Effect of Insider Trading Prohibitions: Regulation on Security Market Returns in Kenya

Gillian Mwaniki

Kenya Institute of Curriculum Development, Nairobi, Kenya; Email: gillianmwaniki@gmail.com

Abstract

This paper provides an analysis of legal insider trading on the Nairobi Securities Exchange (NSE) by using data published by security market. An event study methodology was used to determine the unit of analysis. The causal research design was used on the event to find out whether there was any significant difference between pre and post regulation by observing the behaviour of abnormal returns and stock returns volatility. The sample comprised of 39 companies out a population of 55 companies that traded continuously from 1998 to 2010. The market model was used to determine alpha and beta to calculate abnormal returns. The GARCH model was used to find the significant difference between the pre and post regulation through stock market volatility. The study results indicate that the regulation analysed had evidence of abnormal returns that accumulated slowly over the event period of the regulation. The analysis of regulation on insider trading shows high level of abnormal returns ranging from 0 to 8. The regulation results indicate reduced volatility during the post regulation as indicated by the GARCH model. Statistical analysis gives an F statistic of 242.5 while the critical F statistic is 3.85. The results indicate that investors viewed the regulation as good news to the market. There was anticipation among the investors during pre-regulation as reflected by stock volatility during the pre-regulation period. The study concludes that regulation of the capital market brings about efficiency through reduced volatility and reduced abnormal returns after regulation is enacted by the government.

Keywords: Efficiency, Semi Strong Efficiency, Regulation, Event Methodology, Pre Regulation, Post Regulation

Introduction

Strong security market, facilitative legal and regulatory framework aims at facilitating, stimulating and encouraging private sector investment, protecting the minority, facilitating transparent and timely resolution of disputes and providing flexible tax systems and reasonable tax on dividend (Gakeri, 2011). The establishment of a regulatory arrangement that meets the needs of investors and issuers, generates capital inflows and promotes growth is paramount. Strong securities law presupposes substantive law on disclosure, transparency, prohibition of all forms of market abuse and minority protection against coercive takeover bids and expropriation.

Fama (1970) came up with the efficient market hypothesis which states that efficiency of a market is in three forms namely: weak, semi-strong, and strong. Weak form efficiency is where market prices incorporates all historical information; while semi-strong efficient is where market prices responds to all publicly available information. A situation where prices

respond to all information, both public and private was classified as strong form market efficiency. Upon release of insider trading prohibition, the security prices should instantly change to reflect publicly available information. This reflects how investors react upon receiving that information. Security market regulation is primarily protecting the investors, provide stability of the financial system and bring a level playing ground for all the market players. The government controls the security market by creating rules, reforms, guidelines and regulations in response to the severe disruption in many financial markets. These policy measures are expected to unfreeze markets and restore confidence in the financial system. The government regulates the security market to bring a level playing field for all the investors when accessing information on investment decisions. Failure to have equal access to information leads to market manipulation, corruption and insider trading profit making. This issue affects negatively the stability of the market, market manipulation and price distortions which leads to an inefficient market.

In Kenya, the global financial crisis of 2007-2008 adversely affected the security market, with foreign sales exceeding foreign buys in many counters, as foreign investors diversify away from the market (Kibaara, 2008). There was a decline in net portfolio flows in 2005-2008 from a peak of $15 million in 2005, and substantial outflows since June 2008. The NSE 20-Share Index took a hit since the mid-2008 on the back of the post-election violence and the global financial crisis. With the collapse of security brokerage firms and Uchumi supermarket as a limited company, there was increase of investor complaints and one is left asking are the investor protection rules effective in Kenya. From 1989 to date Capital Market Authority (CMA) has enacted several regulations and continuously amended the Capital Market Act to improve on the security market trading. What have these ever-growing securities reforms, guidelines and regulations actually achieved since 1989? The purpose of securities regulation is universally acknowledged to be concerned with the protection of investor interests and wider public interest. The public interest in the area of securities relates largely (though not entirely) to the effect of regulation on the economic performance of securities markets.

