



## INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, ECONOMICS AND MANAGEMENT

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## THE EFFECTIVENESS OF LIQUIDITY MANAGEMENT ON THE NIGERIAN ECONOMY

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### ABSTRACT

*Within the context of risk integration, this study set out to empirically analyze the effectiveness of liquidity and asset management on the economies of developing nations with reference to Nigeria. The work examined how liquidity management has affected the economy considering some explanatory variables of balance of payments, exchange rates, international liquidity, and broad money supply in relation to the real gross national product as dependent variable. The study revealed significant relationships in terms of the degree of effectiveness. In the light of this, the null hypotheses were rejected while the alternative hypotheses were upheld. Some cogent and credit policy formulation recommendations were preferred in line with the result of the findings. This framework of the study uses the econometrics approach of ordinary least squares while the EVIEWS statistical software justified the method of analysis, using annual data of Central Bank from 1979 to 2008 for asymptotical relevance and credence.*

### KEYWORDS

Value at Risk, Holding Period, Variance Normal Mixture, Tail Dependence, Regression.

### INTRODUCTION

Liquidity conditions interact with market risk and credit risk through the horizon over which assets can be liquidated. To face the impact of market liquidity risk, risk managers agree in adopting a longer holding period to calculate the market VaR (Value at Risk). The liquidity of traded products can vary substantially over time and in unpredictable ways and moreover, banks' exposures to market risk and credit risk vary with liquidity conditions in the market. The prior comment suggest a stochastic description of the time horizon over which a portfolio can be liquidated while the latter highlights a dependence issue. The holding period of a risky portfolio is static. It could be reasonably flexible.

Liquidity and solvency are the divinely ordained twins which are frequently indistinguishable. This is because; an illiquid bank can rapidly become insolvent and an insolvent bank illiquid. The merits of having done so are clearly revealed by the stronger capital positions of most money deposit banks. While the downwards trend in capital adequacy is reversible, that of liquidity may not be reversible.

To make the general idea, it is necessary to distinguish between the two processes:

1. The daily P&L of the risky portfolio;
2. The P&L of disinvesting and reinvesting in the risky portfolio.

What exactly is the distribution of responsibility for liquidity management between money deposit banks and Central Banks! Some are of the opinion that responsibility should be totally borne by the Central Bank. Some however are of the opinion that a call for a return to more traditional banking practices is now. On maturity transformation, it is indeed ideal to determine how long should a bank be in a position to continue to meet its commitments if the wholesale markets on which it has relied upon previously dried up suddenly!

Another problem in this work is for the monetary authorities are the tenor of their operations. The financial crisis may not be related to insufficiency of funds but to concerns about the availability of funding to meet future financial commitments.

We assume no transaction costs, in order to fully represent the liquidity risk through the holding period variability. Therefore, even if the cumulative P&L is the same for the two processes above on the long term, the latter has more variability than the former; due to variable liquidity conditions in the market and a third process could describe the dynamics of such liquidity conditions.

The main objective of this work is to analyze the efficacy of liquidity management on developing economies such as Nigeria. In line with this are the specific objectives of the study is set to determine the extent of government involvement and intervention in the liquidity issue;

Examine and also evaluate the ways and manner in which government involvement is executed or actualized to bring about stability in the polity; determine the main reason for government intervention.

For the purpose of this work, the following hypotheses stated in Null form are of relevance.

**Ho1: There is no significant relationship between liquidity management and balance of payment.**

**Ho2: There is no significant relationship between money supply and gross domestic product.**

### REVIEW OF RELEVANT LITERATURE

The liquidity-adjusted VaR or Expected Shortfall (ES) of a risky portfolio as the VaR or ES of portfolio returns calculated over the horizon defined by the SHP process, which is the 'operational time' along which the portfolio manager must operate, in contrast to the 'calendar time' over which the risk manager usually measures VaR. Earlier literature on extending risk measures to liquidity includes several studies. Jarrow and Subramanian (1997), Bangia et al. (1999), Angelidis and Benos (2005), Jarrow and Protter (2005), Stange and Kaserer (2008), Earnst, Stange and Kaserer (2009), among few others, propose different methods of extending risk measures to account for liquidity risk. Bangia et al. (1999) classify market liquidity risk in two categories: (a) the exogenous illiquidity which depends on general market conditions, is common to all market players and is unaffected by the actions of any one participant and (b) the endogenous illiquidity that is specific to one's position in the market, varies across different market players and is mainly related to the impact of the trade size on the bid-ask spread. Bangia et al. (1999) and Earnest et al. (2009) only consider the exogenous illiquidity risk and propose a liquidity adjusted VaR measure built using the distribution of the bid-ask spreads. The other mentioned studies model and account for endogenous risk in the calculation of liquidity adjusted risk measures. In the context of the coherent risk measures literature, the general axioms a liquidity measure should satisfy are discussed.

