

# Main Determinants of Banks' Stability: Evidence from Commercial Banks in Ghana

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**Abstract** This study focuses on the main determinants of the stability of commercial banks in Ghana. The work was guided by three objectives, namely investigating the firm-specific, board characteristics and macroeconomic variables that determine bank stability in Ghana. This study used panel data, sourced from 8 banks over 2008-2017, constituting 80 observations. Firm-specific and board-characteristic data were sourced from the selected banks through their audited financial statements. Data on macroeconomic variables were sourced from World Development Indicators, 2018 and Bank of Ghana. The study, through Hausman specification test, selected appropriate models for estimations. STATA 13.0 was used for the data analysis. From the findings, bank size and net profit margin had significant positive effects on bank stability whilst interest cover had a negative significant effect on banks' stability. Also, characteristics, gender of CEO, board size and frequency of board meeting there was a significant positive effect on bank stability. With regards to macroeconomic variables effect, inflation and growth of gross domestic product had significant positive impact on banks' stability. Bank rate had a significant negative impact on bank stability. The study therefore recommends that, the commercial banks in Ghana should embark on reasonable expansion. They should also ensure effective and efficient utilization of all banks' assets. The banks should further constitute a reasonably board size, made up of different expertise. Government of Ghana should consciously embark on accelerated economic growth, supported by sound economic fundamentals.

**Keywords:** Bank Stability, determinants, firm-specific, Hausman Test, Ghana

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## 1. Introduction

Banking plays a key role in a sound economy of the country in economic development and growth [1,2,3]. The bank offers as an economic catalyst and helps to sustain any country's economic function [4]. The role of financial intermediation is to be performed by banking industries by accumulating, mobilizing capital in support of enterprises and development projects essential for economic development [5].

For commercial banks to be able to provide the above and other mandated roles continuously, they need to be financially stable among others [6]. Financial stability can be described as the condition where the financial intermediation process functions smoothly, thereby, building confidence among those that use it [7]. Also, financial stability refers to a condition in which the financial system, which comprises financial institutions; financial markets; and market infrastructures, is capable of

facilitating real economic activities smoothly and unravelling financial imbalances arising from shocks [8]. On the contrary, financial instability is a situation whereby there are heavy costs for an economy since the volatility of price variables in the financial markets spikes economic risks and financial institutions or corporations may even run into bankruptcy [9].

Stability of commercial banks are mostly influenced by internal and external factors. The internal factors are also known as bank specific internal while the external factors are macroeconomic, socio-cultural and political factors, which are outside the control of the management of the commercial banks [10]. The internal factors are individual bank characteristics which affect the performance of the bank. These factors are primarily influenced by the internal decisions of the management and board [10,11]. This could contribute to the economic downturn of the financial crisis [12]. Like other enterprises and organisations, the banking industry experiences turbulence emanating from increased globalization, internationalization, enhancements in information, communication and technology together with

trade liberalization and all these have effects on their stability [5].

Money related educated ought to proactively think about the environment of operation and make significant methodologies that would limit how serious they are uncovered to circumstances that are most likely to influence their solidness. Ref [13] recommends that a fitting regulatory mechanism that's past the essential save necessities should be actualized so as to address and handle the systemic perspectives of subsidizing liquidity hazard among commercial banks. The save proportions anticipated by each bank may not be adequate sufficient for the liquidity presentation they confront as they are subjectively decided. Ref [14] hypothesized that a few banks set their liquidity levels through copying conduct in liquidity choices, which may too radiate from learning thought processes. Agreeing to [11], banks have to be think about, adopt and re-initiate themselves to the changing environment in the event that they need to be competitive and perform their intermediation obligations effectively.

In Ghana, directions and supervisions have gotten to be basic within the requirement of rules and controls to guarantee solidness of banks. One normal example is the increment within the least capital necessity by Bank of Ghana to GH ₵60 million in 2008 and assist to GH₵120 million and GH₵400 million in 2013 and 2018 separately with the point of guaranteeing a strong keeping money industry.

In view of the importance of the stability of commercial banks, empirical studies have looked at the factors that determine stability of banks across world. However, the factors differ from country to country due to differences in socio-cultural, political and economic environments. This study, therefore, specifically focus on commercial banks in Ghana with emphasis on factors that determine their stability.

A safe and sound banking system ensures the optimal allocation of capital resources: regulators therefore aim at ensuring stability through regulation and policies [15]. According to [15], a dysfunctional financial industry may prevent capital from flowing to worthy investment and may lead to credit crunch thereby putting pressure on businesses and households, thereby adversely affecting the real economy. In order to ensure that the financial industry remains stable and sound to perform its financial intermediation role effectively, it is important that individual financial institutions in the industry implement relevant strategies that would ensure their financial stability.

Many studies have been conducted on budgetary steadiness within the monetary division over the globe. Acharya [16] conducted a study on the hypothesis of systemic hazard and the plan of prudential bank control. The discoveries of the said think about uncovered that the administrative instruments such as capital ampleness prerequisites offer assistance make strides banks' steadiness. Also, [17] found out that trade rate and swelling decide the budgetary solidness of commercial banks in Kenya.

From these reviews, it is very obvious that most of the existing studies have looked at the determinants of the financial stability of commercial banks in other countries

while there is little or no such studies in Ghanaian commercial banks. The study, therefore, seeks to investigate the determinants of financial stability of commercial banks in Ghana.

