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Unofficial Dollarisation and Monetary Policy in Nigeria

Adamu, Y.*

Abstract

This paper examined the impact of dollarisation on monetary policy in Nigeria, using monthly data spanning 2002 to 2016. The paper adopted the conventional IMF proxy for dollarisation and traced its reactions to changing monetary policy stance. Using the vector autoregression (VAR) model and interbank rate as an indicator of monetary policy stance, the results showed that the size of dollarisation could influence the outcome of monetary policy, though the impact was small. This was evident from the output equations, that inflation did not respond in the first month and responded negatively in the second month. However, from the third to sixth month, it responded positively before it eventually returned to equilibrium. The overall impact of dollarisation on exchange rate is dependent on the degree of dollarisation. The conclusion from the results was that monetary policy could still be effective with the present level of dollarisation.

Keywords: Dollarisation, Monetary Policy, Vector Autoregression

JEL Classification Numbers: C51, E52, E58

I. Introduction

The central goal of monetary policy is to achieve price stability and ensure rapid economic growth, among others. Acknowledging the size, timing, direction, and persistence of monetary policy shocks on economic activities provides the monetary authority the vital information required to fine-tune policy initiatives (CBN, 2014). Dollarisation has become a source of worry for monetary policy because of its potential impact on the stability of the financial system. It has been established that if a substantial part of the financial system is officially or unofficially dollarised, it could create stability risks in the form of either liquidity risk or solvency risk or both.

By definition, 'dollarisation' refers to the holding by residents of a significant share of their assets in the form of foreign currency-denominated assets. It can be official and unofficial dollarisation. It is official when the foreign currency is

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given legal tender status, which implies that the foreign currency is adopted as an official medium of exchange, as well as unit of account. Unofficial dollarization, on the other hand, represents a case in which a foreign currency is used alongside the domestic currency as means of exchange (Alvarez-Plata & Garcia-Herero, 2007).

The extent of dollarization and its impact on monetary policy have continued to generate debate in the literature. Circulation of a foreign currency, either as a means of payment or as a store of value, is bound to affect the conduct of monetary policy and, ultimately, the inflation outcome (Feige, 1997). In Nigeria, under section 16 of the Central Bank Act 2007, the power to fix and determine the exchange rate of the naira is exclusively vested in the Bank. By virtue of the Act, currency notes and coins issued by the Bank shall be legal tender in Nigeria at their face value for the payment of any amount. *Under section 20(5) of the Act, any person who refuses to accept the naira as a means of payment for any amount in Nigeria is guilty of an offense and liable to be prosecuted, and if found guilty shall be fined N50,000 or 6 months imprisonment.*

In addition, many circulars had been issued by CBN, the latest Circular was issued on April 17, 2015 with reference BSD/DIR/GEN/LAB/08/013 and titled Currency Substitution and Dollarisation of the Nigerian Economy. In the circular, the CBN condemned the development and reiterated that the naira remains the only legal tender. The Bank also warned the banks and general public that it was illegal to price or denominate the cost of any product or service (visible or invisible) in any foreign currency, other than naira. Also, no business offer or acceptance should be consummated in Nigeria in any other currency.

The content of the Circular indicated that unofficial dollarisation is a serious concern to the monetary authority, and makes the Nigerian economy vulnerable to external shocks. It has been adjudged in some quarters as a major factor largely explaining the depreciation of the domestic currency. Unofficial dollarisation, which is the focus of this paper, is a reaction of economic agents to a loss of value of a domestic currency, often resulting from persistent inflation, devaluation or currency confiscation (Feige, 2002). It could also be a result of an underground economy, since activities of this segment are often concealed, hence, the appetite to transact in foreign currency. The

preference for the use of a foreign currency gives consumers a hedge against domestic inflation and enables savers to retain the value of their savings. However, its effects can create distortions in the transmission mechanisms of the monetary policy. This study examines the extent to which these distortions could affect the efficacy of monetary policy in Nigeria. In other words, when economic agents choose to voluntarily substitute a foreign currency for domestic currency as a means of payment or choose to hold foreign rather than domestic currency-denominated assets as a store of value, what would be the impact on monetary policy?

The theoretical literature on monetary policy does not offer a clear answer as to how dollarisation may affect monetary policy. The common view among economists is that dollarisation makes monetary policy more complicated and less effective (Alvarez-Plata and Garcia-Herrero, 2007). Monetary policy effectiveness is important, since monetary policy instruments principally affect domestic currency assets and liabilities. Another common view is that dollarisation could result in a loss of seigniorage, which can be quite significant in economies with growing money demand.

