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FINAMETRIC ANALYSIS OF NIGERIA STOCK MARKET AND VOLATILITY OF RETURNS

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Abstract
The study empirically examined nexus between efficient capital market and stock return volatility in Nigeria. Data used was extracted from CBN statistical bulletin 2014; the study also employed vigorous econometric tools such as GARCH model, ARCH model, GARCH graph, stationary test, johanse co-integration, Granger causality test, impulse and variance decomposition test. The test result revealed that stock return is volatile in an efficient market due to announcement of relevant information and that the prices of security in the market is on the downward trend; it is therefore recommended that investors should take due advantage of the low prices of securities in the market.

Keywords: stock return volatility, GARCH model, GARCH graph, all share indexes.

STATEMENT OF PROBLEM

Stock price volatility has been a major concern to both investors and researcher in recent past; various studies have documented evidence that stock price return shows various forms of volatility clustering or pooling, the stock price return which has in various times proven that volatility pooling in the present depends solely on the volatility of past two periods. Investors always find it difficult to predict the stock prices due to it volatility and that has positively or negatively affected the returns of investors in a market that is highly volatile, Engle (1982), assert that the positive or negative movement of asset returns in the present depend to the large extend the movement in the protected periods. Public information which is the premise of efficient capital market has a sign effect on stock price volatility; the nexus between efficient capital market and stock price return is instigating reasonable interest among investors and analyzes, the efficient market hypothesis asserts that asset value reflect all the available information both private and public in the market and that investors cannot always and consistently beat the market.

However, in the light of current controversies surrounding efficient capital market, institutional investors with first class information always and consistently make good and huge returns from

the market; this scenario is negating the concept of efficient market hypothesis. During the stock prices crash in Nigeria between 2007 – 2008, institutional investors with private information about the companies whose shares were traded took advantage of that and consistently make good return from the market above other investors.

Various approaches have been used by different school of thought to determine the value of stock volatility in the market; such school of thought among others include: fundamentalist (assert that every stock in the market has an intrinsic value which is reflected in the value of the shares), technicians (uphold that the value of stock is determined by the forces of supply and demand in the market) and the market efficient hypothesis (believed in the random walk theory of stock volatility.

In Nigeria, numerous studies using financial time series data such as asset return, inflation, exchange rate etc have been conducted using different estimating tools; such studies include but not limited to Beer and Nouyrigat (2005), Jayasuriya (2002), Okpara and Nwezeaku (2009), none of these studies have adopted financial time series data in GARCH model.

This study will tend to incorporate financial time series data in the GARCH - ARCH model to capture stock volatility pooling or clustering in an efficient capital market especially in Nigeria, also, the VAR model will be used to estimate the lag effect on the volatility clustering. Though, recent empirical studies demonstrated that financial time series data are always non stationary at level but when integrated into first difference, they become stationary at order one.

OBJECTIVES OF RESEARCH

The research objectives are to:

- Examine the nexus between all share index and stock price volatility
- Investigate the causality between market capitalization and stock price volatility

RESEARCH HTPOTHESES

The following hypotheses have been specified for the purpose of this study.

- There is no significant relationship between all share index and stock return volatility
- There is no significant relationship between market capitalization and stock return volatility

Significance of the Study

The research will be of immense benefit to researchers, public as well as capital market investors and operators; it will also contribute to the existing knowledge on stock volatility and security evaluation in the capital market. Potential investors will find it interesting in its area of determining security value and the extent of volatility clustering in the market.

CONCEPTUAL FRAMEWORK

Brealey and Meyers (1986:323-4) defined an efficient market as that market where information is widely and freely available to all investors/participants and also all important and ascertainable information is already shown in security value. However, Okafor 1983 (184-186) asserts that a capital market is efficient if it expatiates best allocation of scare resources among investors. At the level of individual investors, capital market efficiency implies unlimited access to scare resources at current interest rate. Such a situation does not admit of capital rationing, the

separation principle of separating investment decisions from financial decisions would reign and operate. It implies that investment decisions should be taken independent of financial decisions.

