


CURRENCY SUBSTITUTION AND GENERAL BUSINESS INDICATORS IN NIGERIA

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ARTICLE INFO	<u>ABSTRACT</u>
<p>Article history:</p> <p>Received 29 May 2023</p> <p>Accepted 24 August 2023</p>	<p>Purpose: This paper examines the effects of currency substitution on general business indicators in Nigeria.</p> <p>Theoretical framework: This paper is based on portfolio balance theory which is concerned with interest rate adjustment and achieving the market equilibrium on currency substitution aggregate.</p>
<p>Keywords:</p> <p>Currency Substitution; General Business Factors; Error Correction Model.</p> <div data-bbox="172 882 480 1128" style="text-align: center;">  </div>	<p>Design/Methodology/Approach: The paper employed appropriate econometric techniques such as the cointegration and <i>error correction model</i> (ECM) approach to examine the long run and short run attendant relationships.</p> <p>Findings: Empirical findings from this study indicate that there is a long run relationship between currency substitution and general business indicators variables as inflation, interest rate differentials, and exchange rate depreciation in Nigeria, the magnitudes of the impact of each are weak.</p> <p>Research, Practical & Social implications: The construction and analysis of currency substitution and general business environment by this study have provided relevant information for Nigerian economy in preparing for substantial currency substitution that would give clear understanding of the aggregate business environment on existing currency substitution policy that may lessen the anxiety of the apparent environmental challenges faced by the countries, and this will further provide policy directions for future currency substitution reforms in the various segment of the economy.</p> <p>Originality/Value: The originality of this study lies in its analysis of currency substitution and general business environment. Furthermore, the study highlights the relevance of tackling regulatory issues to ensure the safe and effective use of currency substitution.</p> <p>Doi: https://doi.org/10.26668/businessreview/2023.v8i9.3098</p>

SUBSTITUIÇÃO DE MOEDA E INDICADORES GERAIS DE NEGÓCIOS NA NIGÉRIA

RESUMO

Objetivo: O presente documento analisa os efeitos da substituição de moeda nos indicadores gerais de negócios na Nigéria.

Quadro teórico: Este documento baseia - se na teoria do saldo da carteira, que está relacionada com o ajustamento da taxa de juro e com a obtenção do equilíbrio do mercado no agregado da substituição de moeda.

Projeto/Metodologia/Abordagem: O artigo empregou técnicas econométricas apropriadas, como a abordagem do modelo de cointegração e correção de erros (ECM) para examinar as relações de atendimento de longo e curto prazo.

Constatações: Os achados empíricos deste estudo indicam que há uma relação de longo prazo entre a substituição de moeda e as variáveis dos indicadores gerais de negócios como inflação, diferenciais de taxa de juros e depreciação da taxa de câmbio na Nigéria, a magnitude do impacto de cada um é fraca.

Investigação, Implicações práticas e Sociais: A construção e análise da substituição de moeda e do ambiente empresarial geral por este estudo forneceram informações relevantes para a economia nigeriana na preparação

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para uma substituição substancial de moeda que daria uma compreensão clara do ambiente empresarial agregado sobre a política de substituição de moeda existente, que pode diminuir a ansiedade dos desafios ambientais aparentes enfrentados pelos países, e isso fornecerá orientações políticas para futuras reformas de substituição de moeda nos vários segmentos da economia.

Originalidade/Valor: A originalidade deste estudo está na sua análise da substituição de moeda e do ambiente geral de negócios. Além disso, o estudo salienta a importância de abordar questões regulamentares para assegurar a utilização segura e eficaz da substituição de moeda.

Palavras-chave: Substituição de Moeda, Fatores Comerciais Gerais, Modelo de Correção de Erro.

SUSTITUCIÓN DE MONEDA E INDICADORES GENERALES DE NEGOCIOS EN NIGERIA

RESUMEN

Objetivo: Este artículo examina los efectos de la sustitución de divisas en los indicadores generales de negocio en Nigeria.

Marco teórico: Este artículo se basa en la teoría de balance de cartera, que se ocupa del ajuste de la tasa de interés y el logro del equilibrio de mercado en el agregado de sustitución de divisas.

Diseño/ Metodología/ Enfoque: En el documento se emplearon técnicas econométricas apropiadas, como el enfoque del modelo de cointegración y corrección de errores (ECM), para examinar las relaciones entre los participantes a largo y corto plazo.

Hallazgos: Los hallazgos empíricos de este estudio indican que existe una relación a largo plazo entre la sustitución de divisas y las variables de los indicadores comerciales generales como la inflación, los diferenciales de tasas de interés y la depreciación del tipo de cambio en Nigeria, las magnitudes del impacto de cada una son débiles.

