Resolving the Liquidity-Profitability Dilemma through Balance Sheet Management

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Abstract

The paper resolves the Liquidity – Profitability dilemma through Balance sheet management. The study covered the periods between 1989 and 2014. Liquidity and profitability ensure short term and long term survival respectively. Thus the more present need should be priority while keeping a future need in mind, given that we eat to live not live to eat. The analysis employs two stage least square (TSLS) to evaluate a set of balance sheet approaches to resolve such dilemma. The Eview statistical package was used to analyze the data. The results confirm fundamental relationships among the variables. Asset based approach has focused much on resolving liquidity dilemma with a resultant higher effect. An Examination of the effect of asset based approach on liquidity-profitability dilemma confirms that the asset based approach significantly resolves the profitability dilemma, but with a different outcome with respect to the resolution of the liquidity dilemma. This attribute to the fact that unlike profitability requirement much of the liquidity requirement is set by an external force (monetary authority) and not controllable by Bank management team. Treasury Single Account (TSA) implementation increases the liquidity and profitability dilemma. Though Banks have been sapped of their free working capital, its management must strategize an interesting perspective by Re-emphasizing purchased liquidity than stored liquidity by seeing borrowed fund more as a source of liquidity than a threat to liquidity dilemma subject to supervisory constraints in a less orthodox manner the money market should be deepened. Eminence should be given treasurers than marketers in the financial superstructure. Deposit money banks should role shift from mobilization position to an investive and inventive position. The reduction of the cash reserve ratio is simply a temporary measure; rather a better approach should be reducing financial exclusion. With more inclusion liquidity and profitability are enhanced ceteris paribus. One outcome of this might be increased friction between the microfinance banks and deposit money banks in rural banking. Such challenge should culminate with advance guide centered on territory map out on deposit mobilization. This might be emergence of microfinance bank importance in Nigeria.

Keywords: Liquidity, Profitability, Liquidity-profitability dilemma, Balance sheet management

1. Introduction

Daily, a banker undertakes five obligations. He undertakes to make maximum wealth for the shareholders who contributed risk capital to set up the bank. Deposits constitute his stock-in trade; He undertakes to maintain maximum liquidity in order to be able to repay the deposits on demand or on maturity as agreed (Nwankwo, 2004). A banker owes obligation to the deficit sector to meet their legitimate credit demands and to the authorities there is the obligation for safe and prudent operation. Finally to the public, which constitute the environment in which he operates, the banker undertakes to be a good corporate citizen contributing to the development of the economy by meeting legitimate banking requirement.

In these endeavors, the banker faces a dilemma; to honor the obligation of maximum profitability to the shareholders he has to invest all his deposits in the highest yielding assets which is loans and advances. To honor the obligation of maximum liquidity to the depositor and to the borrower he has to hold all the deposits in cash. The dilemma arises because while being most profitable, loans and advances are the most illiquid of bank assets and while being the most illiquid, cash is barren of yield and is expensive to maintain. His obligation of maximum contribution to the economy is not to be free of this dilemma. Investments that may contribute to maximum development, such as rural credit, housing and small scale industry may prove to be very illiquid and unprofitable at least in the short run, and at any rate exposes the bank to more risks.

How the banker reconciles or attempts to reconcile apparent conflicting obligations are shown in the statement of financial position. Hence, the study aims at resolving liquidity-profitability dilemma through statement of financial position management. Banks in the Banking industry will benefit from the study as continued survival ceteris paribus is a function of how well or worse the dilemma is resolved. The study benefits monetary authority as the envision being the most efficient and effective of the world's central banks (CBN, 2009)(CBN Golden jubilee: 2009). As an Apex institution the play role in bank liquidity and profitability for instance the legal reserve requirement affects both liquidity and profitability. The study suggests a framework that engages them. The shareholders who provide risk capital and depositors who provide raw material for the banks are engaged as their conflicting interests are balanced by priority.

Values for variables were bottleneck. For example, Liquidity is a daily issue but no data for daily liquidity. Profitability is an annual issue but no daily data for profitability to put both variable at par of measurement. The constraint becomes resolving short term survival that is liquidity and long term survivability

that is profitability. As a result the study adopted universal yardstick of settling liquidity requirement as a routine issue then profitability requirement as an annual issue.

The study compass focuses on the financial institutions; deposit money banks precisely, as part of the congeries of the financial superstructure making up the Nigerian economic system with desk data spanning between 1981 and 2014.

2. Synopsis of Related Empirical Literature
2.1 Review of concepts
Bank liquidity simply means the ability of the bank to maintain sufficient funds to pay for its maturing obligations. Ibe (2013) explicates liquidity as banks' ability to immediately meet cash, cheques, other withdrawal obligation, and legitimate new loan demand while abiding by the existing reserve requirements. Nwaezeaku (2006) defined liquidity as the degree of convertibility to cash or the ease with which any asset can be converted to cash. The liquidity needs of the banking system are usually defined by the size of reserve requirements imposed by monetary authority.

Liquid assets are essential balance sheet items which have the capacity to maintain the confidence of depositors which is the most valuable intangible asset of the commercial banking business (Spindt & Tarhan, 1980). Adequate liquidity is needed to avoid forced sale of assets at unfavorable market conditions and at heavy loss. Liquidity is the lifeblood of every banking setup. It is vital for an ongoing concern (Ali uyar, 2009). Liquidity has close relationship with day-to-day operations of a business (Bhunia, 2010). Liquidity can be measured as a stock at a point in time or as a flow over time using the cash flow maturity ladder which emphasizes maturity structure. The widely used stock approach is based on ratios such as loan deposit ratio which are mainly holding of assets that may be turned to cash (Roussakis, 1999)

Two principal sources of liquidity are identified. Stored/warehoused liquidity and purchased liquidity. Stored liquidity is asset based and purchased liquidity is liability centered. Stored liquidity consists of assets in which funds are temporarily invested with assurance that they will either mature or be paid when liquidity is needed, or readily sellable, without material loss in advance of maturity. Stored liquidity include cash and due from other banks and central bank, call money funds sold, short term government securities, commercial papers, certificate of deposits, securities purchased under agreement to resell (Repos), other marketable securities. Purchased liquidity items include borrowing from the central bank through discounts or advances, call money held for other banks, securities held under repurchase agreements, certificate of deposits sold, etc. the source can simply be arranged as incoming customer deposits, revenues from the sale of non-deposit services, customer loan repayments, sales of assets and borrowings from the money market.

