

AN EMPIRICAL EVALUATION OF DEMAND FOR LIQUID FINANCIAL ASSETS

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ABSTRACT: *This study empirically estimates the behaviour of demand for liquid financial assets, as it is one of the most important recurring issues in theory and application of macroeconomics, and examines the stability of the same in the Sudanese context. The study covered the period 1993 to 2012. The results show that, there is a strong transactions motive for holding liquid financial assets by individuals and banks in Sudan. That happened after the liberalization process and utilization of the credit and debit cards. And also, implementation of Islamic financing techniques; specifically, after the open market policy that allow the functioning of private and Islamic banks along with Khartoum Securities Exchange to join the financial sector. The reliability of the estimation results were questioned due to the shortcomings of traditional techniques. A modern estimation technique was introduced, like cointegration technique. However, findings of cointegration have been interpreted as a sign of constancy of parameter estimates. The empirical analysis shows that the demand for liquid financial assets is a function of national income and negatively behaving with changes in prices and rates of return. ADF test for unit roots results show a non-stationary behavior, and then VAR is applied along with Johansen co-integration method analysis of a multivariate system of equations to test for the existence of a long run relationship between the determinants that shows the existence of a reasonably stable demand for money and other liquid financial assets function in Sudan. Since inflation (continuous prices rising) is exogenous in demand for money and other liquid financial assets function, therefore, the central monetary authority, namely, Central Bank of Sudan and Ministry of Finance are not able to control the price-rises in such open markets.*

KEYWORDS: Demand for liquid financial assets, Islamic financing techniques, VAR, error correction model and co-integration, GLS test statistics.

INTRODUCTION

Financial system with the help of financial assets provides an inexpensive methods for transferring and storing claims to wealth and income. It's well recognized if financial markets work reasonably well, financial assets will play a major role in the allocation of wealth to its best possible uses such as firms that earn higher rates of return and away from firms that earn lower rates of return. The transaction cost incurred to effect a better allocation of assets can be substantially reduced with the development of well-organized financial sector, (Joshi 1999). Liquid financial assets play an important role in the financial system. They are generally defined as financial assets, such as cash and government securities, Shahama, Ijarah, and Musharakah certificates, which can be readily

used to fund payments, even in stressed market conditions. These assets are central to liquidity and credit risk management in financial markets. They are commonly used as collateral to obtain short-term funding and manage counterparty credit risks in derivatives transactions. Liquid financial assets, particularly those that also have low credit and market risk, are also an important asset class for a range of institutional investors, such as official sector managers of foreign exchange reserves. Theoretically, the money demand is generally hypothesized to be an increasing function of some measure of income, and some other variables representing the structural composition of the economy. The scale variable was in accordance with transaction theories of money, which viewed money essentially as an inventory, held for transaction purpose. The rate of interest as a measure of the opportunity cost of holding money in conformity with the assets theories of money, which presumed the money demand to be a problem of portfolio choice.

Recent literature on economic development has focused considerable attention on the financial aspect of economic development. It has been argued that an increase in the demand for money and other liquid financial assets necessarily accompanies growth, although causal relationship has not always been explicitly postulated (Trescott 1972). The main purpose of this paper is to find out how far demand for money and other liquid financial assets has progressed in Sudan and what the proximate determinants of it are. This paper adds to the growing literature by providing an empirical assessment of liquid financial assets after the joining of the Islamic banks and subsequently, establishing Khartoum Securities Exchange, plus to that the financial reforms in Sudan. The rest of the paper is structured in the following way: In section two, gives a survey of related literature ; section three presents theoretical foundation of demand for liquid financial assets. While in section four a data sources along with models specifications are presented. In the fifth section, we carried out the empirical analysis and presented their results. The concluding remarks of this paper are summarized in the last section.

Objectives of the Study

The objectives of this study are:

- (i) to study the demand for liquid financial assets and their relative behaviour in the Sudan.
- (ii) to empirically estimate and evaluate the demand for liquid financial assets.
- (iii) to investigate how the demand for liquid financial assets progressed in Sudan.

Research Hypothesis:

In order to address the objectives above, the following hypothesis shall be proved:

- H_1 there's statistical positive relationship between demand for and other liquid financial assets and macroeconomics variables, namely, gross domestic product, banks offices; negatively to rate of return and changes in the prices.

