POLITICAL CYCLES IN STOCK MARKET RETURN MOVEMENTS IN NIGERIA

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ABSTRACT

The degree to which stock market movements in emerging/developing democracies follow a political cycle, such as the presidential election cycle (PEC), is a crucial area of research in the field of how the political system affect stock markets. This relationship's rationalization accords with the Political Business Cycle Theory (PBC) claims regarding the opportunistic policy behavior of elected presidencies in democracies. It attributes its existence to the effect of a presidency's electoral tenure. The relationship has, nevertheless, been determined to be a puzzle, representing the inconsistency between the robust empirical support for the established US stock market but the lack of equivalent findings for other developed democracies or the PBC theories' implications. This study is motivated by the claim that results from stock markets with varying degrees of market efficiency are instructive to address the puzzle. Thus, the study offers insights from the developing Nigerian stock market. It employs multidimensional analysis to look into the PEC in the Nigerian stock market, utilizing regression, time domain, and frequency domain studies. The findings from the time domain analysis and the PEC model of stock returns fail to support that the years of the presidential election tenure cause the differences in average stock returns across the first and second halves of the presidential election term. The study concludes that the evidence fails to support a causal effect of the years of the presidential tenure on the stock market in Nigeria. Political cycle of the form of the PEC do not appear to exist in Nigeria. The study recommends that investors in Nigeria's stock markets should ignore market timing strategies, such as that based on the PEC pattern in stock market returns, and employ long-term portfolio investment strategies.

Keywords: Political Cycles; Presidential Election Cycle, Spectral analysis, Time domain analysis, GARCH model, Nigeria, Stock price, returns.

JEL Classification: D72, P16, C22, G12, G14.

1. INTRODUCTION

According to the theory of the relationship between the political system and the stock market, the political business cycle theory (PBC), components of the democratic political system cause systematic trends in stock market returns. PBC theory raises the presidential partisan cycle (PPC), the presidential election cycle (PEC) and the election information as the three avenues by which the political system may affect stock markets. Cycles in stock returns have substantial

ramifications for the theory and practice of financial economics. They suggest that traders can explore the systematic patterns for profitable investment strategies and constitute evidence against the hypothesis of market efficiency. The PEC effect in stock returns, which is a systematic pattern of relatively higher stock returns in the second half of the presidential election tenure, has grown a large literature. However, the findings in the literature have inconsistencies, with well-established evidence of the PEC effect for the US stock market (Allvine & O'Neville, 1980; Booth & Booth, 2003; Kräussl et al, 2014; Morales, O'Callaghan, Rajmil, & Gacal, 2021; Sturm, 2013; Wong & McAleer, 2009), but adverse findings in most non-US democracies (Celis & Shen, 2015; Döpke, & Pierdzioch, 2006). While it is thus, unclear the extent to which the phenomenon apply to non-US democracies. the US stock market studies are also unable to verify the PBC theory. The literature has for these reasons, dubbed the PEC pattern the PEC puzzle (Allvine & O'Neville, 1980). A current concern of the literature is to resolve the puzzle. One group of studies move to explore other channels of effects of political views on investor behaviour (Pastor & Veronesi, 2020; Montone, 2022) and the other (Celis & Shen, 2015; Döpke & Pierdzioch, 2006) pursue extending the evidence with findings from stock markets with different informational efficiency This study contributes to the latter literature by investigating the existence of the PEC effect on stock returns in the Nigerian stock market.

Determining whether the PEC effect exists in Nigerian stock market returns provides important information for policy makers, investors and other stock market practitioners in Nigeria. The PEC effect effectually, implies that development of the tenure of a democratically elected president predicts stock market returns. Thus, it implies room for traders to use investment strategies based on the PEC for superior profits. Moreover, the existence of the PEC effect is supported by the opportunistic PBC theory for Nigeria whose democratic presidency has become established since 1999. The critical view of PBC theory is that elected democratic presidents undertake expansive economic policies in the second halve of the election tenure near date of new elections, but more restrictive policies in the first halve. Nigeria's democratic political system established since 1993 has over the 24 year period from 1999, produced seven successive national elections and presidencies in 1999, 2003, 2007, 2011, 2015, 2019 and 2023. There has been no empirical study of the PEC effect in Nigeria to the best of the knowledge of this author. Studies of election effects (Aliyu, 2019; Eboigbe & Imagbe, 2020; Yaya, Adekoya & Adesiyan, 2020) find an effect of the event of national elections. Raifu (2021) makes a similar finding for the political regime. Findings that national election information affects stock markets provide support for the view that political system variables affect stock returns in Nigeria. Moreover, Döpke & Pierdzioch (2006) suggest that the existence of the PEC effect in non-USA economies may be influenced by the similarity between that political system and that of the US. Like the USA, Nigeria operates a majoritarian electoral rule in a multi-party democratic political system with 4-year presidential tenure. However, unlike the two-party political system of US, Nigeria operates a multi-party system. This difference may, however, not have strong consequences for the existence of the PEC effect. In contrast to the observation of similarities between the political systems of the US and Nigeria, Nigerian stock market indicators show a lower level of market development, in terms of market size and efficiency. Specifically, based on World Bank (2023) data, market size measured by stock market capitalization to GDP(%) for USA (Nigeria) respectively were 153.43(4.95) as at 1999, 104.14 (10.92) in 2009, and 158.57 (9.80) in 2019. Also, Stock market total value traded to GDP (%) as the measure of market depth for the two countries respectively, was 195.36 (0.19) as at 1999; 236.95 (1.53) in 2009; and 108.51 (0.61) or the year 2019. These figures highlight the superiority of the US stock market over the Nigerian market in terms of size and depth. The picture is the same for measures of market efficiency. Specifically,

the values of the Stock market turnover ratio (%) for the USA (Nigeria) were 27.33 (3.83) in the year 1999, 227.54 (13.94) in 2009, and 158.57 (9.80) in 2019. The level of market efficiency in the Nigerian stock market is less than that of the USA, which accords with the view that developing stock markets generally exhibit less efficiency (Afego, 2015). Given the above discussion, the study's objective is to verify the existence of the PEC pattern in Nigerian stock market returns. The specific objectives are (1)to identify whether a long-run cyclical pattern in stock returns aligning to the presidential election tenure exists in the Nigerian stock market. (2) to examine whether the years of the 4- year presidential election tenure determine Nigerian stock market returns.

