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The Impact of Bank Capital Regulation on Economic Activity in Nigeria: A Macro-Econometric Simulation

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ABSTRACT
This paper provides new evidence on the effects of bank capital requirement in Nigeria. In investigating the impact, we set up a simple model of the banking firm which can detect the impact of capital regulation on banks' behaviour as well as having possible effects on the economy. In estimation, we use time series data covering the year 1970- 2009. We employed both OLS and vector error correction method of estimations. The results of the two methods were not significantly different. The simulations based on vector autoregressive (VAR) method indicate the importance of growth of economic activity (growth of GDP) as a major determinant on change in deposits and change in loans.

Keywords: Bank Capital Requirement, Bank Regulation, VEC, VAR, Simulation and Economic Activity.

1.0: INTRODUCTION

The increasing integration of international financial markets poses new challenges to domestic financial market everywhere, especially in developing countries. The financial crises of the last decades (80's & 90's) sounded wake-up calls to most developing countries, indicating that regulation and supervision needed to be strengthened substantially. Since then, important steps have been taken to set rules and ensure their implementation (Barbara 2001).

At international realm, the basic capital Adequacy Accord (Basle 1), introduced in 1988. was a milestone in banking regulation. The 8 percent minimum capital requirement for internationally active banks, which was adopted by over 100 countries (developed and developing), clearly improved financial stability (Yudistira, 2003). In spite of many convincing argument for Basic Accord, there are concerns in developing countries of possible negative impact in the early phase of its implementation (Imala, 2005 and Iganiga, 2010).

From theoretical and empirical sights, capital requirements lead to a sudden contraction of bank lending. i.e. the fixed minimum requirement of capital changes the behaviour of banks to shrink their balance sheets and in effect, it creates a slowdown in

the growth of the economy (Yudistira, 2003). The same concern has also been expressed for developing countries where the possible negative impact of capital requirements seems to be more relevant, giving a larger role of banking system in emerging countries. This paper is of special interest in Nigeria, especially in the period when her banking reforms programme is moving towards an advance stage and the effects of those implemented are being awaited by the populace.

The review of developments in the Nigerian banking and financial system indicates that the banking sector has undergone remarkable changes over the years, in terms of the number of institutions, ownership structure, as well as the scale of operations driven largely by the deregulation of the financial sector in order to conform with the international standards. As at the end of December 2009, insured banks stood at 25 with various sizes and degree of soundness. In Nigeria, there have been several empirical attempts to assess the performance of financial reforms (see Ikhide and Alawode, 1994; Ikhide, 1998, Soyibo and Adekanye, 1992; Sobodu, Akiode 1994 and Iganiga, 2010 among others). There are other studies that assess the performance of financial sector reforms in Nigeria in comparison to other countries in sub-sahara Africa (Soyibo, 1994; Aryeetey, 2000; Emenuga, 1998; Aryeetey, and Senbel, 1998 among others. Surprisingly, none of these studies has given a comfortable pass mark to financial sector reforms in Nigeria.

In an attempt to evaluate and predict the possible impact of bank recapitalization process on the behaviours of the banks and the economy in general, we draw experience from related literature. But the study differ from earlier studies in a slight manner. Instead of approaching the problem in a holistic manner, we set up a simple model of the banking firm which can detect the impact of capital regulation on banks' behaviour as well as having possible effects on the economy. Simulations of various forms shall be carried out taking into consideration not only the anticipated elements of the policy action but also the surprise elements. Apart from the paucity of indicators used as evaluation criteria, we believe, the results obtained can aid and guide further implementation of the policy at a more macro pattern.

To achieve the objective of this paper, the paper is sectionalized as follows, section 2 survey theories relating to the impact of capital regulations, and summarizes the major alternative empirical hypothesis developed from the theories. The study also reviewed briefly the banking sector reforms in Nigeria. Section 3 is devoted for methodology, while section 4 presents and analyses the results obtained in section 3.Sectiuon5 concludes.

2.0: RELATED LITERATURE

2.1: THE IMPACT OF CAPITAL REGULATIONS

The survey of evidence on the effectiveness of capital requirement indicates two significant aspects: the first concentration of the study is to investigate whether banks fulfill the capital requirements by increasing capital or by altering the risk-weighted assets. The literature begins with shrives and Dahl (1992) who use several periods of cross-section data on commercial banks in the US. They claim that the effectiveness of risk-based capital standard depends on how well the standard reflects the true risk exposure of the banks.

