

# MACROECONOMIC INSTABILITY AND BANKS LENDING BEHAVIOUR IN GHANA

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## Abstract

This study aims primarily at investigating the impact of macroeconomic instability on banking sector lending behaviour in Ghana using data on commercial banks and macroeconomic instability from 1992 to 2009. My results under the Co-integration and Vector Error Correction Modeling framework show that bank lending has a long-run relationship with macroeconomic instability. The study therefore, recommends that while banks should pay adequate attention to the consequences of their firm specific characteristics in their lending activities both in the short-run and long-run, their worries about macroeconomic instability should be limited to the long-run consequences on their lending behaviour. It is also pertinent that appropriate measures be taken to curtail inflation and sporadic money supply growth making banks become unfavourably disposed to lending given the attendant negative consequences of loan curtailment on economic growth in the long run.

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**Keywords:** Ghana, macroeconomics, instability, banks, behaviour

## Introduction

The are fundamental economic roles banks are expected to perform, especially that of acting as financial intermediaries and facilitating the payment system for the purpose of ensuring an efficient allocation of the deposits in their custody. Banks typically make out loans in order to generate income and make the bulk of their income from the spread between lending and deposit rates relative to the volume of loans granted. The volume of loans granted by a bank in a year may be a function of its internal characteristics such as size, deposit base, liquidity, credit policy and other internal factors, all of which may be said to fall though relatively, within the control of the bank. Though such policies are internal, they, however, to a large extent mimic the general macroeconomic environment, such that the general loan behaviours of most banks will be a reflection of the signals from the aggregate economy.

Expectedly, if they perceive a stable macro environment they form an expectation that the borrowers will be able pay back because of their ability to predict the economy more accurately and possibly earn a good return on their investment projects. Therefore, since banks do not operate in a vacuum, their overall lending behaviour may generally be influenced by the environmental factors particularly the regulatory and macroeconomic factors. The regulatory environment is more stringent and must be observed but the economic environment is perhaps the more challenging since it affords them the opportunity to exercise their discretion at least relatively, in a manner that will impact positively on their business in the long run. The economic environment is a systematic risk component that affects every participant within the economy. The general performance of the economy is reflected by the macroeconomic aggregates including the gross domestic product (GDP), employment level, industrial capacity utilization, inflation, money supply and exchange rate. Banks therefore adjust their lending behaviour in response to the signals from these factors, such that positive signals make banks become more favourably disposed to lending and vice versa. Bank loan portfolio including volume, tenor and structure may be generally influenced by their expectations of the performance of economy both in terms of stability and quantum/level of performance. As indicated by Talavera, Tsapin and Zholud (2006) banks make out more loans during periods of boom and reduced level of macroeconomic uncertainty and curtail lending when the economy is in recession.

This type of proposition in Ghana has however remained relatively not well researched while the country has witnessed series of macroeconomic instability in the last two decades. For instance, the inflation rate rose from an annual average of 34.96 per cent between 1992 to 1996 to an average of 48.92 per cent from 1997 to 1999 while the economy grew in real terms at an average of 5.99 per cent and 1.53 per cent respectively. The performance of the cedi exchange rate has also been very poor with an average exchange rate of  $\text{¢}5000 / \$$  between 1999 and 2002 reaching an annual average of  $\$99.15 / \$$  between 2003 and 2006, an average depreciation of 34.65 per cent under two decades. All these and other factors peculiar to individual banks have jointly influenced the behaviour and performances of the banking industry as they try to adjust to the vagaries of the macroeconomic environment. Olaniyan (2000) has indicated that inflation and its variability are part of the important indicators of macroeconomic instability with significant negative impact on investment.

This study sets out to investigate specifically, whether instability in the macroeconomic environment impacts positively or otherwise on the lending behaviour of the Ghanaian banking sector. As observed by Baum, Caglayan and Ozkan (2005) a very limited attention has been paid to the area

of study even in the developed economies. It is therefore pertinent that some empirical evidence is provided on Ghana. I intend to evaluate the long-run lending behaviour of Ghanaian banking industry in the midst of macroeconomic instability. It is thus expected that an understanding of how banks adjust their credit behaviour in the face of volatile environment will guide bank credit policy formulations and an appropriate guidance for macroeconomic policy makers.