## 2. Literature Review

Commercial banks that are fascinated by achieving high levels of productivity and steadiness got to find out ways that will offer assistance them guarantee that their costs of operations are kept up at a satisfactory degree. Firms that are able to decrease their costs of operations are considered to be more effective, and it is additionally anticipated that they uncover higher benefit edges than their accomplices that have higher costs of operations. [18] shown that a tall cost of operations leads to lower benefit edges since it appears that the organization is investing more so as to induce yield. It is of great significance to note that due to competition and advertise controls, a bank that's confronted with a tall fetched of operations cannot pass the complete burden or stack to the clients through an increase within the bank expenses and charges; subsequently, this implies that the bank should carry that stack [19].

[20] found a positive connection between self-regulation and money related proportion execution for co-operative banks. This result is due to the reality that co-operative divulgence necessities are much lower, compared to commercial banks revelation. [21] watched that monetary soundness is decided by policy-making for the total operation of the financial system so the work incorporates a positive reflection on costs within the advertise.

[21] investigated the impact of bank capitalization on the liquidity of commercial banks in Kenya. The relapse comes about demonstrated that the measure of bank and resource quality have an impact on the liquidity proportion of banks. It, in any case, was distinguished that bank estimate had the most elevated impact on banks' liquidity proportion. This hence exhibits banks' current resources, both settled and current conjointly decides the by and large soundness of banks to a bigger degree. This comes about uncover that bigger banks basically appreciate economies of scale, which in turn emphatically impacts their benefit and stretches their solidness status. The consider assist show that having resources in profoundly fluid shape demonstrates to really increment wage levels.

On the other hand, banks that have destitute resource quality frequently confront the challenge of tall credit dangers, driving to less benefit. Bank estimate subsequently decides the capacity of the bank to stay beneficial and economical for the predictable future. In pith, in case a bank cannot utilize its held resources to produce incomes, at that point it cannot stay steady within the long run as liabilities and other commitments will ought to be met as and when they proceed to develop.

Moreover, [18] conducted an examination on the determinants of the steadiness of the banks that had been working within the US for the period of 1995-2007. The study found that there is an antagonistic relationship that exists between the estimate of the bank and monetary solidness, which certified the conviction that banks are

working most carefully and rejecting possibly beneficial exchanging chances.

According to [22], capital adequacy ratio (CAR) ascertains the sufficiency of capital. Capital adequacy ratio reveals the internal strength of the bank to withstand losses during crisis. Capital adequacy ratio is directly proportional to the resilience of the bank to crisis situations. It also has a direct impact on the profitability of banks by showcasing its expansion to risky but profitable ventures or areas [23]. Ref [22] and [23] contention subsequently affirm that capital estimate contains a positive and critical relationship with bank budgetary solidness. [24] recommended that capital is superior shaped as an inner determinant of bank productivity, as more noteworthy profits may lead to an improvement in capital conjointly means that well-capitalized banks confront lower dangers of going bankrupt, which limits their costs of subsidizing.

Ref [25] examined the effects of interest rates spread on the financial performance of commercial banks in Kenya. Study results indicated that there is a strong relationship that exists between the financial performance of commercial banks and interest rate spread, inflation and default risks. The study recommended that the government needs to regulate the spiking inflation and interest rates as it would help commercial banks to operate in a more stable and suitable environment. [15] concluded, in their study, "that the more banks are involved in international trade, most especially foreign transactions, the more they are faced with increased financial risks due to fluctuations in inflation and interest rates which influences exchange rates. This in turn has an impact on the attainable revenue from foreign exchange dealings and contracts.

[26] set in his investigate that the central bank rate, cash save proportion, open advertise operation and vulnerability are all caused by conceivable results or comes about due to changes that exude in financial approaches pointed at controlling expansion and intrigued rates. This in turn influences the loaning conduct of the banks by commercial banks. The more they dispense advances the more they confront credit dangers which have the potential to break down the commercial banks all together.

[27] assessed the relationship that exists between intrigued rates and budgetary soundness of commercial banks and found that the relationship is especially clear for littler banks than the bigger banks. They advance shown that a minimisation within the intrigued rates amid a subsidence period comes about in a slacking development rate in bank credits whereas, at the same time, summing up the sum of nonperforming advances and in this way expanded credit misfortunes. This hence implies that commercial banks, most particularly the lesser ones, may have a lot of challenges within the upkeep of their budgetary execution when the rates of the advertise are on a diminishing slant [27].

High expansion rates cause high interest rates on credits and, in this way, lead to higher income for commercial banks. [28] recommends that the impact of swelling on managing an account execution is much subordinate on whether swelling is expected or unexpected. An increment within the swelling rates is completely expected and changes are made to the intrigued rates reasonably, leads

to a positive impact on the budgetary execution of commercial banks. When an increment within the swelling rates isn't expected, subsequently will be a circumstance where the neighbourhood borrowers are challenged with cash stream challenges, and this may result within the cancellation of bank credit understandings in an untimely mold, hence, causing advance misfortunes for the issuing commercial bank. The common perception that's commendable of note is that when commercial banks take a parcel of time to create changes to their intrigued rates after changes within the swelling rates, it leads to a circumstance where the working costs of the bank

[29] examined the effects of foreign exchange exposure on the financial performance of banks. The research indicated that unrealized foreign exchange gains/losses have an effect on the net income of listed companies as it was posted to either income statement or owners' equity. The level of foreign exchange gains or losses is much determined by a greater extent by prevailing inflation rates in the country.