In the light of the above, the main objective of this paper, therefore, is to examine the impact of distortions in monetary policy transmission mechanism caused by the dollarisation. In other words, the study investigated the extent to which dollarisation had impacted on monetary policy outcomes in Nigeria. The paper also examined how dollarisation affected inflation and, in particular, the pass-through effect from exchange rate to prices. The findings could be useful to the Bank in achieving its price stability objective.

The rest of the paper is structured as follows. Section 2 reviewed empirical literature while Section 3 examined the data and presented some developments. Section 4 focused on the methodology as well as explained the data used for the study. Section 5 presented the empirical results, while Section 6 drew policy implications and concluded the paper.

II. Literature Review

Literature has traditionally identified three consequences of dollarisation to include: reduced monetary policy autonomy, limited last-minute creditor

capacity, and the unfavorable mismatch of currencies resulting from unhedged borrowers when the national currency depreciates. Though these consequences are recognised by theory, existing empirical studies have produced mixed results as to whether or not they are relevant in practice. The concept of dollarisation has attracted controversial debates for some reasons, including its impact on inflation performance and economic vulnerability. The answer to whether and how dollarisation plays a role in influencing the outcome of monetary policy is an aspect that has remained relatively inadequate. To the best of my knowledge, only a few studies had empirically investigated this subject in details, and the results were mixed.

Hausmann et al., (1999) opined that under a circumstance where de-facto dollarisation became widespread, expansionary monetary policy could have pro-cyclical rather than counter-cyclical consequences. This implied that unofficial dollarisation would impede government efforts to employ inflationary finance to impose implicit taxes on domestic monetary assets. Inferring from this assertion, information on the extent of de-facto dollarisation would be a critical input into the monetary policy decision, since extensive unofficial dollarization was likely to make monetary policy less effective and active exchange rate intervention more dangerous. Levy (2006) noted that financially dollarised economies, tended to exhibit higher inflation rates, higher tendency to suffer from banking crises and slower and more impulsive output growth. De Nicoló et al., (2003) found similar results, which showed that financial instability was probably higher in dollar-dominated economies.

Honohan and Shi (2001) showed that greater dollarisation was associated with a greater pass-through from exchange rate changes to consumer prices, thereby potentially increasing nominal risk in the economy. Bordo et al., (2009) investigated the long-run evidence of the impact of foreign currency debt on growth and found that a higher share of foreign currency debt to total debt was associated with an increased risk of currency and debt crises, which themselves resulted in significant permanent output losses. Cheng and Wang (2011) contended that dollarisation was a form of neo-colonialism.

On the other side of the debate, Arteta (2003) found marginal evidence that significant levels of dollarisation increased the risk of bank crises or currency disruption. Currency disruption would probably not be greater in high-dollar

countries but instead be based on macroeconomic policies. Berg and Borensztein (2000) examined the experience of five dollarised countries, to find which monetary aggregates appear to have the closest connection to future inflation. The study found that a broader monetary aggregate that included foreign currency deposits was superior to one that did not. Reinhart, Rogoff and Savastano (2003) found that partial dollarisation had a limited impact on the effectiveness of monetary policy, and that output fluctuations were quite similar in countries with different degrees and varieties of dollarisation.

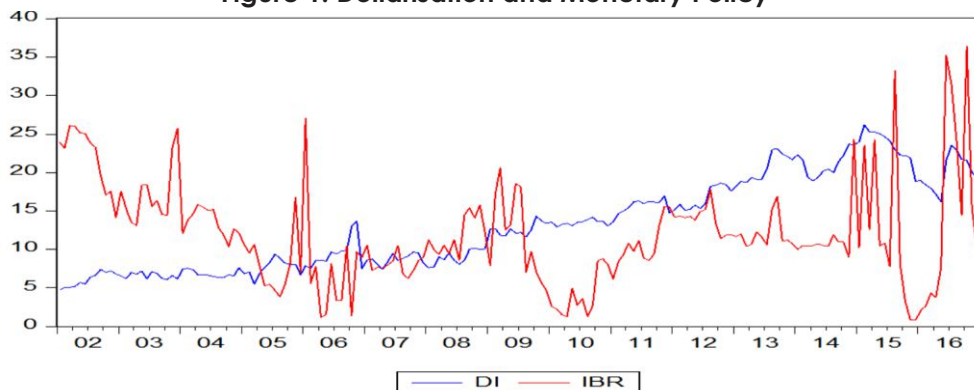
III. Dollarisation and Monetary Policy in Nigeria

