Testing for Mispricing of Stocks on the Ghana Stock Exchange: A Case of Selected Banking Stocks

ABUBAKARI RAZAK

University for Development Studies, Wa Campus, P.o. Box upw 36, Wa, Ghana

Abstract
This paper is aimed at investigating mispricing of stocks on the Ghana stock exchange. Four stocks mainly the banking stocks were sampled for the purpose of this study. Mispricing of stocks in this paper is measured as the difference between the current dividend-price ratio and rationally estimated fundamental value of stock using Campbell and Shiller (1988) model. A monthly mispricing is estimated for the period 2000 to 2015 and the results of the test for mispricing on the selected stocks show that their prices significantly deviate from their fundamental value.
Keywords: Rationality, Market pricing, Imperfect market, Fundamental value, Stock prices, Mispricing

1. Introduction
Mispricing of stocks has been investigated on many stock exchanges globally. Researchers in finance attempt to explain stock return anomalies, stock price volatility, stock price information and stock market agents' trade rationality have driven studies into mispricing of stocks (Lamont and Thalor, 2003; Wang, 1993; Chan et al., 2008; Zhoug et al., 2001; De long et al., 1991).

Although there are no generally agreed on causes of stock mispricing among researchers in the field of finance, imperfect information may contribute to uncertainty in the market causing market agents to either underprice or overprice stocks relative to their fundamental value. For instance, in imperfect markets with the presences of information trading cost and less information can cause market agents to misevaluate prices, and in a market where information asymmetry is present uniformed investors may demand for the risk premium to compensate for the risk they are exposed to for trading with informed agents. This risk premium may drive market price away from their fundamental value (Wang, 1993; Fama, 1991, Fama, 1995). Also, in such market, the presences of the cost of information and trade may prevent market arbitrary trade from driving the market prices to their fundamental value (Fama, 1991; Lamont and Thalor, (2003).

However, under perfect information markets where all market agents are rational in their trade and cost of information and trade are absent, stock prices are expected to reflect their fundamental value because stock prices will reflect rational market agents' decisions which are based on perfect information. Under this perfect market condition, any trader who takes a position that leads to mispricing may suffer losses because the other traders will immediately take positions that may lead to an immediate reversal of the price to its fundamental value, because such position enables them to make a profit. Bakke and Whited (2010); Fama (1995) and Gilson and kraakman (1984).

Recent literature on mispricing by the behavioral theorist holds that, under the prevailing market condition, mispricing cannot be explained only by imperfect information and market agents irrational trading, but by psychological traits such as self-attrition that leads market agents to either overly or under confident of the source and accuracy of the information they receive. Hence, this causes investors to either over value or under value stocks. Baberis and Thaler, (2003); De Long et al. (1991); Daniel, Hirshleifer, and Subramanyam (1998); Barberis, Shleifer and Vishny (1998).

This paper argue that the complexity of market agents' decision making on the financial market makes it impossible to strictly attribute the causes of mispricing of stocks to imperfect information and market agents' irrationality, or psychological traits of market agents. On the market, agents price stock based on information they receive. How much price a market agent offers as a price for a stock is determined by his expectation of the future return of the stock, which he forms based on the information available to him, and the efficiency at which he incorporates such information into his expectation of future returns. The behavioral reasons come to play when the market agents are incorporating information available to them into their pricing decision. At this point psychological reason such as the market agents self-attrition may drive their confident in the information they have received to either over value or under value the stock, this explain the reason why under perfect information, stock may be mispriced but how much of the information the agents accurately incorporates into their pricing decision depends on the nature of information available to him and this level of rationality in their trading decisions. This explains the reason why under imperfect market stock prices are expected to reflect less accurate information because information available in the market may be incomplete and may prevent market agents from pricing stocks rationally. In sum, both inadequate supplies of informational, irrationality and psychological traits all accounts for mispricing of stock.