Investigación, Implicaciones prácticas y Sociales: La construcción y el análisis de la sustitución de divisas y el entorno empresarial en general por este estudio han proporcionado información relevante para la economía nigeriana en la preparación para la sustitución de divisas sustanciales que daría una clara comprensión del entorno empresarial agregado sobre la política de sustitución de divisas existente que puede disminuir la ansiedad de los aparentes desafíos ambientales a los que se enfrentan los países, y esto proporcionará más orientaciones políticas para las futuras reformas de sustitución de divisas en los diversos segmentos de la economía.

Originalidad/Valor: La originalidad de este estudio radica en su análisis de la sustitución de divisas y el entorno empresarial general. Además, el estudio destaca la importancia de abordar las cuestiones regulatorias para garantizar el uso seguro y eficaz de la sustitución de divisas.

Palabras clave: Sustitución de Divisas, Factores Comerciales Generales, Modelo de Corrección de Errores.

INTRODUCTION

The general business factors that contribute to currency substitution in most economies have been the subject of numerous studies. Since the structural imbalances that their economies faced in the 1980s, high levels of currency substitution caused by general business instability in the home economy have been pervasive in emerging countries. One prominent finding is that currency substitution generally takes place during periods of hyperinflation, when the high cost of transacting in local currency causes people to explore for accessible alternatives. Aside from domestic inflation, several economists have noticed instances of currency substitution brought on by financial crises and exchange rate depreciation (Savastano, 2021; Yeyati, 2020). Early empirical research (Arango and Nadiri, 1981) indicates that currency substitution is dependent on income, interest rate, exchange rate volatility, and price expectations, particularly when

these factors deteriorate. According to McKinnon (1982), exchange rate depreciation will make it more likely for locals to interact with foreign cash. Improvements in macroeconomic conditions, such as stable interest rates, a stable exchange rate regime, and low inflation, as claimed (Mizen and Pentecost 1996; Sahay and Vegh 1996; and Savastano 1996), will stop currency substitution.

Currency crises and vulnerabilities, which have long been noted in Latin America, portions of Asia, and Eastern Europe, have now been linked in large part to currency substitution. Although it hasn't changed considerably since 2001, it is also prevalent, notably, in Africa, where it continues to be significant and persistent at above 30% rates for both bank loans and deposits. For instance, various changes, such as financial liberalisation, the abolition of foreign exchange controls, and the deregulation of financial markets, have been put into place in Nigeria following the introduction of Structural Adjustment Programmes (SAP) in 1986. The macroeconomic setting in which monetary policy is applied has changed as a result of these. Although the financial system is still in its infancy, there are indicators that it is deepening. However, the country's financial environment is still rife with significant hazards, and the economy has seen only modest growth in the number of Americans who hold savings in other currencies, mostly the U.S. dollar. The latter has frequently been accompanied by significant foreign currency deposits into domestic accounts, online payments made and received in foreign currencies, and sizeable investments in foreign bonds. According to data that is currently available, there was 78 million USD in foreign currency in deposit money banks in 1994 and 9.3 billion USD in 200 (Adebisi, 2004).

