www.irmbrjournal.com
International Review of Management and Business Research
March 2013
Vol. 2 Issue.1

Accounting Information and Stock Volatility in the Nigerian Capital Market: A Garch Analysis Approach.

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Abstract

The broad objective of the study is to ascertain if accounting information contributes to stock volatility in the Nigerian Capital Market. Specifically, the study examines if Book value per share, Dividend per share and Earnings per share have a sign effect on stock volatility in Nigeria. To capture stock returns volatility clustering, leptokurtosis and leverage effects on the share price series, the GARCH models were used. Specifically, the GARCK (1, 1), TGARCH (1, 1) and EGARCH (1, 1) were utilized. Using the simple random sampling technique, a sample size of 10 quoted companies was selected using the simple random sampling technique for the period 2000-2010 and this gives a total of 100 company years/data points. Secondary data retrieved from the financial statements of the sampled companies were employed for the study. E-views 7.0 was utilized for data estimation. Findings reveal that there are enough evidences to reject the assumptions of conditional normality in stock prices data series and accept the existence of stock volatility in Nigerian stock market. In addition, an evaluation of the three models shows that BVS as a determinant of stock volatility appeared to be significant in the TGARCH (1,1) and EGARCH (1,1). Also EPS appeared to be significant in the TGARCH (1,1) and EGARCH-1(1,1) while DPS as a determinant of stock volatility appeared to be significant in GARCH (1,1). TGARCH (1,1) and EGARCH (1,1) respectively. The study concludes that accounting information influences stock volatility and as such the regulation of disclosures may be an area for consideration by the relevant agencies alongside the need to address volatility issues in the Nigerian capital market.

Key words: *Garch, Tgarch, Egarch and accounting information.*

Introduction

Financial accounting information can be seen as the outcome of accounting systems that measure and routinely disclose audited, quantitative data concerning the financial position and performance of an enterprise. Audited balance sheets, income statements, and cash-flow statements, along with supporting disclosures, form the foundation of the financial accounting reports to investors and indeed a wide range of accounting information users. Financial accounting information supplies a key quantitative representation of individual corporation that supports a wide range of contractual relationships. According to the Accounting Institute of Certified Public Accountants (AICPA. 2005), financial statements must properly reflect the organization's financial and economic reality, so that the users are not induced to take decisions on misleading information. Financial accounting information also enhances the information environment of the reporting entity and those associated with it. The quality of financial disclosure can impact firms' cash flows directly, in addition to influencing the cost of capital at which the cash flows are discounted. Accounting information, such as that conveyed in publicly disclosed accounting reports, is also critical to the analysis of temporal liquidity positions of equity markets.

Disclosure of accounting information arguably reduces information asymmetries amongst investors (Amihud and Mendelson, 1986). As argued by Black (2000) and Ball (2001), timely financial accounting disclosure system that is a prerequisite to the very existence of efficient stock markets in which stock prices to a considerable extent reflects all public information and incorporates private information as well as communicate the information set to managers, current and potential investors.

However, there are several disclosing methods available. The choice of the most adequate method depends on the nature and relative importance of the information to be disclosed. Otavio and Luis (2009) notes that the most common methods are the following: Formal financial statements, information between parentheses, explanatory notes, supplementary statements and exhibits, audit report, annual administration report and management discussion and analysis reports. The disclosure level partially depends on the sophistication level of the reader that uses it, as well as on the disclosure standard considered more desirable. However, Ang and Chen (2006) argued that firms endogenously choose the level of disclosure based on the costs and benefits of direct communications with the market. Otavio and Luis (2009) notes that disclosure standard can be divided into three levels; firstly, there is adequate disclosure which assumes a minimum information volume of disclosure compatible with the purpose of avoiding misleading financial statements. The information must be adequate to the user understanding, and to the actual situation of the firm at the time they refer to. Secondly, there is fair disclosure which holds the view that financial statements must report the firms' situation in a fair manner. Finally, there is full disclosure which considers the presentation of all relevant information. In this case, the financial statements must contain all the information which if omitted or ill disclosed might lead to serious errors concerning the firm's assessment and its trends. Otavio and Luis (2009) however, comment that the difference between the three levels of disclosure above is very subtle.

The relationship between accounting information disclosure and stock volatility is stimulating considerable interest across an eclectic range of researchers and importantly capital market investors, forecast analyst and management. Volatility is simply defined as a measure of dispersion around the mean or average return of a security. It is a measure of the range of an asset price about its mean level over a fixed amount of time (Abken and Nandi, 1996). It follows that volatility is associated with the variance of an asset price. If a stock is labeled as volatile, then it is plausible that there will be a systematic variance of its mean over time. Conversely, a less volatile stock will have a price that will deviate relatively little over time. There are several reasons why an increase in disclosure of accounting information should reduce stock volatility. First, is the effect on stock volatility arising from the role of accounting information disclosure in mitigating uncertainty. Accounting disclosures may reduce the magnitude of the impact of news about a firm's performance, which would reduce stock price volatility (Lang and Lundholm 1993; Bushee and Noe 2000). Second, retrospectively, the market microstructure theory also suggest that by increasing the amount of public information, disclosure is likely to reduce information asymmetries in the market that result in pronounced price changes in response to changes in demand for the stock (Diamond and Verrecchia 1991). Finally, disclosure may reduce heterogeneity of beliefs about the true value of the firm. It may thus reduce both the volume traded and the volatility of the stock price. Conversely, one can also think of a number of reasons why an increase in disclosure might increase stock volatility. First, an increase in disclosure implies that more information is released, which in and of itself might move the price and increase volatility (Ross 1989). Second, an increase in the disclosure of information relies on sophisticated investors to interpret and put the disclosed information into context. Indeed specific disclosure requirements could provide the markets with more data that might be misconstrued by analysts. More disclosure might thus inject more market volatility (Institute of International Finance 2003, 1987; Shleifer and Vishny 1997).