Importance of the study:

- i. Emphasis on the aspects and ways in which they can verify the demand for liquid financial assets by banks and government in Sudan.
- ii. Emphasis on attention to the financial assets management and in productivity and control of prices rise.

- iii. To evaluate the Islamic rate of return through musharakah, mudharabah, ijarah and other modes of financing that may help in investment.

REVIEW OF LITERATURE

The lively debates between Monetarists and Keynesians on the relative effectiveness of monetary and fiscal policies continue partly due to unsettled issues pertaining to money demand function. The research for stable demand for liquid financial assets function continues to dominate the attention of researchers and economists in developed and developing countries. This part of this paper is devoted to study the available literature on the subject of demand for liquid financial assets. Many studies have been carried on, in abroad, which are of greater significance. Among a few of them, many works done by Arthur Brown (1939) and James Tobin (1947), in the late of 1950s appeared the works of Friedman (1959). However, this study covers the works of Meltzer (1963) Trescott (1972), Abu Rasheed (1996), Falls and Natke (1996), Saiyed and Pathak (1999), and Natke (2001). The followings are few studied works cited from different periodicals and have been summarized as follows:

Meltzer (1963) gave a justification for excluding a rate of return variable and he argues that holdings of liquid assets are essentially a function of wealth and the rate of interest. He mentioned that sales are related to wealth by the internal rate of return and a variable which measures changes in the capital-labor ratio and changes in business activity. Meltzer argues, because for any particular industry in any given year the interest rate, capital-labor ratio and internal rate of return are constant. Thus liquid asset demand can be explained by sales in cross-section regression equations.

In his extensive research, Trescott (1972) empirically, studied the financial development in Thailand using data for the period from 1947 to 1967, such as currency, demand and time deposits, government savings, banks and government securities out-side the commercial banks. He applied the standard error of individual coefficients and their t-value, D-W statistic and coefficient of determination (R^2). The results of his regressions analysis indicate that public's demand for government securities responded positively to increase in national income, money stock and to the interest rates offered on government securities. Demand for securities was influenced by a number of other factors, such as income tax status; repurchase provisions, and possible interest rates on international financial assets. The increase in interest rates offered on government debt contributed to rise in interest elasticity of demand for money, and virtually has been found to be constant and behaves like transaction demand.

Domowits and Elbadawi (1987) put forward the study that related to an empirical analysis of the demand for international reserves in the Sudan is presented, based on the error-correction model. The model is parametrically rich enough to allow the division of effects into long-run influences, short-term adjustments, and proportional equilibrium impacts. Beside addressing conventional issues in reserve demand literature; the model explicitly incorporates the impact on reserve demand of remittances transferred by Sudanese nationals working abroad, and the impact due to money

market disequilibrium. The demand function was found to be stable and characterized by constant returns to scale.

The well studied work of Abu-Rasheed (1996) that investigates the demand for liquid financial assets and economic development of Jordan. He found that the demand for total liquid financial assets has higher interest elasticity than that of income, and that of highly liquid financial assets indicates higher income elasticity, finds the one with less liquid financial assets indicates interest elasticity with greater than unity and was highly significant and he notices the progressive fall in the price elasticity of demand for total financial assets. In his conclusion, he states: *“Demand for financial assets is positively and strongly related to GNP variable. About 92 percent changes in financial assets are caused by GNP variable alone. It also reveals that income elasticity for financial assets is greater than unity”*(Abu Rasheed, 1996).

Falls and Natke (1996) examined the impact of cash flow instability on the firm demand for liquid assets. The instability arises from foreign sources in the form of exchange rate variability and the extent of foreign trade and domestically from inflation and interest rate volatility. They also investigate whether multinational subsidiaries react differently than domestic firms to these factors; they incorporate the variability of both the domestic inflation rate and interest rate since these variables may also influence the stability of a firm's cash flow. For the analysis purpose, they used data from a large sample of manufacturing firms in Brazil show that multinational subsidiaries hold fewer liquid assets and respond differently than domestic firms to exchange rate variability and foreign involvement. The two groups exhibit similar behavior in response to the domestic sources of instability.

