Parameterization of Asymmetric News Effect and African Stock Market Returns Volatility Within EGARCH Framework

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Abstract
This study on parameterization of asymmetric news effect and African stock market returns volatility within EGARCH Framework engaged 15 stock exchanges. After, the analysis it was found that the asymmetric parameter for the countries under study except Cote D'Ivoire, Nigeria and Tunisia confirm that bad news create more volatility than good news of the same magnitude, corroborating with the leverage effect theory that opined that bad news create more volatility than good news of the same magnitude. Magnitude effect (volatility clustering) coefficient of EGARCH is positive and significant for countries. That means the conditional volatility will rise or fall when the absolute value of the standardized residual is larger (smaller). It was also found that volatility takes a long time to die following any crisis in the respective market. In the light of the above findings, the researcher is the opinion that African stock markets should endeavour to make timely disclosure and appropriate dissemination of perceived economic vagaries, as well proffer commensurate palliative or solution to the public or investors. This will help to avert escalation of such information as bad news which increases volatility.

Keywords: *Stock returns, Asymmetry effect, Magnitude effect, EGARCH, African Countries*
JEL Classification: C32, C58, G14, G41

1.1 Introduction

The concept of volatility in the field of finance is perceived as the amount of risk or uncertainty regarding the variations in a security value, and as such has immensely influenced the effective functioning of the global market. Most securities are said to be highly volatile, indicating that their values fluctuate over a large range of values, while others are less volatile suggesting that their values spread out over smaller range of values (Engle & Patton, 2001; Banumathy & Azhagaiah, 2015; Marobbe & Pastory, 2019). The inherent variations are not easily and directly dictated, thus need to be evaluated (Fama, 1965). The associated volatility risk of these securities could lead to financial shocks on investors, thereby creating challenges of low capital investments in financial assets, vulnerability in market-making, loss of investors' confidence and erratic stock (Bello, 2020; Chiang & Doong, 2014; Wang & Yang, 2017). Again, stock market that is alluded to be highly volatile will pose difficulty for quoted companies to raise sufficient funds as rational investors prefer stocks with less volatile returns/prices unlike the risk takers (Onyele et al, 2017). Although as suggested by Onyele. & Ikwuagwu, 2020, returns volatility in the stock market is likely not destructive most times, rather its persistence in market returns, especially in developed markets, could lead to a crash in the global financial market due to increasing financial integration.

However, the volatility of stock returns is greatly accentuated by investors' expectations and perceptions of daily information (news effect) in the market. When there is upsurge in returns volatility because of news effect, efficiency and liquidity is altered as market participants receive the news with different mindset (Ho & Hung, 2012). Asymmetry (leverage effect) is a fall in returns followed by an increase in volatility greater than the volatility induced by an increase in returns. This implies that more prices wander far from the average trend in a crash than in bubble because of higher perceived uncertainty (Mandelbrot, 1963; Fama, 1965, Black, 1976; Emenike, 2009). These characteristics are perceived as indicating a rise in financial risk, which can adversely affect investors' assets and wealth. A greater risk premium results in a higher cost of capital, which then leads to less private physical investment (Okpara, 2012). The risk and return of securities in the stock market may differ because of different factors affecting securities such as differences in structures and managerial capacity of different firms, different sectors in which they operate, the state of the economy, government policies as well as internal corporate policies themselves (Oludoyi, 2003; Ejem, et al 2018).

Nevertheless, bad news as alluded trigger returns volatility more than good news which may be interpreted by investors as higher risk-return tradeoff (Jegageevan, 2015). Since returns on financial assets are a function of the market risk, risk takers are expected to receive a rate of return that will compensate for the risk taken in making such long-term funds (such as debentures, common share, bond, and mortgage loan) available to economic units (Ejem & Ogbonna, 2020). This explains the long age maxim of Efficient Market Hypothesis (EMH) that all available information is correctly reflected in stock prices and thus stock prices rapidly react to any novel information now it reaches the market participants (Brealey & Meyers, 2003). This informational fundamental comprises changes to firms' operations, modifications in macroeconomic policies, twist in the level of investors' risk-return preference, financial integration, natural disaster, etc. (Onyele et al, 2020; Sansa, 2020). It is an established fact that the relationship between expected returns and expected volatility remains sacrosanct. Theory generally predicts a positive relationship between expected stock returns and volatility if investors are risk averse, suggesting that equity premium provides more compensation for risk when volatility is relatively high. In other words, investors require larger expected return from a security that is riskier (Okpara, 2011, Emenike & Aleke; 2012; Sansa, 2020).

