Gusau Journal of Accounting and Finance (GUJAF)

Vol. 4 Issue 1, April, 2023 ISSN: 2756-665X

A Publication of
Department of Accounting and Finance,
Faculty of Management and Social Sciences,
Federal University Gusau, Zamfara State -Nigeria

Gusau Journal of Accounting and Finance, Vol. 4, Issue 1, April, 2023

Vol. 4 Issue 1
April, 2023
ISSN: 2756-665X

A Publication of
Department of Accounting and Finance,
Faculty of Management and Social Sciences,
Federal University Gusau, Zamfara State -Nigeria

Published and Printed by:
Ahmadu Bello University Press Limited, Zaria
Kaduna State, Nigeria.
Tel: 08065949711, 069-879121
e-mail: abupress2013@gmail.com
abupress2020@yahoo.com
Website: www.abupress.com.ng

EDITORIAL BOARD

ADVISORY BOARD MEMBERS

CALL FOR PAPERS

The editorial board of Gusau Journal of Accounting and Finance (GUJAF) is hereby inviting authors to submit their unpublished manuscript for publication. The journal is published in two issues of April and October annually. GUJAF is a double-blind peer reviewed journal published by the Department of Accounting and Finance, Faculty of Management and Social Sciences, Federal University Gusau, Zamfara State Nigeria The Journal accepts papers in all areas of Accounting and Finance for publication which include: Accounting Standards, Accounting Information System, Financial Reporting, Earnings Management, , Auditing and Investigation, Auditing and Standards, Public Sector Accounting and Auditing, Taxation and Revenue Administration, Corporate Governance Issues, Corporate Social Responsibility, Sustainability and Environmental Reporting Issue, Information and Communication Technology Issues, Bankruptcy Prediction, Corporate Finance, Personal Finance, Merger and Acquisitions, Capital Structure, Working Capital Management, Enterprises Risk Management, Entrepreneurship, International Business Accounting and Finance, Banking Crises, Bank's Profitability, Risk and Insurance Issue, Islamic Finance, Conventional and Islamic Banks and so forth.

GUIDELINES FOR SUBMISSION AND MANUSCRIPT FORMAT

The submission language is English and must be a well-researched original manuscript that has not previously been submitted elsewhere for publication. The paper should not exceed more than 15 pages on A4 type paper in MS-word format, 1.5-line spacing, 12 Font size in Times new roman. Manuscript should be tested for plagiarism before submission, as the maximum similarity index acceptable by GUJAF is 25 percent. Furthermore, the length of a complete article should not exceed 5000 words including an abstract of not more than 250 words with a minimum of four key words immediately after the abstract. All references including in text citation and reference list, tables and figures should be in line with APA 7th Edition publication manual. Finally, manuscript should be send to our email address elfarouk105@gmail.com and a copy to our website on journals.gujaf.com.ng

PUBLICATION PROCEDURE

After receiving a manuscript that is within the similarity index threshold, a confirmation email will be send together with a request to pay a review proceeding fee. At this point, the editorial board will take a decision on accepting, rejecting or making a resubmission of the manuscript based on the outcome of the double-blind peer review. Those authors whose manuscript were accepted for publication will be asked to pay a publication fee, after effecting all suggested corrections and changes made on the manuscript. All corrected papers returned within the specified time frame will be published in that issue.

PAYMENT DETAILS

Bank: FCMB
Account Number: 7278465011
Account Name: Gusau Journal of Accounting and Finance

FOR INQUIRY

The Head,
Department of Accounting and Finance,
Federal University Gusau, Zamfara State.
elfarouk105@gmail.com
+2348069393824

FOR MORE INFORMATION, CONTACT

The Editor-in-Chief on +2348067766435
The Associate Editor on +2348036057525
OR visit our website on www.gujaf.com.ng or journals.gujaf.com.ng

CONTENTS

INTERVENTION ANNOUNCEMENTS AND NAIRA MANAGEMENT: EVIDENCE FROM THE NIGERIAN FOREIGN EXCHANGE MARKET

Adedeji Daniel Gbadebo
Department of Accounting Science
Walter Sisulu University, Mthatha
Eastern Cape, South Africa
gbadebo.adedejidaniel@gmail.com ; agbadebo@wsu.ac.za

Abstract
Many studies establish how foreign exchange intervention affects the exchange rates. Intervention announcement do also have impact different for the actual financial involvement. Recent evidence has tested this for some countries but none has investigated Nigeria, despite volume of interventions and its announcements made via press circulars by the central bank. The paper applies daily data, from January 02, 2001 to May 15, 2023, to verify the impact of intervention announcements on the Nigerian exchange rate. The paper evaluates the relationship based on an event driven baseline specification, which measure the impact of announcement period windows on the exchange rate. The paper finds conclusive evidence of highly significant impacts that past, contemporaneous and future intervention announcements cause appreciation shocks. The naira is revealed to appreciate by 3.5% upon the intervention announcement, and this further increases to 4.49%, 4.55% and 5.22%, on one day, two day, three days after, but subsequently slow down on fourth day (5.21%) and fifth day (3.45%) after the intervention announcements. Robustness test based using alternative data frequency for the estimation yields close (different) result for the monthly (quarterly) periodicity, therefore supposes that the data frequency matters. The result has implications for future conduct of interventions and conventional monetary policies. Amongst others, higher market uncertainty, low credibility of transmission mechanism and possible predominance of global over the national factors may contribute to influences the effectiveness of interventions. The paper's major limitation is that it excludes the influence of actual intervention, via sales and purchases of dollar, by the central bank.

Keywords: Intervention Announcements, Naira Management, Nigerian Foreign Exchange Market
https://doi.org/10.57233/gujaf.v4i1.210

1. Introduction

Foreign exchange (FX) intervention occurs when government via the central bank, buys or sells foreign currencies to prevent equilibrium exchange rate. The authorities intervene in foreign currency markets to pursue a monetary target and/or to smooth excessive exchange rate volatility triggered by speculative attacks. Most central banks make the announcement of planned interventions by means of press information (Fratzscher, 2008; Germaschewski et al., 2020; Parra-Polania et al., 2022). Recent evidence reveals how intervention announcements carry information contents that moderate exchange rate levels. Germaschewski et al. (2020) and Fratzscher (2008) reveal that oral FX interventions have been effective to influence different exchange rates. Fratzscher (2008) finds that over the short- to medium run, oral intervention events are highly successful in influencing the exchange rate

of the dollar-yen and euro-dollar. Germaschewski et al. (2020) note that the announcements can impact output via the exchange rate depreciation and an unexpected increase in oral interventions may significantly weaken the Australian dollar.