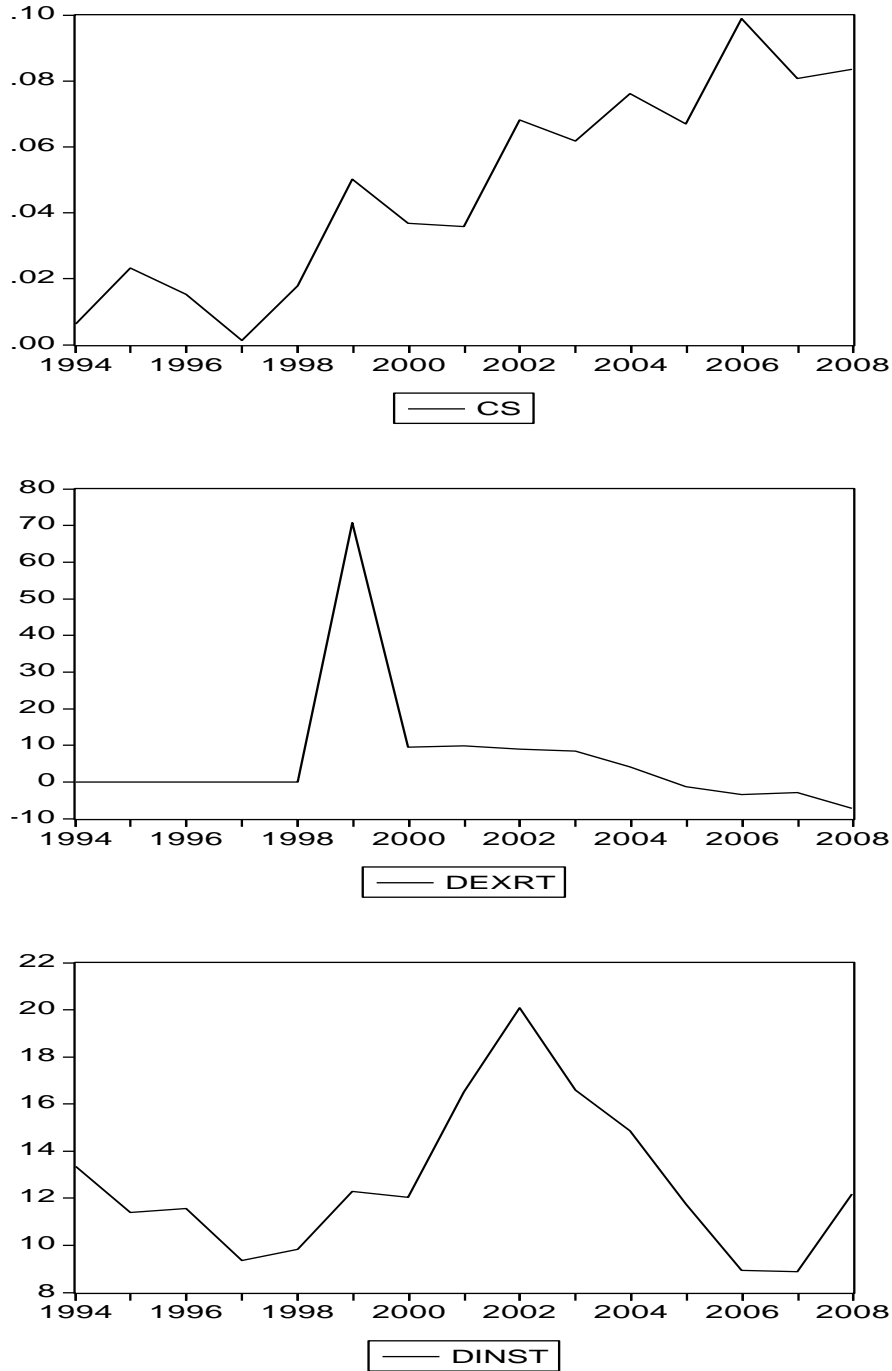
However, progress in lowering currency substitution has lagged, thus it is reasonable to wonder what causes this phenomenon in the Nigerian economy. By analysing these issues specifically with reference to Nigeria on the basis of the evidence from the previous ten years, this paper fills a gap in the literature. This study investigates how much economic agents are influenced to migrate from using domestic currency to using foreign currency by inflation, exchange rate depreciation, and interest rate differentials. The remainder of the essay is structured as follows: The second section summarises the literature, the third section outlines the empirical specification, and the fourth section offers the empirical findings for the case of Nigeria. This finishes section five.

Figure 1 shows interest rate differences (DINST), currency substitution (CS), and exchange rate depreciation (DEXRT) in Nigeria from 1994 to 2008. We can infer from Figure 3.2 that there have been significant changes in currency substitution, interest rate differential,

and exchange rate depreciation between 1994 and 2008. The statistic indicates that between 1994 and 2008, there was a rise in the shift in currency substitution. The degree of currency substitution ranged between 0.001282 and 0.09823 from 1994 and 2008, respectively, notwithstanding a minor decline in 2006. Due to the establishment of a fixed exchange rate regime in Nigeria, the behaviour of exchange rate depreciation was not a severe concern between 1994 and 1998. This statistic also showed that the naira drastically declined in value after the fixed exchange rate regime was replaced by the floating exchange rate regime in 1999 and slightly rebounded in 2000.

This study, when viewed in the context of currency substitution, makes it abundantly evident that adopting a floating exchange system in emerging nations with structural issues causes currency substitution to increase with time. This confirms Obadan's (2006) assertion that the persistent devaluation of the naira against the dollar may encourage capital flight, speculative activity, a fragile balance of payments, and currency substitution. When compared to 1997, the interest rate differentials were 9.36, down from 13.34 in 1994. Between 2000 and 2008, the values change dramatically. Interest rate differentials in Nigeria fell precipitously after 2002 until 2008, when they started to rise and reached a high of 12.17. Because both economies are not connected and have separate interest policies, there is a variation in interest rates between the US and Nigeria.