Statement of the Problem
The government of Kenya has put in place a regulation on prohibiting insider trading which is basically dealing with buying and / or selling in the securities market by the shareholder company, by any connected or deemed to be connected persons while in possession of any material - un-published price sensitive information. This is in breach of a fiduciary duty or other relationship of a trust and confidence, to gain personal benefit out of such dealing. This was outlined in the Capital Markets Act, Chapter 485A section 32A of the laws of Kenya which stipulates the insider trading prohibition rules against the use of unpublished insider information by the corporate managers and any employees of a company to trade with stocks of that company in the security market. From 1989 to date, CMA has enacted several regulations and continuously amended the Capital Market Act to improve on the security market trading. What have these ever-growing securities reforms, guidelines and regulations actually achieved since 1989 and specifically has the insider trading prohibition regulation improved the stock market returns security market trading in Kenya. In an efficient market all available information relevant to the pricing of securities must be rapidly reflected in the prices of the securities. The arguments of Fama (1965) form the theoretical foundation for the Efficient Market Hypothesis, which persuasively reasons that in an efficient and active

market consisting of many well informed investors, equity prices will appropriately reflect the effects of information based on present and future expected events.

Review of Related Literature
Theoretical Review
The author in this paper makes reference to four theories namely: agency theory, information asymmetric theory, efficient market hypothesis (EMH) theory and economic regulation theory.

Agency Theory
Agency theory was developed by Jensen and Meckling in 1976. It evolved from finance and economics, transaction cost theory aroused from economics and organizational theory. Jensen and Meckling (1976) defined an agency relationship as a contract under which one or more persons (the principal) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent. In the context of the firm, the agent (manager) acts on behalf of the principal (shareholder). This theory is useful in this study as it addresses the misuse of information by the agents when trading by taking advantage of uninformed traders. The capital market regulation prohibits firms' insiders (agents) from trading on non-public information as it creates a moral hazard problem. The insiders can profit trading on non-public information which can make the firm prosperous or bankrupt. They may engage in "discretionary" behavior hence increase the volatility of a corporation's stock prices.

Information Asymmetric Theory
Information Asymmetric Theory was developed by Akerlof (1970) as explained by Spence (1973) and Stiglitz (2002b). Asymmetric information refers to situations, in which some agents in a trade possess information while other market agents involved in the same trade do not. Informed traders in the capital market have better information regarding the traded shares than uninformed traders. Information asymmetry therefore explains that informed traders have informational advantage over uninformed traders. Informed traders exploit information asymmetry through their transactions. During this process, they impound their private information into asset prices. This study uses this theory to explain informational efficiency through the price-discovery process. This affects the investors in the evaluation of market performance hence stock market returns.

Efficient Market Hypothesis Theory
The Efficient Market Hypothesis Theory has a preposition that the current security prices fully reflect all available information about the future events and value of the firm (Fama, 1970).This theory argues that if security prices reflect all the information available and immediately incorporates all new information then the market can be considered efficient. In an efficient market, on the average, competition will cause the full effects of new information on intrinsic values to be reflected 'instantaneously' in actual prices (Fama, 1965). 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. This change in prices out

of informational efficiency affects the stock returns. This theory was found as fundamental in this study as it explains the changes in the stock returns and volatility out of introduction of insider trading rules and prohibitions.

The Theory of Economic Regulation
The Theory of Economic Regulation by Stigler (1971) explains the integration of the analysis of political behaviour with the larger body of economic analysis. When government releases an Act, it directly influences the economic analysis of the capital market through stock prices and hence stock returns. The proponent of rules and prohibitions on insider trading argue that insider trading reduces market efficiency by increasing volatility and the cost of equity, while also decreasing liquidity and stock price accuracy. The proponents of the regulations on prohibition of insider trading in publicly traded stock markets believe that it will result in greater stock market efficiency.