Evidence for Nigeria indicates that the naira has depreciated since 1980 till date. The currency keeps wobbling against global currency and more so, its peers in Africa: Reports indicate that the naira depreciated against other global currencies between October 2015 and October 2022 (Central Bank of Nigeria, CBN Bulletin, 2022; Business Day, 2022). The naira depreciated by 122% against the dollar, from an average of ₦196.5/$ to ₦436.78/$. The currency which exchanges at ₦301.7/£ (₦216.6/€) depreciated by 63% (98 %) to ₦491.68/£ (₦428.66/€) against sterling (euro). The depreciation against the Yen (Yuan) was 79% (94%). Relative to other African currencies, the naira depreciated in same periods against the CFA (WAUA) by 102% (104%) from ₦0.32 to ₦0.64 (₦273.06 to ₦556.39).

In curtailing the incessant naira depreciation, the monetary authorities have implemented several exchange rate management approaches (CBN, 2021; Mordi, 2006; Obadan, 2006; Ukeje, 2017). The Nigerian naira has remained excessive volatile since adoption for use in 1970, and the monetary authority, the central bank of Nigeria (CBN), has often watched the movements of the exchange rate and intervene in event of severe and unanticipated market fluctuations. The bank may intervene by announcements that ease foreigners' decision to transact in domestic assets to cause the domestic currency appreciation. The authority initially circulates news information to intervene, which often elicited reactions from market participants (Gbadebo et al., 2021). Subsequently, implements the planned intervention (mostly to sell the dollars to correct depreciatory shock), action which financed from the reserve (Ahmed et al., 2020; Dayyabu et al., 2016; Omojolaibi & Gbadebo, 2014). In 2020 the central bank completes a pseudo devaluation by making adjustment to unify the importer and exporter transaction windows in order to slow down pressure on the foreign reserves due to FX shortage (Gbadebo et al., 2021). Despite the foreign exchange spent by the CBN in intervening to defend the naira and convince the market that the authority was resolute about halting the excessive naira's rally beyond fundamental have not yielded result as the naira continues to depreciate yearly.

Current intervention studies based on evidence from Nigeria concentrate on influence of actual financial interventions, as well as focus mostly on exchange rate volatility (Adebiyi, 2007; Ahmed et al., 2020; Akbar, 2016; Aruwa & Ahmed,

2013; Dayyabu et al., 2016; Omojolaibi & Gbadebo, 2014). No study for Nigeria has considered the announcements impact despite the importance (Germaschewski et al., 2020; Parra-Polania et al., 2022). Understanding why intervention announcements affect the exchange rate an important issue for policy considerations. Because intervention is aimed at targeted exchange rate reference, this paper supposes a paradigm shift to focus on the impact of intervention announcements on exchange the rate in Nigeria.

The paper extends literature by pursuing two objectives. First, the paper finds out whether intervention announcement affects the exchange rate level. The paper follows literature to apply daily data on event driven models and show how exchange rate responds to announcements (Cheung et al., 2019; Fratzscher, 2008; Germaschewski et al., 2020; Parra-Polania et al., 2022; Pyo & Lee, 2020). Since the efficacy of intervention announcement is unrelated to implemented monetary policy but works via the coordination channel (Fratzscher, 2008), the current paper focuses on the events for the naira caused by announcements without the influence of monetary policy (Ponomarenko, 2019) and exogenous macroeconomic factors (Alder et al., 2019; Blanchard et al., 2015; Hoshikawa, 2017). Second, since the data frequency for intervention may impact the outcome (Adler et al., 2021), the paper in line with prior studies on exchange rate and other financial variables verifies how periodicity influence the outcome (Gbadebo et al., 2022; Salisu & Vo, 2021). The robustness is examined for available monthly and quarterly frequency data.

The paper finds conclusive evidence of highly significant impacts that past, contemporaneous and future intervention announcements cause appreciation shocks. This has significant policy relevance as it offers valuable addition to monetary policy. Although FXI is occasionally applicable for Nigeria, the continuous depletion in the reserve has reduced the volume, and the naira remains volatile. Other parts of the work are organized as: Section 2 presents the literature review, and Section 3 the methodology. Section 4 presents the results, while section 5 concludes.

1. Literature

Foreign exchange (FX) intervention occurs when government via her representative, the central bank, buys or sells foreign currencies to influence exchange rates. The central bank interferes in the FX market, by intervention operations, in order to push the exchange rate away from prior equilibrium. If the monetary authority considers that the exchange rate deviates excessively from the expected fundamental, it buys the domestic currency during periods of depreciatory

pressures and vice versa. There is evidence that intervention is more regular in emerging than in advanced economies (Parra-Polania et al., 2022; Frömmel & Midiliç, 2022; Adler & Mano, 2021; Akdogan, 2020; Ponomarenko, 2019; Disyatat & Galati, 2005).

In floating exchange rate system, the demand and supply of foreign exchange by private agents determine the equilibrium rate. Because private agents may push the rate to fluctuate beyond the equilibrium required for external stability, the central bank often intervene to curtail excessive swings. To curtail the undue fluctuations and consequences, governments of advanced economies and their developing counterparts officially guide the exchange rates through official intervention. Three immediate objectives of intervention include to dampen exchange rate volatility, to influence exchange rate level and to manage the foreign reserves. Aside these, central banks intervene in forex markets in order to maintain competitiveness, control inflation and sustain financial stability (Gagnon, 2012).

Literature contains five channels via which intervention affects the exchange rates. The monetary channel explains that intervention influence the exchange rate through the interest rates. This is possible because the government offsets he effects of intervention on the domestic bank reserves. The portfolio channel, suggested by Branson (1983), explains that intervention influence exchange rate through asset prices. The model assumes that sterilized intervention adjusts investor's portfolio composition, or the riskiness of foreign denominated assets in relation to the domestic currency assets, which influence the exchange rate if there is existence of imperfect asset substitutability. This channel is more relevant in emerging market countries, where the interventions play major role in domestic markets.

The signalling channel, from MuNigeria (1981), argue that intervention contains information about the future of monetary policy. Hence, a change in expected interest rates would impact the exchange rate. The channel requires that the central bank backs interventions with the expected change in policy. The fourth channel, the market microstructure channel, contains that intervention influences the exchange rate due to informational asymmetric. Because intervention can cause significant impact on order flows, the central bank affect market expectation about the future path of exchange rate (Dominguez, 1999; Hung, 1997). The fifth medium is the 'coordination' channel (Tapi & Tokman, 2004). Here, intervention affect exchange rate and its volatility by perforating the irrational speculative bubbles because of possible coordination failure and realigning any disequilibria in the exchange rate.