### **Literature Review**

Olaniyan (2000) in his study of the effects of instability on aggregate investment in Nigeria showed that inflation and the variability of inflation rate are part of the important indicators of macroeconomic instability in Nigeria. The study showed that inflation has a negative and significant impact on investment in Nigeria and therefore advocates that appropriate measures be taken not only to stem the trend of rising inflation but also its variability. Kishan and Opiela (2000) found that lending by banks with a low capital ratio seems to react more strongly to monetary policy shocks. Generally, if bank equity is low, the monetary policy effects on lending via the bank capital channel may be weak initially, but will be much larger after several quarters.

Beaudry et al. (2001) investigated the impact of aggregate price uncertainty on the time-variation in cross sectional distribution of investment at the aggregate and industry level using United Kingdom (UK) firm level data. They found that the cross-sectional distribution of investment narrows—implying more homogeneous investment behaviours across firms during times of uncertainty. Whereas, a reduction in inflation uncertainty leads to a widening dispersion as higher –quality information allows firms to invest in projects with deferring expected returns. Impliedly the study confirmed that inflation uncertainty hinders efficient allocation of resources. Micco and Panizza(2004), tested how bank ownership affects bank lending behaviour over the business cycle in developed and developing countries and measured lending behaviour as the growth rate of loans by banks in each country. They found that loan growth is indeed correlated with macroeconomic shocks as measured by GDP growth. Specifically, a 1-percent increase (drop) in GDP is associated with a 1.46 per cent increase (drop) in lending by private domestic banks with a similar pattern exhibited by public banks. They also found that credit cyclicalities are much lower in industrialized countries than in developing countries (the elasticity goes from 1.4 to 0.5) and that the lending activity of state-owned banks located in industrial countries seems to be counter-cyclical.

Nier and Zicchino (2005) concluded that in economic downturns bank experience losses. An increased incidence of loan-loss provision may

eat into capital and result into bank capital requirements becoming binding in recessions. However, the cost of issuing new securities is high in time of recession as a result of more pronounced uncertainty about any banking firm and the economy as a whole. As a result when capital requirement becomes binding and banks are faced with the choice between issuing new capital and curtailing lending, banks may opt for the later. Gambacorta and Iannotti (2005) investigated the velocity and asymmetry in response of bank interest rates (lending, deposit, and inter-bank) to monetary policy shocks (changes) in Italy from 1985-2002 using an Asymmetric Vector Correction Model (AVECM) that allows for different behaviours in both the short-run and long-run .The study shows that the speed of adjustment of bank interest rate to monetary policy changes increased significantly after the introduction of the 1993 Banking Law, interest rate adjustment in response to positive and negative shocks are asymmetric in the short run , with the idea that in the long- run the equilibrium is unique. They also found that banks adjust their loan (deposit) prices at a faster rate during period of monetary tightening (easing).

De Young, Gron, and Winton (2005) examined factors influencing debt overhang in the US small banks (banks with assets less than \$1billion) and found a support for the loan-supply motivations for the pro-cyclic nature of bank lending. During an economic expansion demand for lending is high and business profitability is good, resulting in more profitable loans, more bank capital, and an expanding credit environment in which banks lend more at lower rates as they compete for business. As the economy slows, some businesses will suffer lower income or even losses, leading to delinquent loan payments or outright default, reductions in bank capital, and a tighter credit environment as banks make fewer loans at higher rates. Their findings also indicate that risk overhang effects from outstanding loans work to decrease loan supply during a recession even more than would be implied by the reduction in bank capital alone.

Much of the empirical literature on bank capital and lending stems from the debate over whether implementation of the 1988 Basle Accord's capital requirements caused a "credit crunch" in the U.S. In general, these studies relate overall or sectoral loan growth to capital measures and other controls.) While this literature yields no consensus on the relationship between capital and loan supply, Sharpe (1995) as cited by De Young et al. (2005 identifies two robust results across studies: (i)bank profitability has a positive effect on loan growth, and (ii) loan losses have the opposite effect. Since profits (loan losses) tend to increase (decrease) bank capital, these findings are consistent with a positive association between bank capital and loan growth. In another study, Beatty and Gron (2001) found evidence suggesting that banks with higher capital growth relative to assets have

greater increases in their loan portfolios, with the most significant effects coming from the most capital- constrained banks.

