continue to impede the growth of the financial markets. This study offers a variety of strategies for removing this barrier in addition to the regulatory and prudential guidelines issued by the banking authorities. Given that the board of directors in the banking sector impacts economic growth and has major repercussions for society, thus can be of significant relevance. This paper adds existing data to the under-researched topic of board composition issues in CBs of Tanzania, a developing market. Future studies could use a bigger sample size and a more comprehensive range of time intervals. The primary purpose of this is to consider several factors while examining the correlation between a bank's loan quality and the membership of its board of directors.

One of the study's shortcomings is the inconsistencies in the reported variables from different databases. These differences and non-standardization of measurements may make using data from multiple sources difficult, but it is also a proven route to correct and dependable data. By using annual bank records as confirmation, we resolved this problem. Despite these limitations, the method is consistent with earlier research, and statistical analysis proved that all hypotheses and diagnostic tests were valid. The conclusions of our investigation are not in any way compromised by these restrictions.

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