Development and compilation of macroprudential indicators for financial stability and monetary policy in Nigeria

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Abstract

This paper discusses the development and compilation of quarterly macro-prudential indicators and their relevance to financial stability and monetary policy management in Nigeria. The indicators are analyzed on time series basis to give insight to the level of soundness of the Nigerian financial system. The FSIs, complemented by stress testing of the system, serve as useful tools in evaluating the strengths and weaknesses of the financial institutions, as well as provide signals to the Monetary Policy Committee of the Bank for possible actions to ameliorate the vulnerabilities of the system. The results of recent macro-prudential analyses revealed that the Nigerian financial system was stable, robust and resilient to liquidity and funding shocks.

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1. Introduction

Although, the performance of an economy is determined to a large extent by the level of activities in the real sector, but the critical role of the financial system in sustaining a vibrant and stable economy cannot be over-looked. The stability, soundness and resilience of the financial system have received considerable attention in the recent time due to the continuous integration of the system which leads to increased capital mobility. It brought about the gradual collapse of the financial boundaries among nations while deepening and expanding the potentials of the impact of external financial shocks, as evidenced from the various financial crisis witnessed in the past, particularly the latest global financial crisis which began from the United States as a result of crisis in the sub-prime mortgage market in August 2007.

The beginning of a crisis in any financial system can be shocking, but there may be glaring signals of financial vulnerabilities in the system that could be used in the formulation and implementation of appropriate responses to prevent financial distress or mitigate its impact on the economy. For instance, in the wake of the global financial crisis, there was a widespread acknowledgment for the need to strengthen links among key components of the financial system, examine carefully how systemic risk varies over time, as well as study the robustness of the system when hit by shocks or systemic risk.

Analysts are of the view that, excessive risk-taking coupled with lack of strict macroprudential regulation as well as loose monetary policy was the major contributor to the crisis. Although, it is generally believed that banks survived and flourished on risks, but the risks must be well managed to avoid bankruptcy. Monetary authorities and relevant regulators have a fundamental role to play in ensuring financial stability by monitoring the performance of banks and other related institutions, but their collective actions were clearly not enough to prevent the crisis.

The crisis, has undoubtedly underscored the importance of a macroprudential approach to regulation so as to assess the soundness of financial systems as well as individual financial institutions. Regulators should not only concentrate on identifying banks that do not manage their risks well but should also develop a macroprudential orientation that comprises monitoring, regulation and supervision to identify how risk systematically evolved over time and distributed across a financial system at any given point in time. To achieve this and forestall the re-occurrence of such catastrophe, the international financial community, spear-headed by the International Monetary Fund (IMF) developed a new concept of macroprudential regulation that serves as early warning signals by exposing the vulnerability of the financial system.

This paper focuses on the development and compilation of macro prudential indicators for Nigeria as well as examines how the indicators are used in assessing the stability and soundness of the Nigerian financial system and for monetary policy purposes. To achieve this, the paper is structured into six sections. Following the introduction in this section, section two provides an overview of Nigeria's financial system. The development and compilation of financial soundness indicators (FSIs) are discussed in section three. Section four reviews the dimensions of application of macro prudential indicators for financial stability analysis and monetary policy purposes. Section five discusses the complementary role of stress testing in

assessing the financial strength and vulnerabilities of the banking system, while section six highlights the challenges and concludes the paper.

2. Overview of the Nigerian Financial System

The Nigerian financial system comprises both formal and informal sub-sectors. The formal sub-sector is made up of the regulatory authorities, money, capital and foreign exchange markets, insurance companies, brokerage firms, deposit money banks, development finance and other financial institutions. The informal sub-sector includes community-based organizations such as financial cooperatives, micro finance institutions, rotatory savings and credit associations, self-help groups and similar institutions. A major characteristic of the financial system is the weak relationship and integration of the informal sub-sector with the formal sub-sector.

At end-December 2013, the regulators/supervisory institutions remained the Federal Ministry of Finance (FMF), the Central Bank of Nigeria (CBN), the Nigeria Deposit Insurance Corporation (NDIC), the Securities and Exchange Commission (SEC), the National Insurance Commission (NAICOM) and the National Pension Commission (PENCOM). The operators included 24 deposit money banks (21 commercial banks, 2 merchant banks and 1 non-interest bank); 4 discount houses (DHs); 6 development finance institutions (DFIs); 82 primary mortgage institutions (PMIs); 821 microfinance banks (MFBs); 61 finance companies (FCs); 31 pension funds administrators (PFAs); 2,889 bureaux-de-change (BDCs)operators and 59 insurance companies.

