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Article

The MPC meetings, macroeconomic announcements and exchange rate behaviour in Nigeria

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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

The MPC meetings, macroeconomic announcements and exchange rate behaviour in Nigeria

A. Daniel Gbadebo¹, A. Oluwatobi Adekunle², O. Joseph Akande³* and D. Wahid Olanipekun⁴

Abstract: Literature recognise that announcement impinge shocks which could shift the mean behaviour of the exchange rate. This study apply event driven models to analyse how the expectation of daily log-exchange rate and its daily log-return respond to all the 88 MPC meetings and selected CBN's announcements that "contained information on exchange rate stabilisation" from 2 January 2005 to 25 September 2020. We establish that the log-exchange rate responds to the announcements, with and without the MPC meetings. The exchange rate is expected to depreciate in all the three days before, on the announcement day, and all the three days after the announcement. There is no sufficient evidence that either the MPC meeting or CBN announcement affects the behaviour of the log-return. Hence, unlike the MPC meetings, the announcements affects the exchange

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Gbadebo has taught Econometrics, Computational Economics, Economic Theory and International Finance. He is an economist and a finance expert. His recent focus is on Macroeconomic, Monetary and Financial Forecasting, Blockchain, Neural Networks and Machine Learning.

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PUBLIC INTEREST STATEMENT

The exchange rate has daring consequences for the wellbeing of any economy. So, very often monetary authorities and researchers are concerned about its behaviour. Many authors confirm that macroeconomic news can impinge shocks that could shift the mean behaviour of the exchange rate. The Central Bank of Nigeria (CBN) regularly conduct MPC meetings, as well as make "macroeconomic" announcements in a bid to ensure the exchange rate does not swing significantly from fundamentals required to achieve monetary policy objectives. We use event driven models to explain how the daily log-exchange rate responds to both MPC meetings and announcements between 2 January 2005 and 25 September 2020. We found strong evidence that exchange rate responds to news shocks with and without any meetings. The exchange rate is expected to depreciate in all the three days before, on the announcement day, and all the three days after the announcement.

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rate but not its return. We expect market participants to consider these findings in making forex decisions, and the central banks in the formulation of monetary policy.

Subjects: Economics; Finance; Business, Management and Accounting

Keywords: Monetary policy committee; macroeconomic announcement; exchange rate; exchange rate return; event driven model JEL Classifications: E58; F31; G14

1. Introduction

The exchange rate has daring consequences for the wellbeing of any economy. Literature identify macroeconomic factors that could cause sporadic swings in the exchange rate. Similar to stocks, bonds and other financial assets, the exchange rate responds significantly to announcements from monetary authorities. Such announcements in forms of scheduled monetary policy committee (MPC) meeting announcements or periodic macroeconomic surprises from the central banks contain information that may cause a drift on the mean behaviour of the exchange rate. The release are major source of information for foreign exchange (forex) market participants (Ekincia et al., 2019). Macroeconomic news affect transactions in the forex market, and cause fluctuations in the exchange rate, hence regulators and researchers are concerned about the announcement effects of exchange rate behaviour. This paper investigates the impact of both MPC meetings and macroeconomic announcements on the behaviour of exchange rate in Nigeria.

Many studies confirm the impact of federal open market committee (FOMC) meetings and macroeconomic announcements on asset prices in the financial market (Hussain & Ben Omrane, 2020; Indriawana et al., 2021; Lyócsa et al., 2019), the cryptocurrency market (Pyo & Lee, 2020) and the forex market (Boudt et al., 2019; Corbeta et al., 2019). Pyo and Lee (2020) shows that in absence of FOMC announcements, Bitcoin price increase on the day before the announcement but decreased on announcement day. Lyócsa et al. (2019) find that during quantitative easing announcements, stock realized volatility increases but decline five days after announcement in all countries investigated. Corbeta et al. (2019) find significant increases in stock volatility prior to FOMC announcements. The increase in volatility is substantial when the market is forewarned of an announcement and surprise news cause longer short-term volatility. Indriawana et al. (2021) confirm a post-FOMC announcement drift on long-term US and German bond futures. The post-FOMC increase investment in bonds to four times the ratio of buy-and-hold assets after expansionary shocks.

Studies by Li et al. (2015), Ben Omrane and Savaser (2016) and W. Ben Omrane et al. (2019) analyse the "stable" effects of central bank announcements on the exchange rate. The "unstable" announcement effects was considered for exchange rate returns (W. Ben Omrane et al., 2019; Cheung et al., 2019) and exchange rate volatility (Ben Omrane & Savaser, 2017). W. Ben Omrane et al. (2019) assess whether the impact of announcements is stable over-time, by considering the reaction of euro-dollar rate returns to both US and European news throughout the global financial crisis and the Euro zone debt crisis. They find that announcement impact coefficients vary substantially over-time. Some authors (Boudt et al., 2019; Ekincia et al., 2019; Tamgac, 2021) argue that the exchange rate's respond to news surprises depends on whether the news is positive or negative. Tamgac (2021) shows that announcements associated to the domestic country have a more effect on the USD \Turkish lira exchange rate in relation to surprises associated with the US. There is an asymmetry response, with bad news on US having greater impact than good news, and good news for domestic country having more effects than bad. As noted by Boudt et al. (2019), news creates a large shift in the joint distribution of stock and exchange rate returns. A positive surprise raise the value of the low exposure domestic activities causing decline in foreign exchange exposure.

The implication of the MPC meetings and central bank announcements for the behaviour of exchange rate remains an incessant debates, particularly, for emerging economies where the

Table 3. Data de	terministic statist	ics						
	Mean	Median	Max.	min.	R_{σ}	Skewness	Kurtosis	p(JB)
EXRT	182.461	150.825	379.500	74.520	74.148	1.145	2.721	0.0000
LEXRT	2.231	2.178	2.579	1.872	0.154	0.912	2.323	0.0000
LRETN	0.0000043	0.000000	0.411	-0.022	0.009	38.808	1658.95	0.0000
$\rho(JB)$ is the probabilit	ty of Jarque-Bera (JB) u	ised for the normality	test for each series. R_c	$_{\sigma}$ is standard deviation.			-	

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exchange rate affects macroeconomic stability. In Nigeria, despite regular MPC meetings and periodic announcements made by the Central Bank of Nigeria (CBN), the economy is still puzzled with the wave of foreign exchange scarcity and excessive exchange rate fluctuation, which has caused a large gap between the official rate and the parallel market rate, with which many businesses depend. Table 1 shows several exchange rate policies in Nigeria. This motivate the need to confirm whether such regular and periodic news intervention is effective to curb the behaviours the volatile exchange rate and its returns. While there is no know precursory study which address this issue for Nigeria at the moment, we hope our paper will sufficiently serves one and provide guide on the direction of policies in the foreign exchange market. The rest of the paper is organized as follows. Section 2 presents related literature, Section 3 discusses the data and methodology. Section 4 presents the empirical results and Section 5 is the conclusions.

2. Related literature

The effect of macroeconomic news on asset price has been well considered. Theoretical models on how exchange rate react to macroeconomic news is based on the idea that if the foreign exchange markets are efficient, expected information ("news") shock would spiral in the market exchange rates. The unanticipated exchange rate changes can only be caused by the influx of unanticipated relevant news. Since 1980s empirical literature has adopted different approaches to testing the impact of macroeconomic announcements caprices on exchange rate dynamics. Neely and Dey (2010) provided a compendium of survey on early studies of non-US monetary policy, budget deficits, trade balance and employment effects announcement on exchange rate, as well as, "joint modelling of mean returns and volatility" and "order flows and announcement news".

