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Inflation and Stock Market Returns Volatility: Evidence from the Nigerian Stock Exchange 1995Q1-2016Q4: An E-GARCH Approach

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Abstract The paper investigated the effect of inflation on stock market returns on the Nigerian stock exchange market, employing a volatility modeling approach. Using monthly data on stock market returns and consumer price index inflation rate, the paper employed GARCH and E-GARCH volatility modeling techniques for analysis. The study found that CPI inflation is not an important variable in explaining stock market return volatility in Nigeria. The E-GARCH model did not find existence of asymmetry in the stock return series; that is good news and bad news have identical impact on stock returns in Nigeria. The GARCH model show high persistence in the stock returns series, though a shock to stock returns has only a temporary impact.

Keywords: *inflation, stock market returns, Exponential Generalized Autoregressive Conditional Heteroskedasticity (E-GARCH)*

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1. Introduction

Stock markets the world over are organized exchanges where securities are traded. From the largest stock markets [New York Stock Exchange (NYSE), London Stock exchange (LSE) and Tokyo Stock exchange (TSE)], to the relatively low capitalized stock markets of Sub-Sahara African countries like Ghana, Zimbabwe, Kenya, South Africa and Nigeria, all have same basic functions. First, they are primary markets where corporations, governments, municipalities and other incorporated bodies can raise capital and a second function is serving as a secondary market for trading in existing securities between investors for cash with the aim of reducing investment risk and maintaining liquidity in the system. It is however the second basic function of the stock exchange that has fascinated researchers and led to several scholarly inquiries into the nature and workings of the stock market as a whole.

Holders of company or government stocks consider certain macroeconomic variables when they value stocks [28]. These macroeconomic variables include inflation rate, interest rate, exchange rate and money supply. These are very important macroeconomic variables which affect the performance of stock market in the developed and developing nations. Economists also believe that there is an effect through the macroeconomic variables towards the economy and to the stock markets. This sentiments corroborates the submission of Fama who states that stock prices are the reflector of various variables such as inflation, exchange rate, interest rate and industrial production [16]. Among all these macro-economic variables, inflation can be considered as the major variable with an effect on the economy as well as the stock market by affecting the over-all returns in the stock market [28].

Having identified inflation as one key macroeconomic variable that affects stock market performance, it is not surprising that it has become an important area of inquiry in developing nations, having already received wide scholarly inquisition in developed economies of the world. Inflation has effects on a country in a number of ways, one of which is described as the social cost of inflation [31]. It can adversely affect countries by way of reducing the purchasing power of the consumers in the domestic economy. This effect extends to the stock market as an unexpected rise or fall in the prices from actual levels and therefore disturb the investor's expectations on returns, thereby increasing the air of uncertainty about the expected stock returns. Investors in the capital market show an overwhelming interest regarding the nature and direction of the relationship between rising price levels and instability of stock markets. Empirical studies conducted in advanced markets, though with mixed outcomes provide substantial evidence in support of the argument that stock market returns are affected by macroeconomic variables like inflation rate [16,38,45].

2. Statement of the Problem

Studies on inflation and stock market returns in developing countries exist albeit with different econometric approaches to analyzing the issue at hand. The choice of technique employed can likely be influenced by one of two things. First is the nature of data available to the researcher and second is the ability of the researcher to systematically determine the appropriate econometric technique to be employed in analyzing the issue.

A consensus however exist that inflation substantially affect stock market returns, though what remains to be seen is the direction of the existing relationship with no theoretical or empirical consensus yet to be reached. There is a disagreement in the theoretical literature regarding the relationship between inflation and stock market returns [28]. Fisher's theory avails that there is a positive relationship between inflation and the stock market return while Proxy's hypothesis points to a negative relationship between inflation and stock market returns, hence, highlighting the conflict in theory as regards the direction of existing relationship calls for further scrutiny through this study. Existing empirical evidence in developed and developing countries have failed to put to rest the theoretical conflict on the relationship between inflation and stock market returns. A host of studies supports the Fisher's and the Proxy hypothesis of Fama [24,25,28,32,48] and [1,2,10,12,46]. These studies are based on data from well-established stock markets as well as emerging stock markets of developing countries. In the case of Nigeria, studies abound on stock market returns-inflation nexus. However, most of the studies failed in capturing the effect of time varying volatility an absence of which will yield misleading results. This paper investigates the impact of inflation on stock market returns in Nigeria using time varying volatility modelling techniques.