Figure 1. Trend of Currency Substitution, Interest Rate Differential and Exchange Rate Depreciation



Source: Author's compilation, 2023

LITERATURE REVIEW

A prominent aspect of financial development in macroeconomically precarious circumstances is the use of foreign currencies as a medium of exchange, a store of value, or a unit of account, also known as currency substitution, unofficial dollarization, or usage of a foreign currency. Dollarization can present significant difficulties for decision-makers. It limits the ability of monetary authorities to serve as a lender of last resort, hinders banks' ability to

manage their liquidity, and weakens the financial sector's stability because it may amplify the impact of exchange rate changes on banks' balance sheets, raising the risk of contractionary effects and bank failures. Dollarization, on the other hand, might also be advantageous under certain conditions. Allowing foreign currency deposits may encourage citizens to use the banking system to conduct transactions rather than store money abroad or save their savings in non-financial assets in nations with high and unstable inflation. The use of a foreign currency can also provide legitimacy to a nation's efforts to combat inflation, especially in cases of extremely severe inflation. Dollarization is a method for nations with high inflation or hyperinflation to gain from the established fiscal and monetary systems of industrialized economies as well as the reputation that comes with their currencies. Therefore, the question of whether highly dollarized economies should fully dollarize, fully dedollarize, or preserve the status quo in terms of currency substitution is typically at the centre of the reform discussion.

Studies have recently offered evidence regarding currency substitution and its causes. According to Friedman and Verbetsky (2001), the Russian economy is currently heavily dollarized as a result of excessive inflation and a dearth of financial instruments. They conducted an empirical study of currency replacement between Russian rubles and US dollars in the Russian economy from 1995 to the middle of 2000 using dynamic money in the utility function model, in which money services are generated by both local and foreign money balances. Given that most estimates of the elasticity of substitution were between 2 and 3, their findings suggest that there was significant currency substitution. It was demonstrated that for various inflationary periods, simulated steady state seigniorage revenues are fairly accurate.

According to Adams, Goujon, and Jeanneney (2004), empirical models of the demand for money frequently focus on the portfolio motive for holding foreign currency while upholding the presumption that the income elasticity of the demand for domestic money is independent of the level of currency substitution. They specify the demand for money by allowing for a variable income elasticity of demand for domestic money, which accurately captures the process of currency substitution. In the 1990s, this specification was calculated for Vietnam using a common cointegration framework. Their research found that wealth impacts operated in a clearly defined way in the short term, but only in the long run does it support the presence of currency substitution.

In Turkey, currency substitution and financial dollarization were studied by Baskurt (2005). He calculated the long-term correlations between the variables in a system that included the currency substitution ratio, the predicted change in exchange rates, and the rates of return

on assets denominated in both home and foreign currencies. The General Portfolio Balance Model did not appear to be significantly supported by the findings of the Johansen cointegration study, which was conducted using quarterly data for the period 1987–2004. Although it seemed high, the elasticity of currency substitution was consistent with estimates for other emerging nations with significant inflation. The findings are consistent with a ratchet (hysteresis) effect, which is represented by a trend variable.

Sharma and Morished (2007) used both local currencies and the US dollar as anchor currencies to examine whether currency substitution occurred in eight African nations between 1976 and 2005: Egypt, Morocco, Nigeria, Ghana, Kenya, South Africa, Tunisia, and Zambia. They noticed that when the CFA franc is utilised as an anchor currency, currency substitution is common in Ghana and Nigeria. However, when the US dollar is employed as the anchor currency, Ghana shows no signs of currency substitution, but Nigeria continues to show these signs. When the US dollar is the anchor currency, they also discovered currency replacement in South Africa but not in Egypt. Regardless of the anchor currencies taken into account, there is no evidence of currency replacement for Kenya, Tunisia, or Zambia. When using the Egyptian pound as the anchor currency, they found no evidence of currency substitution in the instance of Morocco, but they did find some tenuous evidence when using the US dollar.

According to Asel (2009), excessive inflation and undeveloped financial markets encouraged the dollarization and currency substitution of Central Asian countries. The empirical portion of their research examines the elasticity of substitution between local and foreign currencies in Kazakhstan, the Kyrgyz Republic, and Tajikistan using a model with a money-in-the-utility function. According to the steady state approach, keeping foreign currency can generate welfare if domestic currency appreciates relative to the currencies in which households' foreign balance assets are denominated, even while currency substitution reduces governments' seigniorage revenue.

In the years following the 1998 financial crisis, Yasuda (2009) looked at the connections between inflation, the exchange rate, and currency substitution in Russia. The impulse responses from the VAR model with level variables show that currency substitution increases (decreases) in reaction to the depreciation (appreciation) of the ruble. Granger causation was also established between currency substitution and the value of the ruble. Contrarily, there is no proof that currency replacement in the post-crisis period was brought on by inflation Granger. Economic agents, particularly in emerging countries, tend to switch to more dependable and stable foreign currency as expected when home currency weakens.