Therefore, modeling and forecasting volatility in financial time series have become an area that has attracted a lot of research in both empirical and theoretical aspects. In this situation, the models established to capture the variations in conditional mean of financial time series become no longer useful and hence, the performance of such mean models is reduced to give accuracy in estimation process. The so called "leverage effect" is also often observed in the financial time series (Black, 1976). This usually occurs when stock price changes are negatively correlated with changes in volatility. Since ARCH and GARCH models are symmetric in nature, they fail to capture the leverage effect. To address this problem, many nonlinear extensions of the GARCH models have been proposed. These include asymmetric class of GARCH models such as exponential GARCH (EGARCH) model by Nelson (1991), the so-called GJR model by Glosten et al. (1993) and the power GARCH (PGARCH) model by Ding et al. (1993). Therefore, modeling and forecasting of this nature has over the decades occupied empirical and theoretical investigations by finance and economics experts. Several studies have indicated that stock markets at different periods exhibit risk return tradeoff or asymmetric news effects, while some scholars have opposed to that. In the light of these observations in the financial time series, the EGARCH framework will be used to estimate and predict the relationship between African stock market returns and leverage theory. That is to know whether asymmetric effect exists in the market and/or how volatility reacts to news in the African stock markets.

The subsequent sections of this paper are decomposed as follows: Section 2 reviews some conceptual, theoretical, and empirical literature. Section 3 provides data and methods of analysis. Section 4 analyses and discusses the findings of the study. Section 5 concludes and recommends.

2. Review of Related Literature

2.1 Conceptual Review

2.1.1 The need for Stock Market: A synopsis

Stock markets, which are an important segment of the financial system of any nation, are intricately interwoven in the fabric of a nation's economic life (Bhalla, 2011). Without a stock exchange, the saving of the community, the sinews of economic progress and productive efficiency would remain underutilized (Ibenta, 2005). The task of mobilization and allocation of savings could be attempted in the old days by a much less specialized institution than the stock exchange. However, as business and industry expanded and the economy assumed a more complex nature, the need for 'permanent finance' arose. Entrepreneurs needed money for the long term whereas investors demanded liquidity; the facility to convert their investment into cash at any given time. The answer was a ready market for investments, and this was how the stock market came into being. Stock exchange means individuals, whether incorporated or not, constituted for the purpose of regulating or controlling the business of buying, selling, or dealing in securities. These securities include common share or ordinary shares, scripts, stocks, bonds, debentures stock or other marketable securities of nature in or of any incorporated company or other body corporate, also government securities and rights or interest in securities (Ezirim, 2005; Ibenta, 2005; Okpara, 2012; Adewale, et al 2016; Ogbulu, 2019).

2.1.2 Parameterization of Stock returns Volatility

Modeling and forecasting volatility inherent in stock market has over the decades occupied empirical and theoretical investigations by finance and economics experts. This academic excursion has a lot of motivation due to the prime place taken by volatility in the field of finance. Brooks (2008) sees volatility as measured by the standard deviation or variance of returns, is sometimes applied as a crude measure of the total risk of financial assets. However, volatility models for evaluating market risk need the estimations or forecast of volatility parameters. From previous study the mostly used stationarity models are original Autoregressive Conditional Heteroskedastic (ARCH) presented by Engle (1982) which permits the conditional variance to change over time as a function of past errors leaving the unconditional variance constant.