The growth of the banking system in the post-consolidation period and the failure of the regulators/supervisors to develop commensurate supervisory capabilities created risks to the system in the late 2000s. Other interdependent factors such as macro-economic instability, weak corporate governance, and uneven supervision and enforcement combined to render the financial system vulnerable, and posed significant challenges to both regulators and other stakeholders. This development informed the CBN intervention in August 2009 through various initiatives aimed at enhancing the stability of the system. The high incidence of non-performing loans in the banking industry and the consequent erosion of the capital of some banks informed CBN's initiative to establish the Asset Management Corporation (AMCON) in 2010, to free such banks of the burden of toxic assets. The CBN also took steps to expose the banking system to global best practice in financial reporting and disclosure.

3. Development and Compilation of FSIs in Nigeria

3.1 The Origin and Relevance of FSIs

The idea of the FSI project was mooted shortly after the Asian financial crisis of the late 1990s. The crisis exposed an enormous data gap requirement for timely monitoring and intervention of the financial system by the monetary authorities and effective oversight of the member countries by the IMF. In order to solve this problem IMF launched some statistical initiatives including the compilation of FSIs,

to improve the coverage of potential financial and external vulnerabilities. FSIs are aggregate measures of the current financial health and soundness of the financial institutions in a country as well as their corporate and household counterparties.

Table 1: Financial Soundness Indicators: Core and Encouraged Sets

Core Sets	
Capital Adequacy	Regulatory Capital to Risk-Weighted Assets Regulatory Tier 1 Capital to Risk-Weighted Assets Nonperforming Loans net of provision to capital
Asset Quality	Nonperforming Loans to Total Gross Loans Sectoral Distribution of Loans
Earning and Profitability	Return on Assets (ROA) Return on Equity (ROE) Interest Margin to Gross Income Noninterest Expense to Gross Income
Liquidity	Liquid Assets to total Assets Liquid Assets to Short Term Liabilities
Sensitivity to Market Risk	Net Open position in Foreign Exchange to Capital
Encouraged Sets	
Deposit Takers	Capital to assets Large exposure to capital Geographical distribution of loans to total loans Gross asset position in financial derivatives to capital Gross liability position in financial derivatives to capital Gross liability position in financial derivatives to capital Trading income to total income Personnel expenses to noninterest expenses Spread between refence lending and deposit rates Spread between highest and lowest interbank rate Customer deposits to total (noninterbank) loans Foreign-currency-denominated loans to toal loans Foreign-currency-denominated liabilities to toal liabilities Net open position in equities to capital
Other Financial Corporations	Assets to total financial system assets Assets to GDP
Nonfinancial Corporations Sector	Total debt to equity Return on equity Earnings to interest and principal expenses Net foreign exchange exposure to equity Number of applications for protection from creditors
Households	Household debt to GDP Household debt service and principal payments to income
Market Liquidity	Average bid-ask spread in the securities market Average turnover ratio in the securities maerket
Real Estate Market	Real Estate Prices Residential Real Estate Loans to Total Loans Commercial Real Estate Loans to Total Loans

Source: *FSIs Compilation Guide, 2006*

The process of compiling FSIs began with a meeting of a group of experts, officials of member countries of the IMF, regional and international bodies and standard setters. The meeting agreed on the urgent need for additional information and identified some set of indicators that are required to reduce the identified data gap.

In the mid-2000, the IMF conducted a survey on the compilation and dissemination of macro-prudential indicators with a remarkable response from over 100 countries. This helped the IMF to identify a core set of financial soundness indicators that all member countries are expected to compile and an encouraged set of important indicators that countries are not compelled but encouraged to compile depending on the national circumstances. These indicators are presented in Table 1.

The IMF published a compilation guide on FSIs in 2006. The Guide provides guidance on the concepts and definitions, as well as sources and techniques for the compilation and dissemination of internally consistent, cross-country comparable sets of indicators that could provide information about the current soundness of the aggregate financial system. The innovative Guide combines elements of macroeconomic frameworks, including monetary statistics, banks supervisory framework and international financial accounting standards.

3.2 Compilation of FSIs in Nigeria

The major data source for the compilation of FSIs for Nigeria is banks statutory returns to the CBN, made up of Income and Expense Statements and Financial Balance Sheet of commercial and merchant banks. The FSI compilers download the bank returns from the electronic financial analysis and surveillance system (e-FASS) of the CBN to extract relevant data for computing the FSIs. The FSI compilation is, however, limited to those indicators whose underlying series are available in the statutory returns as shown in Table 2.