As a financial intermediary, commercial banks are more exposed to the impact of exchange rate. Exchange rate can influence bank performance both directly and by implication. The coordinate impact is simple to recognize and can be effectively overseen. Be that as it may, the roundabout impact of trade rate on the productivity of commercial banks is exceptionally unpretentious. Fundamentally, it roots its course from the impacts of trade rate on the commerce of bank clients and the economy as an entirety. According to [17] findings, exchange rate has a statistically significant adverse influence on the profitability of commercial banks. The result further proved that exchange rate has a statistically significant positive effect on the growth of loans of banks.

According to the study by [30] on financial deepening and economic growth, it has mostly dealt with the causality issue between the two concepts with two main hypothesis: the initial one, the supply-leading hypothesis, argues that financial stability drives economic growth via the presence of efficient markets whereas the second, the demand-leading hypothesis, insinuates that economic growth refers to a response to the expansion of financial markets and progress.

[31] investigated the consequences of financial stability dynamics for financial policy coordination in the West African Economic and Monetary Union sub-region (WAEMU). They adopted a hypothetical-deductive theoretical approach and an empirical investigation in both static and dynamic panel data econometrics. The study recommended the implementation of a financial policy directed at increasing the level of savings rate, GDP per capita growth rate and density. It also recommended the reduction of the level of reserves in the sub-region.

### 3. Methodology

#### 3.1. Sources of Data and Data Type

The study used panel data from listed banks in Ghana. However, data availability was an issue, thus, this study employed convenience sampling technique to sample the banks. The banks were selected based on data availability.

This study, through the Ghana website, listed all the banks in Ghana. With the list, the study visited the websites of the banks. The research revealed that some of the banks had no published financial statements. Others too had published financial statements for only few years. The study observed that few banks had consistently published their audited financial statements and these banks were included in the study. The banks were “Ecobank, Barclays Bank/ Absa, Agricultural Development Bank (ADB), GCB Bank, Societe General, CAL Bank, Prudential Bank and National Investment Bank (NIB)”. Most of the banks had audited financial statements over the period 2008-2017; hence, the study focused on this period. From the audited financial statements, banks specific variables such as firm size, credit risk, interest cover, firm growth and tangibility were computed and bank stability measured as z-score was also computed over the period of 2008-2017. Another data set was obtained from World Development Indicators, 2018 and Bank of Ghana. This study obtained macroeconomic data from the World Development Indicators, 2018 and Bank of Ghana website over the period of 2008-2017.

### 3.2. Model Specification

The study specified the model appropriate for the testing of research hypothesis stated in Chapter One of this study. The main objective of this study was to estimate the determinants of banks' stability in Ghana, where data is sourced from the size of banks over 2005-2018. Therefore, the model appropriate for this study is either fixed effect model or random effect model. The model is specified as follows:

$$BS_{i,t} = \alpha_0 + \beta_i \sum_{i=1}^k X_i + f_i + t_i + \gamma_{i,t} \quad (1)$$

Where;

SB= bank stability of bank i in year t; X= explanatory variables; f= fixed effect; t= time effect;  $\gamma$ = error or stochastic term.

This study has grouped the explanatory variables into three, as firm specific variables, board characteristics

variables and macroeconomic variables; hence, the corresponding models are shown as follows:

$$BS_{i,t} = \alpha_0 + \alpha_1 TANG_{i,t} + \alpha_2 INTCOV_{i,t} + \alpha_3 EPS_{i,t} + \alpha_4 FIRMG_{i,t} + \alpha_5 FIRMZ_{i,t} + \alpha_6 NPM_{i,t} + f_i + t_i + \gamma_{i,t} \quad (2)$$

$$BS_{i,t} = \alpha_0 + \alpha_1 CEOD_{i,t} + \alpha_2 GENCEO_{i,t} + \alpha_3 BOARDZ_{i,t} + \alpha_4 FBOARDM_{i,t} + f_i + t_i + \gamma_{i,t} \quad (3)$$

$$BS_{i,t} = \alpha_0 + \alpha_1 INFL_t + \alpha_2 GDPG_t + \alpha_3 EXCHR_t + \alpha_4 BANKR_t + \alpha_5 GOVB_t + f_i + t_i + \gamma_{i,t} \quad (4)$$

Where; BS= bank stability; TANG= tangibility; INTCOV = interest cover; EPS= earnings per share; FIRMG= firms growth; FIRMZ= firm size; BPM= net profit margin; CEOD= Chief Executive Officer duality; GENCEO= gender of Chief Executive Officer; BOARDZ= board size; FBOARD M= frequency of board meeting; INFL =inflation rate; GDPG= Gross domestic product growth rate; EXCHR= exchange rate; BANKR= bank rate; GOVB= government debt

## 4. Results and Discussions

### 4.1. Summary Statistics for Bank Specific and Board Characteristics

This section presents the descriptive statistics on all the bank-specific and board characteristics of the selected banks. The summary of descriptive statistics is presented in Table 1. The study further used Chi-Square test to show the association between each bank-specific and board characteristic and the dependent variables (bank stability).

From Table 1, result shows that bank stability has a mean value of 23.256 over the period 2008-2017. The bank stability of the selected banks varied over the period of consideration (2008-2017) (Also see Figure 1).