This study provides developing democracy evidence on the existence of the PEC and yields evidence on the PEC in an economy with the same political electioneering rule as the USA but different stock market efficiency. To the best of the knowledge of the author, this is the first study to examine the existence of the PEC in stock returns in Nigeria using frequency domain analyses. The frequency domain analysis allows an accurate measurement and pictorial depiction of cyclical patterns of interest in a time series. Studies of stock market anomalies, including Li & Wang (2002), Romana & Nieves (2023) Wong & McAleer (2009) employed this method.

Four additional sections to the introductory section have been used to present this study. . Sections 2 and 3 include a brief review of literature and methodology respectively. Sections 4 and 5 in turn respectively, contain the study results and the conclusions and recommendations.

2. REVIEW OF LITERATURE

2.1 Theoretical Literature Review

The presidential election cycle (PEC) effect on the stock market, first reported in the US by Hirsch (1967), constitutes a political cycle in stock market returns, depicting a relationship between the political system and the stock market. The PEC effect describes cycles in stock returns, evolving as systematically lower returns in the first half of a (4-year) presidential election term relative to the second half. Unlike the PEC effect, Santa-Clara & Valkanov (2003) also describe political cycles in stock markets in terms of partisan cycles, which refers to political cycles in stock returns aligned with the political party in power.

Political cycles in stock returns are founded on Political Business Cycle theories (PBC) (Hibbs, 1977; Nordhaus, 1975), which propose that the political system: The policies implemented by elected presidents, the ideology of the elected political party and election information impact macroeconomic variables. Nordhaus's (1975) opportunist PBC theory depicts incumbent policymakers as opportunistic, manipulating economic variables to maximize the chance of re- election. According to the PBC theory, policymakers stimulate the economy before an election with expansionary fiscal, monetary, and welfare-oriented policies. The expansion of output and reduced unemployment that follows reverses when the policymakers reverse the expansionary policy stance after re- election. The fundamental implication of the opportunistic PBC, is that if investors do not hold rational expectations, years in the first half of the 4-year presidential election tenure should have negative impacts on stock returns, and the years in the second half, a positive effect.

The problem of the opportunistic PBC theory as the explanation of the PEC effect is its failure in empirical studies. he puzzling findings are that the systematic patterns in stock returns do not arise as a compensation for business cycle fluctuations nor due to time-varying risks premium in association with changes in presidential policy stance over the PEC. Moreover, the PEC is not captured in the trends of macroeconomic policy variables. The literature concludes that political cycles in stock returns are evidence against market efficiency over the long term (Allvine & O'Neill, 1980; Santa-Clara & Valkanov, 2003), and therefore, term them presidential puzzles. Overwhelming evidence that the PEC effect exists for the US, alongside

the failure of theoretical explanations has led to sustained interest in resolving the presidential puzzle.

2.2 Empirical Literature Review

Allvine & O'Neville (1980), Booth & Booth (2003), Huang (1985), are early developed democracy studies of the PEC effect. Their works establish existence of the PEC in US stock market returns. These studies conclude from their findings that average US stock market returns are significantly higher in the second halve of the presidential election tenure. Allvine & O'Neville (1980) observed that stock returns were on average, 21.7% and 15% when the time to the next election was respectively, 2 years and one year. In the election year, the return was on average 3.6% but -15.2% two years following the election. Booth & Booth (2003) extend the literature with findings of the existence of the PEC for both large-cap and small-cap stock returns in the US. The authors also found that the presidential tenure years determined the PEC pattern in stock returns. Huang (1985) find that mean returns were -2.57% and 21.95% in the first and second halves respectively in the 1961-1980 period and respectively, -1.56% and 3.22% for the period of 1832-1903.

Kräussl, et al. (2014) sought to analyse the PEC puzzle by using US data, and applying regression techniques to a PEC model of stock returns. The authors also developed the PEC hypothesis as a formal test of the implications of the PBC opportunistic theory, viz, that strategic changes in government policies: fiscal, monetary, tax, and unexpected inflation over the years of the election tenure, as well as political variables, transmit political cycles to stock returns. The authors find that relative to the first half of the presidential term, excess return of the S&P 500 is higher in the second half. Furthermore, the paper found no evidence to support the hypotheses that estimated returns are equal across the four election years of the presidency. The study also could not verify existence of the PEC effect in policy variables, the authors thus, conclude that their findings failed to support the PEC hypothesis.

Monotone (2022) investigates whether the US President affected the stock market, and argues that non-partisan ratings of elected political officers rather than political affiliations explained the relation between political views and the stock market. The author used time series analysis to determine the effect of Gallup's nationwide approval rating polls on US aggregate stock returns for the period of January 1948 to December 2015. The results of the study showed that net disapproval ratings caused low excess stock, where a 1% increase in net disapproval resulted in 0.11% fall in excess return. The author concludes that his findings explain Santa-Clara & Valkanov's (2003) presidential puzzle. For the view of this study to avail as an explanation of the presidential puzzle, the implication appears to be that net disapproval rating is synonymous with the presidencies of one of the two political parties in the US.

