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Developing Banking System Stability Index for Nigeria

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Developing Banking System Stability Index for Nigeria[1]

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This study constructed a banking system stability index (BSSI) for Nigeria, using a combination of financial soundness indicators and macro-fundamentals. It applied statistical and Conference Board Methodology normalisation processes on Nigeria's banking and macroeconomic data from 2007Q1 to 2012Q2. The resultant index traced fairly well the episodes of crisis in the system over the study period. Hence, the BSSI is capable of acting as an early warning mechanism of signaling fragility. It could, therefore, be used as a complimentary regulatory policy tool to detect potential threat to enable monetary authorities take timely pre-emptive policy measures to avert crisis.

Key words: Banking system, stability index, macro-prudential analysis, financial soundness indicators.

JEL Classification: E580, G01, G17, E65

1.0 Introduction

The Asian financial crisis of 1997- 98, and the 2008 global financial crisis that originated from the United States of America have renewed efforts of monetary authorities to search for more effective frameworks for monitoring financial sector stability/fragility. Hence, more attention is being paid to policy discussions in this direction. Most of these attributed the crisis largely to excessive risk-taking by financial institutions and failure of regulation by the regulatory authorities.

Observers ascribed this failure to the authorities' preference for micro-prudential approaches, which only aim at preventing the costly failure of individual financial institutions. The strategy lies in the common belief that financial crisis occur randomly as a result of bad institutions failing, and eventually the failure becoming systemic. However, experience has revealed a different picture. Most recent crisis starts with a boom. During this period, majority of the financial institutions appear healthy, but during burst almost all appear sick.

[1]The views expressed herein are those of the authors and do not necessarily reflect the position of the CBN.

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The notion that some financial institutions are safe, while others are not is not consistent with a boom-burst cycle. Thus, a call for a gradual shift towards macro-prudential approach in financial stability analysis arose. In contrast to the micro-prudential approach, the macro-prudential emphasizes an all-inclusive slant to monitoring stability of financial systems by observing macroeconomic and market-based data, as well as qualitative and structural information. Financial soundness indicators (FSIs) play a vital role in this regard.

The International Monetary Fund (IMF) developed over forty FSIs as a new concept in macro-prudential analysis and regulation. Nigeria's FSIs, which release date from first quarter 2007, aim to serve as early warning signals of vulnerabilities in the banking system, in order to prompt policymakers' pre-emptive measures. However, for manageability, there is need to aggregate the most salient FSIs and selected macroeconomic variables into a composite index that would serve as a "one-stop-shop" in detecting fragilities that may have significant implications for financial system stability. Experts have proposed various analytical tools and early warning indicators. There is, however, no consensus on how to measure systemic fragility and which explanatory variables to include in the model.

This study aims primarily, to construct a banking system stability index (BSSI) for Nigeria using a set of selected statistically normalised FSIs and macro-fundamentals. The index, though backward looking, will serve to signal potential vulnerabilities in the system. In addition, there will be a validation of the statistically normalised BSSI with the Conference Board Methodology normalised BSSI to determine the authenticity of the derived series. To achieve its objectives, this paper is structured into six sections. Following the introduction is section two, which reviews relevant literature. Section three presents the theoretical framework, while section four contains the methodology for constructing the index and the validation procedure. Section five reports the results, while the last section concludes the paper.

2.0 Theoretical Framework and Literature Review

2.1 Theoretical Framework

Micro and macro-prudential supervisions are interlinked. Macro-prudential supervision cannot achieve its objective except it has some level of impact on supervision at the micro-level. Similarly, micro-prudential supervision cannot

effectively safeguard financial stability without adequately taking into account the developments at the macro level. However, it is pertinent to look at the theoretical literature on each level on its merit, in connection with safeguarding and ensuring system stability.

The paradigm of micro-prudential supervision views that risks arise from individual malfeasance. Therefore, micro-prudential regulation focuses on the stability of the components of a financial system. The regulation seeks to enhance the safety and soundness of individual financial institutions by supervising and limiting the risk of distress. The principal focus is to protect the clients of the institutions and mitigate the risk of contagion and the subsequent negative externalities in terms of confidence in the overall financial system. However, the fact that the financial system as a whole may be exposed to common risks is not always fully taken into account.

The theory of micro-prudential regulation is, oftentimes, based on some reasoning. Banks finance themselves with government-insured deposits. It has been argued that deposit insurance could effectively prevent runs (Bryant (1980) and Diamond and Dybvig (1983)). However, it could induce or create opportunities for bank managers to take excessive risks, knowing fully well that losses will be borne by the taxpayer. Interestingly, if the probability of the deposit insurer to bear losses is minimized to a considerable low level, micro-prudential regulation tends to have achieved its objective. The major objective of capital regulation is to ensure that banks absorb losses internally, thus protecting the deposit insurance fund and moderating any moral hazard. The key to capital regulation is the presumption that a bank will take some strategic actions to restore its capital ratio in the wake of losses.

Micro-prudential regulation has faced some other criticisms. For instance, when a regulating institution revives a troubled bank to restore its capital ratio, the regulator feels less concerned whether the bank adjusts via the numerator or via the denominator—that is, by raising new capital or by shrinking assets. Whichever method that is adopted, the bank's probability of failure is restored to a tolerable level, which is the interest of the micro-prudential regulator. Such indifference to the method of adjustment makes sense if the focus is on a single troubled bank. If that bank chooses to shrink its assets— perhaps by cutting down on lending or dispensing of its securities or other assets —others could pick up the slack. This re-sounds the healthy

Darwinian process, whereby market share is transferred from weaker troubled banks to their stronger peers.

However, if a large fraction of the financial system is in difficulty, a simultaneous attempt by many to shrink assets is likely to have damaging consequences on the economy. This introduces the down side effect of this action with attendant weak economic growth. Basically, generalized asset shrinkage has majorly two effects: credit-crunch and fire-sale. If banking institutions shrink their assets by cutting down, on fresh loans, this reduces investment and employment, with contractionary effect on the general economy. Where the banks shrink their assets by dumping the same illiquid securities (as in the case of toxic mortgage-backed securities in the US) the prices of these securities will fall sharply.

The "fire sale" situation was described by Shleifer and Robert (2010). However, the fire-sale and credit-crunch effects are interrelated (Diamond and Raghuram (2009), Shleifer and Robert (2010) and Stein (2010)). For instance, if the price of a toxic mortgage security drops to the point where it offers a (risk adjusted) 20 per cent rate of return to a prospective buyer, this will tend to increase the rate on new loans by 20 per cent as well—since from the perspective of an intermediary that can choose to either make new loans or buy distressed securities, the expected rate of return on the two must be equalized. In other words, in market equilibrium, the real costs of fire sales manifest themselves in the further deepening of credit crunches. Naturally, raising new capital is the generally preferred option. However, it is rather difficult for a troubled bank to convince its investors that the drive to shore-up is led by prospects for the future, rather than problems of the past.