Saiyed and Pathak (1999) study was to find out how far has the demand for liquid and determinants of assets progressed in India from 1970 to 1995. They examined the elasticity response of explanatory variables such as national income, interest rate and price level. They concluded that the demand for liquid financial assets appears to be statistically stable and positively related to income and negatively to interest rate and inflation. Also they believe that: *“given the allocative efficiency of financial institutions, the high rate of saving generated in financial form would go a long way in promoting India's economic development”*.

Natke (2001) observes that the measures of inflation and the price level are added to the standard model of liquid asset demand and estimated with cross-section data on Brazilian manufacturing firms over a four-year period characterized by substantial inflation. Results indicate that economies of scale exist in a model that is stable over time. Interest rates have a strong and elastic impact on liquid asset demand when inflation is explicitly controlled for although this result is not consistent across all subsets of data used. The usual assumption of a unitary price level elasticity of liquid asset demand is rejected and firms appear to conserve on liquid asset holdings as the rate of inflation increases suggesting more careful management of payments flows.

The foregoing review of related literature highlights the importance of empirically studying the demand for money and other liquid financial assets, in some developing countries. There's a study related to the Sudan despite of the openness of the 1990s of the Sudanese economy as well as the

impact of international political crises that are due to the prices of oil and other imported goods and services. Trescott and Abu Rasheed, Saiyed and Pathak have done a great work in which they surveyed a post-1973 literature of a stable demand for liquid financial assets function, mostly of Jordan. But in our study we review the related economic literature of a stable demand for money and other liquid financial assets with regard to Sudanese research and studies works and others of developing countries. Though this is not an exhaustive survey of the literature and findings of empirical work that has gone into this area, we feel that it does provide analytical framework for enabling us to undertake the present study.

THEORETICAL BASES

It is true that financial assets formation is a mirror image of real assets formation, capital formation can proceed without generating financial assets, if savers are users of their savings. With the development of an economy, dichotomy emerges between decision to hold or accumulate savings in financial form and decision to invest, since distribution of financial assets held among economic units does not always correspond to the distribution of investment expenditure, consequently a mechanism is needed to bridge this dichotomy (Saiyed and Pathak, 1999). From the output generating point of view what is important is the link between financial savings intermediation and capital expenditure. In essence three main issues exist in this process: (i) generating of financial savings through demand process, (ii) financialization of savings through intermediaries, and, (iii) the most efficient transformation of financial savings into real capital. The goals of the central monetary authority, namely, Central Bank of Sudan (CBoS) have been undergoing gradual changes in keeping with trends around the world. Today the implicit objective of CBoS is the long-run macroeconomic stability at maximum feasible output. The demand for financial function is stable under conditions of repression era; once the economy opened up in the mid eighties and early nineties, the stability of demand function became an issue. The economic theory states that changes in financial markets inherently bring about the changes in the demand functions. Hence, an in-depth analysis into this is very important particularity for the economies in transition and the current international financial scenario.

Money is an asset that demanded for three reasons: Precaution motive of holding liquid financial assets show that public would like to keep liquidity for precaution due to the occurrence of unexpected payment needs. In an instable Sudanese economic environment, the cash holdings for precaution may have higher importance. While speculation motive explains that public keep cash in order not to be short in cash when find opportunistic investment alternatives and be able to make investments. Also arbitrage motive presents that some firms and individuals keep their cash invested in the domestic financial markets taking advantages of arbitrage opportunities. These transactions consist of obtaining funds from the foreign financial markets at low investment rates, and investing them in the domestic markets at higher rate of return, usually hedged against foreign exchange.

The Demand for Liquid Assets:

Banks and other financial institutions require liquid assets to support their activities. Banks, in particular, need to hold assets that can be exchanged for cash at short notice to manage their day-

