

Liquidity and Performance of Nigerian Banks

**Kurotamunobaraomi Tamunosiki, Giami, Isaac Baribefe &
Obari, Owate Blessing**

Department of Accountancy,
Port Harcourt Polytechnic, Rumuola.

kurosiki4show@yahoo.com, billygiami1@gmail.com
mgbereblessing@yahoo.com

ABSTRACT

This study empirically investigated the interrelationship between liquidity and corporate performance of banks in Nigeria with the use of annual data from 1984 to 2014. The work utilized Cash Reserve Ratio, Liquidity Ratio and Loan-to-Deposit Ratio as proxies for liquidity; and Return on Shareholders' funds as the proxy for performance and applied finometric analyses that include Ordinary Least Square Regression, Johanson Cointegration, Granger Causality test and Error Correction Model. Empirical results indicate a significant negative short-run relationship between Cash Reserve Ratio and corporate performance as well as a positive relationship between Loan-to-Deposit Ratio and Liquidity Ratio on one hand and corporate performance on the other albeit significantly and insignificantly respectively. Also, Cash Reserve Ratio and Liquidity Ratio are statistically significant enough to influence Return on Shareholders' Fund in the long run, while the Loan-to-Deposit Ratio exhibits complacency in instigating Performance in deposit money banks in Nigeria; a position corroborated by the Causality results, implying that other factors could be responsible for banks' performance such as industry structure and government policies or regulations. Consequently, it is recommended that regulators such as the Central Bank of Nigeria may need to deliberately reconsider banks' capital reserves ratio as negative relationship found in this study points towards that direction in order to increase the corporate performance of banks, banks should avoid excess liquid assets, banks should fully utilize the loan to deposit ratio by increasing marketing effort.

Keywords: *Return on Shareholders' Funds, Cash Reserve Ratio, Liquidity Ratio*

INTRODUCTION

Liquidity management in banks has posed several challenges during the distress era of 1980s and 1990s and persisted to the re-capitalization phase in 2005 when banks were mandated to have an increased capital base from ₦2 billion to an astronomical ₦25 billion (Agbada & Osuji, 2013). The apex bank's mandate for recapitalisation was considered to be the salvation for the banking and indeed financial system in Nigeria, however, just five years later, precisely 2009, the Central Bank's intervention was sought to stabilize and redeem five banks that were deeply enmeshed in illiquidity. Consequently, ₦620 billion was injected into the five affected banks to stimulate stability, and confidence and subsequently heralded the establishment of Asset Management Corporation of Nigeria (AMCON) for the acquisition of affected banks.

Alshatti (2015), brought to light the fact that Banks are largely exposed to various types of risks attributable to liquidity management, which affect the performance and activity of these banks. Admonishing that since the primary goal of the banking management is to maximize the shareholders' wealth, banks should assess the cash flows and the assumed risks in order to direct its

financial resources in different areas of utilization. Ibe (2013) emphasizes that Liquidity plays a vital role in the successful functioning of a business firm; a firm should ensure that it does not suffer from lack-of or excess liquidity to meet its short-term compulsions.

Also capacity of banks to perform their intermediation and credit creation roles in a manner that guarantees optimal profitability and minimum risk is greatly hinged on having adequate liquidity. This liquidity – profitability mix provides stability and confidence banks and the financial system in general as it is the panacea for confidence (Ogbuabor & Malaolu, 2013; Okoye & Eze, 2013).

Among all core banking principles, liquidity plays a crucial role as it is vital for survival of the banking business especially in risk prone business environments (ECB, 2010), given its capacity to make or mar any institution (Nwankwo, 1989). Little wonder Ibe (2013) opined that firms should identify and maintain optimal liquidity positions to avoid shocks attributable to scarcity or glut of it.