THEORIES OF INVESTOR BEHAVIOUR

Two opposing theories therefore have developed from this concept.

a) The Band wagon theory**:** Band wagon theory postulate that error of judgment in capital market business will be minimized by investors who join the group of markers in the market (the specialist and institutional investors). A follow-the –lead strategy requires that one should be cautious of stocks in which market markers have a high or an increasing short position. It implies also, that a rising trend in prices arising from the buying pressure of specialists (round –lot purchase), indicates a strong likelihood of an imminent bull market.

b).The contrary opinion hypothesis: closely related to the band wagon theory is the contrary opinion hypothesis. The hypothesis is based on the notion that individual investors are often wrong. By implication, 'market pressure'' which originate from odd –lot pressure are more likely to deceive than help the investor. The contrary opinion hypothesis therefore, stipulates that transaction losses will be minimized if orders are placed against the odd lot trend. The idea is to determine the prevailing trend in the activities of the odd-lotters (the ill-informed and do exactly the opposite.) this implies going short on stocks in which odd-lotters are bullish and vice versa.

MODELING STOCK VOLATILITY

GARCH (Generalized autoregressive conditional heteroscedaticity) modus was developed independently by Bollerslev (1986) and Taylor (1986). The GARH model is used to capture stock volatility and allows the conditional variance to be dependent upon previous own lags. Bollerslev (1986) generalized the ARCH model by modeling the heteroscedaticity (unequal variance) to depend on its own lagged value and the square residuals of the variance term so that the conditional variance becomes

$\sigma_t^2 = \alpha_0 + \alpha_1\mu^2_{t-1} + \beta\sigma^2_{t-1}$

where: σ_t^2 is the unequal variance which is based on past relevant information.

THEORECTICAL UNDERPINNING

Though many theories are proposed to explain the stock price volatility and efficient capital market; among others are

Efficient market model

The efficient market model simply states that in an efficient market, stock return adjust so quickly to new information such that stock value fully reflect the available information about the affected securities and Successive changes in security prices are random or independent. (Fama, 1970)

Essentially, the feature of independence of successive price changes conforms to the statistical property of a random variable. Hence, the theory has been characterized as the RANDOM –WALK- HYPOTHESIS of stock market prices. Three specifications of the efficient market model (EMT) have been identified to include;

The weak form (Random walk) hypothesis:

The random walk hypothesis postulates that most recent market prices of any security fully reflect the information content of its past sequence of prices. Consequently, knowledge of the historical prices of a security and/or detailed analysis based on such knowledge would not enhance the quality of investment decisions. This assertion is a complete negation of the methods and spirit of technical analysis. If the sequence of prices cannot be used to predict future trends, there would be no value in charting historical prices or in all other procedures adopted by the technicians.

The semi-strong form hypothesis:

The semi-strong form postulate that current prices of shares reflect all information (historical and publish) about the companies whose shares are under considerations. By implication, efforts to acquire and analyze corporate information contained in published annual reports and accounts would not confer any advantage. Similar analogies apply to other public information about corporate performance such as, announcement of dividends, stock splits, semi-annual reports as well as impending mergers, acquisitions or business combinations.

The strong form efficiency:

the strong form asserts that even inside information cannot be used to out –perform other investors consistently in the market. This implies that those who have access to privilege information about companies, or those who have first access to relevant information such as security analysts, portfolio managers and floor specialists cannot use such information to earn abnormal returns. In effect, securities prices reflect all information (public and inside) available in the market.

EMPIRICAL REVIEWED

Mgbame C.O & Ohiorenuan J.I (2013), studied accounting information and stock volatility. They used GARCH model to estimate their analysis by capturing the volatility clustering; the result revealed that accounting information explains and account for stock return volatility in Nigeria capital market.

SPECIFICATION OF ESTIMATING TOOLS

The reason of this research is to examine the nexus between efficient market and stock return volatility; the data involves financial time series and exhibit greater level of volatility; to this regards, the following tools will be used:

GARCH Model

GARCH (Generalized autoregressive conditional heteroscedaticity) model was developed independently by Bollerslev (1986) and Taylor (1986). The GARH model is used to capture stock volatility and allows the conditional variance to be dependent upon previous own lags. Bollerslev (1986) generalized the ARCH model by modeling the heteroscedaticity (unequal variance) to depend on its own lagged value and the square residuals of the variance term so that the conditional variance becomes

$\sigma_t^2 = \alpha_0 + \alpha_1 \mu^2_{t-1} + \beta\sigma^2_{t-1}$

Where: σ_t^2 is the unequal variance which is based on past relevant information.

ARCH Effect (Diagnostic test)
The test is one of a joint null hypothesis that all k lag squared residuals have coefficient values that are not significant from zero. If the value of the test statistics is greater than the value from the x^2 distribution, then we reject the null hypothesis.