Furthermore, Engle et al (1987) introduced the ARCH-M model, an extension of ARCH model which allows the conditional variance to be determining factors of the mean. Engle et al model was applied to three different data sets of bond yields; hence came out to opine that risks are not time invariant; instead risks vary systematically with the assumptions of underlying uncertainty. Other models are improvement of ARCH model, like Generalized Autoregressive Conditional Heteroskedasticity (GARCH), introduced by Bollerslev (1986). This generalized ARCH model allows for a longer memory and a more permissible and flexible lag structure at the same time. It provides a relatively long lag in the conditional variance equation and negates the problems associated with negative variance parameters in a fixed lag structure. The difference between the ARCH and GARCH is that in the ARCH model, the conditional variance is specified as a linear function of past sample variance only, while the GARCH process permits lagged conditional variances to also enter in the model. ARCH and GARCH family models are to provide a volatility measure applied in financial decisions with about risk analysis, portfolio selection and derivative pricing (Bollerslev 1986, Bollerslev et al, 1992; Engle & Ng, 1993; Bera & Higgins, 1993). Another is the Exponential GARCH (EGARCH) model, which according to Brook (2008) is an improvement of the GARCH which imposes a non-negativity constant on market variables and permits conditional variance to respond asymmetrically to return innovations of different signs. The EGARCH used to describe the behaviour of return volatilities by Nelson (1991) was proposed to test the hypothesis that the variance of return was affected differently by positive and negative excess returns, and that excess returns were negatively related to stock market variance. In order to avoid the imposition of a symmetric response of volatility to positive and negative shocks in GARCH model, Glosten et al (1993) presented the Threshold GARCH (TGARCH) models and came out boldly that there is a positive and significant relation between the conditional mean and conditional volatility of the excess return on stocks when the standard GARCH-M framework is used to model the stochastic volatility of stock returns. Glosten et al also found that positive and negative unexpected returns have vastly different effects on conditional variance (Christie ,1982; Schwert ,1990; Pagan &Schwert ,1990; Campbell, 1996; Starr-McCluer, 1998; Ludvigson & Steindel, 1999; Porterba 2000; and Okpara 2011; Suleiman, 2011).

2.1.3 Stock return and asymmetric effect

It is expected that stock return volatility rises more following stock price declines (bad news), than following stock price increase (good news). There are a host of popular explanations for this well-known 'Asymmetry' in stock return volatility. The 'leverage effect' posits that a firm's stock price decline raises the firm's financial leverage, resulting in an increase in the volatility of equity (Nelson,1991). Others have suggested that this negative relationship between returns and return volatility stems from natural-time variation in the risk premium on stock returns. That is, an unexpected increase in volatility today leads to upward revisions by market participants of future expected volatility and therefore, upward revision of the risk premium, which compensates them for greater risk. But a higher risk premium leads to a greater discounting of future expected cash flow (holding those cash flows constant) and, therefore, lower stock processes or negative returns today (Okpara, 2012). While these explanations are popular, the empirical evidence to support them has been limited in scope and two relatively new studies have suggested these perspectives may be biased by the fact they focus on aggregate market returns and not those of individual stocks. Chukwuogo-Ndu (2005) explicitly studies stock returns and volatility of individual firms and finds that the negative relationship between changes in stock return variances and stock returns stems from the fact that the relationship between volatility today and returns today is strongly positive, but that between volatility tomorrow and returns today is negative. Chukwuogo-Ndu finds this regularly for large and small capitalization firms and similar for firms with little and high financial leverage. In addition to de-bunking the leverage and risk premium hypothesis for the asymmetric effect in volatility, Chukwuogo-Ndu offers another related to the option properties of growth opportunities, rather than assets in place for a firm. In other words, growth opportunities are 'real options' on future cash flows from assets in place and firms with greater volatility would have more valuable growth opportunities and higher equity value. Hassan et al, (2000) also performs a firm-level analysis but they decompose risk into its market and firm-specific components. Hassan et al show that changes in market risk are positively correlated with changes in firm values, but changes in firm-specific risk are negatively correlated with changes in firm value, and this new regularity applies mostly to small firms and equally for low-and high-leveraged firms.