A preponderance of research has been conducted to investigate the inter-relationship between liquidity and corporate performance (Raheman & Nasr, 2007; Benjamin & Kamalavali, 2006; Saleem & Raheman, 2011; Bassegy & Moses, 2015) albeit, in the developed world. Also, these studies overwhelmingly use Return on Capital Employed (ROCE), Return on Equity (ROE), Return on Investment (ROI), Return on Asset (ROA), Earnings Per Share (EPS), Profitability Index (PI) etc., as measures of corporate performance. Consequently, this study adopts Return on Shareholders' Fund (RSF) as a measure of corporate performance as it is more encompassing and efficient in comparison with the others. Also, return on shareholders' funds is considered important because it is a narrower assessment of profitability when compared with return on capital employed and it therefore reveals to the investor a deeper insight into the profitability of a firm.

Consequently, the study empirically examines the nature of relationship between liquidity and performance by using Cash Reserve Ratio (CRR), Loan to Deposit Ratio (LDR), Liquidity Ratio (LR) to proxy liquidity and Return on Shareholders' Fund (RSF) to operationalize performance.

REVIEW OF RELATED LITERATURE

THEORETICAL FRAMEWORK

There is a plethora of theories that dwell on liquidity and performance. These theories include financial intermediation theory, securitization theory, commercial loan theory (also known as real bill doctrine), shift ability theory and anticipated income theory.

(a) Financial Intermediation Theory

Financial intermediation is basically a mediatory service performed by banks by linking economic agents with surplus funds and economic units with deficit funds. This is critical in capital formation for real investment (Allen & Santomero, 1998), reduction of informational asymmetries (Scholten & Wensveen, 2003). Intermediation provides banks with the capacity to mobilize deposit and provide credit (Diamond, 1984).

(b) Commercial Loan Theory

The essence of the theory is that short term loans are preferred by commercial banks as they will be repaid from the proceeds of transactions they facilitate and finance. A proposition that has been immensely subjected to criticism Dodds (1982) and Nwankwo (1992). Its antagonists argue that the theory is a deterrent to economic development especially for developing countries like Nigeria that require huge long term funds to provide a *big push* for development.

(c) Shift ability Theory

The shift ability theory is premised on the argument that banks' liquidity is a function of their capacity to acquire assets that are convertible or marketable to other lenders or investors should there be imminent need for cash. Noting that the banks' assets should be marketable to the Central Bank and other financial institutions at discounted values. Thus this theory recognizes marketability or transferability of a bank's assets is a basis for ensuring liquidity.

(d) Liability/Liquidity Management Theory

Liquidity management theory according to Dodds (1982) is a strategic plan on the acquisition funds from depositors and other creditors, and the determination of an appropriate (term based) mix of such funds for a particular bank. It focuses on the liability side of bank balance sheet on the ground that supplementary liquidity could be derived from the liabilities of a bank. Nwankwo (1992) supports this position by arguing that given banks' capacity to purchase all requisite funds, it is inappropriate to have liquidity on the asset side (liquid asset) of the statement of financial position.

(e) Anticipated Income Theory

This theory holds that banks' management of liquidity can be enhanced by adequate phasing and structuring of the loan commitments to the customers. According to Nzotta (1997) the theory focuses on the earning capacity and borrowers' credit worthiness as the ultimate guarantee for liquidity adequacy. It drives banks' transactions in self-liquidating commitments (Nwankwo, 1991); and encourages the adoption of ladder effects in investment portfolio of commercial banks (Ibe, 2013).

(f) Liquidity Preference Theory

Bibow (2005) highlights Keynes description of liquidity preference theory as "the transaction of current business and its use as a store of wealth." Elgar (1999) posits that liquidity preference is necessitated by the need finance expenditure, speculation on interest rate path, or due to uncertainty about the future. These motives became known as transactions-, speculative and precautionary motives to demand money.