MODEL SPECIFICATION AND METHODOLOGY

Model specification

High dollarization values are often correlated with a history of high rates of inflation and currency depreciation. In order to investigate the impact of macroeconomic factors on currency substitution this study follows the portfolio balance model. For estimation purpose, the functional form of the equation to be estimated is specified as:

$$CUS^B = f(DEP, IRD, GDP, INF, DBT, NFA) \quad 1$$

A parametric equation that will be estimated is re-specified in linear format as:

$$CUS_t = \alpha_0 + \alpha_1 DEP_t + \alpha_2 IRD_t + \alpha_3 GDP_t + \alpha_4 INF_t + \alpha_5 DBT_t + \alpha_6 NFA_t + \omega_t \quad 2$$

The variables employed are defined which are currency substitution (*CUS*), exchange rate depreciation (*DEP*), interest rate differentials (*IRD*), inflation (*INF*), growth rate of real gross domestic income (*GDP*), external debts (*DBT*) and net foreign assets (*NFA*).

Methodology and Estimation Procedures

The study aims at understanding short run and long-run relationship between currency substitution and its determining exogenous variables^C. To achieve this, we estimate the Error correction mechanism (*ECM*) and the long run coefficients (*LRC*). Before estimating these coefficients, we first find the estimates of the Static long run regression using the ordinary least square (*OLS*) for our specified equation since such gives us first-hand information of the magnitude and signs of the relationship between currency substitution and vector of explanatory variables to be modelled. Following this, we assess our data by carrying out necessary tests of stationarity and existence of long run relationship which are the Unit root test and Cointegration

^B To proxy currency substitution, literature conveys that foreign currency held by domestic residents is divided into foreign currency deposit (in domestic money banks), foreign currency in circulation and gross border deposit held at foreign banks (i.e. domestic residence foreign assets). It is becoming has been economic convention that measuring currency substitution is done by dividing any of the above variables by domestic *money supply*. But the non-availability of data for foreign currency in circulation and gross border deposit held at foreign banks favoured the use of the ratio of foreign currency deposit to money supply as a last resort. This is the proxy adopted in this study because dollar-denominated deposits of Nigerians are kept in money deposit banks and this has particularly feature in the CBN statistical bulletin since 1994 (see Elkhafif, 2002).

^C This study relies on historical quantitative time series data spanning from 1994Q1 to 2009Q4 which are available in secondary forms and are *sourced* from the statistical bulletin of the *CBN*, and some international website-www.federalreserve.gov/releases/h15/data.htm (for U.S. quarterly interest rates).

test, respectively. In the unit root tests, we intend to determine the underlying properties of the process that generates our time series. That is, to test whether each variable in equation 2 above is stationary or non-stationary. If the data sets are all stationary upon investigation, then it follows that our *OLS* results could be used for decision and policy formulation without further estimation of the long run coefficients of the *ARDL* model.

To test for unit roots, since our data sets are large enough, we employed the *DF* and *ADF* tests which use equations 3 and 4(below) respectively, to test for the null hypothesis of non-stationarity (i.e. presence of unit roots) for the series X_{it} . These various series of X_{it} 's are the variables to be tested for unit root and ΔX_{it} 's are the various first difference operators. If the null hypothesis is rejected, it implies that the test value is greater than the critical value at the various rate of significance. When the series is non-stationary at levels, a higher order of integration will be taken so as to eliminate the presence of unit root.

$$\Delta X_t = \beta_0 + \beta_1 X_{t-1} + \mu_t \tag{3}$$

$$\Delta X_t = \beta_0 + \beta_1 X_{t-1} + \sum_{i=1}^n \alpha_i \Delta X_{t-i} + e_t \tag{4}$$

Where:

μ_t and $e_t \sim NID(0, \sigma^2)$. X_{it} represents each series of *CUS*, *DEP*, *IRD*, *GDP*, *DBT* and *NFA* in equation 2. The *T*-statistics obtained are compared with the special critical value constructed by Dickey Fuller (1979, 1981) and Engle and Granger (1987, 1990). Once there is unit root, we adopt the Engle and Granger (1987) cointegration residual based test. The *DF* statistic will also be used to compare the test statistic generated from the following equations.

$$\begin{aligned} \Delta \mu_t &= \alpha_0 + \alpha_1 \mu_{t-1} + \Psi_t \\ \mu_t &= CUS - CUS^e \end{aligned} \tag{5}$$

Where:

CUS^e represents 'estimated *CUS*' from the *OLS* static regression presented. Next, if the variables are cointegrated, then we estimate the *ECM*. The *ECM* entails using the residuals generated in the long run static regression of equation 2 which was used to test for the unit root to reparametrize the short run specification. The study estimates the *ECM* using *ARDL* model of equation 2. For equation 2, the *ECM* is:

$$\Delta(CUS)_t = b_0 + \sum_{i=0}^n b_{1i} \Delta CUS_{t-i} + \sum_{i=0}^n b_{2i} \Delta DEP_{t-i} + \sum_{i=0}^n b_{3i} \Delta IRD_{t-i} + \sum_{i=0}^n b_{4i} \Delta INF_{t-i} + \sum_{i=0}^n b_{5i} \Delta GDP_{t-i} \tag{6}$$

$$+ \sum_{i=0}^n b_{6i} \Delta DBT_{t-i} + \sum_{i=0}^n b_{7i} \Delta NFA_{t-i} + b_8 CUS_{t-i} + b_9 DEP_{t-i} + b_{10} IRD_{t-i} + b_{11} GDP_{t-i} \tag{7}$$

$$+ b_{12} INF_{t-i} + b_{13} DBT_{t-i} + b_{14} NFA_{t-i} + b_{15} ECM_{t-i} + \pi_t \tag{8}$$

Where:

' $t - i$ ' is the lag of the ECM . This first part of equation 6 with b_i (for $i= 1$ to 6) represents the short run dynamics of the model whereas the second part with b_i (for $i= 8$ to 14) represents the long run equilibrium relationship. The null Hypothesis in the equation is $b_8 = b_9 = b_{10} = b_{11} = b_{12} = b_{13} = b_{14} = 0$ which means the non-existence of the long run equilibrium relationship. The ECM_{t-i} is the lag of the error correction term and its coefficient (b_{15}) is a measure of the speed of adjustment. Lastly, π is the vector of residuals of our estimation (defined by $\pi_t \sim NID [0, \sigma^2]$).

RESULTS AND DISCUSSION

Pretest: Unit Root Test and Cointegration

The pretest results are presented in Tables 1 - 4.

Table 1: Unit root test for stationarity in level form for each variable (Regression include an intercept without a trend)

Variable X_t	DF Statistics	ADF test statistics	ADF lag length	ADF critical value	Remarks
DEP	-6.2498	-4.6729	1	-2.9137	Stationary
IRD	-1.2032	-2.4260	1	-2.9137	Not stationary
GDP	-7.7759	-16.294	1	-2.9137	Stationary
INF	-4.4860	-4.3579	1	-2.9137	Stationary
DBT	0.72354	-1.6546	1	-2.9109	Not stationary
NFA	0.80746	-0.4792	1	-2.9109	Not stationary
CUS	-4.0108	-4.3186	1	-2.9137	Stationary

Source: Author's compilation, 2023

Table 2: Unit root test for stationarity in level form for each variable (Regression include an intercept and a linear trend)

Variables X_t	DF Statistics	ADF test statistics	ADF lag length	ADF critical value	Remarks
DEP	-6.1823	-4.6156	1	-3.4904	Stationary
IRD	-1.3817	-2.5900	1	-3.4904	Not stationary
GDP	-7.7250	-16.9006	1	-3.4904	Stationary
INF	-3.6258	-3.7263	1	-3.4904	Stationary
DBT	-0.8493	-2.5362	1	-3.4862	Not stationary
NFA	-1.5842	-1.7033	1	-3.4862	Not stationary
CUS	-3.3194	-3.6466**	1	-3.4904	Stationary

**implies that variable was stationary with only ADF test but not with DF test.

Source: Author's compilation, 2023

Table 3: Unit root test for stationarity in first differenced (DX_t) form for each variable (regression include an intercept without a trend)

Variables DX_t	DF Statistics	ADF test statistics	ADF lag length	ADF critical value	Order of Integration	Remarks
DDEP	-11.2055	-7.9910	1	-2.9147	I(1)	Stationary
DIRD	-4.2053	-3.8999	1	-2.9147	I(1)	Stationary
DGDP	-8.2132	-14.4198	1	-2.9147	I(1)	Stationary
DINF	-5.8872	-4.0592	1	-2.9147	I(1)	Stationary
DDBT	-5.3635	-4.3107	1	-2.9118	I(1)	Stationary
DNFA	-4.4276	-4.3563	1	-2.9118	I(1)	Stationary
DCUS	-8.6794	-6.7807	1	-2.9147	I(1)	Stationary

Source: Author's compilation, 2023

Table 4: Unit root test for stationarity in first differenced (DX_t) form for each variable (regression include an intercept and a linear trend)