None of the above works however focuses specifically on our setup with random holding period, which represents a simple but powerful idea to include liquidity in traditional risk measures such as Value at Risk or Expected Shortfall. When analyzing multiple positions, holding periods can be taken to be strongly dependent, in line with the initial classification of Bangia et al (1999)

Under the univariate case if one uses a 99% Value at Risk (VaR) measure, this will be the first percentile and the request will be positive. This implies that the horizon at future times can both increase and decrease, meaning that liquidity can vary in both directions. The standard example of a time inconsistency dilemma relates to the people handling emergency situations as they arise. Only recently, the banks have been erecting strategic dispositions for the benefit of their potential and existing customers. Such time inconsistencies issues are usually hard to resolve especially in the middle of crisis similar to the global economic meltdown. It is often worth noting, although not all of the aspects of a present crisis is foreseeable by the regulators and central banks more widely.

They did not just have the instruments or even, the strong will to do anything positive. If trouble strikes, the livewires are put in active mode and coupled with extra liquidity being provided on easy life terms, there is encouragement for the banks to do much more.

There are a large number of choices for positive processes: one can take lognormal processes with or without mean reversion, mean reverting square root processes, squared Gaussian processes, all with or without jumps. This allows one to model the holding period dynamics as mean reverting or not, continuous or with jumps, and with thinner or fatter tails.

Mixtures of distributions have been used for a long time in statistics and may lead to heavy tails, allowing for modeling of skewed distributions and of extreme events. Given the fact that mixtures lead, in the distributions space, to linear (convex) combinations of possibly simple and well understood distributions, they are tractable and easy to interpret.

Extreme behaviour on the single variables is modeled for example by heavy tails in the marginal distributions of the single variables. Extreme behaviour in the dependence structure of say two random variables is achieved when the two random variables tend to take extreme values in the same direction together. This is called tail dependence, and one can have both upper tail dependence and lower tail dependence. More precisely, but still loosely speaking, tail dependence expresses the limiting proportion according to which the first variable exceeds a certain level given that the second variable has already exceeded that level. Tail dependence is technically defined through a limit, so that it is an asymptotic notion of dependence. To tail, between two random variables is best expressed by rank correlation measures such as Kendall's tau or Spearman's rho. In case the returns of the portfolio assets are jointly Gaussian with correlations smaller than one, the adoption of a common random holding period for all assets does not add tail dependence, unless the commonly adopted random holding period has a distribution with power tails. Hence if we want to rely on one of the random holding period distributions, we need to introduce upper and lower tail dependence in a multivariate distribution for the assets returns. We need to adopt a common random holding period for all assets that is Pareto or Inverse Gamma distributed.

Since multivariate SHP modeling is a purely theoretical exercise, nonetheless a lot of financial data is being collected by regulators, providers and rating agencies, together with a consistent report on theoretical and statistical studies. This will possibly result in available synthetic indices of liquidity risk grouped by region, market, instrument type, etc.

Dependences between liquidity, credit and market risk could be an interesting exercise to calibrate the dependence structure between a liquidity index, a credit index and a market index in order to measure the possible dependence between them. The risk manager of a bank could use the resulting dependence structure within the context of risk integration, in order to simulate a joint dynamics as a first step, to estimate later on the whole liquidity-adjusted VaR by assuming comonotonicity between the variations of the liquidity index and of the SHP processes.

## METHOD OF ANALYSIS

The research work will be carried out empirically by reviewing relevant literature on the effectiveness of liquidity in the economy. Secondary data obtained from the Central Bank of Nigeria will be used. On the other hand, all necessary variables will be analyzed by multiple regressions using EVIEWS statistical software. Annual data between 1979 and 2008 will be used for the study.

## MODEL SPECIFICATION

The aim of this work is centered on the effectiveness of liquidity management on the Nigerian economy and other developing economies. In this instance, the variables are needed to examine the efficiency or otherwise of liquidity management on the economy. The Real Gross Domestic Product (RGDP) is the dependent variable while the independent variables includes: Balance of Payment (BOP), Exchange Rate (EXR), International Liquidity (INL) and Total Money Supply (MS).

The model specification is as follows as guided by the classical production theory.

$$RGDP = f(BOP, EXR, INL, MS) \dots \dots \dots 1$$

In furtherance to the above equation 1, wt can be rewritten as;

$$Rgdp = \beta^0 + \beta^1 bop + \beta^2 exr + \beta^3 inl + \beta^4 ms + \epsilon$$

Where:  $\beta^0$  is the intercept while  $\beta^1, \beta^2, \beta^3, \beta^4$  constitutes the various slope coefficients while  $\epsilon$  is the error or disturbance term. The period of study covers 1979 to 2008 totaling 30 years.