2.2 Theoretical Review

2.2.1 Efficient Markets Hypothesis

The efficient market hypothesis (EMH) remains a topic for debate. The EMH states that the market price for shares incorporates all the known information about that stock. This means that the stock is accurately valued until a future event change that valuation. Because the future is uncertain, an adherent to EMH is far better off owning a wide swath of stocks and profiting from the general rise of the market. Studies on stock returns volatility are often anchored on the Efficient Market Hypothesis (EMH) which was developed by Fama (1970). The EMH explains why stock prices are seen to follow a random walk. Fama (1970), an efficient market is one in which all available information is reflected in the stock prices. According to the EMH, the intrinsic value of shares and other financial assets is defined by the future discounted value of cash flows accruing to investors (Fauzel & Fauzel, 2016). Hence, if the stock market is efficient, all available information must be reflected in stock prices. This is needful for the assessment of a firm's performance in the future; therefore, the intrinsic and market value of a share should be equal (Dukes et al, 1987; Lo & MacKinlay, 1988). Hence, information that may alter firm's profitability in the future must be reflected in the share price immediately, else any delay in information diffusion to price would lead to irrationality as availability of some information could be exploited to predict or forecast profitability (Bohl & Henke, 2003; Fama,1991). As such, in an efficient market, it is assumed that changes in share prices are unpredictable since there is random arrival of information. There are three levels of efficient markets among which is the weak-form efficiency whereby the information content of interest is historical prices (Fama, 1970). The weak form of efficiency suggests that current stock prices reflect all the information on previous prices and that investors cannot apply technical analysis of any form in their investment decisions (to determine undervalued or overvalued stocks) but can research firm's financial statements to boost their chances of gaining returns higher than that of the market. On the other hand, the semi-strong form is hinged on the notion that investors cannot use either fundamental or technical analysis to obtain higher returns in the market since all publicly available information is used in the computation of current stock prices and that only information that is not available to the public (private information) can aid investors boost their returns above that of the market (Ogege et al, 2015). The advocates of the strong form version state that all available information (both public and nonpublic) is completed reflected in the current stock prices, that is, there is no type of information that can make an investor make returns higher than the market, not even insider knowledge gives investors a predictive edge over the entire market (Fama, 1970).

2.3 Review of Empirical Literature

Studies that attempted to establish the relationship between stock return and asymmetric or leverage are many, though some are country specific and others on regional. For instance, Onyele and Nwadike (2021) established the relationship between stock returns volatility and asymmetric new effects around the world. The study employed GARCH, GARCH-M (1,1), TGARCH to examine daily S&P Global 1200 index from September 1,2010 to September 30, 2020. The S&P Global 200 index stood for free float weighed stock market index of global equities taken care of 7 regional stock market indices and close to 70% of the global market capitalization. The analysis of GARCH-M and TGARCH models have explosive volatility persistence strong asymmetric news effect in the global stock market.

Ejem and Ogbonna (2020) with EGARCH showed evidence of returns volatility persistence and asymmetric news effect in the Nigerian Stock Market.

While Marobbe and Pastory (2019) used the GARCH models to model stock market volatility in Dar es Salaam stock exchange with daily closing stock price indices from January 2, 2012, to November 22, 2018, with GARCH, GARCH (1,1), EGARCH (1,1) and PGARCH. It was established that all three models were significant to forecast stock returns volatility at DSE. It was also established that the magnitude of stocks in volatility is higher with good news as opposed to bad news. EGARCH models showed evidence of leverage effects associated with the stock returns which can be hazardous to the trading companies' capital structure.

In Kenya, Ndei et al. (2019) analyzed the Nairobi Stock Market from 2010 to 2017 using GARCH (1,1) and TGARCH (1,1) and revealed persistent returns volatility, leverage effects, and absence of risk return trade-off. Using daily time series from 1997 to 2018. Using TGARCH, Aguda (2016); Owidi and Mugo-Waweru (2016 showed that stock returns volatility decreased with asymmetric effects in Nigeria and Kenya respectively.

Adewale et al. (2016) investigated shock persistence and asymmetry in Nigerian stock market by incorporating structural breaks using monthly stock returns for the period from January 1985 to December 2014. Adewale et al segmented the study period into pre-structural break period and after break period having identified breakpoints in the series. Result from the basic GARCH model showed higher shock persistence during pre-break sub-period than the post break sub-period. No evidence of asymmetry or leverage effect was found in the asymmetric GARCH model with or without incorporating the breakpoints in Nigerian stock market.

Bala and Asemota (2013) employed GARCH models with and without breaks to examine the volatility of exchange rate of naira against US Dollar, British Pounds and European Euro using monthly exchange rate data. There was high persistence of shocks in all the models, although the introduction of structural breakpoints improved the volatility estimates by reducing shock persistence in most of the estimated models. Asymmetric property was not evidenced in most estimated models.