The principal uses of liquidity are customer deposit withdrawals, credit requests from quality loan customers, repayment of non-deposit borrowings, operating expenses and taxes incurred in producing and selling services, and payment of stockholder cash dividends.

Profitability is an indication of the efficiency by which the operations of the business are evaluated. Profitability is ascertained with return on investment ratio (operating profit/capital employed), earnings per share ratio, and net profit ratio (net profit/sales). According to Abrurime (2008:1) profit means the difference between the revenue generated from the sale of output and the full opportunity cost of factor used in the production of that output.

Liquidity and profitability are important for any bank to survive. Immediate survival of a business anchors on its liquidity. Its long term survival, growth and expansion depend on profitability. Liquidity ensures short term survival, and profitability ensures long term survival (Owolabi, september 2011) in discharging daily obligations, a banker faces a dilemma; to honor the obligation of maximum profitability to the shareholder; he has to invest all his deposits in the highest yielding assets which is loan and advances. To honor the obligation of maximum liquidity to the depositor and the borrower he has to hold all the deposits in cash. The dilemma arises because while being the most profitable loans and advances are the most illiquid of bank assets and while being the most liquid, cash is barren of yield and indeed expensive to maintain.

2.1.4 Balance sheet management
Statement of financial position management is the co-ordinated management of the entire balance sheet and its inter-relationships (Nwankwo, 2004). It is a continuous monitoring, assessing and trading in banks assets and liabilities. It equally covers off balance sheet business.

Balance sheet management is the totality of funds management in banking which broadly defined includes all policies and approaches designed to obtain funds from deposits and borrowings and to allocate them to loans and investment. It is different from the narrow funds management which specifically deals with the management of funds over which the bank has discretionary control – primary assets and liabilities bought and sold in impersonal financial markets such as treasury bills and purchased funds.

Balance sheet management has also been distinguished from assets and liabilities management which simply defined is the act of changing the structure of the balance sheet in response to perceived changes in the economic environment. Balance sheet management in the modern sense is a later evolution made possible by the

application of management science to bank funds management. Dynamic balance sheet management looks at multi period context unlike asset/liability management which is management in a short run context.

2.2   Theoretical framework

The study adopts Pool of fund approach (POFA) under the asset management approach to meet liquidity then profitability requirement. Borrowed fund approach (BFA) under supplementary fund management approach to meet reserve and liquidity. Gap management (GM) under the asset and liability management approach to meet profitability objectives and finally excess fund lent approach (EFL) for off balance sheet management.

The paper sticks to the view of Owolabi that Liquidity ensures short term survival, and profitability ensures long term survival. Thus the more present need should be priority while keeping a future need in mind, given that we eat to live not live to eat. Similarly the paper adopts the idea of liquidity-profitability dilemma as being deposits that were meant to be invested in highest yielding assets but which were simply held to meet liquidity requirement and deposits which were meant to be held as cash with barren yield but were simply invested in high yielding assets.

2.4   Review of empirical work

Owolabi et al (2011) investigated the relationship between liquidity and profitability in selected quoted companies in Nigeria. The results showed that while a trade-off existed between liquidity and profitability in the banking company, the two variables were positively correlated and also reinforced each other in the other companies. While each company sustained some level of liquidity at zero profitability, only the banking and manufacturing firms could sustain some level of profitability at zero liquidity. The performance measures exerted negative but insignificant effect on, and exhibited weak explanatory power in explaining changes in, each other. They exerted significant positive effect on, and strongly explained changes in, each other in processing firm. In the manufacturing firm, they exerted positive but insignificant effect on, and exhibited weak explanatory power in explaining changes in, each other. Consequently, the study recommended, among other things, that banks should always strike a balance between liquidity and profitability to satisfy regulatory requirements as well as shareholders' wealth aspirations; manufacturing outfits should pursue profit maximization since so doing simultaneously enhances liquidity; while processing outfits should always ensure adequate liquidity, especially raw material inputs, since it seemed necessary to remain in operation.

Eljelly (2004) investigated Liquidity-Profitability Tradeoff in emerging markets. Employing correlation and regression analytical techniques, the study found significant negative relationship between the firm's profitability and liquidity levels as measured by current ratio, and that the relationship is more evident in firms with high current ratios and longer cash conversion cycles. The study also found that at industry level, however, the cash conversion cycle or cash gap is of more importance as a measure of liquidity than current ratio that affects profitability. The size variable is also found to have significant effect on profitability at industry level.

Lanberg and Valming (2009) conducted a study using a sample of companies listed on Stockholm Stock Exchange. They examined impact of active liquidity strategies on company's profitability in and out of economic downturn. Their findings suggest that the adaptation of liquidity strategies do not have a significant impact on return on assets (ROA). Only increased use of liquidity forecasting and short-term financing during financial crisis had a positive impact on ROA. Therefore, they concluded that the adjustment of liquidity practices is beneficial for the companies, even though benefits are not always directly measurable in profitability and, thus that companies should focus on liquidity and working capital management in an economic downturn.

Raheman and Nasr (2007) selected a sample of 94 Pakistani firms listed on Karachi Stock Exchange for a period of 6 years, and found that there is a strong negative relationship between variables of working capital management and profitability of the firms. The study showed a significant negative relationship between liquidity and profitability, and that a positive relationship exists between size of the firm and its profitability. Also, there is a significant negative relationship between debt used by the firm and its profitability.