A parallel circulation of a foreign currency is likely to affect the conduct of monetary policy and, ultimately, the inflation outcome. The index of dollarisation in Nigeria has, on the average, maintained, a smooth upward trend throughout the observed period. As shown in Figure 1, the index of dollarisation was 4.8 in January 2002, rose to 25.3 in March 2005 but declined to 19.3 in December 2006. The movement in the interbank rate was, however, not too smooth, as observed in the case of the dollarisation. The interbank rate was 23.9 per cent in January 2002. It declined to 14.1 per cent by December 2002 and rose to 25.7 per cent in December 2003. The interbank rate also declined to 12.1 per cent in January 2004 and further fell to 3.8 per cent in August 2005, but rose to 27.1 per cent in January 2006 before declining to 1.1 per cent in April 2006. The fluctuations continued throughout the observed period, peaking at 36.4 per cent in October 2016.

Dollarisation typically has been a reaction to economic instability and high inflation. Small amount of foreign currency holdings is supposed to lead to higher inflation, all things being equal. In January 2002, inflation stood at 18.6 per cent, while dollarisation was 4.8. Inflation fell in May 2002 to 10.2 per cent while the dollarisation index rose to 5.7. In July 2006, when inflation fell to 3.0 per cent, dollarisation index rose to 9.8. The inflation trend just like the interbank call rate did not show a regular pattern across the observed period. It was 4.1 per cent in September 2007 and rose to 15.1 per cent in December 2008, in response to rising global food and fuel prices and the loosening of monetary conditions. Prices also declined to 10.4 per cent in September 2009 and to 9.4

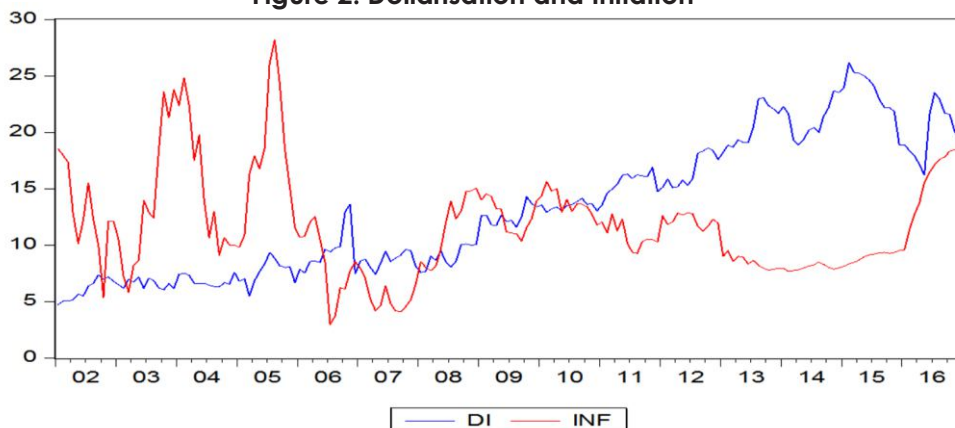
per cent in July 2011. The declining trend continued in November 2014 with a 7.9 per cent decrease, but later rose to 18.6 per cent in December 2016.

Figure 1: Dollarisation and Monetary Policy



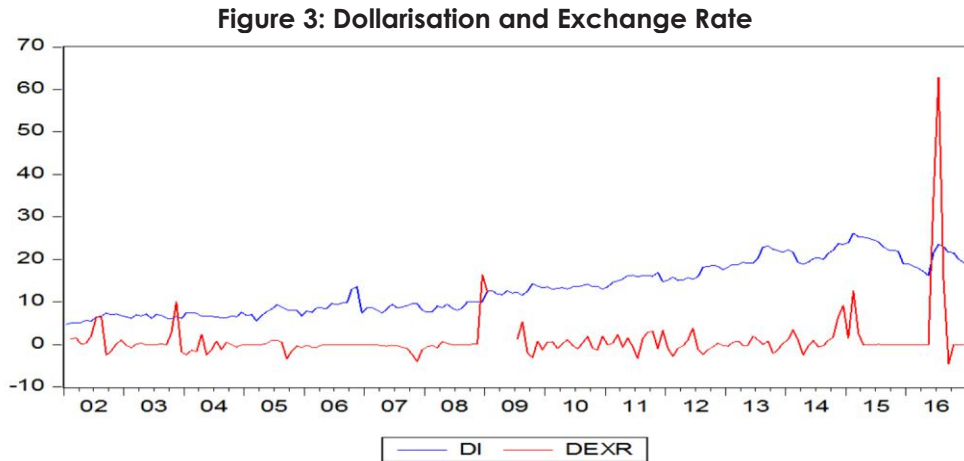
However, the dollarisation index maintained an upward trend on average throughout the observed period with the lowest point of 4.8 in January 2002, and rose to a peak of 26.2 in February 2015