Stationary Test
The stationary test is used to check whether the data are good for analysis; generally, financial time series data are always non stationary at level but when integrated into first difference, they become stationary. The null hypothesis assume that the data has a unit root; if the probability distribution is statistical insignificant, we reject the null hypothesis. Gujarati and Porter (2009) provide a general procedure for evaluation of existence of unit root or non stationary as follows;

$$\Delta Y_t = \propto_o + \sum_{I=1} \propto_1 Y_{t-1} + \sigma_1 \Delta Y_{t-1} + \mu_1$$

Where, ΔY_t is the first difference.

Johansen Co-integration
This model is developed to explain the long run relationship between two or more variables. Generally, the formula used to calculate the long run relationship is given as follows:

$$X_{1t} = \sum \beta_i x_{i,t} + z_t$$

Granger Causality Test
Granger (1952) developed a model to explain the cause – effect relationship between two or more variables on the dependent variable; with g dependent variable and x independent variable, the null hypothesis postulate g does not granger cause x, when the coefficient is statistically insignificant, then reject the null hypothesis otherwise accept the null hypothesis. Generally, granger test is based on the following regression

$$Y_t = \beta_0 + \sum \beta_0 Y_{t-1} + \sum \beta_1 x_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots (1)$$
$$X_t = \infty_0 + \sum \infty_1 x_{t-1} + \sum \infty_1 Y_{t-1} + V_t \ldots\ldots\ldots\ldots\ldots (2)$$

Where;
Y_t and X_t represent the financial times series to be tested
μ_t and V_t denote the idiosyncratic terms and capture all variance in the lagged residuals.

Impulse response and Variance Decomposition
Impulse responses brings out the responsiveness of the endogenous variables in the VAR to shocks to each of the variables; while variance decomposition provides a different method for examining VAR system dynamics. They give the proportion of the movements in the dependent variables that are due to their "own shocks".

Model Specification
Modeling stock volatility does not follow the liner regression model, we shall therefore move straight to the econometric model of our research.

$Tmv_t = X_0 + \beta_1 asi^2_{t-1} + \beta_2 mcp^2_{t-2} + \sigma_t$
Where;
Tmv = total stock return
X = the constant
Asi = all share index
Mcp = market capitalization
σ = the stochastic error noise term.
t-1 = time series data on its lagged residual.

Apariori Expectation
It is expected that both all share index and market capitalization will have positive and statistically significance relationship with stock return volatility.
Asi $>\alpha_1$, mcp$>\alpha_2$

Data Presentation
The table below present financial time series data sourced from CBN statistical bulletin 2014 for the post sap era; the data incorporates the sum total of an independent market variable such as, the all share index, market capitalization and stock return volatility.

Year	Total market value	All share index	Market capitalization
1987	382.4	190.9	8.2
1988	850.3	233.6	10.0
1989	610.3	325.3	12.8
1990	255.4	513.8	16.3
1991	242.1	783.0	23.1
1992	491.7	1,107.6	31.2
1993	804.4	1,543.8	47.5
1994	985.9	2,205.0	66.3
1995	1,838.8	5,092.2	180.4
1996	6,979.6	6,992.1	285.8
1997	10,330.5	6,440.5	281.9
1998	13,571.1	5,672.7	262.6
1999	14,072.0	5,266.4	300.0
2000	28,153.1	8,111.0	472.3
2001	57,683.8	10,963.1	662.5
2002	59,406.7	12,137.7	764.9
2003	120,402.6	20,128.9	1,359.3
2004	225,820.0	23,844.5	2,112.5
2005	262,935.8	24,085.8	2,900.1
2006	470,253.4	33,189.3	5,120.9
2007	1,076,020.4	57,990.2	13,181.7
2008	1,679,143.7	31,450.8	9,563.0
2009	685,717.3	20,827.2	7,030.8
2010	799,911.0	24,770.5	9,918.2
2011	683,925.7	20,730.6	10,275.3

2012	808,991.4	28,078.8	14,800.9
2013	2,350,875.7	41,329.2	19,077.4
2014	1,334,783.1	34,657.2	16,875.1

Source: CBN statistical bulletin 2014

Analysis and interpretation of result

This section of the study portrays the different econometric output and the relevant interpretations such as:

GARCH MODEL

GARCH (generalized autoregressive conditional heteroscedaticity) model is used to capture stock price volatility and the relative statistical significance of the coefficients.

