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DO PRESIDENTIAL ELECTIONS AFFECT STOCK MARKET RETURNS IN NIGERIA?

Shebu U.R. Aliyu¹

Abstract

Evidences thrive on the effects of political regimes and presidential elections on stock market returns. This paper investigates the effects of presidential elections on stock returns around the election periods at the Nigerian Stock Exchange (NSE) market. A sample of five (5) months each for a total of six (6) presidential elections held between 1999 and 2019 was employed. Returns were calculated using daily closing prices of NSE's all share index (ASI). Afterwards, the regime heteroskedastic Markov switching model was found fit for the data. Empirical results typify the daily stock returns in terms of bear (low) and bull (high) regimes. Bear regime (1) leads across the 6 election horizons with lower volatility while the bull regime (2) records higher volatility in addition to more positive returns. Specifically, presidential election impacts positively on stock returns only during the 2011 election. Besides, findings show that stock market returns during presidential elections when the PDP government was in office were bearish whereas the market returns were bullish for elections held when the APC government was in office. To achieve stability in the market and the economy at large, restraints on the side of fiscal authority and setting limits on election/ campaign spending could help in forestalling upheavals in the market around presidential elections in Nigeria.

Keywords: Presidential election, stock market returns, Markov regime switching model, dummy variable

JEL Codes: C22, G12, G17, P16.

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1.0 INTRODUCTION

Stock market returns, in the literature, is swayed by several factors within and outside the economy. Literature documents myriad of factors that influence stock market performance. These include: change in government policy, macroeconomic fundamentals, composition of investors, market sentiments; corporate governance, global events such as booms and recessions, energy crises and inter alia, political events including elections (Gartner, 1995 and Mishkin and Eugene, 2002; Aliyu, 2009; Aliyu, 2012; Blanchard et al., 2018; Balaji et al., 2018). Evidence shows that politics and economy remain keenly intertwined (Huang, 2012), presidential elections have the tendency to affect stock returns in a number of ways. Specifically, electioneering often results in huge spending (Bloomberg and Hess, 2001), influence sustainability or otherwise of government policies and/or regulatory environment (Fiorina, 1991; Blanchard, et al., 2018), breeds uncertainty (Black, 1988; Campello, 2009 and Mehdian, et al., 2008; Bialkowski, et al., 2008), affects corporate governance (Bloomberg and Hess, 2001; and Menge, 2013), expectations or market sentiment (Siegel, 2007 and Leblang and Mukherjee, 2005); increase in price volatility (Park, 2016) and the like.

No doubt, a number of studies that assessed the impact of elections on stock market returns blossomed among researchers and market analysts in the recent past. Germane issue of concern is whether political events influence investors' sentiments in a manner which affect market returns. Substantial body of evidence using 'event study methodology' mostly in the US, suggests that political events affects stock market returns though with variations on the event cycle (Niederhoffer, et al., 1970; Black, 1988; Booth and Booth, 2003; Wong and McAleer, 2009). A study by Molenkamp (2017), for instance, shows that the Republican presidents exert more negative influence on stock market returns compared to the Democratic presidents whereas Blanchard et al. (2018) found that a bit more than half of the increase in the aggregate U.S. stock prices from the presidential election to the end of 2017 is attributable to higher actual and expected dividends.

Elsewhere, evidence shows that the Nairobi Stock Exchange (NSE) significantly responds to political event (Irungu, 2012; Menge, 2013; Menge, et al., 2014; Kabiru, et al., 2015). Further, Balaji, et al., (2018) show that India's National Stock Exchange (NSE) responds more to elections in the short term, less in the medium term and the response subsequently diminish in the long term.

Since the return of democracy in the year 1999, Nigeria has had a total of six presidential elections occurring regularly after four years each. Thus, the series of presidential elections over the last two decades juxtaposed by the global economic predicaments—notably the 2007/2008 US financial cum the 2008 oil price crises, the 2014/2015 oil price shock and Nigeria's 2016/2017 recession, yielded impetus for an empirical investigation. Essentially, it is pertinent to assess whether the pattern of stock market returns has radically changed during the elections in a manner that affect investor decisions. Meanwhile, a cursory look at the trends on the floor of the NSE shows that the market responded differently to successive elections between 1999 and 2019. Stock returns measured as a percentage change in the level of all share index (ASI), for instance, fell consistently a month preceding the national elections and during the election month for the 2003 and 2007 elections while the returns were consistently negative for two months after the April 2011 elections, that is, in May and June, 2011. Further, the returns fell by -0.28% during the election month in 2015 while in the build-up to the 2019 elections, it recorded the highest slide of -1.61%, a week before the election. However, the return series was consistently negative

a week after the February 2019 presidential election. Other market indices like market capitalisation and number of market deals also followed a similar pattern.

Against this background, it is pertinent to investigate the pattern of movements of stock market returns in Nigeria since the return to democracy in the year 1999. That is, whether stock market returns correlate with presidential elections and in what sense? Unless we accurately predict what pattern stock returns had been during elections, it would be difficult to advise investors and regulators on what action they should take in a manner that would best maximize their returns and or guide market operations during elections periods, respectively. Hence, the main objective of the paper is to present a two-state Markov-switching model of the behaviour of stock market returns over the period of presidential elections² held in Nigeria between 1999 and 2019. This would involve conducting a Markov chain analysis of transition probabilities of the returns across the regimes of low and high stock returns and regime durations.