Figure 2: Dollarisation and Inflation



Source: Author

In Figure 3, the dollarisation showed a pattern of upward trend from January 2002 to February 2015 before it started declining. For the exchange rate, it appears there was no sign of trends. The observed behaviour of the exchange may be due to the exchange rate regime operating during the periods.



IV. Methodology

IV.1 Data

The data employed were monthly data spanning 2002 to 2016. The variables of interest were the index of dollarisation, monetary policy rate- proxied by interbank rate, the naira-dollar exchange rate and inflation rate. The main source of data is the CBN statistical bulletin. The index of dollarisation was computed as the ratio of foreign currency supply to the broad money supply. Foreign currency deposit is the traditional proxy for the measurement of dollarisation in an economy. According to Feige (2002), the traditional dollarisation index would be an adequate proxy of unofficial dollarisation when, foreign currency holdings were of marginal importance or when the foreign currency in circulation and foreign currency deposit were highly complementary.

Most literature and institutions, like the IMF, used the traditional index to proxy the extent of foreign currency in an economy. The ideal proxy should include both the foreign currency deposit and the foreign currency in circulation. However, data on the latter are very difficult to obtain in Nigeria. For exchange rate, the official rate was employed as against the Bureau De-Change (BDC) where transactions were speculative in nature. The inflation variable was used as an indicator of the general price level, while the interbank call rate was employed to proxy monetary policy. The monetary policy rate (MPR) is an anchor rate, as well as the operating range or band of overnight interest rates in the money market. However, its lumpy nature did not readily capture the market dynamics, hence the use of the interbank call rate as a proxy for MPR.

In examining the properties of the data, unit root tests were conducted and the results indicated that all the variables were stationary at levels, except for the exchange rate variable which was stationary at first difference (Appendix 1).

IV.2 Descriptive Statistics

Table 1 was based on 174 observations (after adjustment), hence providing a more precise estimate of the parameters. The variables presented a positive mean for all series with interbank rate having a mean of 11.80 and standard deviation of 6.71. The dollarisation index (DI) showed a mean of 13.27 with a standard deviation of 6.02. The Jarque-Bera statistics confirms that the null hypothesis of the variables should not be rejected and that the variables are normally distributed. As shown in the table below: DI stands for index of dollarization, IBR-Inter Bank Rate, INF-Inflation Rate, and DEXR-Exchange Rate.

Table 1: Descriptive Statistics

	DI	IBR	INF	DEXR
Mean	13.26609	11.80460	11.66138	1.087989
Median	13.02049	10.68000	10.99500	-0.010000
Maximum	26.18879	36.42000	28.21000	62.81000
Minimum	5.057444	0.770000	3.000000	-4.500000
Std. Dev.	6.019655	6.713486	4.558580	6.075554
Skewness	0.410046	1.077628	1.020001	7.322641
Kurtosis	1.830140	4.728909	4.363961	68.04152
Jarque-Bera	14.79813	55.34836	43.65946	32225.40
Probability	0.000612	0.000000	0.000000	0.000000
Sum	2308.300	2054.000	2029.080	189.3100
Sum Sq. Dev.	6268.870	7797.266	3595.053	6385.838
Observations	174	174	174	174

IV.3 The Model

In order to capture the real-time effects of policy actions and avoid the freezing of innovations in some variables, the study used the vector autoregression (VAR) models which have the power to avert theoretical assumptions in modern monetary policy analysis. The dependence on the propagation of impulses through the error term also makes VAR models more reliable – the unexplained term is the source of shock to the system.