Consequently, a plausible theoretical link can be established between accounting information and stock return volatility. Fundamentally, the theory of market efficiency suggests that the conditional variance of accounting information is part of the conditional variance of stock returns. Thus if current accounting information is more uncertain, thereby increasing the uncertainty of firm's future cash flows, future stock returns are expected to be more volatile (Lin 2000; Krische and Lee 2000). This paper examines the relationship between accounting information and stock volatility in the Nigerian capital market.

Statement of the Research Problem

Numerous studies have documented evidence showing that stock returns exhibit phenomenon of volatility clustering, leptokurtosis and Asymmetry (Rajni and Mahendra, 2007 Campbell and Hentschel; 1992 LeBaron, 2006). There has also been considerable volatility (and uncertainty) in the past few years in mature and emerging financial markets worldwide (Alexander 1999). It is also well established in the accounting literature that stock price volatility tends to increase around accounting information events (beaver, 1968). Numerous accounting studies document that investors appear to under-react to a firms accounting information even when it leads to a drift in stock prices (Gleason & Lee. 2003, Sticlel; 1991; Bernard and Thomas (1989). Foster, Olsen and Shevlin, 1984). Accounting disclosures may reduce the magnitude of the impact of news about a firm's performance, which would reduce stock price volatility (Lang in Lundholm 1993; Bushee and Noe 2000). However, in Nigeria, it is observed that not much empirical examination of the volatility effect has been done using GARCH models. Importantly, of the few studies carried out in Nigeria such as that of Ogum. Beer and Nouyrigat (2005), Jayasuriya (2002), Okpara and Nwezeaku (2009) none of the studies have incorporated accounting numbers in their GARCH Models. Consequently, the study addresses this critical inadequacy by specifying GARCH models with accounting numbers as exogenous variables. Furthermore, unlike the other studies, the study uses a family of GARCH models; GARCH (1, 1). TGARCH (1, 1) and EGARCH (1, 1) in examining the effect of accounting numbers on stock volatility in Nigerian capital market. In addition, the study provides evidence from Nigeria beyond anecdotal assertions on the relationship between accounting information and stock volatility.

Research Objectives

The research objectives are to;
1. Examine the existence of stock volatility in the Nigerian stock market.
2. Evaluate the relationship between Book value per share and stock volatility in the Nigerian stock market.
3. Determine the relationship between Earnings per share and stock volatility in the Nigerian stock market.
4. Assess the relationship between Dividend per share and stock volatility in the Nigerian stock market.

Literature Review and Hypotheses Development

Accounting Information and Value Relevance

The premise for expecting accounting information to influence stock volatility is that the accounting information is value relevant. Value relevance research is based on the idea that accounting information is useful for determining company value in the case that its cross sectional variation corresponds with the cross sectional variation in stock prices or stock returns (Novak.2010; Barth, et' al 2001). However, the term relevance as a quality of accounting information as used in accounting literature is defined by the American Accounting Association (1966:9); "For information to meet the standard of relevance, it must bear on or be usefully associated with the action it is designed to facilitate or the result desired to produce. This requires that either the information or the act of the communicating exert influence on the designated action". Relevance thus implies the ability of the information to influence decisions of both potential and existing investors whether by changing or confirming their expectations about the result or consequences of actions or events.

According to Barth (200]) for financial information to be value relevant, it is a condition that accounting numbers should be related to current company value. If there is no association between accounting numbers and company value, accounting information cannot be termed value relevant and, hence, financial reports are unable to fulfill one of their primary objectives. Put succinctly, Barth, (2001. p. 95) states that: *"Value relevance research examines the association between accounting amounts and equity market values"*

Theil (1968) was one of the first value relevance researchers and defined information as a change of expectations in the outcome of an event. Within the context of his study, he claimed that a firm's financial statement is value relevant if it leads to a change in investors assessments of the probability distribution of future returns. Beaver (1968) supported this definition and added that a sufficiently large change should exist to induce a change in decision maker's behavior.

According to Kothari (2001) the impact of financial statement information on capital markets is an enduring and well documented area of research. The value-relevance stream of this research is based on the premise that if information is useful, investors will adjust their behavior and the market will respond through changes in stock prices. Therefore, information is considered value-relevant if stock price movements are associated with the release of the information.