Morales, O'Callaghan, Rajmil, & Gacal (2021) contend that there is research gap in the literature, represented by the lack of studies of the effect of the Barack Obama and Donald Trump presidential terms on the S&P500 index. The study adopted US Economic Policy Uncertainty index (EPU) as proxy for economic and political uncertainty, and employed ARDL, LASSO and GARCH models for the analysis of the long run and volatility effects of the two presidential terms on the S&P 500. The paper's findings support the existence of a long-run relationship between stock returns and the measures of policy uncertainty for both the Obama and Trump administrations.

Focusing on partisan cycles, Santa-Clara & Valkanov's (2003) major concern was whether systematic differences in average returns, with average excess returns of 2% under republicans

and 11% under democrats, observed since 1927 shows impact of political variables on the stock market. To address this concern, the authors argued that the observed differences might be due to differences in expected returns, indicating that the presidential cycle proxies for effects of business cycle fluctuations, in which case, the difference represents a democratic risk premium. They could on the other hand be due to unexpected returns which would indicate that policies of both parties systematically differ from the forecasts made by the market. Results from test of the expected return view showed that the difference in returns still remained at between 10% and 20% after accounting for business cycle variables. The paper was also not able to validate the market inefficiency view. The paper concluded the difference in returns across partisan presidencies a presidential puzzle.

Wong & McAleer (2009) using spectral and time series analysis show that in the almost four decades from January 1965 through to December 2003, US stock prices closely followed the 4-year Presidential Election Cycle. The authors employed the GARCH model and the results from their estimation show stock returns equal -0.1287 for year 2 of the presidential term but the estimate was statistically insignificant. On the other hand, stock return for year 3 after the election was 0.2471 and it was statistically significant. The authors concluded the existence of the PEC for the US stock market.

Sturm (2013) investigated the existence of the PEC effect on US stock returns considering whether it was caused by PEC effects on government policy. The paper used annual holding period returns on the CRSP Value- weighted and CRSP Equally-weighted portfolios, and S$P 500 index and employed a difference in means regression method. The results showed a direct showed that years 1 and 2 of the presidential term had negative effects on the returns. Year 4 in turn ad positive effect on the returns. The results however, showed no effect of the years on government fiscal and monetary policy variables. The author concluded that the PEC in stock return and government economic policy effects on stock returns are separate phenomena.

Jones & Banning (2008) defined political cycles in terms of the presidential term and the party in power. They tested for the existence of the presidential term effect on stock returns using data on the Dow Jones Industrial Average (DJIA) for 104 years, from the year 1896 to 2000. The study applied a multiple regression model to monthly returns on the DJIA. The empirical analysis yielded statistically insignificant estimates of the second half of the presidential term variable. The authors concluded that there is no evidence in support of the presidential term effect on stock returns.

The interest of Dokpe's & Pierdzioch (2004) study of Germany stock market was whether evidence from countries under than the US may yield insight into the impact of political variables on the stock market returns. The author notes the existence of differences between the Germany and US political systems, in terms of regularity of election terms and in political institutions. The study innovatively specifies a test of political cycles in stock markets constitutes a test of both the election and partisan cycles, by using the McCallum dummy variable as the proxy for political cycles. The empirical regression model relates aggregate stock index returns to the McCallum dummy. The estimated coefficients for the McCallum dummy were however, largely insignificant across various specifications.

Tornmero & Ortega (2010) tested for the PEC in stock returns, the presidential partisan cycle and the election date effect in the Spanish stock market, using the MSCI Spain index returns and MSCI world index returns. The study employed GARCH model of stock returns. The results of the study showed that there was no systematic difference in excess returns in the last two years preceding an election. Neither does the magnitude of excess returns vary when the incumbent wins or losses. The authors suggest that the results align with uncertain information hypothesis.

Celis & Shen (2015) were motivated to meet the gap in the literature in the context of developing countries. The study thus examines the presence of a political cycle in Malaysia stock returns. The study used tests of equality and GARCH models and data for the period between February 1982 to April 2012. Political cycles defined in terms of effect of election information, prime minister and associated political institutions. The result of the study shows that there is no political cycle in stock market returns but one in volatilities.

Among studies of the Nigerian stock market, Ado & Yaro (2023) was concerned with the effect of Covid-19 on the volatility of prices in the Nigerian stock market. The study used daily returns for two years, from January 2020 to December 2022 and GARCH models. The author finds positive effect of the pandemic on stock price volatility. Iortyer & Maju (2022) examined the impact of selected macroeconomic drives on the stock market. The paper adopts a time series methodology, and focused on real GDP, exchange rate and government expenditure. The study finds that all the variables exert positive impacts on stock prices.

Musah, Domehar & Musah (2023) examine how presidential elections impacted stock return volatility in stock markets of five selected Sub-Saharan African economies. The study adopted the GARCH model and related return volatility to Dummy variables specified for pre- and post- presidential elections. The study finds that uncertainty in the pre-election period increased stock return volatility in the three stock markets.

Ozekhome (2017) aimed to examine effects of dummy variables representing pre- and post-election on economic activities in Nigeria, including GDP, stock market, gross investment and government expenditure. The paper adopts OLS regression analysis and estimates n equation relating stock market capitalization to the specified dummy variables. The study finds that the posy-election period has positive effect on stock market capitalization. Timothy & Okwori (2023) analysed the return spillover effect between oil prices and sectoral stocks. The authors adopted the Constant Conditional Correlation VARMA GARCH methodology, and finds a bidirectional spillover effects . However, the relevance of this results is uncertain, as oil prices are exogenous to Nigerian economic system. In the work of Thomas & Onakoya (2023), the concern is whether the aggregate stock index (ASI) in the Nigerian stock market responds to external financial flows. Using both VECM, ECT and Causality analysis, the author finds that external flows, other than FDI impact the ASI positively.