W. Ben Omrane et al. (2019) assess the reaction of euro-dollar rate returns to wide range US and European announcements from 1 November 2004 to 31 March 2014, using intraday data. They established that announcements' impact is stable over time, and use time varying estimate to examine whether exchange rate return response to macroeconomic news. The study find that the impact coefficients of macroeconomic news vary significantly over time. Maserumule and Alagidede (2017) explore the intraday reaction of South African (SA) rand-dollar returns to the US macroeconomic news with 10-minute bid-ask quotes from 2 January 2014 to 31 December 2015. They found that exchange volatility rises after the release of news information, whether surprised the market or not. They also establish that both SA and US news affect the rand-dollar volatility, although negative news impinge greater impact on the volatility relative to positive news.

Cheung et al. (2019) examine the time- and state-dependent nature of US and Japanese macro news on the yen-dollar rate before, during, and after the financial crisis, using a 5-minute quotes spanning the 1 January 1999 to 31 August 2016. They find that while the US news impact the exchange rate after the crisis than before the crisis, the after-crisis influence of Japanese news is irrelevance. Mueller et al. (2017) investigate the effect of FOMC news on the five-minute highfrequency spot exchange rate data for "G10" currencies¹ spanning from 1 January 1994, to 31 December 2013. They established the exchange rate dynamics are linked to fundamentals. The trading strategy "short the USD" and "long other currencies" is significantly affected by the FMOC scheduled announcements. The result confirm that exchange rate returns are higher for currencies with higher interest rate differentials vis-a-vis the USD.

Evans and Speight (2010) applied standard regression techniques to examine the foreign exchange market reaction of short-run euro-dollar, euro-sterling and euro-yen exchange rates returns volatility to macroeconomic announcements using 5-min returns windows, from January 2002 to July 2003. The study simultaneously controls for the distinct calendar effects, intraday volatility pattern and a latent volatility factor. They establish that news emanating from the US observed to cause statistically significant influences on volatility. Also, they found significant response of large responses for the Euro-Sterling and Euro-Yen rates volatility to UK Industrial Production and Japanese GDP news shocks. Hashimoto and Ito (2009) employed standard OLS to estimate how Japanese macroeconomic news within minutes impact on the dollar-yen exchange

rate between 1 January 2001 and 31 December 2005. They found that macroeconomic news, in addition to the magnitude of surprise increase foreign exchange deals and price volatility in the immediately after the announcement. The study show that for most of news components whose surprise items have return impacts on deals and volatility sequel to the announcement. In sum, while some news items do not have return impacts, others significantly affect deals and volatility.

Faust et al. (2007) applied random coefficient regression to access the joint movements of exchange rates and US and foreign term structures around 10 macroeconomic announcements, plus the FOMC 5-minute, 20 minutes exchange rate returns for dollar exchange rates versus the DM/ euro and DM/pound, covering the high-frequency data from 1987 to 2002. They discovered that a stronger than expected macro announcements appreciates the dollar. Laakkonen (2007) use a 5-minute frequency data spanning 28 October 2003 to 20 January 2004 to investigate the response of USD/EUR exchange rate volatility on US and European news by using the Flexible Fourier Form method. The study divides news into two categories: one convey news on conflicting information on the state of the economy, while the other contain the news that were consistent. The conflicting announcements were found to increase volatility more than the consistent news. The study reveal that although news significantly increased volatility, the US announcement was the most important.

Using twice-daily data, Cagliesi and Tivegna (2005) examined how scheduled and unscheduled US and euro-area news, market events and terror-related events impacts on the on euro-dollar exchange rates from 1999 to 2004. They observed that the scheduled announcements dominates the US trading more, while the unscheduled news affect the European trading more. Andersen et al. (2002) applied weighted least square (WLS) and heteroscedasticity and autocorrelation consistent (HAC) estimation to access the response of 5-min real-time high-frequency exchange rate quotations to 15 USA macroeconomic announcements and macroeconomic expectations on the conditional means of US dollar spot exchange rates versus pound-dollar, mark-dollar, euro-dollar, franc-dollar and yen-dollar. The study finds that news surprises produce conditional mean jumps for the exchange rates. The result shows sign effect, which refers to the fact that exchange rates reacts to announcement in an asymmetric fashion.

3. The data and methodology

3.1. The data

We follow previous studies (Cheung et al., 2019; Pyo & Lee, 2020) and apply daily high-frequency data. We employ daily Naira price of US Dollar exchange rate (USD/NGN), as well as dummies for reported dates of MPC meetings and CBN announcements from 2 January 2005 to 25 September 2020. The USD/NGN data was downloaded from the CBN webpage. Although Pyo and Lee (2020) select announcement data related to the employment rates and price index, but due to peculiar nature of Nigeria which exchange rate is sensitive to forex reserves (Kalu et al., 2019; Nwachukwu et al., 2016); financial assets (Bala-Sani and Hassan, 2018; Oladapo et al., 2017) and official interventions (Dayyabu et al., 2016; Omojolaibi & Gbadebo, 2014), we employ announcement dates targeted at the behaviour of the exchange rate.

3.2. The exchange rates (LEXRT and LRETN)

Exchange rate (EXRT) series was found to exhibits nonlinear pattern with jumps. As suggested by Lahmiri, Bekiros and Salvi (2018), such chaotic series can be transformed to obtain suitable estimates. We apply natural-log in accordance with studied by Pyo and Lee (2020). Our study uses two measures for exchange rate – daily logarithm of exchange rates (logexchange rate: LEXRT) and logarithm of daily exchange rate returns (log-return: LRETN). We take the simple average of the daily bid-ask price quotes, and obtain the middle price quote (Bauwens & Giot, 2000). We eliminate all data on weekends and national holidays since the quoted prices may have some bias based on low transaction volumes. We filter the data for possible outliers cause by compilation errors and adjust the data for 01\02\2005 with extreme values. We obtained a total of 3935 observations. We calculate daily log-returns as the log of the ratio of the exchange rate of consecutive daily mid-prices multiplied by 100. Table 1 presents summary statistics on the exchange rate, log-exchange rates and log-return.

3.3. The MPC meeting (MPCM)

This research covers periods in which 88 MPC meetings were held and published.² Usually, the MPC meeting takes place for two consecutive days once in every two months (specifically, in January, March, May, July, September and November). Since both days detail outcomes of same policy stance, we use one date for the periodic meeting in order to avoid double counting and compounding effects. Two communiques are often published at the end of every meeting—one is a summary document of MP decisions without personal statement, and the other is a detail document on MP with personal statement from some key MPC members. In the case where meeting dates differ from publication date, we adopt the date for the MPC meeting in order to avoid duplication. We assigned a dummy D_t^{MPCM} which takes 1 on announcement day for MPCM, 0 otherwise.

3.4. The CBN announcements (STAB, INTR and boft)

The CBN announcements were released either periodic or on regularly basis. Available information shows that the CBN disseminates over 2000 circulars (news) published on its website³ between 4 September 2006 and 25 September 2020. We scrutinise these documents and obtain a total of 913 circulars that are directed towards exchange rate stabilisation. We group the circulars into three categories – first is circulars that involve direct intervention via the WDAS\RDAS⁴\Special intervention for Bureaux de Change, BDCs (STAB); second is circulars on long-term interest rate and inflation rate (INTR); and third is circulars that involve announcements on balance of trade (BofT). The RDAS intervention was eliminated on 18 February 2015 but from 3 March 2015, the CBN continue to make special intervention through sales of forex to the BDCs. We include announcements on forex sales to BDCs from 19 February 2019 to 25 September 2020 to consolidate the RDAS' suspension. A total of 735 circulars on WDAS\RDAS\BDCs was included as STAB dummy for the estimation.