Van den Heuvel (2005) argued that monetary policy affects bank lending through two channels. According to the thesis of the bank lending channel, monetary policy has a direct effect on the supply of bank loans, and thus the real economy, because banks finance loans in part with liabilities that carry reserve requirements. By lowering bank reserves, contractionary monetary policy reduces the extent to which banks can accept reservable deposits, if reserve requirements are binding. The decrease in reservable liabilities will, in turn, lead banks to reduce lending, if they cannot easily switch to alternative forms of finance or liquidate assets other than loans.

Another approach is the capital-adequacy regulations and an imperfect market for bank equity, is the maturity transformation performed by banks, exposing them to interest rate risk. A consequence of this is that a monetary tightening, by raising the short-term interest rate, lowers bank profits. Unless the bank can reduce dividends substantially, this will result over time in lower bank capital and, given the failure of the Modigliani-Miller logic, less lending. Thus, monetary policy affects the supply of bank loans through its effect on bank equity.

Baum, Caglayan and Ozkan (2005) studied the behaviour of US banks using quarterly data from 1979- 2003, Q3 in response to macroeconomic uncertainty. They found that bank loans constituted about 55% of bank total assets. They measured bank lending behaviour as the dispersion of banks' loans to total assets ratio around their mean values using standard deviation as a measure of cross-sectional dispersion of bank loans. The conditional variance in quarterly industrial production, and CPI-inflation were used as measures of macroeconomic instability. They found that one-year cumulative effect of a 100 per cent increase in uncertainty, captured by the conditional variance of industrial production (IP) and inflation (CPI) leads to somewhere between a 9-11 per cent (5-7%) reduction in the dispersion of bank loans-to-asset ratio for total loans, real estate loans and household loans. This finding supports the view that macroeconomic uncertainty distorts the efficient allocation of funds across potential borrowers.

Talavera, Tsapin and Zholud (2006) investigated the macroeconomic uncertainty and bank lending in Ukraine. They found a negative relationship between bank loan to capital ratio and macroeconomic uncertainty as proxy by the conditional variance of consumer or producer inflation or volatility in money supply (M1 and M2) and its component (demand and time deposit) with banks increasing their lending ratios when macroeconomic uncertainty decreases. The reaction of banks to changes in uncertainty is not uniform and depends on bank-specific characteristics particularly bank size and

profitability. For the bank-specific factors, changes in monetary aggregates which can be related to macroeconomic policies are relatively more important for large banks than for small banks counterparts. This shows that small banks are less able to change their behaviour over time in response to changes in monetary policy and their lending depends to a much greater extent on capital. Also, monetary policy uncertainty factor is significant for bank lending behaviour in the case of more profitable banks but less significant for the less profitable.

## **Methodology**

### ***Data Sources***

The data for the study are time series figures for the quoted commercial banks operating in Ghana from 1992 to 2009 and the corresponding macroeconomic variables as obtained from the publications of the Bank of Ghana Statistical Bulletin. The data on bank lending activities and other bank characteristics are obtained from the annual published financial statements of the banks and by the Ghana Stock Exchange. The sampled commercial banks were limited to all the commercial banks whose financial data are published annually. Public quotation of banks was not very popular until the adoption of the privatization policy in 1990's; this informed the starting point of our data collection. However, my analysis reveals that the sampled quoted commercial banks represented on the average about 60 per cent in terms of assets of the Ghanaian banking (commercial) industry for the period covered. The data in respect of each variable were collected on the banks in each year and the mean values of the variables takes as representative values for the industry for the year.

### ***Model Specification***

Generally, bank lending will be influenced jointly by factors peculiar to each bank, the banking industry and their perception about the economy both in the present and the future. This condition and the expectation can therefore be modeled as:

$$L/A_{it} = \beta_i X_{it} + \theta_i V_{it}$$

where:

$L/A_{it}$  - the loan to asset ratio of bank i, at time t

$X$  - is a vector of bank specific factors used as control variables and decomposed into:

$D/K$  - bank's deposit to capital ratio of bank i at time t

$L/K$  - Loan to capital to capital ratio of bank i at time t

$A$  - Natural log of bank's own assets at time t

$\Pi/K$  - Bank's net profit to capital ratio at time t

$LP/L$  - Loan loss provision to total loan ratio at time t.

$\beta_{is}$  - The parameters of bank specific factors to be estimated.