This paper improves on Osamwonyi and Omorokunwa (2017) who assessed the impact of the 2003 to 2011 elections on stock returns in Nigeria. This is in addition to Osuala, et al., (2018), who analysed the effects of the 2011 and 2015 presidential elections, and Eboigbe and Modugu (2018), who investigated the effects of the 1999 to 2011 elections on stock returns at the NSE. It differs from that of Raheem and Ezepue (2016) that uses a three-state Markov regime switching model; rising (positive) (*Rk*), falling (negative) state (*Rm*) and stable (zero) state (*RI*), in the Nigerian banking sector. It is worthy to note that these studies applied the event study methodology and focused on some selected firms/sectors on the floor of the NSE, whereas this paper employs the symmetric and asymmetric GARCH models and the Markov regime-switching autoregressive model. Thus, this underscores the need for this investigation. The paper is organized in five sections. Following the introductory section, section 2 presents a review of empirical studies and theoretical issues. Research methodology is presented in section 3, while sections 4 and 5 cover presentation of empirical results and concluding remarks, respectively.

2.0 REVIEW OF THEORETICAL ISSUES AND EMPIRICAL EVIDENCES

The theory of stock market behaviour started with the work of Fama (1965a) who first used the term “*efficient market*”. The efficiency is categorized into: weak form efficiency, semi-strong form and strong form market (Fama, 1970). The *random walk hypothesis* on the other hand posits that stock market prices evolve randomly and thus stock prices cannot be predicted (Fama, 1965b). The *prospect theory*, a behavioural economics and finance theory, explains the existence of an apparent regularity in human behaviours when assessing risk under uncertainty. The theory assumes that human beings are not consistently risk-averse; rather they are risk-averse in gains but risk-takers in losses (Tversky and Kahneman, 1981 and 1992). The *political policy* theory holds a partisan view of macroeconomics (Alesina and Jeffrey, 1987), and posits that different political parties may have different preferences concerning their economic policy. The political policy theory implies that if one party has superior economic policies over the other, then a governmental period of this party should lead to a better performance of the economy (Nofsinger, 2007).

² Presidential elections are intertwined with periods of general elections in Nigeria. The National Electoral commission invariably sets the timetable for the conduct of general elections as provided in the constitution of the Federal Republic of Nigeria every four years.

Likewise, the political business cycle (PBC) theory argues that competitive elections within democracies lead to unfavourable economic outcomes, such as a post-election recession or inflation. Evidences show that regardless of the political orientation, a government in power will pursue policies that maximize its chances of re-election (Nordhaus, 1975 and Vuchelen, 2003). Invariably, it will try to selfishly adjust business cycle to the timing of elections, that is, stimulating the economy via unsustainable expansionary policies before the elections and resorting to tough measures afterwards, that is, after winning election. However, such policy-induced cycles will be transient if economic agents and voters follow rational expectations (Rogoff, 1990; Kaplan, 2006; Park, 2016). Furthermore, the Uncertain Information Hypothesis (UIH) by Brown et al. (1988,) assumes that investors set prices before an event takes place.

On the empirical front, evidences abound on how the political process affects economic activity to the extent that political violence impedes economic progress and throws nations into serious crisis. In particular, studies on the behaviour of the stock market around election periods have been carried out over the last four decades.

Evidence in the 1970s in the US (Niederhoffer, et al., 1970) reveal that stock market returns show abnormal behaviour 17 weeks surrounding the election-day. Investors are afraid of investing at the time when there is a likelihood of political and economic instability (Black, 1988).

Smaller cap stocks outperform their larger counterparts under democratic presidents (Santa-Clara and Valkanov, 2003; and Chan, et al., 2005), exhibit cyclical pattern (Wong and McAleer, 2009), whereas no significant change was found in either of the stocks under both regimes (Booth and Booth, 2003) in the US. Stock market performs better when Democrats are in control of the presidency than when the Republicans are in the office (Oumar and Ashraf, 2011; and Molenkamp, 2017). Stock market participants in the US incorporate expectations about political change into stock prices before and adjust after election (Durnev, 2012; and Oehler, et al., 2013). Market quality deteriorates in the months leading up to elections but it improves in the months afterwards (Pasquariello and Zafeiridou, 2014). Further, expected government partisanship matters for specific industrial sector or firm profitability during an election period such as on defense and healthcare (Park, 2016). Though Trump's win plunges the US into uncertain future, positive reactions of abnormal return were found, hence, effects of political uncertainty on stock returns were mixed (Bouoiyour and Selmi, 2016).

Stock market returns depend on the probability of a right-(left) leaning coalition winning the election (Fuss and Bechtel, 2008 and 2010) in Germany. The Brexit referendum on EU membership impacts on both the UK and German financial markets as uncertainty around the polling result increases (Smales, 2016). Also, positive statements suggesting that a Grexit is less likely lead to higher returns whereas negative statements lower stock returns (Haupenthal and Neuenkirch, 2017). Generally, informal political volatility in the new EU countries of Central and Eastern Europe exert negative effect on stock returns, while formal political institutions generate much higher financial volatility than changes in monetary policy (Hartwell, 2018).

