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REGULATORY RESERVE RATIO AND PROFITABILITY OF TIER 1 DEPOSIT MONEY BANKS IN NIGERIA

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ABSTRACT

This study examines the relationship between Regulatory cash reserve ratio (CRR) and the profitability of Tier 1 Nigerian Deposit Money Banks. Regulatory Cash Reserve Ratio is the percentage of total deposits that Banks are required to keep with Central Bank. Serious concerns continue to be raised about the health and financial soundness of the Nigerian Banking System. Of particular concern is the liquidity position of the Nigerian Deposit Money Banks. For Banks to be profitable, there has to be sufficient supply of funds which invariably allows the Banks to increase lending activities and investment in financial assets, hence, more income for the Banks. Changes in the CRR affects this money supply. This hold true especially for the five Nigerian Tier 1 Banks. They are Systematically Important Banks (SIB) who control over half of the entire banking total assets and sixty percent (60%) of the entire credit supply from the Nigerian banking system. Data for the study was extracted from the Annual Financial reports of the DMBs and CBN statistical bulletins on CRR for the period

Introduction:

Recent developments, out of the banking industry, have continued to raise concerns about the health and financial soundness of Deposit Money Banks in Nigeria, including raised eyebrows about the safety of depositor's fund. The Nigeria banking system has witnessed a plethora of reforms initiated by regulators, all in an effort, to bolster and build Public confidence in view of the deteriorating capital and asset quality of banks in the country. (Okolo, 2015)

Regulatory interventions, including the 2005 consolidation and recapitalization exercise, which saw 89 banks pre-consolidation shrinking to 25 bigger banks with a minimum regulatory capital base of N25billion Post Consolidation. The Banking

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(2009-2017). Descriptive statistics and Panel regression estimation was employed to analyse the data using OLS regression Model. Before estimation of the model, multiple diagnostic tests were carried out to check for the robustness and reliability of the data. Findings reveals that cash reserve ratio has a positive effect on net operating profits and return on assets, but a negative and insignificant effect on the earnings per share of Tier 1 deposit banks. The study recommends that the Monetary Policy Committee (MPC) should set differential cash reserve ratio (CRR) for Tier 1 Banks and others Banks in order to make more funds available to SIBs for advancing credit and investing in the economy for growth and development. In addition, a single rate CRR regime, both for private and public deposits, to allow consistency and free up more public sector deposit for lending. Furthermore, government, through the CBN, should set lending rate at optimum level as these would help to boost credit expansion, money supply and invariably, profitability of Deposit Money Banks in Nigeria. The Deposit Money Banks should harvest other alternative avenues of Money supply that do not come from customers deposits. Investment Banking, Pension fund management and Assets Management are other bespoke avenues that can be expanded to increase profitability.

Keywords: *Cash Reserve Ratio, Earnings per Share, Return on Asset, Deposit Money Banks, Profitability*

Reforms of 2009-2010 were a direct consequence of the Global Financial Meltdown in 2008-2009. The initial perceptions that the Nigerian banking system was sound and insulated from global financial crisis were misplaced. That effort only created "too big to fail behemoth" known as Systematically Important Banks (SIBs). This Behemoth are classified as Tier 1 Banks based on their Capital levels, Asset Size, Total deposits, Total Loans and Advances and Branch Network spread. Their failure or distress itself, could trigger a systematic chain contagion and eventual collapse of the Nigerian financial system and by implication economic stability of Africa's largest Economy

Globally, the banking industry is an important sector charged with the responsibility of allocating capital resources as well as risk distribution of future flows in an economy. In any economy, a well-functioning banking industry facilitates business cycles which bring about increased growth and welfare in

that country (Warue, 2013). These roles include the provision of services such as money conversion, processing of payments, and maturity transformation of assets, enhancing quality as well as managing and controlling risks. In order to avert predominant economic conditions, most countries globally redesign the structure and function of their monetary policy. The developed and developing countries ratify the changes in their monetary policy in order to suit the economic changes in various countries.

Monetary policy is the instrument used by the monetary authority to regulate the economy. These includes promotion of economic growth and development, price level stabilization, realisation of full employment level, maintenance of healthy balance of payment, increase in industrialization, achievement and sustenance of economic stability(Is & Policy, 2009).