**Table 1. Summary Statistics of Study Variables, Chi-Square Test for Association between Bank Stability and Firm/ board Characteristics**

Variables	Mean	Std. Dev.	Min.	Max.	p-value of Chi-square
Bank stability	23.256	11.267	13.54	31.0	-
Firm size	16.284	0.607	15.118	17.456	0.000**
Firm growth	10.257	17.016	-1.694	120.848	0.057
Interest cover	16.121	0.781	14.847	17.785	0.032*
Tangibility	0.297	0.167	0.077	0.603	0.324
Earnings per share	56.753	51.99	8.520	271.15	0.021*
Net profit margin	0.345	0.269	0.005	0.896	0.000**
CEO duality	0.625	0.487	0	1	0.328
Board size	10.05	2.181	7	13	0.017*
Gender of CEO	0.362	0.483	0	1	0.003*
Frequency of board meeting	4.200	1.023	2	6	0.000**

Source: Data from the Selected Banks, \*\* significant at 1%; \*Significant at 5 %.

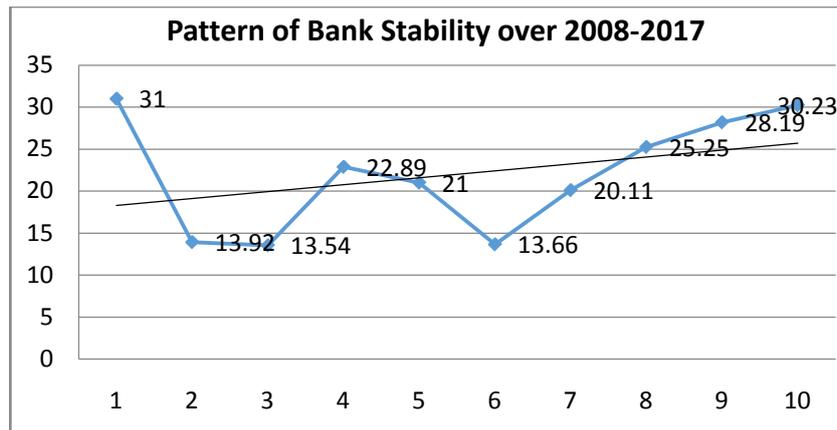


Figure 1. Pattern of Bank Stability between 2008 -2017 (Source: Computed Form Audited Financial Statements of the Selected Banks)

From Figure 1, the year 2008 recorded the highest Z-score of 31.0, followed by the year 2018 (Z-score of 30.23). Year 2010 recorded the least z-score of 13.52. The Z-score rose steadily after 2013. More of the Z-score values for years 2009, 2010, 2013 and 2014 fell below the best fit line, indicating weak bank stability for those years.

The results in Table 1 show that firm specific determinants such as firm size, firm growth, interest cover, tangibility, earnings per share and net profit margin have a mean value of 16.284, 10.257, 16.121, 0.297, 56.753 and 0.345 respectively over the period 2009-2018. The Chi-square test shows that firm size ( $p < 0.001$ ), interest cover ( $p = 0.032$ ), earnings per share ( $p = 0.021$ ) and net profit margin ( $p < 0.001$ ) have significant association with bank stability (measured by z-score). However, firm growth ( $p = 0.057$ ) and tangibility ( $p = 0.324$ ) have no significant association with bank stability.

Among the board characteristics in Table 1, board size ( $p = 0.017$ ), gender of CEO ( $p = 0.003$ ) and board meeting frequency ( $p < 0.001$ ) have a significant association with bank stability. However, CEO duality has no significant association with bank stability ( $p = 0.328$ ).

## 4.2. Descriptive Statistics for Macroeconomic Variables

The macroeconomic variables considered in this study are inflation, bank rate, gross domestic product growth

rate, exchange rate (cedi to dollar rate) and government net debt. This section of the chapter presents summary statistics on each of them as well as Chi-Square test for the association between each macroeconomic variable and bank stability. The results are summarized in Table 2.

Table 2 shows mean inflation, gross domestic product growth, bank rate (Bank of Ghana Policy rate) value over the period 2005-2018 as 13.184, 5.782 and 18.060 respectively. From the Chi-square test, inflation rate ( $p < 0.001$ ), gross domestic product growth ( $p < 0.001$ ) and bank rate ( $p = 0.036$ ) have a significant association with bank stability in Ghana. Exchange rate (cedi to dollar rate) and government net debt have mean values over the period of 2005-2018 as  $\text{¢}2.482$  and 55.173 respectively. However, from the Chi-square test, exchange rate ( $p = 0.449$ ) and government net debt ( $p = 0.619$ ) have no significant association with bank stability.

## 4.3. Effect of Firm Specific Determinant on Bank Stability

This section focused on research objective one: "Determine the effect of firm specific determinant on bank stability of banks in Ghana. To do this, this study first performed the Pairwise correlation between firm specific determinant and bank stability of banks in Ghana, and the results are shown in Table 3.

Table 2. Summary Statistics and Chi-Square Test for Association between Bank Stability and Macroeconomic Variables

Variables	Mean	Std. Dev	Min	Max	p-value for Chi-square
Inflation	13.184	3.852	8.58	17.7	0.000**
Gross Domestic Product growth rate	5.782	3.166	3.49	14.05	0.000**
Exchange rate (cedi to dollar rate)	2.482	0.889	1.47	3.75	0.449
Bank rate	18.060	4.874	12.5	26	0.036*
Government net debt	55.173	11.864	38.76	70.94	0.619

Source: Data From World Development Indicators; Bank of Ghana Website; \*\* significant at 1%; \* significant at 5%.