Francis and Schipper (1999) suggested four possible alternative interpretations of value relevance. The first interpretation considers accounting information as leading stock prices by capturing intrinsic share values. The measurement of value relevance will then be the profits generated from implementing accounting trading rules. The second interpretation indicates that if the variables used in valuation models originate from financial statement information, the information is termed value relevant.

The third interpretation is based on the statistical association between accounting information and market value where the main objective is to measure whether investors actually use the information in setting prices. Finally, the fourth interpretation is seen in a long window perspective where the correlation between accounting information and market values are statistically examined, Interpretation three and four are the most common used interpretations in value relevant research in recent studies (e.g.. Kothari, 2001; Aboody, Hughes, & Liu. 2002; Dontoh, Radhkrishnan, & Ronen, 2004),

According to Beaver (2002), value relevance research investigates the association between a security price dependent variable and a set of independent accounting variables. There are several approaches to this definitional explanation. Francis and Schipper (1999) and Nilsson (2003) define it from four perspectives: (a) The predictive view of value relevance: The accounting number is relevant if it can be used to predict future earnings, dividends, or future cash flows. (b) The information view of value relevance: The value relevance is measured in terms of market reactions to new information. (c) Fundamental analysis view of value relevance: The accounting information is relevant in valuation if portfolios formed on the basis of accounting information are associated with abnormal returns and (d) The measurement view of value relevance: The financial statement is measured by its ability to capture or summarize information that affects equity value.

Stock Returns Volatility

The volatility of stock prices in the stock market has been of concern to researchers. Stock return volatility which represents the variability of stock price changes could be perceived as a measure of risk faced by investors. Shiller (198!) argues that stock prices are more volatile than what is justified by time variation in dividends. Similarly, Schwert (concludes that stock market volatility cannot be fully explained by changes in economic fundamentals. Numerous studies have documented evidence showing that stock returns exhibit phenomenon of volatility clustering, leptokurtosis and Asymmetry. Volatility clustering occurs when large stock price changes are followed by large price changes, of both signs, and small price changes are followed by periods of small price changes (Mande 1963; Fama, 1965; Black, 1976).

Ajao (2012) notes that a number of recent studies have sought to characterize the nature of financial market return process, which has always been described as a combination of drift and volatility. Volatility may impair the smooth functioning of the financial system and adversely affect economic performance (Rajni and Mahendra, 2007; Mollah, 2009). Stock price volatility is an indicator that is most often used to find changes in trends in the market place.

Rajni and Maliendra, (2007) notes that stock price volatility tends to rise when new information is released into the market, however the extent to which it rises is determined by the relevance of that new information as well as the degree in which the news surprise investors. However, economists and financial experts have propounded theories on what causes volatility. Some financial economists see the causes of volatility embedded in the arrival of new, unanticipated information that alter expected returns on a stock (Engle, 1982). Others claim that volatility is caused mainly by changes in trading volume, practices or patterns which in turn are driven by factors such as modifications in macroeconomic policies, shift in investors' tolerance of risk and increase uncertainty (Rajni and Mahendra, 2007). These characteristics are perceived as indicating a rise in financial risk, which can adversely affect investors' assets and wealth. For instance, volatility clustering makes investors more averse to holding stocks due to uncertainty.

Firm-level stock return volatility is important for both managers and shareholders. First, high volatility increase a firm's perceived riskiness, thereby raising its cost of capital (Froot, Perold and Stein 1992). Second, high volatility could affect the various agency relationships in the firm, exacerbating conflicts between stockholders and bondholders and hindering resolution of stockholder-management problems (Bainian and Verrecchia 1995). Third, recent research suggests that investment strategy based on volatility can earn statistically and economic significant abnormal returns (Fleming. Kirby and Ostdiek 2001, 2003; Ang. Hodrick, Xing and Zhang 2006).

In Nigeria Okpara and Nwezeaku (2009) examine the effect of the idiosyncratic risk and beta risk on the returns of 41 randomly selected companies listed on the NSE from 1996 to 2005. They employed a two-step estimation procedures, firstly, the time series procedure is used on the sample data to determine the beta and idiosynsratic risk for each of the companies; secondly, a cross-sectional estimation procedure is used employing EGARCH (1,3) model to determine the impact of these risks on the stock market returns. Their results reveal, among others, 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.

Theoretical Framework

Theory of market efficiency or the efficient market hypothesis provides an appropriate theoretical framework for the study. According to the theory, share prices on the market place react fully and instantaneously to all information available (Fama, 1991). According to the Efficient Market Hypothesis (EMH), an operationally efficient stock market is expected to be externally and informationally efficient; thus security prices at any point in time are an unbiased reflection of all the available information on the security's expected future cash flows and the risk involved in owning such a security (Reilly and Brown 2003). Such a market provides accurate signals for resource allocation as market prices represent each security intrinsic worth. Market prices can at times deviate from the securities true value, but these deviations are completely random and uncorrelated.