Empirical Review
Security market regulation started in the early 1929 after the stock market crash and the Great Depression which prompted US Congress to pass extensive legislation to regulate the securities industry and to prevent the recurrence of a national economic crisis. Specifically, Congress passed the Securities Exchange Act of 1934 (Exchange Act) with the goal of promoting fairness and integrity in the securities markets (Ferrell, 2004). This became the point of reference for most of the other nations of the world including the emerging markets when effecting regulation on the security markets. With respect to insider trading, the primary concern is that the integrity of U.S. securities markets will be impaired if there is a perception that certain persons trading in securities have an unfair informational advantage over other persons (Stigler, 1964). Consequently, federal securities laws generally prohibit insiders from benefiting from information that is not available to the investing public (Liu & Stone, 2009). The federal securities laws do not mandate that participants in public markets have equal information; rather, such laws focus on the fact that certain persons may use their position to obtain an unfair informational advantage over others. In a mature capital market, securities regulation forms the framework within which the market operates. They are designed to protect the investor, prevent systemic crises and promote the market they govern.

Christensen, Hail and Leuz (2012) established that when the directive on insider trading, market manipulation and the market transparency are tightened and enforced, the cost of capital decreases and the market liquidity improves which is economically significant. They found out improving key elements of securities regulation leads to substantial capital-market benefits while stronger securities regulation have significant economic benefits in terms of increased market liquidity and reduced cost of capital. Christensen, Hail and Leuz (2016) found a significant increase in market liquidity among the countries that implemented the regulation, but the effects were stronger in countries with stricter implementation and traditionally more stringent securities regulation.

The effect of trading rules on liquidity (velocity, volatility and bid-ask spread) was realised (Douglas, Sofia & Dan Li, 2009). They found out that the insider trading and market manipulation rules provide clarity regarding prohibited manipulative trading practices. These have a direct and central importance to the conduct of market participants. This was built on prior work on mandatory disclosure and delegation between private and public enforcement of securities laws. The insider trading prohibition regulation has been empirically tested

among the developed countries. The examination of the Acts on the stock market returns is necessary as insider trading regulation plays an important role in economic development.

Battacharchya and Daouk (2002) found out that 87 out of 103 countries with stock markets have insider trading laws, 38 of which had taken enforcement measures. One interesting aspect of these regulations is that they allow insiders to trade in their own companies' stocks, provided that certain conditions are fulfilled. Such transactions are referred to as legal insider trading. Under the U.S. securities laws, legal insider trading occurs on a daily basis, as corporate insiders such as officers, directors or employees buy or sell stock issued by their own companies. One constraint is that the insiders concerned have to report these trades to the Securities and Exchange Commission (SEC). Once the trades are completed, filings have to be sent to the SEC which makes them public.

Diamond and Verrecchia (1991) examined the effect of insider trading regulations on market efficiency and found out that insider trading regulation enhance market liquidity by reducing the information asymmetry between the firm and investors, reducing the price impact of trade. When investigating, the behavior of the abnormal returns, Aktas *et el,* (2007) found out that there was no significant existence of short-term abnormal returns associated with insider trades on Euronext Amsterdam using event methodology. They used short-term abnormal returns as a noisy proxy for private information revelation in the context of insider trading. However, using longer event-windows, they found that the adjustment of the stock prices is notable. This suggests that insiders either have some market timing ability and/or use long-term information. The notification process seems to provide outsiders with an important source of information.

Fernandes and Ferreira (2008) investigated the relationship between a country's first-time enforcement of insider trading laws and stock price information using data from 48 countries over 1980- 2003. They explored different types of informed agents, such as insiders, analysts, and institutions. They found out that insider trading laws enforcement increases firm-specific stock return variation, but this increase is concentrated in developed markets. Among the emerging market countries firm-specific return variation changes were insignificant after the enforcement, as the important contribution of insiders in impounding information into stock prices was largely eroded. In countries with poor infrastructure or institutions, the enforcement of insider trading laws does not achieve the goal of improving the information environment.