Smith and Begemann (1997) investigated how the maximization of the firm's returns could threaten its liquidity, and whether the pursuit of liquidity had a tendency to dilute returns. They analyzed the relation between working capital measures and return on investment (ROI) for a sample of industrial firms listed on the Johannesburg Stock Exchange (JSE). The statistical test results showed that a traditional working capital leverage ratio, current liabilities divided by funds flow, displayed the greatest associations with return on investment. Traditional liquidity ratios as current and quick ratios registered insignificant associations.

Owolabi investigated the relationship between liquidity and profitability from selected companies in Nigeria, While this study attempts resolving the dilemma between liquidity and profitability subject to known fact that there exists a relationship between the two variables with focus on the banking sector. Eljelly measured liquidity using current ratio which is a stock approach to liquidity and accurate at a point in time, the study adopts a flow approach in measuring not just liquidity but the liquidity dilemma. The study is similar to that of Eljelly as it is carried out at industry level. Lanberg and Valming, Raheman and Nasr, and Smith and Begemann, like Eljelly

used financial ratios with similar demerit as mentioned for Eljelly. This study agrees with owolabi that liquidity and profitability reinforce each other.

3. Method of Investigation

The research follows a non-experimental design. The research is an exposte facto research. This means that relationships are investigated after the fact has been known. The research work delimitation is restricted to the financial superstructure and macroeconomic variables in Nigeria. The variables needed were specified viz. liquidity dilemma, profitability dilemma, pool of fund approach meeting liquidity requirement, pool of fund approach meeting profitability requirement given that liquidity subject to liquidity constraint, liability management, asset and liability management, off balance sheet management. Then a table is structured with columns equal to variables needed and the rows equal to the number of years of interest, and then data were extracted from the statistical bulletin.

The data typology is time series data or desk data. The sample size for the analysis is determined judgmentally. The researcher looks at a set of data covering a period of 34 years from 1981 – 2014. The population is the total number of deposit money bank in the financial superstructure. Toward achieving the research aforementioned objective a structural construct is modeled to resolve the dilemma. The two stage least square (2SLS) method is used to estimate the parameters of the structural equations. Two stage least square is a method of systematically creating instrumental variables to replace the endogenous variables where they appear as explanatory variables in simultaneous equation models. It does these through two successive applications of ordinary least square to the reduced form equation (stage 1) and to the transformed structural equations (stage 2)

The construct captures essence of conceptual and theoretical framework in its specification. The study aims at resolving the liquidity profitability dilemma. This spontaneously makes the liquidity profitability dilemma the endogenous variable.

The simultaneous dilemma[1] of liquidity and profitability is given by equation (1) and (2)

$$V = PI – LI + U = PR + SR \qquad ………………….1$$
$$U = LI – PI + V = L + OS + FA \qquad ……….……………2$$

Where

V – Profitability dilemma

U – Liquidity dilemma

LI – liquidity requirement

PI – profitability requirement

Resolution of liquidity-profitability dilemma is achieved through balance sheet management. The researcher adopts POFA[2] under the asset management approach to meet liquidity then profitability requirement. Borrowed fund approach (BFA)[3] under supplementary fund management approach to meet reserve and liquidity. Gap management (GM)[4] under the asset and liability management approach to meet profitability objectives and finally excess fund lent approach (EFL)[5] for off balance sheet management.

Toward achieving the research aforementioned objectives, a simultaneous equation was estimated. The structural model aims at resolving the liquidity-profitability dilemma[6]. The liquidity-profitability dilemma model is functionally stated as:

$$V = f (POFA_p, U, GM, EFL, e_1) \text{ and } U = f (POFA_L, BFA, V, e_2)$$

Restated as:

$$V = b_0 + b_1POFA_p + b_2U + b_3GM + b_4EFL + e_1 \qquad ……………………………………1$$
$$U = a_0 + a_1POFA_L + a_2BFA + a_3V + e_2 \qquad ……………………………………2$$
$$POFA_p = (T + CF) – LI – PI \qquad ……………………………………3$$
$$GM = T * \{1 - (LI/T)\} - (T + CF) – LI \qquad ……………………………………4$$
$$EFL = T - LI – PI \qquad ……………………………………5$$
$$POFA_L = (T + CF) – LI \qquad ……………………………………6$$
$$BFA = T * \{1 - (LI/T)\} \qquad ……………………………………7$$

Where

V – Profitability dilemma

$POFA_p$ – Pool of fund approach to meet profitability requirement

U – Liquidity dilemma

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[1] See Appendix A for derivation of simultaneous dilemma.

[2] See Appendix B for derivation of POFA approach.

[3] See Appendix C for derivation of BFA approach.

[4] See Appendix D for derivation of GM approach.

[5] See Appendix E for derivation EFL approach

[6] See Appendix L for identification of the structural equation.

GM – Gap management

EFL – Excess fund lent

e_1 – Disturbances for equation one

$POFA_L$ - Pool of fund approach to meet liquidity requirement

BFA – Borrowed fund approach

e_2 - Disturbances for equation two

T – Total borrowed fund

CF – Capital fund

LI – Liquidity requirement

PI – Profitability requirement

The predictands profitability dilemma and liquidity dilemma are proxied by Deposits that were meant to be invested in highest yielding assets but which were simply held to meet liquidity requirement and Deposits which were meant to be held as cash with barren yield but where simply invested in high yielding assets alternatively called liquidity dilemma. The predictors Pool of fund approach (POFA) under the asset management approach to meet liquidity then profitability requirement. Borrowed fund approach (BFA) under supplementary fund management approach to meet reserve and liquidity. Gap management (GM) under the asset and liability management approach to meet profitability objectives and finally excess fund lent approach (EFL) for off balance sheet management. The predictors were selected for reasons explained in section two of this paper.