The characteristic of macro-prudential regulation is its emphasis on the system as an entity. Macro-prudential regulation aims to identify macroeconomic risks in the economy (including macro-economic imbalances) and in the financial system, which may have implications for the stability of the system as a whole, and where necessary, advise on measures, which could be taken to address these risks. Undoubtedly, risks to the financial system could arise in principle, from the failure of one financial institution alone if, as in oligopoly, it is large enough in the country and/or with multiple branches/subsidiaries in other countries. However, the much more important systemic risk arises from a common exposure of many financial institutions to the same risk factors.

On theoretical grounds, it has been argued that macro-prudential regulation combines both "externalities paradigm" and "mood swings paradigm". The externalities paradigm dwells on the "pecuniary externality". This occurs when the action or otherwise of an economic agent affects another through the effects on the price channel. According to Greenwald and Stiglitz (1986), if imbalances like incomplete markets or information asymmetry exist in an economy, policy intervention would make everyone better off in a Pareto efficiency sense.

In Keynes (1936) mood swings paradigm, animal spirits, which cause excess optimism in good times and sudden risk retrenchment on the down side, influence the behaviour of financial institutions' managers. As a result, pricing signals in financial markets may be inefficient, increasing the likelihood of systemic distress. In this instance, the call for a macro-prudential regulator is certainly justified.

Drawing from above paradigms, it is appropriate to characterize the macro-prudential approach as an effort to control the social costs associated with excessive balance-sheet shrinkage on the part of multiple financial institutions if hit with a common shock. It is in this light, especially in the aftermath of the series of financial crisis that rocked the past two decades, that there is a growth in consensus towards macro-prudential perspectives. These perspectives rightly build macro financial models that link financial stability and performance of the economy that underscore systemic risk analysis, while assessing the exposure and risks to contagion.

2.2 Literature Review

There have been remarkable efforts since the Asian financial crisis to build models of early warning signals of distress by examining the causes of the crisis as well as measures of financial stability. These efforts were further heightened by the recent US-triggered financial tsunami. Kaminsky and Reinhart (1998) developed a model to detect currency and banking crises. They used the "signal extraction approach", which involves mainly the construction of a zero-one binary variable, where zero signifies no-crisis and one implies crisis. They identified 105 possible indicators that might indicate the possibility of crisis, but recognized 43 critical. Prominent among these are credit growth, international reserves, inflation and real gross domestic product. However, according to Nicholas and Isabel (2010) the disadvantages of binary variables are that they are less informative and are useful only in

assessing the condition of the domestic banking sector. The absence of full-blown crisis locally does not always imply that the sector is completely crisis-free.

Prior to the emergence of the Asian financial crisis, Doguwa (1996) proposed alternative early warning models for identifying problem banks in Nigeria using logit-analytic technique and financial ratios. The two separate models developed for commercial and merchant banks were found to be more efficient than earlier failure prediction models. The results revealed those banks that were known to be distressed and further identified the banks that were at the verge. However, during the period of the study the exposure of Nigerian banks to the external financial system was largely limited.

Demirguc-Kunt and Detragiache (1998) used a multivariate logit model of banking crisis to monitor banking sector fragility. The study identified that a group of variables, including macroeconomic, characteristics of the banking sector and structural characteristics of the country were robustly correlated with the emergence of banking sector crisis. The multivariate logit framework used historical incidents of previous crises over a cross-section of countries and time to identify a set of indicators, which would signal the likelihood of future problems. By and large, these models have been found to have real, but limited out-of-sample predictive power.

However, Jide (2003) designed an early-warning bank failure model to capture the dynamic process underlying the transition of the banks from soundness to closure, utilizing a transition probability matrix. He used "Instrumental Variables-Generalized Maximum Entropy formalism" to assess the likelihood of the banking sector experiencing distress via the evaluation of banking crisis probabilities. The framework is also used to assess the impact of hypothetical, but plausible macroeconomic and bank-specific shocks on the stability of the commercial banking sector over the medium-term. The informational approach performed well even when data was limited, ill-conditioned or when explanatory variables were highly correlated, making it an acceptable framework for the evaluation of bank failure dynamics.

In macro-prudential regulatory frameworks, rather than depend on individual and possibly fragmented indicators of financial crisis, a number of authors have succeeded in developing one-stop indices that serve as signals. The indices combine both domestic and external macroeconomic variables. Illing

and Liu (2003) developed a Financial Stress Index for the Canadian financial system. The index provided a single measure of macroeconomic financial stress, which they allowed to vary over a continuum of values, where extreme values reflect crises. The study conducted a survey on Canadian policy-makers and economists, whose responses fed into the model to determine the events that were most stressful for Canada.

Van den End (2006) advanced a financial stability condition index for the Netherlands. This index incorporated interest rates, effective exchange rate, real estate and stock prices, solvency of the financial institutions, as well as volatility of the stock index of financial institutions. Gersl and Hermanek (2006) also constructed an aggregate financial stability indicator based on the values of the IMF's core FSIs for the Czech National Bank. Similarly, the Central Bank of the Republic of Turkey (2006) constructed a financial strength index. The bank used six sub-indices covering capital adequacy, asset quality, liquidity, profitability, foreign exchange and interest rate risks.

On their own part, Wong et al (2007) used quarterly data spanning from the second quarter of 1990 to the first quarter of 2007 for eleven Asia-Pacific economies to identify and validate the key indicators of banking distress in the countries. They found that asset-price misalignment, default risk of commercial banks and the non-financial corporate sector as well as growth of real credit to the private sector were significant leading indicators. Economic growth, inflation and the ratio of short-term external debt to international reserves were found to be important determinants.

During the global financial tsunami, Cardarelli, Elekdag and Lall (2008) presented a financial stress index to signal the episodes of financial stress. They adopted an equal-variance weighted average of seven variables associated with stock market returns, foreign exchange, sovereign debt, international reserves and the risk, liquidity and profitability of the banking system. They applied statistical standardization to the variables and then summed up the individual components using weighted averages to arrive at the aggregate financial stress index.

Albulescu (2010) constructed an aggregate stability index for the Romanian financial system. The index composed of developments in the financial system, vulnerability, soundness and international economic climate indicators. The approach followed first, the normalization of the values of the indicators and thereafter aggregation of the normalized variables, which then

summed up into a chain index. Meanwhile, Verlis (2010) developed an aggregate financial stability index for Jamaica using banking system quarterly data over the period 1997 to March 2010. This index aggregated microeconomic, macroeconomic and international factors indicative of banking sector performance into a single measure of financial stability. The index was successful in capturing key periods of financial instability during the sample period. The Swiss National Bank (2012) developed a composite stress index that combined several variables that could represent symptoms of stress in the banking sector. These include banks' profitability and capital base, amongst others, which Hanschel and Monnin (2005) had included also in their study to determine the level of stress experienced by the banking sector at a given period.

This paper adapts the Nicholas and Isabel (2010) approach to constructing the BSSI for Nigeria. The approach combines banking soundness, vulnerabilities in the macro-economy and the influence of the external financial environment. In furtherance, this paper validated the derived index using the Conference Board Methodology (CBM), in addition to statistical normalization. Secondly, the weights of the index components were derived empirically, as opposed to the calibration method of Nicholas and Isabel (2010).