Dependent Variable: TMV
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 03/10/16 Time: 10:30
Sample: 1987 2014
Included observations: 28
Convergence not achieved after 500 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)

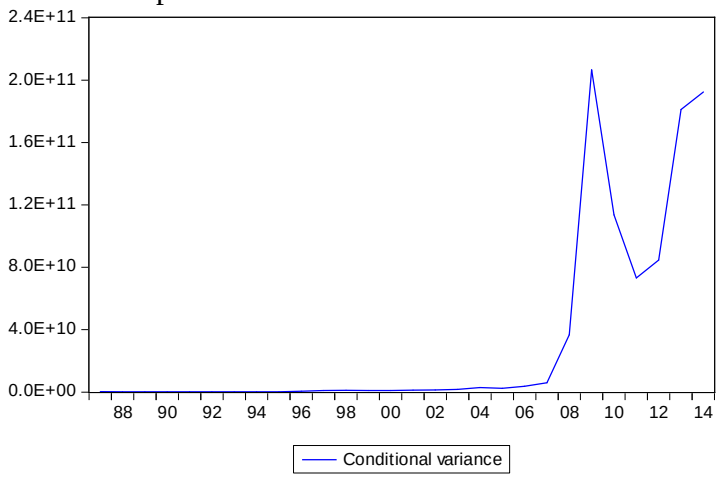
Variable	Coefficient	Std. Error	z-Statistic	Prob.
ASI	3.531701	0.886063	3.985835	0.0001
MCP	89.07907	3.905810	22.80681	0.0000
	Variance Equation			
C	58035388	67169122	0.864019	0.3876
RESID(-1)^2	0.363372	0.173859	2.090038	0.0366
GARCH(-1)	0.549327	0.389543	1.410184	0.1585

R-Squared – 84.6%, Adjusted R-Squared – 84%, Durbin Watson Sta- 2.40, Akaike ifo – 26.07038

The coefficient of the squared lagged residual and the conditional lagged variance which are statistically significance shows that volatility clustering in the conditional variance is not actively present and that the shock in the conditional variance is not persistence; the huge value of the constant term in the variance equation shows the absent of ARCH effect (unequal variance) in the conditional variance.

The individual coefficient in the relative statistic are statistically significance which implies that stock return volatility is influence by all share index and market capitalization; the value of R^2 in the global statistic shows that 86% change in stock returns is affected by variations in efficient market variables.

GARCH Graph (conditional variance)
The GARCH graph is used to explain the movement of asset return in an efficient capital market.



From the conditional variance graph, there was persistence upward movement noticed in the asset returns between 2007-2008 before the stock market crashed in mid 2008-2011 respectively; However, indications from the graph shows that the market in 2014 reached it maximum and we expect asset return to drop tremendously in 2015-2016 respectively.

Testing for ARCH effect
The null hypothesis in an ARCH effect postulate that conditional variance of the variables is not equal to zero.

Heteroskedasticity Test: ARCH				
F-statistic	1.527284	Prob. F(5,17)		0.2337
Obs*R-squared	7.129188	Prob. Chi-Square(5)		0.2112
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Date: 03/10/16 Time: 11:06				
Sample (adjusted): 1992 2014				
Included observations: 23 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.55E+10	3.43E+10	1.034108	0.3156

RESID^2(-1)	0.036762	0.217050	0.169369	0.8675
RESID^2(-2)	-0.051624	0.229000	-0.225430	0.8243
RESID^2(-3)	0.039021	0.240915	0.161970	0.8732
RESID^2(-4)	0.348361	0.241350	1.443384	0.1671
RESID^2(-5)	0.530955	0.253951	2.090773	0.0519

The probability of the F-statistic is not statistically significance, to that end, we reject the null hypothesis and conclude that the presence of ARCH effect was not found in the GARCH output; therefore, our financial time series data is good for our model and can be use for analysis.

Stationary Test

Documented evidence has shown that financial time series data are non stationary at level but are stationary at first difference.

Variable	PP	T-sta	Prob	Order	Remark
Stock return	-7.685171	-2.981038	0.0000	1(1)	stationary
Share index	-7.436328	-2.981038	0.0000	1(1)	stationary
capitalization	-5.045828	2.981038	0.0004	1(1)	stationary

The result of Phillip Perron unit root test revealed that the financial time series data are stationary at first difference demonstrating evidence that the data are good for analysis and forecasting.

Granger Causality Test

The test was founded by Granger (1952) to show the cause-effect relationship between variables; similarly, the output of our result will present the cause-effect relationship.