Intervention can be nonsterilised and sterilised. Intervention is nonsterilised or unsterilized if it causes a shift in the monetary base. The unsterilized intervention is conducted by the monetary authorities if the purported aim of the intervention is to influence the exchange rate without trading domestic assets (Ponomarenko, 2019; Omojolaibi & Gbadebo, 2014). This affects the exchange rate via its effect on money supply by changing interest rates in the domestic economy. In general, any intervention that is nonsterilised will have effects on domestic money supply growth. Nonsterilised intervention is crucial because it induces changes in monetary base, affect interest rates, expectations, capital flows and consequently, exchange rate. The general usage of such intervention is such that it simultaneous pursuit of exchange rate and monetary policy operations. Sterilized intervention may not have substantial effect on domestic money supply growth.

There are debates about FX intervention's effectiveness and efficiency. A smooth transmission channel matter for intervention to be effective. Almudhaf (2014) finds that unlike the exchange rates of South Africa, Colombia, Indonesia and Turkey that are efficient, the exchange rates of Egypt and Vietnam were inefficient. Kumar (2015) reveals that although the market was inefficient, but that efficiency was attained and improved after the crisis. The efficiency is improved because of foreign exchange interventions. Ning et al. (2017) find that the pre-reform market was more efficient relative to the post-reform. The decline in the market efficiency level is because of the various interventions by the People's Bank of China since the reform. Khuntia et al. (2018) identifies that the efficiency in the currency's market had fluctuated because of various events including financial crises, legal reforms, institutional structures, central bank actions, macroeconomic fluctuations, and political instability. Diniz-Maganini et al. (2023) find substantial differences in the efficiency of the countries, with China the least efficient and South Africa the most efficient.

2. Methodology

Considered Model

In assessing the influence of intervention announcements on the USD/NGN exchange rate, the paper focuses on the interventions periods, in which the pre-actual intervention announcements are made through the press publication on the CBN website. The paper estimates the effects of past, current and lead of announcement periods on log-exchange rate. According to Pyo and Lee (2020) and Ben-Omrane et al. (2019), the paper reports an event driven model that analyses how the intervention announcements on five days windows prior ($t-i, for\ i$ $=-1\ to\ -5$), day of announcement (t), and post ($t+i,$ for i =1 to 5), explain

exchange rate levels. The paper specifies a baseline model that considers the stable' effects of intervention news on exchange rate given as:

$$Log(\frac{USD}{NGN})_t = \alpha_0 + \sum_{i=-5}^{5} \beta_{t+i} FXINTVDum_{t+i} + \varepsilon_t \quad (1)$$

$$Log(USD/NGN)_t = \alpha_0 + \sum_{i=-5}^{-1} \beta_{t+i} FXINTVDum_{t+i} + \beta_t FXINTVDum_t + \sum_{i=1}^{5} \beta_{t+i} FXINTVDum_{t+i} + \varepsilon_t \quad (1')$$

Equation (1) estimate the log transformation of the daily USD/NGN's exchange rate on the announcement dummies for FX intervention press releases. Equation (1') is a convenient way to write (1) for table presentation. The log-normalization is used in the empirical estimations to secure suitable estimates (Lahmiri et al., 2018). Unlike the daily data, the study considers 2, 3, and 4 quarters, months and weeks periods effects windows for the respective frequency identifies because of limited data. The explanatory variables (i.e., the D_{t+i}'s) are dummies identified as 1 for the announcement (immediate) time and 0 otherwise. D_{t+i}, $i \epsilon \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\}$ for the daily estimation involves lagged by *i* (past and future) days from the announcement. Based on standard events models (Gbadebo et al., 2021; Pyo & Lee, 2020), $var(\varepsilon_t)$ (i.e., variance of error) follows the Generalized Autoregressive Conditional Heteroskedasticity (GARCH(1,1)) [(2)], hence, the paper finds whether the *t*-test for the variance of GARCH(1,1) of ε_t of the exchange rate (1) is significant:

$$\varepsilon_t = \delta + \sigma_t z_t$$
$$z_t \sim nid\ (0,1), \forall\ t \quad (2)$$
$$\sigma_t^2 = \omega_0 + \omega_1(\varepsilon_{t-1})^2 + \Omega\sigma_{t-1}^2$$
$$\sigma_t^2 > 0$$

The intercepts α_0 indicate the expected value of the naira when no announcements released, and expectedly, is non-negative. The coefficient β_{t+i} (for $i = 1\ to\ k$) corresponding to each D_{t+i} measures change in the mean level of the exchange rate, provided that intervention announcement is released time *t* for each *i* lag. $\beta_{t+i} >$ (<) 0 supposes that the mean exchange rate of naira is would be expected to depreciate (appreciate) by approximately β_{t+i} (times 100 percent for that particular period *i's* announcement.

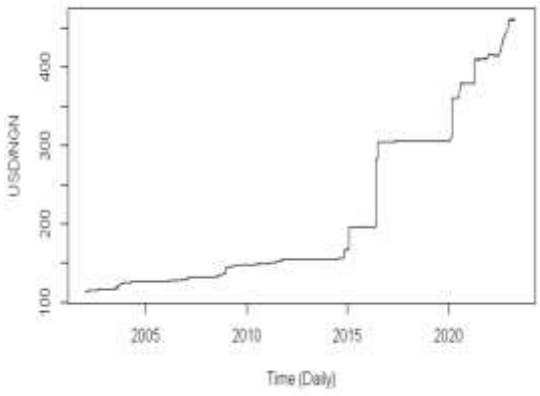
Data and Basic Statistics

For intervention announcements, the paper employs dummy variables for reported dates of official press release related to intervention announcements by the CBN within the considered period is used. The announcements are scrapped on CBN webpage from the various press release from January 02, 2001 to May 15, 2023. Table A1 and Table A2 report, with their links, the considered releases. The paper includes announcement dates involving direct intervention and others with information content relating to FX transactions such as guidelines and instructions for BDCs, which are all targeted to moderate the exchange rate undulations. This is important because of the peculiar nature of the Nigerian FX market, in which the naira is sensitive to increase reserves (Kalu et al., 2019); financial assets (Bala-Sani & Hassan, 2018; Oladapo et al., 2017) and FX intervention (Adebiyi, 2007; Ahmed et al., 2020; Akbar, 2016; Aruwa & Ahmed, 2013; Dayyabu et al., 2016; Omojolaibi & Gbadebo, 2014).