3. METHODOLOGY

3.1 Theoretical Framework

The study employs the opportunistic political business cycle theory (Nordhaus, 1975) as the theoretical framework for the PEC effect on stock market returns. Opportunistic PBC theory asserts that a president in office is incentivized to manipulate economic policies to ensure that the incumbent and his party are successful in the next elections. The person will enact stringent policies during the first half of the presidential tenure, but welfare-increasing policies during the second half culminate in the election date. Economic deflation and expansion in the first and second halves of the presidential term, respectively, then cause negative and positive movements in stock prices. Therefore, the PBC theory suggests that each year in the first half of the presidential election term affects stock returns negatively, while each year in the second half has a positive effect (Wong & Mcleer; 2009). The theory's proposition that there is a deterministic relationship between the years of the presidential election tenure and the stock market may be stated in symbols as follows,

$R_t = F(Y_1, Y_2, Y_3, Y_4)$ (1)

Where,

R_t = Stock return as at time t

Y_1 = First year of the presidential election tenure

Y_2 = Second year of the presidential election tenure

Y_3 = Third year of the presidential election tenure
Y_4 = Fourth year of the presidential election tenure

3.2 Empirical Model Specification

The empirical model of the study follows from the theoretical model in Equation (1). Following Kraussl et (2014), Wong & McCleer (2009) the study specifies a PEC effect on stock returns model.

3.2.1 The Presidential Election Cycle effect on Stock returns Model

Equation (2) expresses the returns on the NGX ASI (R_t) in terms of the years of the presidential election tenure in the specific form as,

$$R_t = \alpha_0 + \alpha_1 Y_1 + \alpha_2 Y_2 + \alpha_3 Y_3 + \alpha_4 Y_4 + \varepsilon_t \quad (2)$$

Where, the variables of the model, R_t is weekly stock return, and Y_1, Y_2, Y_3, and Y_4 are as defined in Section 3.1. Equation (2) specifies R_t as a function of the years, Y_1, Y_2, Y_3, and Y_4 in the 4-year presidential term. ε_t is the error term, assumed to be a sequence of independent, identically distributed random variable, with mean zero and constant variance. Previous empirical works such as Kraussl, et al (2014) and Wong & Mcleer (2009) for example, suggest that the relative returns to Y_2 and Y_3 yield the basis for establishing a PEC effect. A PEC effect is evidenced by Y_2 having a negative effect on the stock returns while Y_3 has a positive effect. This view reflects the assumption that a bearish trend in the stock return ensues and reaches its trough in Year 2, in association with the first and second years of the presidency, when the policymakers adopt a restrictive economic policy stance. Year 3 after the election, however, impacts stock returns positively. A condition reflecting that the stock market goes into a bullish trend in year 3 in response to policymakers' expansive policy stance..

Apriori expectations: $\alpha_0 > 0, \alpha_1 < 0, \alpha_2 < 0, \alpha_3 > 0, \alpha_0 \gtreqless 0$

3.3 Data and Estimation Methodologies

3.3.1 Data

Secondary data on the weekly Nigerian stock exchange All Share index (NGX ASI) (pt) for February 2, 1999, to December 27, 2023, were obtained from NGX and Investing.com websites. To account for the weekday effects, (Aggarwal, & Jha, 2023; Lo, & MacKinlay, 1988; Raza, Baiqing, Hussain, & Kay-Khine, 2023), the study used the Wednesday values rather than the end-of-week values of the NGX ASI. Our study computed the weekly return series, Rt, using $R_t = \log(pt/pt\text{-}1)$. The study also adjusted the return series by removing outliers to address econometric problem in the time series analysis.

Nigerian elections dates, on the other hand, were obtained from various sources including Wikipedia. The study identified seven (7) presidential elections conducted in Nigeria in February 1999, April 2003, April 2007, April 2011, March 2015, February 2019 and February 2023. Two conditions could make stock market participants uncertain about the period, especially the start date of a presidential term. One, unlike the US, the dates of Nigeri's elections are not fixed but variable. Second, the election process has high post-election controversy. The study captures the presidential term variables Y_1, …Y_4 using dummy variables (DV). A DV for year one (Y_1) takes the value of 1 from the week closest to the election date (the exact date of election may not be captured in the weekly stock price series) till end of year 1 after the election, and zero for all other years in each of the seven presidencies. The same method is used to generate the dummy variables for Years 2, 3, and 4. Some studies have used other methods to capture the years of the election tenure. for example, Dokpe & Pierdzioch (2006) use the McCallum dummy variable. Our study considers this method most appropriate for lower frequency data, as it assumes the values 0,1,2,.., 8,7,6,5,…,0. Where each number is a different quarter within the period between two elections.

3.3.2 Estimation Method

The study estimates the PEC model of stock returns specified in 3.2.1 using an Autoregressive Moving Average (ARMA) model also called the Box-Jenkins models. The ARMA(p, q) model specifies the dependent variable as a pth order autoregressive and qth order moving average process. The ARMA model captures serial correlations and effects of past errors on present values, and is thus used in modelling financial variables. The ARMA process is appropriate because the explained stock return variable is stationary in levels. The ARMA(p, q) model of stock returns is specified as follows,

$$R_t = \alpha + \theta_1 R_{t-1} + \cdots + \theta_2 R_{t-p} + u_t + \pi_1 u_t + \pi_2 u_{t-1} + \cdots + \pi_q u_{t-q} \quad (3)$$

Where,

$\alpha = the\ constant\ term,$

R_{t-i} = autoregressive terms, i = 1, …, p

θ_i = coefficients on the autoregressive terms

$u_i = the\ values\ of\ the\ error\ term, i = 1, \ldots, q$ and

$\pi_1 = coefficients\ on\ the\ error\ terms.$

To implement this model, the intervention variables, Y_1, Y_2, Y_3, and Y_4 are added to an ARMA(9, 1) model,

$$R_t = \alpha + \theta_1 R_{t-1} + \theta_2 R_{t-9} + \pi_2 u_{t-1} + \alpha_1 Y_1 + \alpha_2 Y_2 + \alpha_3 Y_3 + \alpha_4 Y_4 + \varepsilon_t \quad (4)$$

Equation (4) is the ARMA (9, 1) PEC model of stock returns to be estimated by our study.