CONCEPTUAL FRAMEWORK

Liquidity as a Concept

Liquidity is the capacity of business concerns to meet maturing financial obligations. It is also portrayed as the conversion and exchangeability of an asset for another in a timely and cost effective manner. Acharya & Naqvi (2012) views it as the speed and certainty of converting an asset to cash whenever at the discretion of the asset holder. A position corroborated by Anyanwu (1993) who posits that liquidity is the convertibility of an asset to cash with minimum cost or loss. In same vein, Kurotamunobaraomi (2016:22) adds that liquidity is "the capacity to exchange an asset at a negligible cost, price and (on) short notice, ... therefore adjudged among many others, on the grounds of its ability to facilitate transactions." Given its pivotal role, Jinghan (2010) asserts that banks need a high degree of liquidity in their assets portfolio. The bank must hold a sufficient large proportion of its assets the form of cash and liquid assets for the purpose enhancing customers' confidence and corporate performance (profitability). According to Spindt & Tarhan (1980), states that since banks operations are facilitated by liabilities from depositors, liquid assets constitute a sine qua non in the overall asset basket of banks.

From the foregoing, it is apparent that liquidity is defined by marketability, stability and conservatism. Marketability establishes the shift ability; transact ability and exchangeability of an asset for another with the capacity of being redeemed before maturity in an easy and prompt manner. Stability connotes value preservation. Consequently, liquid assets have fixed and relatively (in comparison with real assets) lesser price variability. Also, conservatism establishes assets holders' capacity to market the assets with minimal price impact.

Liquidity Components

Liquidity consists of the Vault Cash, Balances Held With CBN, Balances Held With Other Banks in Nigeria, Balances Held With Offices & Branches outside Nigeria, Money at Call in Nigeria, Inter-bank Placement, Placement with Discount Houses, Treasury Bills, Treasury Certificates, Investment in Stabilization Securities, Bills Discounted Payable in Nigeria, Negotiable Certificates of Deposits, Bankers Acceptances and Commercial Papers, Investments in FGN Development Stock and Industrial (Other) Investments (Olagunju, et al., 2011).

It is imperative for banks to have adequate and sufficient proportions of these liquid components as it helps mitigate funding risk, compensation for the non-receipt of inflow of funds if the borrower(s) fail to meet their commitments, and risk arising from calls to honour maturing obligations Nwankwo (1991). Inadequate liquidity culminates in the compulsion to liquidate assets at unfavourable prices which could instigate losses. Liquidity shortfalls also erode customers' confidence, leading to bank runs which could expose the bank to unnecessary borrowing from the Central Bank at which eventually subjects the bank to heightened scrutiny.

Measurement of Liquidity in Deposit Money Banks

An accurate measurement of liquidity require going beyond technical liquidity indicated by the stock flow approach to the assessment of the stock of circumstances likely to place under certain pressure that could in return affect its worth in the market place. This is to say that liquidity could be measured as a stock at a particular point in time or as a flow over time. However, due to analytical complexities, the former which constitute of loan-deposit ratio, cash reserve ratio, liquidity ratio, etc is commonly adopted.

The loan/deposit ratio as a measure of liquidity compares the aggregate value of loans with the total deposit. A high ratio is indicative of liquidity contraction, while a low ratio indicates the contrary (Nwankwo, 1991). The liquidity ratio is another measure for liquidity which is computed as a proportion of banks current liabilities such as deposit liabilities, short-term interbank loans, net balance with foreign branches and free balance with the central bank. The loan to liabilities ratio is also a measure of liquidity. It is an approach that recognises that liabilities other than deposit ratio represent potential drain on bank funds (Ibe, 2013). The liquid asset ratio is another tool for measuring liquidity. It allows assets to be selected on the basis of their liquidity, notwithstanding whether they are loans or investments. Furthermore, Cash ratio is another measure of liquidity. Ibe (2013), posits that the cash ratio is particularly effective for sterilizing excess liquidity in the banking system as it can be effectively monitored by the regulating authorities. Under cash ratio, liquid assets are related directly to deposits, rather than to loans and advances that constitute the most liquid illiquid of banks assets. Emezie (2015) asserts that the main measures of liquidity in Nigeria are the Cash Reserve Ratio (CRR), the Liquidity Ratio (LR), and the Loan-to – Deposit Ratio.