The paper scrutinizes the webpage reports and secure circulars involving direct intervention via the Wholesales Dutch Auction System (WDAS), Dutch Auction System Retail (RDAS) and special intervention for Bureau de Change (BDCs), which are all geared towards exchange rate stabilization. The RDAS was suspended in Feb 18, 2015 but since March 3, 2015, the authority makes special FX intervention through sales of FX to the BDCs. Hence, the paper involves all announcements on FX sales to BDCs to consolidate the RDAS. A total of 264 releases at distinct days are obtained and conjectured as intervention dummy, which is denoted as 1 on announcement day for categorized released announcements, and 0 otherwise. For the other series (monthly and quarterly), the paper shares the sentiment to apply dichotomy variable for intervention announcements. Thus, the dummy is used to represent the week, month or quarter which intervention news is released rather than to use discrete variable involving to sum up all days of intervention for the considered periodicity. This approach is applied in order to have a fair comparison with the estimation for the daily series. For exchange rates, the data applied is the daily, monthly and quarterly naira price of the US dollar (i.e., USD/NGN rate), from January 02, 2001 to May 15, 2023. The series was sourced from the CBN online bulletin. The CBN-rate, been the average of the bid-ask price quotes, is used. The data published does not include weekends and slated national holidays, due to inherent bias influence the transactions for these days would have on the quoted prices.

The plots of the daily exchange rate in level (Figure 1) and log-transform (Figure 2 (black line)) are chaotic with jumps and vertical striations, clearly, due to regime

switches, announced devaluations and volatility drifts. Within closer periods, the daily CBN-rate for naira appears stable around same domain between the days except for periods of jumps. The series are nonlinear, although the log transform is relatively smoothened. Figure 3 depicts the breakdown of the exchange rate (log form) with the Seasonal-Trend decomposition using LOESS (STL) into different time-series components. The plot identifies that the Although trend component remains explosives, the remainder convergent and mean reversing, and the seasonality oscillatory but stable around a zero mean.



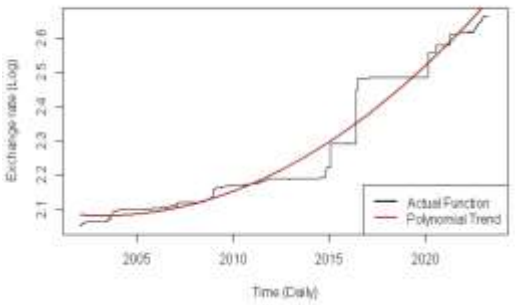


Figure 1: Time series plots of the daily USD/NGN exchange rate (actual data)
Figure 2: Time series plots of the daily USD/NGN exchange rate (log-transform data)
Note: The daily naira price of the US dollar (i.e., USD/NGN rate), from January 02, 2001 to May 15, 2023, is shown in Figure 1 and 2.

Figure 2 includes a fitted polynomial trend (Brown line).
Source: Author (2023)

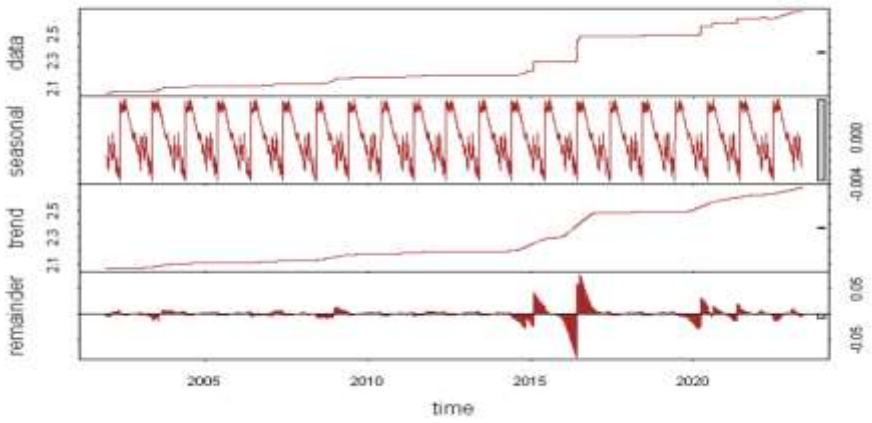


Figure 3: Seasonal-Trend decomposition using LOESS (STL) for the log of USD/NGN rate.

Note: The STL breakdown of USD/NGN rate into different time-series components.

The trend component remains explosives, the remainder convergent, and the seasonality oscillatory but stable around a zero.
Source: Author (2023)

Table 1:
Statistical properties of the exchange rate

Statistics	USD/NGN_t	$\log(USD/NGN)_t$
μ	210.831	2.278
$median$	155.240	2.191
$maximum$	461.000	2.664
$minimum$	112.950	2.053
σ	103.214	0.192
$\tilde{\mu}_3$	0.963	0.669
$\tilde{\mu}_4$	2.461	1.869
JB-*stat.*	872.32	668.8
$p(JB$-*stat.*$)$	0.000	0.000

Note: Table 1 provides the basic statistics, including the mean (μ), median (med), standard deviation (σ), skewness ($\tilde{\mu}_3$) and kurtosis ($\tilde{\mu}_4$) coefficients, of the exchange rates (USD/NGN_t, and the log transformed

series. $p(JB\ stat)$ is the probability of Jarque-Bera (JB) used for the normality test for each series. σ is standard deviation.
Source: Author (2023)

Table 1 reports the basic statistical characterization for the exchange rate and the log series. The mean (standard deviation) for the naira exchange rate series is NGN210.831 (103.214). The evidence indicates that the exchange rate has high spread. The exchange rate distribution is asymmetric (positive skewed) and mesokurtic (moderate peaked). The Jarque-Bera test shows that the series is significant, rejecting stated normality null. The series indicate outliers that could generate heteroskedastic because the distribution is very leptokurtic and rightly skewed. The log transformation is adopted for empirical verification of the considered impact of intervention announcement on the daily exchange rates, in order to present standardized scale and interpret the estimates in percent appreciation or depreciation change.

4. Results and Interpretations

Does FX intervention announcements cause appreciation or depreciation impacts?