to-day needs. Banks need liquid assets to help them manage the risks inherent in using short-term liabilities to fund longer-term assets, such as loans. Financial institutions active in derivatives markets also typically need to hold an inventory of liquid assets for use as collateral to fund their trading and hedging activities. To fulfill these roles, there needs to be reasonable certainty about the value of these assets. Banks and other financial institutions require liquid assets to support their activities. Banks, in particular, need to hold assets that can be exchanged for cash at short notice to manage their day-to-day needs. Banks need liquid assets to help them manage the risks inherent in using short-term liabilities to fund longer-term assets, such as loans. Financial institutions active in derivatives markets also typically need to hold an inventory of liquid assets for use as collateral to fund their trading and hedging activities. To fulfill these roles, there needs to be reasonable certainty about the value of these assets. Liquid assets accounted for around 20.9 per cent in (2001) and remained in the same range in the year 2010 (22.5%) of Sudanese banks' total deposits, but financing accounted for per cent in 2010 from the total domestic assets (Table 1). A large share of liquid assets was in the form of unsecured securities issued by other banks: holdings of short-term paper, such as central bank musharakah and Ijarah certificates of deposit accounted for large amount of liquid assets, and a further 18 per cent was held in long-term bank papers.

Table No. 1: Commercial Banks Balance Sheet Indicators

Year	Liquid Assets /Total Deposits	Total Deposits /Total Liabilities	Capital & Reserves /Total Liabilities	Finance/Total Assets	Finance/Total Deposits
2001	20.90 %	60.20 %	10.50 %	24.50 %	40.60 %
2002	18.60 %	59.40 %	12.10 %	31.60 %	53.20 %
2003	19.20%	59.90 %	14.00 %	37.30 %	62.30 %
2004	18.31%	61.97 %	13.77 %	41.82 %	67.48 %
2005	17.40%	63.88 %	12.01 %	45.74 %	71.61 %
2006	17.00 %	53.20 %	16.80 %	48.10 %	90.50 %
2007	21.00 %	53.20 %	17.60 %	49.60 %	93.50 %
2008	23.40 %	53.90 %	17.10 %	49.70 %	92.50 %
2009	20.90 %	56.90 %	18.20 %	48.80 %	90.60 %
2010	22.50 %	60.00 %	17.30 %	49.10 %	81.90 %
2011	23.20%	60.00%	19.40%	49.20%	82.00%
2012	22.30%	59.30%	16.20%	45.50%	76.70%

Sources: Central Bank of Sudan, annual reports

ANALYTICAL FRAMEWORK AND RESEARCH METHODOLOGY

It is our contention that in a developing economy what is more crucial is to stimulate demand for financial assets rather than institutionalization of other assets and their allocation. In what follows we would like to investigate statistically the demand for liquid financial assets. E-Views is a computer software package used for this study, therefore, achieving analytical precision we have used ordinary least square (OLS) technique for estimation and most of the required statistical information such as coefficient of determination (R^2), F-statistics, t-value and others. The statistical information has been collected from annual reports that published by Central Bank of Sudan (CBoS). It is hypothesized here that demand for liquid financial assets is statistically strongly and positively related to national income and negatively to rate of return and inflation. We have used murabahah profit margin rate as an indicator of market pressure and also it is relatively free rate of interest. For empirical analysis the study also has applied Johansen Cointegration test, which provides the existence of long-run equilibrium relationship among variables. The reason behind choosing 1993 to 2012 seems from the fact that this was a decade

before the starting of liberalization, globalization and privatization of the Sudanese economy and a decade after it in addition to that the current scenario. This paper concentrates on very first aspect, namely, demand of liquid financial assets and its relative behaviour in the Sudanese context. The study considered currency in circulation (CU), commercial banks' demand deposits (DD), and time or investment deposits (INVTD) in local and foreign currencies. Also gross domestic product (GDP), consumer price index (CPI), and rates of return (RR), new components of the financial sector such as private banks, Islamic banking techniques and utilization of information technology (credit and debit cards) are included. The data used in this study consists of annually observations which are taken from the annual reports of the Central Bank of Sudan.

Model Specifications and Results Discussion:

In order to estimate the demand for liquid financial assets which is non-observable, we have used supply data on the assumption that equilibrium in the financial market exists. There are mainly two forms of the demand liquid financial assets function that are considered by researchers, viz:

- (i) A linear form which states that demand liquid financial assets is a linear function of the independent variables.
- (ii) A log-linear form, and according to this view the natural logarithm of the demand for liquid financial assets is a linear function of the natural logarithms of the independent variables.