3. Conceptual Clarification

3.1. Inflation

Inflation is defined as a persistent rise in the general level of prices of goods and services in an economy over a period of time. "The rate of inflation—the percentage change in the overall level of prices—varies greatly over time and across countries" [31]. When the general price level in an economy rises, each unit of currency purchases fewer goods and services than the pre-inflation period, eroding the buying power of money in the economy. Inflation is measured by inflation rates, the annualized percentage change in the general price index (usually the Consumer Price Index) over time. The effects of inflation on an economy are numerous and can be positive or negative, but mainly negative. Four expected negative effects of inflation which includes first, a distortion of the inflation tax on the amount of money people hold [31]. A higher inflation rate leads to a higher nominal interest rate, which in turn leads to lower real money balances. If people are to hold lower money balances on average, they must make more frequent trips to the bank to withdraw money. The inconvenience of reducing money holding is metaphorically called the shoeleather cost of inflation, because walking to the bank more often causes one's shoes to wear out more quickly.

A second cost of inflation arises because high inflation induces firms to change their posted prices more often. Changing prices is sometimes costly [31]. These costs are called menu costs, because the higher the rate of inflation, the more often restaurants have to print new menus.

A third cost of inflation arises because firms facing menu costs change prices infrequently; therefore, the higher the rate of inflation, the greater the variability in relative prices. For example, suppose a firm issues a new catalog every January. If there is no inflation, then the firm's prices relative to the overall price level are constant over the year. Yet if inflation is 1 percent per month, then from the beginning to the end of the year the firm's relative prices fall by 12 percent. Sales from this catalog will tend to be low early in the year (when its prices are relatively high) and high later in the year (when its prices are relatively low). Hence, when inflation induces variability in relative prices, it leads to microeconomic inefficiencies in the allocation of resources.

A fourth cost of inflation results from the tax laws. Many provisions of the tax code do not take into account the effects of inflation. Inflation can alter individuals' tax liability, often in ways that lawmakers did not intend.

Positive effects of inflation includes central banks' adjustment of nominal interest rates (carried out to reduce adverse effects of recessions), and encouragement of investment in non-monetary capital projects like real estates and other social infrastructure.

3.2. Stock Market

In this section, the paper takes a look at the stock market which is often times also called equity market. Companies wishing to raise initial or additional capital for operations issue shares on the stock exchange market which define the main part of their ownership structure. These shares, also known as stocks, are either offered to the public when the company is listed or to some certain select individuals for privately owned entities. Equities have also been defined as being an ownership of a firm, with full participation in its success or failure by the holders of the firm's equities [41]. Companies issue shares on the stock exchange to raise money to procure fixed assets or to diversify into new business venture rather than using the fund realized for recurrent expenditure. Shareholding has been explained as simple possession of a paper asset which carries with it a hold on the capital and income of the company and a share in the management of the company through voting right proportional to number of shares held [23]. A veiled differentiation of common and preference stocks have been availed, that the term "common stock" do not convey a precise meaning, and is usually used in reference to stocks or shares that are given no special preference in the event of dividend payment or bankruptcy, and where the holders receive certificate with a stated value of cash share called "par value" which is normally lower than the market value of the stock [42].