Salisu and Fasanya (2012) examined the relative performance of symmetric and asymmetric GARCH models for West Texas Intermediate (WTI) daily closing oil prices by considering the pre-crises, during crises and the post global financial crisis periods. The WTI oil stock price was found to be most volatile during the financial crises period than other sub-periods. Asymmetric models found empirical evidence for the existence of leverage effects and were found superior over the symmetric GARCH model. The study concluded that ignoring these effects in modeling oil.

Olowe (2009) investigated the relationship between stock returns and volatility in Nigeria using E-GARCH-in-mean model in the light of banking reforms, insurance reform, stock market crash and the global economic and financial crisis. Volatility persistence, asymmetric property and risk-return relationship are investigated for the Nigeria stock market. It was found that the Nigeria stock market returns show persistence in the volatility and clustering and asymmetric properties.

Applying EGARCH, Nwezeaku and Okpara (2009) examined volatility clustering in Nigerian stock market. The found that volatility clustering is not quite persistent but there exists asymmetric effect in the Nigerian stock market. They concluded that unexpected drop in price (bad news), increases predictable volatility more than unexpected increase in price (good news) of similar magnitude in Nigeria.

With EGARCH, Ogum et al, (2005) reports, amongst others that volatility clustering and asymmetric volatility found in the United States and other developed markets are also present in Nigeria. They also report positive and significant asymmetric volatility coefficient in Kenya, which suggests that positive shocks increase volatility more than negative shocks of the same magnitude.

3. Material and Data

3.1 Sources of Data

This study employed daily stock return historical data spanning from January 05, 2015 to November 07, 2022 obtained from 15 African stock markets: Botswana BSE Domestic company historical data, Cote D'Ivoire BRVM 10 historical data, Egypt EGX 30 historical data, Kenya NSE 20 (NSE20) historical data, Mauritius Semdex (MDEX) historical data, Morrocco All share (MASI) historical data, Namibia FTSE NSX Overall (FTN098) historical data, Nigeria All share Index (ASI) historical data, Rwanda All share (ALSIRW) historical data, South Africa FTSE historical data, Tanzania All share historical data, Tunisia Tunindex historical data, Uganda All share historical data, Zambia LSE All share (LASLZ) historical data, and Zimbabwe ZSE All share (ALSZ) historical data obtained from countries' stock exchanges publications

3.2 Techniques for Data Analysis

The study employed EGARCH model. Brooks (2008), for EGARCH, model, the conditional covariance is given by:

$$\ln(\sigma_t^2) = \omega + \beta\ln(\sigma_{t-1}^2) + \gamma\frac{\mu_{t-1}}{\sqrt{\sigma_{t-1}^2}} + \alpha\left(\frac{|\mu_{t-1}|}{\sqrt{\sigma_{t-1}^2}} - \sqrt{\frac{2}{\pi}}\right)$$

Where, ω, β, α, γ are constant parameters, Log (σ_t^2) = the one period ahead volatility forecast,

ω = the mean level,β = persistence parameter, α = volatility clustering coefficient, Log (σ_{t-1}^2) = the past variance, γ = the leverage effect.

The above model ensures that even when the parameters are negative, σ_t^2 will be positive and the asymmetry or the leverage effect measure, γ, will be negative even when the relationship between volatility and log returns is negative. The EGARCH is symmetric when = 0, when γ < 0 then positive shocks (good news) generate less volatility than bad news (negative shocks); in other way round, bad news or negative shocks magnify more volatility than good news or positive shock of the same magnitude. When γ > 0, it implies that positive innovations or shocks are more destabilizing than negative innovations or shocks (Black, 1976; Christie, 1982). In other words, negative value of γ is called the 'sign effect'. The choice of EGARCH framework is to accommodate examination of conditional variance (volatility), asymmetric effect and volatility persistence. The $'\propto$' parameter represents the symmetric effect of the model, if $\propto$ is positive, then the conditional volatility tends to rise (fall) when the absolute value of the standardized residuals is larger (smaller), hence magnitude effect'. The GARCH effect β measures the persistence in conditional volatility. When β is relatively large, then volatility takes a long time to fizzle out or decay or die out following mayhem in the market or economy in general. Succinctly, the EGARCH model has a good number of advantages over the normal GARCH specification. First, since the log (σ_t^2) is modeled, then even the parameters σ_t^2 will be positive. There is thus no need to artificially impose non-negativity constraints on the model parameters. Second, asymmetries are allowed under the EGARCH formulation, since if the relationship between volatility and returns is negative, γ, will be negative (Brooks, 2008).