The concept of FSIs grew out of the need for better data and apparatus to gauge financial risks and vulnerabilities in national financial systems. Monetary statistics that has always been the interest of the IMF do not provide soundness and risk information. This information, however, is primarily available to national supervisors and focuses on the strength of individual banks. Besides, relating individual bank information to information for the sector was cumbersome. However, supervision needed to grow in parallel with the increasing interconnectedness of the global system. The contagion effect of the Asian crisis further underlined the imperativeness to think out of the box and shift from micro to macro-prudential approaches.

In line with this obvious challenge, the IMF met with relevant bodies in 1999 to brainstorm on the types of information needed to assess aggregate soundness, risk and vulnerability, as well as data availability. The meeting identified a number of important indicators that should be compiled. In the mid-2000s, the IMF conducted a survey on the use, compilation, and dissemination of macro-prudential indicators to address the dichotomies in the models for compiling the identified indicators. The responses from over 100

countries helped to identify a set of core FSIs that all countries should compile and an encouraged set that countries may wish to compile, depending on national circumstances.

Against this backdrop, the Fund published the 2006 IMF-FSIs Compilation Guide. The Guide provides the concepts, definitions, sources and techniques for the compilation and dissemination of internally consistent, cross-country comparable sets of indicators that could provide information about the current status of the financial system as an aggregate entity. The Guide combines elements of macroeconomic frameworks, incorporating monetary statistics, banks' supervisory framework and international financial accounting standards. The IMF then launched a voluntary Coordinated Compilation Exercise (CCE) in which sixty-two systematically selected countries participated. The CCE developed the capacity of member countries to compile the FSIs. The ultimate aim is to enhance transparency and strengthen the discipline of financial institutions of the member countries.

Contributing to empirical literature on warning signals, Bell and Pain (2000) contended that outcomes from signaling and multinomial regression approaches of measuring financial stability put forward that macroeconomic issues tend to be connected with an increased probability of a banking crisis. These include high real interest rates, low output growth, rapid domestic credit growth, falls in the terms of trade and high inflation. Kaminsky (2003) while examining crisis episodes for twenty industrial and developing countries using a variety of macroeconomic and financial indicators concluded that crises have not been created equal. Crises were found to be of six varieties, with all of them indicating the efficacy of macro approaches in their identification. Four of these varieties were associated with domestic economic fragility, with vulnerabilities related to current account deterioration, financial excesses, or foreign debt unsustainability. However, crisis could also be triggered by adverse world market conditions, such as the reversal of international capital flows. He identified sudden-stop phenomenon as the fifth cause. Finally, crises also happen in economies with ideal fundamentals. Accordingly, the last variety of crisis was labeled self-fulfilling.

Nonetheless, Nelson and Perli (2005) expounded that despite the different causes of financial crises, key financial variables behave in very similar ways during such periods. In particular, risk, liquidity, term spreads and implied volatilities all move significantly higher at those times. They argued that "as

suggested by economic theory, expected yields on risky debt instruments and equities relative to those on riskless assets vary with investors' assessments of risk and willingness to bear risk". Thus, spreads between the yields on securities widen when investors judge their relative risks to have increased. A sharp widening of these spreads has often been a component of financial turmoil.

As a result of the acknowledged drawbacks in the use of individual variables and bank ratios, Gadanecz and Jayaram (2009) identified some central banks that now make use of composite measures to reflect banking stability or fragility. These include the Czech National Bank, the Swiss National Bank, the Hong Kong Monetary Authority and the Central Bank of Turkey.

3.0 Methodology and Data

3.1 Derivation of Banking System Stability Index

The compilation of FSIs follows strictly the IMF-FSIs Compilation Guide 2006. Based on Nicholas and Isabel (2010) and the framework for IMF-FSIs[3], the following indicators are identified for the construction of the BSSI for Nigeria (Table 1). The indicators are grouped into three, Banking Soundness Index (BSI), Banking Vulnerability Index (BVI) and Economic Climate Index (ECI).

Banking Vulnerability Index focuses mainly on critical areas that mirror macro-fundamentals, vis-à-vis the external sector (the balance of payments, with emphasis on the current account), financial as well as real sectors.

Economic Climate Index largely reflects the performance of the country's major trading partners, vis-à-vis USA, UK and China, which account for approximately 40 per cent of external trade. It seeks to evaluate the perception of exposure of the banking system to the vagaries of these economies. Following Nicholas and Isabel (2010), the indicators of banking system stability require normalization so as to put them on a common scale. The study used both statistical and CBM normalization.

Using the statistical method, the BSSI is obtained by computing the weighted averages of the three sub-indices that emerged from the normalization process; namely:

[3]IMF framework is commonly used in the literature for early warning signals (EWS)

$$BSSI_t = \omega_1 BSI_t + \omega_2 BVI_t + \omega_3 ECI_t \quad (1)$$

$$\sum_{p=1}^{3} \omega_p = 1$$

where ω_p is the weight attached to each sub-index connoting its relative importance.

Table 1: Indicators of Banking System Stability Index for Nigeria[4]

Category	Indicator	Notation
1. Banking Soundness Index		
Capital Adequacy	Capital Adequacy Ratio	CAR
	Ratio of Non-Performing Loans net of Provisions to Capital	NPLP/C
Asset Quality	Ratio of Non-Performing Loans to Total Loans	NPL/TL
Liquidity	Ratio Liquid Assets to Total Assets	LA/TA
	Loans to Deposits Ratio	TL/D
Profitability	Return on Assets	ROA
	Interest Margin to Gross Income Ratio	NIM
	Non-Interest Expense to Gross Income	NIE/GI
2. Banking Vulnerability Index		
External Sector	Current Account Balance to GDP Ratio	CAB/GDP
	Ratio of Money Supply to Foreign Reserves	M2/FR
	Ratio of External Assets to Total Assets of DMBs	EA/TA
	Ratio of Foreign Currency Assets to Foreign Currency Liabilities of DMBs	FCA/FCL
Financial Sector	DMBs Domestic Credit to GDP	DC/GDP
Real Sector	Inflation	IF
	GDP Growth Rate	GDPR
3. Economic Climate Index		
	GDP Growth Rate of the US	GDPUS
	GDP Growth Rate of the UK	GDPUK
	GDP Growth Rate of China	GDPCH

In order to reflect the peculiar characteristics of the Nigerian banking sector, $\omega_{p,}$ are derived from the combination of the responses from the focused group discussions (FGD) with both regulators and operators of the banking system. The operators comprise of risk and strategy management officers of selected DMBs. The selection process applied a combination of stratified and

[4] Appendix 1 contains explanatory notes on the indicators.

purposive sampling methodology, whereby the DMBs were stratified by: randomised big, randomised small, foreign, bridge and non-interest.

Representatives were selected from each stratum, while the biggest (by total assets) three were purposively included. Thus, 16 DMBs participated. The regulators included the Deputy Governors and Directors of the relevant departments of the CBN.