To strengthen its surveillance and supervision activities, the CBN using the FSI compilation guide compiled some macro-prudential indicators of the strength and stability of the financial system. These indicators are very important in the sense that they enable the evaluation of the system based on objective measures that include both aggregate micro-prudential indicators of the solvency of the financial institutions and macroeconomic variables related to the strength of the financial system. The IMF encourages countries to compile this type of indicators in order to start systematic monitoring of financial soundness and improve the possibilities to execute macro prudential analysis. This comprehensive set of indicators has been renamed financial soundness indicators (FSIs).

Available data are sufficient for compiling 11 core (out of 12) and four encouraged (out of 28) FSIs, which is well within the range of other countries' FSIs reported in the IMF website. The granularity of the current framework for reporting Income and Expense Statements and Financial Balance Sheet of banks in the eFASS does not support the compilation of the outstanding FSIs. However, the new user specification requirements of the Bank will ameliorate this data issue when fully implemented and Nigeria would then be able to compile all core and at least nine encouraged FSIs in the near future.

4. FSIs, Financial Stability and Monetary Policy in Nigeria

The Central Bank of Nigeria computes a group of macro prudential indicators for the purpose of analyzing the effects of macroeconomic variables on the financial system in order to pursue its goals of monetary and financial stability. When the

development in the key indicators are examined, it is possible to find some early warning signals that may imply the necessity to take certain economic policy action to avoid possible crisis in the financial system. However, the use of these indicators for financial system stability assessments and monetary policy decisions is quite recent.

Over the years, the CBN's monetary policies consists of a combination of actions aimed at ensuring monetary and price stability as well as promoting financial system stability. It therefore becomes pertinent to have coordination between actions taken towards each goal, as the achievement of each depends on the other. Appropriate monetary policy is desirous of financial stability and vice versa, and the maintenance of price stability requires a stable financial environment. Thus, policy actions taken for both goals must be consistent and mutually reinforcing.

The monetary policy in recent years was conducted against the background of the lingering effects of the liquidity crunch in the domestic economy, arising from the global financial and economic crises of 2007/2008 and internal problems in some deposit money banks in Nigeria.

Liquidity management was, therefore, geared towards improving the liquidity and efficiency of the financial market, without compromising the objective of monetary and price stability. Consequently, the monetary policy measures substantially improved liquidity conditions in the banking system and, to a large extent, ameliorated the capital erosion witnessed in the banking system in the late 2009.

4.1 Financial Soundness Indicators

The Central Bank of Nigeria (CBN) compiles both core and encouraged FSIs for deposit takers (DTs) in Nigeria. The compilation is limited to the indicators whose underlying series are available in the statutory returns of deposit money banks (DMBs) in Nigeria. The Bank has successfully computed quarterly series of FSIs for the period spanning 2007Q1 to 2013Q4 as reported in Table 2.

Eleven out of the twelve core FSIs are currently being compiled for the banking sector in Nigeria. These FSIs cut across four components of the indicators: capital adequacy, asset quality, earnings and profitability, and liquidity. The definition and methodology applied are explained hereunder.

4.1.1 Capital Adequacy Based Indicators

The three core indicators of capital adequacy are vital to the robustness of financial sector to withstand shocks to their balance sheets. Deterioration in the ratio signifies increased risk exposure and possible capital adequacy problems while an increase in the ratio means the reverse. *Regulatory Capital to Risk-Weighted Assets* ratio measures the capital adequacy of the banking sector in Nigeria. The numerator represents the industry position of the regulatory capital of all DMBs in the country, while the denominator is their Risk Weighted Assets (RWA) within the given period. Regulatory capital is defined in line with the provisions of the Basel Committee on

Tier 1 and Tier 2 capitals[2]. The international convention is that regulatory capital should not be less than 8.0 per cent of banks' risk weighted assets, while the required minimum ratio in Nigeria is 10 per cent for Regional and National banks and 15 per cent for International banks.

Regulatory Tier 1 Capital to Risk-Weighted Assets ratio measures the capital adequacy of the banking sector in Nigeria. The numerator represents the industry position of the Tier 1 capital of all DMBs in the country, while the denominator is their Risk Weighted Assets (RWA) within the given period. Tier1 capital comprises of paid-up capital, common stock and disclosed reserves such as retained earnings, share premiums, general reserves and legal reserves.

Nonperforming Loans net of provision to capital indicator is intended to compare the potential impact on capital of nonperforming loans net of provision. The numerator is treated in Nigeria as nonperforming when payments of principal and interest are overdue by three months or more. Specific provisions are deducted from the capital which is measured as capital and reserves reported in the sectoral balance sheet. In the alternative, however, regulatory capital can also be used.