Results Analysis

This study used descriptive and empirical approaches to suitability for such study, which is generally commensurate with financial studies and shows aspects of the theory of a particular subject and measure the views of the research data. Table 2 shows the descriptive results, meanwhile table 3 shows the Correlations Matrix as follows:

Table 2: Statistical Description (1993-2012)

	Currency in Circulation	Demand Deposits	Liquid Financial Assets1	Time-Investment Deposit	Liquid Financial Assets2	Gross Domestic Product	Consumer Price Index	Rate of Return	Banks' Branches	Population
Mean	4.15E+09	8.02E+09	1.39E+10	3.87E+09	8.02E+09	7.32E+10	3.87E+09	5.87E+09	1.39E+10	7.32E+10
Median	2.17E+09	4.05E+09	6.50E+09	1.88E+09	4.05E+09	5.17E+10	1.88E+09	2.45E+09	6.49E+09	5.17E+10
Maximum	1.68E+10	3.10E+10	5.87E+10	1.42E+10	3.10E+10	2.43E+11	1.42E+10	2.77E+10	5.87E+10	2.43E+11
Minimum	94540000	1.57E+08	2.64E+08	62000000	1.57E+08	9.48E+08	62000000	1.01E+08	2.65E+08	9.48E+08
Std. Dev.	4.67E+09	8.97E+09	1.63E+10	4.32E+09	8.97E+09	6.84E+10	4.32E+09	7.37E+09	1.63E+10	6.84E+10
Skewness	1.350862	1.210069	1.351592	1.067985	1.210069	0.954549	1.067985	1.556925	1.351868	0.954549
Kurtosis	3.963827	3.472314	4.011225	3.008718	3.472314	3.055809	3.008718	4.868064	4.011102	3.055809
Jarque-Bera	6.856892	5.066789	6.941486	3.802036	5.066789	3.039807	3.802036	10.98810	6.943763	3.039807
Probability	0.032437	0.079389	0.031094	0.149416	0.079389	0.218733	0.149416	0.004111	0.031059	0.218733
Sum	8.30E+10	1.60E+11	2.78E+11	7.74E+10	1.60E+11	1.46E+12	7.74E+10	1.17E+11	2.78E+11	1.46E+12
Sum Sq. Dev.	4.14E+20	1.53E+21	5.04E+21	3.55E+20	1.53E+21	8.89E+22	3.55E+20	1.03E+21	5.04E+21	8.89E+22
Observations	20	20	20	20	20	20	20	20	20	20

Sources: this estimation is computed by the authors

Table 3: Correlations Matrix:

	Currency in Circulation	Demand Deposits	Liquid Financial Assets1	Time-Investment Deposit	Liquid Financial Assets2	Gross Domestic Product	Consumer Price Index	Rate of Return	Banks' Branches	Population
Currency in Circulation	1.000000	0.993877	0.998584	0.993378	0.998645	0.989469	0.981915	-0.002686	-0.133977	0.597094
Demand Deposits	0.993877	1.000000	0.998348	0.983759	0.994118	0.993287	0.970035	0.005586	-0.181656	0.654626
Liquid Financial Assets1	0.998584	0.998348	1.000000	0.990269	0.997996	0.992822	0.977698	0.001296	-0.157132	0.625708
Time- Investment Deposit	0.993378	0.983759	0.990269	1.000000	0.997089	0.980324	0.976374	0.022832	-0.101822	0.578761
Liquid Financial Assets2	0.998645	0.994118	0.997996	0.997089	1.000000	0.989461	0.979425	0.011320	-0.131529	0.605567
Gross Domestic Product	0.989469	0.993287	0.992822	0.980324	0.989461	1.000000	0.985603	-0.031004	-0.232744	0.696502
Consumer Price Index	0.981915	0.970035	0.977698	0.976374	0.979425	0.985603	1.000000	-0.049665	-0.165881	0.638345
Rate of Return	-0.002686	0.005586	0.001296	0.022832	0.011320	-0.031004	-0.049665	1.000000	0.440989	0.055518
Banks' Branches	-0.133977	-0.181656	-0.157132	-0.101822	-0.131529	-0.232744	-0.165881	0.440989	1.000000	-0.510057
Population	0.597094	0.654626	0.625708	0.578761	0.605567	0.696502	0.638345	0.055518	-0.510057	1.000000

Sources: this estimation is computed by the authors

Empirically, to investigate the nature of demand for liquid financial assets, using the above analytical framework, the changes in liquid financial assets, growth of gross domestic product rates, consumer price index and rates of return, must be tested for stationarity and cointegration. The Augmented Dickey-Fuller (1979, 81) standard unit root tests and semi-parametric approach proposed by Philips-Perron (1988, 2000) and their extensions assume that the adjustments process is symmetric.