In Africa, the Nairobi stock exchange (NSE) stock returns increased around general elections (Lusinde 2012; and Menge, 2013) whereas the magnitude of abnormal returns is greater in presidential elections held in less-free countries when an incumbent president loses (Mange, 2013). Specifically, while the 2002 election positively affected the Nairobi stock exchange market, it was negatively affected it during

the 2007 election (Kituku, 2014) and, to a great extent, negative or positive returns depends on the volatility of election environment (Kabiru, et al., 2015). The Tunisian Revolution had impact on volatility of major sectorial stock indices traded on the TSE (Jeribi, et al., 2015). Political uncertainties, in particular, the 2013 military coup had profound impact on most sectors of the Egyptian market, though with different degrees of intensities (Ahmed, 2017). Conventional equity markets of developed countries prove much more sensitive to political uncertainty than their Islamic counterparts (Ahmed 2018).

In India, elections covering 1998 and 2014 show that maximum impact (positive or negative) in the short-term, diminishes in the medium-term and further reduces in the long-term in comparison to the pre-election period (Balaji, et al., 2018). In North Korea, nuclear tests exert heterogeneous effects on South Korea's stock prices across industries and over time, especially in the banking industry, during the entire sample period (Huh and Pun, 2018).

Effect of election worldwide between 1982 & 2012 show that firm stock is less likely to crash during the election years but are more likely to crash during the post-election period (Li, et al., 2018). Political uncertainty affects the supply of relevant information about a firm emerging markets (Chen, et al., 2018).

In Nigeria, evidence reveals negative relationship between market returns and risk behaviour of selected companies and election announcement (Osamwonyi and Omorokunwa, 2017). The 2011 presidential election was found to exert negative and significant impact on stock market performance while the 2015 presidential election exerted positive but insignificant impact (Osuala, et al., 2018). Specifically, evidence show that banking and petroleum sectors decrease before and increases after 1999 to 2015 elections (Eboigbe and Modugu, 2018).

The foregoing review shows that though different studies applied different methodologies across a number of countries, findings support adverse effect of political events on stock market returns at the level of firm, industry and stock market at large. Few studies applied the Markov regime-switching methodology in Nigeria. Guided by data characteristics, this paper applies the regime heteroskedastic Markov-switching (RHMS) model to identify possible occurrence of multiple regime behaviour in the Nigerian stock exchange market. For novelty, we incorporated an additional dummy variable to account for the impact of presidential elections in our model.

3.0 RESEARCH METHODOLOGY

This section presents the methodology applied in the paper. We begin by conducting preliminary data analysis using the standard statistics, namely; the unit root tests on the series to ascertain their order of integration. Moreover, the test for the ARCH effects was carried out to avoid running into econometric misspecification of the model. In addition, post-estimation and other diagnostic tests, namely serial correlation and multicollinearity tests were carried out to ascertain the statistical adequacy of the model. Although, linear models are popular and widely used statistical and econometric techniques, there exists convincing evidence in the literature that non-linear techniques such as the regime-switching model are appropriate quantitative tools for modelling macroeconomic and financial relationships, particularly those that are characterized by regime change.

This paper uses the regime heteroskedasticity Markov regime-switching model with 2 regimes (assuming a period/regime of high volatility and a period/regime of low volatility) in order to assess stock returns behaviour during the presidential election periods. We extend the conventional Hamilton's model with focus on one-time regime shift in the mean by allowing the mean and the variance to shift simultaneously across the regimes as applied by Kim, et al., (1999). Thus, the Markov-switching models have been popular over the decades in financial and economic modelling owing to business cycles identified in macroeconomics, monetary economics and finance (Wang, 2009). Stock market behaviour is one of the areas to which Markov-switching has been widely applied. A number of researchers have applied Markov-switching model with exogenous variables; Bialowolski, et al., (2011), Uzoma and Florence (2016), Aliyu and Wambai (2019).

3.1 The Regime Heteroskedastic Markov Switching Model

We consider a univariate autoregressive (AR) process, where the AR is subject to regime shifts. Hamilton (1989) assumes a single regime shift in the mean while trends in the literature now allow both the mean and the variance to shift simultaneously across the regimes. It is, in other words, a dynamic specification of the Markov-Switching approach to assume that the errors are serially correlated. It is called the "Markov-switching autoregressive" (MSAR) (Hamilton, 1989 and Fruhwirth-Schnatter, 2006) or the "Markov-switching mean" (MSM) model (Krolzig, 1997). Thus, the MSAR model is often referred to as the "Hamilton model" of switching with dynamics.

In a simple example, suppose there are two regimes (or states of the world) and that the autoregressive process for y_t is regime-dependent. In particular, let:

$$y_t = a_{10} + a_1 y_{t-1} + \varepsilon_{1t} \quad (\text{if the system is in regime 1}) \quad (1)$$

$$y_t = a_{20} + a_2 y_{t-1} + \varepsilon_{2t} \quad (\text{if the system is in regime 2}) \quad (2)$$

At this point, the autoregressive coefficient is a_1 in regime 1 and a_2 in regime 2. The MSAR model assumes fixed probabilities of a regime change. That is, if p_{11} denotes the probability that the system remains in regime 1, $(1 - p_{11})$ denotes the probability that the system switches from regime 1 to regime 2. Similarly, if p_{22} denotes the probability that the system remains in regime 2, $(1 - p_{22})$ is the probability that the system switches from regime 2 to regime 1. Thus, the probabilities, p_{11} , $(1 - p_{11})$, p_{22} and $(1 - p_{22})$, are all conditional probabilities where $p_{11} + p_{12} = p_{21} + p_{22} = 1$. On the other hand, the unconditional probability that the system is in regime 1 is given as: $(p_1 = (1 - p_{22}) / (2 - p_{11} - p_{22}))$ and in regime 2 is given as: $(p_2 = (1 - p_{11}) / (2 - p_{11} - p_{22}))$.