To investigate the effect of these CBN announcements on the dynamics of exchange rates, we attach a dummy D_t^{STAB} which takes 1 on announcement day for STAB circulars, and 0 otherwise. We observe that the CBN periodically auction treasury bills to mop-up excess money in circulation, which may as well lead to exchange rate appreciation. We assigned a dummy D_t^{INFR} which takes 1 on announcement day for Treasury Bill Auction, 0 otherwise. We identify approximately 43 announcements for this. Lastly, we categorise all CBN announcements on Pilgrims (Tourism), Trade (Import and Exports) and Remittances which affect the reserves and the exchange rate as Balance of Trade issues as BofT. We incorporate 135 of these announcement dates for this study. We attach a dummy, D_t^{BofT} which takes 1 on announcement day, 0 otherwise. Table 2 (Appendix) presents selected CBN circulars with Titles (hyperlinked), published dates and categorisation as MPCM, STAB, INTR or BofT.

3.5. The methodology

Before the model was estimated the actual, Seasonal Trend decomposition using Loess (STL) trend and polynomial plots for exchange rate, log-exchange rate, and the actual plot for log-returns were presented. We decompose the actual exchange rate (EXRT) into trend, seasonal and residuals to peruse a rule of thumb for the existence or otherwise of possible GARCH effects in the residuals. In order to assess the influence of MPC meetings and CBN announcements on the dynamics exchange rate, we model contemporaneous and past of announcements days on the logexchange rates (Equations 2.1 and 2.4) and log-returns (Equations 2.2 and 2.3).

In accordance with some studies (W. Ben Omrane et al., 2019; Pyo & Lee, 2020), we set up event driven models to analyse how news surprises on three days before the announcement day (t-3, t-2 and t-1), on the announcement D-day (t) and on three days after the announcement day (t+ 1, t+ 2 and t + 3) explain the dynamics of exchange rate and its returns.

LEXRT without MF	'CM announcement					LRETN Equatic	in without MPCM ar	nnouncement	
Parameters	Estimates	σ_{lpha}	t_{lpha}	$p(t_{lpha})$	Parameters	Estimates	$\sigma_{ heta}$	$t_{m{ heta}}$	$p(t_{m heta})$
$\boldsymbol{\alpha}^*_0$	2.338730	0.002919	801.3437	0.0000	${oldsymbol{\mathscr{G}}}^*$	0.0000047	0.000027	1.7765	0.0757
α_{t-3}^{STAB}	-0.039958	0.006925	-5.7700	0.0000	θ_{t-3}^{STAB}	-0.000047	0.000065	-0.7153	0.4745
$lpha_{t-2}^{STAB}$	-0.058610	0.007173	-8.1705	0.0000	θ_{t-2}^{STAB}	-0.000004	0.000067	-0.0663	0.9472
$lpha_{t-1}^{STAB}$	-0.076471	0.006187	-12.3608	0.0000	$\boldsymbol{\theta}_{t-1}^{STAB}$	0.000058	0.000058	1.0066	0.3142
α_t^{STAB}	-0.070962	0.006334	-11.2030	0.0000	$\boldsymbol{\theta}_t^{STAB}$	0.000043	0.000059	0.7297	0.4656
α_{t+1}^{STAB}	-0.075928	0.006188	-12.2694	0.0000	θ_{t+1}^{STAB}	-0.000065	0.000058	-1.1136	0.2655
α_{t+2}^{STAB}	-0.060175	0.007163	-8.4007	0.0000	θ_{t+2}^{STAB}	-0.000056	0.000067	-0.8255	0.4091
α_{t+3}^{STAB}	-0.042354	0.006924	-6.1173	0.0000	θ_{t+3}^{STAB}	-0.000054	0.000065	-0.8270	0.4083
$lpha_{t-3}^{NTR}$	0.048299	0.019074	2.5322	0.0114	$oldsymbol{ heta}_{t-3}^{ ext{INTR}}$	-0.000040	0.000179	-0.2216	0.8247
$lpha_{t-2}^{iNTR}$	0.049676	0.019067	2.6054	0.0092	θ_{t-2}^{INTR}	-0.000031	0.000179	-0.1740	0.8618
$lpha_{t-1}^{iNTR}$	0.044851	0.019064	2.3527	0.0187	$oldsymbol{ heta}_{t-1}^{ ext{iNTR}}$	-0.000055	0.000179	-0.3073	0.7586
α_t^{INTR}	0.046304	0.019063	2.4290	0.0152	$\boldsymbol{\theta}_t^{\text{INTR}}$	-0.000003	0.000179	-0.0150	0.9880
$lpha_{t+1}^{NTR}$	0.047282	0.019075	2.4788	0.0132	$oldsymbol{ heta}_{t+1}^{INTR}$	0.000018	0.000179	0.0996	0.9206
$lpha_{t+2}^{NTR}$	0.053014	0.019076	2.7791	0.0055	$oldsymbol{ heta}_{t+2}^{INTR}$	-0.000063	0.000179	-0.3540	0.7234
$lpha_{t+3}^{NTR}$	0.051819	0.019077	2.7163	0.0066	$oldsymbol{ heta}_{t+3}^{ ext{iNTR}}$	-0.000050	0.000179	-0.2784	0.7807
α_{t-3}^{BofT}	-0.038366	0.010618	-3.6133	0.0003	$oldsymbol{ heta}_{t-3}^{BofT}$	-0.000082	0.000100	-0.8215	0.4114
\pmb{lpha}_{t-2}^{BofT}	-0.037400	0.010588	-3.5324	0.0004	$oldsymbol{ heta}_{t-2}^{BofT}$	0.000395	660000.0	3.9806	0.0001
$\boldsymbol{lpha}_{t-1}^{BofT}$	-0.037773	0.010592	-3.5662	0.0004	$oldsymbol{ heta}_{t-1}^{BofT}$	0.000414	660000.0	4.1621	0.0000
$\boldsymbol{\alpha}_t^{BofT}$	-0.038231	0.010581	-3.6132	0.0003	$oldsymbol{ heta}_{ extsf{t}}^{ extsf{BofT}}$	0.000175	660000.0	1.7594	0.0786
$lpha^{BofT}_{t+1}$	-0.039570	0.010585	-3.7382	0.0002	$oldsymbol{ heta}_{t+1}^{BofT}$	-0.000048	660000.0	-0.4864	0.6267
$lpha_{t+2}^{BofT}$	-0.039391	0.010578	-3.7238	0.0002	$oldsymbol{ heta}_{t+2}^{BofT}$	-0.000039	660000.0	-0.3959	0.6922
									(Continued)

Table4. (Contin	ned)								
$lpha_{t+3}^{BofT}$	-0.036080	0.010606	-3.4019	0.0007	$m{ heta}_{t+3}^{Boff}$	-0.000053	0.000100	-0.5361	0.5919
ш ₀	0.0001	0.0000031	33.4517	0.0000	ω ₀	0.000005	0.0000002	25.0000	0.0000
ω1	1.1060	0.0409	27.0226	0.0000	١m	8.4986	0.1886	45.0548	0.0000
а	0.1648	0.0103	15.9772	0.0000	α	0.2335	0.0034	69.3200	0.0000
\bar{R}^2		0.3295			\bar{R}^2		0.0105		
F-statistic		94.5782			F-statistic		1.0166		
Prob(F-stat)		0.0000			Prob(F-stat)		0.0913		
The statistics— σ_{α} ,	t_{lpha} and $p(t_{lpha})$ are the	standard error, the t	-value and probabil	lity of t value for α ,	respectively. The san	ne apply for each $ heta$	parameter estimate:	°.	