The shock as a term encompasses variables that impact on liquidity and profitability dilemma, but not included in the model because of the principle of parsimony, vagueness of theory, unavailability of Data, core variable with qualitative data, peripheral variables and proxy variables.

3.1 Properties of Data
3.1.2 Cointegration Test
Table 1 and 2 presents results of the johansen cointegration tests for the liquidity dilemma-financial position model and the liquidity dilemma-financial position model. Shows that the variables are cointegrated as indicated by trace and eigenvalue statistic greater than the critical value at 5% level.

Table 1: liquidity dilemma - financial position model cointegration output
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.996802	214.4408	40.17493	0.0001
At most 1 *	0.940201	82.30315	24.27596	0.0000
At most 2 *	0.471278	17.51749	12.32090	0.0062
At most 3	0.116918	2.859761	4.129906	0.1074

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.996802	132.1377	24.15921	0.0001
At most 1 *	0.940201	64.78566	17.79730	0.0000
At most 2 *	0.471278	14.65773	11.22480	0.0120
At most 3	0.116918	2.859761	4.129906	0.1074

Source: Eview cointegration output

Table 2: profitability dilemma - financial position model cointegration output

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.994567	289.6242	60.06141	0.0001
At most 1 *	0.961629	169.6733	40.17493	0.0000
At most 2 *	0.944887	94.68302	24.27596	0.0000
At most 3 *	0.659938	28.02042	12.32090	0.0001
At most 4	0.130339	3.211997	4.129906	0.0866

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.994567	119.9509	30.43961	0.0000
At most 1 *	0.961629	74.99030	24.15921	0.0000
At most 2 *	0.944887	66.66261	17.79730	0.0000
At most 3 *	0.659938	24.80842	11.22480	0.0001
At most 4	0.130339	3.211997	4.129906	0.0866

3.2 Diagnostic Test

3.2.1 Weak instrument diagnostic

Using canonical correlation to test whether any relationship between the instruments and the endogenous variables is sufficiently strong for reliable econometric inferences.

Cragg-donald $F = [(N-G-B)/L]*[r^2_B/(1- r^2_B)]$

Where

N denote the sample size

B the number of RHS endogenous variables

G the number of exogenous variables included in the equation (including the intercept)

L the number of "external" instruments that are not included in the model, and

r_B the minimum canonical correlation.

The first equation under maximum relative bias is not available for models with less than 3 instruments. While based on the maximum test size criterion at stock-yugo critical value of 5% and L=2 instumental variables. The instruments are strong as cragg-donald (23.58442) is greater than stock-yugo (19.93). The second equation under maximum relative bias size at 5% and L=3 instumental variables, The instruments are strong as cragg-donald (54.16061) is greater than stock-yugo (13.91) relative bias and stock-yugo (22.30) maximum size.

3.2.2 Endogeneity test

From the profitability dilemma – financial position model perspective the endogenous regressors are truly endogenous at 5% as the p-value is below the selected level of significance. OLS estimators are not consistent, and cannot be used to estimate the parameters of the equation. Thus is better to use the instrumental variable (IV) estimator. A different conclusion is reached from the liquidity dilemma – financial position model perspective, the endogenous regressors are not truly endogenous at 5% as the p-value is above the selected level of significance. OLS estimators are better here than IV estimators. Table 4 shows the endogeneity test.

Table 1: endogeneity, exogenous and simultaneity test output for liquidity and profitability dilemma

Variable	Endogeneity test (p-value)	Simultaneity test (p-value)	Exogeneity test (p-value)
U	0.0098	0.9476	0.8212
V	0.2209	0.9247	0.7161

3.2.3 Simultaneity test

From the liquidity dilemma – financial position model perspective Simultaneity problem does not exist. The endogenous regressors are mutually independent. Same conclusion is reached from the profitability dilemma – financial position model perspective.

3.2.4 Exogeneity test

The endogenous regressors in the profitability dilemma – financial position model are truly exogenous with p-value of instrumental variable of liquidity dilemma (0.7161) being insignificant at 5%. The endogenous regressors

are not correlated with the disturbances using ols estimator is not biased and inconsistent. The estimators will converge to the true values or zero. Using IV its estimators will be consistent but not efficient (i.e. smaller variance) while OLS estimators are consistent and efficient. Same conclusion is reached from the liquidity dilemma – financial position model perspective.

3.3 Regression results and interpretation
The regression equation is given as:

$V = b_0 + b_1 POFA_p + b_2 U + b_3 GM + b_4 EFL + e_1$ ……………………………………1

$U = a_0 + a_1 POFA_L + a_2 BFA + a_3 V + e_2$ ……………………………………2

The regression result is presented in table 5 below.

Table 2: Regression result

	Variable	Coefficient	Standard error	t-Statistic	Prob.
Dependent Variable: V	C	67.91122	76.33687	0.889625	0.3837
Adjusted R-squared=.9999	POFAP	-2.077136	0.615391	-3.375312	0.0029
F-statistic=7407764	U	0.471660	0.359556	1.311784	0.2038
J-statistic = 1.69E-24	EFL	0.540026	0.291378	1.853350	0.0779
	GM	1.039383	0.338766	3.068144	0.0058
Dependent Variable: U	C	-34.84013	107.4900	-0.324124	0.7489
Adjusted R-squared=0.997571	POFAL	-34.84013	107.4900	-0.324124	0.7489
F-statistic=3015.046	BFA	0.998787	0.244886	4.078579	0.0005
J-statistic = 7.449159	V	1.287886	0.042062	30.61889	0.0000

Source: Eview regression output

With cointegration confirmed for the profitability dilemma – financial position and liquidity dilemma – financial position models, the long run model was estimated with output extract in table 5. The jarque – bera statistic of indicate the disturbances of the structural model are normally distributed.