Cash Reserve Ratio (CRR) is a specific minimum fraction of the total deposit of customers, which Deposit Money Banks must hold as reserves either in cash or as deposits with the Central Bank.(Bawa & Akinniyi, 2018). Regulatory Cash Reserve Ratio (CRR) is set according to the guidelines of the Central Bank of a country. In Nigeria, banking activities are regulated strictly by the Bank and Other Financial Institution Act (BOFIA) and was amended under the control of the Central Bank of Nigeria. As a result of these regulations, the Bank is required to hold specific asset equal to certain other liabilities in liquid form. This is known as cash reserve requirement (CRR).

However, there is the extra factor of the banks' lending depositors' funds to other people in form of loans and advances. The Banks make profit margins from the spread between interest on deposit and interest on loan and advances. However, there is a risk that a bank could excessively loan out funds until their ability to meet withdrawals on demand is jeopardized. To mitigate this risk, Central Banks sets regulatory cash reserve ratio (CRR) as a monetary policy instrument to maintain liquidity and solvency, curb inflation and influence interest rates of banks.

Depending on the current stand of the economy, the Central Bank of Nigeria (CBN) might decide to pump more money into circulation in the economy by employing the expansionary monetary policy which includes the reduction of the cash reserve ratio (CRR) to control the amount of money in circulation and conversely to reduce the amount of money in circulation or to mop up excess liquid cash the CBN would in turn employ the contractionary monetary policy (tight monetary regime) which includes the increase of the CRR.

STATEMENT OF PROBLEM

It could be said that the restrictions placed on Deposit Money Banks in Nigeria by the Central Bank through its regulatory cash reserve ratio (CRR) as a monetary policy instrument has clearly hindered the ability of banks to make more profit through the creation of loanable funds, based on the availability of deposit held in the custody of Deposit Money Banks in the country.

The Tier 1 Deposit Money Banks adjudged "Systematically Important Banks" are Banks that are too big to fail based on their capital levels, asset size, total deposits, total loans and advances and branch network. The control over sixty percent of credit supply from the banking sector. (Central Bank of Nigeria, 2018). Failure or distress of these SIBs, could trigger a systematic chain contagion and possible collapse of the banking sector and by implication threaten Financial System Stability, which is a core pillar of the CBN mandate.

One of primary factor of these potential distress, is insufficient availability of funds to the banks, due to recent increases in CRR and differential CRR for Private and Public Deposits. Sufficient money supply invariably allows the Banks to increase lending activities and hence more interest income for the Banks. Changes in the CRR affects this money supply.

Monetary policy is one of the principal economic management tools that governments use to shape economic performance. Measured against fiscal policy, monetary policy is said to be quicker at resolving economic shocks. Monetary policy objectives are concerned with the management of multiple monetary targets among them such as price stability, promotion of growth, achieving full employment, smoothing the business cycle, preventing financial crises, stabilizing long-term interest rates and the real exchange rate.

Experience shows that the Regulator's main emphasis is usually placed on maintaining price stability and/or ensuring low inflation rates in the country. This is at the detriment of profit maximization and by, implication enhanced profitability/viability of the Deposit Money Banks in the country.

The use of cash reserve ratio affects the level of liquidity in Banks. When Banks are faced with limited liquidity, they turn to other Banks for inter-bank borrowing. Those funds are borrowed at the inter-bank rate and it is usually very high, which affects the interest expense for the borrowing bank and the interest income for the lending bank.

OBJECTIVES OF THE STUDY

1. To determine the extent to which Cash Reserve Ratio (CRR) impact on Earning per Share (EPS)

2. To ascertain the extent to which Cash Reserve Ratio (CRR) impact on Net operating profit (NOPAT)
3. To determine the extent to which Cash Reserve Ratio impact on Return on Asset (ROA)

HYPOTHESES

1. A change in Cash Reserve Ratio (CRR) does not have significant impact on Earning per Share.
2. A change in Cash Reserve Ratio does not have a significant impact on Net operating Profit
3. A change in Cash Reserve Ratio (CRR) does not have a significant impact on Return on Assets

LITERATURE REVIEW

Conceptual Framework

Cash Reserve Ratio

According to Michael (2013), Cash Reserve Ratio refers to a certain percentage of total deposits that the commercial banks are required to maintain in the form of cash reserve with the Central Bank. The objective of maintaining the cash reserve is to prevent the shortage of funds in meeting the demands of the depositors. The amount of reserve to be maintained depends on the bank's experience regarding the cash demand by the depositors. If there had been no government rules, the commercial banks would keep a very low percentage of their deposits in the form of reserves. Since cash reserve is non-interest bearing, i.e. no interest is paid on the deposits, therefore, the commercial banks often keep the reserve below the safe limits. This might lead to a financial crisis in the banking sector.