The study offers attempt to answer the pertinent objective question on how intervention announcements affect the exchange rate level in the Nigerian FX market. Because the purpose is purely to establish how announcement events impact the asset price (i.e., FX), the empirical estimation conjectures that the announcement works in the market via the coordination channel. Thus, according to literature (Cheung et al., 2019; Germaschewski et al., 2020; Parra-Polania et al., 2022; Pyo & Lee, 2020) the study applies the daily naira price of dollar on event explainable model (equation 2). The estimation shows how announcements alongside its expectations days before and after the news release drive the exchange rate level without accommodating the influence of exogenous macroeconomic interdependence (Alder et al., 2019; Blanchard et al., 2015 Hoshikawa, 2017), such as monetary policy interaction (Omojolaibi & Gbadebo, 2014; Ponomarenko, 2019). Table 2 reports how log of the USD/NGN_t clusters around intervention announcements, without the influence of actual financial involvement by the authority.

The estimation process after adjustments due to iterations reflects around 5,231 observations. The naira exchange rate is well driven by the central bank's interventions announcement according to the long run stable estimates. The evidence, according to the intercept (α_0) shows that the anticipated value of the

exchange rate is about 2.3459 (log-form) or NGN210.83 per dollar, if the central bank would not make announcement via circular related intervention to stabilise the naira in the FX market. The past, contemporaneous and future upon the intervention announcement cause appreciation shocks. The estimates $\beta_{t+i}(for -5, -4, \dots, 4, 5)$ are all negative and significant, therefore expresses that the mean of the USD/NGN_t rate appreciates on the WDAS/RDAS/BDCs intervention announcement expectations for some days, upon the announcement and even day after FX auctions.

The evidence is not surprising because most exchange rate management in the country has been often gear to stabilise the volatile FX price from short run excessive swings in Nigeria (CBN, 2022, Gbadebo et al., 2021). The naira is expected to appreciate by 3.5% upon the intervention announcement but the naira appreciation would further increase to 4.49%, 4.55% and 5.22%, on one day, two day, three days after, but would subsequently and not surprisingly slow down on fourth day (5.21%) and fifth day (3.45%) after the intervention announcements by the central bank. The combined impact, of the announcement expectation and after, on the exchange rate is significant as well the overall model is robust and fit for policy significance.

The finding is justifiable since the CBN's announcement of intervention, which unusually involves sales of the US dollars to the BDCS conveys information that provide signal which prevents possible FX hoarding, and makes market participant to bid at lesser price, and seller to accept, due to expected release of dollars into the FX market by the central bank. The increase in forex in circulation definitely pushes appreciation pressure. Although, the efficacy of the announcement intervention may not be directly related to implemented monetary policy (Fratzscher, 2008), but the precise degree of appreciation effect may depend on existence of credible monetary transmission medium. Also, higher uncertainty levels in the market, low credibility of transmission mechanism and possible predominance of global over the national factors are amongst factors that contribute to influences the effectiveness of interventions in the economies. They counter pressure exchange rate by impinging lopsided potentials about expected interventions and the naira future value. Improved digitalized FX and financial system, such as increase financial instruments, may facilitate intermediation that can promote effective mechanism for the intervention announcement to transmit coordinately with other macroeconomic policies to help stabilise the naira and attain targeted value. This is because such would attract more capital inflows and increase the reserve, which is needed to help stabilized the naira or make the currency to appreciate. Table 2

presents the estimated change in the naira appreciation rate between days. The outcome identifies continuous appreciation from the intervention announcement day up to the day three.

The evidence is inconsistent with other studies that show how assets prices, such as global stock respond to macroeconomic news in the US (Lucca & Moench, 2015). Ekincia et al. (2019) show appreciation impact of news announcement on the bid, ask and mid-prices in post-release period. This result is consistent and collaborates established evidence, including research on intervention for G3 exchange rates based on events models (Hussaina & Ben-Omrane, 2020; Fatum & Hutchison, 2005. Hussaina and Ben-Omrane (2020) find that the US macroeconomic releases impose significant influence on the market returns in Canada.

Table 2:
Estimated event driven model for daily exchange rate

$USD/NGN_t = \alpha_0 + \sum_{i=-5}^{5} \beta_{t+i}\, FXINTVDum_{t+i} + \varepsilon_t$

Variable	*Parameter*	Estimate	σ	*t-stat*	*p-value*
Intercept	α_0	2.3459*	0.0030	787.61	0.0000
FXINTVDum$_{t-5}$	β_{t-5}	-0.0326*	0.0098	-3.3339	0.0009
FXINTVDum$_{t-4}$	β_{t-4}	-0.0499*	0.0101	-4.9345	0.0000
FXINTVDum$_{t-3}$	β_{t-3}	-0.0501*	0.0101	-4.9551	0.0000
FXINTVDum$_{t-2}$	β_{t-2}	-0.0438*	0.0103	-4.2491	0.0000
FXINTVDum$_{t-1}$	β_{t-1}	-0.0436*	0.0103	-4.2313	0.0000
FXINTVDum$_t$	β_t	-0.0353*	0.0110	-3.1957	0.0014
FXINTVDum$_{t+1}$	β_{t+1}	-0.0449*	0.0103	-4.3563	0.0000
FXINTVDum$_{t+2}$	β_{t+2}	-0.0455*	0.0103	-4.4142	0.0000
FXINTVDum$_{t+3}$	β_{t+3}	-0.0522*	0.0101	-5.1599	0.0000
FXINTVDum$_{t+4}$	β_{t+4}	-0.0521*	0.0101	-5.1492	0.0000
FXINTVDum$_{t+5}$	β_{t+5}	-0.0345*	0.0098	-3.5221	0.0004
Variance (σ_t^2) Equation					
Intercept	ω_0	0.0000	0.0000	52.8249	0.0000
$(\varepsilon_{t-1})^2$	ω_1	1.1670	0.0386	30.2273	0.0000
σ_{t-1}^2	Ω	0.1622	0.0142	11.4254	0.0000
Statistics					
$\bar{R}^2$			0.2091		
F-stat.			125.32*		
Prob(F-stat.)			0.0000		
DW-stat.			2.0042		

Note: σ, t-stat, p-value, and DW-stat are the standard error, t-statistics and probability of t value, and Durbin Watson statistic respectively.
***** implies significant t 1%
Source: Author (2023)