EMPIRICAL REVIEW

The nexus between liquidity measures and corporate performance has undergone appreciable empirical scrutiny from many scholars. The influx of liquidity management on the profitability of banks in Nigeria was investigated using a sample of three randomly selected banks in Nigeria. The study utilized cash and short term fund, bank balances and treasury bills and certificates to represent liquidity management, while profit after tax was the proxy for profitability. Elliot Rothenberg Stock (ERS) stationary test model was utilized to test the run association of the variables under study while regression analysis was used to test the hypotheses. The findings show the enormity of challenges posed by liquidity management in the Nigerian banking industry (Ibe, 2013).

Kurawa & Abubakar (2014) examined the impact of liquidity on banks' profitability in Nigeria. The systematic random sampling method was adopted to select five banks over the period 2003 – 2012. The linear regression analysis was used to reveal the absence of a significant impact between liquidity and profitability among banks in Nigeria.

Aremu (2011) investigated liquidity series of Nigerian banks to highlight aspects of vulnerabilities. The study focused on the Central Bank's Lender of Last Result (LOLR) policy may affect banking in the period of liquidity crises. Time series data were extracted from the three biggest banks (in terms of assets, capital base, turn over and branch networks) for the study. The Ordinary Least Square (OLS), Johansen co-integration, Error Correction Mechanisms (ECM), and Granger Causality tests were employed to show prima facie evidence that bank A and B are more liquid than bank C because proxies of liquidity series and Tobin's Q of the banks are significant.

Raheman & Nasr (2007) revealed a negative relationship between liquidity and profitability as well as a significant negative relationship between debts used by the firms and its profitability in a study which had average collection period, inventory turnover in days, average payment period, cash conversion cycle, current ratio, size of firm, and financial assets to total assets ratio as independent variables and net operating profit as the dependent.

Benjamin & Kamalavali (2006) had current ratio, quick ratio, inventory turnover ratio, working capital turnover ratio, debtor's turnover ratio, ratio of current asset to total asset, ratio of current asset to operating income, comprehensive liquidity index, net liquid balance sd independent variables while the dependent variable was return on investment (ROI) in an investigation that revealed a negative association between ROI and current ratio, cash turnover ratio, current asset to operating income and leverage. There was a positive association between ROI and quick ratio, debtor's turnover ratio, current asset to total asset and growth rate.

Saleem & Rehman (2011) examined the influence of liquidity ratios on profitability, with Return of Equity (ROE), Return on Assets (ROA), and Return on Investment (ROI) as exogenous variables, while the endogenous variables are current ratio, acid test ratio or quick ratio and liquid ratio. By adopting the linear regression model, the study provided evidence that ROA is significantly influenced by liquidity ratio but ROE is unaffected by other liquidity ratios. Agbada & Osuji (2013) studied the efficacy of liquidity management and banking performance to show evidence of a significant positive relationship between efficient liquidity management and banking performance.

Zygmunt (2013) recognized the liquidity impact on profitability in a study that consisted of all quoted Polish companies for 9 years (2003 – 2011) using Pearson's Product Moment Correlation and OLS regression model, to find that there is statistically significant relationship between liquidity and profitability.

Niresh (2012) studied the trade-off between liquidity and profitability using correlation analysis and descriptive statistics. The study of over 31 manufacturing firms quoted in the Colombo Stock Exchange (CSE) revealed that there is no significant relationship between liquidity and

profitability, thus concluded that manufacturing firms focus on maximizing profit while preserving liquidity.

Bordeleau & Graham (2010) determined the impact of liquid assets holding on bank profitability for a panel of Canadian and US Banks over the period of 13 years (1997 – 2009) through econometric analysis. Result suggests increased profitability for banks with some quantum of liquid assets, however, beyond a point, holding further liquid assets diminish a bank’s profitability. Further empirical evidence also suggests that the link between the duos is dependent on the bank’s framework and the economy in general.