Thus, in order to avoid such uncertainty, the Central Bank imposes a cash reserve ratio or CRR on commercial banks. The Central Bank has the legal power to change the CRR anytime at its discretion. The cash reserve ratio is a legal requirement and therefore, it is also called a Statutory Reserve Ratio (SRR). Through a cash reserve ratio, the Central Bank can change money supply in the economy. Such as, when the economy demands a Contractionary Monetary Policy, the Central Bank will raise the CRR. On the other hand, when the economic conditions demands for an Expansionary Monetary Policy, the Central Bank cuts down the CRR.

Theoretical Frame Work

The theoretical framework is anchored on various economic theories including the Too Big to Fail theory and Keynesian theory

a. The Too Big to Fail Theory

The term ''Too big to Fail' was popularized by US congressman Steward McKinney in 1984. The theory of too big to fail is premised on the belief that, certain financial institutions are so large and so interconnected that their failure will be disastrous to an economy. Proponents of this theory believe that these institutions should become recipient of beneficial financial and economic policies from government and/or Central Bank to keep them alive. However, critics see this as counterproductive and that large bank or other institutions should be left to fail if their risk management is not effective. This theory has held true in countries like America, United Kingdom and China and also in Nigeria where the regulatory authority has been bailing out banks that display or show distress tendencies. The 2016 - 2018 regulatory interventions to save depositors funds in Skye bank which led to the creation of Polaris Bank comes to mind. That effort alone costed taxpayers, an estimated N1Trillion naira (USD2.7 Billion), also refer to the 2018 forced merger between Diamond and Access Banks. These were all systematically important banks (SIBs) and previously classified Tier 1 Banks. To prevent potential scenarios of bailout for SIBs, more liquidity is needed for Tier 1 banks. Hence, differential CRR should be set for Tier 1 banks who supply sixty percent (60%) of credit supply from the banking system and other Banks. The too big to fail theory is validated in studies by Annelise (2011) and Malte (2008) who opined that systemic risk is primarily objectionable because of the "moral hazard" involved in letting banks grow so large that they can reliably count on public bailouts in case they get into trouble, which in turn incentivizes overdue risk-taking that might result in failure, bailouts and lost output. Furthermore, he argues that the concern with moral hazard is only one amongst a number of normative objections too big to fail. In addition to the worry over moral hazard, Malte (2008) argues that these objections include the concerns that such financial institutions being "too big to fail", make it impossible for states to effectively combat tax evasion, and that they come to impose an elusive but powerful background influence on economic policy.

b. Keynesian theory

According to Keynes (1936), monetary policy alone is not effective in stimulating economic activity because it works through indirect interest rate mechanism. For the Keynesian mechanism, monetary policy works by influencing interest rate which influences investment decisions of financial institutions such as banks and the public and consequently, output and income via the multiplies process. Keynes (1936) posits that government had the responsibility to undertake actions to stabilize the economy and maintain full employment and economic growth, using fiscal policies. He therefore recommends a proper blend of monetary and fiscal policies as at some occasions, when monetary policy could fail to achieve its objective.

Furthermore Keynes, as cited by Bawa et al (2018) opined that monetary mechanism of Keynesians emphasizes the role of money, but involves an indirect linkage of money with aggregate demand via the interest rate as symbolically shown below: ↓OMO→↓ R→↑MS→↓r → I→↓GNP

Where, OMO = Open Market Operation R = Commercial Bank Reserve MS = Stock of Money r = Interest Rate

I = Investment GNP = Gross National Product

Furthermore, Bawa et al (2018) argued, if the economy is initially at equilibrium and there is open market purchase of government securities by the Central Bank of Nigeria (CBN), this Open Market Operation (OMO) will increase the commercial banks reserve (R) and raise the bank reserves. The bank then operates to restore their desired ratio by extending new loans or by expanding bank credit in other ways. Such new loans create new demand deposits, thus increasing the money supply (MS). A rising money supply causes the general level of interest rate (r) to fall. The falling interest rates affects commercial bank performance and in turn stimulate investment given businessmen expected profit. The induced investment expenditure causes successive rounds of final demand spending by GNP to rise by a multiple of the initial change in investment. On the other hand, a fall in money supply according to Jhingan (2005) causes the general level of interest rate (R) to rise or increase thereby increasing the commercial banks profitability. The Keynesian theory as espoused by this study is validated by studies as contained in the works of Amacher and Ulbrich, 1989; Gertler and Gilchrist, 1991; Okpara, 2010; Solomon, 2013 as cited by (Bawa & Akinniyi, 2018)