## RESULTS OF FINDINGS

The result of the regression analysis revealed the presence of significant relationship between the specific variables tested. In the light of this, the two null hypotheses are rejected while we upheld the alternative hypothesis.

In another vein, the Durbin Watson is very good at 1.7 which showed that there was no presence of autocorrelation amongst the variables. Also the R-squared and R-adjusted gave a very strong factor which supports our decision to uphold the alternative hypotheses. Finally, the standard error is small relative to the mean values of the dependent variable.

## CONCLUSIONS

Within the context of risk integration, in order to include liquidity risk in the whole portfolio risk measures, a stochastic holding period (SHP) model can be useful, being versatile, easy to simulate, and easy to understand in its inputs and outputs. In a single-portfolio framework, as a consequence of introducing a SHP model, the statistical distribution of P&L moves to possibly heavier tailed and skewed mixture distributions. In a multivariate setting, the dependence among the SHP processes to which marginal P&L are subordinated, may lead to dependence on the latter under drastic choices of the SHP distribution, and in general to heavier tails on the total P&L distribution. At present, lack of synthetic and consensually representative data forces to a qualitative top-down approach, but it is straightforward to assume that this limit will be overcome in the nearest future.

In line with the result of findings therefore, the importance of liquidity to the health of the economy is imperative. All hands must be on deck to make it happen. Efficient liquidity management coupled with a strong risk management posture is not negotiable.

## RECOMMENDATIONS

The following policy recommendations becomes relevant in order to improve the management and measurement of liquidity exposures in less developed nations of which Nigeria is one.

1. Due process must be followed in all financial dealings so as to put to the front burner the concept of transparency.
2. In line with the above, any erring officials should be brought to book instantly so as not to encourage negative compromise.
3. The need to have an enhanced inflow base and this will be able to give us a positive balance of payment position at all times.
4. The negative attitude of most underdeveloped nationals to foreign products, values and culture should be checkmated. This will bring about the required change in terms of self reliance and financial independence.
5. Efforts should be made to reduce external sector borrowing in financing balance of payment deficit. This may have an adverse effect on the country's resources.
6. The government should be focus and have an economic blueprint. In the absence of this, the zeal to advance may be lost 'ab initio'.
7. The level of corruption and self centeredness in most developing nations is very high. Genuine efforts must be put in place legally to put them on the path of restoration and excellence.

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## APPENDIX

TABLE 1: RELEVANT DATA ON THE REQUIRED VARIABLES FOR ANALYSIS

YEAR	BOP	INL	MS	EXR	RGDP
1979	1868.9	3238.2	10224.6	0.5605	29948.0
1980	2402.2	5646.3	15100	0.5445	31546.8
1981	3020.8	2593.6	16161.7	0.61	205222.1
1982	1398.3	906.9	18093.6	0.6729	199685.3
1983	301.3	495.4	20879.1	0.7241	185598.1
1984	354.9	1125.6	23370	0.7649	183563
1985	349.1	1492.4	26277	0.8938	201036.3
1986	7571.2	5388.2	27389.8	2.0206	205971.4
1987	159.2	3729.3	33667.4	4.0179	204806.5
1988	2294.1	9520.5	45446.9	4.5367	219875.6
1989	8727.8	22444.6	47055	7.3916	23679.6
1990	18498.2	44794.0	68662.5	8.0378	267550
1991	5959.6	55393.8	87499.8	9.9095	265379.1
1992	65271.8	70616.1	129085.5	17.2983	271365.5
1993	13615.9	89606.3	198479.2	22.0511	274833.3
1994	42623.3	51197.8	266944.9	21.8861	275450.6
1995	1953316	102748.1	318763.5	21.8861	281407.4
1996	53152	229502.2	370335.5	21.8861	293745.4
1997	1076.3	308534.9	429731.3	21.8861	302022.5
1998	220675	221530.9	525637.8	21.8861	310890.1
1999	326634	695734.8	699733.7	92.6934	312183.5
2000	314139.2	1274135.4	1036079.5	102.1052	329178.7
2001	24738.7	1458124.3	1315869.1	111.9433	35994.3
2002	563484	1378220.9	1599494.6	120.9702	433203.5
2003	162298	1475712.2	1985191.8	129.3565	477533
2004	1124157	2712527.2	2263587.9	133.5004	527576
2005	678781.8	3822705.2	2814846.1	132.147	561931.4
2006	0.1	5229215.43	4027901.7	128.6516	595821.6
2007	0.0	713566.475	5349253.3	124.75	634251.1
2008	0.0	934909.25	8518489.2	119.78	674389.0

