

Macroeconomic Factors and the Performance of Loans of Commercial Banks in Ghana: A Case Study of HFC Bank

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Abstract

With the increasing rate of default of loans in the country, this study assessed the macroeconomic factors that influence loan performance of commercial banks in Ghana using HFC bank as a case study. The sample period used for the study was based on a quarterly data from 2008 to 2015. Using the ARDL bounds test of co-integration as an estimation technique, the results showed evidence of long run relationship among the variables. The results suggested that macroeconomic factors that influenced loan performance were inflation and T-bills. These therefore show that macroeconomic instabilities do have significant impact on loan performance. Hence, there is the need for policy makers to manage the economy well, embark on fiscal discipline and reduce government domestic borrowing to reduce Treasury bill rates in order to improve on loan performance.

Keywords: Loan performance, Treasury bill, Macroeconomic variables

1. Introduction

The financial sector plays certain key roles in economic growth by means of financial-intermediary-service provisions which includes savings mobilization, risk management, projects evaluation and facilitating transactions (Schumpeter, 1934). Channelling of funds from depositors (surplus units) to investors (deficit spending units) is a key role played by commercial banks. This is possible so long as commercial banks can generate enough income to cover operational cost incurred. Thus for sustainable intermediation to function well, there is the need for financial performance (profitable) in the banking industry.

A standardized and widely employed statistic measure of financial performance of a banking institution is the ratio of non-performing loans (NPLs) to total loans. This ratio is often used to evaluate and compare bank loans portfolio quality (Festic, Repina, and Kavkler, 2009; Mendoza and Terrones, 2008), to analyze banking sectors' efficiency (Podpiera, 2006; Lízal and Svejnar, 2002), to foretell forthcoming failures of banks (Jin, Kanagaretnam, and Lobo, 2011).

Keeton and Morris (1987) brought one of the first empirical studies on the subject of non-performing loans (NPLs) examining the causes of loan loss diversity of banks in USA. The study indicated that, part of the changes in loan losses was significantly due to differences in local economic situations and also owing to poor performance in industries such as agriculture and energy, with a minor part of the remaining variation in loan loss associated to bank-specific factors, such as banks intentionally embarking on greater risks and granting loans that knowingly have a high default probability. Many studies and findings consider non-performing loans (NPLs) as toxic with injurious effects on both economic development and social welfare (Zeng, 2011; Gonzales-Hermosillo, 1999; Barseghyan, 2010). Banks, according to Khemraj and Pasha (2009), must be circumspect in providing loans and take into consideration several factors in controlling the level of impaired loans.

Amuakwa-Mensah & Boakye-Adjei (2014) in their study found that both bank-specific factors (previous year's NPL, bank size, net interest margin and current year's loan growth) and macroeconomic factors (past inflation, real GDP, per capita growth and real effective exchange rate) significantly affect non-performing loans of large banks but not necessarily applicable in explaining NPLs for small banks in the banking industry. Individual bank level analysis for Ghana is lacking, in this regard, this study seeks to empirically investigate the determinants of loan performance of HFC Bank considering macroeconomic factors (external factors), so as to increase profitability.

2. Review of Related Literature

In recent times the banking system has experienced crisis and in both developed and developing countries and this can be attributed largely to the fall in the quality of loan portfolio. The numbers of loans that go bad continue to increase in the banking sector which generally results in bank failures. As these non-performing loans rises it may have a rippling effect on the economy as a whole and in the financial sector, leads the institution to difficulty and affects its ability to make profit. There is a positive relationship between NPL and banking crisis. Sorge (2004) explains and continues to argue that using NPL and loan losses provisions easily assess the excessively susceptible manner of the financial system.

Various literatures have explained the relationship between macroeconomic environment and the quality of loans in relation to the business cycle and banking stability. In a situation where the economy is expanding, it is obvious that the number of bad loans is relatively small since consumers and institutions have enough revenue to fulfil their obligations of repayment in due time. As the economy continues to expand then financial institutions grant credit with little or no considerations given to the quality of monies to be received. However, when the economy is in recession then a rise in bad debt adversely affects the economy in general, and the financial sector.