Statistical normalization converts indicators to a common scale with a mean of zero and standard deviation of one. The zero average avoids introducing aggregation distortions arising from differences in the means of the indicators. The scaling factor is the standard deviation. The formula is given as:

$$Z_t = \left(\frac{X_t - \mu}{\sigma}\right) \quad (2)$$

where X_t represents the value of indicators X during period t; μ is the mean and σ is the standard deviation.

The BSSI is derived through double weighting:

$$BSSI_{t,ww} = \omega_s \sum_{i=1}^{8} \theta_{si} Z_{ts} + \omega_v \sum_{i=1}^{7} \theta_{vi} Z_{tv} + \omega_3 \sum_{i=1}^{3} \theta_{ci} Z_{tc} \quad (3)$$

$$\sum_{r=s,v,c} \omega_r = 1$$

Z_{tr} are the statistically normalized values of the indicators of banking system stability, 's' relates to the BSI, 'v' to BVI and 'c' to ECI. The weight of the individual statistically normalized indicator in each sub-index:

$$\theta_{ri} = \frac{u_i}{\sum_{i=1}^{U} u_i}$$

$$where\ r = [s, v, c] \quad (4)$$

Where u_i are responses that returned "high" in the consolidated responses from the FGD and U is the number of indicators in each sub-index. Therefore:

$$BSI_t = \sum_{i=1}^{8} \theta_{si} Z_{ts} \quad (5)$$

$$BVI_t = \sum_{i=1}^{7} \theta_{vi} Z_{tv} \quad (6)$$

$$ECI_t = \sum_{i=1}^{3} \theta_{ci} Z_{tc} \quad (7)$$

Using the Conference Board Methodology normalization process, the BSSI is derived as:

$$BSSI_{t,cbm} = \omega_s * L_{ts} + \omega_v * L_{tv} + \omega_c * L_{tc} \quad (8)$$

The weights ω_r are as defined under statistical normalisation.

L_{tr} $(r = s, v, c)$ are the CBM normalized values of the indicators of the banking system stability. To derive L_{ts}, the CBM normalisation uses quarter-on-quarter symmetric change Q_{tq} which is computed as follows:

$$Q_{tq} = \left(X_{tq} - X_{t-1,q}\right)$$

$$if\ the\ indicators\ are\ either\ in\ percentages\ or\ rates^5 \quad (9)$$

t - time (quarter in the review period, $t = 1, 2, \ldots T$)

q – specific indicator of interest

Now, let us consider σ_q as the standard deviation. These statistical measures are inverted: $\left(\frac{1}{\sigma_q}\right)$.

The sums are then calculated to derive: $\sum \frac{1}{\sigma_q}$.

The statistical measures are further restated as adjusted volatility measures R_q, where

[5] $Q_{tq} = \frac{200\left(X_{tq} - X_{t-1,q}\right)}{X_{tq} + X_{t-1,q}}$ $if\ the\ indicators\ are\ neither\ rates\ nor\ percentages$

$$R_q = \frac{\frac{1}{\sigma_q}}{\left(\sum \frac{1}{\sigma_q}\right)} \quad (10)$$

Such that $\sum R_q = 1$

Thus, the adjusted quarter-to-quarter symmetric change for quarter *t* and indicator X_1 represented as P_{tq} is given as:

$$P_{tq} = Q_{tq} R_q \quad (11)$$

The total of the indicators of the adjusted quarter-to-quarter symmetric change S_t in quarter t can then be presented as:

$$S_t = \sum_{q=1}^{n} P_{tq} \quad (12)$$

n – number of indicators in the sub-index

The initial indicator in the series (t = 1) denoted as L_1 is given by CBM as:

$$L_{1r} = \frac{200 + S_1}{200 - S_1} \qquad r = [s, v, c] \quad (13)$$

The sequential level of the series then obtained through iteration for the period t = 2, 3,...,T, denoted by L_{tr} in the following format:

$$L_{1r} = \frac{L_{t-1}(200 + S_1)}{200 - S_1} \quad (14)$$

$$\begin{cases} BSI_t = L_{ts} \\ BVI_t = L_{tv} \\ BCI_t = L_{tc} \end{cases}$$

Therefore, the BSSI using statistical normalisation has 0 as threshold, while the CBM has 1. The CBN, the United States Bureau of Economic Analysis and the National Bureau of Statistics of China serve as sources of data.

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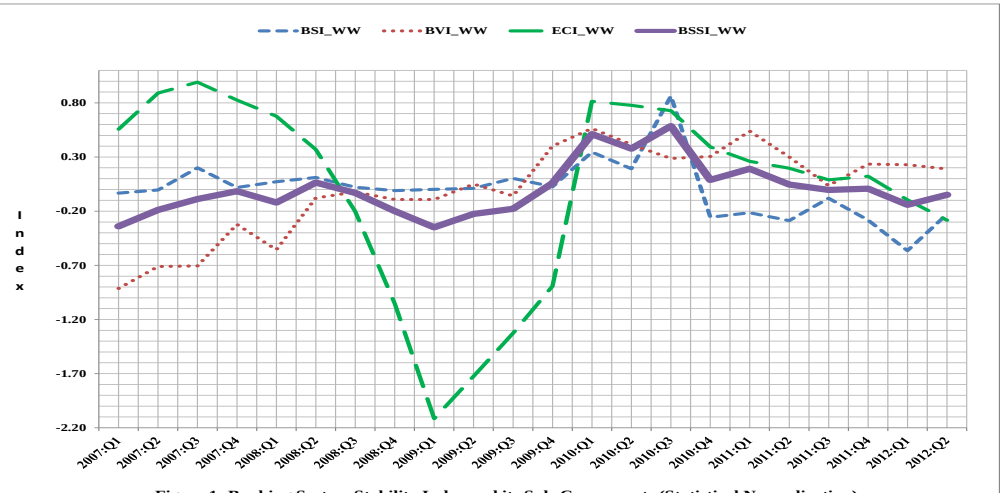

Figure 1: Banking System Stability Index and its Sub-Components (Statistical Normalization)

4.0 Interpretation of Results and Applicability of the BSSI

4.1 Interpretation of the BSSI

Figures 1 and 2 show the banking soundness index, banking vulnerability index and the economic climate index and their corresponding aggregate BSSI derived based on both statistical and CBM normalisation processes, BSSI_WW and BSSI_CBM, respectively. The trend of the indices is similar for both approaches, only the magnitude varies. Both indicate that, for instance, ECI was at its lowest level in 2009:Q1 and recorded the highest value in 2007:Q3. In the same vein, the BSI for both methods was at their highest levels in the third quarter of 2010. Importantly, the BSSI averaged its three sub-indices throughout the period of the analysis, implying that it is representative of its components.

Figure 3 depicts the BSSI for the Nigerian economy between 2007:Q1 and 2012:Q2 using both normalisation methods. However, being that the CBM series serve as validation, this analysis focuses on the aggregate index derived from the statistically normalised series (BSSI_WW)[6]. Thus, the BSSI expresses the indicators as their deviations from the mean. Zero is its

[6] The statistically normalised BSSI_WW, henceforth, will be referred to as BSSI in this analysis.

threshold. Any level above zero shows that the stability of the system is above average and the farther away above zero the index is, the more stable the system. Similarly, any level below zero is a reflection of instability. Additionally, increasing consecutive values of the index connote improvement, and vice versa. Generally speaking, the BSSI showed mixed results within the study period, indicating that while the banking system in Nigeria was stable at some time, it was not at others.