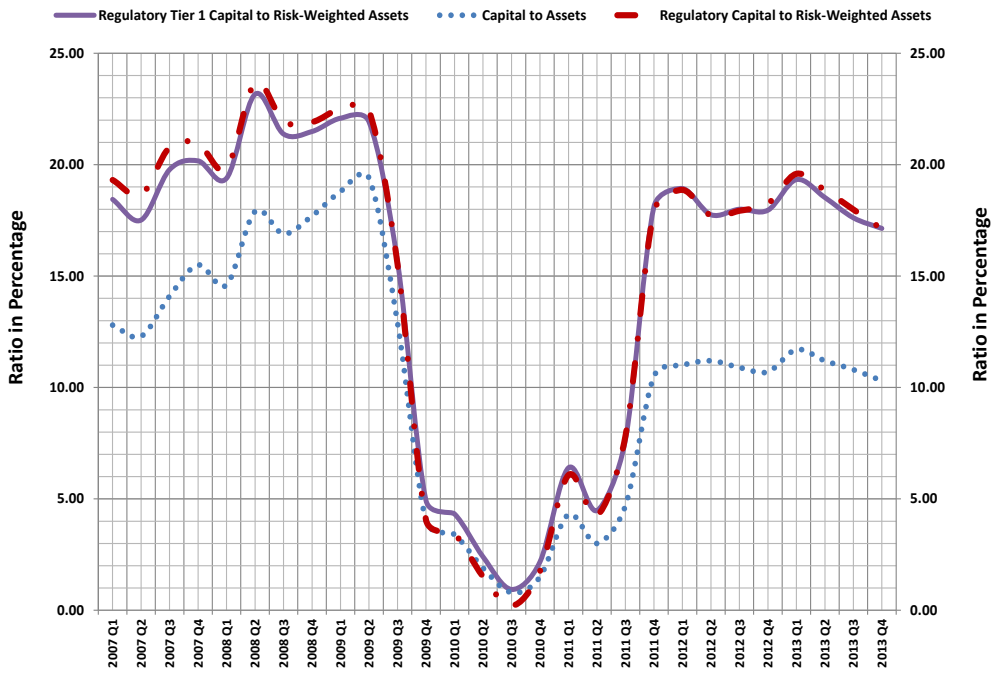

Fig 1: Trend in Capital Adequacy Based Indicators

[2] Tier1 capital is core capital, which includes equity capital and disclosed reserves.
Tier2 capital is supplementary bank capital that includes items such as revaluation reserves.

Table2: Selected Financial Soundness Indicators of the Nigerian Banking Industry*

(All figures in percentages, except otherwise indicated)

	2007 Q1	2007 Q2	2007 Q3	2007 Q4	2008 Q1	2008 Q2	2008 Q3	2008 Q4	2009 Q1	2009 Q2	2009 Q3	2009 Q4	2010 Q1	2010 Q2
1. Asset Quality and Liquidity Based Indicators														
Non-performing Loans to Total Gross Loans	8.9	7.7	7.6	8.4	7.1	4.0	4.6	6.3	6.5	8.5	20.8	27.6	34.8	28.8
Liquid Assets to Total Assets	26.6	24.7	25.7	21.2	23.6	20.7	17.7	14.7	13.8	12.9	7.6	10.5	13.0	12.3
Liquid Assets to Short Term Liabilities	31.7	29.2	32.3	26.7	29.6	27.2	23.1	19.1	18.3	17.1	10.2	13.6	15.0	13.6
2.Capital Adequacy Based Indicators														
Regulatory Capital to Risk-Weighted Assets	19.3	18.6	20.8	20.9	19.8	23.7	22.0	21.9	22.5	22.4	15.5	4.1	3.4	1.5
Regulatory Tier 1 Capital to Risk-Weighted Assets	18.4	17.5	19.8	20.2	19.4	23.2	21.4	21.5	22.1	21.9	15.6	4.9	4.3	2.4
Capital to Assets	12.8	12.3	14.1	15.5	14.6	17.9	16.9	17.7	18.8	19.4	12.9	4.0	3.4	1.9
Non-performing Loans Net of Provisions to Capital	15.0	11.9	12.4	11.1	11.4	3.5	5.5	9.1	9.5	12.5	38.9	106.8	268.0	289.8
3. Earnings and Profitability Based Indicators														
Interest Margin to Gross Income	52.6	62.3	60.7	1.4	56.6	52.4	62.7	61.2	60.2	60.0	51.1	59.1	54.0	51.9
Non-interest Expenses to Gross Income	61.6	51.1	50.7	29.1	58.4	57.1	59.8	62.6	61.7	68.0	78.2	137.4	88.3	65.7
Return on Assets	6.2	7.6	7.0	9.1	5.2	4.4	3.9	3.7	4.2	3.5	(1.5)	(8.8)	1.4	2.1
Return on Equity	48.5	55.0	44.2	57.2	32.0	23.0	22.0	20.7	22.7	17.7	(11.1)	(19.5)	39.9	110.0
Personnel Expenses to Non-interest Expenses	40.1	41.2	43.1	47.4	43.8	43.2	43.7	41.0	43.3	41.9	39.4	47.7	41.8	40.1