It is the Common stocks of a listed company that can be bought or sold freely on the stock exchange market and the reward for ownership is paid in the form of a dividend

[42]. Dividend payment however is not guaranteed in either real or nominal terms to shareholders, but depends primarily on the ability of the company to make profits and the policy of its directors to either pay dividends or retain profits [23]. With shareholding conferring ownership status on the holders, stockholders indirectly make the dividend policy and other operational decisions through representatives they chose at the company's annual general meetings (AGM), using their voting rights. Directors who make up the company's board ought to work in the interest of shareholders, however, sometimes they take decisions which are not in the interest of the shareholders whom they represent, leading to an agency problem. To resolve the agency problem, shareholders have the powers to limit the decisions directors can take on their behalf to ensure some level of control. Stock holders can give up ownership of the shares they possess that confer authority on them as part-owners of the company through the secondary market on the stock exchange.

4. Trend of Inflation and Stock Market Returns in Nigeria, 1995-2016

Figure 1 shows the monthly stock market returns and Consumer Price Index (CPI) inflation rate in Nigeria from 1995-2016. The trend shows a wild monthly fluctuation in the stock market returns data over the study period. Slightly mild fluctuations occurred from 1995 up to 1999, with the year 1995 returning an aggregate stock markets returns value of 80.12% boosted by a high return of 18.48% in July of 1995. The year 1996 witnessed a drastic decline in stock market returns over the 12 month period, returning an aggregate of 31.71%. The period from 1997 to 1999 witnessed negative aggregate returns over the 12 months period with -8.23%, -12.69% and -7.43% respectively. This period is synonymous with discontent on the part of investors citing repressive policies, and poor human right records of the military regime. A lose in investors' confidence led to a sustained fall in returns on the stock market for three years consecutively. However, from the last quarter of the year 1999 which saw a nascent democratic government in charge of the country, a return in investors' confidence marked by positive stock market returns was observed and by the end of the year 2000, an aggregate positive stock market return value of 43.19% over a 12 month period was recorded and sustained up to the end of the year 2007 with 12 months aggregate return values from 2001 to 2007 of 30.13%, 10.18%, 50.58%, 16.94%, 1.01%, 32.06% and 55.80% respectively.

The year 2008 witnessed the highest deficit returns ever recorded on the Nigerian stock exchange over a 12-month period with an aggregate deficit stock market return of 61.19% and the year 2009 with deficit aggregate annual returns of 41.22%. This was however due to the global financial crisis with its origins from the United States real estate market albeit with far reaching global effects. In addition to the global financial meltdown was the uncertainties that came with the general elections in Nigeria, giving investors cause to worry. By 2010 however, the market had recovered, posting positive returns of 17.34%. In 2011, the general elections induced uncertainties that plunged the market into posting negative returns; though the oil price boom that followed afterwards ensured a quick recovery with positive returns posted in the year 2012 and 2013. With declining oil prices, the market posted negative aggregate returns from 2014 to 2016 with the last two years result worsened by the economic recession in the country.