In Kenya the insider trading is prohibited either on his own behalf or on behalf of any other person who deals in securities of a company listed on any stock exchange or otherwise publicly offered on the basis of any unpublished price sensitive information; or where a person is in possession of any such information which if made generally available, would likely, materially affect the price of securities. The Act explains that no person shall deal in those securities or communicate any unpublished price sensitive information to any person, with or without his request for such information, except as required in the ordinary course of business or under any law; or counsel or procure any other person to deal in securities of any company on the basis of unpublished price sensitive information. These rules were put in place to reduce market manipulation and protect the investors against unfair trading by insiders who have an advantage over information the other investors do not have (GOK, 2000).

Methodology

Research Design and Approach

The causal research design was used through event study methodology. Event study methodology is a direct test for causality in determining the effects of reforms and regulation on stock returns. The standard event study methodology was used in this study to capture informative announcements and to estimate daily abnormal returns over time. The event study design indicates the information content and the behavior of information asymmetry around regulation news releases. This study is an inference of causality study where legal reforms are expected to cause change on stock prices. In regulation event, abnormal returns were computed as the sum of daily abnormal returns realized in the event period constituting of 261days prior to the regulation and 261 days subsequent to the regulation event day. The two events period were compared to find out if they are significantly different from zero to signify the regulation information which was impounded immediately to conform to the market efficiency hypothesis.

Volatility tests were carried out on both event periods so to find out if the regulation contains information that causes the stock returns volatility depending on how the investors view the reform. The regulation was examined through one event with the period before the regulation being compared with post regulation period where inferences were made. For the test to be valid, both variables must be stationary. The stationary tests were carried out on the daily panel data series. Trends were removed by taking first differences, second differences, to make the panel data stationary before analysis. The study employed Sharpe's market model (1992) to estimate the alpha and beta for the purposes of calculating abnormal returns. The study focuses on the means, standard deviation and variance of stock market returns. The total population consisted of 55 companies which have been listed on the Nairobi Stock Exchange (NSE) since 1998 and from which 39 listed companies were selected to participate in the study. These were selected through elimination method. The first stage was eliminating those companies not yet listed by January 1998. The next stage was checking on the number of trading days. The study eliminated the companies that traded less than 200 days continuously. The study period has been determined by previous studies which stated that a period of ten years and above is adequate for analysing the effects of a regulation (Binder, 1985b; Fama, 1998; Taylor, 1986).

The stock returns was organised in form of panel data which combines both time series and cross section series. Three daily series namely the NSE index, daily closing prices and security returns data was used in the analysis of the effects of regulation on stock returns (Gul *et el.,* 2013). The data was collected from Nairobi Security Exchange information desk constituting of computer files of listed companies' daily security prices for twelve years from 1998 to 2010. The CMA regulations were obtained from CMA website. The closing prices were used in the analysis of the effects of regulation on security returns based on Jarrett and Kyper (2005) and Jarrett (2008) studies. Both studies argue that daily closing prices are suitable for information assimilation on stock prices.

Research in securities markets relies heavily on historical data which consists of past series of security prices. The data for this study consisted of past series of daily security prices of 39 NSE quoted companies sampled, daily stock market indexes, insider trading rules and prohibitions. The data collected comprised of closing share prices for the 39 sampled companies from 1998 to 2010; any dividend/bonuses issues January 1998 to December 2010;

share splits and right issues per company during this period under study. Dividends, security split, security bonus and security rights were necessary to adjust prices for any effects in daily security prices. The dividend data comprised of dividend paid per share and dividend declared; share price index information comprised of daily closing price index from 1998 to 2010. The other secondary data was sought from CMA annual reports, handbook and the dates of announcement of the regulations by CMA.