Furthermore, the transition probabilities yield expected regime duration, that is, expected length a system stays in a given regime, 1 or 2. These are expressed as: $E(D_1) = \frac{1}{1 - p_{11}}$, for regime 1 and $E(D_2) = \frac{1}{1 - p_{22}}$, for regime 2.

Conventionally, regime-switching models are estimated via two approaches, namely by the Gibbs sampling technique and by maximum likelihood technique (Kuan, 2002). In this paper, the maximum likelihood technique is employed to estimate the model. Hence, following (Kuan, 2002), the quasi-log-likelihood function upon which the estimation is based is given as:

$$\ell_T(\theta) = \frac{1}{T} \sum_{t=1}^T \log f(Z | Z^{t-1}; \theta) \quad (3)$$

and the full log-likelihood function to be maximized is:

$$\ell((\beta, \gamma, \sigma, \delta)) = \sum_{i=1}^T \log \left\{ \sum_{m=1}^M \frac{1}{\sigma_m} \psi \left(\frac{y_t - \mu_t(m)}{\sigma(m)} \right) \cdot P(s_t = m | \xi_{t-1}, \delta) \right\} \quad (4)$$

3.2 The Econometric Model

Our econometric model allows both the mean and the variance to shift simultaneously across the regimes and at the same time checkmates heteroskedasticity. We follow the specification of Bhar and Hamori (2004) and Aliyu and Wambai (2019) for the regime heteroskedastic Markov-switching model with two regimes. This paper utilizes daily stocks returns on the floor of the NSE covering a period of 5-months around each presidential election for a total of 6 elections. Fitting a regime heteroskedastic Markov-switching model of two regimes with order $\rho = 6$, we have:

$$\log(STR)_t = \tau + \mu_1 S_{1,t} + \mu_2 S_{2,t} + (\alpha_0 + \alpha_1 \log \sigma_1 S_{1,t}) \varepsilon_t + \log(STR)_{t-1} + \log(STR)_{t-2} + \dots + \log(STR)_{t-6} + \mu_1 \rho_{11} + \rho_{11} DUM + \mu_2 \rho_{21} + \rho_{21} DUM \quad (5)$$

where: $\tau_t = \tau_{t-1} + (\beta_0 + \beta_1 \log \sigma_2 S_{2,t}) v_t$, the terms $\mu_1 S_{1,t}$ and $\mu_2 S_{2,t}$ are the two economic regimes with their corresponding means, the terms $\log \sigma_1 S_{1,t}$ and $\log \sigma_2 S_{2,t}$, which is subsumed under the variable (τ_t) are the log standard deviations that provide information about the degree of volatility in the two regimes. The regressors from $\log(STR)_{t-1}$ to $\log(STR)_{t-6}$ are common regressors of the two regimes. However, we use the regressor DUM to represent the dummy for presidential election as a predictor / probability regressor in the model. Finally, the terms $\mu_1 \rho_{11}$ and $\mu_2 \rho_{21}$ are the time-varying transition probabilities, and, ε_t and v_t are disturbance terms that are assumed to be independently and identically distributed, that is, $\varepsilon_{s,t} \sim (N(0,1))$ and $v_t \sim (N(0,1))$.

3.3 Data Metric

The data used for the investigation are daily stock market index, the all share index (ASI), from the Nigerian Stock Exchange (NSE) market. The paper covers a total of six (6) presidential elections held in Nigeria in 1999, 2003, 2007, 2011, 2015 and 2019. The ASI and returns (measured as the differenced

logged form of the ASI multiplied by 100) cover a period of five (5) months, comprising of the election month, and two (2) months before and after the election. The use of fairly high frequency data allows us to observe the data characteristics. The paper constructs a dummy which assumes a value 0 for a period of eight weeks around the election date and 1 otherwise, to capture the effect of election on stock returns (performance).

4.0 RESULTS AND INTERPRETATION

In this section, we present and discuss the empirical results. We begin by presenting descriptive statistics of the ASI and stock returns (STR) of Nigeria's stock market. This is followed by the results of the unit root tests, the Augmented Dickey Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski, Phillips, Schmidt and Shin (KPSS) tests. The autoregressive conditional heteroskedasticity (ARCH) and serial correlation tests were also conducted and finally, results of the estimated Markov-switching regime heteroskedasticity model were also presented and discussed.

4.1 Descriptive Statistics

Table 1 presents the basic statistics across the six election periods. For instance, ASI picks up from a mean of N5,487.8 in the 1999 election to its highest mean value of N45,360.0 in the 2007 election. Evidently, this corresponds to the period before the emergence of the 2007 global financial crisis that emanated from the United States. Moreover, the skewness statistic reveals evidence of fat tails in the distribution with the presence of more right (+) than left (-) tail, thus indicating evidence of asymmetry in the distribution and perchance, a leverage effect. In addition, while the ASI consistently recorded high standard deviation across the horizons, the STR demonstrated evidence of leptokurtic (+) distribution.