Variables DX_t	DF Statistics	ADF test statistics	ADF lag length	ADF critical value	Order of ntegration	Remarks
DDEP	-11.1198	-7.9236	1	-3.4914	I(1)	Stationary
DIRD	-4.1963	-3.8914	1	-3.4914	I(1)	Stationary
DGDP	-8.1168	14.2679	1	-3.4914	I(1)	Stationary
DINF	-6.6578	-34.7947	1	-3.4914	I(1)	Stationary
DDBT	-4.1205	-4.0152	1	-3.4875	I(1)	Stationary
DNFA	-5.5936	-4.5771	1	-3.4875	I(1)	Stationary
DCUS	-9.2280	-7.7797	1	-3.4919	I(1)	Stationary

Source: Author's compilation, 2023

The unit root test in level form of each variable in Tables 1 and 2 show that there is strong evidence in favour of the null hypothesis of non-stationary of some of the series. In other words, not all the variables pass the unit roots test of stationarity. But turning to the first differenced form of the variables in Tables 3 and 4, the test provides overall support to reject the null hypothesis of non-stationarity of all the data series in the first differenced form since all the test-statistics (absolute values) were greater than the (absolute value of the) critical values for the DF and ADF at 95 percent level for both techniques of regression utilized leading us to conclude that all the original variables seem to be integrated order of one, denoted conventionally as $I(1)$. The unit root test for the entire variable is significant at 5 percent level at their first differenced. By implication, it follows that we can proceed to the second stage of testing for cointegration relationship between CUS and its attendant explanatory variables.

Cointegration among time series variables suggests that series may behave in different way in the short run but that they will converge towards common equilibrium behaviour in the long run. According to Engle and Granger (1969), set of time series are cointegrated when their residual is stationary. The stationarity of residual implies the existence of a long run stable relationship between CUS and the associated explanatory variables (DEP , IRD , GDP , INF ,

DBT and *NFA*). If cointegration is established in our test, then it follows that a non-spurious long run relationship exists and when this is combined with the *ECM* whose order are $I(0)$ then consistent estimates of both long run and short run elasticities will be obtained unequivocal. *Table 5* presents the results of the cointegration test.

Table 5: Test for cointegration

Variable	ADF Statistic	Lag length	Critical Value	Order of Integration	Remarks
Residuals(ECM)	-4.0901	1	-2.9137	I(0)	Stationary

Source: Author's compilation, 2023

From the result above, the absolute value of the ADF statistic (-4.0901) is greater than the absolute of the DF critical value (-2.9137) at 5 percent level implying that the residuals are stationary in their level form. This implies that the dependent variable - currency substitution and all the regressors - exchange rate depreciation, interest rate differentials, inflation, growth rate of gross domestic product, the external debt and net foreign assets are cointegrated. This further means that between the periods *1994Q1* and *2009Q4* studied, there was a long run stable relationship amongst currency substitution and vector of explanatory variables. As such, we present next the estimates of this long run equilibrium relationship. This implies that there exists a long run equilibrium relationship between the series. This study supports the portfolio balance theory to establish a long-run relationship between variables in the model in line with previous (Adams, Goujon and Jeanneney, 2004 and Harrison and Vymyatnina, 2007) to have confirmed similar findings. *Table 6* presents the result of the estimates of the long run of *CUS*.

Table 6: Long run coefficients

Regressors	Coefficients	Standard error	T-statistics
DEP	-0.0031416	0.0017484	-0.76735
IRD	0.0001599	0.0047375	0.033761
GDP	0.0071777	0.0031320	2.29117
INF	0.0003660	0.0010763	0.34009
DBT	0.9860E-6	0.1457E-5	0.67681
NFA	-0.4672E-8	0.5198E-8	-0.89887

Source: Author's compilation, 2023

This empirical result in *Table 6* shows the long run coefficients that exists between currency substitution and all its influential variables modelled. The result shows that all the coefficients of the long run relationship on *CUS* except for both exchange rate depreciation and net foreign assets did not comply with theory given by the portfolio balance approach. This apparent contradiction was upheld by the fact that aside the income growth which was

significant at 5 percent level, all other variables were not significant. The result indicates that external debt will follow the interest rate channel to affect *CUS*. In addition to the results above, given the fact that cointegration exists as already established, Engle and Granger (1989) postulated that most cointegrated series have an error correction representation. The result of the *ECM* is presented in *Table 7*. The model is used to capture the short run deviations that might occur in estimating the long run cointegrating equation. The starting point is to model changes in currency substitution as a response to one, two or all the linear stationary combination of *I(1)* variables augmented by short term dynamics from the current and lagged first differenced of the variables included in the cointegrating vector.