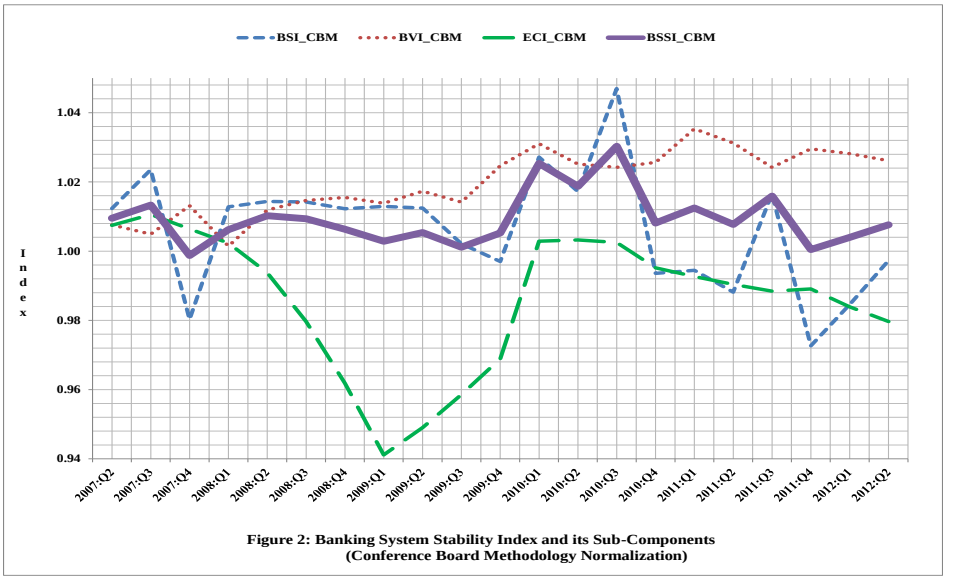

Figure 2: Banking System Stability Index and its Sub-Components (Conference Board Methodology Normalization)

4.2 Tracking Developments in the Banking System

The BSSI, as constructed, successfully depicts developments in Nigeria's banking system. Figure 3 reveals the index below the threshold largely. This trend implies system fragility, especially from 2007 to beyond third quarter 2009. However, the northwards movement of the index at the beginning of the series is attributable to the March 29, 2007 and April 13, 2007 releases of ₦105.54 billion and ₦145.68 billion, respectively, cash reserve ratio matured investments of the DMBs, following reduction in required reserves from 5.0 to 3.0 percent. The dip in quarter one 2008 reflected the lag impact of the aggressive monetary policy measures by the CBN in quarter four 2007, taken to meet the respective indicative targets set for the year. These included the use of OMO and vigorous sale of government securities in the primary

market, special sales and swap transactions in the foreign exchange market as well as upward adjustment of the MPR.

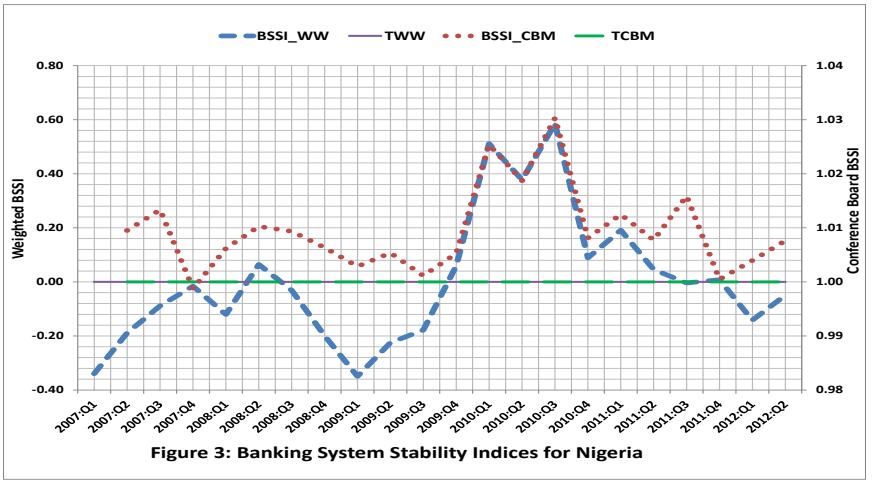

Figure 3: Banking System Stability Indices for Nigeria

Stability returned in 2008:Q2, arising from the Paris Club debt exit refund as well as the sharing of part of the excess crude proceeds by the tiers of government. Within the same period, four banks assumed the private sector liabilities of eleven of fourteen failed banks.

Conditions deteriorated from 2008:Q3 and the index bottomed-out in 2009:Q1, as a result of the spill-over effects of the global credit crunch, which manifested from end-August 2008. Outflow of portfolio investment from the capital market and exposure of intensified high risk margin lending abuse were characteristic. Huge exposures, in addition, came through the oil and gas sector and drying up of foreign credit lines. Poor asset quality pressured earnings and capital. Consequent compliance with CBN directives to increase provisions for loan losses further impacted on profitability and shareholders' funds. CAR plunged below prescribed 10 per cent minimum in 11 out of the 24 existing DMBs. Meeting minimum liquidity ratio of 25 per cent turned challenging, while chronic resort to the CBN discount window became a lifeline for maturing obligations – indicative of the absence of a robust liquidity management framework.

As a result, monetary policy in 2009 had to be aggressive in design and implementation. From January 2009, the CBN stationed resident examiners in the DMBs. It injected liquidity into some troubled banks, reviewed the MPR downward and provided guarantees on interbank transactions from July 2009. Occasioned by the two rounds of the joint special audit examination by the

CBN and Nigeria Deposit Insurance Corporation, the Bank injected ₦420.0 billion into five banks in August 2009 in the form of tier 2 capital and an additional ₦200.0 billion into five more in October 2009. The Bank further strengthened the Credit Risk Management System.

These policy efforts stabilized the system till the third quarter of 2010. Specifically, the index spiraled up to March 2010. Though the BSSI dipped slightly between the first and second quarters of 2010, improvement renewed. However, the decline in June 2010 reflected the withdrawal of Nigerian National Petroleum Corporation funds from the DMBs in May 2010 and the delay in sharing of the monthly statutory revenue to the three tiers of government, resulting in liquidity challenges. The Asset Management Corporation of Nigeria (AMCON) was established in third quarter 2010 as a special purpose vehicle for acquisition, management and disposal of non-performing assets. Its eventual purchase of over N3.3 trillion NPLs injected fundamental lifeline. Capital adequacy, asset quality and liquidity improved. Results of the December 2011 CBN stress test revealed stability. Although the key risks eased and the system remained stable up to fourth quarter 2011, there were swings reflective of the liquidity conditions.