3.3 Determination of Expected Returns

The price data is converted into compound returns by taking logarithms:

$R_t = \ln(p_t/p_{t-1})$,

where R_t, is the current market returns, p_t is the current market index price, p_{t-1} is the previous market index price.

4. Data Presentation and Analysis

This section made use of computed returns spanning from January 05, 2015, to November 07, 2022, obtained from 15 African stock markets.

4.1. Test of ARCH EFECT

Table 4.1 below shows that the F-version and the LM-statistics are significant, indicating presence of ARCH effects in the returns of all capital markets of the countries, except Namibia, Rwanda, and Zimbabwe. That means Namibia, Rwanda, and Zimbabwe are exempted from the ARCH and its variants test.

Table 4.1 ARCH Effect Test

ARCH Test	BOT	COT	EGPT	KEN	MAU	MOR	NAM
F-statistic	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9954
Obs*R-squared	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9954

Table 4.1 ARCH Effect Test (continued)

ARCH Test	NIG	RWA	SA	TAN	TUN	UGA	ZAM	ZIM
F-statistic	0.0000	0.9853	0.0000	0.0000	0.0000	0.0000	0.0036	0.7764
Obs*R-squared	0.0000	0.9853	0.0000	0.0000	0.0000	0.0000	0.0037	0.7761

4.2 Estimation of model

Here, the researcher employed EGARCH as shown on table 4.2. The result of the analysis revealed that the leverage effect or asymmetry parameter γ are negative and significant for Egypt, Kenya, Mauritius, Morrocco, South Africa, and Uganda, suggesting presence of leverage effects in the markets, implying that bad or negative news cause more volatility than good or positive news of the same magnitude. For Cote D'Ivoire, Nigeria and Tunisia, the asymmetric coefficient γ is positive and significant, indicating that good news has more impact on volatility than bad news of equal magnitude, invalidating the leverage effect theory which states that the effect of bad news on volatility is higher than the effect of good news of the same magnitude. Furthermore, the persistent parameter β are positive and significant, also are relatively large for all the markets under study, except Botswana and Uganda indicating that the various capital market volatility is persistent, confirming that volatility takes a long time to die following the crisis in the respective markets. Magnitude effect ($\propto$) (volatility clustering) coefficient of EGARCH is positive and significant for countries. That means the conditional volatility will rise or fall when the absolute value of the standardized residual is larger (smaller). Table 4.2 below also found that the ARCH-LM tests for the serial correlations were insignificant at 5% critical level for all the countries under study, suggesting that the asymmetrical models are sufficient in modeling the serial correlation structure in the conditional mean and variance. This indicates there is no further ARCH effect in the estimated ARCH-GARCH models, as well as suggesting that the models are correctly specified. The AIC and SIC were found to maintain small criterion value for all the variants of ARCH in the countries under study, affirming the suitability of the models, hence are best fit models.

Table 4. 2 Estimation of models using EGARCH.