Unit Root Tests:

This study used Augmented Dickey-Fuller (ADF) to test the order of integration of the variables, knowing that the stationery test of the time series is needed in order to avoid the problem of spurious regression. The estimation results of unit root tests are summarized in table 3. An analysis of the overall empirical results indicates that all variables become non-stationary and a few non-stationary even after being differenced twice. It is therefore, the study applied VAR, and subsequently the cointegration and thereafter the ordinary least squares (OLS).

Table No. 4 Unit Root Tests Results:

	ADF		PP	
	Level	1st. Difference	Level	1st. Difference
LFA1	-2.2718	-2.3738	-2.2644	-
LFA	- 1.4169	- 3.217	- 3.5189	- 1.9819
LFA1/CPI	-0.0754	-2.3738	-0.4001	-3.0212*
LFA/CPI	0.07106	-1.4959	-0.2806	-3.4840*
GDP	-6.4849*	-5.9480*	-5.7214*	-
CPI	-5.0714*	-	-4.0886*	-
RR	-4.4172	-	-4.4211	-
BO	-1.1957	-1.7619	-1.4960	-3.9394*
Log(CU/CPI)	-0.0324	-1.8573	-0.3234	-3.7284*
Log(DD/CPI)	-0.2175	-1.2218	-0.5144	-2.5052
Log(TD/CPI)	0.0391	-1.8284	-0.1759	-4.4534*

(*) denotes @ 5 % of significance level.

Sources: Sources: this estimation is computed by the authors

VAR & Johansen Co-integration and Error Correction Model:

The unit root tests confirmed that there's a non-stationarity only in the second order, thus satisfying the initial assumption for co-integration analysis. The lag lengths were selected to be two using information criteria, also Sc and HQ and satisfied the mathematical stability condition.

Table No. 5: Sample: 1993 to 2012 - Included observations: 18

Test Assumption: Linear deterministic trend in the data

Series: LOG(LFA/CPI) LOG(GDP) LOG(CPI) RR BO

Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.963693	140.8947	68.52	76.07	None **
0.894062	81.21123	47.21	54.46	At most 1 **
0.730888	40.80304	29.68	35.65	At most 2 **
0.614643	17.17571	15.41	20.04	At most 3 *
0.000619	0.011154	03.76	06.65	At most 4

*(**) denotes rejection of the hypothesis at 5% (1%) significance level

L.R. test indicates

cointegrating equation(s) at the 5% level of significance.

Sources: this estimation is computed by the authors

Table No. 6: VAR Lag Order Selection Criteria

Endogenous variables: LLFA LGDP LCPI BO RR

Exogenous variables: C

Sample: 1993 2012

Included observations: 18

Lag	LogL	LR	FPF	AIC	SC	HQ
0	-544.9631	NA	2.38e+20	61.10701	61.35434	61.14111
1	- 411.2883	178.2331*	1.55e+15	49.03203	50.51599	49.23665
2	-371.0016	31.33407	6.71e+14*	47.33351*	50.05410*	47.70865*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level) - FPE: Final prediction error

AIC: Akaike information criterion

- SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Sources: this estimation is computed by the authors

Testing residual stationarity (u) due to insignificant trend logarithm demand of liquid financial assets.

Table No. 7:

Null Hypothesis: U has a unit root

Exogenous: Constant Lag Length: 1 (Automatic based on SIC, MAXLAG=3)

	t-Statistics	Prob.*
Augmented Dickey-Fuller test statistic	-4.451329	0.0033
Test critical values:	1% level	-3.886751
	5% level	-3.052169
	10% level	-2.666593

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20.

observations and may not be accurate for a sample size of 17.