Imad, et al. (2011) studied the link between banks profitability and liquidity in Jordan from pool data for the period 2001 to 2010. Having ROA and ROE as measures for profitability, the results show that liquidity in Jordanian banks significantly explains the variation in bank profitability. It also tends to be associated with well-capitalized banks, high lending activities, low credit risk, and the efficiency of credit management.

METHODOLOGY

Data was extracted from corporate financial statements of the firms under study from the Port Harcourt branch of the Nigeria Stock Exchange (NSE), as well as the relevant companies’ websites. The study employed data which consists of Cash Reserve Ratio, Liquidity Ratio, Loan to Deposit Ratio for Liquidity measures; and Returns on Shareholders Funds for Performance. The extracted from the statistical bulletin of the Central Bank of Nigeria (CBN), from 1984 to 2014 and analysed same using the Ordinary Least Square (OLS), Johansen Cointegration, Error Correction Model, Unit Root Test and Granger Causality Test.

Model Estimation

The model follows the Classical Linear Regression Model (CLRM) in line with the models of Saleem and Raheman (2011) the study thus formulates the model as:

$$RSF = f(CRR_t, LDR_t, LR_t) \text{-----} (1)$$

Converting to econometric form by the introduction of the constant term (α_0) and error term (μ)

$$RSF_t = \alpha_0 + \alpha_1 CRR_t + \alpha_2 LDR_t + \alpha_3 LR_t + \mu \text{-----} (2)$$

Where:

RSF	=	Returns on Shareholders’ Funds
CRR	=	Cash Reserve Ratio
LDR	=	Loan to Deposit Ratio
LR	=	Liquidity Ratio
α_0	=	Constant Term
$\alpha_1 - \alpha_3$	=	Coefficients of Predictors
μ	=	Error Term/Stochastic Variable

RESULTS AND DISCUSSION

It can be deduced from the Ordinary Least Square (OLS) output (in appendix below) that the coefficient of determination (R-squared) has a value of 0.636432 which is a portrayal that the endogenous variables constitute about 64% of the elements that predict the exogenous variable, implying that the stochastic (unobserved) features in the model constitute about 36%. The adjusted R-squared hovers around 60%. The *Durbin-Watson* is 2.6 shows absence of serial correlation. In addition, the standard error of the regression 0.033784 indicates the variability between the point

estimate and the population mean. The F-statistic shows a probability of 0.000004, which is below the 0.05 significance level shows that the probability is significant and the model successful.

With respect to the coefficients, the constant (C) has a value of 0.231338, whose implication is that if all the explanatory variables are held constant or pegged at zero (0), the explained variable – Corporate Performance will surge by 0.231338 units. This shows that regardless of change on the explanatory variables, Corporate Performance will be elevated. The variable – Cash Reserve Ratio (CRR) shows a negative coefficient of 0.952194, implying that where other predictor variables are held constant, a 1 unit change in the CRR will precipitate a 0.96 unit decline of Corporate Performance.

On the other hand, Loan-to-Deposit Ratio (LDR) and Liquidity Ratio (LR) show a positive direction as they possess coefficients of 0.217263 and 0.130466 respectively; indicating that where other variables are held at zero, a unit increase in LDR will boost corporate performance by 0.22 units while a unit increase in LR will culminate in a 0.13 expansion of corporate performance where other variables are held constant.

A consideration of the strength of relationships, using the t-statistic shows that only Liquidity Ratio whose t-statistics is 1.513102 relates insignificantly or weakly with corporate performance in the short run given its 0.1419 probability which is above the 0.0500 significant margin, while other explanatory variables show statistically significant short run relationships with the predictor variable – corporate performance.