Mispricing of stocks may also be influenced by the composition market agents present in the market. In a

heterogeneous market, for example, the extent of mispricing of stock is greatly influenced by the extent to which noised and uninformed traders' impacts on the market. A market dominated by noise and uninformed traders is most likely to have its stocks mispriced compare with the market dominated by rational and informed traders. The reason is that noised and uninformed market agents' trade are based on incomplete information. They infer information from previous and current prices, demand and supply of the stock, and for this reason, their trade turn to drive stock price away from their fundamental value. Unlike the trade impact of rational and informed market agents whose trades are assumed to reflect full information about the stock, their trade drive stock prices to their fundamental value. So in a market where the trade impact of noised and uninformed agents dominates, prices tend to deviate from their fundamental value although, rational and informed agent are expected to trade against noised and uninformed traders for the reward of returns that arises from mispricing driven noise and uninformed traders. On a market where the impact of rational and informed market agents dominates, stock prices tend to move towards their fundamental value, Wang (1993); Delong, et al (1990); shleifer and Vishny (1997); Bloomfield, Ohara and Saar (2007). It is also important to note however that, in a market where the impact of rational trader dominates stock may be mispriced due to rational and informed market agents risk aversion and short time horizon, De long et al (1990) Barker, Stein and Wugler (2003).

It has been argued by Birrus (2012); Barker,Stein and Wurgler (2003); Baberis and Tharler (2003); and Polk and Sapienza (2009), that mispricing of stock may stimulate investment by firms because it enables managers of constraints financial constraints firms with overpriced shares to issue new shares for investments. Contractedly, firms with undervalued shares may hold back investment because it requires issuing shares at a low price.

Following the financial sector reforms in Ghana in the late 1980s, (FINSAP), Ghana stock exchange was established in 1989 but commerce trading in late1990 with 12 listed companies, by the end of 2015 rose to 39. The Ghana stock exchange is relatively small compare with major Africa stock market like Johannesburg stock market, and Nigeria stock market and major stock exchanges in develop countries like New York Stock Exchange, and the Financial Times Stock Exchange, London, standards. Besides being small, it is highly illiquid and low trade momentum makes it very difficult for stock prices to quickly reverse to their fundamental value when they are mispriced. In addition, low development of institutions in the country makes it difficult for market agents to acquire information that is necessary to guide them to price stock in a way that will drive stock prices to their fundamental value. A test of the efficiency of the Ghana stock exchange by Frimpong and Oteng (2008), Osei (2002) revealed that the stock market is generally considered to be inefficient. For these reasons, stock prices are expected to be mispriced.

A study of the Ghana stock exchange reveals that there hasn't been an empirical study of mispricing of stock on Ghana. The central objective of this paper therefore, is to investigate the prevalence of mispricing of stocks on the Ghana stock market

The rest of this paper is organized as follows, section two(2) describes the model applied to estimate the fundamental value, section three (3) present the description of data on fundamental value and mispricing estimated, section four (4) describe how the properties of fundamental value were tested, section five (5) present the empirical results and section (6) the conclusion

2. Model Specification:

In this paper, mispricing is measured by the extent to which market stock prices deviate from their fundamental value. Unlike misprice measured as a violation of the law of one price which may capture differences of risk in different markets as mispricing instead of the difference between actual price and the fundamental value. Birru (2012). Mispricing measured as the difference between the market price and its fundamental value eliminate the effects of difference in price that are attributable to differences in risk at a different market. Also, it captures the subjective reaction of investors in the market because the estimated misprice represents the temporal component of price and its mean reversal following the arrival of new information in the market. Although the challenge for adopting this method is the fact that fundamental value is not observable Lamont and Thaler (2003); French (1988), it is important to note that, in every stock price there is an unobserved informational efficient value, that is random walk, because its values varies with the new arrival of new information about the fundamentals of the stock. It is this price that short run prices of stock converges in the long run. As more information is revealed in the market in the long run and noise trader suffers losses from trading against rational informed agents, they revise their prices towards the rationally efficient value of the stock and in addition to rational trading by informed, rational market agents, the price of the stocks in the short run converges toward this informational efficient value which represents the attractor prices short run prices randomly revolve around. The present value method attempts to estimate this component of stock price by discounting expected cash flow from stock with a rationally determined discount factor. Campbell and Shiller (1988) model which is based on log dividend/price ratio provides a rational measure of discounted expected returns and dividends base on rational estimated discount factor.