Table 3:
Estimated change in naira appreciation rate between days

Variable	$Parameter$	Estimate	%CAR*
FXINTVDum_{t-5}	β_{t-5}	-0.0326	NA
FXINTVDum_{t-4}	β_{t-4}	-0.0499	53.10%
FXINTVDum_{t-3}	β_{t-3}	-0.0501	0.40%
	β_{t-2}		-
FXINTVDum_{t-2}		-0.0438	12.74%
FXINTVDum_{t-1}	β_{t-1}	-0.0436	-0.36%
	β_{t}		-
FXINTVDum_{t}		-0.0353	19.14%
FXINTVDum_{t+1}	β_{t+1}	-0.0449	27.33%
FXINTVDum_{t+2}	β_{t+2}	-0.0455	1.27%
FXINTVDum_{t+3}	β_{t+3}	-0.0522	14.87%
FXINTVDum_{t+4}	β_{t+4}	-0.0521	-0.19%
	β_{t+5}		-
FXINTVDum_{t+5}		-0.0345	33.87%

Note: * Change in the appreciation rate of daily naira exchange rate. NA: Not applicable.
Source: Author (2023)

Is the estimation sensitive to the nature of data frequency?
Here, the study attempts to know whether the estimation would change significantly upon use of a different data frequency for the high frequency naira rate. The paper appraises the soundness reposed in the previous findings using different frequency of the exchange rate, as demonstrated by some empirical analyses that the nature of data frequency matter (Gbadebo et al., 2022; Narayan & Liu, 2015; Narayan & Sharma, 2015; Salisu & Adeleke, 2016). The previous analysis is replicated for monthly (quarterly) data frequency and the estimates are presented in Table 4 (Table 5).

Interestingly, the results for the monthly frequency supposes similar evidence with the previous. Most of the estimates remains significant and the overall model remains significant as with the daily data estimation. However, because monthly data supposes a relatively longer time than usual day announcement, the overall effect is depreciatory. All the intervention announcement coefficients β_{t+i}, for the various months are positively signed, hence, would cause exchange rate depreciation. The disseminated releases on intervention are significant at 1 to 10% level, identifying the exchange rate to depreciate by 6.57% on the month of

announcement, and by 7.85%, 6.36% and 4.16% on three, two and one month, respectively, after the announcement.

The case for the quarterly data shows dissimilar outcomes. The estimates for the different announcement quarters and the overall model are not significant, although, like with the monthly data, the dummies for intervention, supposes depreciation on the expectation of released WDAS/RDAS auction on the quarter before, current quarter and quarter after announcements. Upon the intervention in the quarter, the exchange rate would depreciate by approximately 3.55%, on the quarter of announcement, and by 2.77% and 1.8% on three, two and one quarter, respectively, after the announcement. This is not surprising because quarterly data conveys medium run information, and for the Nigeria, curtailing exchange rate undulation has often only been attained temporarily, and in particular, within first quarter of policy implementations. The appreciation tendency seems within the immediate periods of the announcement, whereas in short- and long run, the depreciations is more likely. This probably explains the reasons various exchange rate management approaches by the government, in the considered periods, remains unsuccessful in curtailing the depreciation as the continues to wobble.

Table 4:
Estimated event driven model for monthly frequency

Variable	*Parameter*	Estimate	σ	*t-stat*	*p-value*
Intercept	α_0	2.1677*	0.0187	115.67	0.0000
FXINTVDum_{t-3}	β_{t-3}	0.0346**	0.0318	1.0865	0.2782
FXINTVDum_{t-2}	β_{t-2}	0.0479**	0.0330	1.4506	0.1481
FXINTVDum_{t-1}	β_{t-1}	0.0675***	0.0296	2.2763	0.0236
FXINTVDum_{t}	β_{t}	0.0657***	0.0304	2.1641	0.0314
FXINTVDum_{t+1}	β_{t+1}	0.0787*	0.0296	2.6559	0.0084
FXINTVDum_{t+2}	β_{t+2}	0.0636***	0.0329	1.9350	0.0541
FXINTVDum_{t+3}	β_{t+3}	0.0416**	0.0315	1.3203	0.1879
Statistics					
$\bar{R}^2$		0.1336			
F-stat.		5.8167*			
Prob(F-stat.)		0.0000			
DW-stat.		1.0147			

Note: The statistics – σ, t-stat and p-value the standard error, t-statistics and probability of t value, respectively.
*, **, ***, implies significant t 1%, 5%, 10%
Source: Author (2023)

Table 5:
Estimated event driven model for quarterly frequency

Variable	*Parameter*	Estimate	σ	t-stat	p-*value*
Intercept	α_0	2.2237	0.0402	55.332	0.0000
FXINTVDum_{t-3}	β_{t-3}	0.0142	0.0522	0.2718	0.7865
FXINTVDum_{t-2}	β_{t-2}	0.0219	0.0541	0.4056	0.6862
FXINTVDum_{t-1}	β_{t-1}	0.0374	0.0522	0.7168	0.4757
FXINTVDum_{t}	β_{t}	0.0355	0.0526	0.6759	0.5011
FXINTVDum_{t+1}	β_{t+1}	0.0277	0.0526	0.5271	0.5996
FXINTVDum_{t+2}	β_{t+2}	0.0182	0.0537	0.3399	0.7349
FXINTVDum_{t+3}	β_{t+3}	0.0077	0.0515	0.1505	0.8808
Statistics					
$\bar{R}^2$		0.0158			
F-stat.		0.1794			
Prob(F-stat.)		0.9888			
DW-stat.		0.0172			

Note: The statistics – σ, t-stat and p-value the standard error, t-statistics and probability of t value, respectively.
*, **, ***, implies significant t 1%, 5%, 10%
Source: Author (2023)

5. Conclusion

Policymakers, and in particular, the central banks, are often committed to intervention in FX market in order to moderate the magnitude and pace of their domestic currency fluctuations and volatility. Due to the impacts, some central banks make the announcement of planned interventions by means of press released information. Recent evidence reveals how such intervention announcements transmit information contents that moderate exchange rate value (Parra-Polania et al., .2022; Germaschewski, Horvath & Zhong, 2020).

Since 1980 till date, the Nigerian naira has kept wobbling against global currency and more so, its peers in Africa, despite several exchange rate management approaches implemented by the CBN to curb the incessant depreciation (CBN, 2021; Gbadebo et al., 2021; Mordi, 2006). Some studies have been investigated on operations in the FX market, particularly related to determinant of exchange rate (Kalu, *et al.* 2019; Bala-Sani & Hassan, 2018; Oladapo *et al.,* 2017), while other evidence reports how actual FX intervention impact the exchange rate (Ahmed et al., 2020. Dayyabu, Adnan & Sulong, 2016; Akbar, 2016; Omojolaibi & Gbadebo, 2014). However, there is no available study that has considered the influence of the

central bank announcements on the naira exchange rate, therefore, the current paper fills this gap.