$\Theta_{is}$  - The parameters of macroeconomic volatility factors to be estimated. The parameters measure sensitivity of bank lending to the volatility of the macroeconomic factors. The sensitivity of bank lending as indicated by  $\Theta$  to each macroeconomic uncertainty variable is the focus of this study.

$V$  – is a vector of macroeconomic volatility indicators.

This model has been adapted from the work of Baum, Caglayan and Ozkan (2005), but the lending behaviour in the present study has been measured using the loan/asset ratio rather than the standard deviations of banks' quarterly loan data as in their work. Their method is more suitable when a high frequency data series is utilized whereas available data in the Ghanaian case are annual.

### ***Justifications for the Variables***

It is pertinent that our dependent and explanatory variables would need to be justified to show their relevance in our study. I justify them as follows:

$L/A$  – the dependent variable, is the bank's loan to asset ratio. It is intended to measure the lending behaviour of the bank because it indicates the proportion of the bank's assets represented by loans which should naturally constitute the major earning asset of banks. However, this ratio is expected to vary from time to time for each bank and across the industry depending on factors that are bank specific and those that are systematic especially the macroeconomic factors.

$D/K$  – the deposit represents the main source of funding for a bank and acts as an additional source of liquidity that the cash assets and securities cannot provide. The ratio of bank deposit to capital shows the extent of to which a bank relies on customers' deposit. The higher this ratio is the greater the capacity of the banks to offer loans. This is denoted as DTK

$L/K$  – Banks would normally determine their optimal loan to capital ratio within the framework specified by the central bank guideline. This ratio is a measure of risk and indicates the level of bank equity exposed to credit risk. Generally banks with high equity capital have greater latitudes to make huge amount of loans as they are not under serious pressure especially under capital constraint/ regulation. Denoted as LTK

$A$  – The bank's total assets. Banks with large asset base are expected to have the capacity to make out larger loans with strong ability to accommodate credit risk. They are likely to have well diversified loan portfolio and more favourably disposed to lending.

$II/K$  – This is a measure of profitability of the bank operations. It is derived as the ratio of the bank's operating income to total asset i.e the return on asset and denoted as ROA or ROE if the denominator is bank capital instead

of assets. Profitable banks are expected to be more favourably disposed to lending and thus have high loan-to-asset ratio.

### ***Macroeconomic uncertainty is proxied at two levels***

I measure the macroeconomic variables as follows:

- i. Monetary factors (measured by: the broad money supply (M2) and exchange rate of the naira to the US dollar).
- ii. Price level changes (measured by the annual inflation rate.)

These proxies are in line with the suggestions of Satyanath and Subramanian (2004), the works of Beaudry, Caglayan and Schiaterelli (2001) and Olaniyan(2000). The level of uncertainty of each factor is derived as the percentage annual changes over its previous year's level. This is what the banker cannot determine ahead, but believes that such changes play a major role in the success or profitability of his/her credit extension in any particular year. Thus, I present main model explicitly as follows:

$$L/A_{it} = \alpha + \beta_1(D/K_{it}) + \beta_2(L/K_{it}) + \beta_3(\Pi/K_{it}) + \beta_4(A_{it}) + \Theta_i V_{t-1}$$

The *a priori* expectations are stated as:

$$(\Delta L/A_i / \Delta X_i) = \beta_1, \beta_2, \beta_3, \beta_4 > 0 \text{ and } \beta_5, \Theta_i < 0$$

Where  $X_i$  represents the individual independent variables.

The main model will be decomposed into three and estimated based on the proxy for each macroeconomic instability denoted as Model 1, 2 and 3

### ***Estimation Technique***

Data analysis covers a test for stationarity (unit root test) using the Augmented Dickey-Fuller (ADF) and Phillip Perron (PP) tests which are conventional in most time series studies. I also adopt the vector-autoregression (VAR) framework and evaluate the existence of a long-run relationship using the co-integration test. The co-integration analysis will enable me to establish if there is any equilibrium (long-run) relationship between the bank lending behaviour and the anticipated macroeconomic behaviours. I adopted the multivariate Error Correction Model (ECM) to enable me distinguish between equilibrium and dynamic adjustment to equilibrium. Patterson (2000) has indicated that this is just a reparameterisation of a VAR.