Table 3. Correlation coefficient Matrix for firm specific determinants and bank stability

	Bank stab	Firmz	FirmG	Tang	Intcov	EPS	Netprofit
Bank stab	1.000						
Firmz	0.653*	1.000					
FirmG	-0.102	0.237*	1.000				
Tang	0.288*	-0.022	-0.280*	1.000			
Intcov	0.043	0.509*	0.365*	-0.664*	1.000		
EPS	0.019	0.366*	0.111	-0.349*	0.623*	1.000	
Netprofit	-0.042	-0.093	-0.062	0.441*	-0.587*	-0.469*	1.000

Source: Data from the Selected Banks, Where; bank stab=bank stability, Firmz= firm size, FirmG= firm growth, Tang= tangibility, Intcov.= interest cover, EPS= earnings per share and Netprofit= net profit margin \*Significant at 5 %.

For Table 3, firm specific determinant such as firm size and tangibility are positively correlated with bank stability at 5% significant level. This means that as firm specific determinants such as firm size and tangibility increases, bank stability significantly increases. On the other hand, when firm specific determinants such as firm size and tangibility decrease, bank stability significantly decreases.

This study estimated both fixed and random effect models for firm specific determinants on bank stability. This study then performed Hausman Specification test to choose between FEM and REM model, and the test results are shown in Table 4.

From Table 4, the study accepts the null hypothesis which says that random effect model is appropriate for the data. This is because the Hausman specification test produces Chi-square value of 4.92 with p-value of 0.619. The p-value is more than 5% (0.005); hence the null hypothesis is accepted. The study then relied on random effect model for the estimation of the firm-specific determinants of bank stability. To take off any possible heteroskedascitiy, the study ensured that the standard errors were robust. The random effect model results for firm-specific determinants of bank stability is summarized in Table 5.

From Table 5, firm size has a significant positive effect on bank stability in the selected banks in Ghana at a significance level of 5%. The results show that a unit increase in firm size significantly increases bank stability in the selected banks in Ghana by 96.83098. The result is consistent with the findings of [30] study on the effects of bank capitalization on liquidity of commercial banks in

Kenya. This study however contradicts [18] findings in USA that bank size and bank stability are inversely related.

Table 5 further shows that net profit margin has a positive significant effect on banks stability at 5% significant level. Thus, a unit increase in net profit margin significantly increases bank stability by 74.03886 units. On the other hand, a unit decrease in net profit significantly decreases bank stability by 74.038 units. Bank size and net profit margin mostly move together. [32] found a positive relationship between firm size and profitability. This is because banks that have large asset and are able to effectively utilize the assets, have higher net profit margins. [21] explained that asset holding matters, but its utilization matters most. In essence, if a bank is not able to utilize its assets to generate revenues, then it cannot remain stable in the long run as liabilities and other obligations will have to be met as and when they continue to mature.

However, interest cover has a negative significant effect on banks stability at 5% significant level. From Table 5, a unit increase in interest cover significantly decreases bank stability by 31.93509 units. On the other hand, a unit decrease in interest cover significantly increases banks' stability by 31.935.

Table 5 shows that earnings per share and bank growth have no significant influence on banks' stability at 5% significant level. From Table 5, the overall R-square of 0.6396 shows that explanatory variables used in this study explained 63.96 % of the variation in bank stability. The model as a whole is statistically fit for predicting the firm specific determinant on bank stability in the selected bank in Ghana (Wald  $\chi^2=129.56$ ;  $p=0.000$ ).

**Table 4. Hausman Specification test for Firm-specific Determinants of Bank Stability**

Bank Stability	Coefficients			(b-B) Difference	Sqrt (diag(V_b-V_B)) S.E.
	(b) fe1	(B) Re1			
TANG	66.944	30.366		36.577	24.517
INTCOV	-5.692	-31.935		26.242	14.503
EPS	-0.2855	-0.216		-0.069	0.997
NPM	-72.529	-74.038		1.509	9.753
FIRMSZ	77.373	96.830		-19.457	12.029
FIRMG	-0.463	-0.579		0.115	0.080
chi2(6) =			4.42	b-B)/[(V_b-V_B)^(-1)](b-B)	
Prob>chi2 =				0.6196	

**Table 5. Effects of Firm Specific Determinants on Bank Stability**

Bank Stability	Coef.	Robust Std. Err.	Z	P>  z	(95% Conf. Interval)	
Tang	30.366	19.063	1.59	0.111	-6.996	67.730
Intcov.	-31.935	12.688	-2.52	0.012	-56.803	-7.066
EPS	-0.216	0.111	-1.94	0.053	-0.435	0.002
Firm G.	0.579	0.337	1.72	0.086	0.284	6.792
FirmZ	96.830	10.071	9.61	0.000	77.090	116.571
Netprofit.	74.038	3.696	20.03	0.000	-1.241	0.082
C	-973.965	345.994	-2.81	0.005	-1652.102	-295.828
No. of obs.				80		
No. of groups				8		
Wald chi <sup>2</sup> (5)				129.56		
p-value				0.000		
r-sq. within				0.546		
between				0.953		
overall				0.639		

Source: Data from the Selected Banks, Where; bank stab=bank stability, Firmz= firm size, FirmG= firm growth, Tang= tangibility, Intcov.= interest cover, EPS= earnings per share and Netprofit= net profit margin \*Significant at 5%.

The study further performed a post-diagnostic test on the estimated model. The tests include normality test, and serial correlation test via Wooldridge test. The results are summarized in Table 6.

**Table 6. Model Diagnostics Tests For Firm-specific Determinants of Bank Stability**

Diagnostic	Statistics	P-value
Normality	6.211	0.301
Serial correlation	2.015	0.331

Table 6 shows that there is no normality problem and serial correlation problem, hence, the result produced by the random effect model for firm-specific determinants for banks' stability is reliable and valid.