According to Williamson (1987), models in theory that explain the business cycle with a financial explicit role is a good basis to model non-performing loans since emphasis are placed on the cyclical nature and failures associated with business. It is obvious that there is a link between many macroeconomic variables and non-performing loans. Literature cites real interest rate, annual inflation, real exchange rate, GDP growth rate, unemployment rate, loans growth and money supply as the significant determinants. These determinants affect non-performing loans in diverse ways. For instance, real GDP and employment rate are inversely related to NPL since a growing economy is a favorable ground to increase income and a decrease in financial distress. Works done by Salas and Saurina (2002), Khemraj and Pasha (2009), and Dash and Kabra (2010) have all concluded that there is a positive relationship between unemployment and NPL and an inverse relationship between NPL and real GDP growth rate. A higher GDP growth means that the economy is doing well and therefore a higher level of income. Borrowers in such an economy have a higher capacity to pay their debt and eventually a reduction in bad debts. Borrowers in an economy that is experiencing negative growth in GDP are highly unlikely to repay their debt and in such instance the level of bad debt increasing.

Interest rate is positively related to NPL. A rise in interest rate makes the payment of debt very difficult and leads to a rise in debt and eventually a rise in non-performing loans (Bofondi and Ropele,

2011). In the sub-Saharan African countries, Fofack (2005) found interest rate and economic growth to be important determinants of loan performance. Increasing interest rate makes the cost of borrowing expensive and the ability to repay also falls thereby increasing non-performing loans. Banks giving out loans excessively and charging high level of interest rate are most likely to have higher bad debts Khemraj and Pasha (2009).

Jimenez, Salas, and Saurina (2006) presented evidence from Spain and suggested that GDP growth, real interest rate and a credit condition explain NPL. In terms of real exchange rate, Khemraj and Pasha (2009) from the Guyanese banking sector explained that it was positively related to bad loans. This implies that when local currency appreciates; or a falls in exchange rate; NPL portfolios of financial institutions will increase. Their results also confirmed the inverse relationship between GDP growth and NPL.

With evidence from Islamic bank in Malaysia, Adebola, Sulaiman, Yusoff, and Dahalan (2011) used ARDL in exploring the factors that explain NPL and concluded that long run relationship between macroeconomic variables and that of interest rate has a positive long term effect on bad loans. The authors further stated that the producer prices were inversely related to bad loans.

These results can be likened to the study of Bofondi and Ropele (2011) that looked at conventional banks in Italy. Analyzing the relationship between nature of borrowers and loan quality, they concluded that macroeconomic variables do affect borrowers either individuals or businesses. With evidence from the first quarter in 1990 to the second quarter in 2010, Bofondi and Ropele said the quality of loans to both households and businesses may be attributed to a limited number of mainly macroeconomic variables of the economy, the important level of debt and to the cost of borrowing. In effect, macroeconomic variable changes do actually affect the quality of loans.

From Brazil, Vazquez, Tabak, and Souto (2012) did a good job with 78 banks and 21 credit categories between 2001 and 2009 and found that the pro-cyclical behavior of loan quality depends on the type of credit. When an economy is in recession, banks that are largely exposed to high pro-cyclical credit types are affected most since the quality of their credit deteriorates.

Using dynamic panel data, Louzis et al (2010) examined the determinants of NPLs for each category of loan in the Greek banking sector. Studying real gross domestic product growth rate, rate of unemployment and real interest rate for each type of loan from 2003 to 2009, the study concluded that bad or doubtful loans were related to these macroeconomic factors and to how well they were managed. They further indicated that the sensitivity of non-performing loans on mortgages was less to macroeconomic conditions.

3. Study Methodology

3.1 Model Specification

The model used by Messai and Jouini (2013) is adopted for this study as depicted below;

$$\frac{NPL}{TL} i, t = \beta_0 + \beta_1 \Delta GDP_{t-1} + \beta_2 UN_t + \beta_3 RIR_t + \beta_4 ROA_{i,t-1} + \beta_5 \left(\frac{LLR}{TL} \right)_{i,t} + \beta_5 \Delta Loans_{i,t} + \epsilon_{i,t}$$

where;

$\frac{NPL}{TL}_{i,t}$ is the ratio of non-performing loans to total loans for bank i , in year t .

ΔGDP_{t-1} is the annual growth in real GDP at period $t-1$.

UN_t is the rate of unemployment at period t .

RIR_t is the real interest rate at year t .