The Augmented Dickey Fuller statistic is adopted for Unit Root Test. Given the conditions for acceptance, the ADF statistic values are higher than the Test Critical values at all (1%, 5% and 10%) levels, and the probability less than the 0.05 threshold, therefore the null hypothesis is not rejected and stationarity ascertained.

Therefore Johansen Co-integration test is considered to ascertain the long-run relationship of the variables. Results show that there is one co-integrating equation which met the acceptance criterion. Thus, the null hypothesis of no co-integration is rejected. The test statistics reveal a co-integrating relationship between the dependent variable and the independent variables. Thus, we conclude that there exists a long-run relationship between exogenous and endogenous variables.

Consequently, to adjust for variations from the equilibrium long-run relationship due to short-run systemic shocks, the Error Correction Model (ECM) is considered.

The ECM estimation results (**in appendix below**) reveal that the independent variables jointly account for approximately 51.45 percentage changes in Return on Shareholders' Fund, dependent variable. Therefore, a 51.45% adjustment is required to attain the equilibrium long-run relationship.

The Pair-wise Granger Causality tests were performed subsequently to reveal that:

- i. Uni-directional causality prevails between Liquidity Ratio (LR) and Return on Shareholders' Fund (RSF). The direction of influence stems from Liquidity Ratio (LQ) to Return on Shareholders' Fund (RSF).
- ii. Uni-directional causality stems from Cash Reserve Ratio (CRR) to Return on Shareholders' Fund (RSF).

Implications and Recommendations

The findings from the regression analysis indicate a negative and significant relationship between Cash Reserve Ratio and corporate performance while Loan-to-Deposit Ratio and Liquidity Ratio are positively related to corporate performance albeit, significantly and insignificantly respectively in the short-run. This suggests an effective implementation of the cash reserve benchmark as there is absolute conformity with theoretical postulations; also its significance can be attributed to the

efficient utilization of available liquidity in order to minimize the impact of increased CRR benchmark on banks. Furthermore, the positive short-run relationship between liquidity ratio and corporate performance is in tandem with theoretical assertions, as higher quantum of liquid assets translates to better capacity to transact and increase banks performance, beside the relative impact of barren assets in the short-run is negligible.

The implications of these findings are factual. For instance, in the case of cash reserve ratio, higher ratio culminates in lesser returns on shareholders' funds. This is because, if banks are required to reserve some high percentage of their deposit liability, it would definitely affect the amount available for transaction purposes, and the lesser the transactions funds, the lesser the bank is able to make profit or returns on shareholders' funds. Simply put, cash reserve ratio negatively affects the amount of funds available for loans and other banking businesses which yields interest to the banks, thereby increasing shareholders' wealth or returns on shareholders' funds.

The positive loan-to-deposit ratio relationship with Performance implies that if the ratio is quite high, the bank may not have sufficient liquidity to cover any unforeseen fund requirements leading to risk exposures. However, this could culminate in greater profitability where the bank operates efficiently, that is, where instances of bad debts are at barest minimum. In other words, a high loan-to-deposit ratio implies that a bank issues out more of its deposits in the form of interest-bearing loans, which, consequently should generate additional income.

The relationship between Liquidity ratio and Return on Shareholders fund is found to be negative. This is consistent with conceptual and anecdotal knowledge as heightened liquidity ratio portends higher level of unproductive or barren assets which could otherwise be utilized or deployed to earn returns. Consequently, increased corporate performance is not just dependent on the level of liquidity but the capacity of banks to deploy available liquid assets to productive and profitable ends.

Therefore, from the above results and implications it can be recommended that:

1. Banks should negotiate a reduced Cash Reserve Ratio with the Central Bank of Nigeria to improve performance.
2. Banks should fully utilize the loan-to-deposit ratio by boosting marketing efforts.
3. Banks should avoid holding excess liquid assets which only yields minimum return for the shareholders.
4. The financial companies especially quoted banks should seek to use cash or liquidity management models that will minimize the opportunity costs of excess liquidity.
5. Furthermore, the researcher recommends maintenance of optimal liquidity level in order to enhance corporate performance.