2.1 Deriving the Campbell and Shillers 1988 model

One period holding returns

$$r_t = \frac{P_t + D_t}{P_t} \qquad equ(1)$$

Where rt is the one period a holding return, Pt is the price of the stock at the end of period (1), Dt is dividend payable at the end of period (1). Pt is the price of stocks at the period Pt -

Taking the log of return of equ.(1) yields

$$r_t = (p_t + d_t) - p_t \qquad equ(2)$$

Where the lower case represents the log of the upper case.

Equ (2) is a nonlinear function of Pt + Dt.

To linearized equ (2), apply first order Taylor series expansion around the mean of Pt and Dt.

This results in $r_t = k + p\log(p_t) + (1-p)\log(d_t) - \log(p_t)$ equ (3)

Where $p = (1/1+\exp(d-p))$ d-p represent the log average of dividend and price respectively K is the constant which equal to $-\log p - (1-p)\log(1/p - 1)$. The presence of K in equation 3 ensures that approximation in the equations are held constant.

see Campbell and Shiller (1988).

Equ (3) shows the log linear relationship between log return, log price and log dividend.

Iterating forward by applying recursive substitution method and assuming transversality condition to hold that $\lim = p^j p_t = 0$

$$d_t = \sum P^J (r_{t+j} - \Delta d_{t+j}) - K/1-P \qquad equ (4)$$

where d_t is the log dividend/ price ratio

equ (4) show that current log D/P (d_t) is a function of discounted value of future returns adjusted for dividend growth discounted by the underlying discount rate *p*.

see Campbell and Shiller (1988).

Given that, both expected returns and expected dividend growth in this model are constant, dividend price ratio estimated in equation (4) represent the rational value of expected dividend price ratio and for that matter the fundamental value, because it represent the infinite sum of estimated return adjusted for dividend growth rate discounted at a time-varying discount rate *p* see Campbell and Shiller (1988).

3. Data

This paper draws information from four (4) selected banks stocks listed on the Ghana stock exchange. The stocks compose of two Ghanaian dominated shareholding banks and two foreign dominated shareholding banks. This study concentrated on the banking stocks because of the similarity in the nature of their business and dividend policy, this is to avoid comparing mispricing of stocks that might arise as results of difference in the field of operations, risk and dividend policies of different industries.

The bases for selecting the stocks for this study was that the stock should have been listed on the Ghana stock by 2000 and should have been continuously traded up to 2015. Data for this study were sourced from end of month stock price data from Ghana stock exchange, annual reports of the selected banks and a statistical bullet of the bank of Ghana. Fundamental value and Mispricing of each of the stock was estimated on monthly basis instead of annual basis. This was aimed at capturing the impact of the frequency of trade on the stock fundamental value and mispricing since estimates based on annual data are less frequent compared with monthly estimates. Mispricing is estimated as the difference between the real log current dividend/price ratio and the log real fundamental value estimated from with the model above. The real value of the estimated mispricing and fundamental value are applied in this study. The real values were used for analysis because this paper holds that the test of mispricing of stock is the test of the market agents subjective valuation of cash flow from the stock and so long as the effects of inflation can be removed through deflation, the fundamental value of stock should be restricted to the value of cash flow generated by the stock net the risk of inflation. Besides, to avoid money illusion problems which may be captured as a mispricing, it is necessary to discount real expected dividend by real require a rate of returns. The nominal value of returns, dividend growth rate, and dividend-price ratio was deflated using consumer price index published by the bank of Ghana. In this paper, mispricing is measured in terms of dividend-price ratio and not in terms of price levels as applied by Zhoug et al. (2003). The dividend-price ratio is applied because, it summarizes all relevant information on the market as well as rationally linked the market perception to changing risk and business cycle, for that matter cash flow from the stock. This makes dividend-price ratio a good proxy of fundamental value. In addition, studies such as Ball and Brown (1968); Dimson, (1979); Hou and Moskowitz, (2005), have revealed that stock prices adjust slowly to information. This implies that stock price levels at a point in time may not contain all information about the stock. For this reason, testing for mispricing using price levels might not capture all possible misevaluation of stocks by market agents.