Sources: this estimation is computed by the authors

Demand for Currency by individuals and corporate: Demand for currency (Sudanese pound) by public, that is, members of the society has a crucial role in monetary analysis for a number of reasons: (i) relatively large share of money is held in the form of currency, a question arises while considering the utilization of credit and debit cards, (ii) the volatility of demand for currency, and features of monetary system which is reinforced the importance of the public demand looking into joining of the private and Islamic banks in the financial sector along with Khartoum Securities Exchange. The demand for currency is the amount of currency in circulation which is determined by the demand for it rather than by factors influencing its supply.

Here, we present an equation for demand for currency in Sudan:

$$\text{Log} \left(\frac{CU}{CPI} \right) = \alpha_0 + \beta_1 \log GDP - \beta_2 RR - \beta_3 CPI + \beta_4 \log \frac{CU}{CPI_{t-1}} + U_1 \dots \dots \dots (1)$$

Where, (CU/CPI) indicates Demand for liquidity (currency). the estimated result is as follows:

$$L(CU/CPI) = -1.7296 + 0.3825 LY - 0.2882 LP + 0.0623 RR - 0.0011 BO + 0.6284 L(CU/CPI)_{(-1)}$$

(-0.670) (1.736) (-1.027) (0.449) (-1.359) (8.538) *

R²=0.99

D-W Statistics= 2.12

The estimation results demand for liquidity by presents above show there's a strong relationship (coefficient of determination stands on 0.99) among the variables, but consumer price index (LP) and bank offices are negatively behaving, while the musharakah and mudharabah margins are positively behaving with demand for currency.

Demand for Demand Deposits by individuals, corporate, and government: Demand deposits are known to be the most important source of funds for commercial banks (public, private and Islamic), but this has changed in recent years. The rapid growth of time deposit and saving deposit has, in fact, been the most significant in the Sudanese commercial banking. There has been a gradual increase in investment deposits ratio, specifically, the factors affecting this ratio are identified as rate of return, income, banking services expansion, and expected rate of inflation. The estimating equation is thus specified as:

$$\text{Log} \left(\frac{DD}{CPI} \right) = \alpha_1 + \beta_5 \log Y - \beta_6 CPI - \beta_7 R + \beta_8 \log \left(\frac{DD}{CPI} \right)_{t-1} + U_2 \quad (2)$$

Where, (DD/CPI) indicates demand for demand depositis. the estimated result is presented as:

$$\text{Log}(DD/CPI) = -3.7447 + 0.5127 LY - 0.4419 LCPI + 0.0803 RR - 0.0013 BO + 0.6692 \text{Log} \left(\frac{DD}{CPI} \right)_{(-1)}$$

-1.520) (2.443)** (-1.665) (0.639) (-1.873)*** (11.782)*

R²=0.988

D-W Statistics = 1.87

The estimation results demand for demand deposits in Sudan show there's a strong relationship among the variables (coefficient of determination stands on 0.988). Meanwhile, consumer price index (LP) and bank offices are negatively behaving, while the musharakah and mudharabah margins are positively behaving with demand for demand deposits in the Sudan.

Demand for Investment (Time) Deposits (TD /CPI)

$$\text{Log} \left(\frac{TD}{CPI} \right) = \alpha_2 + \beta_9 \log Y - \beta_{10} CPI - \beta_{11} R + \beta_{12} \log \left(\frac{TD}{CPI} \right)_{t-1} + U_3 \quad (3)$$

$$L \left(\frac{TD}{CPI} \right) = -4.4944 + 0.5224 LY - 0.4488 LP + 0.0639 RR - 0.001BO + 0.7109 LG \left(\frac{TD}{CPI} \right)_{(-1)}$$

(-1.536) (2.119)** (-1.448) (0.446) (-1.182) (11.813)*

R²=0.987

D-W Statistics= 1.81

The above-mentioned estimation results of demand for investment and time deposits without interest but musharakah and mudharabah margins are positively behaving. There's a strong relationship (coefficient of determination stands on 0.987) among the variables, but consumer price index (LP) and bank offices are negatively behaving.