Table 1: Descriptive Statistics – ASI and Differenced log of ASI (STR)

Statistic	1999 Election		2003 Election		2007 Election		2011 Election		2015 Election		2019 Election	
	ASI	STR	ASI	STR	ASI	STR	ASI	STR	ASI	STR	ASI	STR
Mean	5487.8	-7.00E	13837	0.001	45360	0.0036	25515	-7.00E	31718	0.0001	30906	-5.00E
Median	5427.4	-7.00E	13700	0.001	46925	0.0019	25424	0.001	30616	-3.00E	30834	4.00E
Maximum	5716	0.0068	14685	0.017	51703	0.0534	26929	0.017	35728	0.079	32715	0.038
Minimum	5290	-0.008	13292	-0.02	36453	-0.043	24337	0.025	27585	-0.04	29149	0.024
Std. Dev.	131.1	0.003	368.2	0.007	4194	0.011	651.8	0.006	2392	0.016	926.2	0.009
Skewness	0.499	0.172	0.738	-0.27	-0.02	0.346	0.496	0.421	0.221	0.915	0.062	0.449
Kurtosis	1.767	3.225	2.268	3.639	1.667	8.669	2.431	4.713	1.414	9.64	2.383	5.441
J-Bera	10.39	0.689	11.19	2.814	7.045	127.7	5.559	15.33	11.3	197.6	1.667	28.46
Prob	0.006	0.709	0.004	0.245	0.029	0.00	0.062	0.001	0.004	0.00	0.434	1.00E
Observations	99	98	99	98	95	94	102	101	100	100	101	101

Source: *Researcher's computation.*

The plots of the ASI and STR series for the 6 elections mimicked the statistics presented in Table 1. There is a clear evidence of non-normality almost across all the election periods as implied by low value of Jarque-Bera statistic. A look at the plots across the horizons shows excessive gains and losses that suggest evidences of regime shifts during the periods. In particular, the market returns slowed towards the end of December 1998, persisted in January 1999 and through the election week, that is, 27th February 1999. However, some dots of post-election gains were recorded later in the last of March and significant loss in the second week of April 1999. Similar pattern was repeated in the 2003 election period. The 2007 election period showed huge negative returns in the month of February 2007 but the margins narrowed afterwards. Significant gains and losses were recorded in March 2011. Furthermore, while the 2015 election window recorded positive returns around the election week, there were more indications of regime shifts in the plots for the 2011 and 2019 election periods.



In Table 2, results of unit root tests, ADF, PP and KPSS all reveal nonstationarity of the variables at levels except for the 2015 election where the PP test rejects the null hypothesis at the 5 level. Thus, the STR series is integrated of order one, that is, $I(1)$ across all the presidential elections.

Table 2: Stationarity Test

Statistic/Event	ADF		PP		KPSS		Order of Integration
	At Level	At 1st Difference	At Level	At 1st Difference	At Level	At 1st Difference	
1999 Election	-1.184	-8.144	-1.327	-8.144	0.231	0.127	I(1)
2003 Election	-1.900	-6.983	-1.708	-6.927	0.276	0.083	I(1)
2007 Election	-2.699	-7.933	-2.912	-7.972	0.0826	0.0617	I(1)
2011 Election	-2.190	-7.936	-1.705	-7.782	0.2283	0.124	I(1)
2015 Election	-3.272	-6.878	-3.849	-5.881	0.1585	0.1235	I(0)
2019 Election	-1.222	-9.271	-1.496	-9.319	0.2228	0.0607	I(1)

Note: The Augmented Dickey Fuller (ADF) test statistic for rejection of null hypothesis of nonstationarity at the 1% and 5% levels is: 4.055 and 3.456, respectively. For the Philip Perron (PP) test it is 4.051 and 3.455 while for the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) test: 0.216 and 0.146 at the 1% and 5%, respectively.

Table 3 reports results of residual diagnostic tests applied to an estimated AR (1) model of stock returns (STR). First, the ARCH-LM test shows that the null hypothesis of homoscedasticity is accepted for all the six presidential elections given the high p-values. It is known in the literature that disregarding the ARCH effect could result in model misspecification in view of the fact that its presence in time series portends evidence of volatility. Furthermore, the White's heteroskedasticity test validates the results of the ARCH-LM test. As well, the Q-statistic at all lags, up to the 36th lag, concurs with the ARCH-LM and the White's test on homoskedastic residuals. The paper also tests for serial correlation among the residual series using the Breusch-Godfrey serial correlation Lagrange multiplier test. The test statistic calls for rejection of the null hypothesis of serially correlated errors across all the six elections implying that the errors are uncorrelated.

Table 3: ARCH-LM and Serial Correlation Tests

Statistic/Event	ARCH-LM Test		H. White's Heteroskedasticity Test		Serial Correlation (BG-LM Test)	
	Stat	Prob	Stat	Prob	Stat	Prob
1999 Election	0.008	0.928	0.143	0.867	1.914	0.153
2003 Election	1.324	0.253	0.949	0.391	0.741	0.929
2007 Election	1.124	0.292	0.407	0.667	1.806	0.170
2011 Election	0.335	0.564	1.262	0.288	1.024	0.363
2015 Election	0.008	0.928	1.1209	0.330	2.589	0.803
2019 Election	0.001	0.972	0.0352	0.965	0.181	0.835

Source: Researcher's computations

4.3 The Regime Heteroskedastic Markov Switching Model (RHMS)

Using the maximum likelihood estimation, equation (5) was estimated using a two-regime heteroskedastic Markov-switching model with election-period specific dummy. The objective is to identify the presence or otherwise of regime-switching behaviour, that is, period of calm and turbulence. Results are presented in Table 4.