3.3.3 Spectral Density and Time Domain Techniques

In pursuit of objective 1 of this study, the study follows Chaudri & Lo (2015), Romana & Nieves (2023), Wong & McAleer (2009) and employs spectral analysis to investigate the existence of the PEC effect in NGX ASI returns. The technique yields a vigorous mathematical and reliable approach to identifying deterministic cycles or recurring patterns in a time series (Allvine & O'Neille, 1980; Wong & McCleer, 2009). The basic assumption in using the technique is that the autocovariance of the series can be represented by the spectral density function. The focus then is to conduct the frequency domain analysis, which requires that we transform the time domain data to frequency domain, and then generate a set of numbers called the power spectrum, which shows the frequencies that dominate the variance of the time series. The power spectrum shows the degree to which the movement in the stock return series is explained by cyclical patterns or waves of varying lengths. For ease of presentation and interpretation, the spectral density is commonly estimated using the periodogram, which is mathematically, the squared correlation between the time series and sine/cosine waves at the different frequencies spanned by the series. Following Wong & McCleer (2009), estimation of the periodogram assumes that the stock return R_t, is a stationary series that can be expressed as,

$$R_t = \sum_{i=1}^{k} (A_i Cos\omega_{it} + B_i Sin\omega_{it}) + \varepsilon_t \quad (5)$$

$Where,$

$A_i = c_i Cos\emptyset_i$ $and\ B_i = -Sin\emptyset\ are\ the\ individual\ cycles\ in\ the\ series, \emptyset = phase\ angle$ and $A_i\ gives\ up\ cycles\ and\ B_i\ gives\ down\ cycles.$

$c_i = amplititude,$ $\omega_i = angular\ frequency\ in\ radians\ per\ unit\ of\ time, \varepsilon_t$ = error term. Equation (9) transforms the series, R_t, from time domain into frequency domain and the sums A and B of the individual cycles A_i and B_i respectively, are estimated using Least Squares, so that the amplitude c_i is $(A^2 + B^2)^{1/2}$

The periodogram is typically, smoothened to improve its consistency. This study uses the Hamming Kernel density function to generate the smoothened periodogram. The presentation and interpretation of the results of the analysis is made easy by use of the graphical periodogram,

which is the plot of the estimated Angular frequencies in the series against the spectral density. A dominant peak in the plot at a frequency indicates a significant frequency in the spectrum of the series.

Time Domain Technique

The study also conducts time domain analysis to test for PEC effects in the NGX ASI returns. The technique estimates the average returns on the NGX ASI for each year of the presidential election tenure. Evidence on the PEC effect is based on differences in the average returns over the years of the election term (Kräussl, et al., 2014; Wong & McAleer, 2009).

4. RESULTS AND DISCUSSION OF FINDINGS

4.1 Descriptive Statistics

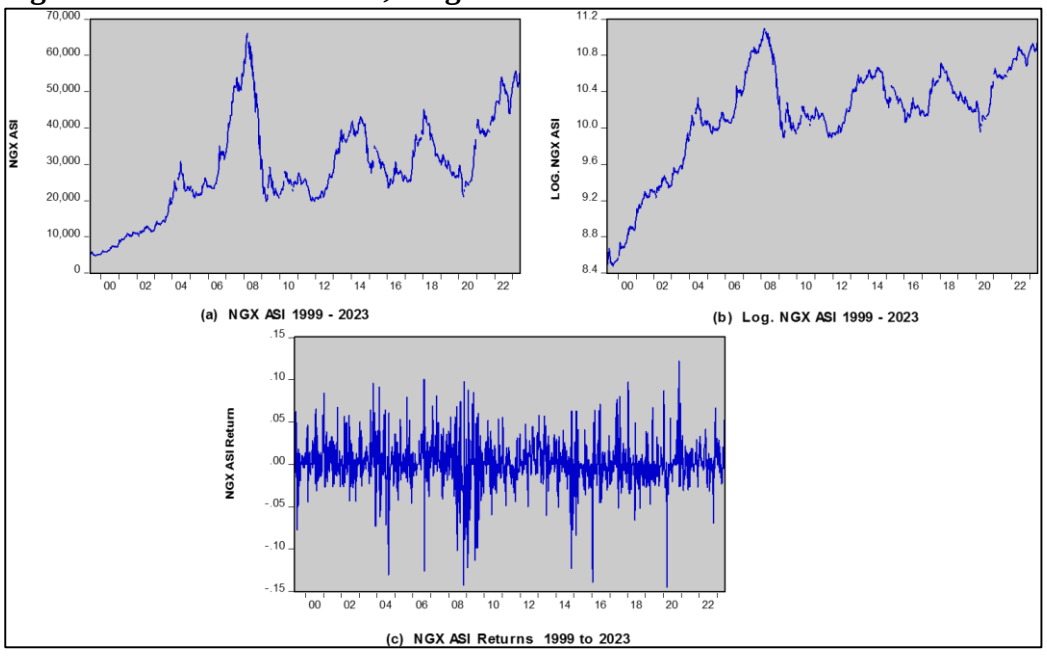
The descriptive statistics, Table 1, shows that the mean weekly NGX ASI and its logarithm are 28644.09 and 10.1292 respectively. The NGX ASI Return has an average value of about 0.0021. The weekly standard deviation for the index, its logarithm and the returns are respectively, about 14198.83, 0.604 and 0.100. The Jarque-Bera statistic indicates non-normality of all the series at the 1% level of statistical significance. The computed ADF test statistics show that the null of unit roots cannot be rejected for both the NGX ASI and its logarithm, but it is rejected for the NGX ASI Return series at the 1% level of statistical significance.