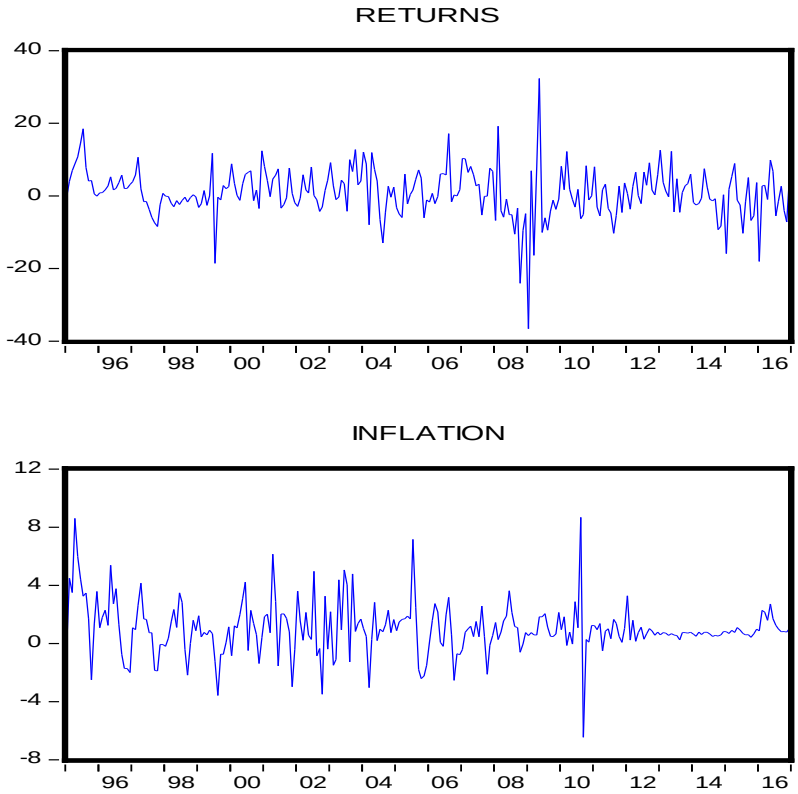

Figure 1. monthly trend of stock market returns and inflation in Nigeria

Consumer price index (CPI) inflation over the same period also shows wild fluctuation when plotted with monthly data indicating a relationship in its movement with stock market returns. From the year 2010 to 2016, there was a decline in the rate of fluctuation of the CPI inflation rate implying relative stability in CPI inflation rate in that period.

5. Theoretical Relaionship between Inflation and Stock Market Returns

Two conflicting theories, the Fisher hypothesis and the Fama Proxy hypothesis provide the basis for an economic investigation of the relationship between inflation rate and stock market returns [16,17]. The theoretical foundation of the discourse lies in the Fisher equity stocks declaration [17]. The generalized Fisher hypothesis states that equity stocks represent claims against real assets of a business; and as such, may serve as a hedge against inflation [17]. If this stands true, then investors could sell their financial assets in exchange for real assets when expected inflation is pronounced. In such a situation, stock prices in nominal terms should fully reflect expected inflation and the relationship between these two variables should be positively correlated ex ante [27]. This argument of stock market serving as a hedge against inflation may also mean that investors are fully compensated for the rise in the general price level through corresponding increases in nominal stock market returns and thus, the real returns remain unchanged [30].

For most of the period from 1930's to the 1970's, the Fisher hypothesis was the logical explanation for the stock-inflation relationship, as it underscored the notion that assets underlying value is maintained in the face of inflation [17].

The theory however did not remain unchallenged for too long. During the 1970's investors found the Fisher theory to falter in the short and intermediate terms, as stock returns were negatively related to inflation [45].

The last half of the decade 1970-1980 thus witnessed increased research in this area. Empirical evidences emerged to show an inverse relationship between stock returns and inflation [6,15,35,37]. These new empirical evidences as at that decade led to the second empirical theory, the proxy hypothesis, explaining the relationship between inflation and stock market returns by Fama who argued that the direct relationship envisioned by the Fisher's hypothesis was spurious [16].

6. Previous Related Studies

The study groups the empirical literature into three categories, those in support of the Fisher's hypothesis, those in support of Fama's Proxy Hypothesis and those who do not find sufficient evidence to support the relationship between inflation and stock market returns.

The study groups the empirical literature into three categories, those in support of the Fisher's hypothesis, those in support of Fama'sProxy Hypothesis and those who do not find sufficient evidence to support the relationship between inflation and stock market returns.

Studies with findings in agreement with the Fisher's hypothesis found a positive long run relationship but not in the short run [1,28,32,33]. Studies whose findings agreed with Fama's Proxy hypothesis employed approaches like volatility modelling with some of the studies using cross-country data [2,3,8,9,11,12,40,46,49,50].

Studies in the third category find that stock market performance is not predictable [24]. Another study in this category finds that the observed negative relationship is due to model misspecification and that inflation and stock returns are independent of each other [43]. Another study further showed that relationships established between inflation and stock returns is driven by both conditional heteroskedasticity of the regression residual and a non-stationary statistical behavior of the inflation variable, concluding that inflation is irrelevant for stock returns [44].