Table 4: Estimated Regime Heteroskedastic Markov Switching Model

Variable	1999 Election	2003 Election	2007 Election	2011 Election	2015 Election	2019 Election
<i>Regime 1</i>						
μ_1	0.0007* (0.0003)	-0.025 (0.0022)	0.0013 (0.0011)	0.0002 (0.0008)	0.0029 (0.0035)	0.0141 (0.0156)
$\log(\sigma_1)$	-5.94** (0.8370)	-5.541** (0.4006)	-4.766** (0.0942)	-5.073** (0.0868)	-3.933** (0.1444)	-4.172** (0.0441)
<i>Regime 2</i>						
μ_2	0.0001** (0.0000)	0.0009 (0.0008)	0.0042** (0.0005)	0.0027** (0.0001)	-0.0005 (0.0008)	-0.0015 (0.0009)
$\log(\sigma_2)$	-12.87** (0.2756)	-5.037** (0.0916)	-6.962** (0.4653)	-8.395** (0.2774)	-5.438** (0.1454)	-4.902** (0.0925)
<i>Common</i>						
STR_{t-1}	0.1453** (0.0006)	0.2771* (0.1107)	0.3797** (0.0982)	0.3314** (0.0198)	0.3126** (0.0899)	0.0971 (0.0957)
STR_{t-2}	-0.1479** (0.0005)	-0.0081 (0.1308)	-0.0673 (0.0554)	-0.0274 (0.0144)	-0.0234 (0.0946)	-0.0363 (0.0964)
STR_{t-3}	-0.0303** (0.0006)	-0.0833 (0.1147)	-0.1078 (0.0684)	-0.1828** (0.0197)	-0.0191 (0.0856)	0.2259* (0.1042)
STR_{t-4}	0.00702** (0.0005)	-0.0792 (0.1105)	0.1846* (0.0771)	-0.0496** (0.0147)	0.1829** (0.0634)	-0.1230 (0.0940)
STR_{t-5}	0.0548** (0.0007)	-0.0601 (0.1083)	0.0006 (0.0857)	0.1086** (0.0143)	0.0183 (0.0619)	0.0547 (0.1001)
STR_{t-6}	0.0751** (0.0005)	-0.0657 (0.1011)	-0.0147 (0.0371)	-0.0419* (0.0176)	0.0294 (0.0464)	-0.2212* (0.0998)
<i>Transition Matrix Parameters</i>						
$\rho_{11}-\mu_1$	0.1779 (0.6058)	0.3439 (1.8480)	0.8556 (1.1743)	1.1438* (0.7156)	0.3737 (1.3313)	-10.650 (278.87)
$\rho_{11} - DUM$	4.2008* (1.3825)	-1.2545 (3.9100)	1.6454 (1.3545)	0.4382 (0.8848)	1.2272 (1.1503)	-4.800 (1893.4)
$\rho_{21}-\mu_2$	1.7896 (1.1905)	1.1290 (5.2708)	0.0066 (1.4622)	20.024 (715.78)	0.6608 (1.3696)	-1.3102 (2.2052)
$\rho_{21} - DUM$	4.295 (22.72)	-20.496 (6092.8)	1.9905 (3.6598)	-19.024 (71578)	-3.1569 (1.5142)	-2.2160 (1.9843)

Note: Results are obtained from estimation of Equation (5) using maximum likelihood method.
(.) Standard error while ** & * indicate significance at the 1% and 5% levels, respectively.

The estimated parameters of the model using maximum likelihood estimation with the Broyden, Fletcher, Goldfarb and Shanno (BFGS) optimization method are presented in Table 4. Intuitively, regime 1 is characterized by high volatility measured by the standard deviation $\log(\sigma_1)$ and low expected return (μ_1) while regime 2 is identified with lower volatility $\log(\sigma_2)$ and higher expected (μ_2) return. Though the empirical results clearly delineate the two regimes, regime 2 leads with more consistent and statistically significant coefficients for the mean (1999, 2007 and 20011 elections) and standard deviation across the election periods. Counterintuitively, there are more evidences of higher volatility in regime 2 than in regime 1, albeit, all are statistically significant. Furthermore, the common coefficients of the non-switching parameters show that stock returns respond significantly to immediate past trading day (one-period lag) in virtually all the elections but sparsely during other lagged periods, except in 2003 and 2011 elections.

The use of dummy variable as a probability regressor in the two regimes was meant to account for the influence of election on stock returns. The results under the transition matrix parameters show that the dummy variable in regime 1 positively (statistically significant in the 1999 election) affects stock returns except in the 2019 election where the impact was found to be negative, albeit statistically insignificant. The transition matrix parameters, however, reveal inconsistent probability values across the regimes alluding to weak impact of elections on stock returns. In this regard, Eboigbe and Modugu (2018) using Markov regime-switching methodology found that stock returns in Nigeria tend to reduce generally before and increase after election periods. Osuala, et al., (2018) found that though the 2011 election in Nigeria negatively affected stock returns, the 2015 exerted a weak positive impact on stock returns in Nigeria.