#### 4.4. Effects of Board Specific Determinants on Bank Stability

This section focused on research objective two: "Explore the effect of Board-specific determinants on bank stability of selected banks in Ghana. To do this, this study first performed the Pairwise correlation between board-specific determinant and bank stability, and the results are shown in Table 7.

From Table 7, bank-specific determinants such as gender of CEO and board size have a weak positive

correlation with bank stability, and the correlations are statistically significant at 5% significant level. This means that as banks have more male CEOs and board size increases, bank stability weakly increases; and this increase is significant at 5% significance level. On the other hand, as banks have more female CEOs and board size decreases, bank stability significantly decreases slightly at 5% significance level.

This study estimated both fixed and random effects models for board characteristics determinants on bank stability. To choose between the fixed effect model and random effect model, the study performed a Hausman Specification test, and the results are shown in Table 8.

From Table 8, the study rejects the null hypothesis which says that random effect model is appropriate for the data; which is in favour of the alternative hypothesis. This is because the Hausman specification test produces a Chi-square value of 64.06 with p-value of 0.000. The p-value is less than 5% (0.005); hence, the null hypothesis is rejected in favour of alternative hypothesis. The study then relied on fixed effect model for the estimation of the board characteristics determinants of bank stability. To overcome any possible heteroskedascity, the study ensured that the standard errors are robust. The fixed effect model (with robust standard errors) are reported in Table 9.

**Table 7. Pairwise Correlation between Board Specific Determinants and Bank Stability**

	Bankstab	CEOduality	GENRCEO	BOARDSI	FREQMET
Bankstab	1.000				
CEOduality	0.055	1.000			
GENRCEO	0.324*	-0.167	1.000		
BOARDSI	0.245*	0.113	-0.005	1.000	
FREQMET	0.141	0.025	-0.046	0.154	1.000

Source: Data from the Selected Banks, Where; bank stab=bank stability, CEOduality= CEO duality, GENRCEO= gender of CEO, BOARDSI= board size, FREQMET. = frequency of board meeting \*Significant at 5 %.

**Table 8. Hausman Specific Test for Board Characteristics Determinants of Bank Stability**

Bank Stability	Coefficients		(b-B) Difference	Sqrt (diag(V_b-V_B)) S.E.
	(b) fe	(B) Re		
CEOduality	18.068	11.050	7.018	.
GENDRCEO	80.248	45.119	35.128	4.284
BORDSIZE	5.370	6.356	-0.986	.
FREQUENCY OF BOARD MEETING	10.331	7.479	2.851	.
chi2(4) =			64.06	
Prob>chi2 =			0.000	

**Table 9. Board Characteristics Determinants of Bank Stability**

Bank Stability	Coef.	Robust Std. Err.	T	P>  t	(95% Conf. Interval)	
CEOduality	18.068	20.607	0.88	0.410	-30.659	66.796
GENDRCEO	80.248	21.062	3.81	0.007*	30.442	130.053
BOARDZ	5.370	1.9160	2.80	0.026*	0.840	9.901
FREQMET	10.331	3.421	3.02	0.019*	2.241	18.421
C	-84.495	38.127	-2.22	0.062	-174.651	5.661
No. of obs.				80		
No. of groups				8		
F stats				16.89		
p-value				0.001		
r-sq. within				0.374		
between				0.003		
overall				0.174		

Source: Data from the Selected Banks, Where; bank stab=bank stability, CEOduality= CEO duality, GENRCEO= gender of CEO, BOARDZ= board size, FREQMET.=frequency of board meeting \*Significant at 5 %

From Table 9, gender of CEO, board size and frequency of board meeting have a significant positive effect on bank stability, with a coefficient of 80.24808, 5.37089 and 10.331 respectively at 5% significance level. This implies that a unit increase in board specific determinants such as gender of CEO, board size and frequency of board meeting significantly increase bank stability in the selected banks in Ghana by 80.248, 5.370 and 10.331 respectively.

This finding on the board characteristics determinants of banks' stability is consistent with some previous studies. For example, [33] conducted an investigation that was focused on the impact flow of bigger board size on the financial performance of firms in Nigeria and found that bigger board size significantly improves financial performance, and this leads to higher bank stability.

However, CEO duality as an indicator for board specific determinant does not significantly have an effect on the stability of the selected banks in Ghana. This finding contradicts the agency theory and empirical study by [34]. According to [34], a single person holding the positions of CEO and Chairman cannot monitor and supervise the organization well. In addition, a person being head of the board and operations is not a good sign, keeping in mind the principles of corporate governance. They further suggest the agency problem increases when a single person holds both of these delicate roles. Therefore, dual leadership firm may lack proper direction, leading to a lower bank stability.

Table 9 shows that the overall R-square of 0.174 shows that explanatory variables used in this study explained 17.44 % of the variation in bank stability. The model as a whole is statistically fit for predicting the board specific determinants of bank stability in the selected bank in Ghana (F stats =16.89; p= 0.011).

The post-diagnostic test on the estimated model for board characteristics determinants of bank stability is

shown in Table 10. The post-diagnostic test included normality test, and serial correlation test with Wooldridge.

**Table 10. Model Diagnostics Tests For Firm-specific Determinants of Bank Stability**

Diagnostic	Statistics	P-value
Normality	5.018	0.417
Serial correlation	3.382	0.210

The post-diagnostic test in Table 10 shows that there is no normality problem and serial correlation problem. This is because p-value value for each test (normality and serial correlation) was more than 5%. Therefore, the estimated result for board characteristics determinants of banks stability is reliable and valid.