7. Methodology and Data Issues

The data for the study was drawn from the Central Bank of Nigeria (CBN) Statistical Bulletin 2016 annual edition. Monthly data on the Nigerian Stock Exchange (NSE) market's All Share Index (ASI) and Consumer Price Index (CPI, all items) from January 1995 to December 2016 was used to compute stock market returns and inflation rate respectively as follows

$$SMR_t = 100 * Ln\left(\frac{ASI_t}{ASI_{t-1}}\right);$$

$$INF_t = 100 * Ln\left(\frac{CPI_t}{CPI_{t-1}}\right)$$

Where *SMR* denotes stock market returns, *INF* denotes inflation, *t* denotes time period.

8. Justification of Method

Recent developments in financial econometrics requires the use of models and techniques that are able to model the attitude of investors not only towards expected returns but towards risk as well [4]. This fact requires models that are able to deal with the volatility of the series, unlike conventional econometric analysis which views the variance of the disturbance terms as constant over time [4,22]. Financial series are high frequency series which when modeling with, one is faced with the issue of random walk and conditional heteroskedasticity. Faced with this two problems, an appropriate approach to modeling the financial series becomes inevitable such as the autoregressive conditional heteroskedasticity (ARCH) type models.

ARCH family models have been described as a sophisticated group of time series models widely employed in the investigation of time varying volatility in stock markets of many developed countries [39]. The ARCH type models ranges from ARCH (q) models, GARCH(p,q) models, E-GARCH, TGARCH or GJR-GARCH and QGARCH [7,13,18,19,20,26,37].

9. Model Specification

The study employs the most widely used asymmetric GARCH type models. The exponential generalized autoregressive conditional heteroskedasticity (E-GARCH) model exhibit a better fit and accuracy in the estimation of volatility as compared to other types in the asymmetric GARCH family models; [5,21,29,34,47].

A general specification of the E-GARCH(p,q) model with Inflation included in the variance equation as an explanatory variable is specified below.

$$SMR_t = \alpha + \sum_{i=1}^{q} \Phi_i SMR_{t-i} + \varepsilon_t \quad (1)$$

$$Ln(h_t) = \omega + \sum_{j=1}^{q1} \delta_j \left| \frac{\varepsilon_{t-j}}{\sqrt{h_{t-j}}} \right| + \sum_{j=1}^{q2} \lambda_j \frac{\varepsilon_{t-j}}{\sqrt{h_{t-j}}} + \sum_{i=1}^{p} \beta_i Ln(h_{t-i}) + \psi_n INF \quad (2)$$

10. E-GARCH(1,1) Specification

By popular usage for practical applications, GARCH (1,1) has been the best model for volatility modeling and extends to all GARCH type models [5,14,21,29,34,47]. By implication therefore, the study adopts an E-GARCH (1,1) model to investigate the effect of inflation on stock market returns in the Nigerian capital market. An estimable E-GARCH (1,1) model is specified for the study

$$SMR_t = \alpha + \Phi SMR_{t-1} + \varepsilon_t \quad (3)$$

$$Ln(h_t) = \omega + \delta_1 \left| \frac{\varepsilon_{t-j}}{\sqrt{h_{t-j}}} \right| + \lambda_1 \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + \beta_1 Ln(h_{t-1}) + \psi_1 INF \quad (4)$$

Where equation 1 and 3 denotes the mean equations [AR(q) and AR(1) processes] for the general case and estimable model case respectively and equation 2 and 4 denotes the variance equation for the general case E-GARCH (p,q) and specific case E-GARCH(1,1) respectively. The coefficients of importance in the E-GARCH (1, 1) specification of the variance equation in equation 4 are β , λ and ψ which are measures of persistence, asymmetry and the relationship between inflation and stock market returns respectively.

11. Half-Life Specification

In order to determine the number of months required for the impact of shocks to stock market returns to dissipate by half, the study used half-life measure of persistence stated as;

$$h = Log(0.5) / Log(\beta + \rho) \quad (5)$$

Where h is half-life, $(\beta + \rho)$ is the level of persistence.