The second portion of the literature, and most relevant to this paper is to test whether the enforcement of capital requirements can lead to a contraction in banks supply of loans or best described as credit crunch. This particular channel describes how monetary shocks to balance sheet might affect the cost of finance for certain borrowers over and above the standard impact on finance costs of higher interest rates (Bernanke and Gertler 1995). Banks may shrink both assets and liabilities due to capital regulation which would impact the economy in terms of the slowdown of credit supply with a binding capital requirement such that additional is

needed to expand lending. However, banks may prefer to shrink rather to issue new equities due to the asymmetric information and lemons problems (Myers and Majluf, 1984). A formal analysis by Blum and Hellwig (1995) shows that relationship between bank equity and bank lending may amplify macroeconomic cycles, tempting banks to lend less when times are bad and to lend more when times are good. More rigorously, Holmstrom and Tirole (1997) have addressed the importance of capital as a determinant of investment, monitoring, interest rates and its macroeconomics implications for banks. From a sample model that captures equilibrium level of banks and firm in the credit market, they show that the macroeconomic magnitude of market-determined capital ratios as part of monitoring are procyclical which means higher during expansion and lower during recessions. By presenting the strong relationship between bank's asset side and liabilities side, Diamond and Rasan (2000) confirm that capital requirements have obvious effects in the short run which is credit crunch where as delicate outcome in the long run which creates banks to be more risky in their performance (Furfine 2000; Ito and Sasaki, 1998, Agung et al. 2001).

2.2: BANK CAPITAL REGULATION IN NIGERIA

This section briefly discussed bank capital regulation in Nigeria to further buttress the interest and implication of the study. The Nigerian banking system, prior to the introduction of the current reforms, did not fully facilitate economic development as it was characterized by a number of structural and operational inadequacies (Soludo, 2006). Soludo further argued that such inadequacies included low capital base, a large number of small banks with relatively few branches (89 banks with 3,382 branches), the dominance of a few banks (top 10 banks controlled about 51% of aggregate assets, 52% of deposits and 45% of aggregate credits), poor rating by regulatory authorities (as at December 2004, no Nigerian bank was rated very sound), others included over-dependence on public sector deposits and foreign exchange trading, the neglect of small and medium scale private savers, insolvency evidenced by negative capital adequacy ratios of some banks, poor asset quality etc (Soludo, 2004).

Examining the regulations from 90's, Adam (2005) stated that between 1990 and 1992, the authoritie adopted a set of measures to strengthen bank supervision and promote increased liability of the system. In 1990, the CBN issued the circular on capital adequacy which relate banks' capital requirements to risk-weighted assets. It directed the banks to maintain a minimum of 7.25 percent of risk-weighted assets as capital; it holds at least 50 percent of total component of capital in reserve; and to maintain the ratio of capital to total risk-weighted assets at a minimum of 8 percent from January, 1992. Effective from 1989, the minimum paid-up capital for commercial banks was increased from 10 million Naira to 20 million Naira, it moved to 50 million Naira in 1991. As at the end of 1997, paid-up capital have increased to 500 million Naira and again increased to 2 billion in year 2000. In 2001, the minimum paid-up capital for a new bank was raised from 1 billion Naira to 2 billion Naira and in June, 2004, the Governor of CBN announced that bank capitalization has been raised to 25 billion Naira effective from end of December, 2005 (Soludo, 2004 and (Nwaoba, 2010). This has been effective, those banks that could not meet up with the requirement has been asked to surrender their licenses.

2.3 THEORETICAL FRAMEWORK

Mckinnon (1973) provides a theoretical framework on the role of financial intermediationand financial system in economic development. In the framework, the functions of financial institutipons were seen as effective conduit for mobilization and allocation of capital through the equalization of supply of loanable funds and demand for investment funds. Iganiga (2010) also asserts that there is a link between financial policy reforms and money market operations such that the conventional Keynesian theory and policy opined that the impact of monetary can be transmitted to the rest of the economy through the monetary system. It is this

theoretical framework that Chiuri et al (2000) and Yudistira, (2003) adopted in their separate studies and on their steps we follow in the present study.