$\frac{LLR}{TL}_{i,t}$ denotes loan losses reserves for bank i in year t .

$\Delta Loans_{i,t}$ represents loan growth for the bank i in year t

This study modified Messai and Jouini (2013) model by proxing unemployment rate data with money supply (money supply according to economic theory is highly correlated with output and

unemployment but less correlated to NPL), and adding inflation (CPI), exchange rate and 90 days treasury bill rate as these are other relevant variables that also do affect banks operations as well as debtors ability to meet loan obligations.

The study employed the following model to determine the effect of macroeconomic variables on loan performance;

$$NPL = f(INF, EXR, M2, GDP, TBILL, e) \quad (1)$$

This model is transformed into an econometric model as:

$$NPL = \beta_0 + \beta_1 INF + \beta_2 EXR + \beta_3 M2 + \beta_4 GDP + \beta_5 TBILL + e \quad (2)$$

3.2 Data Source

The study employed a quarterly secondary data from 2008 to 2015. Data on non – performing loans was sourced from HFC Bank's records and books, and data for 91 days Treasury bill was sourced from the Ghana Statistical Service. Macroeconomic factors such as GDP, exchange rate, money supply and inflation were sourced from International Monetary Fund.

3.3 Theoretical and a Priori Assumptions

Non-performing loans (NPL) in this study is defined as the total amount of money borrowed in which the borrower is yet to fulfil his or her debt obligations within 90 days. Macroeconomic factors may affect non-performing loans (NPLs). To find the effects of macroeconomic variables on non-performing loans (NPL), the ratio is regressed on macroeconomic variables below;

Inflation (measured by CPI) is expected to be positive. This is because, as prices of goods and services increase, it increases economic hardships for the consumer thus increasing risk of loan default.

Exchange rate (EXR). As the value of the domestic currency on the international market (measured to the dollar) appreciates, this makes borrowers who invest or consumers purchases (as most goods and input in Ghana are imported) to have more purchasing power and a reflection in the lowering of cost of inputs. The profit of businesses rises and their ability to meet loan obligations rises. But currency appreciation can lead to increases in imports and a fall in exports considering goods to be normal, leading to a fall in net export (exports minus Imports) and a fall in output and income. Thus, β_2 could be positive or a negative.

Money supply (M2). An increase in money supply (M2) reflects an expansionary monetary policy that leads to increase in output but associated with inflationary effect. Increase in output have same expectation as a rise in GDP, but the accompanying inflationary impact will have a counter expectation as a rise in inflation. Thus the expected sign of β_3 can be positive or a negative.

Gross domestic income (GDP) is expected to be inversely related. This is because income increases mean increase in one's ability to command goods and services and raises one's ability to pay loan.

Treasury bill 90 days (TBILL) is expected to be negative. A rise in the Tbill reflects a rise in the opportunity cost of giving out loan to customers. Hence, it would be relatively profitable to invest deposit into Tbill compared to giving loans. Hence, banks would be more efficient in their loan operational managements so as to minimise loan loss, as the opportunity cost of a unit currency given out as loan, would be higher.

3.4 Unit Root Tests

In order to avoid the issue of spurious regression results, the study used the Augmented Dickey Fuller test to ascertain stationarity properties of the variables concerned before transforming non-stationary time series to make them stationary for appropriate economic analysis.

3.5 The Long Run and Short Run Model Specification

A conditional ARDL model of order (p, q1, q2, q3, q4, q5) was used to test the long run relationship of the variables identified. The long run ARDL model assumed the form;

$$NPL_t = \beta_0 + \sum_{i=1}^p \delta_{1i} NPL_{t-i} + \sum_{i=1}^{q1} \delta_{2i} INFL_{t-i} + \sum_{i=1}^{q2} \delta_{3i} EXR_{t-i} + \sum_{i=1}^{q3} \delta_{4i} M2_{t-i} + \sum_{i=1}^{q4} \delta_{5i} GDP_{t-i} + \sum_{i=1}^{q5} \delta_{6i} TBILL_{t-i} + \varepsilon_t \quad (3)$$

The lag length of the variables is selected based on the Schwarz Bayesian criterion since it gives more parsimonious models specification.