Table 7: Parsimonious representation of the ECM for the selected ARDL model of *DCUS*

Regressors	Coefficients	Standard error	T-statistics
DDEP	-0.8921E-4	0.1105E-3	-0.80726
DIRD	0.1063E-4	0.3132E-3	0.03395
DGDP	0.1152E-4	0.6129E-4	0.18798
DINF	0.2434E-4	0.7715E-4	0.31549
DDBT	0.6556E-7	0.1125E-6	0.58302
DNFA	-0.3106E-9	0.3221E-9	-0.96444
<i>ECM (-1)</i>	-0.066492	0.021613	-3.0765

Source: Author's compilation, 2023

$$ECM = CUS + 0.1341E-3(DEP) - 0.1599E-3(IRD) - 0.7178E-3(GDP) - 0.3660E-3(INF) - 0.9860E-6(DBT) + 0.4672E-8(NFA)$$

9

Where:

R-bar squared $[\overline{R}]^2$ 0.41598
 F-stat. (and Prob.) 8.5269 (0.000)
 DW-stat. 2.0817

From this result, it is clear that all the changes in variables are properly signed except for the coefficient of changes in the *NFA*. The parsimonious regression from the *ECM* above shows further that changes external debt follow the interest rate channel (in line with findings of the long run relationship) to trigger fluctuation in currency substitution. This is in alignment with literature on currency substitution that the chief cause of the phenomenon in any economy, and particularly developing ones, is high and persistent inflation (see Savastano, 1996; Yeyati, 2003; Ho, 2003 and Civcir, 2003). Exchange rate depreciation and interest rate differentials have no significant impact on currency substitution in Nigeria. Although, both have bearing on currency substitution but the magnitudes of their influences are too trivial for them to be

significant determinants of the phenomenon. Our finding on the sign of the exchange rate depreciation is in agreement with theoretical postulation by Mckinnon (1982), empirical observation by Imorohoglu (1994) and Akinlo (2003) for Nigeria who observed that depreciation of the naira has not resulted to decrease in domestic money holding in Nigeria or increase foreign currency usage.

The model also shows that over 42 percent of systematic variation in changes in currency substitution in Nigeria is accounted for by changes in the exchange rate depression, interest rate differentials, growth of national income, inflation, external debt and the net foreign assets. Furthermore, the coefficient of the *ECM* was properly signed being negative and highly significant. Conceptually, a significant error term with right sign indicates a feedback effect of deviation of *CUS* from its long run or equilibrium growth path. This implies that any perturbation or disequilibrium on account of previous periodic shock will adjust back to the long run equilibrium in the current quarter specifically at a low speed of 6 percent in each period. Lastly, on the significance of the overall model, the *F*-statistic of 8.5269 was highly significant at 1 percent. This signals the possible existence of a linear relationship between fluctuations in the regressand and regressors. The value of the *DW*-statistic (of approximately 2) confirms undoubtedly that there is absence of residual serial correlation.

CONCLUSIONS

The findings of this study are summarized below:

- That there is a long run relationship between currency substitution and exogenous macroeconomic variables as inflation, interest rate differentials, exchange rate depreciation, income growth, external debt and net foreign assets in Nigeria.
- Although this long run relationship exists, the magnitudes of the impact of each are not strong enough to be significant determinants of currency substitution both in the short run dynamic and long run equilibrium. This suggests that other factors such as expected exchange rate, expected inflation, dollarization hysteresis, ratchet effects and preference of economic agents to hold foreign currency could possibly have been the cause of currency substitution in Nigeria.
- Since the coefficient of external debt was positive in both the long run equilibrium relationship and the short run dynamics, this implies that there is evidence that external debt stocks in Nigeria fizzle via an interest rate shock to simulate the use

of naira for transaction and discourage gross use of foreign currency in the Nigerian economy.

In effects, we conclude that since macroeconomic factors in Nigeria may not have accounted for trends of currency substitution in the economy but if not appropriately checked they may trigger the phenomenon in the imminent future. We therefore recommend fiscal prudence and consolidation, coupled with the issuance of local currency-denominated bonds, would help de-dollarize the government's balance sheet by reducing the need for the government to borrow in foreign currency. Foreign aid ought to be absorbed in local currency and taxation designed so that it does not discriminate in favor of foreign currencies. The Central Bank of Nigeria should pursue well-coordinated reforms. These reforms should strengthen the regulation of the banks, improve the asset and loan quality. Doing this will encourage the public to denominate their assets in naira. Aside, since providing numerous alternative naira-denominated financial assets with tax-free interest rates and dividends could help reduce hedging benefits of foreign currency assets thus facilitate help the process of complete "nairization" of the Nigerian economy.

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