Table 1. Descriptive Statistics of NGX ASI, LOG(NGX ASI) and NGX ASI Return

Statistic	NGX ASI	Log NGX ASI	NGX ASI Returns
Mean	28644.09	10.12924	0.002082
Std. Dev.	14198.83	0.604186	0.100044
Skewness	0.507330	-1.048711	0.295330
Kurtosis	3.149030	4.019176	461.9600
Jarque-Bera	55.12890	285.0363	11032510
Probability	0.000000	0.000000	0.000000
ADF	-0.0555885	-1.928679	-31.92696
Crit. ADF Val.	5% -2.863631	5% -2.863637	1% -3.435340

Source: Author

Figure 1. Plots of NGX ASI, Logarithm of NGX ASI and NGX ASI Returns



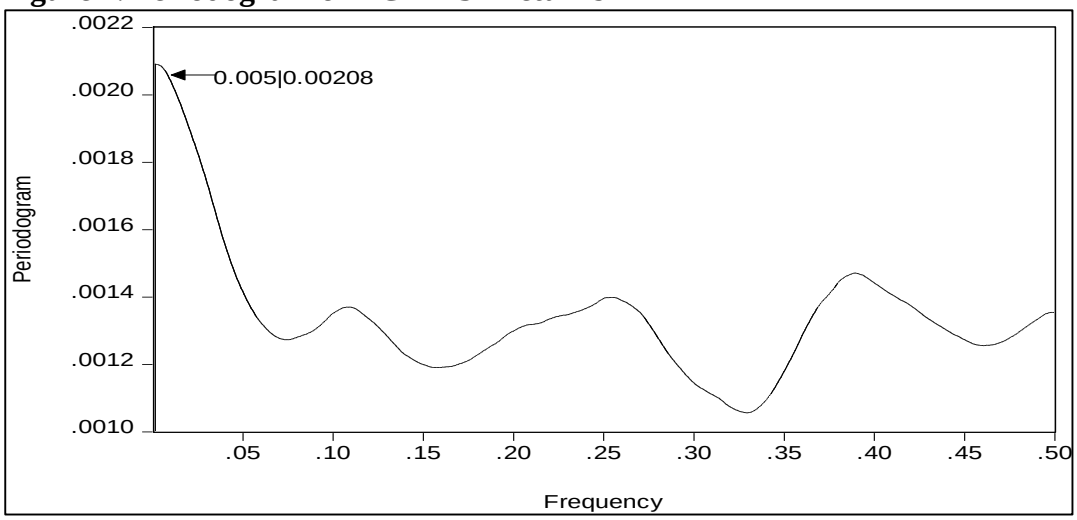
Source: Authors

Figure 1 presents time plots of NGX ASI, its logarithm and NGX ASI Returns. The plots show both upward trends over time and non-smooth movements in the trends for NGX ASI and its logarithm. The plots of these two also evidence changing means and variances which has the implication that the series and the log of the series are heteroskedastic and nonstationary. The two series also exhibit volatility clustering as their plots shows that large changes in return tend to be followed by large changes and small changes by small changes. The plot of the NGX ASI returns, in contrast, shows no trend but it is mean-reverting. All further empirical analysis uses the weekly NGX ASI returns.

4.2 Spectral Analysis Results

The plot in Figure 2 shows the periodogram of the NGX ASI Return series, smoothened using the Hamming Kernel density function to show cycles that are significant at the 5% level.
The angular frequencies are plotted on the horizontal axis and the periodogram, the estimate of the spectrum density of the series, on the vertical axis. The required information on cyclical patterns that dominate the NGX ASI return series is derived using the angular frequencies. Specifically, the cycles per time unit is obtained as the ratio, 1/angular frequency. Since the stock returns are weekly time series, the plot in Figure 2 shows that a cycle of 200 weeks (3.8years) corresponding to frequency of 0.005, is found in the stock returns. The plot also shows that a long cycle of 500 weeks (9.6 years) corresponding to frequency of 0.002, as well as short cycles of 4 weeks and 2.5 weeks may explain the movements of the stock return series. The finding of a 3.8 years cycle shows the existence of the PEC effect in the Nigerian stock market. This finding is in accord with Wong & McAleer (2009) for USA, Allvine & O'Neille, (1980) for USA.

Figure 2. **Periodogram of NGX ASI Returns**



Source: Authors

4.3 Time Domain Analysis

The study tests for PEC in the returns, specifically the hypothesis that stock returns fall in the first half of the presidential tenure and reach a trough in the second year. The returns then, rise and reach a peak in the third or fourth year. Percentage weekly average returns and standard deviations of the NGX ASI return series for each of the years of the presidential term are in Table 2. The lowest estimated weekly average return is 0.00014 in year 2, while the highest is 0.0043 in ear 3. Moreover, mean weekly returns for the first are equal 0.0012 and is less than returns in the second half which is equal 0.0030. However, based on the reported probability values all tests, the t-test, anova F-test and Welch F-test support the null hypothesis

that the returns in the two halve are equal. This result accords with Celis & Chen (2005) for Malaysia.

Table 2. Performance of NGX ASI Return Across Years of Tenure of Elected President

Variable	**Statistic**	**Year 1**	**Year 2**	**Y1 + Y2 First ½**	**Year 3**	**Year 4**	**Y3+Y4 Second ½**	**All Years**
Average weekly NGX ASI Return	Mean	0.0022	0.00014	0.0012	0.0043	0.0017	0.0030	0.0021
	Std Dev.	0.0535	0.0333	0.0451	0.0282	0.1931	0.1374	0.1000
Test of Equality of First ½ and Second ½								
t-test		-0.278830						
Anova F-test		0.0077746						
Welch F-test		0.077746						

Source: Authors

4.4 Correlation Analysis

The coefficients of correlation in Table 3 show that the dependent variable, NGX ASI Return, is negatively correlated with Year 1 and Year 2, but positively with year 3 and negatively with Year 4. Likewise, NGX ASI Return is negatively correlated with First1/2, the first half of the of the 4-years of the presidential tenure, but positively with second1/2, the second half of the tenure.