Pairwise Granger Causality Tests
Date: 03/10/16 Time: 13:42
Sample: 1987 2014
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
ASI does not Granger Cause TMV	27	14.2397	0.0009
TMV does not Granger Cause ASI		1.25668	0.2734
MCP does not Granger Cause TMV	27	75.0449	7.E-09
TMV does not Granger Cause MCP		7.69369	0.0106
MCP does not Granger Cause ASI	27	0.00469	0.9459
ASI does not Granger Cause MCP		0.00051	0.9822

The result of the Granger test revealed that all share index granger cause stock returns thus showing a cause effect relationship between the both variables, though, stock return does not granger cause all share index which implies a unidirectional flow of relationship. It was gathered

that asset return granger cause market capitalization and not vice versa; it shows a unidirectional flow of asset return impacting greatly on market capitalization.

Johanse co-integration

Johanse co-integration test is used to confirm the long run relationship between the endogenous and exogenous variables in our model.

Hypothesized No. of CE(s)	Eigen value	Trace statistics	Critical value	Probability values
None*	0.506914	36.48522	29.79707	0.0073
At most 1*	0.402515	18.10134	15.49471	0.0198
At most 2*	0.165714	4.710652	3.841466	0.0300

Normalized co-integrating coefficients

Asset return	All share index	Market capitalization
1.000000	-8.713555	-87.25579
	(2.46367)	(8.22706)

The trace test statistics and probability values indicates three co-integration equations; denoting rejection of the null hypothesis at 0.05 level of significance. The normalized co-integrating coefficients also indicate a long run but inverse relationship among the variables also rejecting the null hypothesis at 5% level of significance.

Impulse Response

The impulse response test determines the responsiveness of the endogenous variables to own shock emanating from shocks from other variables in the conditional variance.

Response of TMV:			
Period	TMV	ASI	MCP
1	209127.5	0.000000	0.000000
2	-74114.09	308177.7	80793.98
3	-103829.7	177220.2	-44661.05
4	-41529.43	233575.7	-27950.51
5	-99880.67	240229.2	-50451.21
6	-71235.96	220261.7	-67390.25
7	-76820.06	237084.6	-64025.24
8	-80552.58	229440.6	-72533.51
9	-74881.88	230881.0	-72634.20
10	-78260.07	232233.1	-73497.40

The responsiveness of the dependent variable to own shock was seen to be inverse in the long run while other shocks emanating from the independent variables was noticed to be direct and

inverse to the dependent variable; this implies that all share index will have a positive shock on asset return while market capitalization will have an inverse shock on asset return.

Variance Decomposition

Variance decomposition detects the proportion of movements in the dependent variable that are due to their own shocks.

Variance Decomposition of TMV:				
Period	S.E.	TMV	ASI	MCP
1	209127.5	100.0000	0.000000	0.000000
2	388237.5	32.65955	63.00970	4.330750
3	441486.8	30.78735	64.84024	4.372404
4	501970.2	24.49954	71.80821	3.692248
5	567631.6	22.25556	74.06703	3.677413
6	616714.5	20.18821	75.50238	4.309411
7	668241.3	18.51644	76.89512	4.588438
8	714800.2	17.45281	77.50733	5.039859
9	758372.2	16.47989	78.12542	5.394682
10	800366.8	15.75199	78.56132	5.686692

The conditional variance was decomposed to enable us understand the proportion of movement that are due to own shocks; the test result revealed that the movement of shocks in the variance seems to be consistence and persistence, this implies that investors can used the result for forecasting the stock price movement in an efficient capital market.

Conclusion and Recommendations.

Stock price volatility in an efficient capital market was a major concern to investors as this affect the overall returns in an investor's portfolio; however, it has been demonstrated and empirically revealed that stock return moves in either positive or negative directions due to own shock and other shocks of influencing variables.

The test result revealed that stock price volatility in an efficient capital market is largely influence by market information which is reflected in all share index and capitalization; the increased in all share index, the greater the return on stocks. The GARCH graph indicates that the stock return will drop drastically this year 2016 and a new upward trend will be experience next year 2017.

Therefore, investors and operators in an efficient capital market should take advantage of the low price and key into the market, because every indication shows that asset returns are under value as against the appraised value of the researcher.

References

Abel, Andrew B., (1988), Stock prices under time-varying dividend risk: An exact solution in an infinite horizon general equilibrium model, Journal of Monetary Economics 22, 375-393.

Abel, R. (1969): A comparative simulation of German and U.S. Accounting Principles, journal of accounting research. 1-11.