Profitability dilemma – financial position model, the financial position variables had expected signs and no autocorrelation between the disturbances as the Durbin-Watson tends to 2. The model is plausible and adequate as Ramsey Regression specification error test (RESET) accepts the null hypothesis at 5% level of significance (0.0632) to imply that no misspecification is detected. Without financial position management, profitability dilemma over the period autonomously averages 67.91122 per annum absolutely. Table 5 shows significant negative association between pool of fund approach to meet profitability requirement and profitability dilemma. The magnitude of pool of fund approach to meet profitability requirement on resolving profitability dilemma is small. An increase in the pool of fund approach to meet profitability requirement of 1percent, on average leads to about 2.077136 decreases in resolving profitability dilemma. A positive relationship exist among gap management, excess fund lent and profitability dilemma.

For the liquidity dilemma – financial position model, financial position management variables had expected signs and no autocorrelation between the disturbances as the Durbin-Watson tends to 2. The model is plausible and adequate as Ramsey Regression specification error test (RESET) accepts the null hypothesis at 5% level of significance (0.9997) to imply that no misspecification is detected. Without financial position management, liquidity dilemma over the period autonomously decreases by 34.84013 per annum absolutely. A significant positive association exist between liquidity dilemma and profitability dilemma. liquidity dilemma and profitability dilemma may be conflicting but reinforcing objective (with values of 0.471660 and 1.287886) requiring trade-off. An increase in Profitability dilemma of 1percent, on average leads to about 1.287886 increase in profitability dilemma. An anti-growth rate of 34.84013 occur in liquidity dilemma as pool of fund to meet liquidity requirement increase by one. Borrowed fund approach serve as threat to liquidity dilemma. In reality macroeconomic variables are not mutually exclusive or substitutes rather the compliment another to have reinforcing effect. Jointly the financial position variables affect and relate to liquidity dilemma at fisher 3015.046.

Table 5 indicates a negative relationship between pool of fund approach to meet profitability requirement and resolving the liquidity dilemma. The relationship is statistically significant (p-value = 0.0029) at 5% level. Similarly, a negative relationship exists between pool of fund approach to meet liquidity requirement and resolving the liquidity dilemma. The extent to which the asset based approach resolves the liquidity-profitability dilemma is deduced from the parameter values of 2.077136 and 34.84013. Asset based approach has focused much on resolving liquidity dilemma with a resultant higher effect. An Examination of the effect of asset based approach on liquidity-profitability dilemma confirms that the asset based approach significantly resolves the profitability dilemma, but with a different outcome with respect to the resolution of the liquidity dilemma. This might be attributed to the fact that that the dispersion of meeting liquidity requirement mean value is higher than that of meeting profitability requirement. This same fact can be rephrased in a less orthodox manner to mean that unlike profitability requirement much of the liquidity requirement is set by an external force (monetary authority) and not

controllable by Bank management team.

The borrowed fund approach represents the liability based approach. Table 5 indicates a positive relationship between borrowed fund approach and resolution of the profitability dilemma. The cointegration indicates that this relationship is fundamental not spurious. The liability based approach significantly (p-value = 0.0005) resolves liquidity dilemma at 5% level. The extent to which the liability based approach resolves the liquidity dilemma is captured from the coefficient values of 0.998787. An Examination of the effect of liability based approach on liquidity dilemma confirms that the liability based approach significantly resolves the liquidity dilemma. This might be attributed to the fact that that the dispersion of meeting liquidity requirement mean value is low when other borrowed fund apart from deposits are used. This means that deposit rather than borrowed funds are main source of liquidity. Hence banks source supplementary liquidity to augment deposits. Deposits too are borrowed funds, but with less formality than other sources of borrowed fund.

The gap management represents the asset - liability based approach. Table 5 indicates a positive relationship between assets – liability based approach and resolution of the profitability dilemma. The asset - liability based approach significantly (p-value = 0.0058) resolves profitability dilemma at 5% level. The extent to which the asset - liability based approach resolves the profitability dilemma is captured from the coefficient values of 1.039383. An Examination of the effect of asset - liability based approach on profitability dilemma confirms that the asset - liability based approach significantly resolves the profitability dilemma.

The excess fund lent represents the off statement of financial position based approach. Table 5 indicates a positive relationship between excess fund lent and resolution of the profitability dilemma. The off statement of financial position based approach significantly (p-value = 0.0779) resolves profitability dilemma at 5% level. The extent to which the off statement of financial position based approach resolves the profitability dilemma is captured from the coefficient values of 0.540026. An Examination of the effect of off statement of financial position based approach on profitability dilemma confirms that the off statement of financial position based approach significantly resolves the profitability dilemma.

3.5 Little surprise from Treasury single account (TSA)

The implementation of the treasury single account (TSA) by the federal and some state government is already having rippled effects on the economy[1]. An examination of this ripple effect is examined in this sub – section and a recommendation is proffered in the next section.

The concept of TSA is mop up of free deposits from deposit money banks to a central bank to provide for good public financial management (PFM). To operators in the banking sector, it is feared that the sector would lose some trillions to the Central Bank of Nigeria with the implementation of the TSA.

The study examines the effect by removing free deposits (FD) from the variables connected to deposits in the model, and then checks how that infuse or diffuse the dilemma.

The model was earlier specified as:

$V = b_0 + b_1 POFA_p + b_2 U + b_3 GM + b_4 EFL + e_1$ …………………………………………1

$U = a_0 + a_1 POFA_L + a_2 BFA + a_3 V + e_2$ …………………………………………2

The adjusted model would be as below:

$V - FD = b_0 + b_1(POFAp – FD) + b_2 U + b_3 GM + b_4(EFL – FD) + e_1$ …………………1

$U = a_0 + a_1(POFAL – FD) + a_2 (BFA – FD) + a3(V – FD) + e_2$ …………………2

Where FD – Free deposit[2]

All the variables retain their original definition.