Table 5: Regime Probabilities, Duration and Diagnostics

Statistic	1999	2003	2007	2011	2015	2019
	Election	Election	Election	Election	Election	Election
	<i>Probabilities & Duration</i>					
ρ_{11} (Low)	0.891	0.352	0.871	0.853	0.776	5.14E-06
ρ_{22} (High)	0.033	0.836	0.209	0.207	0.787	0.933
Uncon. Prob (Low)	0.899	0.202	0.860	0.844	0.487	0.063
Uncon. Prob (High)	0.101	0.798	0.140	0.156	0.513	0.937
ED_{11}	63.66	1.621	10.85	6.955	5.137	1.000
ED_{22}	1.038	2.0E+08	1.340	1.282	10.42	28.62
	<i>Diagnostics</i>					
DW	1.784	1.904	2.106	2.093	1.598	2.015
AIC	-9.569	-7.03	-6.709	-7.428	-6.116	-6.447
SIC	-9.185	-6.65	-6.316	-7.052	-5.737	-6.071
VIF Test	reject	reject	reject	reject	Reject	reject

Resid. Normality	reject	reject	reject	accept	Accept	accept
Q-Stat	reject	accept	accept	accept	Accept	accept

Note: The Variance Inflation Factor (VIF) test using both centered and uncentered VIF rejects the null hypothesis of multicollinearity among the regressors, normality test rejects the null hypothesis of non-normal distribution of residual series and Q-stat at 36 lags accepts the null hypothesis of homoskedastic residuals.

Furthermore, Table 5 reports results of estimated regime probabilities. In four (1999, 2007, 2011 and 2015 elections) out of the six elections, the probability of stay in low yield/negative returns are quite high. Except for the 2003 election, these were periods when the Peoples' Democratic Party (PDP) was in office. Conversely, the probabilities for the 2003, 2015 and 2019 elections are in favour of regime 2, that is, high yield/positive returns. Obviously, except for the 2003 election, the 2015 and 2019 election periods were when the All Peoples' Congress (APC) party was office. Accordingly, the unconditional probabilities equally display similar pattern. Moreover, regime durations across the six elections mimic the pattern of regimes probabilities. The highest duration of stay in regime 1 of 63.66 days was recorded in the 1999 election while the lowest duration of 1 day was recorded for the 2019 election. In regime 2 as well, the highest duration of stay of 28.62 days was recorded during the 2019 election while the lowest, albeit infinitesimally less than 1 day, was recorded for the 2003 election.

These findings support the evidences in the literature in the United States and Germany, among others. For instance, Oumar and Ashraf (2011) and Molenkamp (2017) show that higher returns were associated with the presidency of the Democrats as against that of the Republicans in the United States. In Germany, Fuss and Bechtel (2008 and 2010) found that small-firm stock returns were positively (negatively) linked to the probability of a right-(left-) leaning coalition winning the election and volatility heightened as the electoral prospects of right-leaning parties improved. Others include Smales (2016) on effects of Brexit referendum on stock return in the United Kingdom and Haupenthal and Neuenkirch (2017) on effects of Grexit-related (exit of Greece from the EU) on stock market returns in Germany.

Results of diagnostic tests show that the DW statistic for serial correlation of the error term, except for the 2015 election, is very close to 2.0. The optimal lag selection values using the AIC and SIC are lower than those of AR (6) linear model³ thus confirming the superiority of the regime heteroskedastic Markov-switching model, the non-linear model. Furthermore, we accept the null hypothesis that the regressors are orthogonal while on the basis of Q-statistic, the residuals were consistently homoskedastic up to the 36th lag length. However, on the basis of normality test, some residuals were characterized by non-normal distribution.

³ Results, however, not reported here but can be made available on request.