This paper pursues two objectives – The first conforms whether the intervention announcement affects the exchange rate level, and the second confirms whether the frequency of the data explore maters for the conclusion. The event driven model, from standard literature, is applied to establish the aims. According to the baseline specification, the paper finds conclusive evidence of that pasts, contemporaneous and future intervention announcements significant cause appreciation shocks. According to the daily data utilized for the main analysis, the naira is expected to appreciate by 3.5% upon announcement, and this further increases to 4.49%, 4.55% and 5.22%, on one day, two day, three days after, but slowdown in subsequent days after the intervention announcements. Robustness test based using alternative data frequency for the estimation yields close (different) results for the monthly (quarterly) periodicity, supposing that frequency matters.

They counter pressure exchange rate by impinging lopsided potentials about expected interventions and the naira future value. Improved digitalized FX and financial system, such as increase financial instruments, may facilitate intermediation that can promote effective mechanism for the intervention announcement to transmit coordinately with other macroeconomic policies to help stabilise the naira and attain targeted value. This is because such would attract more capital inflows and increase the reserve, which is needed to help stabilized the naira or make the currency to appreciate. Since the Nigerian economy and FX market is integrated in the global financial system, the paper recommends the central bank should implement policies to largely hold more foreign exchange in the reserves in order to have sufficient fund to intervene aggressively to prevent excessive depreciation of the naira. The result has implications for future conduct of interventions and conventional monetary policies. The paper's major limitation is that it excludes the influence of actual intervention, via sales and purchases of dollar, by the central bank.

References

Adebiyi, M. A. (2007). An evaluation of foreign exchange intervention and monetary aggregates in Nigeria (1986-2003). *Munich Personal RePEc Archive Paper*, No 3817. https://mpra.ub.uni-muenchen.de/3817/1/mpra_paper_3817.pdf

Adler, G. & Mano, R. C. (2021). The cost of foreign exchange intervention: Concepts and measurement. *Journal of Macroeconomics*, 67, 103045, https://doi.org/10.1016/j.jmacro.2018.07.001

Adler, G., Chang, K. S., Mano, R. C., & Shao, Y. (2021). Foreign Exchange Intervention: A Dataset of Public Data and Proxies. IMF Working Paper WP/21/47.

Adler, G., Lisack, N. & Rui, C. M. (2019). Unveiling the effects of foreign exchange intervention: A panel approach. *Emerging Markets Review, 40*, 100620. https://doi.org/10.1016/j.ememar.2019.100620

Ahmed, A. U., Ismail, S., Dayyabu, S., Adnan, A. A., Farouq, I. S., & Jakada, A. H. (2020). Non-linear causal link between central bank intervention and exchange rate volatility in Nigeria. *Global Journal of Management and Business Research.*

Akbar, J. I. (2016). Efficiency of foreign exchange markets: The case of Nigeria. *International Journal of Global Economics.* 4(4). https://doi.org/10.4172/2375-4389.1000220

Akdogan, I. U. (2020). Understanding the dynamics of foreign reserve management: The central bank intervention policy and the exchange rate fundamentals. *International Economics,* 161, 41-55. https://doi.org/10.1016/j.inteco.2019.11.002

Almudhaf, F. (2014). Testing for random walk behaviour in CIVETS exchange rates. *Applied Economics Letter,* 21 (1), 60–63. https://doi.org/10.1080/13504851.2013.839856

Anjaly, B. (2022). A study of the effectiveness of central bank intervention in BRICS countries. *Research Square.* https://doi.org/10.21203/rs.3.rs-2111880/v1

Aruwa, S. A., & Ahmed, M. (2016). Effectiveness of official daily foreign exchange market intervention operation in Nigeria.

Bala-Sani, A. R., & Hassan, A. (2018). Exchange rate and stock market interactions: Evidence from Nigeria. *Arabian Journal of Bossiness Management Review,* 8(1), 334.

Ben-Omrane, W., Savaser, T., Welch, R., & Zhou, X. (2019). Time-varying effects of macroeconomic news on euro-dollar returns. *The North American*

Journal of Economics and Finance, 50 (C), 130–143. https://doi.org/10.1016/j.najef.2019.101001.

Blanchard, O., Alder, G. & Filho, I. C. (2015). Can foreign exchange intervention stem exchange rate pressures from global capital flow shocks. *IMF Working Papers,* 15(159). https://doi.org/10.3386/w21427

Branson, W.H. (1983). Macroeconomic determinants of real exchange risk. In: Herring, R.J. (Ed.), Managing Foreign Exchange Risk. Cambridge University Press, Cambridge. https://ssrn.com/abstract=351348

Business Day, (2022). The Nigerian consumers and naira depreciation. Business Day Press release https://businessday.ng/editorial/article/the-nigerian-consumers-and-naira-depreciation/

CBN (2021). Understanding monetary policy series No 8: Exchange rate management in Nigeria. https://www.cbn.gov.ng/out/2022/mpd/series%208.pdf.

CBN (2022). Statistical Bulletin, 2022.

Cheung, Y., Fatum, R., & Yamamoto, Y. (2019). The exchange rate effects of macro news after the global financial crisis. *Journal of International Money and Finance,* 95(C), 424–443. https://doi.org/10.1016/j.jimonfin.2018.03.009

Dayyabu, S., Adnan, A. A., & Sulong, Z. (2016). effectiveness of foreign exchange market intervention in Nigeria (1970-2013*). International Journal of Economics and Financial Issues,* 6(1), 279-287. https://ideas.repec.org/a/eco/journ1/2016-01-36.html

Diniz-Maganini, N., Rasheed, A. & Sheng, H. H. (2023). Price efficiency of the foreign exchange rates of BRICS countries: A comparative analysis. *Latin American Journal of Central Banking,* 4(1), 2666-1438. https://doi.org/10.1016/j.latcb.2022.100081.

Disyatat, P. & Galati, O. (2005). The effectiveness of foreign exchange interventions in emerging countries: evidence from the Czech koruna. *Bank for International Settlement (BIS) Working Paper*, No 172. https://www.bis.org/publ/bppdf/bispap24g.pdf

Dominguez, K. (1999). the market microstructure of central bank intervention. *NBER Working Paper, 7337.*

Ekincia, C., Akyildirim, E., & Corbet, S. (2019). Analysing the dynamic influence of US macroeconomic news releases on Turkish stock markets. *Finance Research Letters,* 31, 155–164. https://doi.org/10.1016/j.frl.2019.04.021.