I noted that if the variables are stationary, then simple OLS stationary model may be adequate to explain the relationship. If the variable are however, found to be integrated that is I(d), then it becomes necessary to determine whether the model is co-integrating and hence may have an error correction specification. Following Engle and Granger (1987) who pointed out that a linear combination of two or more non-stationary (with unit root) series may become stationary or I(0) thus such linear combinations are said



to be co-integrated. The stationary linear combination may be interpreted as long-run equilibrium relationship between the variables. A multivariate analysis of this type will require co-integration and error correction which follows the Johansen (1995) vector autoregression (VAR) framework. This methodology has been developed based on Engel-Granger Representation Theorem, which states that if two series are co-integrated, then they are most efficiently represented by an error correction specification. It also implies that if the series are co-integrated and error correction specification is validated, then the model encompasses any other specification, including partial adjustment model (Nkurunziza, 2000).

## Results

### *Descriptive Statistics of Bank Characteristics in Ghana*

Table 4.1 presents the descriptive statistics of the Ghanaian banking industry characteristics from 1992 to 2009. The data were derived from the summary of the individual bank's yearly data of quoted banks on the Ghana Stock Exchange (GSE) for the period. The data were then aggregated for all the banks and the mean values derived over the banks for each year. The aggregate mean for all banks for each year were used to obtain the mean values of the banking industry characteristics over the eighteen – year period covered by the study presented in the above table. The Table shows that the average banking industry loan for the sampled period and GH¢9.899 million per annum. The average industry asset size was GH¢44.505 million was bank equity capital averaged GH¢3.908 million. The volume of industry average deposit mobilization was GH¢27.798 million. The average industry profit before tax was GH¢4.446 million, while profit after tax averaged GH¢0.989 million per annum.

Table 1: Average Annual Banking Industry Performance/Characteristics (1992-2009)

<b>Bank Characteristics</b>	<b>Mean(GH¢'million)</b>	<b>Maximum (GH¢'million)</b>	<b>Minimum (GH¢'million)</b>	<b>Coefficient of Variation (%)</b>
Loans	9,898.81	45,071.67	748.23	118.25
Assets	44,505.42	183,700.35	2,476.99	144.25
Capital	3,908.19	22,726.78	190.35	126.37
Deposit	27,797.74	111,153.28	1,858.58	3,832.09
Profit Before Tax	4,666.48	64,866.32	-181.45	323.36
Profit After Tax	835.70	3,832.09	-223.64	129.60

*Source: Authors' Computations*

It is important to note that the industry characteristic exhibited a very high degree of variability with the coefficient of variation ranging between 118.25 per cent in the case of loans to as high as 3,832.09 per cent. It is obvious that the industry had exhibited a high level of dispersion in the behaviour of the constituent banks over the period covered.

### ***Descriptive Statistics of Macroeconomic Instability Indicators***

Presented in table 4.2 is a summary of the basic indicators of the macroeconomic instability factors for 1992 to 2009. The average broad money growth was 28.87 per annum while inflation averaged 26.69 per cent. The average exchange rate was GH¢ 2.341/US Dollar. The factors can be considered relatively high especially when compared with the growth rate of the economy which averaged 4.43 per cent. These instability factors further exhibited very high level of variability as shown by the high values of the coefficient of variation ranging between 47.12 per cent and 76.19 per cent.

Table 2: Average Annual Macroeconomic Instability Indicators (1992-2009)

Macroeconomic Instability Indicator	Mean	Maximum	Minimum	Coefficient of Variation (%)
Broad Money Growth (%)	28.87	53.78	8.05	47.12
Inflation (%)	26.69	72.80	6.60	76.19
Exchange Rate(¢/\$)	69.10	137.00	4.54	71.39
GDP (%)	4.43	13.02	-0.81	76.56

Source: Authors computations

Further to this is the evidence from the fact that in a particular year the broad money and inflation rose by 53.68 and 72.80 per cent respectively while the exchange rate rose as high as ¢3400/US Dollar.

### ***Descriptive Statistics of Bank Performance Measurements in Ghana***

Table 3: Shows the performance measurement variables of the banking industry.