Empirical Review

A number of studies have focused on cash reserve requirements in developing economies and its impact on the profitability of banks. Bawa et al (2018) examined the effect of cash reserve ratio and money supply on the profitability of DMBs in Nigeria. Using a period of 2002-2012, their findings revealed that cash reserve ratio has negative and insignificant impact on the earnings of DMBs in Nigeria. Money supply has a positive significant on volume of loans and advances, interest rate and interest income. Udeh (2015) documented that cash reserve ratio, has no significant impact on the profit before tax of Zenith Bank Plc, one of the leading DMBs in Nigeria.

Uchendu (1995) studied the impact of monetary policies on the performance of Nigerian deposit banks. The study found out that the overriding factors effecting bank profitability are cash reserves ratio, interest rates, exchange rate, unit labour costs and bank structure. Ogunlewe (2001) also examine the monetary policy effects on bank's profitability, using data from Nigerian deposits money banks and discovered the factor affecting commercials banks profitability to include cash reserve requirement ratio, allowable credit growth, securities and exchange rate and stabilization.

Other studies on the effects of the monetary policy tools on profitability of Banks include: Gitonga (2010) studied the relationship between interest rate risk management and profitability of commercial banks in Kenya; Olusanya (2012) did a survey of the foreign exchange reserves risk management strategies adopted by the Central Bank of Nigeria and Nwazeaku (2006) did a study on the impact of the Central Bank of Nigeria (CRR) on commercial banks benchmark lending interest rates

Ogunlewe (2001) carried out a study on effect of macroeconomic factors on the profitability of commercial banks in Nigeria with a focus on Lion Bank. Aburime (2008) considered a sample of banks with 1255 workers observation on unbalanced panel data over the period of 1980-2006 to examine the macroeconomic determinants of bank profitability in Nigeria and discovered that monetary policy, actual interest rate, foreign exchange and inflation, are directly linked with banks' return. Uremadu (2012) reported a positive relationship between CRR and banks profitability. This position was confirmed by Akanbi and Ajagbe (2012) and Onoh (2017) among banks in Nigeria. On the other hand, Tovar and Ocampo (2003) and Larrain and Cerda (2005) documented that

increase in cash reserve requirements raise interest spreads and reduce bank profits.

In Nepal Bijoy and Maud (2015) documented that CRR may have an impact on DMBs profitability. This is because Central Bank pays zero interest on the amount commercial banks keeps with them as cash reserve. Mccall and Walker (2013) examined the effects of bank specific factors and macroeconomic factors on the performance of commercial banks in New Hampshire during the period from 2001 to 2010. Punita and Somaiya (2006) carried out a study on the impact of monetary policy on the profitability of banks in India between 1995 and 2000. The study found out that bank rate, cash reserve system have negative and significant effect on the profitability of banks. Bokan (2009) in Croatia and Sarmiento (2008) and Prada (2012) in Colombia found that reserve requirements and money supply affect banks profitability. Abid and Lodhi (2015) reported that CRR taken as measure for Reserve Requirement has significant inverse relationship on banks' financial performance in Pakistan, which is measured by ROA and ROE. The reserve requirement ratio (RRR) of banks in Vietnam show negative relationship with profit (Nguyen, Vu & Le, 2017).

METHODOLOGY

Source and Justification of method of data collection

The data utilized in this study was secondary data which was collected from the CBN statistical bulletin and audited financial statements of the five Tier 1 Banks for a period of 9years spanning 2009-2017.

The justification for the method is based on two reasons. Significant reforms were made in the Nigerian banking sector post 2009 due to global financial meltdown which altered Universal banking model in place previously and ushered in a series of reforms, which include the current banking model of Tier structure based on the regulators evaluation of health and financial soundness of the 25 Deposit Money Bank in existence then. The Tier 1 banks adjudged Systematically Important Banks being too big to fail based on asset size, leverage, interconnectedness and spread.