Table 3. Estimated Correlation Coefficients

	NGX ASI Return	Year 1	Year 2	Year 3	Year 4	First1/2	Second1/2
NGX ASI Return	1.000000						
Year 1	-0.000801	1.000000					
Year 2	-0.035869	-0.351524	1.000000				
Year 3	0.044039	-0.344732	-0.319990	1.000000			
Year 4	-0.005660	-0.337509	-0.317186	-0.311058	1.000		
First1/2	-0.031639	0.590418	0.548042	-0.583878	-0.575008	1.000000	
Seond1/2	0.032793	-0.581220	-0.542819	0.589496	0.584331	-0.987279	1.000

Source: Authors

4.5 Estimated MA (9, 1) Model of PEC Effect on Stock Returns

Table 4 presents the results for the ARMA(9, 1) PEC model of stock returns (R_t). The ARMA model is estimated as an ARMA(9, 1) model including an AR(1) and AR(9) and an MA(1) terms by maximum likelihood methods. The order of the AR and MA terms was chosen based on the partial autocorrelation, PACF, graphs. The results in Table 4 show that the autoregressive terms are each positively signed, while the MA(1) term is negatively signed. Also, based on estimated t-values, AR(1) and MA(1) are statistically significant at the 1% level while the AR(9) term is significant at the 10% level. The results indicate that current stock return is affected by one and 9 period lags of stock returns. Also, the statistical significance of the MA(1) term imply that the previous period error contributes to the present value of stock returns. Furthermore, the estimated polynomial roots are each lower than one showing that the estimated model meets the condition for model invertibility. The study also presents the Invert Root of AR/MA Polynomials graph, which shows that the roots lie inside the unit circle. (see appendix 1)

Table 4. Estimated Stock Return Model

Dependent Variable: RESIDUAL
Method: ARMA Maximum Likelihood (Newton-Raphson)
Included observations: 1257

Variable	Coefficient	Std. Error	t-Statistic	Prob.
YR1	0.000376	0.002358	0.159458	0.8733
YR2	-0.002893	0.002261	-1.279581	0.2009
YR3	0.002582	0.002494	1.035247	0.3008
YR4	0.000109	0.002512	0.043530	0.9653
AR(1)	0.739219	0.101142	7.308712	0.0000
AR(9)	0.030871	0.018623	1.657694	0.0976
MA(1)	-0.656156	0.113276	-5.792528	0.0000
SIGMASQ	0.000867	2.04E-05	42.55195	0.0000

R-squared	0.021543	Mean dependent var	-2.41E-06
Adjusted R-squared	0.016059	S.D. dependent var	0.029779
S.E. of regression	0.029539	Akaike info criterion	-4.199814
Sum squared resid	1.089828	Schwarz criterion	-4.167123
Log likelihood	2647.583	Hannan-Quinn criter.	-4.187528
Durbin-Watson stat	1.983208		

Inverted AR Roots	.85	.62-.38i	.62+.38i	.19+.63i
	.19-.63i	-.28-.57i	-.28+.57i	-.58+.23i
	-.58-.23i			
Inverted MA Roots	.66			

Source: Authors' Computation

The coefficients on the year variables are all positively signed excepting Year 2 (Y_2) which is negatively signed. Specifically, the estimated values are about 0.0004, -0.0029, 0.0011 respectively, for Y_1, Y_2, Y_3, and Y_4. Also based on the estimated t-statistics, the coefficients on the intervention variables are all statistically insignificant. The R-Squared and Adjusted R-Squared are 2.2% and 1.6% respectively. The D-W statistic value of about 1.98 shows absence of autocorrelation. However, the D-W test is not the appropriate test for autocorrelation for ARMA models. The Ljung-Box Q-statistic test for autocorrelation was estimated for 36 lags, and the output shows there is no autocorrelation from lag 5 (Appendix 2). The test indicates presence of autocorrelation at lag 4 but at the 10% level of significance.

Model Diagnostics

Table 5 presents the results for the Breusch-Pagan-Godfrey Heteroskedasticity Test. All three statistics, F-statistic, Obs*R-squared except the Scaled explained SS show support for the null of homoscedasticity based on the estimated probability values.

Table 5. Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.733570	Prob. F(4,1252)	0.5691
Obs*R-squared	2.939109	Prob. Chi-Square(4)	0.5681
Scaled explained SS	9.127195	Prob. Chi-Square(4)	0.0580

Source; Author.

Interpretation of Results

The estimates of the coefficients on Years 2 and 3 are the critical tests of the PEC effect. The finding that Year 2's effect is negative accords with the study's apriori expectation. Moreover, its' statistical insignificance accords with Sturm (2013), Wong & McCleer (2009), Kraussl, et al (2014). Likewise, the finding of a positive effect of Year 3 also follows theoretical specification. However, in contrast to these authors, the year 3 variable is not statistically

significant at conventional levels. The key finding from the estimated results is that Nigerian stock market returns appear to vary in association with the presidential election tenure, reaching a trough in Year 2 and a peak in Year 3, one year to the next election. However, the statistical insignificance of the intervention variables in the estimated model do not appear to support a causal effect of the years of the presidency term on stock returns. This finding accords with Celis & Chen (2015) for Malaysia, Dokpe & Pierdzioch (2006) for Germany, Jones & Banning (2008) for the US and Tornmero & Ortega (2010) for Spain.