Fatum, R. & Hutchison, M. M. (2005). Foreign exchange intervention and monetary policy in Japan, 2003-04. *International Economics and Economic Policy* 2, 241-260. http://dx.doi.org/10.2139/ssrn.642862

Fratzscher, M. (2008). Oral interventions versus actual interventions in FX Markets – An event-study approach. *The Economic Journal.* 118(530), 079-1106. https://doi.org/10.1111/j.1468-0297.2008.02161.x

Frömmel, M. & Midiliç, M. (2021). Daily currency interventions in an emerging market: Incorporating reserve accumulation to the reaction function, *Economic Modelling*, 97, 461-476, https://doi.org/10.1016/j.econmod.2020.09.020

Gagnon, J. E. (2012). Combating widespread currency manipulation. *Policy Briefs* PB12-19, Peterson Institute for International Economics.

Gbadebo, A. D., Adekunle, A. O., Akande, O. J. & Olanipekun, D. W. (2021). The MPC meetings, macroeconomic announcements and exchange rate behaviour in Nigeria. *Cogent Economics & Finance,* 9*:*1, http://dx.doi.org/10.1080/23322039.2021.1952720

Gbadebo, A. D., Akande, J. O. & Adekunle, A. O. (2022). Price Prediction for Bitcoin: Does Periodicity Matter? International Journal of Business and Economic Sciences Applied Research, 15(3). http://dx.doi.org/10.25103/ijbesar.153.06

Germaschewski, Y., Horvath, J. & Zhong, J. (2020). Oral interventions in the exchange rate market: Evidence from Australia. https://ssrn.com/abstract=3356115

Hoshikawa, T. (2017). Exchange rate rebounds after foreign exchange market interventions, Physica A: Statistical Mechanics and its Applications, 469, 102-110, https://doi.org/10.1016/j.physa.2016.11.044

Hung, J. (1997). intervention strategies and exchange rate volatility: A noise trading perspective. *Journal of International Money and Finance*, 6, 779–93.

Hussain, S. M. & Ben-Omrane, W. (2020). The effect of US macroeconomic news announcements on the Canadian stock market: Evidence using high-frequency data. *Finance Research Letters*. 38, 101450. https://doi.org/10.1016/j.frl.2020.101450.

Kalu, E. M., Ugwu, O. E., Ndubuaku, V. C., & Ifeanyi, C. P. (2019). Exchange rate and foreign reserves interface: Empirical evidence from Nigeria. *The Economics and Finance Letters,* 6, 1–8. https://doi.org/10.18488/journal.29.2019.61.1.8.

Khuntia, S., Pattanayak, J.K., & Hiremath, G.S. (2018). Is the foreign exchange market efficiency adaptive? The empirical evidence from India. *Journal of*

Asia-Pacific Business, 19 (4), 261–285. https://doi.org/10.1080/10599231.2018.1525249

Kumar, S. (2015). Turn-of-month effect in the Indian currency market. *Int. J. Managerial Finance,* 11 (2), 232–243. https://doi.org/110.1108/IJMF-05-2014-0068

Lahmiri, S., Bekiros, S. & Salvi, A. (2018). Long-range memory, distributional variation and randomness of bitcoin volatility. *Chaos, Solitons and Fractals,* 107, 43–48. https://doi.org/10.1016/j.chaos.2017.12.018.

Lucca, D, & Moench, E. (2015). The Pre-FOMC announcement drift. 70(1), 329-371. https://doi.org/10.1111/jofi.12196

Mordi, N. O. (2006). Challenges of exchange rate volatility in economic management in Nigeria. in the dynamics of exchange rate in Nigeria. *CBN Bullion*, 30(3), 17-25.

MuNigeria, M. (1981). The role of official intervention. VA: George Mason University Press.

Narayan, P. K., & Liu, R. (2015). A unit root model for trending time-series energy variables. Energy Economics, 50, 391–402.

Narayan, P. K., & Sharma, S. S. (2015). Does data frequency matter for the impact of forward premium on spot exchange rate? International Review of Financial Analysis, 39, 45–53.

Ning, Y., Wang, Y. & Su, C.W. (2017). How did China foreign exchange reform affect the efficiency of foreign exchange market? Physica A 483, 219–226. https://doi.org/10.1016/j.physa.2017.04.150

Obadan, M. I. (2006). Overview of exchange rate management in Nigeria. *CBN Bullion, 30*(3), 1-9. https://dc.cbn.gov.ng/cgi/viewcontent.cgi?article=1123&context=bullion

Oladapo, F., Adeyeye, P. O., Seyingbo, O. A., & Owoeye, S. (2017). Exchange rate volatility and stock market performance in Nigeria, *Nigerian Journal of Management Sciences,* 6(1), 3.

Omojolaibi, J. A. & Gbadebo, A. D. (2014). Foreign exchange intervention and monetary aggregates: Nigerian evidence. *International Journal of Economics, Commerce and Management UK,* II(10). https://ijecm.co.uk/wp-content/uploads/2014/10/21017.pdf

Parra-Polania, J. A., Sánchez-Jabba, A. & Sarmiento, M. (2022). Oral FX interventions in emerging markets: The Colombian case. *Borradores de Economia 1194*. https://doi.org/10.32468/be.1194

Ponomarenko, A. (2019). Do sterilized foreign exchange interventions create money? *Journal of Asian Economics,* 62, 1-16. https://doi.org/10.1016/j.asieco.2019.03.001.

Pyo, S., & Lee, J. (2020). Do FOMC and macroeconomic announcements affect Bitcoin prices? *Finance Research Letters*. 37, 101386 https://doi.org/10.1016/j.frl.2019.101386.

Salisu, A. A. & Vo., X. V. (2021). The behavior of exchange rate and stock returns in high and low interest rate environments. *International Review of Economics & Finance,* 74, 138-149, https://doi.org/10.1016/j.iref.2021.02.008.

Salisu, A. A., & Adeleke, A. I. (2016). Further application of Narayan and Liu (2015) unit root model for trending time series. *Economic Modelling,* 55, 305–314.

Tapia, M. & Tokman, A. (2004). Effects of foreign exchange intervention under public information: the Chilean case. *Economia*, LACEA, 4 (Spring),1-42. https://doi.org/110.1353/eco.2004.0020

Ukeje, E. U. (2017). Exchange rate management in period of economic uncertainty. CBN *Bullion*, 41(1), https://dc.cbn.gov.ng/bullion/vol41/iss1/1