Table 3: Regression result for liquidity and profitability dilemma adjusted for TSA

Variable	Coefficient	Standard error	t-Statistic	Prob.
C	-57.63207	112.5581	-0.512021	0.6140
POFAP-FD	0.774836	0.402219	1.926404	0.0677
U	-1.250450	0.206435	-6.057358	0.0000
GM	-0.457990	0.217414	-2.106531	0.0474
EFL-FD	-0.816819	0.242276	-3.371447	0.0029
C	-201.6792	249.8480	-0.807207	0.4282
POFAL-FD	0.747530	0.742858	1.006289	0.3252
V – FD	0.752616	0.745372	1.009718	0.3236
BFA-FD	1.474779	0.220794	6.679446	0.0000

Source: Eview regression output

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[1] See appendix G for counting the cost of TSA

[2] Free deposits is used here to mean deposit of central, state

Table 4: Regression result for liquidity and profitability dilemma

Variable	Coefficient	Standard error	t-Statistic	Prob.
C	67.91122	76.33687	0.889625	0.3837
POFAP	-2.077136	0.615391	-3.375312	0.0029
U	0.471660	0.359556	1.311784	0.2038
EFL	0.540026	0.291378	1.853350	0.0779
GM	1.039383	0.338766	3.068144	0.0058
C	-34.84013	107.4900	-0.324124	0.7489
POFAL	-34.84013	0.244886	4.078579	0.0005
BFA	0.998787	0.042062	30.61889	0.0000
V	1.287886	0.245888	4.092110	0.0005

Source: Eview regression output

Table 5: Net effect of TSA

Variable	Coefficient	Standard error	t-Statistic
C	125.54329	-36.22123	-3.466013992
POFAP	-2.851972	0.213172	-13.37873642
U	1.72211	0.153121	11.24672645
EFL	1.356845	0.049102	27.63319213
GM	1.497373	0.121352	12.33908794
C	166.83907	-142.358	-1.171968347
POFAL	-35.58766	-0.497972	71.46518278
BFA	-0.475992	-0.178732	2.663160486
V – FD	0.53527	-0.499484	1.071645939

Source: Extract from table 6 and 7.

From the results in table 6 to 8, TSA implementation increases the liquidity and profitability dilemma by approximately 126 and 167 points on average%. Despite such policies liquidity and profitability maintain their reinforcing symbiosis of 1.72211 and 0.53527. Profitability dilemma gained 265 percent more (from 0.471660 to 1.72211) with the implementation of TSA. The dilemma is reduced as no free deposits meant to be invested are held as sterile cash. On the other hand liquidity dilemma faced more threat (from 1.287886 to 0.53527) due to implementation of TSA. This dilemma arises because neither are this deposits utilized for profit but the deposits are no longer within our control. In a less orthodox manner "Bank has been sapped of their free working capital. The would any day any time prefer having such fund locked in profit focused endeavor than lose it outright". The point then becomes that liquidity dilemma can be categorized into internal and external liquidity dilemma. The dilemma controllable to some extent by management through proper statement of financial position management and dilemma outside management control but which they must learn to live with. Management can to some extent control amount of fund to meet legal reserve by for example controlling the amount of deposit they receive, though such a strategy lacks weight in a competitive setting. Moreover the legal reserves are ratios. The liquidity management policy in the guise of TSA is not simply asking for a fraction of the free deposit, but all free deposits. What a hard nut to crack for the Banks.

When Banks react to shake off such policy through statement of financial position management with the resultant polarized effect. Gap management and excess fund lent increases the liquidity dilemma while pool of fund to meet liquidity and profitability and borrowed fund reduces the liquidity and profitability dilemma. Borrowed fund will more be seen like a source of liquidity than a threat to liquidity dilemma.[1]

4. Policy lessons and conclusion

Liquidity ensures short term survival, and profitability ensures long term survival. Thus, the more present need should be priority while keeping a future need in mind, given that we eat to live not live to eat. Liquidity-profitability dilemma refer to deposits that were meant to be invested in highest yielding assets but which were simply held to meet liquidity requirement and deposits which were meant to be held as cash with barren yield but where simply invested in high yielding assets.

Asset based approach has focused much on resolving liquidity dilemma with a resultant higher effect. An Examination of the effect of asset based approach on liquidity-profitability dilemma confirms that the asset

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[1] Unlike the expected surge in interest rate (has crashed even below deposit rate so that it pays leaving money a s deposit than any other investment in the bank) a reverse turn has been seen. Banks have reduced most rate as for in fixed deposits, Nigeria treasury bill saying that there is much liquidity. Which is a paradox. TSA threatens liquidty, but there is more liquidity with TSA.

based approach significantly resolves the profitability dilemma, but with a different outcome with respect to the resolution of the liquidity dilemma. This might be attributed to the fact that that the dispersion of meeting liquidity requirement mean value is higher than that of meeting profitability requirement. This same fact can be rephrased in a less orthodox manner to mean that unlike profitability requirement much of the liquidity requirement is set by an external force (monetary authority) and not controllable by Bank management team. The extent to which the liability based approach resolves the liquidity dilemma is captured from the coefficient values of 0.998787. An Examination of the effect of liability based approach on liquidity dilemma confirms that the liability based approach significantly resolves the liquidity dilemma. This might be attributed to the fact that that the dispersion of meeting liquidity requirement mean value is low when other borrowed fund apart from deposits are used. This means that deposit rather than borrowed funds are main source of liquidity. Hence banks source supplementary liquidity to augment deposits. Deposits too are borrowed funds, but with less formality than other sources of borrowed fund.

The extent to which the asset - liability based approach resolves the profitability dilemma is captured from the coefficient values of 1.039383. An Examination of the effect of asset - liability based approach on profitability dilemma confirms that the asset - liability based approach significantly resolves the profitability dilemma. The extent to which the off statement of financial position based approach resolves the profitability dilemma is captured from the coefficient values of 0.540026. An Examination of the effect of off statement of financial position based approach on profitability dilemma confirms that the off statement of financial position based approach significantly resolves the profitability dilemma.