Demand for currency + Demand Deposits by individuals, corporate, and government: The following is the specification model for narrow liquid financial assets demand:

$$\text{Log (LFA1/CPI)} = a_3 + b_{13} \log Y - b_{14} \text{CPI} - b_{15} \text{RR} + b_{16} \log (\text{LFA1/CPI})_{t-1} + U_4 \quad (4)$$

Estimated Long-Run Demand for real (narrow liquid financial assets) *currency + demand deposits by individuals, corporate, and government:*

$$L\left(\frac{\text{LFA1}}{\text{CPI}}\right) = -2.5645 + 0.4587 LY - 0.3784 LCPI + 0.0692 RR - 0.0012 BO + 0.6416 L\left(\frac{\text{LFA1}}{P}\right)_{(-1)}$$

(-1.029)
(2.135)**
(-1.388)
(0.527)
(-1.561)
(9.799)*

$$R^2=0.982 \quad \text{D-W Statistics}= 1.667$$

The estimation results demand for currency and demand deposits in Sudan show there's a strong relationship among the variables (coefficient of determination stands on 0.982). Meanwhile, consumer price index (LP) and bank offices are negatively behaving, while the musharakah and mudharabah margins are positively behaving with demand for currency and demand deposits in the Sudan, as it is known that the interest rates are prohibited.

4.6 Demand for liquid financial assets (LFA) by individuals, corporate, and government:

We have specified a demand for liquid financial assets equation which stands as:

$$\text{Log (LFA/CPI)} = a_4 + b_{17} \log Y - b_{18} \text{CPI} - b_{19} \text{RR} + b_{20} \log (\text{LFA/CPI})_{t-1} + U_5 \quad (5)$$

Estimated Long-Run Demand for real Liquid Financial Assets:

$$L\left(\frac{\text{LFA}}{\text{CPI}}\right) = -3.1983 + 0.4877 LY - 0.4147 LP + 0.06481 RR - 0.0011BO + 0.6727 L\left(\frac{\text{LFA}}{I}\right)_{-1}$$

(-1.217)
(2.156)**
(-1.449)
(0.478)
(-1.323)
(10.750)*

$$R=0.984 \quad \text{D-W Statistics}= 1.71$$

(*) denotes (1%) significance level -

(**) denotes (5%) significance level

(***) denotes (10%) significance level

The estimation results demand for liquid financial assets in Sudan show there's a strong relationship among the variables (coefficient of determination stands on 0.984). Meanwhile, consumer price index (LP) and bank offices are negatively behaving, while the musharakah and mudharabah margins are positively behaving with demand for liquid financial assets.

CONCLUDING OBSERVATIONS AND POLICY RECOMMENDATIONS

The following observations of this study are summarized as follows:

1. Demand for liquid financial assets as dependent variable appears to be statistically strongly and positively related to income and negatively to rates of return and consumer price index.
2. The demand for liquid financial assets function is highly stable as indicated by the values of statistical indicators such as coefficient of determination (R^2) and t-values of regression coefficient attached to each individual variable.
3. Prices are negatively behaving.

4. Treasury bills and government bonds such as Musharakah, Mudarabah, Ijarah, and other Islamic techniques are required to enhance the financial sector.

The growth of real income is strongly related to demand for money and other financial assets, such as central bank musharakah certificates and government musharakah certificates. It should also be noted that during the period of our study of Sudanese economy, the inflationary pressure has not distorted the financial sector, as indicated by insignificant value of its regression coefficient. Hence, the authors believe that given the allocative efficiency of financial institutions, the high rate of saving generated in financial form would go a long way in promoting Sudan's economic structural programme. Thus, the monetary management has a greater role to play in macroeconomic stability.

5.1 Policy Implementation:

Firstly, Monetary authorities namely, the Central Bank of Sudan (CBOS), could achieve the economic growth goal by providing cash balances without leading to inflation, this could be happen if CBOS controls the demand for liquid financial assets (LFA) and directing the money stock to meet the needs of the demand for cash balances. This will be done under the complete independence of the authority of the Central Bank of Sudan without the government intervention in making decisions.

Secondly, studying of the structure of rates of returns (musharakah and mudharabah margins) in the future due to the call to manage the rates on the dollar after reducing (less export of oil) after the separation of the South Sudan as a new independent country in 2011, and taking into account the impact of restructuring the murabahah rate on investment levels and the requirements of the development process and also the short run financial flows and exchange rates.

Thirdly, coordinating between the CBOS as a responsible and autonomous body for implementation the objectives of monetary policy and the other government agencies that responsible for formulating and implementing fiscal policy, trade policy and exchange rate policy in order to achieve the objectives of Sudan's economic structural programme.

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