Returns on stock were estimated as the ($p_{t+} + d_t / p_t$) and dividend growth rates were estimated as ($d_{t+} - d_t / d_t$) for each of the selected banks. The monthly dividend for the banks was estimated on the assumption that

dividend was compounded monthly this allows the researcher to calculate the monthly dividend retrospectively using geometric growth model. Thus the monthly dividend was estimated as $Dn = (1+ dt)^{1/ \aleph} -1$ where

Dn is the estimated monthly dividend

Dt is the end of year proposed dividend

To test whether the dividend price ratio of the firm significantly deviates from their fundamental value, t statistics was applied to test the significant of the difference between current dividend-price ratio of the selected stocks and their estimated fundamental value. A hypothesis formulated below was to test whether the estimated log dividend ratio significantly different from 0.

H   ù= 0

Ha ù≠ 0

3.1 Testing for Fundamental Value:

One of the fundamental identity of fundamental value is that it is part of the price that permanently affects price and that of mispricing is that it is the temporal part of prices. To test for the decomposition of the estimated log dividend-price ratio into permanent and temporal parts, the Gonzalon and Grenger (1995) model of decomposition of time series variable into permanent and temporary components, was tested on the estimated fundamental value and mispricing. The hypothesis was formulated to test whether (Υ, α) in a reduced rank of co integration in a VECM model, is significantly different from zero (0) such that given the matrix for the permanent component Υ = (0, 1) becoming $\ddot{\Upsilon}$ (1, 0) when inverted in the model.

∫ = $\ddot{\Upsilon}$ (fv, mp) for a test for permanent part of the d/p ratio

where;

∫ is the linear combination of fv and mp

$\ddot{\Upsilon}$ is the matrix linking ∫ to (fv, mp)

fv represent the fundamental value of the stocks

mp represent the mispricing part of the estimated dividend-price ratio

The hypothesis for permanency is formulated as:

H   : Υ = 0

Ha: Υ ≠ 0

And a test for temporal component by testing for whether α is significantly different from 0 thus α = (1, 0) becoming α' (0, 1) when inverted to satisfy the condition under the Gonzalon model

Logd/p = A $\ddot{\Upsilon}$(logd/p) + A   α' (logd/p).(where logd/p represent log dividend price ratio)

The hypothesis for transition part is formulated as:

H   : α = 0

Ha: α ≠ 0

Where A $\ddot{\Upsilon}$(logd/p) represent the permanent part of log d/p

A   α' (logd/p) represent the temporal part of log d/p(see Gonzalo and Granger, (1995).

To establish whether relevant restriction for the test of error correction model is acceptable or not, this paper tested for unit root using augmented Dickey Fuller test on both estimated fundamental value and mispricing. The pure unit root method was applied in the dickey fuller test, that is, the model was tested without constant and deterministic terms. Under a simple AR(1) model $\Delta Xt = \pi Xt- +ù$ with the assumption that Xt is random walk, the hypothesis test for unit root under the augmented Dickey fuller model, stated as:

H   = π = 0

Ha= π < 0

Where π = 0 means ΔXt is has a unit root and if π is >0 is stationary

The long run equilibrium relationships between the fundamental value and the mispriced value of estimated fundamental values and mispricing of the selected stocks were tested using Johansen test for co integration. The Johansen test for co integration were tested under the hypothesis

H   = r= 0

Ha = r= 1

Where r represent the number of co integration.

The resulted coefficients of mispricing were normalized to one (1) (fundamental value) to establish whether the estimated mispricing converges on fundamental value by applying Johansen normalization restriction impose.

4. Results:

Results on the test of unit root on the estimated monthly fundamental value of the selected stocks reveals that the fundamental value has a unit root at level becoming stationary after first difference at selected lag derived from testing for AIC, (see table 1.) The null hypothesis was rejected in favour of the alternative hypothesis this is evident by the augmented Dickey Fuller test results which reveal trace statistics for all the selected stocks that are in excess of their 5% critical value. (See table 2). This implies that the restrictive condition was accepted as

such the error correction model was model in line with the Vector auto correction mode (VECM).