3.0: METHODOLOGY

In choosing our econometric approach we were aware of the well-known problem of identifying supply-driven contractions in intermediation. This problem, noted among others by Bernanke and Lown (1991), Ghosh and Ghush (1999) and Peek and Rosengren (1995), must be treated within any attempt to empirically model the interlink between bank balance sheet and sources of its shocks. In view of this, the methodology we follow in our econometric analysis is the one proposed by Peek and Rosengren (1995). The Peek and Rosengren frame work can be easily generalized in order to model the effect that changes in capital regulation might caused on deposits and loans of banks operating in Nigeria. In particular, capital shortages in the banks in our sample may have derived from two sources; the first is given by loan losses, which forced banks to write down capital; the second is due to changes in regulation which raised banks' capital ratio. In order to derive the implications of the two sources of shocks, a simplified version of the banks' balance sheet can be followed.

3.1 MODEL SPECIFICATION

In order to test for the effect on deposits and loan of a change to capital requirements, we use the Peek and Rosengren (1995) approach with some modifications composed to specifically convene the Nigerian case. Though time series data were used but stationarity tests were conducted for the series used, haven't realized the problem of trends that usually characterized such data. However, we are aware that such data may not reveal individual bank's specific effect, but a representation of what is happening at aggregate level shall be represented. To a slight different from the works of previous authors we introduced a specific variable that capture the specific effects of uncertainties on the policy actions which government can not neglect, if she's to follow the implementation of her policies to the latter.

The model thus takes a lead from the works of previous authors (Chiuri. et al, 2000 and Yudistira,, 2003) and as such specify as follows:

$$\frac{\Delta BD_t}{A_{t-1}} = a_0 + \frac{a_1 BK_{t-i}}{A_{t-1}} + \left(a_2 + \frac{a_3 BK_{t-1}}{A_{t-1}}\right) \times \frac{\Delta BK_t}{A_{t-1}} + a_4 \log(A_t) + a_5 \Delta R_t +$$

$$a_6 Y_t + a_7 PFD + \in_{1t} \quad \_\_\_\_\_ 1$$

$$\frac{\Delta BL_t}{A_{t-1}} = b_0 + b_1 \frac{Bk_{t-1}}{A_{t-1}} + \left(b_2 + \frac{b_3 BK_{t-1}}{A_{t-1}}\right) \times \frac{\Delta BK_t}{A_{t-1}} + b_4 \log(A_t) + a_5 LR_t + a_6 Yt +$$

$$A_7 PFD + \in_{2t} \quad \_\_\_\_\_ 2$$

The dependent variable of equation (1) is the change in deposits (ΔBD) and of (2) is the change in bank loans (ΔBL). Both variables and change in bank capital (ΔBK) are normalized at the beginning of the year of total assets (A_{t-1}) to reduce the potential heteroscedasticity problems with the error term. Banks are not expected to fall below the minimum capital requirement, rather it is anticipated to adjust capital or assets to satisfy the regulation. Banks with capital to asset ratio below the required minimum would either have their licenses revoked or sense pressure to shrink independent to the current capital stock. Thus, banks with poor capitalization is expected to have a sluggish growth in deposits or liabilities than phenomena, the tests include the beginning of the year capital to Asset ratio, with a_1 and b_1 are predicted to be positive. The a_2 and b_2 parameters define the effects of change in bank deposits and change in bank

loans to changes in bank capital respectively and they were predicted to be positive.

The effects of a bank to change in capital as a result of bank capital regulation are smaller for banks with higher initial capital regulatory ratio and higher for poor capitalized banks. As a result, parameters a_3 and b_3 are expected to be negative. Also, the inclusion of logarithm of total assets (A_t) is to control bank's size, other factors that may be important in controlling demand shocks are the deposit rate (DR) and lending rate (LR) as well as the growth of GDP (y). Thus, a_5 and b_5 are predicted to move positively (negatively) with changes in deposits (loans) whereas a_6 and b_6 are to be positive. The variable introduced to capture the extent of uncertainties (PFD) is expected to hanegative shocks on the policy targets.

In vector error correction (VEC) format equation 1 and 2 can be expressed as;

$\Delta Y_t = \Delta D_t + a_i \Sigma \Delta Y_{t-i} - \beta_i ECM_{t-i}$ _____ 3

Where

BD is change in Bank Deposit, BL is change in Bank Loan, BK is Bank Capital, A_t is Total Assets, R_t is change in Interest Rate, LR is Lending Rate, Y_t is the Growth of Economic Activity (GDP), PFD is a Proxy for Uncertainties while a and b are parameters to be estimated.

Where D_t represents the deterministic component including intercept. Y_t is the vector of all variables as defined in equation 1 and 2. and the error correction mechanism (ECM) shows the deviation of the dependent variable(s) from its long run path. We use E-view 7.0 econometric package for analysis.