The index fell below zero from 2012, mirroring the various policy measures to contain the threat of inflationary pressure. Nonetheless, the upward trend of the BSSI from second quarter 2012 reflected on-going reforms to further mitigate vulnerabilities and improve stability.

5.0 Summary and Conclusion

The Asian financial crisis of 1990s as well as the global financial and economic crisis of 2008 triggered the search for a framework for monitoring potential crisis in the financial system. Since regulators are said to have a share of the blame for their preference for micro-prudential regulation as against macro-prudential approach to regulation, there are concerted stern efforts by the regulatory bodies to design a composite macro-regulatory framework for monitoring the financial system so as to be able to detect potential as well as systemic crisis in the system in order to take proactive policy measures to avert them. This paper is an effort in that direction. Considering the increasing linkages among economies arising from globalization, the study combined the FSIs as proposed by the IMF with some

macro-fundamentals, including external variables to construct a BSSI for Nigeria.

The study applied Nicholas and Isabel (2010) approach on the normalized series, derived through statistical normalization to obtain the sub-indices used in the construction of the BSSI. However, the methodology of this study is an improvement on Nicholas and Isabel (2010). Unlike the authors who applied calibration, this study determined the weights of the sub-indices empirically, through FGDs with both regulators and operators in the Nigerian banking system. Furthermore, the study utilized the CBM normalised series to validate the statistically normalized BSSI.

The trend of the resultant BSSI obtained through both normalization processes followed almost the same pattern, only the magnitude varied. The index revealed mixed results within the studied period, indicating that while the banking system in Nigeria was stable sometimes, it was not at some others.

The study results mirrored fairly well the episodes of crisis in the Nigerian banking sector over the period covered, including the crisis that led to CBN interventions from 2009. It reveals the resiliency of the banking system in the face of adverse shock. Hence, the derived BSSI is capable of acting as an early warning mechanism for signaling fragility. Thus, the recommendation is that, it should be used as a complimentary regulatory policy tool to detect potential threat so that timely pre-emptive policy measures could be taken to avert crisis.

Despite the robustness of our results, it should be noted that the study faced some limitations, such as, the use of retrospective indicators, small sample size and non-inclusion of qualitative factors. It is the hope that future statistical research efforts would overcome these. This brings to fore the need to strategically position Nigerian banks to withstand potential negative external influences that may destabilize financial system.

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Appendix I: Notes on the Financial Soundness and Macroeconomic Indicators

Indicator	Remarks
	Capital Adequacy
CAR	Capital provides required funds for business operations and finances long-term lending. It is the fall-back in a period of shock. This ratio is a significant measure of health, which determines the degree of robustness to withstand shocks to balance sheets. The higher this ratio the better for system stability.
NPLP/C	NPL erode the capital base, increase vulnerability to liquidity strains and reduce capacity to withstand financial shocks. The NPLP/C is an important indicator of the capacity of the institutions to withstand losses from NPLs.
	Asset Quality
NPL/TL	Any factor, such as NPL, that strongly impacts on the industry's core function of financial intermediation will destabilize and even threaten its existence. Thus, NPL/TL is a vital indicator of asset quality and identifies problems in the loan portfolio. The lower this indicator the better.
	Liquidity
LA/TA	This measures the ability to meet short-term obligations and demands for cash. Banks' leverage on it to finance immovable assets, etc. A swing in this ratio could affect stability as it determines the ability to withstand shocks to balance sheets. Regulators normally prescribe its range.
TL/D	The ratio signals the industry's risk of over trading that could affect its capacity to meet short-term obligations to deposit liabilities. It reflects the propensity for illiquidity. Meeting depositors and other due obligations may be threatened if it falls below a regulator-prescribed minimum.
	Profitability
ROA	This is an indicator that measures the institutions' efficiency in using their assets. The higher the better.
NIM	NIM is a good litmus test for profitability in the core function of financial intermediation. It is the share of interest earned less interest expenses to gross income. A high ratio signifies low leverage.
NIE/GI	Administrative and other non-interest expenses reveal the efficiency in the use of resources. Operators should target to minimize NIE/GI, as a high ratio connotes a high share of non-core expenses and weakening earnings.

Appendix I: Notes on the Financial Soundness and Macroeconomic Indicators (Cont'd)

External Sector	
CAB/GDP	The impact of CAB/GDP is gleaned from the ability of the economy as a whole to meet its current obligations to the rest of the world. Trade deficits, e.g., require substantial capital inflows and raise sustainability concerns.
M2/FR	This indication of reserve adequacy measures the economy's ability to withstand external shocks and ensure the convertibility of the local currency. An economy should restrain the quantum of M2 chasing its reserves.
EA/TA	A measure of the external position of the industry, EA/TA compares the banking industry external investments to total assets. A high ratio signifies exposure to external shocks
FCA/FCL	Large industry exposure to foreign currency assets vis-à-vis liabilities, and a mismatch in the components of this ratio could trigger a systemic inertia in the short to medium term. The ratio reveals vulnerabilities to foreign exchange movements.
Financial Sector	
DC/GDP	A high measure depicting rapid loan growth compared to GDP growth precedes declining loan standards, system instability and eventual crisis. The indicator has a ceiling for the sector,
Real Sector	
IF	The inflation rate is a key factor in setting inter-bank cum deposit rates. Banks usually moderate the impact of high IF with upward adjustments in lending rates. This has attendant poor economic growth potentials. IF must be kept at a minimum.
GDPR	This aggregate measure of economic activities is a key factor in the empirical link between the real economy and the financial sector. A declining rate dulls economic activities, weakens debt-servicing capacity of borrowers with attendant effects on credit risk, amongst others.
Economic Climate of Major Trading Partners	
GDPUS GDPUK GDPCH	These are measures of the economic activities of Nigeria's major trading partners that constitute approximately 40 percent of the country's import and export trade in goods and services. Globalization gives impetus to their influences on the performance of the local banking industry.

Appendix 2: Normalized Series of Financial Stability and Macroeconomic Indicators: Statistical Normalization Method