	2010 Q3	2010 Q4	2011 Q1	2011 Q2	2011 Q3	2011 Q4	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	2013 Q2	2013 Q3	2013 Q4**
1. Asset Quality and Liquidity Based Indicators														
Non-performing Loans to Total Gross Loans	35.6	15.7	12.0	10.8	9.1	5.3	4.2	4.3	4.1	3.5	3.8	3.7	3.4	3.2
Liquid Assets to Total Assets (Liquid Asset Ratio)	10.3	12.0	18.1	17.4	20.8	25.4	24.6	22.5	20.9	24.6	27.9	20.9	18.1	22.0
Liquid Assets to Short Term Liabilities	11.3	13.3	20.1	19.4	24.8	30.1	29.2	26.5	24.6	28.4	32.3	24.3	21.0	25.2
2.Capital Adequacy Based Indicators														
Regulatory Capital to Risk-Weighted Assets	0.2	1.8	6.1	4.2	7.8	17.9	18.9	17.7	17.9	18.3	19.6	18.9	18.0	17.1
Regulatory Tier 1 Capital to Risk-Weighted Assets	0.9	2.2	6.4	4.5	7.7	18.1	18.9	17.8	18.0	18.0	19.3	18.5	17.6	17.1
Capital to Assets	0.8	1.5	4.3	3.0	4.7	10.5	11.0	11.2	10.9	10.7	11.7	11.2	10.8	10.3
Non-performing Loans Net of Provisions to Capital	241.3	192.7	47.0	74.3	32.2	10.1	4.5	6.8	6.7	6.1	6.0	7.2	7.1	7.4
3. Earnings and Profitability Based Indicators														
Interest Margin to Gross Income	54.7	53.6	56.4	49.4	66.4	31.0	63.8	67.7	66.6	62.0	62.6	65.2	65.8	63.9
Non-interest Expenses to Gross Income	70.3	50.2	74.0	70.6	47.5	24.4	68.4	59.2	68.5	64.8	63.4	62.7	69.7	68.1
Return on Assets	2.2	3.9	1.6	1.7	(1.3)	0.2	1.6	2.8	2.3	2.3	2.8	2.8	2.5	2.1
Return on Equity	285.6	266.0	35.5	55.1	(27.1)	2.2	14.5	25.0	20.0	21.1	23.2	24.8	22.4	20.1
Personnel Expenses to Non-interest Expenses	39.4	36.8	39.6	41.1	18.6	67.8	43.6	39.3	40.4	42.5	40.0	39.5	36.1	36.9

**FSIs are computed based on IMF guidelines, **Provisional.*

Capital to Assets (CA) tends to reveal the leverage of the deposit takers by showing the extent to which assets are funded by other funds other than those that belong to the DTs. Both capital and assets are measured as in the core FSIs.

On the capital adequacy based indicators, it can be seen that the ratio of regulatory capital to risk-weighted assets (commonly known as capital adequacy ratio) fluctuated widely and peaked at 23.7 per cent in the first half of 2008. The capital adequacy ratio showed deterioration between Q4, 2009 and Q3, 2011, but improved considerably thereafter to 17.1 per cent at end-December 2013, which was well above the CBN minimum CAR of 10.0 per cent and 8.0 per cent benchmark recommended by the Basle Committee.

The ratio of Tier 1 capital to risk-weighted assets was also strong, indicating that the Nigerian banks are resilient to shocks on their balance-sheet items. The capital based indicators remained stable in the last three years, owing largely to CBN's intervention by setting up the AMCON in 2010 to absorb the prevalent toxic assets in the banking system. Similarly, the return on equity (ROE) improved, reflecting the competitiveness of the banking system. On the whole, the above scenario reflected a strong capital base for Nigerian banks as indicated in Fig 1.