3.2 DATA SOURCE AND MEASUREMENTS:

All the data used were obtained from the Central bank statistical bulletin (various issues) covering 1970-2009. The total bank deposit include, time, saving demand deposits. The GDP were expressed in growth rate while bank's total assets were in their logarithm form.

4.0 : EMPIRICAL RESULTS

Based on the models specified, we shall present the results of the estimates in two sections.

4.1: THE EFFECTS OF CAPITAL REGULATION ON BANK DEPOSITS

The results of estimates of equation (1) were reported in table 4.1 based on OLS and VEC methods. The coefficient of the initial bank capital requirement is strong and significant at 1 percent confidence level. This result corroborate the result obtained by Yudistra, (2003) for Indonesia. It implies that initial capital requirement clearly had a significant positive relationship on bank deposits during the sample period. However, the coefficient of $\underline{\Delta BK}$ shows a contrary sign (negative) and not statistically significant.

This is contrary to the result of Chiuri et al (2000). The result may be due to the fact that, there are other factors that can determine change in deposits other than $\underline{\Delta BK}$ in such country like Nigeria, this fact is supported by the curiosity of significant positive finding in the growth of GDP as the bench mark for deposit rate in Nigeria.

Parameter a_3 in the regressions is significantly negative as predicted by the capital crunch hypothesis, though, the coefficient obtained is large (0.98) indicating the characteristics of poor capitalized banks (see Chiuri et al (2000) and Yudistira, (2003)). Logarithm of total asset also turn out with right sign (positive) and significant. Which means, the size of banks have positive influence on the change in deposits. The bank deposit rates (DR) although positive but not statistically significant. Due to either asymmetric information or high marginal propensity to consume of the people, this variable may not be a significant factor determining the volume of banks depositsPolitical dummy factor, though prove insignificant but shows a tendency of negative relationship with bank behaviour.

The speed of adjustment of bank to disequilibrium in volume of deposits as

indicated by ECM is high (-0.96) and highly significant.

TABLE 4.1: Estimates of Changes in Deposits

Variable	OLS	VECM	
Constant	-0.20	0.17	
	(-0.85)	(5.49)	
$\frac{BK}{A}$	0.50	0.68	
	(3.38)*	(1.77)**	
$\frac{\Delta BK}{A}$	-0.28	-0.04	
	(-0.82)	(-0.41)	
$\frac{BK}{A} \times \frac{\Delta BK}{A}$	-0.91	-0.002	
	(-2.34)**	(-1.93)***	
Log (A)	0.01	0.02	
	(0.82)	(2.35)**	
ΔR	0.004	0.009	
	(0.23)	(0.565)	* = 1. Sig level
ΔGDP	0.71	0.007	
	(3.64)	(236)**	** = 5% Sig level
PFD	-0.013	-0.004	
	(-0165)	(-0.27)	*** = 10% Sig level
$\frac{\Delta BD_{t-1}}{A_{t-1}}$	--	0.28	
		(3.73) *	
ECM	--	-0.965	
		(3.48) **	
	$R^2 = 0.51$	$R^2 = 0.86$	
	$R^2 = 0.49$	$R^2 = 0.80$	
	DW = 2.14	DRC = 2.59E.08	

4.2: SIMULATION RESULTS:

We present the results of simulations based on variance decomposition and impulse response for change in deposits equation in table 4.2.

Table 4.2 Simulation Results of Change in Deposit.

Period	BKD	BKC	BKK	Δ BK	CBTA	LR	ΔGDP	PFD
1	1.20 (0.002)	99.6 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
2	83.2 (-0.67)	12.8 (-0.03)	0.32 (-0.006)	3.64 (-.03)	0.08 (-0.002)	0.08 (-0.004)	0.14 (-0.002)	0.05 (0.003)
3	42.2 (-0.07)	22.2 (0.09)	0.16 (0.003)	13.62 (0.08)	0.13 (0.04)	3.08 (0.041)	17.48 (0.096)	1.24 (0.025)
4	37.2 (-0.001)	26.41 (0.07)	1.49 (0.03)	13.94 (-0.04)	0.46 (0.02)	3.26 (-0.019)	15.96 (0.023)	1.39 (-0.01)
5	22.6 (0.87)	22.1 (-0.03)	1.79 (0.019)	12.04 (0.002)	0.43 (-0.006)	3.61 (-0.025)	13.96 (-0.02)	1.50 (0.0150)