Sub-indices	Variable	Country	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	2010:Q3	2010:Q4	2011:Q1	2011:Q2	2011:Q3	2011:Q4	2012:Q1	2012:Q2	Mean	Std Dev
V^s	CAR	Nigeria	0.68	0.60	0.85	0.86	0.74	1.18	0.98	0.97	1.04	1.03	0.25	-1.06	-1.13	-1.35	-1.50	-1.33	-0.83	-1.04	-0.63	0.52	-1.31	0.50	*0.00*	*1.0*
	NPLP/C	Nigeria	-0.39	-0.43	-0.43	-0.45	-0.44	-0.55	-0.52	-0.47	-0.47	-0.42	-0.20	-0.28	0.86	1.08	3.93	0.67	0.09	0.30	-0.32	-0.49	-0.54	-0.51	*0.00*	*1.0*
	NPL/TL	Nigeria	-0.12	-0.50	-0.51	-0.43	-0.57	-0.88	-0.81	-0.65	-0.63	-0.43	0.79	1.47	2.19	1.59	2.27	0.29	-0.07	-0.20	-0.36	-0.75	-0.85	-0.84	*0.00*	*1.0*
	LA/TA	Nigeria	1.21	0.85	1.66	0.46	1.16	0.84	0.25	-0.54	-0.65	-1.00	-1.53	-1.23	-1.10	-1.19	-1.49	-0.92	0.10	0.14	1.03	0.82	0.78	0.33	*0.00*	*1.0*
	TL/D	Nigeria	-2.18	-0.62	-0.25	0.74	-0.36	0.54	0.42	0.81	0.91	0.97	1.65	1.14	0.65	0.80	0.90	-0.18	-0.53	-0.94	-0.91	-1.24	-1.32	-1.01	*0.00*	*1.0*
	ROA	Nigeria	0.63	0.87	0.76	-0.96	0.46	0.38	0.32	0.32	0.41	0.21	-1.37	-3.68	0.03	0.25	0.20	0.98	0.13	0.11	-0.90	0.37	0.23	0.27	*0.00*	*1.0*
	NIM	Nigeria	-0.06	0.66	0.54	-3.88	0.23	-0.08	0.69	0.58	0.51	0.49	-0.18	0.43	0.05	0.04	0.06	-0.03	-0.16	-0.24	0.13	-1.45	0.89	0.77	*0.00*	*1.0*
	NIE/GI	Nigeria	-0.39	-0.75	-0.77	0.91	-0.50	-0.54	-0.45	-0.35	-0.38	-0.16	0.19	2.26	0.69	-0.03	-0.11	-0.80	0.06	-0.04	3.09	-1.36	-0.16	-0.40	*0.00*	*1.0*
V^s	CAB/GDP	Nigeria	0.58	0.50	0.46	0.55	1.53	1.96	1.37	-1.42	-0.28	-0.14	0.15	1.26	-1.02	-0.49	-0.96	0.13	-0.24	-0.21	-2.11	-0.88	0.00	-0.75	*0.00*	*1.0*
	M2/FR	Nigeria	-1.34	-1.24	-1.24	-1.21	-0.92	-0.91	-0.77	-0.64	-0.65	-0.47	-0.38	0.00	0.18	0.38	0.73	1.10	0.97	1.27	1.39	1.44	1.14	1.18	*0.00*	*1.0*
	EA/TA	Nigeria	1.01	2.47	0.33	0.07	-1.24	-1.02	-0.51	0.99	0.32	-0.67	-0.93	-1.09	-0.92	-1.36	-0.59	-0.85	0.18	1.18	0.35	0.35	1.06	0.87	*0.00*	*1.0*
	FCA/FCL	Nigeria	0.30	-0.22	1.03	0.89	-0.63	-1.39	-1.12	-1.26	-1.17	-0.70	-0.84	-0.97	1.20	-0.15	-0.23	-0.04	1.62	0.07	1.82	1.69	0.15	-0.06	*0.00*	*1.0*
	DC/GDP	Nigeria	-2.19	-1.51	-1.53	-1.30	0.11	0.44	0.02	-0.01	1.23	0.95	0.60	0.46	1.76	1.34	0.51	-0.43	0.59	0.05	-0.51	-0.86	0.15	0.13	*0.00*	*1.0*
	IF	Nigeria	-1.81	-1.44	-2.17	-1.40	-1.02	0.31	0.62	1.25	1.04	0.04	-0.21	0.90	1.18	0.95	0.81	0.24	0.54	-0.26	-0.24	-0.24	0.33	0.58	*0.00*	*1.0*
	GDPR	Nigeria	-1.18	-1.34	-0.32	0.97	-2.09	-1.13	-0.67	0.25	-1.74	0.58	0.43	0.79	0.50	0.80	0.97	1.44	0.24	0.83	0.53	1.02	-0.64	-0.25	*0.00*	*1.0*
V^e	GDPR	US	0.22	0.43	0.74	0.63	0.38	0.14	-0.57	-1.71	-2.08	-2.24	-1.72	-0.34	0.49	0.76	0.89	0.71	0.47	0.50	0.36	0.53	0.74	0.66	*0.00*	*1.0*
	GDPR	UK	0.81	1.14	1.48	1.21	0.85	0.11	-0.87	-1.62	-2.13	-1.89	-1.19	-0.36	0.35	0.65	0.73	0.44	0.39	0.12	0.11	0.14	-0.13	-0.33	*0.00*	*1.0*
	GDPR	China	0.79	1.26	1.03	0.85	0.91	0.73	0.50	-0.09	-2.14	-1.09	-0.97	-1.73	1.38	0.85	0.56	0.03	-0.03	-0.09	-0.21	-0.32	-0.97	-1.26	*0.00*	*1.0*

Appendix 3: Normalized Series of Financial Stability and Macroeconomic Indicators: Conference Board Methodology Normalization