A major requirement for the estimation of a VAR model is the choice of an appropriate lag length. The Final Prediction Error (FPE), Schwarz Information Criterion (SC) and Hannan-Quinn Information Criterion, selected an optimal lag length of 3, which was employed in the study (Appendix 3). As part of the diagnostic test, a stability test was undertaken to ascertain the reliability of the VAR model using the autoregressive (AR) root stability test. The estimated VARs proved to be stable, since all roots indicated a modulus of less than one and lie inside the unit circle (Appendix 1).

IV.4 Model Specification

In a VAR model, each variable is expressed as a function of its own lags and the lags of other variables in the system. The general specification is as follows:

$$y_t = \delta + \Phi_1 y_{t-1} + \Phi_2 y_{t-2} + \dots + \Phi_p y_{t-p} + \varepsilon_t$$

The specification for this model follows the general framework of the VAR which constituted four variables in this paper, namely: index of dollarization (DI), interbank interest rate (IBR), inflation rate (INF) and exchange rate changes (DEXR).

Where y_t represent the vector of the four endogeneous variables DI, IBR, DEXR, and INF. δ is the vector of equation specific constant while ε_t is the vector of error terms, or innovations (shocks) to the four variables. In matrix form the equations is stated as below:

$$AY_t = \begin{bmatrix} DiDi & Dilbr & Didexr & DiInf \\ lbrDi & lbrlbr & lbrdexr & lbrInf \\ Dextr & Dextrlbr & DextrDextr & DextrInf \\ InfDi & Infibr & InfDextr & InfInf \end{bmatrix} \begin{bmatrix} Di \\ lbr \\ dextr \\ Inf \end{bmatrix}$$

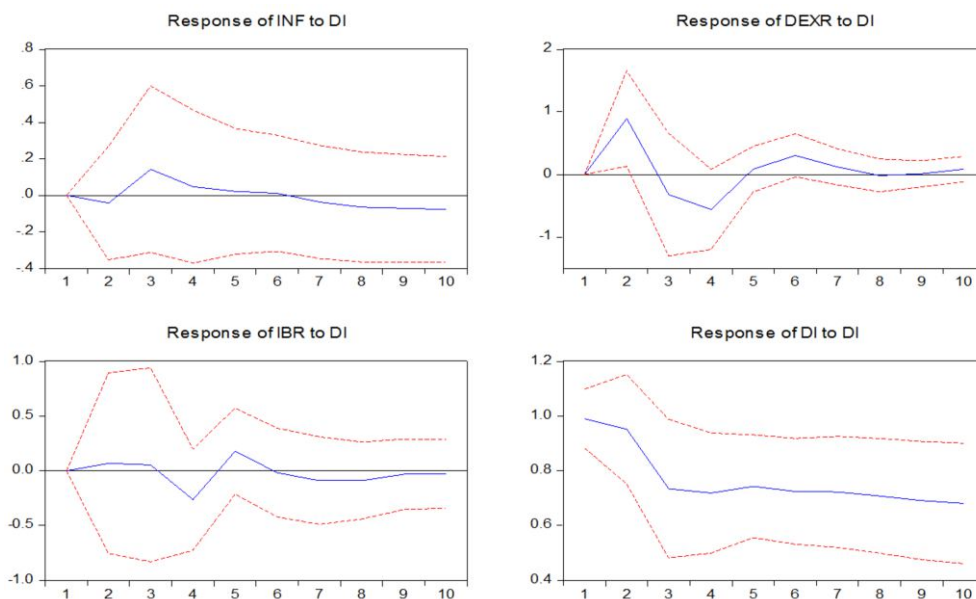
In terms of ordering, the index of dollarisation entered first because the central bank is expected to monetise its flows as it intervenes in the foreign exchange market. The interbank rate is next since the money market is expected to respond to increase in money stock. This also affects the exchange rate, which makes it come next in the model. Inflation entered last because it is expected to react to interest rate and exchange rate.

V. Analysis of Results

V.1 Impulse Response Analysis

Impulse response functions (IRF) are structured such that they trace the effects of any shock, represented by the error term of the concerned equation, on the future values of the dependent variable in that equation and those in the other equations. In this paper, the impulse response function was applied to identify the impact of dollarisation on monetary policy in Nigeria. From the results shown in Figure 4, IRF revealed that given a one standard deviation innovation, dollarisation does not affect the outcome of monetary policy contemporaneously. In the second month, inflation declined by 0.04 per cent, while interbank rate and exchange increased by 0.07, and 0.9 per cent, respectively.