6	34.5 (0.009)	20.3 (0.005**)**	1.86 (0.012)	14.24 (-0.05)	0.43 (-0.004)	3.82 (0.019)	15.56 (0.04)	2.21 (0.014)
7	36.7 (0.92)	21.2 (0.03)	2.24 (0.021)	16.5 (-0.05)	0.41 (-0.003)	3.61 (0.01)	16.24 (0.05)	2.49 (0.027)
8	28.8 (-0.029)	21.6 (0.012)	2.59 (0.018)	16.6 (-0.02)	0.48 (-0.007)	3.57 (-0.005)	15.9 (0.007)	2.60 (0.019)
9	36.2 (0.002)	21.3 (0.010)	2.64 (0.01)	17.04 (-0.03)	0.52 (-0.01)	3.58 (0.005)	15.9 (0.02)	2.73 (0.06)
10	15.3 (- 0.015)	20.2 (0.006)	2.68 (0.01)	17.99 (-0.04)	0.52 (-0.009)	3.63 (0.022)	16.63 (0.028)	2.77 (0.01)

The results in table 4.2 above shows the effects of a shock in the initial Bank Capital requirements (BKC) on the changes in (BKD) and other variables. The result indicates a negative shock in the third, fourth, eighth and tenth periods to a change in deposit s with a very low dynamic multipliers that ranged from 0.001 (4^{th} period) to 0.92 (7^{th} period) using variance decomposition, the result of the growth of economic activity (GDP) in the 3^{rd}, 4^{th} and 5^{th} period of analysis indicate a variation of 12.48, 10.96 and 8.96 percents respectively corresponding to variations of 32.0, 27.2 and 40.6 percent in bank deposits. The implication of these results is that, the large proportion of variation in bank deposits are determined by the growth of economic activity rather than some other endogenous variables of the Bank.

THE EFFECT OF CAPITAL REGULATION ON BANK LOANS

The results of estimates of equation (2) are reported in table 4.3 based on OLS and vector error correction (VEC) methods. Likewise in the equation on bank deposit, the coefficient of the initial bank capital requirement came positive in both methods. The implication of this result is that, a higher initial capital base of the bank commands higher loan to the public according to the result, a one billion increase in capital requirement of the bank will lead to 1.53 billion naira increase in the bank loans. Another important variable according to the result obtained is the change in economic activity proxied by a change in GDP the more the growth of economic activity the more will be the loanable fund available to be lent out by the banks. For instance, an increase in the growth of GDP will lead to a 4 percent increase in loans giving by the estimate of VEC, the error correction term that measures the speed of adjustment appeared high (0.97) and highly significant. The implication of this result is that, any disequilibrium caused by the introduction of new capital requirement shall be restored back in the long-run such that, the speed of adjustment to the equilibrium is at percent.

Table 4.3: Estimates of Changes in Loans

Variable	OLS	VECM
Constant	-0.35 (- 0.79)	0.24 (3.93)
$\frac{BK}{A}$	1**.53** (3.24)*	1.32 (1.85) ***
$\frac{\Delta BK}{A}$	-0.65 (-1.037)	-0.49 (-0.81)
$\frac{BK}{A} \times \frac{\Delta BK}{A}$	-0..005 (-2.83) **	-0.006 (-2.96)
Log (A)	0.029 (0.97)	0.06 (1.99)

LR	0.003 (0.15)	0.005 (0.14)
Δ G D P	0.04 (2.56) **	0.02 (2.74)
PFD	0.015 (0.38)	0.04 (0.51)
$\frac{\Delta BL_{t-1}}{A_{t-1}}$	-	0.62 (2.64)
ECM	-	-097 (-4.45)
	R^2 = 0.55 R^2 = 0.43	R^2 = 0.86
	DW = 2.17	R^2 = 0.80 DRC = 2.59E-08

We also present the results of our simulations for change in loans in table 4.4 below.

Table 4.4: Simulation Results of change in loans.