The second relates to fundamental changes by monetary policy committee (MPC) on CRR from 2009. This changes specifically involve segregation of cash reserve ratios separately for private and public sector deposits. This changes fundamentally altered the single ratio in place previously and any data included

before this date would distort the possible results of the tests based on the segregation for Private and Public deposit.

Operationalization and measurement of variables

The study variables were operationalized and measured as shown in Table 1.

Table 1: Operationalization and Measurement of Variables

Type	Operationalization	Measurement
Independent variable	Regulatory Reserve requirement	Cash Reserve Ratio (CRR)
Dependent variable	Profitability	Earnings per share (EPS)
Dependent Variable	Profitability	Operating profit after tax
Dependent variable	Profitability	Return on Asset (ROA)

Source: (Researcher, 2018)

EMPIRICAL MODEL

To quantitatively examine how cash reserve ratio (CRR) affects Profitability, profitability was measured using Earning per share (EPS), Net operating profit after tax (NOPAT) and Return on Asset (ROA). Accordingly, it can be seen that the variable for Profitability (EPS, NOPAT and ROA) is dependent on the CRR. Thus, the model for this study functionally becomes;

$Y=f(X)$

Y= EPS, NOPAT, ROA

X= CRR

EPS, NOPAT, ROA $=f$ (CRR)……..1

Where;

CRR= Cash Reserve Ratio

EPS= Earnings per Share

NOPAT= Net Operating Profit after Tax

ROA= Return on Assets,

The econometric equation for the model is specified as;

EPS, NOPAT, ROA$= \beta_0 + \beta_1$ CRR$+ \mu$……..2

Where; β_0 = Constant parameter/Intercept

β_1 = Coefficient of independent variable

μ = Error term

The expectation in the model is that the independent variable is to have a negative relationship on bank profitability measured by EPS, NOPAT, ROA. The mathematical expression is represented as; $\beta_1 < 0$ implying that a unit increase I n the independent variables will lead to a decrease in the dependent variable by a unit. Therefore, equation 2 can be thus rewritten as:

$EPS = \beta_0 + \beta_1 CRR^* + \mu$.....3

$NOPAT = \beta_0 + \beta_1 CRR^* + \mu$.....4

$ROA = \beta_0 + \beta_1 CRR^* + \mu$.....5

The test is estimated in the following manner, pre-test for stationary, lag-length, and test for co-integration and this is to ensure that the variables are stationary and that shocks are only temporary and will dissipate and revert to their long-run mean. Co-integration requires that all the variables be integrated of the same order and to test for unit roots, we used the ADF model. Hypotheses were tested using simple OLS regression model.

EMPIRICAL FINDINGS

Summary Statistics

Table 1 presents the descriptive statistics of the variables used in the estimations that follow.

Table 1: Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum	Number of Observations
Earnings per Share (EPS)	2.46	2.31	-3.2	10.9	45
Return on Assets (ROA)	2.13	1.38	-0.6	5.09	45
Net Operating Profit after Tax (NOPAT)	60,500.20	46,377.60	-9,647	203,461	45
Cash Reserve Ratio (CRR)	13.27	7.59	4	24	45

Table 1 shows that for the Tier 1 money deposit banks in Nigeria the average earnings per share is 2.46, the average of Return on Assets is 2.13, the mean of

Net Operating Profit after Tax is 60, 500.20 and the average of Cash Reserve Ratio is 13.27. The deviation from the mean score is 2.31, 1.38, 46, 377.60 and 7.59 for EPS, ROA, NOPAT and CRR respectively. Overall, as shown by the negative minimum values of the profitability indices, some of the Tier 1 money deposit banks in Nigeria experienced losses at some time.

Test of Hypotheses

Hypothesis one: A change in Cash Reserve Ratio (CRR) does not have significant impact on Earning per Share

The first objective sort to determine the effect of CRR on EPS. To achieve this, the CRR was regressed on EPS. However, before interpreting the results from the estimation, several diagnostic tests were carried out. First of all, the Hausman test for model selection was done. Given that the result from the test had a probability value of 1 (see table I in Appendix), the null hypothesis that the Random Effects is appropriate could not be rejected. Next, having established that the random effects model was appropriate, the Breusch and Pagan Lagrangian Multiplier Test for Random Effects was conducted to decide between the random effects model and the simple OLS regression model.

The probability value of the test as shown in table II in the appendix is greater than 0.05 hence, we fail to reject the null hypothesis and conclude that there is no significant differences across the banks, therefore a simple OLS regression be used.