4.1.2 Assets Quality and Liquidity Based Indicators

There are two core indicators for asset quality; namely: nonperforming loans to total gross loans and sectoral distribution of loans.

Nonperforming Loans to Total Gross Loans indicator shows the quality of assets created by the banking system. The numerator is the total value of loans that are overdue while the total value of the loan portfolio is used as the denominator. Loan include those financial assets created through the direct lending of funds by a creditor to a debtor through an arrangement in which the lender either receives no security evidencing the transactions or receives a non-negotiable document or instrument.

Sectoral Distribution of Loans reveals the level of credit concentration and/or diversification in the loan portfolio which may be a source of vulnerability to the financial system. The numerators are lending to each of the listed sectors while the denominator is total gross loan.

There are two core indicators for liquidity: liquid assets to total assets and liquid assets to short-term liabilities. *Liquid Assets to Total Assets* is indicator is designed to provide an indication of the liquidity available to meet expected and unexpected demands for cash. It is calculated by imposing the core or broad measure of liquid assets on total assets. Core liquid assets comprise of currency and deposits and other financial assets that are available either on demand or within three months or less. Broad liquid asset equals the core assets plus securities that are traded in liquid markets and can be easily converted into cash with no or minimal change in value.

Liquid Assets to Short-term Liabilities determines the liquidity mismatch of assets and liabilities and provides an indication of the extent to which deposit takers could meet short-term withdrawal of funds without facing liquidity problems. The core or broad measure of liquid assets is taken as the numerator while short-term liabilities are taken as the denominator. Short-term liabilities are the short-term elements of debt liabilities plus the net short-term market value of the financial derivatives.

The asset quality and liquidity based indicators revealed an improvement in the asset quality of the Nigerian financial system over the years. The ratio of non-performing loans to total loans stood at 3.7 per cent as at end-December, 2013, reflecting a significant decline below the level of 27.6 per cent at end-December, 2009. The improved position was attributable to stricter adherence by banks to credit risk management policies and standards. Also the level of liquidity in the system improved steadily during the period, as the ratio of core liquid assets to total assets increased from 16.5 per cent at end-December 2009 to 21.2 per cent at end-December, 2013. Similarly, the ratio of liquid assets to short-term liabilities increased from 22.3 per cent to 25.0 per cent during the same period. The trends in these indicators are illustrated in Fig 2.

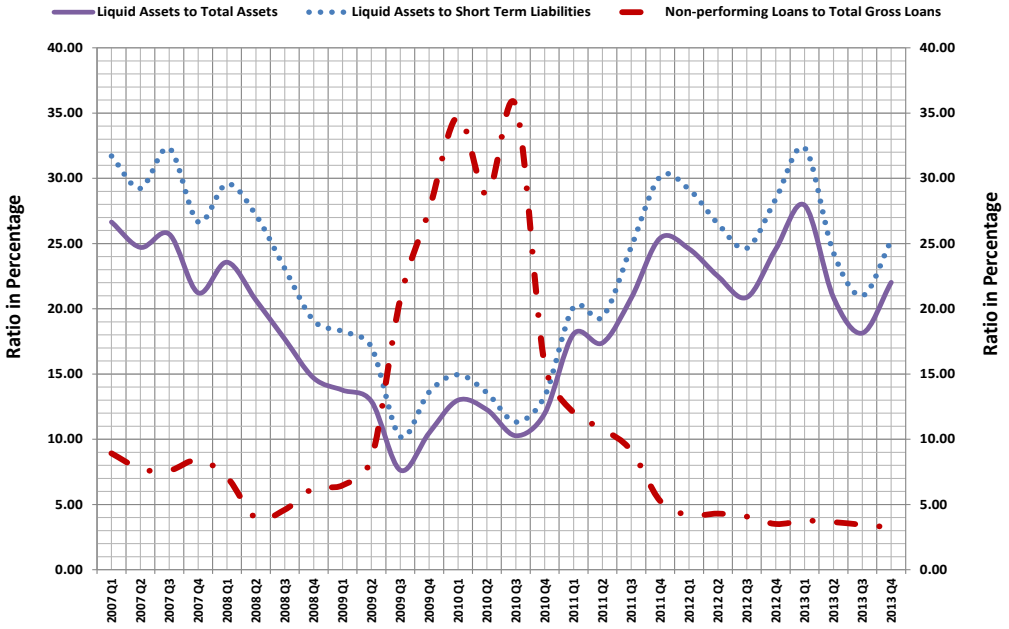

Fig 2: Trend in Assets Quality and Liquidity Based Indicators

4.1.3 Earning and Profitability Based Indicators

Return on Assets measures deposit takers' efficiency in the use of own assets. Net income according to the amended FSI Guide is defined before extra-ordinary items and taxes and includes gains and losses on financial instruments as per the provision of international financial reporting standard. *Return on Equity* measures deposit takers' efficiency in the use of capital. In this case, net income is divided by capital[3].