5. CONCLUSIONS AND RECOMMENDATIONS

The study sought to investigate the existence of the presidential election cycle in the Nigerian stock market. The PEC refers to a cyclical pattern in stock returns that follows the 4-year presidential tenure. The study conducted a multidimensional analysis implemented by the frequency domain, time domain and time series analyses of the NGX ASI Return Series. In accordance with the proposition of a PEC effect, the findings from the frequency domain analysis showed that the spectrum of the series contains a cyclical period of 3.8 years. The findings from the time domain analysis, however, is that there is no significant difference between the average annual returns in the second half of the presidential tenure relative to the first half. Likewise, the findings based on the PEC model of stock returns show that the years of the presidential election tenure do not cause the differences in average stock returns across the first and second halves of the presidential election term. The study concludes that the evidence fails to support a causal effect of the years of the presidential tenure on the stock market in Nigeria. The political cycle of the form of the PEC does not appear to exist in Nigeria. The paper's findings contribute to the increasing evidence that the PEC effect is peculiar to the developed US democracy and is either non-existent or weakly found in other democracies. In addition, the findings appear to define a scope of portfolio investment strategy that is profitable in non-US developing democracies such as Nigeria. The study recommends that investors in Nigeria's stock markets ignore market timing strategies, such as that based on the PEC pattern in stock market returns. The study rather recommends alternative strategies such as value investing and long-term portfolio investment strategies.

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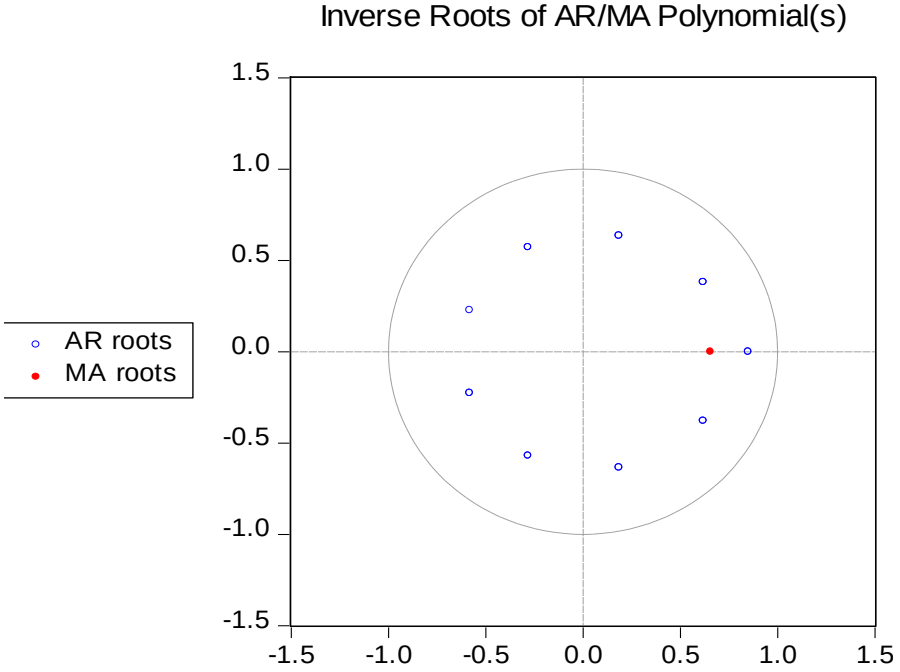
Appendix 1: Inverse Roots of AR/MA Polynomials



Appendix 2: Ljung-Box Q Statistic

Included observations: 1256

Q-statistic probabilities adjusted for 3 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
| |	| |	1	0.004	0.004	0.0177	
| |	| |	2	0.043	0.043	2.3581	
| |	| |	3	0.028	0.027	3.3152	
| |	| |	4	-0.004	-0.006	3.3325	0.068
| |	| |	5	0.023	0.020	3.9858	0.136
| |	| |	6	0.030	0.030	5.1191	0.163
| |	| |	7	-0.033	-0.035	6.4986	0.165
| |	| |	8	0.008	0.005	6.5808	0.254
| |	| |	9	-0.000	0.002	6.5808	0.361
| |	| |	10	-0.032	-0.031	7.8525	0.346
| |	| |	11	-0.005	-0.007	7.8820	0.445
| |	| |	12	0.010	0.014	8.0152	0.533
| |	| |	13	0.037	0.041	9.7904	0.459
| |	| |	14	0.036	0.033	11.424	0.408
| |	| |	15	-0.004	-0.006	11.442	0.491
| |	| |	16	-0.002	-0.005	11.449	0.573
| |	| |	17	0.002	-0.001	11.453	0.650
| |	| |	18	-0.036	-0.038	13.105	0.594
| |	| |	19	0.022	0.019	13.721	0.619
| |	| |	20	-0.006	-0.003	13.760	0.684
| |	| |	21	0.002	0.004	13.767	0.744
| |	| |	22	0.034	0.033	15.241	0.707

|	|	|	|	23	-0.024	-0.020	15.956	0.719
|	|	|	|	24	0.030	0.031	17.078	0.706
|	|	|	|	25	0.046	0.042	19.747	0.599
|	|	|	|	26	0.020	0.018	20.256	0.626
|	|	|	|	27	-0.025	-0.036	21.047	0.636
|	|	|	|	28	0.015	0.007	21.326	0.674
|	|	|	|	29	-0.034	-0.029	22.822	0.643
|	|	|	|	30	-0.007	-0.011	22.890	0.691
|	|	|	|	31	0.053	0.057	26.447	0.548
|	|	|	|	32	0.024	0.033	27.194	0.561
|	|	|	|	33	0.022	0.018	27.820	0.580
|	|	|	|	34	-0.022	-0.029	28.452	0.598
|	|	|	|	35	-0.002	-0.001	28.457	0.647
|	|	|	|	36	-0.002	-0.006	28.462	0.693

*Probabilities may not be valid for this equation specification.