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and $\rho(t_{lpha})$ are the standard error, the t-value and prol
t_lpha and $p(t_lpha)$ are the standard error, the t-value and prob
, t_lpha and $ ho(t_lpha)$ are the standard error, the t-value and prol
$\mathbf{r}_{lpha},\ t_{lpha}$ and $p(t_{lpha})$ are the standard error, the t-value and prob
$-\sigma_{lpha}, t_{lpha}$ and $p(t_{lpha})$ are the standard error, the t-value and prol
$-\sigma_lpha, t_lpha$ and $p(t_lpha)$ are the standard error, the t -value and prol
cs— σ_{lpha}, t_{lpha} and $p(t_{lpha})$ are the standard error, the t-value and prol
tics— σ_{lpha},t_{lpha} and $ ho(t_{lpha})$ are the standard error, the t-value and prol
istics— σ_{lpha}, t_{lpha} and $p(t_{lpha})$ are the standard error, the t-value and prol
atistics— σ_lpha, t_lpha and $p(t_lpha)$ are the standard error, the t-value and prol
statistics— σ_{lpha},t_{lpha} and $p(t_{lpha})$ are the standard error, the t-value and prol

The first set of models analyse the "stable" effects of announcements on the log-exchange rate (2.1) similar to Li et al. (2015) and the "unstable" effects for exchange rate log-return (2.2) in line with W. Ben Omrane et al. (2019) and Pyo and Lee (2020).

$$\mathsf{LEXRT}_{t} = \alpha_{0}^{*} + \sum_{i=1}^{3} i = -3\alpha_{t+i}^{\mathsf{STAB}}\mathsf{D}_{t+i}^{\mathsf{STAB}} + \sum_{3}^{i=-3} \alpha_{t+i}^{\mathsf{INTR}}\mathsf{D}_{t+i}^{\mathsf{INTR}} + \sum_{3}^{i=-3} \alpha_{t+i}^{\mathsf{BofT}}\mathsf{D}_{t+i}^{\mathsf{BofT}} + \varepsilon_{t}$$
(2.1)

$$\mathsf{LRETN}_{t} = \beta_{0}^{*} + \sum_{i=-3}^{3} \beta_{t+i}^{\mathsf{STAB}} D_{t+i}^{\mathsf{STAB}} + \sum_{i=-3}^{3} \beta_{t+i}^{\mathsf{INTR}} D_{t+i}^{\mathsf{INTR}} + \sum_{i=-3}^{3} \beta_{t+i}^{\mathsf{BofT}} D_{t+i}^{\mathsf{BofT}} + \varepsilon_{t}$$
(2.2)

The second sets of models, (2.3) and (2.4), provide the stable and unstable effects of the exchange rate' responds to the combined effect of both MPC meeting and macroeconomic announcements on log-return (Pyo & Lee, 2020) and on log-exchange rate (Chatrath et al., 2014).

$$\begin{aligned} \mathsf{LRETN}_{t} &= \beta_{0}^{**} + \sum_{i=-3}^{3} \beta_{t+i}^{\mathsf{MPCM}} \mathsf{D}_{t+i}^{\mathsf{MPCM}} + \sum_{i=-3}^{3} \beta_{t+i}^{\mathsf{STAB}} \mathsf{D}_{t+i}^{\mathsf{STAB}} + \sum_{i=-3}^{3} \beta_{t+i}^{\mathsf{INTR}} \mathsf{D}_{t+i}^{\mathsf{INTR}} + \sum_{i=-3}^{3} \beta_{t+i}^{\mathsf{Boff}} \mathsf{D}_{t+i}^{\mathsf{Boff}} \\ &+ \varepsilon_{t}(2.3) \end{aligned}$$
(2.3)

$$\mathsf{LEXRT}_{t} = \alpha_{0}^{**} + \sum_{i=-3}^{3} \alpha_{t+i}^{\mathsf{MPCM}} D_{t+i}^{\mathsf{MPCM}} + \sum_{i=-3}^{3} \alpha_{t+i}^{\mathsf{STAB}} D_{t+i}^{\mathsf{STAB}} + \sum_{i=-3}^{3} \alpha_{t+i}^{\mathsf{INTR}} D_{t+i}^{\mathsf{INTR}} + \sum_{i=-3}^{3} \alpha_{t+i}^{\mathsf{BofT}} D_{t+i}^{\mathsf{BofT}} + \varepsilon_{t}$$
(2.4)

The models (2.3) and (2.4) indicate not only the effect MPC meetings, but also the effect of the three CBN macroeconomic announcement on the log-exchange rate and log returns. The explanatory variable, $D_t^{\chi} - allX\{MPCM, STAB, INTR, BofT\}$ —is a dummy that indicates 1 for announcement (contemporaneous) day and 0 otherwise, for each variable X.⁵ The independent variables $D_{t+i}^{\chi,i}\{-3, -2, -1, 1, 2, 3\}$ are dummies lagged by *i* (past and future) days from announcement day. Following Pyo and Lee (2020), we hypothesise and statistically verify that the variance of error terms, ε_t , follows GARCH(1,1). The *t*-test for the variance of the GARCH(1,1) components of ε_t for all the log-exchange rate and log-return are significant, hence support (2.5) specification (Tables 4–7).

$$\varepsilon_t = \delta + \sigma_t z_t$$

 $z_t \sim nid(0, 1)$

(2.5)

$$\sigma_{t}^{2} = \omega_{0} + \omega_{1}(\varepsilon_{t-1})^{2} + \Omega \sigma_{t-1}^{2}; \sigma_{t}^{2} > 0$$

The intercepts $\alpha_0^* and \beta_0^*$ indicate the expected value of log-exchange rate and log-return, respectively, when no CBN announcements are not released. The constant terms α_0^{**} and β_0^{**} imply the mean value of exchange rate, without both meetings being held and announcements being disseminated. The vector $[\alpha_0^*, \alpha_0^{**}, \beta_0^{**}] > 0$ as the exchange rate is non-negative. The coefficients, α_{t+i}^X and β_{t+i}^X of D_{t+i}^X , foreachimeasures the change in the mean level of the log-exchange rate or log-return, given that an announcement (for instance, on intervention) or MPC meeting occurs at time *t*, being day(s) before, D-day or a day(s) after announcement\meeting. If $\alpha_{t+i}^X > (<) 0$, it means that the mean value exchange rate is expected to depreciate (appreciate⁶) by approximately α_{t+i}^X multiply by 100 percent for that particular day *i* of the CBN announcement. We apply the least squares to estimate our models using the coefficient covariance method of HAC. For event driven regression, the *F*- and *t* statistics (*t_i*) are more useful as for model evaluation.



Figure 2. Transform the series by taking its natural log and plot the three trends for the log-exchange rate.