Bank Characteristics	Mean (%)	Maximum (%)	Minimum (%)	Coefficient of Variation (%)
LTA	23.51	36.95	13.44	25.05
LTK	286.84	490.48	198.32	23.63
LnA	9.84	7.81	7.81	14.93
DTK	849.44	1,042.00	516.00	1,672.23
ROE	14.41	54.78	-104.63	223.10
ROA	1.57	2.81	-7.33	151.36

LTA- Loan/Asset; ROA- Return on Asset; ROE- Return on Equity; DTK- Deposit/Capital; Loan/Capital; LnA- Natural log of Bank Asset(Bank Size)

From table 3, the average industry loan-asset ratio for the period was 23.51 per cent while loan- capital ratio was 286.84 per cent implying that bank loan was 186.84 per cent above the equity capital of the banking industry. The deposit-capital ratio was 849.44 per cent. The measures of bank profitability, that is return on equity and return on asset was 14.41 per cent and 1.57 per cent respectively.

### ***Results of Co-integration and Vector Error Correction Estimates***

The unit root tests confirmed that the series are integrated I(1) thus satisfying the initial assumption for co-integration analysis. The series are also trended and given this attribute , a co-integration test with trend and intercept was adopted and found to produce the best result based on the likelihood ratio.(see also Johanson and Juselius, 1992). The test confirmed that the series are co-integrated. Thus, it is concluded that there exists a long-run equilibrium relationship between bank lending and the other members of the series. The analysis extends further to the Vector Error Correction estimate to establish the short-run dynamics of bank lending behaviours and macroeconomic instability. We estimate three models for co- integration with all the models containing the same bank specific factors but different in terms of macroeconomic instability factors. Thus, model 1 contains money supply volatility, model 2 contains exchange rate, while model 3 contains inflation as a measure of macroeconomic instability. The summary of the statistical results of co-integration tests is presented in Table 4

Table 4: The Normalized Co-integrating Vectors /Long- Run Bank Lending Behaviour in Ghana

Variables	Model 1	Model 2	Model 3
LTA(-1)	1.0000	1.0000	1.0000
DTK(-1)	0.0361(6.7465)*	0.03474(5.0786)*	0.0176(7.3892)*
LnA(-1)	-53.9047(-8.9104)*	-32.6822(-5.7267)*	-30.6639(-15.6162)*
M2G(-1)	0.3957(11.4532)*		
EXR(-1)		-0.3418(-7.7735)*	
INF(-1)			0.0413(4.3943)*
Constant	311.6942	168.9413	176.1720
Trend	16.1589(9.1788)	13.0597(7.1151)	9.1081(15.9748)

*Note: Figures in brackets are the associated t-values of the estimates and “\*” denotes significant at 1per cent*

The variables that entered into the final long-run equilibrium analysis are loan/asset ratio, deposit/capital ratio, bank size, money supply growth rate, exchange rate and inflation. The other variables like return on asset/return on equity and loan-capital ratio were dropped in the estimation of the co-integration relationship because they had little or no explanatory

powers as revealed by the granger causality test. Dropping these variables improves the capacity for the long-run co-integration and Vector Error Correction Modelling (VECM) estimation arising from improvement in the degree of freedom. Also, it should be noted that though co-integration tests produced three co-integrating equations in each of the three models, only one of the equations is presented in respect of each model in the final analysis. The co-integrating equations explained here are those normalized on the loan-asset ratio, while the same also applies in the case of the VECM.

### ***Model 1-Long-run Bank Lending Behaviour and Money Supply Changes***

Model 1 incorporates the impact of changes in broad money supply as an indicator of macroeconomic instability on the long- run bank lending behaviour in Ghana and normalized on the loan-asset ratio. A 1% growth money supply leads to a corresponding 0.4 per cent reduction in bank lending. However, a similar 1 per cent increase in bank size brings about 54 per cent growth in bank lending. Also, a 1 per cent growth in deposit relative to bank capital makes bank to reduce their lending contrary to expectation (perhaps due to low bank capital) confirming the findings of Beatty and Gron (2001) that capital-constrained banks tend to experience reduced lending. It is thus, obvious that macroeconomic instability due to changes in money supply has a negative long- run impact on bank lending in Ghana. Specifically, banks tend to reduce lending during periods of high liquidity basically because of possible low return on lending (and possibly low loan demand) and perhaps have to channel their funds towards alternative sources of income earning activities and investments.