According to Lo (1997) the market efficiency hypothesis stipulates that price changes are only expected to result from the arrival of new information. Given that there is no reason to expect new information to be non-random, period-to-period price changes are expected to be random and independent. In other words, they must be unforecastable if they are properly anticipated, i.e. if they fully incorporate the expectations and information of all market participants. It is expected that the more efficient a market, the more random the sequence of its price movements, with the most efficient market being the one in which prices are completely random and unpredictable. In an efficient market information gathering and information based trading is not profitable as all the available information is already captured in the market prices. This may leave investors with no incentive as to the gathering and analyzing of information, for they begin to realize that market prices are an unbiased estimate of the shares' intrinsic worth (Fama, 1965; Lo 1997).

Efficient Market Hypothesis (EMH) asserts that in an efficient market, prices at all times fully reflect all available information that is relevant to their valuation (Fama, 1970). Thus, security prices at any point in time are an unbiased reflection of all available information on the security's expected future cash flo and the risk involved in owning such a security. Fama (1970) classified the information items into three levels depending on how quickly the information is impounded into share prices: (1) weak form EMH, (2) semi strong form EMH, and (3) strong form EMH.
Weak form efficiency:

According to Dryden, (1970) Jensen and Bennington (1970) if the market is efficient in the weak form, share prices reflect all past market information; hence information on past prices and trading volumes cannot be used for share valuation. Investigating the presence of any statistically significant dependence or any recognizable trend in share prices changes, is traditionally used to directly test weak form efficiency. The weak form of the efficient market hypothesis is such in which the present stock price is as a result of all the past information in the history of the market.
ii. Semi strong form efficiency:

A semi strong-form efficient market is a market in which prices fully reflect all publicly available information. This form is concerned with both the speed and accuracy of the market's reaction to information as it becomes available. Event studies that examine how stock prices adjust to specific significant economic events have been used to directly test semi-strong form efficiency. Events normally tested are stock splits, initial public offerings (IPO), company announcements (especially earnings and dividend announcements) and other unexpected economic and other world events. The semi strong form of market efficiency deduces that the share prices reflect all available information both publicly and privately existing. Various other methods have been employed to test the semi-strong efficiency. Researchers have tested the significance of price to earnings (PIE) and other ratios, the effect of firm size and many other characteristics that can be derived from publicly available information.
iii. Strong form efficiency

The strong form efficiency holds that prices are expected to reflect both public and private information. It seems to be more concerned with the disclosure efficiency of the information market than the pricing efficiency of the securities market. Tests for the strong form efficiency are mainly centered on finding whether any group of investors, especially those who can have access to information otherwise not publicly available, can consistently enjoy abnormal returns. According to Damodaran, (1996) Reilly and Brown (2003) this implies that no one ' having private or public information can out beat the market, because the market automatically anticipates in an unbiased manner the stock prices and incorporates the effect of all these information on the share prices.

Modeling Stock Volatility

Engle (1982) introduced the autoregressive conditional heteroskedasticity (ARCH) to model volatility. Engle (1982) modeled the heteroskedasticity by relating the conditional variance of the disturbance term to the linear combination of the squared disturbances in the recent past. Bollers (1986) generalized the ARCH model by modeling the conditional variance to depend on its lagged values as well as squared lagged values of disturbance, which is called generalized autoregressive conditional heteroskedasticity (GARCH). Since the work of Engle (1982) and Bollerslev (1986), the financial econometrics literature has been successful at measuring, modeling, and forecasting time-varying return volatility.

Bollerslev (1986) generalized the ARCH model by modeling the conditional variance to depend on its lagged values as well as squared lagged values of disturbance. Since the works of Eng (1982) and Bollerslev (1986), various variants of GARCH model have been developed to model volatility. Some of the models include EGARCH originally proposed by Nelson (1991), GJR-GARCH model introduced by Glosten, Jagannathan and Runkle (1993). Threshold GARCI-I (TGARCH) model due to Zakoian (1994).

Following the success of the ARCH family models in capturing behavior of volatility. Stock returns volatility has received a great attention from both academies and practitioners as a measure and control of risk both in emerging and developed financial Markets.

Concerning the effectiveness of the ARCH family models in capturing volatility of financial time series, Hsieh (1989) found that GARCH (1, 1) model worked well to capture most of the stochastic dependencies in the time series. Based on tests of the standardized squared residuals, he found that the simple GARCI-1 (1.1) model did better at describing data than a previous ARCH(1 2) model also estimated by Hsieh (1988). Similar conclusions were reached by Taylor (1994). Brook and Burke (2003). Frimpong and Oteng-Abayie (2006) and Olowe (2009). In a like manner. Bekaert and Harvey (1997) and Aggarwal et al.(1999) in their study of emerging markets volatility, confirm the ability of asymmetric GARCH models in capturing asymmetry in stock return volatility. Thus, ARCH family models are good candidates for modelling and estimating volatility in emerging stock markets.

In literature, also, studies like Campbell and Hentschel (1992), LeBaron (2006) provide evidence that stock returns has time-varying volatility. Although the GARCH model has been very successful in capturing important aspect of financial data, particularly the symmetric effects of volatility, it has had far less success in capturing extreme observations and skewness in stock return series. The Traditional Portfolio Theory assumes that the logarithmic stock returns are independent and identically distributed (IID) normal variables which do not exhibit moment dependencies, but a vast amount of empirical evidence suggest that the frequency of large magnitude events seems much greater than is predicted by the normal distribution (Harvey and Siddique, 1999; Verhoeven and McAleer, 2003; diBartolomeo, 2007).