4. The results and discussion

4.1. Data trends and deterministic statistics

Figure 1 shows the time series plots for actual series, polynomial trend and the SLT trend for the actual exchange rate. The plots indicate there are jumps, pulse and vertical striations. The jumps are era for exchange rate regime switches and period of devaluation. Recently, there was the exchange rate adjustment (unification) for importer and exporter window in a bid to avoid devaluation and as well as push down pressure on the reserve due to forex shortage occasioned by low income from oil revenue around the epic of the 2020 COVID 19 pandemics. The path overtime is nonlinear, so we transform the series by taking its natural log and plot the three trends for the log-exchange rate, as shown by Figure 2. Unlike as it would be expected, the log-exchange rate exhibits similar nonlinear





pattern, although the log-plot is smoothened relatively. The time series plots of log-returns (Figure 3) shows notable and extreme outliers, with sharp protrusions. Figure 4 shows what happened when we apply the SLT to decompose the actual exchange rate series into key time series components. Although the trend is explosives, the remainder is convergence and mean reversing, and the season components is both oscillatory and stable around the mean which is approximately zero.

Table 1 presents the statistical properties for exchange rate, log-exchange rate and log-return series. The standard deviation of the variance of dynamic of the exchange rate (R_{σ}) shows that there is high spread in the exchange rate, and low spread in the log-return. The daily official close for Naira appears stable around some domain between days except for periods of jumps. The Jarque-Bera statistics indicate that all the data series are significant, rejecting the normality null. Both log of returns and daily variance series indicate high presence of outliers that may generate heteroskedastic, as their distribution is extremely leptokurtic, as well as highly positively skewed. The distributions of exchange rate and log-exchange rate are positive asymmetric (skewed) and moderately peaked (mesokurtic).

4.2. Estimated models

Table 2 presents how log-exchange rate and log-return respond to announcements, if no MPC meeting was held. The process reflects 3930 observations after adjustments. The exchange rate



Figure 4. Applying the SLT to decompose the actual exchange rate series into key time series components.

Table 5. The log-r	eturn (LRETN) with	MPCM announcem	nent	
Parameters	Estimates	$\sigma_{ heta}$	t _θ	$p(t_{\mathcal{B}})$
$\boldsymbol{\theta}_0^*$	0.000045	0.000029	1.578286	0.1146
$\boldsymbol{\theta}_{t-3}^{MPCM}$	-0.000042	0.000123	-0.345836	0.7295
$\boldsymbol{\theta}_{t-2}^{MPCM}$	-0.000016	0.000123	-0.127053	0.8989
$\boldsymbol{\theta}_{t-1}^{MPCM}$	-0.000049	0.000123	-0.394117	0.6935
$\boldsymbol{\beta}_{t}^{MPCM}$	0.000061	0.000123	0.492858	0.6221
$\boldsymbol{\theta}_{t+1}^{MPCM}$	-0.000003	0.000123	-0.023323	0.9814
$\boldsymbol{\theta}_{t+2}^{MPCM}$	0.000152	0.000123	1.243139	0.2139
$m{ extsf{ heta}}_{t+3}^{MPCM}$	0.000035	0.000123	0.285122	0.7756
$\boldsymbol{\theta}_{t-3}^{STAB}$	-0.000050	0.000065	-0.758901	0.4480
$\boldsymbol{\theta}_{t-2}^{STAB}$	-0.000002	0.000068	-0.033235	0.9735
$\boldsymbol{\theta}_{t-1}^{STAB}$	0.000059	0.000058	1.018648	0.3084
$\boldsymbol{\theta}_{t}^{STAB}$	0.000047	0.000060	0.791323	0.4288
$\boldsymbol{\theta}_{t+1}^{STAB}$	-0.000066	0.000058	-1.121856	0.2620
θ_{t+2}^{STAB}	-0.000056	0.000068	-0.832500	0.4052
θ_{t+3}^{STAB}	-0.000055	0.000065	-0.840483	0.4007
$\boldsymbol{\theta}_{t-3}^{INTR}$	-0.000039	0.000179	-0.220108	0.8258
$\boldsymbol{\theta}_{t-2}^{INTR}$	-0.000032	0.000179	-0.180388	0.8569
$\boldsymbol{\theta}_{t-1}^{INTR}$	-0.000052	0.000179	-0.291086	0.7710
$\boldsymbol{\theta}_{t}^{\textit{INTR}}$	0.000000	0.000179	-0.000400	0.9997
$\boldsymbol{\theta}_{t+1}^{INTR}$	0.000021	0.000179	0.115523	0.9080
$\boldsymbol{\theta}_{t+2}^{INTR}$	-0.000060	0.000179	-0.334676	0.7379
$\boldsymbol{\theta}_{t+3}^{INTR}$	-0.000048	0.000179	-0.266256	0.7901
$\boldsymbol{\theta}_{t-3}^{BofT}$	-0.000086	0.000100	-0.858956	0.3904
$\boldsymbol{\beta}_{t-2}^{BofT}$	0.000399	0.000100	4.002995	0.0001
$\boldsymbol{\mathcal{B}}_{t-1}^{BofT}$	0.000406	0.000100	4.076629	0.0000
$\boldsymbol{\mathcal{B}}_{t}^{BofT}$	0.000179	0.000100	1.793510	0.0730
$\boldsymbol{\mathcal{B}}_{t+1}^{BofT}$	-0.000051	0.000100	-0.513958	0.6073
$\boldsymbol{\theta}_{t+2}^{BofT}$	-0.000036	0.000099	-0.361784	0.7175
θ ^{BofT}	-0.000054	0.000100	-0.542486	0.5875
ω ₀	-0.00003	0.000001	-0.718925	0.4722
ω1	11.376510	0.477246	23.837840	0.0000
Ω	0.186635	0.003942	47.346850	0.0000
\overline{R}^2		0.011079		
F-statistic		1.018844		
p(F-statistic)		0.085441		

Table 6. The Log	l-exchange Rate (LEXRT) Model with	MPCM Announcem	ient				
Parameters	Estimates	σ_{lpha}	t_{lpha}	$p(t_{lpha})$	0.95	C.I.	0.99	C.I.
					Low	High	Low	High
α_0^*	2.337214	0.00305	766.2823	0.0000	2.3312	2.3431	2.3293	2.3450
$lpha_{t-3}^{MPCM}$	0.009395	0.013065	0.719108	0.4721	-0.0162	0.0350	-0.0243	0.0431
$lpha_{t-2}^{MPCM}$	0.012582	0.013128	0.958364	0.3379	-0.0132	0.0383	-0.0213	0.0464
α_{t-1}^{MPCM}	0.005871	0.013126	0.447289	0.6547	-0.0199	0.0316	-0.0280	0.0397
α_t^{MPCM}	0.009526	0.013130	0.725518	0.4682	-0.0162	0.0353	-0.0243	0.0434
α_{t+1}^{MPCM}	0.011209	0.013065	0.857921	0.3910	-0.0144	0.0368	-0.0225	0.0449
α_{t+2}^{MPCM}	0.010768	0.013053	0.824956	0.4094	-0.0148	0.0364	-0.0229	0.0444
α_{t+3}^{MPCM}	0.005255	0.013066	0.402203	0.6876	-0.0204	0.0309	-0.0284	0.0389
$lpha_{t-3}^{STAB}$	-0.039697	0.006952	-5.709944	0.0000	-0.0533	-0.0261	-0.0576	-0.0218
$lpha_{t-2}^{STAB}$	-0.058227	0.007191	-8.097162	0.0000	-0.0723	-0.0441	-0.0768	-0.0397
α_{t-1}^{STAB}	-0.076495	0.006204	-12.330350	0.0000	-0.0887	-0.0643	-0.0925	-0.0605
α_t^{STAB}	-0.070742	0.006365	-11.114200	0.0000	-0.0832	-0.0583	-0.0871	-0.0543
α_{t+1}^{STAB}	-0.075720	0.006218	-12.177730	0.0000	-0.0879	-0.0635	-0.0917	-0.0597
α_{t+2}^{STAB}	-0.060650	0.007197	-8.426752	0.0000	-0.0748	-0.0465	-0.0792	-0.0421
α_{t+3}^{STAB}	-0.042981	0.006951	-6.183429	0.0000	-0.0566	-0.0294	-0.0609	-0.0251
$lpha_{t-3}^{INTR}$	0.048716	0.019089	2.552081	0.0107	0.0113	0.0861	-0.0005	0.0979
$lpha_{t-2}^{INTR}$	0.050504	0.019085	2.646304	0.0082	0.0131	0.0879	0.0013	0.0997
$lpha_{t-1}^{INTR}$	0.045299	0.019083	2.373803	0.0177	0.0079	0.0827	-0.0039	0.0945
α_t^{INTR}	0.046235	0.019084	2.422647	0.0155	0.0088	0.0837	-0.0029	0.0954
α_{t+1}^{INTR}	0.047346	0.019095	2.479509	0.0132	0.0099	0.0848	-0.0019	0.0966
$lpha_{t+2}^{INTR}$	0.053203	0.019096	2.786100	0.0054	0.0158	0.0906	0.0040	0.1024
$lpha_{t+3}^{INTR}$	0.051928	0.019099	2.718944	0.0066	0.0145	0.0894	0.0027	0.1011
								(Continued)