#### 4.6. Macroeconomic Determinants of Bank Stability

This section focused on research objective three: "Identify macroeconomic variables that determine the bank stability of selected banks in Ghana". To do this, this study first performed the Pairwise correlation between macroeconomic variables and bank stability, and the results are shown in Table 11.

From Table 11, bank stability has a significant negative relationship with inflation, exchange rate, bank rate and government debt. This implies that an increase in either inflation, exchange rate (cedi to dollar), and government debt significantly decreases bank stability. On the other hand, a decrease in inflation, exchange rate, and government debt significantly increases bank stability.

Table 11 however shows that bank stability and gross domestic product have a significant positive relationship. A rise in gross domestic product growth significantly increases bank stability. On the other hand, a fall in gross domestic product growth significantly reduces bank stability.

**Table 11. Pairwise Correlation between Macroeconomic Variables and Bank Stability**

	Bank stability	Inflation	Gross domestic product growth	Exchange rate	Bank rate	Government debt
Bank stability	1.000					
Inflation	-0.868*	1.000				
Gross domestic product growth	0.904*	-0.445*	1.000			
Exchange rate	-0.867*	0.459*	-0.416*	1.000		
Bank rate	-0.856*	0.420*	-0.426	0.488*	1.000	
Government debt	-0.905*	0.476*	-0.478	0.498*	0.470*	1.000

Source: World Development Indicators, 2018 and Bank of Ghana; \* Significant at 5%.

This study estimated both fixed and random effects models for macroeconomic determinants of bank stability. To do this, both fixed effect model and random effect models were estimated, and Hausman Specification test was performed to choose the most appropriate model. The Hausman Specific Test results are shown in Table 12.

**Table 12. Hausman Specification Test for Macroeconomic Determinants of Bank Stability**

Bank Stability	Coefficients		(b-B) Difference	Sqrt(diag(V_b-V_B)) S.E.
	(b) Fe	(B) Re		
INFLATION	0.5696	0.569	6.17e-14	1.54e-07
GDPCHG	0.807	0.807	7.52e-13	4.99e-07
EXCHANGERATE	-8.128	-8.128	-1.42e-11	0.00001
BoGPolicyR~e	0.972	0.972	1.00e-12	8.30e-07
Govtnetdeb~P	-0.028	-0.028	8.12e-13	4.53e-07
chi2(5) =			3.13	
Prob >chi <sup>2</sup>			0.676	

Table 12 shows that Hausman specification test produces a Chi-square value of 3.16 with p-value of 0.410. The p-value is more than 5% (0.005); hence, the null hypothesis is accepted. Therefore, a macroeconomic determinant of banks' stability is estimated with a random effect model. To overcome any possible heteroskedasticity, the study ensured that the standard errors are robust. The random effect models (with robust standard errors) are reported in Table 13.

From Table 13, inflation has a significant positive impact on banks stability in Ghana. A unit rise in inflation rate significantly increases bank stability by 0.569 unit. On the other hand, a unit fall in inflation rate significantly decreases bank stability by 0.569 units. High inflation rates cause high interest rates on loans and, thus, lead to higher income to commercial banks. [28] insinuates that "the effect of inflation on banking performance is much dependent on whether inflation is anticipated or unanticipated. An increase in the inflation rates is fully anticipated and changes are made to the interest rates justifiably, leads to a positive influence on the financial performance of commercial banks, thereby, leading to higher bank stability. The findings on the effect of inflation rate on bank stability suggest that banks in Ghana are able to anticipate and calculate future change in inflation. This helps the banks to fully plan for the future changes, thereby, helping to improve bank stability".

Table 13 shows that gross domestic product growth has a significant positive impact on bank stability. A unit rise in the growth of gross domestic product significantly increases bank stability by 0.807 units. On the other hand, a unit fall in the growth of gross domestic product significantly reduces bank stability by 0.807 units. [30] noted that "financial deepening and economic growth drive bank performance and bank stability". [31] added that "economic growth, measured by growth in gross domestic product, plays critical roles in the development of the financial sector of any economy. Economic growth leads to an increase in savings and investment which are coordinated by the financial sector of the country. This leads to stable financial sectors. This is because as economic growth increases, savings increases, and this

makes the banks more liquid, relieving the banks from financial stress. Moreover, economic growth is characterised by massive investments which are financed by banks". This increases the return on asset of the banks and earnings, thereby, making the banks more stable [31].

From Table 13, bank rate has a significant negative impact on bank stability. A unit increase in bank rate leads to a significant fall in bank stability by 0.972 units. On the other hand, a unit fall in bank rate leads to a significant rise in bank stability by 0.972 units. The finding is consistent with some previous studies. For example, [25] found in "commercial banks in Kenya that interest rate has a strong negative relationship with bank stability". [26] posited in his research that "the central bank rate, cash reserve ratio, open market operation and uncertainty are all caused by possible outcomes or results due to changes that emanate in monetary policies aimed at controlling inflation and interest rates. This in turn affects the lending behaviour of the banks by commercial banks. The more they disburse loans, the more they face credit risks which have the potential to collapse the commercial banks all together. [27] noted that "the negative effect of bank rate on bank stability is stronger in smaller banks than in larger banks". "This therefore means that smaller banks may have challenges of maintaining stability when bank rate is rising.

However, exchange rate and government net debt do not have a significant impact on bank stability. This contradicts some previous studies. For example, [29] explained that "unanticipated foreign exchange gains/losses affected the net income of listed companies. Exchange rate can affect bank performance both directly and indirectly. The direct effect is easy to identify and can be easily managed. However, the indirect effect of exchange rate on the profitability of commercial banks is very subtle. [17] noted that exchange rate has a statistically significant negative effect on the profitability of commercial banks and bank stability.