### ***Model 2 – Long-run Bank Lending Behaviour and Exchange Rate***

Model 2 shows the long-run equilibrium between bank lending behaviour and macroeconomic instability as proxied by the exchange rate. A 1% depreciation (increase in exchange rate) in the nominal exchange rate causes a 0.34 per cent growth in bank lending. This may be a product of demand pressure effect arising from increasing needs of firms for additional borrowing to meet additional naira required to meet payment for import of raw materials, machineries, and finished goods. A growth in the deposit-capital ratio significantly reduces banks desires to increase lending. However, increase in assets size of banks significantly leads to their willingness to lend as expected. Larger banks in Ghana have capacity to monitor lending and minimize the fear of credit risk and also pursue diversified lending. A plausible explanation for this may be that as Ghanaian banks increase in size they tend to pursue credit creation more aggressively and perhaps lend more profitably and thus greater desire to channel the benefit of asset growth towards credit creation.

**Model 3– Long-run Bank Lending Behaviour and Inflation.**

Model 3 is also normalized on the loan-asset ratio with inflation as the measure of macroeconomic instability. Inflation also exerts a negative and significant impact on bank lending behaviour. A 1 per cent growth in inflationary anticipation makes banks to reduce lending by 0.04 per cent. This further, confirms the finding of Olaniyan (2000) that inflation and inflationary variability had a negative and significant impact on investment in Ghana. It also shows that an increase in deposit-capital ratio significantly reduces bank lending growth. However, bank size has a positive and significant impact on bank lending possibly arising from diversified lending, capacity for good credit control and ability to identify good quality borrowers as bank size increases.

**Short-run Dynamics of Lending Behaviour and Macroeconomic Instability**

The short run dynamic specifications obtained with the VECM are presented in table 4.6. It shows the deviations of bank lending behaviour and the associated factors from their long- run position in each of the models. All the Error Correction terms (ECM) in the three models are negatively signed indicating that the system reverts to its long-run position for any deviation from the equilibrium.

Table 6: Short-run Vector Error Correction Model

Variables	Model 1 D(LTA)	Model 2 D(LTA)	Model 3 D(LTA)
D(LTA(-1)	0.6160(2.2258)*	0.4861(1.8102)**	0.4132(1.5286
D(DTK(-1)	0.0326(4.229)*	0.0299(4.0113)*	0.0257(3.3898)*
D(LnA(-1)	-6.9526(-1.0774)	-4.3447(-0.7441)	-5.2619(-0.8208)
D(M2G(-1)	0.1126(1.4471)		
D(EXR(-1)		-0.1272(-1.0644)	
D(INF(-1)			-0.0316(-0.4497)
Constant	2.5029(1.2558)	2.5916(1.2022)	1.5963(0.8022)
Ecm	-0.3940(-2.1875)	-0.1272(-1.0644)	-0.4813(2.0083)*
Adj. R <sup>2</sup>	0.5996	0.5989	0.5748
LR	-41.8859	-41.9009	
AIC	5.9858	5.9876	6.0459
SC	6.2754	6.2773	6.3357

*Note: Figures in brackets are the associated t-values of the estimates*

The regressors accounted for about 60 per cent (models 1 and 2) and 58 per cent (model 3) as indicated by the adjusted R<sup>2</sup> values of the VECM of the short-run lending behaviour of banks in Nigeria. These variables thus, jointly account for more than half of modifications of Nigerian banking industry lending activities in the short run. Also, almost 62 per cent , 49 per cent and 41 per cent of the misalignments in bank lending behaviours from the equilibrium position are corrected within the immediate period after they

the occurrence of the shocks in the presence of macroeconomic instability due to money supply (model 1) , exchange rate (model 2) and inflation (model 3) respectively. Specifically, evidence from the error correction (ECM) factors shows the speed of adjustment to equilibrium. It thus, becomes obvious that bank lending adjusts faster to long-run position in the presence of instability arising from the presence money supply (ECM of 0.62) than in the presence of instability due to exchange rate (ECM of 0.49) and inflation (ECM of 0.41) holding other factors constant.

I also present the short-run bank lending behaviour responses to short-run changes in its determinants as revealed by the VECM. The results suggest that response due to 1 per cent increase in deposit-capital ratio brings about a 0.03 per cent increase in bank lending in all the three models and are very significant. This response is considered to be very marginal but statistically and economically important. The implication is that in the short run it is easier for banks to improve their deposit-capital ratio (increasing bank leverage) through significant deposit derive than to think of reducing leverage (through raising of additional capital) and to also conform with the regulatory requirement for this ratio. However, shocks arising from bank size disproportionately affect bank lending in all cases because a 1 per cent increase in bank size makes to curtail lending by at least 4 per cent though it is not significant. Evidence from the response of bank lending to short run shocks due to macroeconomic instability shows that money supply growth stimulates a positive response. Whereas, shocks due to exchange rate and inflation are indicated as stimulating a reduced short run bank lending response.