In this study, the regulation announcement event was taking all firms as a portfolio as regulation had an effect on all the NSE listed companies. Traditionally, the event study methodology involves a two-stage estimation procedure. In the first stage, the market model is estimated for the period before the event. In the second stage, returns are forecasted using the pre-event estimated parameters to calculate abnormal return (or forecast errors) and their respective t-statistics. This procedure was pioneered by Ball and Brown (1968) and Fama *et al*. (1969) and has been used extensively, especially in corporate finance to measure the effects of financing decisions or the mergers on wealth or on the prices. This methodology is based on the assumption that the residuals are independent and identically distributed. The assumption of independence of residuals means that, when analysing aggregate abnormal returns, it is assumed that the abnormal returns on individual securities are uncorrelated. Thus, the variance of the aggregated sample cumulative abnormal returns can be calculated assuming that the covariances are zero. Therefore this study performed the event methodology into two stages; the estimation period (261 days) and during the event period (pre regulation period 261 days) and 261 days for post regulation period.

Market Model Description
The empirical model used in this event study is the market model. The market model is a statistical model which relates the return of any given security to the return of the market portfolio. The model's linear specification follows from the assumed joint normality of asset returns. The market model was found appropriate for the impounding of regulation information on the stock prices. This study adopts the market model as it provides a linear specification of the return of the given security to the return of the market portfolio. Lee and Varela (1997) advocated that the market model is superior in specification and power to other types of model applied in event studies. Sharpe (1963) also found this model appropriate for measuring the movement of the security prices after the regulation information arrives into the market. The market model posits that returns of security tend to go up and down together with the market returns. This model therefore explains the price movements of one security *vis* a *vis* the movements of all other securities in the portfolio.

The market model for each company is estimated by regressing changes in the daily closing price against the corresponding changes in the daily security market index chosen for the model (Olatundun, 2009). The return on a security price is linearly related to the return on the market hence the use of a linear regression to estimate the market model. Sharpe's Single-Index Model is based on the hypothesis that the risk premium on security j during interval t (R_{jt}) is a linear function of the market risk premium (R_m). The risk premiums are formed by subtracting the riskless rate from the respective security and market returns. It establishes a linear relationship between the returns of a share and the return of the market. The market model relates the return of any given security R_i to the return of the market portfolio R_m

(Asbell & Bacon, 2010). The market model used in this study for each security i in period t is represented by the following equation.

$$R_{it} = \alpha_{it} + \beta_{it}R_{mt} + \varepsilon_{it} \tag{1}$$

$$E(\varepsilon_{it}) = 0, \qquad VarE(\varepsilon_{it}) = \sigma^2_{\varepsilon_i}$$

Where:

ε_{it} =zero mean disturbance term and uncorrelated with the market return (different variance in event and non-event periods), serially uncorrelated and to have finite variance.

α_{it} = component of security i's return that is independent of the market's performance and is a random variable and

β_{it} = constant that measures the expected change (measuring the co-movement between the security return and the independent variables) in R_{it} given R_{mt}, α_{it}, β_{it} and $\sigma^2_{\varepsilon_t}$ the parameters of the model, which are obtained from time series regression analysis. In the equation R_{mt} represents the market portfolio which is a broad based security index and in this study NSE 20 share index has been used.

Findings and Discussion of Results

The insider trading prohibition rules are contained in the Capital Market Act, 2000 Cap 485 of the Laws of Kenya. The Capital Market Act, 2000 Cap 485 of the Laws of Kenya was an amendment of the Capital Market Authority Act of 1989. The Capital Market Act Cap 485 of the Laws of Kenya contains specific rules that prohibit insider trading among the members of the securities industry on non-public material information. These rules prohibit officers or employees of a securities company from trading on securities for their own accounts on special information or disclose this information to any person who can manipulate the market using such information.