12. Results and Discussions

12.1. Properties of the Data

Table 1. Descriptive statistics

	SMR	INF
Mean	0.933593	1.022500
Median	0.692493	0.807988
Maximum	32.35158	8.672330
Minimum	-36.58828	-6.459412
Std. Dev.	6.782239	1.774734
Skewness	-0.475352	0.544821
Kurtosis	8.255020	6.842650
Jarque-Bera	313.7097	175.4861
Probability	0.000000	0.000000
Sum	246.4685	269.9400
Sum Sq. Dev.	12097.68	828.3658
Observations	264	264

Source: Authors computation using Eviews 9.0

Stock market returns had a mean monthly value of 0.93%, a minimum value of -36.59%, a maximum of 32.35% and a standard deviation of 6.78%. Inflation had a mean value of 1.02% monthly over the study period, a standard deviation of 1.77%, a minimum and maximum values of -6.46% and 8.67%. The Kurtosis and Jarque-Bera statistics both do not fall in the acceptable range for both stock market returns and inflation which implies the two series are not normally distributed.

12.2. Testing for ARCH Effect

A justification for using a volatility modeling approach rest on the fact that the series is affected by the autoregressive conditional heteroskedasticity, the so called 'ARCH effect'. The series used in the study are high frequency series, it is important to test for the presence of conditional heteroskedasticity, an absence of which makes the use of the GARCH-type models inappropriate.

Table 2. Heteroskedasticity Test: ARCH

F-statistic	5.456003	Prob. F(1,260)	0.0203
Obs*R-squared	5.384971	Prob. Chi-Square(1)	0.0203

Source: Author's computation using Eviews 9.0

Table 2 shows the result of the test for autoregressive conditional heteroskedasticity (ARCH). The F-statistic value (5.456) and the probability of F-statistic (0.0203) show that, sufficient evidence do not exist to accept the null hypothesis of the absence of ARCH effect. The null hypothesis is therefore rejected in favor of the alternative hypothesis of the presence of ARCH effect in the model. This implies that the series in question is volatile which requires modelling for volatility to take account of the volatility in the model.

Table 3. E-GARCH(1,1) Model output

Dependent Variable: SMR

Method: ML ARCH - Student's t distribution (BFGS / Marquardt steps)

LOG(GARCH) = C(3) + C(4)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(5) *RESID(-1)/@SQRT(GARCH(-1)) + C(6)*LOG(GARCH(-1)) + C(7)*INF

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Mean Equation				
C	0.884198	0.339832	2.601867	0.0093
SMR(-1)	0.302968	0.070049	4.325061	0.0000
Variance Equation				
ω	0.220211	0.232266	0.948101	0.3431
δ_1	0.445486	0.114916	3.876615	0.0001
λ_1	-0.011665	0.068297	-0.170799	0.8644
β_1	0.841964	0.070362	11.96616	0.0000
ψ_1	-0.005709	0.040962	-0.139362	0.8892

Source: Author's estimation using Eviews 9.0

Table 3 shows the results for the mean and variance equations from the Exponential General Autoregressive Conditional Heteroskedasticity E-GARCH model. The variance equation provides information on the persistence and impact of shocks as well as asymmetry and the relationship between inflation rate and stock market returns on the Nigerian Stock Exchange.

$$Ln(h_t) = 0.22 + 0.45\left|\frac{\varepsilon_{t-j}}{\sqrt{h_{t-j}}}\right| - 0.01\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + 0.84Ln(h_{t-1}) - 0.005INF$$

P-values (0.3431) (0.0001) (0.8644) (0.0000) (0.8892)

The coefficient λ_1 -0.01 measures the presence of asymmetry. It is however not statistically different from zero which implies the absence of asymmetry which reduces the model to a GARCH model. Positive and negative shocks have identical effects on the stock market returns series. That is bad and good news will increase volatility of stock market returns in the same magnitude. This simply imply that investors on the Nigerian stock exchange react the same way to information be it positive or negative in making investment decisions.