The short run dynamics is captured by the error correction model as follows:

$$\Delta NPL_t = \beta_0 + \sum_{i=1}^p \theta_{1i} \Delta NPL_{t-i} + \sum_{i=1}^{q1} \theta_{2i} \Delta INFL_{t-i} + \sum_{i=1}^{q2} \theta_{3i} \Delta EXR_{t-i} + \sum_{i=1}^{q3} \theta_{4i} \Delta M2_{t-i} + \sum_{i=1}^{q4} \theta_{5i} \Delta GDP_{t-i} + \sum_{i=1}^{q5} \theta_{6i} \Delta TBILL_{t-i} + \varphi ECM_{t-1} + \varepsilon_t \quad (4)$$

where θ_i is the short-run coefficient of model's dynamic adjustment to equilibrium. ECM_{t-1} term is Error Correction factor. Thus, it shows the estimate of short run disequilibrium adjustment of long-run equilibrium error term. φ measures speed of adjustment to attain equilibrium in the presence of shocks.

To determine the goodness of fit or robustness of the ARDL model, stability and diagnostic tests were conducted. The cumulative sum of recursive residuals and cumulative sum of squares of recursive residuals were employed for the stability tests whiles serial correlation, normality, functional form and heteroscedasticity were used for the diagnostic test.

4. Empirical Results

4.1 Test for Stationarity

The Augmented Dickey-Fuller (ADF) test was used to test for stationarity of the variables used in the study. The results are shown in Table 1.

Table 1: Unit root test using ADF

Variable	Constant	Constant and trend	Decision
Levels			
NPL	-3.368840**	-3.422572*	Series is stationary
INF	-1.435216	-1.914796	Series is not stationary
GDP	0.470785	-2.258324	Series is not stationary
TBILL	-2.033944	-1.699255	Series is not stationary
M2	1.591417	0.566488	Series is not stationary
EXR	-0.335314	0.119861	Series is not stationary
First difference			
INF	-5.471455***	-5.524325***	Series is stationary
GDP	-6.158975***	-5.977155***	Series is stationary
TBILL	-3.895353***	-3.810083**	Series is stationary
M2	3.207865**	-3.309511*	Series is stationary
EXR	-3.202508**	-3.717009**	Series is stationary

Note: *, ** and *** denotes rejecting the null hypothesis at 10%, 5% and 1% level respectively

From the ADF test, NPL is stationary at the levels hence integrated of order zero: I (0), while the rest of the series are all stationary after the first difference hence integrated of order one: I (1). Since the series are integrated of orders zero and one. It is therefore appropriate to estimate the model using the ARDL bounds tests specification.

4.2 Test for Co-integration Relationship

The ARDL bounds test procedure was used in determining long run relationship hence co-integration among the variables employed in the study. The results are presented in Table 2.

Table 2: Bounds Test Results for Co-integration Relationship

F-Statistic	Significance	Lower Bound	Upper Bound	Decision
3.993523	10%	2.26	3.35	Evidence of co-integration
	5%	2.62	3.79	

The F–statistic from Table 2 is greater than the upper bound test. As a result the joint null hypothesis of no co-integration is rejected at 5% level. That is since the F – statistic (3.993523) is greater than the upper bound critical value (3.79) at 5% significant level, there is evidence of co-integration and hence long run relationship among the variables in the study.

4.3 The Long Run Relationship Results

The results from Table 3 depict long-run relationship between selected macroeconomic variables and loan performance.

Table 3: Estimated ARDL Long Run Coefficients

Dependent variable: NPL				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
INF	-0.001050	0.000389	-2.698148	0.0135
TBILL	0.024151	0.012003	2.012049	0.0572
M2	0.000005	0.000015	0.312553	0.7577
GDP	-0.000024	0.000019	-1.297925	0.2084
EXR	-0.030237	0.033624	-0.899279	0.3787
C	1.804357	0.449808	4.011392	0.0006

The effect of inflation on loan performance was inverse and statistically significant at 5 percent level as displayed in Table 3. Hence, an increase in inflation would improve loan performance by 0.0010550. This implies that an increase in inflation would rather enhance loan performance. Although the study does not meet the a priori expectation, it supports the finding of Adebola *et al.* (2011) whose study posits a negative relationship between inflation and non – performing loans.