Parameter Estimates	BOT	COT	EGPT	KEN	MAU	MOR
Mean Eqn						
b_2	6.787819 *0.7522	6.166183 *0.1343	3.286053 *0.3684	-9.244358 *0.3361	22.97276 0.0000	-11.12416 *0.0331
μ	0.202780 *0.0000	-0.077094 *0.0008	0.225024 *0.0000	0.224455 *0.0000	0.302281 0.0000	0.136535 *0.0000
ω	-3.52E-05 *0.7797	-0.000837 *0.0376	-0.000308 *0.5617	-8.17E-05 *0.8193	-0.000240 0.0008	0.000457 *0.0238
Variance Eqn						
ω	-9.468100 *0.0000	-1.653238 *0.0000	-0.704883 *0.0000	-0.918498 *0.0000	-0.976766 *0.0000	-1.161643 *0.0000
α	0.341428 *0.0000	0.332157 *0.0000	0.233425 *0.0000	0.209390 *0.0000	0.397088 *0.0000	0.315828 *0.0000
γ	-0.024143 *0.1182	0.054972 *0.0000	-0.062795 *0.0000	-0.031459 *0.0046	-0.034128 *0.0000	-0.055827 *0.0000
β	0.227964 *0.0000	0.847267 *0.0000	0.940399 *0.0000	0.925327 *0.0000	0.938129 *0.0000	0.909646 *0.0000
Log likelihood	8978.779	6327.298	5783.138	7187.898	8290.163	7293.241
Dw Stat	2.401900	2.134281	1.954620	1.924694	1.261112	2.022573
AIC	-9.234976	377780.5	-6.048313	-7.349946	-8.456522	-7.465411
SIC	-9.214902	-6.472399	-6.027954	-7.329965	-8.436583	-7.445412
P-valueof ARCH LM Test	*0.9246	*0.3497	*0.8108	*0.2120	*0.1312	*0.1901

*Probability values

Table 4. 2 Estimation of models using EGARCH (continued)

Parameter Estimates	NIG	SA	TAN	TUN	UGA	ZAM
Mean Eqn						
b_2	3.367944 *0.4528	10.47136 *0.0006	3.605579 *0.0256	0.305111 *0.9732	-4.685445 *0.0011	12.08160 *0.0000
μ	0.204403 *0.0000	0.044523 *0.0492	-0.131805 *0.0000	0.202040 *0.0000	0.035514 *0.1102	-0.046035 *0.0254
ω	-0.000266 *0.4411	-0.001066 *0.0065	-0.001217 *0.0000	0.000143 *0.3403	0.001675 *0.0000	-0.000162 *0.0035
Variance Eqn						
ω	-1.693731 *0.0000	-0.579950 *0.0000	-1.113944 *0.0000	-1.545803 *0.0000	-10.15221 *0.0000	-0.475368 *0.0000
α	0.375256 *0.0000	0.134119 *0.0000	0.304683 *0.0000	0.376212 *0.0000	0.427400 *0.0000	0.217648 *0.0000
γ	0.063860 *0.0000	-0.127821 *0.0000	-0.020396 *0.0589	0.006040 *0.6995	-0.106936 *0.0000	-0.002634 *0.5721
β	0.849384 *0.0000	0.947328 *0.0000	0.894259 *0.0000	0.886019 *0.0000	-0.146522 *0.0001	0.964262 *0.0000
Log likelihood	6482.626	6316.446	5854.844	8108.010	5534.302	7191.320
Dw Stat	1.830290	1.996211	2.486044	1.945133	2.484021	1.871622
AIC	-6.665595	-6.187784	-6.047409	-8.257910	-5.796856	-7.550520
SIC	-6.645521	-6.165733	-6.027258	-8.237996	-5.776472	-7.530101
P-value of ARCH LM Test	*0.9398	*0.7825	*0.3405	*0.5812	*0.6253	*0.3114.

*Probability values

Conclusion and Recommendations

This study on Parameterization of asymmetric news effect and African stock market returns volatility within EGARCH Framework engaged 15 stock exchanges to achieve the aim. The result found that the asymmetric parameter for the countries under study except Cote D'Ivoire, Nigeria and Tunisia confirm that bad news create more volatility than good news of the same magnitude, this corroborates features of market volatility known as leverage effect (Black, 1976; Christie, 1982; Engle & Ng, 1993). This also corroborates the findings of Ogum (2005); Olowe (2009); Okpara and Nwezeaku (2009); Salisu and Fasanya (2012); Ndei et al (2019); Marobe and Pastory (2019); Ejem and Ogbonna (2020); Onyele and Nwadike (2021). That no asymmetric effect in Nigeria Stock market agrees with the findings of Bala and Asemota (2013); Adewale et al (2016). That means African stock markets exhibit asymmetric volatility, showing that negative shocks increase volatility more than positive shocks of equal magnitude. In the light of the above findings, the researcher is the opinion that African stock markets should endeavour to make timely disclosure and appropriate dissemination of perceived economic vagaries, as well proffer commensurate palliative or solution to the public or investors. This will help to avert escalation of such information as bad news which increases volatility.

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