In Nigeria, the few published studies on modelling volatility of stock returns, include: Ogum. Beer and Nouyrigat (2005). Jayasuriva (2002), Okpara and Nwezeaku (2009). Ja (2002) use asymmetric GARCH methodology to examine the effect of stock market liberalization on stock returns volatility of fifteen emerging markets, including Nigeria for the period December 1984 to March 2000. The study reports, among others, that positive (negative) change in prices have been followed by negative (positive) changes indicating a cyclical type behavior in stock price changes rather than volatility clustering in Nigeria.

In contrast to Javasuriya (2002), Ogum, Beer and Nouyrigat (2005) investigate the emerging market using Nigeria and Kenya stock return series. Results of the exponential GARCH model indicate that asymmetric volatility found in the U.S. and other developed markets is also present in Nigerian, but Nenva shows evidence of significant and positive asymmetric volatility, suggesting that positive shocks increase volatility more than negative shocks of an equal magnitude. Also, they show that while the Nairobi Stock Exchange return series indicate negative and insignificant risk-premium parameters, the NSE return series exhibit a significant and positive time-varying risk premium. Finally, they report that the GARCH parameter Q3) is statistically significant indicating volatility persistence in the two markets.

Accounting Information and Stock Volatility

Earnings and stock volatility

The influence of earnings on stock volatility has been examined from several perspectives and different methods have also been adopted in detecting its effects on stock movements. Harris (1991) using a value relevance approach utilized earnings and change in earnings as explanatory variables for stock returns. This result suggests that both earnings levels and earnings changes play a role in stock price movements. Easton and Harris (1991) provides evidence of value relevance of earnings. They suggested that earnings are an explanatory variable for returns. According to Ball and Brown (1968) earnings announcements do not appear to cause any unusual jumps in stock prices. Still, the study suggests certain under-reaction in stock price movements at the time of the announcement. This under reaction creates a post earnings announcement drift that appears to be most pronounced in cases of negative income surprises.

Beaver (1968) concludes that the information content of income is significant is explaining the stock volatility. His evidence indicates a dramatic increase in the trade volume of stocks in the week of earnings announcements. In addition, the magnitude of the stock price changes in the week of announcements is much larger than the average during the non-report period.

Lev and Zarowin (1999) provides supportive evidence of declining influence of earnings information in relation to stock returns. Their results suggest that stock returns are not excessively sensitive to earnings innovations. Bauman and Nier (2004) have presented evidence suggesting that accounting information disclosure induces reaction by investors which influences stock volatility. Veronesi (2003) examines the role of firm-specific volatility to uncertainty about average future profitability. The study notes that firm age is negatively related. Interestingly, Wei and Zhang (2006) provide evidence that stock return volatility is significantly associated with ROE and ROE volatility. However, a limitation of the study is that the means by which various measures of stock return volatility (total, systematic and idiosyncratic) at the level of the individual stock relate to a firm's characteristics is not addressed. Abel (1988) examines the effect of the persistence of dividend volatility on stock prices in a encral equilibrium Lucas-type (1978) model. Hodrick (1990) and Bekaert (1996) show that movements in conditional variance of market fundamentals are legitimate market fundamentals that imply movements in conditional variance of asset prices

Book values and stock volatility

A vast amount of studies (Ayers, 1998; Barth, Beaver, & Landsman, 1998; Dontoh, Radhakrishnan, & Ronen, 2004) documents that book values of equity are highly associated with stock prices volatility. Some of these studies show that the statistical association between stock prices and book equity is typically stronger than the association between stock returns and earnings. Several studies conclude that fair value estimates are more pervasive in affecting stock movements (Carroll, Linsmeier, & Petroni, 2003; Khurana & Myung-Sun, 2003). Khurana and Kim (2003) notes that while fair value accounting may increase the value relevance of balance sheet measures, the value relevance of earnings might actually be depressed compared to historical cost estimates. This feature is attributed to a higher portion of unexpected earnings under fair value accounting, for instance transitory gains and losses. The effect of book equity on stock movements is also a function of differences relating to the extent and accounting measurement of unrecognized intangible assets. However, book value of equity has been confirmed in several studies (e.g.. Collins et al.. 1997: Francis & Schipper, 1999; Le & Zarowin, 1999) as being highly associated with stock prices. Collins. Maydew. and Weiss (1997) suggest that a decline in the effect of earnings on stock movements and an increase in effect of book values.

Their findings support similar empirical studies suggesting that book values show a tendency of increased importance relative to earnings.

Hypotheses Statements

The following hypotheses have been specified for the purpose of the study
1. Book value per share has a significant effect on stock volatility in Nigeria.
2. Dividend per share has a significant effect on stock volatility in Nigeria.
3. Earnings per share have a significant effect on stock volatility in Nigeria.