Another factor that significantly affects loans performance is TBILL. The effect of TBILL on loan performance was obtained to be positive and significant at 10 percent level. Hence, high Treasury bill rates worsen loan performance by 0.024151. This can be explained by the environment of the economy of Ghana with exposure to external shocks. This implies that as the government, who is largest borrower in the money market borrows more, Treasury bill rate increases, increasing other rates of interest in the country. Debt increases causing increase in payments of interest rates and ultimately increasing non-performing loans. This is evidenced in the work of Bofondi and Ropele (2011).

Money supply on the other hand did not have a significant effect on loan performance, though the relationship between loan performance and money supply was found to be positive. Hence, increase in money supply does not affect loan performance. Evidence of a positive relationship between M2 and NPL is found in previous work by Rajan and Dhal (2003).

In addition, the level of economic growth showed a negative impact on non-performing loans as expected. An increase in economic growth leads to a fall in NPL by 0.000024. This could be attributed to the fact that when there is slowed growth of GDP in an economy, the level of bad debts increases. This result is however insignificant. Similar result was found in the study of Salas and Saurina (2002).

Finally, the effect of exchange rate on NPL was also negative and statistically insignificant. This means that an increase in exchange rate (appreciation) reduces NPL by 0.030237. This is possible because when the value of a currency depreciates; lender loses and borrower gains. As a result, it is easier to meet loan repayment. Evidence of a negative impact of exchange rate on NPL is found in the works of Jimenez *et al.* (2006); Quagliariello (2007); and Louzis *et al.* (2010).

4.4 Short Run Results

The short run effects of macroeconomic variables on loan performance are shown in Table 4.

Table 4: Estimated ARDL Short Run Coefficients and the Error Correction Estimate

Dependent Variable: NPL. Selected Model: ARDL(1, 0, 0, 0, 0, 1) Obs = 29				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
D(INF)	-0.000939	0.000316	-2.969808	0.0073
D(TBILL)	0.021582	0.008648	2.495602	0.0210
D(M2)	0.000004	0.000013	0.325960	0.7477
D(GDP)	-0.000022	0.000015	-1.498544	0.1489
D(EXR)	-0.065463	0.049810	-1.314249	0.2029
CointEq(-1)	-0.893633	0.198483	-4.502309	0.0002

The results obtained for the short run estimates did not differ from the long run estimates.

The short run effect of inflation on loan performance was inverse and significant at 1%. Again, this implies that increasing inflation would improve loan performance.

Treasury bill rates also affected loan performance positively and significantly at 5 percent level. Hence, increasing the Treasury bill rates would worsen loan performance in the short run.

However, GDP and exchange rate affected loan performance negatively, while money supply affected loan performance positively but the effects were insignificant. Hence GDP, exchange rate and money supply did not influence loan performance in the short run.

The error correction coefficient (CointEq (-1)) was negative and statistically significant at -0.893633, implying that the adjustment process of the system would restore equilibrium quickly and effectively. Hence it will take 89% of any shock on the dependent variable caused by the independent variables to be corrected within a year and per the figure obtained, the convergence to equilibrium would be fast to ensure long run equilibrium.

5. Conclusion and Policy Recommendations

The study employed a quarterly data from 2008 to 2015 to assess the macroeconomic variables that influence loan performance of commercial banks in Ghana using HFC Bank as a case study. The results suggest that the macroeconomic factors that influence loan performance are inflation and T-bill rates.

With respect to the study findings, there is the need to embark on both short and long term policies to reduce inflation. Reducing prices of goods and services can help reduce economic hardships for consumers who are not resource endowed (the poor in society) so as to reduce risk of loan default and hence improve loan performance. This will enhance the profitability of banks and improve the general operations of the banking industry in the country.

Secondly, although the study reported that a rise in T-bill rate reflects a rise in the opportunity cost of giving out loan to customers since it would be relatively profitable to invest deposit into T-bill compared to giving out loans. Hence, banks would be more efficient in their loan operational managements so as to minimise loan loss, as the opportunity cost of a unit currency given out as loan would be higher. The study recommends the need for the government to reduce its domestic borrowing to reduce Treasury bill rates. From another perspective, the government by reducing its borrowing in the domestic money market, thus reducing Treasury bill rates, will reduce the general rates of interest in the country. This would be more appropriate since it would make banks grant more loans to businesses to increase investment instead of buying Treasury bills. When banks grant loans at reduced rates customers pay back loans with ease and this reduces non-performing loans.

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