However, in the third month, inflation turned positive increasing by 0.14 per cent. The interbank rate also increased in the third month by 0.05 per cent, while the exchange rate turned negative by 0.32 per cent. The sign on the response of the monetary policy in the fourth month was negative, which was reversed in the fifth month. From the fifth month to the tenth month, the sign of the monetary policy stays negative. The fourth month decline in the monetary policy rate is a sign of slow impact of increasing dollarisation on monetary policy because short term rates are expected to respond rapidly. In the case of prices, the increase in dollarisation resulted to an increase in inflation for the third month, which lasted until the sixth month before it reversed to decreasing trend up to the tenth month. For the exchange rate, aside the depreciation experienced in the second, third, and the fifth month, the other months were appreciations due to increasing dollarisation in the economy. In summary, the results suggested a small impact in terms of a reduction in the degree of dollarisation despite tight monetary policies.

Figure 4: Impulses of Dollarisation Graph

V.2 Variance Decomposition Analysis

The VAR system was estimated to isolate the variation of each endogenous variable that was due to shocks in each component. In doing this, the significance of each random shocks, relative to the others, was ascertained.

The forecast error variance decomposition (FEVD) analysis (in Table 1) revealed that shocks to index of dollarisation accounted for only 0.02 per cent of the variation in the growth of inflation at the first period and settles at 0.09 per cent by the end of the tenth month. Shocks to dollarisation generated 13.2 per cent variation in exchange rate in the first month, which gradually increased and settled at 22.0 per cent by the tenth month. This position was implied by the impulse response analysis where the real exchange rate changed significantly in response to an impulse from dollarisation. Moreover, the reaction of monetary policy rate to the index of dollarisation was marginal in the first month at about 0.38 per cent and rose slowly afterwards to 0.58 per cent by the tenth month. This is, however, contrary to a priori expectation. Lastly, the impact of an own shock to dollarisation was 86.4 and 77.4 per cent in the first month and tenth month, respectively.

Table 1: Forecast Error Variance Decomposition (FEVD) of Index of Dollarisation

Period	S.E.	Decomposition of DI			
		INF	DEXR	IBR	DI
1	1.937706	0.018421	13.16931	0.383683	86.42859
		-0.86133	-5.07672	-1.18586	-5.20356
2	2.858011	0.014111	16.56079	0.227999	83.1971
		-1.00704	-6.39668	-0.96056	-6.62822
3	3.439461	0.019404	20.13507	0.952784	78.89274
		-1.40431	-7.91117	-1.40195	-7.91487
4	3.806247	0.01837	21.41309	0.925329	77.64321
		-1.80297	-8.81279	-1.41453	-8.82057
5	4.065632	0.015504	21.34178	0.854729	77.78799
		-2.04681	-9.25841	-1.40465	-9.3414
6	4.255148	0.021744	21.59922	0.757814	77.62122
		-2.36204	-9.74493	-1.39969	-9.90176
7	4.389678	0.031489	21.9486	0.68418	77.33573
		-2.76745	-10.18	-1.46228	-10.4116
8	4.485103	0.045024	22.11069	0.626116	77.21817
		-3.22116	-10.5078	-1.56546	-10.8255
9	4.553871	0.064119	22.07307	0.57807	77.28474
		-3.70929	-10.7506	-1.701	-11.1604
10	4.604013	0.090531	21.95823	0.535623	77.41562
		-4.21726	-10.9349	-1.85514	-11.4426

VI. Policy Implications and Conclusion

VI.1 Policy Implications

- i. From the findings, monetary policy could still be effective even with the current level of unofficial dollarisation in the Nigerian economy, since the impact was small.
- ii. Furthermore, the results indicated that reaction of the index of dollarisation to changes in monetary policy stance was marginal, in terms of percentage. This development might be because the level of dollarisation that could have influenced

monetary policy was largely from the foreign currency in circulation rather than foreign currency deposit with domestic banks.

- iii. The results may also suggest that monetary policy could still be effective in influencing domestic transactions in part because these have remained predominantly in domestic currency and dollarisation may reflect primarily asset substitution and foreign exchange in circulation.
- iv. The study also showed that there was no regular pattern in the response of the exchange rate to monetary policy shocks.