The post-diagnostic test on the estimated model for macroeconomic determinants of bank stability is shown in Table 14. The post-diagnostic test included normality test and serial correlation test with Wooldridge.

Table 13. Macroeconomic Determinants of Bank Stability

	Coef.	Robust Std. Err.	Z	P> z	(95% Conf. Interval)	Interval
INFL	0.569	0.119	4.77	0.000**	0.335	0.803
GDPG	0.807	0.307	2.63	0.009*	0.204	1.409
EXCHR	-8.128	5.492	-1.48	0.139	-18.893	2.635
BANKR	0.972	0.479	2.03	0.042*	0.033	1.911
GOVB	-0.028	0.251	-0.11	0.902	-0.522	0.464
CONSTANT	-0.863	11.907	-0.07	0.942	24.203	22.475
No- obs				80		
No. of groups				8		
R-sq: within				= 0.000		
between				= 0.000		
overall				= 0.885		
wald chi2(3)				405.53		
prob> chi2				0.000		

Source: Data from the Selected Banks, Dependent Variable= bank stability, INFL= inflation rate; GDPG= gross domestic product growth; EXCHR= exchange rate (cedi- to -dollar rate); BANKR= bank rate; GOVB= government net debt; \*\* significant at 1% and \*Significant at 5%.

**Table 14. Model Diagnostics Tests for Firm-specific Determinants of Bank Stability**

Diagnostic	Statistics	P-value
Normality	2.718	0.427
Serial correlation	3.190	0.240

The post-diagnostic test in Table 14 shows that there is no normality problem and serial correlation problem. This is because the p-value value for each test (normality and serial correlation) was more than 5%. Therefore, the estimated result for macroeconomic determinants of banks stability is reliable and valid.

## 5. Conclusion and Policy Recommendations

From the study, firm size has a significant positive effect on bank stability in the selected banks in Ghana at a significance level of 5%. The study further found that the net profit margin has a positive significant effect on banks' stability at 5% significance level. However, interest cover has a negative significant effect on banks' stability at 5% significance level. The study found out that earnings per share and bank growth have no significant influence on banks' stability at 5% significance level.

This study found that gender of CEO, board size, and frequencies of board meeting have a significant positive effect on bank stability at 5% significance level. However, the study observed that CEO duality as an indicator for board specific determinant does not significantly have influence on banks stability of the selected banks in Ghana at 5% significance level. This study found out that inflation and growth of gross domestic product have a significant positive impact on banks' stability in Ghana at 5% significance level. However, bank rate has a significant negative impact on bank stability. This study revealed that exchange rate and government net debt do not have a significant impact on bank stability at 5% significance level.

The explanatory variables were grouped into three as firm-specific determinants, board characteristics determinants and macroeconomic determinants. Based on the findings, the following conclusions are made: With regard to firm-specific variables, this study concludes that firm size and net profit margin significantly improve bank stability. Therefore, as banks become larger and are able to optimize the use of assets, the return on asset of the banks increases, leading to higher net profit margin; this in turn leads to higher bank stability over a long period. This study concludes further that interest cover has a negative significant effect on banks stability at 5% significance level. Though earnings per share and bank growth are important features of banks, they do not significantly influence bank stability in Ghana. With regard to board characteristics, this study concludes that having a male CEO, a reasonably large board size, and frequent board meetings significantly improves bank stability. Board of directors are the overseers of the banks, and active participation in an efficient and effective manner help minimize risks such as credit risk, operational risk and financial risk; thereby helping to improve performance

and stability of the banks. However, CEO duality as an indicator for board specific variable does not significantly have influence on banks stability of the selected banks in Ghana.

With regards to macroeconomic variables, this study concludes that anticipated inflation, and growth in gross domestic product help to improve bank stability. The study further concludes that a rise in bank rate (that is Bank of Ghana policy rate) reduces banks' stability in Ghana. Exchange rate (cedi to dollar rate) and government net debt do not have a significant impact on bank stability at 5% significance level.

This study, on the basis of the findings, makes recommendations to improve bank stability in Ghana. The recommendations are grouped into two as: recommendations for banks and recommendations for Government of Ghana.

This study recommends that commercial banks in Ghana should embark on reasonable expansion. Banks that do not have branches in some of the regions and regional capitals should strategically establish branches in those places to increase patronage of their services. Strategic expansion increases banks' assets, and this makes the banks more stable over a long period of time. The banks should ensure effective and efficient utilization of all banks' assets. This would help improve the profitability of the banks to ensure stability. One of the ways to ensure effective asset utilization is devising and implementing an effective credit risk management system. An effect implementation of a credit risk management system will help reduce loan default, thereby, helping to improve returns on loan assets. This will increase net profit margin and banks' stability. The banks should have reasonably large board sizes made up of different expertise. This expertise diversity will help to make the board more effective and efficient in the performance of their functions, thereby, helping to achieve the goals set for the banks. The shareholders of the banks should ensure that the board meets as often as possible to discuss matters relevant to the operation and growth of the bank.

Government of Ghana should consciously embark on accelerated economic growth in Ghana. For this to become a reality, the economic fundamental should be good. For example, bank rate (Bank of Ghana policy rate), inflation rate, and cedi to dollar rate should be favourable to economic growth and the developmental agenda of Ghana. In pursuing this, the banks stand to benefit either directly or indirectly, thereby making them stable, which in turn helps to sustain the growth and development of Ghana.

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