Table 1 AIC test results on lag selected

	GCB	HFC	SCB	SG.SSB
Lag selected by AIC	2	3	1	4

Table 2 Results of Augmented Dickey Fuller test of Sampled Stocks

	GCB		HFC		SCB		SG.SSB	
	Fv	Mp	Fv	Mp	Fv	Mp	Fv	Mp
Trace statistics	5.515	6.915	5.550	2.763	2.678	3.783	2.592	8.648
5% critical value	1.950	1.950	1.950	1.950	1.950	1.950	1.950	1.950

The test results of the VECM model on the estimated fundamental and mispriced value which was aimed at testing the Gonzalon and Granger 1995 model for permanent and transitionary reveals that, the error correction coefficients in the fundamental value equation are significant for all the selected stocks. Similarly, the error correction coefficients in the mispricing equation are also significant. Except HFC. This means that the estimated fundamental value coefficients

(y')is significantly different from zero as such, , Υ = (1,0) and their inverse $\ddot{\Upsilon}$ (0, 1), this will be represented in Gonzalo and Grengar (1995) model as $\int$ = (0,1) (fv, mp). This indicates that, fv cannot represent the permanent component of the estimated log dividend price ratio. In the case of the estimated mispricing, the significant of the error correction coefficient implies that the mispricing represent the transitionary component of the estimated log dividend price ratio. Because the coefficient α is (1, 0) becoming α' (0, 1) when inverted. The only exception is the mispriced for HFC, which indicated an coefficient of α= (0, 1) because it is insignificantly different from zero but when inverted the coordinates become α' (1, 0). (See table 3)

Table 3 Test Results of Gonzalon and Grengar(1995) Permanent/temporal decomposition Test

FV	GCB	HFC	SCB	SG.SSB
FV:coefficient	0.3424254	-0.7109815	-0.1852401	-0.0157189
p. value	0.000	0.0000	0.000	0.297
MP: coefficient	-0.1488322	-14.1159	10.49170	-240.83
p. value	0.0000	0.780	0.0000	0.000

Hypothesis test on co integration rejected the null hypothesis that the estimated fundamental value and mispricing are not integrated but accept the alternative hypothesis. The Johansen test for integration of the selected stocks reveals that, there was at least one co integration between the estimated fundamental value and the mispricing of the selected stocks. Table (4) shows the test statistic of the Johansen test for co integration of the selected stock. These results were supported by their maximum Eigen value.

A test for long run relationship between estimated fundamental value and mispriced of the log dividend price ratio shows that, estimates of the fundamental value and misprice of the sampled stocks are co integrated. The test rejected the null hypothesis of no co integration and accepted the alternative of at least the existence of one (1) co integration between fundamental value and mispricing. The trace statistics for all the selected shares appears to exceed their five percent (5%) critical value. This implies that, long run equilibrium relationship exist between the estimated fundamental value and mispricing. See table 4

Table(4) Results of Johansen test for co integrated

	GCB		HFC		SCB		SG.SSB	
r = 0 vs r = 1	0	1	0	1	0	1	0	1
Trace statistics	132.7	34.8	114.56	14.49	75.36	24.28	61.55	15.41
5% critical value	15.41	3.76	15.41	3.76	15.41	3.76	15.41	3.76

The test on long run convergence of the estimated mispricing on fundamental value supported the hypothesis of long run equilibrium relationship between the estimated fundamental value and mispricing by rejecting the null hypothesis of no convergence of estimated mispricing on fundamental value and accepting the alternative. This is evident by coefficients of mispricing (MP) of the selected stocks which are significantly different from zero (0) of the normalization of the coefficient of the co integration coefficients.(See table 5).

Table 5 Johansen normalization restriction impose

FV	GCB	HFC	SCB	SG.SSB
BETA				
Cel FV	1	1	1	1
MP	8.051126	-0.000159	0.0041834	5.089804

The hypothesis test on whether the annual log dividend price ratio of the selected stocks significantly deviate from their estimated fundamental value, rejected the annul hypothesis and the alternative hypothesis accepted because, the test coefficient was significant different from zero (0). This implies that the estimated log dividend price ratio of the selected stocks significantly deviate from their estimated fundamental value.

www.iiste.org

IISTE

The information in table 6 reveals the results of the t test on the estimated log dividend price ratio and log fundamental value.