It is important however, to note that no shock to any of the macroeconomic instability factors (money supply changes, exchange rate and inflation) was able to stimulate any significant response from the bank lending behaviours in Ghana in the short-run. A plausible argument is that these variables may be unobservable in the short-run especially where the official release of information on macroeconomic indicators is highly lagged, thus economic agents may not be able to incorporate them in their activities in the short-run.

### ***Short-run and Long-run Impact of Macroeconomic Instability on Lending***

Table 4.7 presents a summary of the short and long run responses of bank lending to macroeconomic instability factors as derived from the co-integrating equations and the vector error correction models. In the short run macroeconomic instability is not important in explaining bank lending behaviour but becomes very important in the long run. The implication is that in the short run, shocks due to macroeconomic instability are not

pronounced in bank lending but these shocks are incorporated in their lending behaviours in the long run.

Table 7: Long-run and Short run Impact of Macroeconomic Instability on Lending in Ghana

Time Dynamics	Macroeconomic Instability indicators		
	Money Supply	Exchange Rate	Inflation
Short run	+ ve ; insignificant	- ve ; insignificant	-ve ; insignificant
Long run	- ve; significant	+ ve; significant	- ve; significant

Thus, like most macroeconomic factors that are generally systematic and exact long- run impact on economic agents, the banking industry in Ghana considers adjusting their lending behaviours to the long-run impact of macroeconomic instability rather than the to the short run influences. More specifically, in the long run growth in money supply and inflation as expected makes banks to curtail lending while increase (depreciation) in exchange rate (GH¢/US\$) encourages banks to lend more. A one per cent increase (drop) in the volatility of money supply is associated with a 0.40 per cent drop (increase) in bank lending. In the same vein a one per cent increase (drop) in inflation leads to a 0.04 per cent drop (increase) in bank lending. This is in line with the findings of Talavera, Tsapin and Zholud (2006) in the case of Ukraine, who found that instabilities arising from volatilities in monetary policy factors due to money supply and inflation led to curtailment of bank lending. However, a one per cent increase (depreciation) in nominal exchange rate of GH¢/US\$ creates a 0.34 per cent growth in bank lending in the long run. It is also important to note that bank specific factors of deposit-capital ratio and bank size are both important in the long run whereas, only deposit-capital is also important in the short run bank size is not important in explaining bank lending behaviour in Ghana.

### Conclusion

The study sets out to investigate the impact of macroeconomic instability on the lending behaviours of commercial banks in Ghana. The data for the study were obtained from the published accounts of the publicly quoted commercial banks. The mean values of commercial bank characteristics for each year were utilized with the macroeconomic instability factors over the eighteen-year period. I adopted the econometric modeling techniques of co-integration and VECM for our analysis. The study shows that bank loans averaged 24 per cent of total asset of the banking industry per annum. With respect to macroeconomic instability, broad money grew on the average by 29 per cent and inflation grew by 27

per cent annually. The analysis of the time series properties of the data revealed that most of the series were integrated of order one I(1). Evidence from the co-integration and VECM analysis showed that bank lending has a long run relationship with macroeconomic instability in Ghana. Any deviation from the long run equilibrium has the tendency to adjust back to the equilibrium position. While increases in broad money supply and inflation induced banks to curtail lending, exchange rate depreciation induced the industry to increase lending in the long run. The deposit mobilization capacity of banks and bank size are the most important bank characteristics that explain their lending behaviour given the vagaries of the macroeconomic environment.

Therefore, the study concludes that banks in Ghana take a long-run perspective of the macroeconomic instability in modifying their lending behaviour. Also, they have both the short and long term view of the industry inherent characteristics in adjusting their lending behaviour. The study therefore recommends that (i) banks should monitor their deposit mobilization capacity and asset base because they have major implications on their lending behaviour both in the short and long run. (ii) Banks may only bother about the long-run implications of macroeconomic instability on their lending because it does not matter in the short-run. (iii) Macroeconomic policy makers should adopt measures aimed at controlling inflation and sporadic increases in money supply because of their negative impact on bank lending and (iv) the consequential deleterious effect of loan curtailment on investment and economic growth in the long-run.

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