Period	BKL	BKC	BKK	Δ BK	CBTA	LR	ΔGDP	PFD
1	1.30 (0.002)	99.6 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
2	83.2 (-0.87)	12.6 (-0.03)	0.35 (-0.009)	3.64 (-.03)	0.08 (-0.002)	0.08 (-0.002)	0.17 (-0.005)	0.05 (0.003)
3	42.8 (-0.06)	21.2 (0.09)	0.16 (0.003)	13.62 (0.08)	0.13 (0.04)	3.08 (0.041)	17.48 (0.096)	1.24 (0.025)
4	37.2 (-0.001)	26.3 (0.07)	1.49 (0.03)	13.94 (-0.04)	0.46 (0.02)	3.26 (-0.019)	15.96 (0.023)	1.39 (0.01)
5	42.6 (0.87)	24.1 (-0.03)	1.79 (0.019)	12.04 (0.002)	0.43 (-0.005)	3.61 (-0.024)	13.96 (-0.01)	1.50 (0.0140)
6	s39.5 (0.009)	22.3 (0.006)	1.86 (0.012)	14.24 (-0.05)	0.43 (-0.004)	3.82 (0.019)	15.56 (0.04)	2.21 (0.014)
7	36.7 (-0.02)	21.8 (0.03)	2.24 (0.021)	16.5 (-0.05)	0.40 (-0.003)	3.61 (0.01)	16.24 (0.04)	2.49 (0.025)
8	38.8 (0.029)	21.5 (0.013)	2.59 (0.018)	16.6 (-0.02)	0.48 (-0.009)	3.57 (-0.006)	15.9 (0.007)	2.60 (0.019)
9	36.2 (0.012)	21.3 (0.017)	2.64 (0.01)	17.04 (-0.03)	0.58 (-0.01)	3.58 (0.009)	15.9 (0.02)	2.73 (0.012)
10	35.3 (- 0.016)	20.6 (0.006)	2.68 (0.01)	17.99 (-0.04)	0.62 (-0.007)	3.63 (0.012)	16.63 (0.028)	2.77 (0.01)

The result in table 4.4 above shows the effects of a shock in the initial bank capital requirements (BKC) on the changes in loan (BKL) and other variables. The result indicates a negative shock in the second, third, forth, seventh and tenth periods to a change in loans, with a very low dynamic multipliers ranger from 0.009 (4^{th} period) to 0.87 (5^{th} period) using variance decomposition, the result of the growth of economic activity (GDP) in the 3^{rd}, 4^{th} and 5^{th} period of analysis indicate a variation of 17.48, 15.96 and 13.96 percents respectively corresponding to variations of 42.8, 37.2 and 42.6 percent in bank loans. The implication of these results is that, the large proportion of variation in bank loans are determined by the growth of economic activity rather than some other endogenous variables of the banks.

5.0: CONCLUSION AND POLICY IMPLICATIONS

This paper has provided new evidence on the effects which a stricter enforcement of minimum capital discipline can have on bank intermediation in Nigeria. In this respect, the study did not limit its scope to the sample revision of capital ratios but have also carried out some simulations ahead of this period in which it was discovered that the growth in economic activity was determined by more change in deposits as well as an improvement in loan disbursement. Thus, capital regulation may not clearly address the distinct needs of our (Nigerian) economy.

Based on our results, some policy lessons are prescribed below.

1. It is clear that much remains to be done in the specific areas of regulation and supervision. Nonetheless, it is important to ponder on the apparent relationship that emerged whereby the tightest regulations are not necessarily found in the best performing banking systems. This may mean that strict regulations are important as the banking system begins to develop, but it may be possible to relax them somewhat in the long – run, if and when banks are to take greater responsibilities for their own behaviour.
2. The best regulatory and supervisory system also assume relatively stable macroeconomic environment i.e. the environment must be made stable.
3. Regulations should not be too tight as not to make the banks prefer to hold only the safest assets whether government bonds or loans to the largest and lowest risk customers in the private sector.

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APPENDIX

Phillip Perron Unit Root Test

PPT-sta		
$\frac{BK}{A} - \frac{\Delta BK}{A}$	-6.52	-
ΔBK/A	-6.13	-
ΔBD/A	-3.93	-
ΔBL/A	-3.91	-
BK/A	-5.13	-
DR	-1.29	- 6.03
LR	-2.88	-11.49
GDP	-0.48	-405
log (A)	-3.01	-8.48

Critical values

1% = -4.2605, 5% = -3.5514, 10% = - 3.2081

Co-integration Test (Granger method)

$e_{1t} = -0.002 - 1.29e_{1t-1} + 0.22\Delta e_{1t-1}$

t - (-0.031) (-449) (1.13)

$e_{2t} = 0.004 - 1.66e_{2t-1} + 0.47\Delta e_{2t-1}$

t - (0.30) (-5.61) (2.41)