Other diagnostic tests done include the Breusch-Pagan LM test of independence to check for contemporaneous correlation, the Modified Wald Test for Groupwise Heteroskedasticity and the Wooldridge Test for Autocorrelation.

The probability value from all the test is less than 0.05 (see tables III, IV and V in the appendix), implying that there is the presence of cross-sectional dependence, heteroskedasticity and autocorrelation. To correct for these the robust standard errors estimation was done and the results of the estimation is as presented in table 2.

Table 2: Result of the Estimated OLS Regression Equation of the Effect of CRR on EPS

	Dependent Variable: Earnings Per Share		
Independent Variable	Coefficient	Robust Standard Error	Probability
Cash Reserve Ratio	0.0234	0.0536	0.664

Constant	2.1482	0.9587	0.030
Number of Observations	45		
F- Statistic	0.19		
Prob. (F- Statistic)	0.6641		
R^2	0.0059		

Table 2 reveals that the overall fitness of the model could not be ascertained since the probability value of the F-test is greater than 0.05. This findings agree with similar studies like Bawa et al (2018) that cash reserve ratio has negative and insignificant impact on the earnings of DMBs in Nigeria.

Hypothesis Two: A change in Cash Reserve Ratio does not have a significant impact on Net operating Profit

As was the case earlier, the Hausman test was carried out and the result presented in Table I in the appendix. Since the probability value of the test is 0.26 (greater than 0.05) the null hypothesis that the random effects model be used was accepted. Afterwards, the Breusch and Pagan Lagrangian Multiplier Test for Random Effects was conducted and the results presented in table II in the appendix. Given that the chi-square statistic of the test had a probability value of 0.01 the null hypothesis that there is no significant differences across the banks was rejected and the alternate hypothesis that the random effects be used was accepted.

The results of the Breusch-Pagan LM test of independence, Modified Wald Test for Groupwise Heteroskedasticity and the Wooldridge Test for Autocorrelation presents in tables III, IV and V in the appendix show a probability value of less than 0.05. Thus, the model suffered from contemporaneous correlation, heteroskedasticity and serial correlation. Therefore, the robust standard errors for panel regressions estimation was employed. The result obtained from the random effects estimation is shown in table 3.

Table 3: Random Effects Results of the Effect of CRR on NOPAT

	Dependent Variable: NOPAT		
Independent Variable	Coefficient	Robust Standard Error	Probability
Cash Reserve Ratio	0.0777	0.0279	0.005
Constant	9.6064	0.5248	0.000

Number of Observations	45
Wald Chi-Square Statistic	7.76
Prob. (Wald Chi-Square)	0.0054
R^2	0.2546

The probability value of the Wald chi-square test of 0 attest to the fact the overall goodness of fit of the model indicating that variation in the cash reserve ratio explains changes in the Net Operating Profit after Tax of the Tier 1 deposit money banks. Also, the result indicates that there is positive relationship between cash reserve ratio and banks' Net Operating Profit after Tax. Specifically, a 1 unit increase in cash reserve ratio will lead to a 0.08 per cent increase in Net Operating Profit after Tax of Tier 1 money deposit banks in Nigeria.

This findings agree with similar studies like Bawa et al (2018) and Uremadu (2012) reported a positive relationship between CRR and banks profitability. This position was further confirmed by Akanbi and Ajagbe (2012) and Onoh (2017) among banks in Nigeria. On the other hand, Tovar and Ocampo (2003) and Larrain and Cerda (2005) documented that increase in cash reserve requirements raise interest spreads and reduce bank profits.

Hypothesis Three: A change in Cash Reserve Ratio (CRR) does not have a significant impact on Return on Assets

Before interpreting the results from the estimation of the effects of CRR on ROA, first the Hausman test was carried out to decide between the fixed effects and the random effects models. The results as presented in table I in the appendix has a probability value greater than 0.05 hence, the null hypothesis that the random effects model is appropriate was not rejected. Next, the Breusch and Pagan Lagrangian Multiplier Test for Random Effects was conducted to ascertrain whether pooled OLS be used.

The probability value of the test as shown in table II in the appendix is less than 0.05 hence, we reject the null hypothesis that there are no significant differences across the banks, and conclude that the random effects is applicable.

Then, the Breusch-Pagan LM test of independence to check for contemporaneous correlation, the Modified Wald Test for Groupwise Heteroskedasticity and the