TSA implementation increases the liquidity and profitability dilemma. Though Banks have been sapped of their free working capital, its management must strategize an interesting perspective by seeing Re-emphasizing purchased liquidity than stored liquidity by seeing Borrowed fund more as a source of liquidity than a threat to liquidity dilemma subject to supervisory constraints in a less orthodox manner the money market should be deepened. Eminence should be given treasurers than marketers in the financial superstructure. Deposit money banks should role shift from mobilization position to an investive and inventive position. The reduction of the cash reserve ratio is simply a temporary measure; rather a better approach should be reducing financial exclusion. With more inclusion liquidity and profitability are enhanced ceteris paribus. One outcome of this might be increased friction between the microfinance banks and deposit money banks in rural banking. Such challenge should culminate with advance guide centered on territory map out on deposit mobilization. This might be emergence of microfinance bank importance in Nigeria.

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Appendix A

Identification and reduced form of equation

$V = a_O + a_1 POFAP + a_2 EFL + a_3 U + a_4 GM + U_1$ ….(1)

$U = b_0 + b_1 POFAL + b_2 BFA + b_3 V + U_2$ …. (2)

From equation (2)

$U = b_0 + b_1 POFAL + b_2 BFA + b_3 V + U_2$ …. (2)

Substitute V in equation (2)

$U = b_0 + b_1 POFAL + b_2 BFA + b_3 (a_0 + a_1POFAP + a_2 EFL + a_3 U + a_4 GM + U_1) + U_2$

$U = b_0 + b_1 POFAL + b_2 BFA + b_3 a_0 + b_3 a_1POFAP + a_2 b_3 EFL + a_3 b_3U + a_4 b_3 GM + b_3U_1) + U_2$

Collect like terms

$U - a_3b_3U = b_0 + b_1 POFAL + b_2 BFA + b_3 a_0 + b_3 a_1POFAP + a_2 b_3 EFL + a_4 b_3GM + b_3U_1 + U_2$

$U (1- a_3b_3) = b_0 + b_1 POFAL + b_2 BFA + b_3 a_0 + b_3 a_1POFAP + a_2 b_3 EFL + a_4 b_3GM + b_3U_1 + U_2$

$U = (b_0/ 1- a_3b_3) + (b_1 / 1- a_3b_3) POFAL + (b_2 / 1- a_3b_3) BFA + (a_Ob_3/1- a_3b_3) + (a_1 b_2/1- a_3b_3) POFAP + (a_2b_3/1- a_3b_3) EFL + (a_4b_3/1- a_3b_3) GM + (b_3U_1/1- a_3b_3) + (U_2/1- a_3b_3)$

From equation (1)

$V = a_0 + a_1, POFAP + a_2EFL + a_3BS + a_4GM + U_1$ ….(1)

substitute U in equation (1)

$V = a_0 + a_1POFAP + a_2EFL + [a_3] (b_0 + b_1 POFAL + b_2BFA + b_3V + U_2) + a_4GM + U_1)$

$V = a_0 + a_1POFAP + a_2EFL + a_3b_0 + a_3b_1POFAL + a_3b_2BFA + a_3b_3V + a_3U_2 + a_4GM + U_1)$

Collect like term

$V = a_3b_3V + a_0 + a_1POFAP + a_2EFL + a_3b_0 + a_3b_1 POFAL + a_3b_2BFA + a_3b_3V + a_3U_2 + a_4GM + U_1)$

$V (1 - a_3b_3) = a_0 + a_1POFAP + a_2EFL + a_3b_0 + a_3b_1 POFAL + a_3b_2BFA + a_3b_3V + a_3U_2 + a_4GM + U_1)$

$V = (a_0/1- a_3b_3) + (a_1/ 1- a_3b_3) POFAP + (a_2 /1- a_3b_3)EFL + (a_3b_0 / 1- a_3b_3) + (a_3b_1 /1- a_3b_3) POFAL + (a_3b_2/1- a_3b_3) BFA + (a_3U_2 /1- a_3b_3) + (a_4 / 1- a_3b_3)GM + (U_1/1- a_3b_3)$

Putting equation in a more compact form

$V = π_{11} + π_{12} + π_{13}POFAP + π_{14} EFL + π_{15} POFAL + π_{16} BFA　π_{17}GM + V_1$ …..(1)

$U = π_{21} + π_{22} + π_{23} POFAP + π_{24}EFL + π_{25}POFAL + π_{26}BFA + π_{27}GM + V_2$ …..(2)

Where

$π_{11} = a_0/1- a_3b$	$π_{21} = b_0/1- a_3b_3$	$π_{12} = a_3b_0 / 1- a_3b_3$	$π_{22} = a_Ob_3 /1- a_3b_3$	$π_{13} = a_1 /1- a_3b_3$
$π_{23} = a_1b_2 /1- a_3b_3$	$π_{14} = a_2 / 1- a_3b_3$	$π_{24} = a_2b_3 / 1-a_3b_3$	$π_{15} = a_3b_2 / 1- a_3b_3$	$π_{25} = b_1 /1- a_3b_3$
$π_{16} = a_3b_2 /1- a_3b_3$	$π_{26} = b_3 / 1- a_3b_3$	$π_{17} = a_4 /1- a_3b_3$	$π_{27} = a_4b_3 / 1- a_3b_3$	V_i = disturbances
				V_2= disturbances

Identification of equation

Identifying the equation is done by order and rank condition

Order condition for identification

Given as $R - r \geq g-1$

Where R= number of predetermined variable in the model

g = number of endogenous variable in the ith equation

r= number of predetermined variables in the ith equation under consideration.