Source: Central Bank of Nigeria



TABLE 2: DATA ANALYSIS

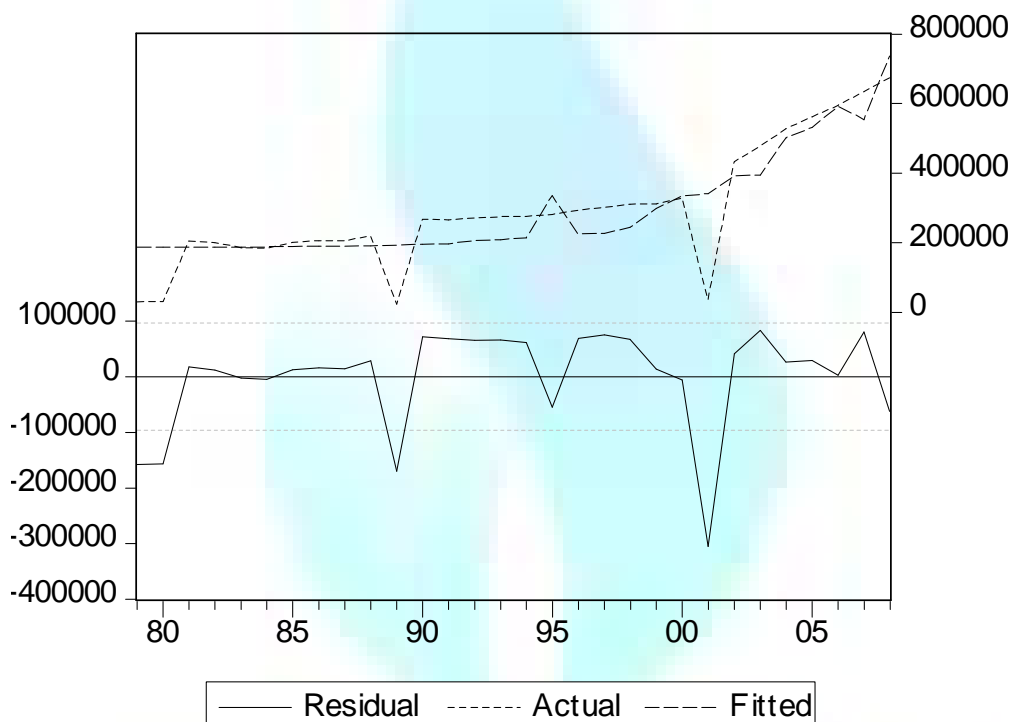
Dependent Variable: RGDP  
 Method: Least Squares  
 Date: 11/26/10 Time: 05:37  
 Sample: 1979 2008  
 Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BOP	0.061792	0.046226	1.336736	0.1933
EXR	375.8567	704.1067	0.533806	0.5982
INL	0.024786	0.023344	1.061764	0.2985
MS	0.056575	0.014469	3.910054	0.0006
C	186789.0	23979.16	7.789638	0.0000

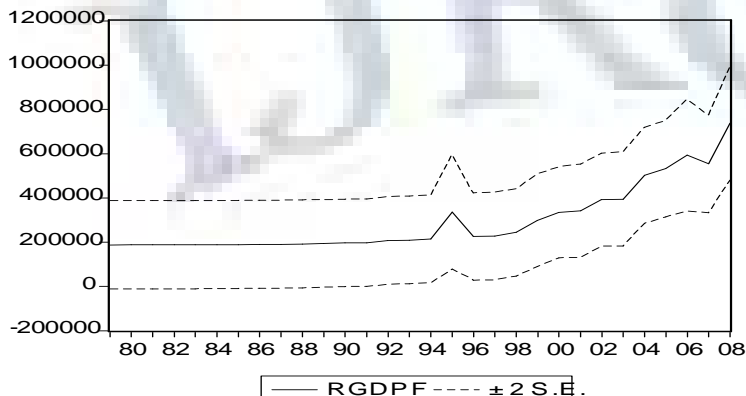
R-squared	0.735710	Mean dependent var	293854.6
Adjusted R-squared	0.693424	S.D. dependent var	174652.2
S.E. of regression	96703.74	Akaike info criterion	25.94770
Sum squared resid	2.34E+11	Schwarz criterion	26.18124
Log likelihood	-384.2156	F-statistic	17.39829
Durbin-Watson stat	1.720595	Prob(F-statistic)	0.000001

GRAPH 1: RESIDUALS



Source: Eviews

GRAPH 2: FORECASTS



Forecast: RGDPF  
 Actual: RGDP  
 Forecast sample: 1979 2008  
 Included observations: 30

Root Mean Squared Error: 96703.74  
 Mean Absolute Error: 61307.84  
 Mean Abs. Percent Error: 97.22730  
 Theil Inequality Coefficient: 0.131945  
 Bias Proportion: 0.000000  
 Variance Proportion: 0.076579  
 Covariance Proportion: 0.923421

Source: Eviews

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