Table6. (Continue	d)							
$lpha_{t-3}^{BofT}$	-0.038601	0.010644	-3.626440	0.0003	-0.0595	-0.0177	-0.0660	-0.0112
$lpha_{t-2}^{BofT}$	-0.037433	0.010616	-3.526219	0.0004	-0.0582	-0.0166	-0.0648	-0.0101
$lpha_{t-1}^{BofT}$	-0.038026	0.010618	-3.581323	0.0003	-0.0588	-0.0172	-0.0654	-0.0107
α_t^{BofT}	-0.038142	0.010607	-3.595998	0.0003	-0.0589	-0.0173	-0.0655	-0.0108
$lpha_{t+1}^{BofT}$	-0.039590	0.010604	-3.733613	0.0002	-0.0604	-0.0188	-0.0669	-0.0123
$lpha_{t+2}^{BofT}$	-0.039391	0.010594	-3.718360	0.0002	-0.0602	-0.0186	-0.0667	-0.0121
$lpha^{BofT}_{t+3}$	-0.035791	0.010620	-3.370028	0.0008	-0.0566	-0.0150	-0.0632	-0.0084
w ₀	0.000028	0.000009	31.111111	0.0000				
ω1	1.104331	0.040375	27.351920	0.0000				
υ	0.165190	0.010834	15.247070	0.0000				
\bar{R}^2		0.328865						
F-statistic		70.98400						
p (F-statistic)		0.000000		_				
The statistics— $\sigma_{lpha}, t_{lpha},$	and $p(t_{lpha})$ are standari	d error, t—value and p	orobability value of α , r	espectively. Same app	ly for $ heta$ estimates.			

Table 7. Diagnostic tests				
Statistics	Heteroskedasticity ^a	Autocorrelation ^b	Heteroskedasticity	Autocorrelation
R ²	16.534	15.442	18.195	14.694
F-statistic	0.8622	1.3861	0.9255	1.0531
Prob.(F)	0.4706	0.2501	0.3225	0.1726
Prob.(X ²)	0.1251	0.0817	0.1051	0.0551
	Normality ^c		Normality ^c	
Prob.(JB)	6660.0		0.1201	
Theil	0.0274		0.0274	
The BOLD figures indicate result of robi	ustness diagnosis for the LEXRT model w	vith the MPCM in included in the estimat	tion.	

a Breusch-Pagan-Godfrey homoskedastic test; ^b Breusch-Godfrey no serial correlation test. ^c Jarque-Bera (JB) normality test.

responds well to CBN announcement disseminated for intervention, interest rate and inflation control, and trade balance. The data could not establish evidence that the log-return could be explained by these events. The intercept α_0^* shows that the expected value of the log-exchange rate is approximately 2.3387/218NGN when CBN does not release circular related the exchange rate. The estimates α_{t+i}^{STAB} show that the mean of log-exchange rate appreciate on expectation of intervention on announcement day and day after WDAS/RDAS/BDCs auction. The exchange rate is expected to appreciate by 7% on the day of intervention announcement but the expectation of this announcement on the exchange rate reduces to 6% and 4.2% on two day and three day after.

All past, present and future released announcement related on BOT, α_{t+i}^{BofT} cause appreciation shock. The CBN announcements related on interest rate/inflation, α_{t-i}^{INTR} are positive signed, cause exchange rate depreciation. All the variables are identified as significant. Disseminated news on interest rate/inflation is significant at 5%, while others are highly significant at 1%. On the log-return, except for a day, β_{t-1}^{BofT} and two days, β_{t-2}^{BofT} before announcements, all past, contemporaneous and lead dates for the various announcements do not explain the behaviour of the log-returns series, as well as not statistically significant.

Table 3 presents the result when we access the combined effects of MPC meetings and the CBN announcements on log-returns. The result was inconsistent with some study by Li et al. (2015) on how the returns for global stock indices respond to FOMC and US macroeconomic news. Our result shows that the log-returns does not respond to both announcement from MPC Meeting and CBN released macroeconomic announcements. Like with log-returns without MPC meetings, in absence of surprises from both meeting and announcements, the parameter estimate for the intercept, β_0^* indicates that the expected value of the log-return series is meagre of 0.00045%. Forex intervention announcement impinge mixed effects on the expected value of exchange rate for announcement day and day before or after as the exchange rate respond with appreciation or depreciation shocks. Not surprisingly, all the variables are insignificant except dummy for the BofT announcement for a day before, β_{t-1}^{BofT} , which are both highly significance. The combined effects for both as reported from the Wald test is not significant. The overall event model lacks explanatory power and the combined effects for all past, contemporaneous and leads announcement shocks are insignificant. The data evidence is not strong to support that both MPCM meetings and macroeconomic announcements influence the return.

Table 3 presents result for the event driven model that analyses how log-exchange rate responds to combine effect of MPC meeting held and CBN announcements released. We find that the expected value of log exchange rate without both meetings and news released is 2.337 (approximately, 217.7NGN) with an accompanying 95% confidence interval (C.I.) between 2.31 and 2.342. While the CBN disseminates announcement on MPC meeting, the exchange rate is expected to rise (depreciate) from surprises occasioned by information from all days before, on the announcement day, and all days after the announcement day. The contemporaneous dummy for MPCM, α_t^{MPCM} indicates that the mean value of the exchange rate may depreciate by approximately 0.95% on news of schedule meeting in the forex market. The coefficient of the one day before the MPC meeting a_{t-1}^{MPCM} shows that the average value of exchange rate is expected to rise (depreciate) by 0.587% on expectation of meeting the following day. This is in consistent with Lucca and Moench (2015) who observed approximately 49 basis points increase in the S&P 500 index a day before the FOMC announcement, and in which about 80% of them signalled a pre-FOMC announcement drift. Contrary, Lyócsa et al. (2019) find that quantitative easing announcements does not impact stock realized volatility not only on news release but also five days before and five days after announcement date. Ekincia et al. (2019) show a negative impact of announcement release on the weighted bid, ask and mid-prices in the post-release period.