Table 6 t test Results on the Deviation of Dividend price ratio from the Fundamental value of the sampled stocks

T. TEST	Alternative hypothesis		GCB	HFC	SCB	SG. SSB
Ho: mean (diff) = 0	Ha: mean (diff). ≠ 0		0.0000	0.0000	0.0000	0.0000
	Degree of freedom	155		163	164	148

The movement of the estimated mispricing of the sampled stock shows that the Ghanaian dominated ownership banks mispriced moves in tandem likewise the foreign dominated ownership banks. The test however reveals a negative correlation between Ghanaian and foreign dominated ownership banks. (See table 7.)

Table 7   Test Results on the Correlation between the Selected Stocks

	GCB	HFC	SCB	SG.SSB
GCB	1	0.1336	-0.0603	-0.0200
HFC	0.1336	1	-0.2	-0.2072
SCB	-0.0603	-0.2	1	0.2440
SG. SSB	-0.0200	-0.2072	0.2440	1

A test on the strength of the association using Pearson correlation coefficient reveals rather a weak positive association of mispricing between Ghanaians dominated ownership banks. Similar result is revealed for the association between foreign dominated ownership banks. However the test revealed weak negative correlation between the Ghanaian and foreign dominated banks.

 (see table 8). The results of the test of association between Ghanaian dominated ownership banks and foreign dominated ownership banks in this paper implies that the nature of ownership have to an extent an impact on the market agents decisions on the Ghana stock exchange.

Table 8: Test Results of Pearson correlation

Pearson correlation	GCB	HFC	SCB	SG.SSB
GCB	1	0.1318	-0.0626	-0.02
HFC	0.1318	1	-0.1732	-0.2072
SCB	-0.0626	-0.1732	1	0.2440
SG.SSB	-0.02	-0.2072	0.2440	1

5. Conclusion

The primary objective of this paper is to investigate mispricing of stocks on the Ghana stock exchange from 2000 to 2015. Four banking stocks were sampled and test for their mispricing. Mispricing of stocks in this paper is measured as the difference between current dividend price ratio and estimated fundamental value. This method was applied in this paper because it captures the subjective misevaluation of stocks by market agents given information available in the market and not the differences in the prices arising out of differences in the risk of different markets as it may be for the case the law of one price method. The fundamental values of the sampled stocks were modeled in the line of Campbell and Shiller (1988). The estimated fundamental values were test for their permanency and their long run equilibrium relationship using Gonzalon and Granger (1995) model and Johansen test for co integration respectively. The test result reveals that the selected stocks prices proxy by dividend price ratio, significantly deviated from their fundamental value.

References

Abarbanell, S. J. (1992). Test OF Analysts Overreaction/ Underreaction to Earnings information as an Explanation for anomalous stock price behavior. *Journal of finance vol 47* , pp 1181-1207.

Abel, B. A. (1998). Assets prices Under Heterogenous Beliefs: Implications for Equity Premium. *National bureau of Economic Research* .

Bakke Tor Erik and Whited M. Toni. (2010). Which firms follow the Market? An analysis of corporate investment Decision . . *revew of financial studies,* , 23, 5.

Barberis, Nicholas, Andrei Shleifer and Robert Vishny . (1998). A model of investor Sentiment. *Journal of financial economics 49* , 307-343.

Barberis, Nicholas and Richard Thalered. (2003). Asurvey of behavioural finance. *hand book of economics of finance.,1, 2,* 1053-1128.

Barker Malcom, C. fritz Foley and Jeffrey Wurgler . (2009). multinationals as arbitrageurs: the effects of stock market valuations on foreign Direct Investment. *The review of financial studies, , 22, 1* , 338-369.

Bloomfield j Robert, Maureen Ohara and Gideon Saa. (2007). How Noise Trading affects Markets : . *an experimental Analysis. Review of financial studies, , 22, 6* , 2275- 2302.

Brennan J Micheal and Patricia J Hughes . (1991). stock price and the supply of information. *journal of finance vol 46 no 5* , 1665- 1691.