Interest Margin to Gross Income measures the relative share of net interest earnings – interest earned less interest expenses – within gross income. It is calculated by using interest income as the numerator and gross income as the denominator. Net interest income is interest income (gross interest income minus provisions for accrued interest on NPLs) minus interest expense. Gross income

[3] The definition of capital is given as above.

equals net interest income plus noninterest income such as fees and commissions' receivable, gains and losses on financial instruments, pro-rated earnings from other deposit takers and other income.

Non-interest Expenses to Gross Income indicates the size of administrative expenses to gross income (interest margin plus non-interest income). It is calculated by using non-interest expenses as the numerator and gross income as the denominator. Non-interest expenses cover all expenses other than interest expenses, but without provisions and extra-ordinary items.

There are three encouraged set of indicators under earnings and profitability, out of which two are currently being computed for the Nigerian banking sector. *Trading Income to Total Income* is a measure of the relative share of deposit takers' income from financial market activities in gross income. It is an indication of reliance on market-oriented activities in gross income. It also assesses the sustainability of the DMBs' profitability. The indicator is calculated by using gains or losses on financial instruments as the numerator and gross income as the denominator. Trading income comprises of gains and losses on financial instruments valued at market or fair value in the balance sheet. It excludes equity in associates, subsidiaries and any reverse equity investment. Gross income is as defined under core indicators.

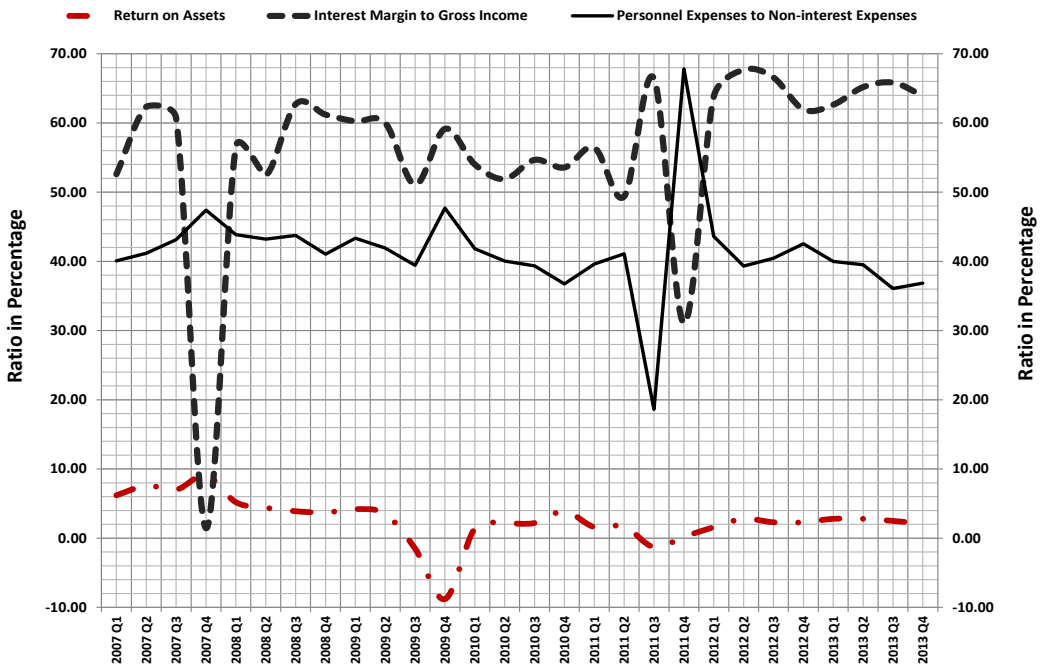

Fig 3: Trend in Earnings and Profitability Based Indicators

Personnel Expenses to Non-interest Expenses appraises the incidence of personnel costs in total administrative costs. It uses personnel costs as the numerator and non-interest expenses as the denominator. Personnel costs cover the total remuneration payable by the organization in return for services rendered by the employers. Non-interest expenses are as defined under the core FSIs.