Analogous to the case without the meeting announcement, the dummies for intervention, α_{t+i}^{STAB} provide evidence that the exchange rate decreases (appreciate) on expectation of the WDAS/ RDAS auction for day before, D-day and day after announcements. We notice that the forex intervention

shocks explains approximately 7% for the log-exchange rate, ceteris paribus. We observe that the exchange rate responds more on announcement on intervention a day before (7.65%) and a day after (7.57%) than on the announcement day (7.07%). A possible reason for this is that the central bank's pronouncements on intervention sends strong signal that may motivate or mitigate forex hoarding. The precise degree of effect however depends on a credible monetary policy transmission mechanism. In the forex market, we observe that intervention via the RDAS is time-constraint within the opening window hours, but forex demands and official supply in banks and BDCs operate 24 hours. Hence, the expectation from whether RDAS bids may be successful or not may cause short term hoarding leading to temporary depreciation. If the bid is successful during the window, information gets to market participants and increase supply effects is expected to relieve the hoardings on that day.

The dummies for trade balance, α_{t+i}^{BofT} shows that the mean value of the exchange rate appreciates on expectation of announcement on trade issues for the days before, D-day and day after announcements. We observe that the trade balance surprises explain about 3.8% variation of the log-exchange rate caprices on the announcement day. In addition, the log-exchange rate increased by approximately 4.5% on the day before the announcement and by 4.6% on the announcement day. Our finding collaborates Hussain and Ben Omrane (2020) observed that US macroeconomic news fundamentals exhibit a significant influence on the Canadian stock return and volatility. In particular, during the 2008 recession, more US news announcements exert significant impacts on the Canadian equity returns.

The a_{t+i}^{INIR} for *i* show that the mean of log-exchange rate responds to around 5% to news related macroeconomic variable on long term interest rate and inflation control. This may be associated with possible risk premium for market changes due to the announcement. Aside the intervention shocks, the depreciation drift occasioned by other macroeconomic announcements in the forex market may be seen as a premium to the exchange rate shock. With approximately 4.62%, we observe that the average value of the exchange rate depreciate on the announcement day, increased more on the day after the announcement by 4.73% and two days after the announcement by about 5.32% and independently move slowly down on the third day after with approximately 5.19%. This announcement reveals to market participants the information about imminent and economic conditions that the central bank intend to adapt for the economy.

The announcements related to the intervention, price control and trade balance on exchange rate are all statistically significant. The various dummies for the macroeconomic variable reject the null for the past, present and future on how exchange rate respond to announcements from the central bank. The result supports Hausman and Wongswan (2011) on how global stock price indices respond to news surprises in the US days before and after. We find a light conflict with Pyo and Lee (2020) who observe that the effect of announcement on BTC price is rather difficult to affirm because most of the variable for the three days before and after the announcement are not significant and bear no explanatory power.

The effect of MPC meeting schedule was not statistically significant. This indicate that exchange rate does not respond to the monetary policy committee meeting's announcement. This finding is in line with Indriawana et al. (2021) for long-term US and German bond futures but contrary to Pyo and Lee (2020) on Bitcoin price responds to FOMC meeting announcement. Indriawana et al. (2021) show that after expansionary shocks, there is large investment trading strategy in government bond market with substantial yields up to four times the ratio of buy-and-hold assets. The explanatory has low (approximately, 33%) prediction power, while the overall model is highly significant. Since our interest is examined how exchange rate respond to the dichotomy of CBN announcements, the model significance is important relative to its explanatory ability that concerns with prediction of exchange rate through the announcements.

Unlike the MPC meetings, the announcements affects the exchange rate behaviours but not its return. These results has implications for forex market dynamics and monetary policy direction in future. Hence, we conduct some robustness test for the exchange rate models to validate the adequacy of the estimations. The results, presented in Table 5, show that the Breusch-Pagan-Godfrey test with the null of No ARCH effect is not significant. The *p* values of

approximately 47% and 32% for the model with and without MPC meetings, respectively, suggest evidence on the absence of heteroscedasticity in the models' residuals. The Breusch-Godfrey test is also insignificant. With *p* values of 0.25 and 0.17 for the model with and without the MPC meetings, respectively, the result provides no basis to reject the null of no serially correlation. The Jarque-Bera statistics indicate that the residuals are not significant, hence, we could not reject the normality null. The Theil inequality coefficients [0.0274] for both models (with and without) log of exchange rate forecasts is not very close to 1, suggesting the model is capable of generating better forecasts.

5. Conclusions

We verified whether MPC meetings and macroeconomic announcements published regularly in form of circulars affect the behaviours of the exchange rate in the Nigeria. We focus on the announcements that convey news on stabilising the exchange rate, and apply event driven analysis to confirm the impact of both MPC and CBN's announcements on the log of exchange rate and its returns. We found that although the MPC meeting is insignificantly, exchange rate respond significantly to announcements. Contrary, we observe that both the MPC meetings and the CBN's announcement do not have impact on the exchange rate return. We conclude that the announcements convey information that have impact on the exchange rate but not its return. Since market participants and monetary authorities would consider this finding invaluable, we recommend that the central bank should be more stable with policies. Stability helps announcement to have consistent effect on the exchange rate through the monetary channel, otherwise the exchange rate is likely to move in favour of more stable, developed countries.

The study limits its focus on the behaviour of the exchange rate and its returns. Future research may be extended to the impact of announcements on exchange rate volatility in the Nigerian forex market. We use daily data for this paper, hence, subsequent studies may apply monthly or infra-monthly (weekly) data to check the sensitivity of data frequency on expected outcomes. This research is incumbent foundation for studies that intend to consider the efficacy of the channel—the monetary transmission mechanism—via which the central banks announcements affect the behaviour of the exchange rate.

The statistics— σ_{α} , t_{α} and $p(t_{\alpha})$ are the standard error, the t-value and probability of t-value for α , respectively.

Same apply for each β parameter estimates

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Notes

- 1. Australia, Canada, Euro, Japan, New Zealand, Norway, Sweden, Switzerland, and the United Kingdom against the US dollar.
- 2. https://www.cbn.gov.ng/documents/mpc.asp
- https://www.cbn.gov.ng/documents/mpc.asp?begin rec=1&endrec=20&keyword=&from=&tod=
- 4. Wholesales Dutch Auction System (WDAS)\Dutch Auction System Retail (RDAS).
- $5 \cdot \sum_{i=-3}^{3} \alpha_{t+i}^{*D} t + i^{X} = \sum_{i=-3}^{-1} \alpha_{t+i}^{*D} t + i^{X} + \alpha_{t}^{*D} t^{X} + \sum_{i=1}^{3} \alpha_{t+i}^{*D} t + i^{X}$
- 6. Unlike equity price, for exchange rate positive coefficient means exchange rate will depreciate and vice versa.

