

# EXCHANGE RATE DEPRECIATION AND CURRENCY SUBSTITUTION IN NIGERIA

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## 1. Introduction

The paper investigates whether currency depreciation has resulted in currency substitution in Nigeria. Recent literature has shown that currency depreciation could have adverse effects on the debt-service costs of domestic countries' private sectors and cause the residents to hedge external liabilities (Fisher, 1998). It is argued that as domestic currency depreciates, the expected rate of returns on foreign-currency-denominated deposits, if expressed in terms of domestic currency, would be higher than the rate of return paid on domestic interest bearing assets. This differential in favor of foreign currency deposits would therefore prompt portfolio shift out of domestic money into foreign currency<sup>1</sup>. This in a nutshell means less demand for domestic currency. However, the obverse may hold where those holding foreign assets perceive the increase in domestic currency as increase in their wealth. Thus, as pointed out in the literature, if the force of the hedgers is greater than the force of those with positive perception about the increase in domestic currency, the domestic money holdings would decline. This decline in the demand for domestic could have serious adverse effects on growth of the domestic economy (Bahmani-Oskooee and Techaratanachai, 2001).

The Nigeria domestic currency has continued to depreciate since the introduction of the liberalization policies in the mid 80s<sup>2</sup>. Thus, it will be of interest to know how this sharp depreciation of Nigerian currency has affected domestic money holding. Asides, the result of the work will be very useful for the purpose of monetary policy formulation in the country.

The paper is divided into three sections. The second part that follows gives the specification of money demand holding in Nigeria. The third part discusses the empirical results. The final part provides the conclusions.

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<sup>1</sup> Those who want a safe haven could equally anticipate further depreciation and thus substitute foreign currency for domestic currency.

<sup>2</sup> The extent of the depreciation of Nigerian currency has been properly documented in the literature. One may consult Akinlo and Odusola (2003); Obadan (1994) and Alaofin (1995).

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## 2. The Model

In economic theory, demand for money is related to scale variables and opportunity cost measures. Thus the final equation estimated is specified in a log linearised form as follows:

$$m2_t = a_0 + a_1 y_t + a_2 i_t + a_3 e_t + u_t \dots\dots\dots (1)$$

Where  $m2$  is the real money stock,  $y$  is the real income,  $i$  is the nominal interest rate,  $e$  is the nominal effective exchange rate and  $u$  is the error term. Small case letters are the logarithmic forms of the respective variables and subscript  $t$  denotes time period. The coefficient of real income is expected to be positive while that of the interest rate negative. The coefficient of exchange rate can be either positive or negative depending on the wealth-holders' perception of the depreciation.

In line with the argument of Arango and Nadiri (1991) and Bahmani-Oskooee and Techaratanachai (2001), if individuals see depreciation as increase in wealth, demand for domestic cash balances may increase. However, when the exchange rate is expected to depreciate further, the expected returns from holding foreign money increases, and the demand for domestic currency falls. Here individuals substitute foreign money for domestic currency. Thus if depreciation of the Nigeria's Naira reflected by a decrease in effective exchange rate is to induce a decline in money holding by domestic residents, the estimate of  $a_3$  should be positive.

## 3. Empirical Results

In estimation, we adopted the Johansen and Juselius (1990) cointegration technique. Before applying the technique, we tested for the units root of each variable. The results of the ADF test (with and without linear trend) showed that all the variables are integrated of order 1. The results are shown in Panels A and B of Table 1.

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**Panel A: Nigeria: Unit root tests for stationarity with constant and time trend: Sample Period 1980:1 – 2000:4**

Variables	Levels	First difference	5%Critical Value	1%Critical Value
m2	-1.06	-5.83**	-3.47	-4.07
y	-1.56	-7.27**	-3.47	-4.07
i	-2.38	-6.43**	-3.47	-4.07
e	-2.64	-6.12**	-3.47	-4.07

**Panel B: Nigeria: Unit root tests for stationarity with constant only, sample period 1980:1 – 2000:4**

Variables	Levels	First difference	5%Critical Value	1%Critical Value
m2	-1.47	-5.72**	-2.90	-3.51
y	-0.66	-7.26**	-2.90	-3.51
i	-2.52	-6.26**	-2.90	-3.51
e	-0.15	-6.03**	-2.90	-3.51

Notes: McKinnon Critical values for rejection of hypothesis of a unit root.\*\* denotes significance at 1% level

Following this, we determined the order of the VAR. To do this we employed Akaike's Information Criteria (AIC) and the Schwartz Bayesian Criterion (SBC). The two criteria indicated 10 lags in the VAR. The results of the  $\lambda$ -max and trace tests are as shown in Panel A of Table 2.

**Table 2: Cointegration results (with a linear trend) where  $r$  is the number of cointegrating vectors**

Panel A: Estimates of $\lambda$ -max and trace tests					
Null	Alternative $r$	$\lambda$ -max	95%critical value	Trace	95% critical value
0	1	51.84	27.07	87.49	47.21
$\leq 1$	2	19.39	20.97	35.65	29.68
$\leq 2$	3	14.85	14.07	16.26	15.41
$\leq 3$	4	1.41	3.76	1.41	3.76
Panel B: Estimates of Cointegrating Vector					
m2	y	i	e		
-1	0.57	-0.33	-0.05		

From Table 2, it is evidenced that we can reject the null hypothesis of no cointegration using either the  $\lambda$ -max or the trace statistic. Their calculated values are higher than their critical values. To determine the sign of the estimated coefficient, Panel B of Table 2 gives the estimate of the cointegrating vector that is nor-

malized on  $m_2$  by setting its coefficient at  $-1$ . The results show that income and interest rate have the expected positive and negative sign respectively. The nominal exchange rate, on the other hand, has a negative sign meaning that as the domestic currency depreciates, public holding of  $m_2$  increases<sup>3</sup>. The results here seem to support the argument that as Naira depreciates, those holding foreign currencies see this as increase in wealth and thus demand for more domestic currency.

#### 4. Conclusion

In this paper we have attempted to address whether or not currency depreciation has led to currency substitution in Nigeria. Employing the Johansen and Juselius (1990) cointegration technique, the results show that as the domestic currency depreciates the public holding of money broadly defined increases. The results show that Naira depreciation has not led to currency substitution.

#### *Data and source*

All the data are quarterly over the period 1980- 2000. They were obtained from: International Financial Statistics of IMF (various Years)

#### *Definition of Variables*

- M2 is real definition of money supply broadly defined. M1 figures added to quasi-money. To obtain the real value, we deflate the nominal  $m_2$  by CPI;
- Y is the real Gross Domestic Product. Nominal GDP deflated by the CPI to obtain real GDP. The quarterly values were interpolated following the approach of Goldstein and Khan (1976);
- i is the interest rate;
- e is the exchange rate defined as units of foreign currency per unit of the Nigeria Naira.

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<sup>3</sup> This result is contrary to the result obtained for Thailand by Bahmani-Oskooee and Techaratanachai (2001).

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## Abstract

*The paper adopts cointegration approach to examine whether Nigeria's Naira depreciation has resulted in currency substitution in the country. Time series quarterly data are employed and a money demand function that incorporates exchange rate, income and interest rate estimated. The main finding is that depreciation of Nigeria's Naira has not resulted in a decrease in domestic money holdings.*

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