With regard to the earnings and profitability based indicators, the ratio of interest margin (i.e. interest earned less interest expenses) to gross income remained in the range of 31.0 per cent and 67.7 per cent, except for Q4 2007 when it recorded 1.4 per cent. The ratio of non-interest expenses to gross income (a measure of the size of administrative expenses for banks) average 63.98 per cent during the period Q1, 2007 and Q4, 2013, and peaked at 137.38 per cent in Q4, 2009 with a minimum of 24.37 per cent attained in Q4, 2011. Similarly, the ratio of personnel expenses to non-interest expenses trended down to 36.9 per cent at end-December, 2013. Overall, the earnings and profitability based indicators revealed that the income and cost structure of the banking sector remained stable post crisis period, thereby confirming the sustained profitability posted by the sector in recent years.

5. Complementary Role of Stress Testing

As a complementary approach to assessing the financial strength and vulnerabilities of the banking system, stress testing is used to give information in addition to that provided by the FSIs. The relationship between FSIs and stress testing derives from the fact that FSIs are typically the output of stress tests. Specifically, an FSI provides a quantitative measure to assess a particular vulnerability, while the stress test, which is a shock to the relevant macroeconomic risk factor, yields an estimate of the FSIs associated with this vulnerability.

The CBN adopts stress testing as a means of identifying the vulnerabilities, and measuring the resilience of the Nigerian banking industry to various and varying shocks. The stress test is conducted under four scenarios: the entire banking industry; large; medium and small banks. The latest liquidity stress test was conducted by the CBN at end-December 2013, using the implied cash flow analysis (ICFA) and maturity mismatch/rollover risk approaches. The test was aimed at assessing the ability of the banking system to withstand liquidity and funding shocks. A solvency stress test was also conducted on the banking industry as at December 31, 2013 to assess the stability of the sector under various hypothetically strained macroeconomic conditions. The test results revealed that the Nigerian banking industry, in general, was resilient to liquidity and solvency stress in the second half of 2013.

The CBN has also, since 2010, consistently published its bi-annual Financial Stability Report as one of the several avenues through which the Bank seeks to contribute to the resiliency of the Nigeria financial system. The report combines the Bank's ongoing work in monitoring developments in the system, with a view to identifying potential risks to the overall soundness, as well as highlighting the efforts of the Bank and other regulatory authorities, to mitigate the risks. It is pertinent to note that macro-prudential analyses, including financial soundness indicators and stress test, are among the key features of the Financial Stability Report.

6. Challenges and Concluding Remarks

To strengthen the supervision over the financial sector, the regulatory authorities need adequate indicators of the strength and stability of the financial system. The macro prudential indicators are very important in this respect as they enable the regulators make evaluations based on objective measures. Macro prudential analysis closely complements and reinforces early warning systems and other analytical tools to monitor inherent vulnerabilities, using macroeconomic indicators as key explanatory variables.

The Central Bank of Nigeria uses a combination of macroeconomic and macro prudential indicators and the associated stress testing for financial stability assessment and monetary policy purposes. The indicators serve in measuring the soundness and vulnerabilities of the financial system in five key areas: capital adequacy, asset quality, liquidity, earnings and sensitivity to market risk. Currently, the CBN compiles eleven out of the twelve core FSIs for the banking sector and only four out of the twenty eight encouraged FSIs for deposit takers in Nigeria. The limitation in compiling the remaining indicators arises mainly from data challenges, which the Bank is trying to address through collaboration with other data generating agencies in the country.

Given the expertise required in compiling the FSIs, the CBN constituted an FSI Harmonization Committee comprising staff of Statistics, Banking Supervision, Other Financial Institutions and Monetary Policy departments. The committee is currently working on fine-tuning the metadata for the compiled FSI. Also, the Bank is exploring the feasibility of expanding the coverage of FSIs compilation to include the microfinance banks and mortgage institutions, which are major deposit takers engaged in microfinance activities and financing of real estate in Nigeria. Similarly, the Bank is reviewing and improving the data collection of the source data for the capture of sectoral distribution of loans and foreign currency exposure of the DTs. These efforts are expected to expand the number and improve the quality of computed FSIs in Nigeria.

Recent assessments using the FSIs and stress testing revealed that the Nigerian banking sector is stable, robust and resilient to liquidity and funding shocks. It was found that the quality of assets of the banking industry was good as the non-performing loans reduced drastically over time; the capital adequacy ratio of 17.2 per cent at end-December 2013 was well above the CBN minimum CAR of 10.0 per cent and 8 per cent minimum requirement of the Basle Committee; and earnings and profitability were satisfactory. These salutary developments were considered to be the fallout of the various initiatives and interventions by the CBN aimed at sanitizing the financial sector.

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