Ball, R and Philip Brown. (1968). An empirical evaluation of Accounting income numbers. *Journal of accounting research vol 6 no 2* , 159 179.

Brunnermeier k Markus and Christian Julliarn . (2006). money Illusion and Housing frenzies. *Review of financial studies vol 21 issue 1* , 135- 180.

Campbell Y john and Shiller J. Robert . (1988). The dividend ratio and expectations of future dividend and Discount factors. *Review of financial Studies 1 (3)* , 195-228.

Chen R. Carl, Peter P Lung and F. Albert Wang . (2009). Stock market Mispricing: Money Illustion or Resales Options:. . *Journal of financial and QuantitativeAnalysis* , 1125-1147.

Daniel Kent, Hirshleifer and Avanidhar Subrahmanyam . (1998). *journal of finance vol 53 issue 6 America finance association.* , 1839 -1885.

De long Brandford J, Andrei Shleifer, Lawrence H.SummerS and Robert J. Waldman . (1990). Noise Trader risk in Financial Markets. *Journal of political economics vol. 98 no: 4* .

Delong Brandford J, Andrei Shleifer, Lawrence H.SummerS and Robert J. Waldman . (1991). The Survival of Noise Traders in Financial Market. *Journal of Business vol 64* .

Delong Brandford J, Andrei Shleifer, Lawrence H.SummerS and Robert J. Waldman. (1990). Noise traders risk in financial market. *Journal of political economics 98, 40* , 703-738.

Elroy, D. (1979). risk measurement when shares are subject to frequent trading. *Journal of financial economics vol 7 issue 2* , 197 226.

Fama, E. F. (1995). Random walk in Stock market prices. *Financial analyst journal* , 75-77.

Fama, E. F. (1991). efficient capital market II. *Journal of finance vol 46,* , 1575 -1617.

French, K. (1988). Crash Testing the efficient Market hypothesis. *National Bureau of Economic research Macroeconomic Annual vol 3* , 277- 286 .

Frimpong, Magnus Joeseph and Abayie Eric Fusu Oteng. (2008/07). Market returns and Weak form of Efficiency: the case of Ghana stock exchange MPRA.

Gibson J Ronald and Reinier H Kraakman . (1984). The Mechanisms of Market Efficiency. *Virginia Law Review vol 70 no 4* , 549-644 .

Gonzalon Jesus and Clive, Granger. (1995). Estimation of common long memory component I n co integrated system. *Journal of business and economic Statistics vol 13 no 1* , 27- 35.

Hou Kewei and Tobias J Moskowitz. (2005). Market Friction, price Delay and cross section of expected return. *Review of financial studies 18 (3)* .

jiang, W. (1993). Amodel of intertemporal Asset prices under asymmetric information. *Review of economic studies 60* , 249-282.

Jiang, W. (1993). A model of competitive Stock trading volume. *Journal of political economy vol 102,* .

Justin, B. (2012). inefficient markets, efficient investment. *the Ohio state university.*

Lamont A, O. a. (2003). Can the Market add and Substrate ? mispricing in Tech Stocks carve- outs. . *Journal of political economy vol 3* .

Osei, K. A. (2002). Assets pricing and information efficiency of Ghana stock exchange. *AERC research paper115. Africa Economic Research consortium. Naroibi.*

Polk Christopher and Poala Sapienza. (2008). stock market and corporate investment: A test of catering theory. *Review of financial studies vol: 22* .

Robert, S. (1981). Do stock prices move too much to be justified by subsequent changes in dividend. *American economic review 71 (3)* .

Soren, J. (1995). 'Likelihood-Based Inference in Cointegrated Vector Autoregressive; *Advance Text in Econometrics* New York, Oxyford press, 3 - 280

Shanken, Jay and Ane Tamayo . (2001). Risk, Mispricing and Asset Allocation: Conditioning on Dividend Yeild. *National bureau of economic research w 8666* .

Shleifer Andrei and Robert W. Vishny (1997). Limits of arbitrates. *journal of finance 52,* , 35-55.

Zhoug Moasen, Ali F Darrat, Dwight C. Anderson . (2003). Do Us stock prices Deviate from their fundamental value? Some new Evidence,. *Journal of banking and finance* , 673 -697.