Methodology

In the relatively short period that has elapsed since their initial development by Engle (1982) and Bollerslev (1986), applications of the ARCH/GARCH family of models in finance have become commonplace. To capture stock returns volatility clustering, leptokurtosis and leverage effects on the NSE return series, the GARCH (1, 1) models were used. The GARCH (1, 1) is a generalization of the ARCH (q) model proposed by Engle (1982) as a way to explain why large residuals tend to clump together, by regressing squared

residual series on its lag(s). However, empirical evidence shows that high ARCH order has to be selected in order to catch the dynamics of the conditional variance. Bollerslev (1986) proposed the Generalized ARCH (GARCH) model as a solution to the problem of high ARCH orders. The GARCH reduces the number of estimated parameters from an infinite number to just a few. According to Brook and Burke (2003). The lag order (1, 1) is sufficient to capture all the volatility clustering that is present in a data. Using the simple random sampling technique, a sample size of 10 quoted companies of the 199 listed equities was selected using the simple random sampling technique for the period 2000-2010 was utilized for the study and this gives a total of 100 company years/data points. Krejcie & Morgan (1970) in Amadi (2005) agrees with the sample as they proposed the population proportion of 0.05 as adequate to provide the maximum sample size required for generalization. Secondary data retrieved from the financial statements of the sampled companies was employed for the study. Eviews 7.0 is utilized for data estimation.

Model Specification

The GARCH (1, 1) modelling process involves two steps. The first step involves specifying a model for the share price series: the second step involves modelling the conditional variance of the residuals. We examine if the existence of accounting information has any effect on stock volatility. The AR (1)-GARCH (1,1) model for stock returns can be expressed as follows:

$R = C + R_{t-1} + \varepsilon_t$ …….. (I) where R is defined as Pt

$\sigma = \omega + \alpha\varepsilon^2_{t-1} + \beta\sigma^2_{t-1} + cD_1 + \varepsilon_1$ …… (2)

Where C is constant term in the mean equation,

R is defined as $p_t - p_{t-1}$ is the constant term in the conditional variance equation.
α is the ARCH coefficient and β is the GARCH coefficient.

D captures the following variables; Book value per share (BVS), earnings per share (EPS) and dividends per share (DPS). This allows us to determine whether accounting information is related to any change in the stock market volatility. When the coefficient of the variables are positive (negative) then there is a positive (negative) effect of accounting numbers on volatility.
ε_t = error term

Although the simple GARCH (1, 1) model captures symmetric behaviour of volatility, a vast amount of empirical evidence suggest that time-varying asymmetry is a major component of volatility dynamics (Hsieh, 1991). In addition, assuming that markets are efficient, then α_1 (the ARCH parameter) can be viewed as a 'news/announcement' coefficient, while β (the GARCH parameter) can be viewed as the persistence coefficient. Further, an increase (decrease) in α suggests that ne is impounded into prices more rapidly (slowly). A reduction in suggests that old news has a less persistent effect on prices changes. In addition, an (increase in suggests greater persistence. Also, when the sum a -I-s approaches unity then the volatility shocks are persistent.

Other specifications of the GARCH (p. q) include the exponential GARCL-I (EGARCH) and threshold GARCH (TGARCH).

The conditional variance equation of the Exponential GARCH (1, I) model (Nelson, 1991) is given by
$\log(\sigma^2) = \omega_0 + \beta\log(\sigma^2_{0-1}) + \alpha(\square_{0-1}/\sigma_{0-1}) + \square^{\square 0-1}/\sigma_{t-1} + cD + \varepsilon$ …… (3)

The main difference with the GARCH model proposed by Bollerslev (is that the leverage effect now is exponential and also that the variances are positive. The presence of leverage effects can be tested by the hypothesis that y< 0.

The TGARCH (1, 1) was introduced by Zakoian (1990) and Glosten, Jagannathan and Runkle (1993). TGARCH usually accounts for the fact that traders react differently to positive and negative increments of a factor. The conditional variance equation of TGARCH (1, 1) is given by:

$\sigma^2 = \omega_0 + \alpha\varepsilon^2_{t-1} + \varepsilon^2_{t-1} + d_{t-1} + b\sigma^2_{t-1} + cD_t$ ..... (4)

Presentation and Analysis of Result

Table 1 Descriptive statistics

	BVS	DPS	SP	EPS
Mean	1571.490	231.4400	39.98590	485.2800
Median	634.0000	97.50000	17.25000	157.5000
Maximum	14293.00	2200.000	248.6200	8400.000
Minimum	-844.0000	0.000000	0.000000	-43.00000
Std. Dev.	2588.541	315.1293	51.60424	1215.260
Jarque-Bera	498.7157	951.0916	96.38479	4002.139
Probability	0.000000	0.000000	0.000000	0.000000
Observations	100	100	100	100

Source: Eviews 7 0

Where: BVS = Book value per share, DPS = Dividend per share, SP = share price, EPS = Earnings per share.