The publication of price-sensitive information should occur through the publication of a press release. It is the responsibility of the issuing company to determine the best practice for an immediate and simultaneous (accessible to all) publication of its price-sensitive information. Price-sensitive information should be made public in such a way that it is immediately available for everyone such that it is possible for investors to assess whether the information is complete, correct or timely. The regulation of the market is expected to reduce abnormal returns as everybody in the market is well informed and none is using internal information for their advantage. These policies are expected to enhance the informational efficiency of the security market.

First step followed in analysing the effects of the insider trading prohibition rules on stock returns was to determine the estimation period from 21st August 1998 to 20th August 1999 constituting 261 days. The NSE index was regressed against the logged stock prices using the market model equation (1) $R_{it} = \alpha_{it} + \beta_{it}R_{mt} + \varepsilon_{it}$ during the estimation period. The market model was used to calculate the Alpha and Beta during the estimation period before the regulation was in place. The regression of the NSE index and logged stock prices (stock

returns) yielded Beta and Alpha which were used to calculate each company's expected returns for each of the 39 companies for a period of 261 days estimation period. The expected returns for 39 companies were used to determine abnormal returns and cumulative abnormal returns for the 261 days pre-regulation and 261 days post-regulation. The expected returns were subtracted from actual returns to determine the abnormal returns. The following equation was used to estimate abnormal returns.

$$AR_{i\tau} = R_{i\tau} - E(R_{i\tau}/X_{\tau}) \qquad\qquad (2)$$

Average Abnormal Returns during the Pre-and Post-Regulation Period
To establish whether the cross sectional distribution of returns at the time of an event is abnormal that is systematically different from predicted, the entire distribution of abnormal returns over the event period was determined. The AR was aggregated for each company to get the Average Abnormal Returns (AAR). The AAR was subjected to graphical and descriptive statistics to find out whether they were significantly different from zero. The AAR graph for pre and post regulation indicates that AAR increased after regulation of the market. The graphical presentation indicates that the market anticipated the regulation which is reflected by increased AAR during the pre-regulation period. This was the period when information was being assimilated by the market. The increase in AAR continued up to the post regulation period which ranges from 0 to 8 as shown by Figure 1, 2 and 3. This is a reflection that the market took time assimilate information.
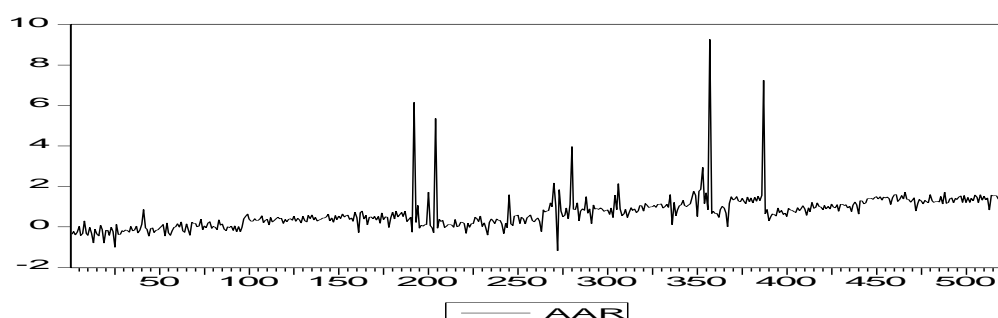