Table 4. GARCH(1,1) Model

Dependent Variable: SMR

GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1) + C(6)*INF

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Mean equation				
C	1.064042	0.309081	3.442603	0.0006
SMR(-1)	0.264014	0.062438	4.228416	0.0000
Variance Equation				
C	5.345932	2.795968	1.912015	0.0559
RESID(-1)^2(β)	0.288384	0.105973	2.721301	0.0065
GARCH(-1)(ρ)	0.636330	0.103270	6.161842	0.0000
INF	-0.558943	0.766461	-0.729252	0.4658

Source: Authors computation using Eviews 9.0

For a measure of persistence, the coefficient $\beta + \rho$ 0.92 shows that there is high persistence in the stock market return series. For impact of shocks, the coefficient of $\beta + \rho$ 0.92 which is less than one shows that shocks to the stock returns series do not have a permanent but temporary impact.The coefficient INF measures the relationship between stock market returns and inflation on the Nigerian stock exchange. The coefficient of the relationship is statistical insignificant which agrees with the submission that inflation is not relevant to stock returns [43,44].

The result also provides information about the stationarity of stock returns series in Nigeria showing that it is a shock dissipating process. A shock to stock market returns on the Nigeria stock exchange persists for a while then decay out in the long run. However being a shock dissipating process, the half-life of the monthly stock return series can be estimated. The result of the half-life shows that it will take at least 9 months to halve the impact of shocks to the stock return series on the Nigerian stock exchange. By implication, since good or bad news have identical impact, both positive or negative shocks will have the same rate of persistence and will equally take at least 9 months to halve the impact of shocks on the stock returns series on the Nigerian stock exchange.

13. Postestimation Test

Testing for the presence of ARCH effect in order to validate the model (check if the model is still ensued with heteroskedasticity) entails carrying out an autoregressive conditional heteroskedasticity test on the (exponential) generalized autoregressive conditional heteroskedasticity (E-GARCH) model to see if volatility is still prevalent in the model. The post estimation ARCH effect test is presented in Table 5.

Table 5. Heteroskedasticity Test: ARCH

F-statistic	0.036660	Prob. F(1,260)	0.8483
Obs*R-squared	0.036937	Prob. Chi-Square(1)	0.8476

Source: Authors computation using Eviews 9.0

The result presented in Table 5 shows that, the F-statistic value 0.028255 and its probability of 0.8483 provides evidence to accept the null hypothesis of no ARCH effect in the model. The model is therefore free from conditional heteroskedasticity and therefore reliable for policy.

14. Summary and Conclusion

Modeling high frequency time series data requires some caution be taken with respect to the method of analysis in order to take account of volatility that may be experienced with data sets of this nature. It is important to model the series to account for the presence of conditional heteroskedasticity which not accounted for leads to misleading results.

The paper employed the Exponential Generalized Autoregressive Conditional Heteroskedasticity E-GARCH

and GARCH technique of modelling series with conditional heteroskedasticity in order to test for first the stochastic properties of the series and second to assess the impact of good and bad news to the behavior of stock market returns in Nigeria and as well examine the relationship between stock market returns and inflation. On the relationship between stock market returns and inflation, the study found an insignificant relationship between inflation and stock market returns, implying that inflation does not influence stock market returns on the Nigerian stock exchange. The study also found that the model series exhibit high persistence, which is a negative or positive shock to the stock market return series occasioned by either good news or bad news will have a long lingering effect on the market. The study however found that the impact of good or bad news to the market is temporary though long lasting. Further, the study established that good and bad news have same impact on the stock market in Nigeria with investors reacting the same way.To conclude, the paper ascribe an absence of asymmetry on the Nigerian stock exchange market to its size relative to developed stock markets (New York Stock Exchange, London Stock Exchange and Tokyo Stock Exchange), regulatory institutions and environment.

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