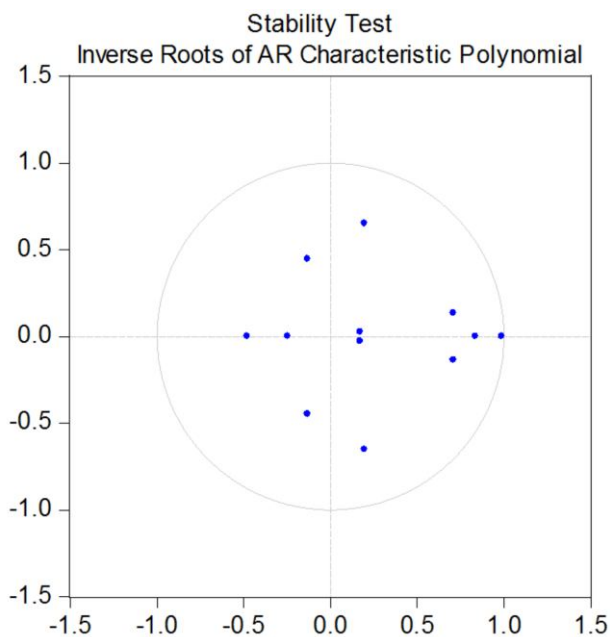
VI.2 Conclusion

This paper examined the impact of dollarisation on monetary policy in Nigeria. The paper adopted the conventional IMF proxy for dollarisation and traced its reactions to changing monetary policy stance. Using the vector autoregression (VAR) model and interbank rate as an indicator of monetary policy stance, the results showed that the size of dollarisation could influence the outcome of monetary policy, though the impact was small. This was evident from the output equations, that inflation did not respond in the first month and responded negatively in the second month. However, from the third to sixth month, it responded positively before it eventually returned to equilibrium. The overall impact of dollarisation on exchange rate is dependent on the degree of dollarisation. The conclusion from the results was that monetary policy could still be effective with the present level of dollarisation.

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Appendix



VAR Lag Order Selection Criteria

Endogenous variables: INF DEXR IBR DI

Exogenous variables: C

Sample: 2002M01 2016M12

Included observations: 158

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1978.142	NA	926246.4	25.09040	25.16794	25.12189
1	-1518.423	890.3425	3368.689	19.47370	19.86137*	19.63114
2	-1483.972	64.97638	2668.140	19.24015	19.93796	19.52354*
3	-1467.352	30.50432	2649.938*	19.23231*	20.24025	19.64165
4	-1456.602	19.18762	2837.260	19.29876	20.61684	19.83405
5	-1447.053	16.55899	3087.882	19.38042	21.00864	20.04166
6	-1431.229	26.64156*	3108.379	19.38264	21.32099	20.16983
7	-1417.534	22.36261	3220.011	19.41182	21.66031	20.32496
8	-1413.467	6.433958	3775.629	19.56288	22.12150	20.60197

* 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

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 06/23/17 Time: 14:52

Sample: 2002M01 2016M12

Included observations: 168

Dependent variable: INF

Excluded	Chi-sq	df	Prob.
DEXR	5.646203	3	0.1302
IBR	1.472770	3	0.6886
DI	2.031632	3	0.5659
All	8.541751	9	0.4806

Dependent variable: DEXR

Excluded	Chi-sq	df	Prob.
INF	4.554062	3	0.2075
IBR	4.857251	3	0.1826
DI	12.96441	3	0.0047
All	22.27325	9	0.0081

Dependent variable: IBR

Excluded	Chi-sq	df	Prob.
INF	0.432885	3	0.9334
DEXR	10.16938	3	0.0172
DI	0.311650	3	0.9578
All	12.22786	9	0.2008

Dependent variable: DI

Excluded	Chi-sq	df	Prob.
INF	0.212180	3	0.9756
DEXR	1.656708	3	0.6466
IBR	3.618817	3	0.3057
All	7.268614	9	0.6092

Group unit root test: Summary

Series: DI, IBR, DEXR, INF

Date: 06/23/17 Time: 14:55

Sample: 2002M01 2016M12

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 2

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.56267	0.0591	4	703
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W stat	-5.43551	0.0000	4	703
ADF - Fisher Chi-square	57.3954	0.0000	4	703
PP - Fisher Chi-square	86.8449	0.0000	4	709

** Probabilities for Fisher tests are computed using an asymptotic Chi - square distribution. All other tests assume asymptotic normality