Table I above presents the result for the descriptive statistics for the variables. As observed, BVS has a mean value of 1571.490 and a standard deviation of 2588.541. The maximum and minimum values stood at 14293.00 and -844.00 respectively. The Jarque-Bera statistic value of 498.72 and p-value of 0.00 confirms the normality of the data and suitability for generalization. It also indicates the absence of outliers in the data. The mean value for DPS stood at 123.44 with a standard deviation of 315.1293. The maximum and minimum values of OPS for the period under review were 2200.00 and 0.00 respectively. The Jarque-Bera statistic value 951.09 and p-value of 0.00 confirms the normality of the data and suitability for generalization. It also indicates the absence of outliers in the data. The mean value for SP stood at 39.98 and the standard deviation stood at 51.604. The maximum and minimum values were 248 and 0.00 respectively while the Jarque-Bera statistic value of 96.384 and p-value of 0.00 also confirms the normality of the data and suitability for generalization. It also indicates the absence of outliers in the data. Finally, EPS was observed to have a mean value of 485.280 and a standard deviation 1215.260. The maximum and minimum values were 8400 and -43.00 respectively while the Jarque-Bera statistic value of 4002 and p-value of 0.00 also suggest confirms the normality of the series and suitability for generalization. It also indicates the absence of outliers in the data.

Table 2 Volatility Analysis

Panel A		α		B	BVS
AR(1)-GARCH(1, 1)	2641610 (0.25)	0.504 (0.00)		-0.03 (0.00)	0.252 (0.45)
AR(I)-TGARCH(1,1)	26451610 (0.25)	0.544 (0.00)	-279 (0.53)	-0.030 (0.00)	0.265 (0.04)
AR(I)-EGARCH(1,1)	0.223 (0.18)	0.369 (0.07)	0.013 (0.95)	0.976 (0.00)	0.108 (0.00)

Panel B		A	□	B	EPS
AR(1)-GARCH(1, 1)	26496560 (0.63)	0.544 (0.00)		-0.030 (0.00)	0.438 (0.63)
AR(I)-TGARCH(1,1)	26496560 (0.00)	0.431 (0.00)	-1.00 (0.26)	0.019 (0.85)	0.888 (0.02)
AR(I)-EGARCH(1,1)	0.787 (0.00)	-3.139 (0.57)	3.897 (0.49)	0.571 (0.00)	0.265 (0.04)

Panel C		α	β	□	DPS
AR(1)-GARCH(1, 1)	20606021 (0.00)	0.521 (0.00)	-0.023 (0.00)		5.265 (0.00)
AR(I)-TGARCH(1,1)	20606021 (0.00)	0.431 (0.00)	-1.00 (0.26)	-0.026 (0.00)	5.607 (0.00)
AR(I)-EGARCH(1,1)	-0.145 (0.367)	0.910 (0.00)	-0.469 (0.00)	0.985 (0.00)	4.351 (0.00)

Panel D		A	β	□	BVS	DPS
AR(1)-GARCH(1, 1)	20531409 (0.843)	0.525 (0.00)	-0.022 (0.03)		0.100 (0.84)	5.078 (0.00)
AR(I)-TGARCH(1,1)	20531409 (0.843)	0.334 (0.00)	-4.65 (0.00)	-0.023 (0.39)	0.066 (0.92)	6.126 (0.00)
AR(I)-EGARCH(1,1)	-8.850 (0.00)	-1.097 (0.00)	-0.655 (0.00)	91.210 (0.00)	0.088 (0.00)	4.328 (0.00)

Panel E		α	B	□	BVS	DPS	EPS
AR(1)-GARCH(1, 1)	19858 (0.25)	0.150 (0.04)	0.600 (0.05)		0.184 (0.89)	9.758 (0.00)	-0.833 (0.55)
AR(I)-TGARCH(1,1)	19858 (0.25)	0.150 (0.04)	0.05 (0.05)	0.600 (0.05)	0.184 (0.89)	9.758 (0.00)	-0.833 (0.55)
AR(I)-EGARCH(1,1)	17.234 (0.25)	0.010 (0.98)	1.010 (0.98)	0.010 (0.98)	0.184 (0.85)	9.758 (0.00)	-0.833 (0.25)

Source: Eviews 7.0

In Selecting the GARCH model, the best representation for all indices is the GARCH (1,1) model and its extensions, TGARCH (1,1) and EGARCH (1, 1) The results presented in panel 1show that the coefficient of the Arch effect (α1) is statistically significant at 5% significance level.

This indicates that news about volatility from the previous time periods has an explanatory power on current volatility. Similarly, the coefficient of the lagged conditional variance (β) is significantly different from zero, indicating volatility clustering in stock return series. Its coefficient value of -0.03 is low and suggest that volatility clustering takes less time fizzle out. An evaluation of the three models shows that BVS as a determinant of stock volatility appeared to be significant in the TGARCH (1.1) and EGARCH(1.1) but not significant for GARCH(1, 1). Therefore we accept (H1) that BVS has a significant effect on stock volatility. Furthermore for the TGARCH (1,1) specification, the ARCH effect (α) and Garch effect (β) were found to be significant. However, the TGARCH leverage effect term (□) is negative as shown in the value of -2.79 which suggest that good news generates less volatility than bad news although it is not significant. Unlike in the GARCH, BVS appeared to be positive and significant at 5% level and indicates its effect on stock volatility. The EGARCH models show a positive and significant ARCH effect (α) and Garch effect with coefficients of 0.369 and 0.976 respectively. For the ARCH effect (α), this indicates that volatility from the previous time periods has an explanatory power on current volatility. For the Garch effect which measures the persistence in conditional volatility, the coefficient suggests that volatility clustering takes much time fizzle out. The EGARCH leverage effect term (□) unlike the TGARCH is positive as shown in the coefficient value of 0.013 indicating the existence of the leverage effect in returns. EGARCH results indicate that BVS appeared to be positive and significant at 5% level and is thus influences stock volatility.