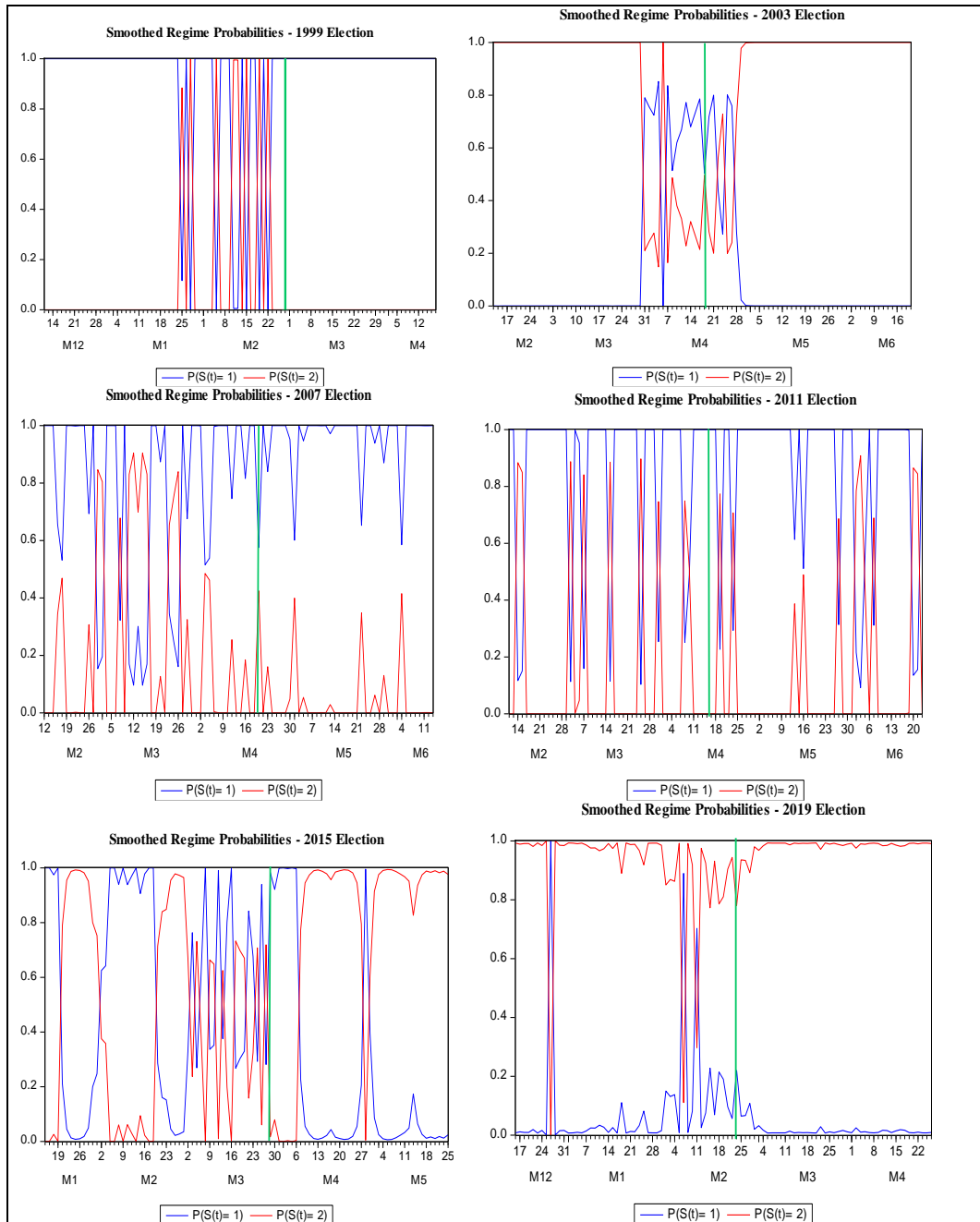


Figure 3: Smoothed Probabilities of Regime 1 and 2 (combined graphs)

The above findings are reinforced by the smoothed probability plots for the two regimes fitted by the RHMS model across the 6 elections as presented in Figure 3. The plots show clear pattern of correlations between the smoothed probabilities of regimes 1 and 2, that is, as the probability of regime 1 is close to unity, the probability of regime 2 is close to zero and vice versa. In particular, trading on the floor of the NSE on the eve of the elections across the 6 time horizons; Friday 26th February, 1999; Friday, 18th April, 2003; Friday, 20th April, 2007; Friday, 15th April, 2011; Friday, 27th March, 2015 and Friday, 22nd February, 2019 were marked using a vertical line. Also, the lines clearly re-echo the strong correlation relationship between regimes 1 and 2. Generally speaking, the findings indicate that the RHMS performs well in capturing the direction of movements of the return series at the NSE across regimes 1 and 2 over the event windows.

5.0 CONCLUDING REMARKS

A plethora of studies have assessed the impact of political events on stock market returns using varied research methodologies and reported mixed results. This paper applies a RHMS to assess the effect of presidential elections on stock market returns in Nigeria on the basis of daily data (5-days in a week) extracted from a sample of 5 months around each presidential election period. This covers a total of 6 presidential elections held between 1999 and 2019.

Preliminary investigation into the nature of the data unveils evidence of fat tails in the distribution with the presence of more right (+) than left (-) tail, thus indicating evidence of asymmetry in the distribution and possible leverage effect. The series, ASI and STR were found to be nonstationarity at level and the error process from an AR (1) model precludes the use of linear-based models, especially ARCH/GARCH models due to presence of homoscedasticity. The RHMS model typifies the NSE's daily returns in terms of bear (low) and bull (high) returns regimes 1 and 2. The results reveal mixed outcomes where regime 1 leads across the 6 election horizons with lower volatility though with statistically insignificant returns. Conversely, regime 2 records higher volatility but with more statistically significant positive returns. Additionally, the dummy impact of election reveals positive effect of presidential election on returns during the 2011 election. Meanwhile, findings also show that stock market returns were bearish during presidential elections when the PDP government was in office and bullish for elections held when the APC government was in office.

Election is synonymous to democracy and investors must contend with the upheavals it portends. However, good knowledge of potential effects of election is key to efficient portfolio management. In line with the findings, it is recommended that market instruments with fixed expected returns and other inter-temporal investments as against those that are short term in nature could be the investors' safe heaven. To fiscal authorities and other agencies of the government like the Economic and Financial Crimes Commission (EFCC) and the Independent Corruption Practices Commission (ICPC), curtailing government spending and election campaigns expenditure around election period are fundamental to macroeconomic stability and the stock market combined. The empirical evidence is also useful to regulators, especially the Nigerian Stock Market (NSE) and the Securities and Exchange Commission (SEC) in Nigeria, in forestalling crisis in the market through continuous monitoring of volatility around elections to mitigate wanton uncertainties.

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