G = number of actual equation / number of endogenous variable

Decision rule ≥ : over identified

≤ : under identified

= : exactly indentified

For equation 1:

$V = a_O + a_1 POFAP + a_2EFL + a_3 U + a_4 GM + U_1$

R= 5　G =2　r_i = 3　g_i =2

$R- r \geq g-1$

$5-3 \geq 2-1$

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2 >1

This necessary not sufficient to conclude that equation is over identified.
For equation 2

$U = b_0 + b_1 POFAL + b_2 BFA + b_3 V + U_2 \ldots(2)$

$R = 5 \quad r = 2 \quad g = 2 \quad G = 2$

$R-r \geq g-1$

$5-2 \geq 2-1$

$3 > 1$

This necessary not sufficient to conclude that equation is over identified.

Rank order for identification
Put model in standard form.

$-V + a_1 POFAP + a_2 EFL + a_3 U + a_4 GM + 0POFAL + 0BFA = -U_1$

$b_3 V + 0POFAP + 0EFL - U + 0 GM + b_1 POFAL + b_2 BFA = -U_2$

	V	POFAP	EFL	U	GM	POFAL	BFA
1	-1	a_1	a_2	a_3	a_4	0	0
2	b_3	0	0	-1	0	b_1	B_2

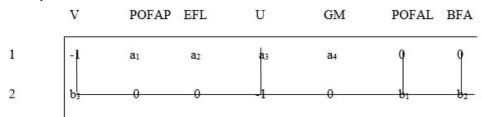Number of determinant to form will be of order G-1= 2-1 = 1
For equation 1
Strive out equation one and strive vertically parameters z of equation one which are non zero i.e

	V	POFAP	EFL	U	GM	POFAL	BFA
1	-1	a_1	a_2	a_3	a_4	0	0
2	b_3	0	0	-1	0	b_1	b_2

We have matix $[b_1 b_2]$ given that determinant to be formed is G-1 =1
$|b_1| \neq 0$ and $|b_2| \neq 0$ thus equation (1) is over identified.
For equation 2:

	V	POFAP	EFL	U	GM	POFAL	BFA
1	-1	a_1	a_2	a_3	a_4	0	0
2	b_3	0	0	-1	0	b_1	b_2

We have matrix $[a_1 a_2 a_4]$ given that determinant to be formed is G-1 =1
$[a_1] \neq 0 \; [a_2] \neq 0$ and $[a_4] \neq 0$ thus equation (2) is over identified.

Appendix B

Table array for analysis

Table 6: predictand variable (liquidity and profitability dilemma) with predictor (pool of fund to meet liquidity and profitability requirement, borrowed fund approach, gap management and excess fund lent)

YEAR	Pool of fund approach to meet liquidity (POFAL) 'Billion Naira'	Pool of fund approach to meet profitability (POFAP) 'Billion Naira'	Liquidity dilemma (U) 'Billion Naira'	Profitability dilemma (V) 'Billion Naira'	Gap management (GM) 'Billion Naira'	Excess fund lent (EFL) 'Billion Naira'	Borrowed fund approach (BFA) 'Billion Naira'	Free Deposit (FD) 'Billion Naira'	Primary reserve (PR) 'Billion Naira'
1989	-51.9261	-133.652	35.3	46.42607	-195.852	-136.352	62.2	0	81.72607
1990	-65.6639	-173.828	45.2	62.9639	-253.128	-177.528	79.3	0	108.1639
1991	-86.6553	-230.011	52.3	91.05531	-343.211	-234.311	113.2	0	143.3553
1992	-110.343	-323.186	98.7	114.1428	-455.886	-349.686	132.7	5.6	212.8428
1993	-195.771	-533.541	144	193.7707	-730.141	-563.141	196.6	4.5	337.7707
1994	-270.638	-717.375	214.2	232.5375	-980.275	-749.475	262.9	4.4	446.7375
1995	-376.78	-979.16	297.3	305.0799	-1321.06	-1022.36	341.9	8.7	602.3799
1996	-148.118	-572.237	361.6	62.51843	-975.437	-627.837	403.2	9.6	424.1184
1997	-120.51	-595.12	466.4	8.210075	-1105.62	-669.02	510.5	17.5	474.6101
1998	-185.161	-798.822	585.4	28.26122	-1392.02	-900.222	593.2	26.1	613.6612
1999	264.2032	-130.494	911.2	-516.503	-1058.49	-272.494	928	61.1	394.6968
2000	562.3338	151.9676	1334.5	-924.134	-1220.13	-44.7324	1372.1	119.7	410.3662
2001	5761.654	10183.41	1836.5	-6258.25	8300.708	9819.108	1882.7	55.7	-4421.75
2002	5067.308	8424.115	2339.7	-5696.51	6158.015	7923.315	2266.1	100	-3356.81
2003	6050.681	10147.06	2666.5	-6762.88	7636.362	9609.862	2510.7	123.7	-4096.38
2004	5127.386	7790.172	3390.4	-6053.19	4722.972	7104.072	3067.2	176.6	-2662.79
2005	15740.63	28375.47	3669.3	-16304.1	24810.97	27424.87	3564.5	192.8	-12634.8
2006	3751.081	2734.063	5866.1	-4849.08	-3049.94	1345.163	5784	240	1017.019
2007	3969.649	457.9985	9397.8	-5886.15	-8298.3	-1767.4	8756.3	401.8	3511.651
2008	13038.05	14458.6	13788.2	-15208.7	1903.698	11093.9	12554.9	699	-1420.55
2009	-1576.02	-17684.5	15874.6	233.9178	-30276.8	-22615.1	12592.3	903.5	16108.52
2010	-14158.8	-41145.5	16178.9	10807.82	-56259.3	-43363.3	15113.8	1427.6	26986.72
2011	108964.3	202115.1	17332.6	-110483	186400.6	198433	15714.5	2797.7	-93150.8
2012	625709	1233535	17821.1	-625647	1215885	1229897	17650.4	1933.1	-607826
2013	724191.1	1427813	20284.4	-723907	1407382	1423944	20431.5	3967.9	-703622
2014	1047656	2072916	22544.9	-1047805	2049907	2068444	23009.3	1830.1	-1025260

Source: CBN Statistical bulletin and bureau of statistics, 2014.