Adjusted Symmetric change	Variable	Country	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	2010:Q3	2010:Q4	2011:Q1	2011:Q2	2011:Q3	2011:Q4	2012:Q1	2012:Q2
Pts	CAR	Nigeria	-0.07	0.23	0.02	-0.12	0.41	-0.18	0.00	0.06	-0.01	-0.74	-1.23	-0.07	-0.21	-0.14	0.17	0.46	-0.20	0.38	1.08	-1.72	1.70
	NPLP/C	Nigeria	-0.03	0.00	-0.02	0.00	-0.10	0.02	0.05	0.01	0.04	0.21	-0.08	1.07	0.21	2.67	-3.07	-0.54	0.20	-0.58	-0.16	-0.05	0.03
	NPL/TL	Nigeria	-0.35	-0.01	0.08	-0.12	-0.29	0.06	0.15	0.02	0.19	1.15	0.64	0.67	-0.56	0.64	-1.86	-0.34	-0.12	-0.16	-0.36	-0.10	0.01
	LA/TA	Nigeria	-0.35	0.77	-1.13	0.66	-0.30	-0.55	-0.75	-0.10	-0.34	-0.50	0.29	0.12	-0.09	-0.28	0.54	0.96	0.04	0.83	-0.19	-0.04	-0.43
	TL/D	Nigeria	1.46	0.35	0.94	-1.03	0.85	-0.12	0.37	0.09	0.06	0.63	-0.47	-0.47	0.15	0.09	-1.02	-0.33	-0.38	0.03	-0.31	-0.07	0.29
	ROA	Nigeria	0.23	-0.11	-1.62	1.33	-0.07	-0.06	0.00	0.09	-0.18	-1.49	-2.17	3.48	0.21	-0.05	0.74	-0.81	-0.02	-0.94	1.19	-0.13	0.04
	NIM	Nigeria	0.68	-0.12	-4.16	3.87	-0.29	0.72	-0.10	-0.07	-0.02	-0.63	0.57	-0.35	-0.01	0.02	-0.08	-0.12	-0.08	0.35	-1.49	2.20	-0.12
	NIE/GI	Nigeria	-0.35	-0.01	1.58	-1.32	-0.04	0.09	0.09	-0.03	0.21	0.34	1.94	-1.48	-0.68	-0.07	-0.65	0.81	-0.09	2.94	-4.18	1.13	-0.23
	St		1.23	1.10	-4.32	3.27	0.16	-0.02	-0.19	0.07	-0.05	-1.03	-0.51	2.98	-0.97	2.88	-5.23	0.09	-0.64	2.84	-4.42	1.22	1.28
Ptv	CAB/GDP	Nigeria	-0.03	-0.02	0.04	0.40	0.18	-0.24	-1.14	0.47	0.06	0.12	0.45	-0.93	0.21	-0.19	0.44	-0.15	0.01	-0.77	0.50	0.36	-0.30
	M2/FR	Nigeria	0.04	0.00	0.01	0.12	0.00	0.06	0.05	0.00	0.07	0.04	0.16	0.07	0.08	0.14	0.15	-0.05	0.12	0.05	0.02	-0.12	0.02
	EA/TA	Nigeria	0.60	-0.87	-0.11	-0.54	0.09	0.21	0.61	-0.27	-0.40	-0.11	-0.07	0.07	-0.18	0.31	-0.11	0.42	0.41	-0.34	0.00	0.29	-0.07
	FCA/FCL	Nigeria	-0.21	0.51	-0.06	-0.62	-0.31	0.11	-0.06	0.04	0.19	-0.06	-0.05	0.88	-0.55	-0.03	0.08	0.68	-0.63	0.71	-0.05	-0.62	-0.09
	TC/GDP	Nigeria	0.28	-0.01	0.09	0.57	0.14	-0.17	-0.01	0.51	-0.11	-0.14	-0.06	0.53	-0.17	-0.34	-0.38	0.42	-0.22	-0.22	-0.15	0.41	-0.01
	IF	Nigeria	0.15	-0.29	0.31	0.15	0.54	0.12	0.26	-0.09	-0.40	-0.10	0.45	0.11	-0.09	-0.06	-0.23	0.12	-0.32	0.01	0.00	0.23	0.10
	GDPR	Nigeria	-0.06	0.42	0.53	-1.25	0.39	0.18	0.38	-0.81	0.94	-0.06	0.15	-0.12	0.12	0.07	0.19	-0.49	0.24	-0.12	0.20	-0.68	0.16
	St		0.76	-0.27	0.81	-1.16	1.04	0.27	0.08	-0.16	0.34	-0.31	1.03	0.62	-0.57	-0.09	0.14	0.94	-0.40	-0.69	0.52	-0.13	-0.20
Ptc	GDPR	US	0.16	0.23	-0.08	-0.19	-0.18	-0.52	-0.85	-0.27	-0.12	0.39	1.02	0.61	0.20	0.09	-0.13	-0.18	0.02	-0.10	0.13	0.15	-0.06
	GDPR	UK	0.24	0.25	-0.20	-0.27	-0.55	-0.73	-0.56	-0.38	0.18	0.52	0.62	0.53	0.23	0.06	-0.22	-0.03	-0.20	-0.01	0.02	-0.20	-0.15
	GDPR	China	0.35	-0.17	-0.13	0.04	-0.13	-0.17	-0.44	-1.52	0.78	0.09	-0.57	2.31	-0.39	-0.22	-0.39	-0.04	-0.04	-0.09	-0.09	-0.48	-0.22
	St		0.74	0.31	-0.41	-0.41	-0.86	-1.43	-1.84	-2.18	0.84	1.00	1.08	3.44	0.04	-0.07	-0.73	-0.25	-0.23	-0.20	0.06	-0.53	-0.43

Appendix 4: Computed Banking System Stability Index and its Sub-indices using the Two Approaches

STATISTICAL NORMALISATION PROCESS				
Qtr	BSI	BVI	ECI	BSSI
2007:Q1	-0.0328	**-0.9129**	0.5573	-0.3397
2007:Q2	-0.0043	-0.7108	0.8909	-0.1891
2007:Q3	0.2005	-0.7050	0.9912	-0.0885
2007:Q4	0.0183	-0.3223	0.8260	-0.0159
2008:Q1	0.0716	-0.5564	0.6769	-0.1205
2008:Q2	0.1108	-0.0778	0.3692	0.0643
2008:Q3	0.0208	-0.0228	-0.2023	-0.0313
2008:Q4	-0.0107	-0.0918	-1.0538	-0.1993
2009:Q1	0.0011	-0.0916	-2.1147	-0.3494
2009:Q2	0.0102	0.0503	-1.7233	-0.2251
2009:Q3	0.1027	-0.0586	-1.3259	-0.1780
2009:Q4	0.0256	0.4006	-0.8921	0.0591
2010:Q1	0.3451	0.5641	0.8147	0.5115
2010:Q2	0.1919	0.4161	0.7775	0.3776
2010:Q3	0.8626	0.2862	0.7271	0.5853
2010:Q4	-0.2564	0.3045	0.3924	0.0889
2011:Q1	-0.2150	0.5388	0.2595	0.1910
2011:Q2	-0.2871	0.3000	0.1963	0.0458
2011:Q3	-0.0809	0.0359	0.0897	-0.0038
2011:Q4	-0.2826	0.2348	0.1231	0.0078
2012:Q1	-0.5639	0.2289	-0.0962	-0.1415
2012:Q2	-0.2275	0.1897	-0.2834	-0.0493
MIN	**-0.5639**	**-0.9129**	**-2.1147**	**-0.3494**
MAX	**0.8626**	**0.5641**	**0.9912**	**0.5853**

CONFERENCE BOARD METHODOLOGY NORMALIZATION PROCESS				
Qtr	BSI	BVI	ECI	BSSI
2007:Q1	-	-	-	-
2007:Q2	1.0123	1.0076	1.007	1.010
2007:Q3	1.0235	1.0049	1.011	1.013
2007:Q4	0.9803	1.0131	1.006	0.999
2008:Q1	1.0128	1.0015	1.002	1.006
2008:Q2	1.0144	1.0119	0.994	1.010
2008:Q3	1.0142	1.0147	0.980	1.009
2008:Q4	1.0123	1.0155	0.962	1.006
2009:Q1	1.0129	1.0139	0.941	1.003
2009:Q2	1.0125	1.0173	0.949	1.005
2009:Q3	1.0021	1.0142	0.959	1.001
2009:Q4	0.9970	1.0247	0.969	1.005
2010:Q1	1.0272	1.0310	1.003	1.025
2010:Q2	1.0172	1.0252	1.003	1.019
2010:Q3	1.0470	1.0242	1.003	1.030
2010:Q4	0.9936	1.0256	0.995	1.008
2011:Q1	0.9945	1.0354	0.993	1.012
2011:Q2	0.9882	1.0313	0.990	1.008
2011:Q3	1.0166	1.0242	0.988	1.016
2011:Q4	0.9727	1.0296	0.989	1.000
2012:Q1	0.9846	1.0282	0.984	1.004
2012:Q2	0.9973	1.0261	0.980	1.008
MIN	**0.9727**	**1.00146**	**0.9411**	**0.9988**
MAX	**1.0470**	**1.03535**	**1.0106**	**1.0303**