Panel B shows the result For GARCH (1, 1), TGARCH (1.1) and EGARCH (1,1) models incorporating Earnings per share (EPS). An evaluation of the three models shows that EPS as a determinant of stock volatility appeared to be significant in the TGARCH (1,1) and EGARCH(1,1) but not significant for GARCH(1,1). Therefore we accept H2 that that EPS has a significant effect on stock volatility. The result for the Arch effect (α) across the three models shows that it is statistically significant at 5% significance level for both the GARCH and T-GARCH. This indicates that news about volatility from the previous time periods has an explanatory power on current volatility. Similarly, the coefficient of the lagged conditional variance (β) is significantly different from zero for both GARCH and EGARCH indicating volatility clustering in stock return series. Its coefficient value of -0.03 and 0.571 respectively for both models suggest that volatility clustering takes less time fizzle out in the GARCI-1 than in the EGARCH. The leverage effect term (□) is positive for EGARCH and negative for GARCH. This indicates that negative shocks (bad news) is larger effect on the conditional variance (volatility) than positive shocks (good news) of same magnitude for EGARCH while negative shocks imply a higher next period conditional variance than positive shocks of the same sign for the TGARCH. However, both effects appear to be statistically insignificant.

Panel C shows the result For GARCH (1,1).TGARCH (1.1) and EGARCH (1,1) models incorporating Dividend per share (DPS) An evaluation of the three models shows that DPS as a determinant of stock volatility appeared to be significant for all three models. Therefore we accept H3 that that BPS has a significant effect on stock volatility. The result for the Arch effect (α) across the three models shows that it is also statistically significant at 5% significance level for the GARCH, T-GARCH and EGARCH. This indicates that news about volatility from the previous time periods has a significant effect on current volatility. Similarly, the coefficient of the lagged conditional variance (β) is significantly different from zero for GARCH, TGARCH and EGARCH indicating volatility clustering in stock return series. Its coefficient value of-0.023,-0.026 and 0.985 respectively for the models suggest that volatility clustering takes less more time fizzle out in the EGARCH than in the GARCH and TGARCH. The leverage effect term (□) is positive and significant only for EGARCH. This indicates that a negative shock (bad news) is larger effect on the conditional variance (volatility) than positive shocks (good news) of same magnitude for EGARCH.

Panel D shows the result For GARCH (1, 1), TGARCH (1, 1) and EGARCH (1, 1) models incorporating Book value per share (BVS) and Dividend per share (BPS) jointly. An evaluation of the three models shows that while DPS appeared to be significant cross the three models, BVS is significant for only EGARCH. The result for the Arch effect (α) across the three models shows that it is statistically significant

at 5% significance level for the GARCH, EGARCH and T-GARCH. This indicates that news about volatility from the previous time periods has a significant effect on current volatility. Similarly the coefficient of the lagged conditional variance (β) is significantly different from zero for only EGARCH. The leverage effect term (□) is negative and significant for both TGARCH and EGARCH and this implies that negative shocks imply a higher next period conditional variance than positive shocks of the same sign.

Finally, Panel E shows the result For GARCH (1, 1), TGARCH (1, 1) and EGARCH (1,1) models incorporating Earnings per share (EPS) Dividend per share (BPS) and Book value per share (BVS) jointly. An evaluation of the three models shows that only DPS appeared to be significant across the three models. The result for the Arch effect (α) across the three models shows that it is statistically significant at 5% significance level for only GARCH and T-GARCH. Similarly, the coefficient of the lagged conditional variance (β) is significantly different from zero for only TGARCH and EGARCH. The leverage effect term (□) is positive and significant only for EGARCH.

Conclusion and Recommendation

This paper investigated the effect of accounting information the volatility of stock market returns in Nigeria using GARCH (1, 1). TGARCH (1,1) and EGARCH l. I models. The results from models show that accounting information explains and accounts for stock volatility in the Nigerian stock market. Specifically, release of information on book values, earnings per share and dividend per share is found to be related to stock volatility. On the overall, the results from this study provide evidence to show volatility clustering, leptokurtic distribution and leverage effects for the Nigeria stock returns data. These results are in tune with international evidence of financial data exhibiting the phenomenon of volatility clustering, fat tailed distribution and leverage effects. The results also support the e of volatility clustering in Nigeria provided by Ogum, et al. (2005); existence of leverage effects in Nigeria stock returns provided by Okpara and Nwezeaku (2009) and also agrees with their conclusion that stock returns volatility is not quite persistent in Nigeria as the sum of the GARCH coefficients were not so close to 1. The recommendation is that there is the need to address volatility issues in the Nigerian capital market.

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