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APPENDIX**A: Multiple Regression (Ordinary Least Square) Output**

Dependent Variable: RSF

Method: Least Squares

Date: 08/04/16 Time: 10:10

Sample: 1984 2014

Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.231338	0.041078	5.631628	0.0000
CRR	-0.952194	0.247498	-3.847287	0.0007
LDR	0.217263	0.049751	4.367025	0.0002
LR	0.130466	0.086224	1.513102	0.1419
R-squared	0.636432	Mean dependent var		0.260000
Adjusted R-squared	0.596036	S.D. dependent var		0.055655
S.E. of regression	0.035373	Akaike info criterion		-3.725803
Sum squared resid	0.033784	Schwarz criterion		-3.540772
Log likelihood	61.74994	Hannan-Quinn criter.		-3.665487
F-statistic	15.75468	Durbin-Watson stat		2.609004
Prob(F-statistic)	0.000004			

Source: EViews, Version 9

B: ADF unit root test results

Differenced Variables	ADF-statistic	Test Critical Values			Order of Integration	Prob.
		1%	5%	10%		
D(RSF)	-7.114676	-3.679322	-2.967767	-2.622989	1(1)	0.0000
D(CRR)	-7.315093	-3.679322	-2.967767	-2.622989	1(1)	0.0000
D(LDR)	-4.787363	-3.679322	-2.967767	-2.622989	1(1)	0.0006
D(LR)	-5.954651	-3.689194	-2.971853	-2.625121	1(1)	0.0000

Source: Extract from E-VIEWS-8 Output

C: Results of Johansen's Cointegration

Date: 08/04/16 Time: 10:25		
Sample (adjusted): 1986 2014		
Included observations: 29 after adjustments		
Trend assumption: Linear deterministic trend		
Series: RSF CRR LDR LR		
Lags interval (in first differences): 1 to 1		
Unrestricted Cointegration Rank Test (Trace)		
Hypothesized	Trace	0.05

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.568336	50.11315	47.85613	0.0302
At most 1	0.513766	25.75001	29.79707	0.1364
At most 2	0.152305	4.839136	15.49471	0.8257
At most 3	0.001631	0.047330	3.841466	0.8278
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Extract from E-VIEWS-8 Output

D: Estimates of the Error Correction Model

Dependent Variable: D(RSF)				
Method: Least Squares				
Date: 08/04/16 Time: 10:18				
Sample (adjusted): 1985 2014				
Included observations: 30 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CRR)	-0.798025	0.178107	-4.480606	0.0007
D(LDR)	0.005302	0.086578	0.061242	0.9516
D(LR)	-0.061181	0.059916	1.021118	0.0066
ECM(-1)	-0.317508	0.123013	-2.581086	0.0158
R-squared	0.564689	Mean dependent var		0.260000
Adjusted R-squared	0.514461	S.D. dependent var		0.055655
S.E. of regression	0.022070	Akaike info criterion		-4.665629
Sum squared resid	0.012664	Schwarz criterion		-4.478803
Log likelihood	73.98444	Hannan-Quinn criter.		-4.605862
F-statistic	15.75468	Durbin-Watson stat		1.787953
Prob(F-statistic)	0.000004			

Source: Extract from E-VIEWS-8 Output

E: Results of Pair-Wise Granger Causality Tests

Pairwise Granger Causality Tests			
Date: 08/04/16 Time: 09:56			
Sample: 1984 2014			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
CRR does not Granger Cause RSF	29	0.90001	0.0198
RSF does not Granger Cause CRR		0.41805	0.0630

LDR does not Granger Cause RSF	29	1.67314	0.2088
RSF does not Granger Cause LDR		1.63836	0.2153
LR does not Granger Cause RSF	29	2.69194	0.0082
RSF does not Granger Cause LR		2.90849	0.0740

Source: Extract from E-VIEWS-8 Output