Abken, P. A. & Nandi, S. (1996). "Options & Volatility". Economic Review; December,: 21-35.

Aboody, D. J. , Hughes and J. Liu (2002): Measuring value relevance in a (possibly) inefficient market, journal of accounting research(Sept), 965-986.

Aggarwal R., Inclan C., & Leal. R. (1999). Volatility in Emerging Markets. Journal of Financial and Quantitative Analysis, 34(1), 33-55. http://dx.doi.org/10.2307/2676245.

Ajao, M. G. (2012): Testing the weak form of efficient market, hypothesis in Nigerian Capital Market, journal of Accounting and Finance Research, 1(1), May, 2012.

Alan M. Taylor 1994, Domestic Saving and international capital flows reconsidered NBER country paper 4892, National Bureau of economic research, Inc.

Amadi, S. N. and Odubo T. D. (2002): Macroeconomic variables and stock prices, causality analysis, the Nigerian journal of economic and management studies, 4(1 & 2), 30-39.

Amihud, Y. and Mendelson, H. (1986): Asset pricing and bid-ask spreak, journal of financial economics, 17, 223-250.

Baiman, S. and R. E. Verrecchia (1996): The relation among capital markets, financial disclosure, Production efficiency and insider trading, journal of accounting research. 1-22.

Ball, R. (2001): Infrastructure requirements for an economically efficient system of public financial reporting and disclosure, Bookings- Wharton papers on financial services.

Ball, R. and P. Brown (1968): An empirical evaluation of accounting income numbers, journal of accountion research, 159-178.

Barth, M. E., Beaver, W. H., & Landsman, W. R. (1998). Relative valuation roles of equity book value and net income as a function of financial health. Journal of Accounting &Economics, 25(1), 1-34.

Baumann, Ursel and Erlend Nier. 2004. "Disclosure, Volatility, and Transparency: An Empirical Investigation into the Value of Bank Disclosure." Federal Reserve Bank of New York Economic Policy Review. September 2004, 31-45.

Beaver, W. H. 1968, Market prices, financial ratios and the prediction of failure. Journal of accounting research, 179-192.

Beaver, W. H. (1968): The information content of annual earnings announcements, journal of accounting research (Empirical research in accounting: Selected studies) 67-92.

Bekaert, G. and Harvey, C. R. (1997): Emerging market volatility, journal of financial economics, 43, 29- 77.

Bernard, V. L. and Jacob, K. T. (1989): Post Earnings announcement drift and delayed price response or risk premium? Journal of accounting research, 27, 1-36.

Black, F. (1976): The pricing of commodity contracts, journal of Financial Economics,3, 167-179.

Black B. (2000): "Legal and Institutional Preconditions for strong stock market." Working paper, John M Olin Program in Law and Economics, Stanford Law School.

Bollerslev T. (1986): A generalised Autoregressive conditional Heteroscedasticity, Journal of econometrics, 31, 307-327.

Brook C. and Burke S. P. (2003): Information criteria for GARCH model selection: An application of high frequency data, European journal of finance, 9(6), 557-580.

Bushee, B. J. and Noe C. F. (2000): Corporate disclosure practices, institutional investors and stock return volatility, journal of accounting research(studies on accounting information and the economics of the firm), 171-202.

Campbell, J. Y. l and Hentschel, L. (1992): No News is good news and asymmetric model of changing volatility in stock return, journal of financial and economic, 31, 281-318.

Carroll, T, Linsmeier, T. and Petroni, K,(2003), The reliability of fair value versus historical cost information: evidence from closed-end mutual funds, Journal of Accounting, Auditing, and Finance 18: 1-23.

Easton, P. D. and T. S. Harris (1991): Earnings as an explanatory variable for returns, Journal of accounting research, 19-36.

Engle R. F. (1982): Autogressive Conditional Heteroscedasticity with estimates of the Variance of the United Kingdom inflation, Econometrics 50, 987-1008.

Fama, E. (1965): The behaviour of stock market prices, Journal of business, 38(1), 34-105.

Fleming, J. B., Kirby C. and Ostdiek B. (2001): The economic value of volatility timing, journal of Finance 56, 329-352.

Fleming, J. B., Kirby C. and Ostdiek B. (2003): The economic value of volatility timing Using realized volatility, journal of Financial Economics 67, 473-509.

Foster G., Olsen C. and Shevlin T. (1984): Earnings releases, abnormalities and the behaviour of security returns, the accounting review, 59, 574-603.