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Appendix

Table 1. Exchange rate policies	
YEAR	POLICIES
1999	The foreign exchange market was freed up in 1999 with the re-introduction of the inter-bank foreign exchange market (IFEM) with a view to reducing rent seeking behaviour and restore stability in the market
2002	Replacement of the Inter-Bank Foreign Exchange Market System with the Retail Dutch Auction System (RDAS)
2006	Introduction of the Wholesale Dutch Auction System (WDAS) for further liberalisation
2009	Q1: Re-introduction of the RDAS, partial suspension of trading in the inter-bank market, directives to oil companies and government agencies to sell foreign exchange earnings to the central bank only, suspension of the sale of foreign exchange to the Bureaux de Change (BDCs). Q2: Re-introduction of WDAS, oil companies and government agencies again permitted to sell foreign exchange directly to authorized dealers of their choice, resumption of sales to BDCs
2010	Reduction in the number of BDCs foreign exchange is sold to through the withdrawal of 132 class "A" licenses in November
2011	Wholesale Dutch Auction System-Forward (WDAS- FWD) Market was introduced as foreign exchange risk management tool
2012	Reduction of the net open position (NOP) limit to 1.0 percent, from 3.0 percent, to curtail the demand pressure in WDAS, introduction of quarterly reviews of the foreign exchange activities of bans to ensure compliance
2015	RDAS introduced and closed in February, movement of eligible demands to inter-bank segment, exclusion of 41 items from the list of goods valid for foreign exchange at the official window, limited usage of naira-denominated cards overseas to US\$300 per person, per day, stringent regulations and supervisions of BDCs, reduction in weekly sales to BDCs from US \$15,000.00 to US\$10,000.00 per BDC
2016	Introduction of a two-way quote interbank foreign exchange market; banks to execute all foreign exchange traded with corporates on FMDQ-advised FX trading and surveillance systems; International Money Transfer Operators required to remit foreign currency to the agent banks for disbursement in naira to the beneficiaries and the foreign currency proceeds to be sold to BDCs; authorised dealers to allocate at least 60% of total foreign exchange purchases for importation of raw materials, plant and machinery
2017	Release of guidelines to ease access to PTA and school fees; continuous intervention of CBN in the interbank market; allocation of foreign exchange to small scale importers
2021	Release of guidelines to regulate Naira 4 Dollar scheme for Diaspora Remittances, modalities for payout of diaspora remittance, amendment to diaspora remittance procedure.

Source: Authors review from various issues of CBN Annual Reports and Circulars

Table 2. 36 Selected MPCM Meetings and CBN Circulars with Memo No., title, published date and empirical categorisation							
	Memo	Title	Published Date	Category			
1	MPC-132-2020-1	Central Bank of Nigeria Communique No. 132 of the Monetary Policy Committee Meeting Held September 21 and 222,020	09/22/2020	MPCM			
2	FMD	Nigerian Treasury Bills Issue Programme 4th Quarter 2020	09/01/2020	INTR			
3	TED/FEM/FPC/GEN/ 01/006	Resumption Of Sales To BDCs	08/27/2020	STAB			
4	MPD/DIR/GEN/MPC/ 09/016	Central bank of Nigeria MPC Communique No. 131 with Personal Statements of Members	08/12/2020	МРСМ			
5	FMD	Nigerian Treasury Bills Issue Programme 3rd Quarter 2020	06/04/2020	INTR			
6	TED/FEM/FPC/GEN/ 01/003	Clarification on Operations of Ordinary Domiciliary Accounts	02/24/2020	BofT			
7	ED/FEM/FPC/GEN/ 01/002	Milk and Dairy Products Importation	02/11/2020	BofT			
8	FMD	Nigerian Treasury Bills Issue Programme 1st Quarter 2020	12/04/2019	INTR			
9	FMD	NTBs Issue Programme 4th Quarter 2019	09/04/2019	INTR			
10	MPC—125-2019—1	Central bank of Nigeria Communique no. 125 of the Monetary Policy Committee Meeting of Monday 22nd and Tuesday 23 July 2019	07/23/2019	MPCM			
11	FMD	<u>3rd Quarter 2019</u> <u>NTB Issue</u> Programme	06/07/2019	INTR			
12	FPR/DIR/GEN/CIR/ 07/019	Foreign Exchange Restriction on the Importation of 42 Items	12/10/2018	INTR			

(Continued)

Table2. (Continued)								
13	TED/FEM/FPC/GEN/ 01/005	Introduction of Special Intervention of Foreign Exchange Cash Sales to Bureau de Change Operators	11/29/2018	STAB				
14	TED/FEM/FPC/GEN/ 01/001	Charges on The Sale of Foreign Exchange for Invisible Transactions (BTA, PTA, School Fees and Medicals)	02/12/2018	BofT				
15	BPS/FPO/DIR/GEN/ CIR/01/099	Unutilized FX Returned To The CBN For The SMIS Wholesale and Retail Interventions	07/03/2017	STAB				
16	FMD/DIR/CIR/GEN/ 08/008	Further Liberalization of the Inter-Bank Foreign Exchange (FX) Market	06/05/2017	BofT				
17	FMD/DIR/CIR/GEN/ 08/007	Establishment of Investors and Exporters FX Window	04/21/2017	STAB				
18	TED/FEM/FPC/GEN/ 01/007	Foreign Exchange Sales To End Users	08/22/2016	STAB				
19	TED/FEM/FPC/GEN/ 01/006	Sales of Forex To BDCs By IMTSO	08/09/2016	BofT				
20	TED/FEM/FPC/GEN/ 01/005	2016 Hajj Pilgrimage	08/05/2016	BofT				
21	TED/FEM/FPC/GEN/ 01/004	Sales of Foreign Currency Proceeds of International Money Transfers to Bureaux De Change Operators	07/22/2016	STAB				
22	TED/FEM/FPC/GEN/ 01/016	2015 Hajj Operations: Purchase of Pilgrims Travelling Allowance (PTA)	08/13/2015	BofT				
23	TED/FEM/FPC/GEN/ 01/015	Developments in the Foreign Exchange Market, Re: Cash Deposit into Domiciliary Accounts	08/05/2015	STAB				
24	TED/FEM/FPC/GEN/ 01/010	Inclusion of Some Imported Goods and Services on the List of Items Not Valid for Foreign Exchange in the Nigerian Forex Market	06/26/2015	BofT				
25	BSD/DIR/GEN/LAB/ 08/013	Currency Substitution and Dollarisation of the Nigerian Economy	04/17/2015	BofT				

(Continued)

26	MPC-100-2015-1	CBN Communique No. 100 of the Monetary Policy Committee Meeting of Monday 23rd and Tuesday 24 March 2015	03/24/2015	MPCM
27	MPC-99-2015-2	CBN Communique No. 99 of the Monetary Policy Committee Meeting with Personal Statements of members January 19 and 20, 2015	03/18/2015	MPCM
28	TED/FEM/FPC/GEN/ 01/005	Repatriation of Export Proceeds (Oil and non-Oil)	02/19/2015	BofT
29	FMD/FDO/GEN/CIR/ 02/05/15	Foreign Exchange Market Auction- RDAS No.05/2015	01/19/2015	STAB
30	FMD/FDO/GEN/CIR/ 01/94/14	Foreign Exchange Market Auction- RDAS No.94/2014 and FX Forward Auction No. 14/ 2014	12/10/2014	STAB
31	FMD/FDO/GEN/CIR/ 01/61/14	Foreign Exchange Market Auction- RDAS No.61/2014	08/11/2014	STAB
32	TED/FEM/FPC/GEN/ 01/015	Year 2014 Christian Pilgrimage; Purchase of Pilgrims Travelling Allowance	08/11/2014	BofT
33	FPR/DIR/GEN/CIR/ 01/009	Circular to All Bureau De Change: New Requirements for the Operation of Bureau De Change in Nigeria	06/24/2014	STAB
34	FMD/FDO/GEN/CIR/ 01/072/13	Foreign Exchange Market (WDAS) Auction No. 072/ 2013	09/23/2013	STAB
35	FMD/FDO/GEN/CIR/ 01/71/13	Foreign Exchange Market (WDAS) Auction No. 71/ 2013 and FX Forward Auction No 12/2013	09/18/2013	STAB
36	MPC-05-04	Document of the Monetary Policy Committee: Communique No. 35	05/31/2004	МРСМ



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