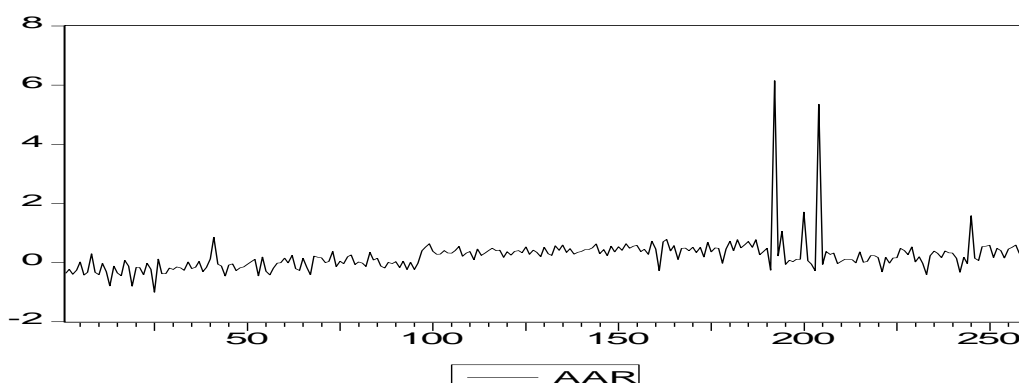**Figure 1: Average AR during the Pre and Post Regulation Period**

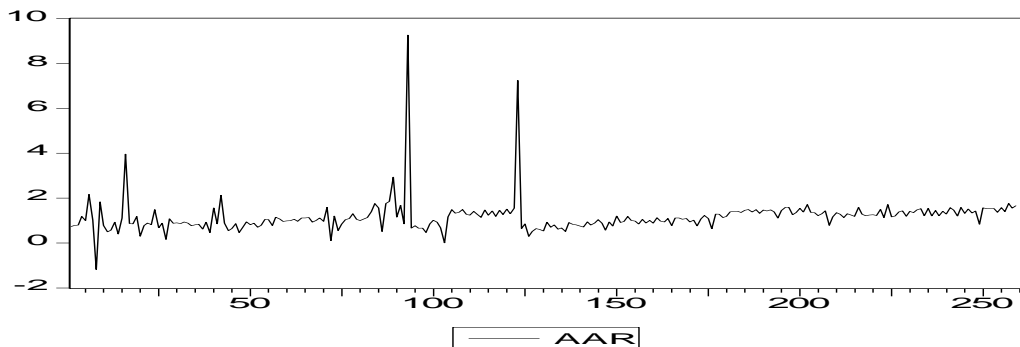**Figure 2: Average AR during the Pre Regulation Event Period**

Figure 3: Average AR during the Post Regulation Event Period

The evaluation of the effectiveness of the insider regulation was also performed by examining the changes in the risks and returns of the security. The measurement of the risk was done in terms of means, standard deviation and variance of AAR. The examination of the standard deviation, variance and returns in the pre-regulation period was compared with the post-regulation period.

The regulation is expected to have an effect on the risk and returns. The examination was done using descriptive statistics results after aggregating AAR which indicated that all sampled companies had a mean and a standard deviation of less than one as summarised in Table 1. The descriptive statistics for AAR provides standard deviation and variance of 0.017784 and 0.003163 respectively during the pre-regulation. During the post-regulation the standard deviation and variance was 0.020656 and 0.0042667 respectively. The results for Jarque-Bera in both pre-regulation and post regulation were 4905.603 and 24652.90 respectively which was significant with a p-value of 0.000.

The average abnormal return series had skewness of 2.848295 and 5.266904 which is greater than zero for both the pre and post regulations respectively. This is an indication that the series distribution was right skewed and most of the values are concentrated on left of the mean, with extreme values to the right. The kurtosis values are 23.46066 and 49.43245 which is greater than 3 for both pre and post regulation. This was indication that the distribution is peaked (Leptokurtic) relative to the normal before and after the regulation.

Table 1: Descriptive Statistics for the AAR Pre and Post-regulation Period

Descriptive statistics	Pre-regulation	Post regulation
Mean	0.019256	0.048325
Median	0.021237	0.045581
Maximum	0.158277	0.252456
Minimum	-0.026010	-0.014574
Std. Dev.	0.017784	0.020656
Variance	0.003163	0.0042667
Skewness	2.848295	5.266904
Kurtosis	23.46066	49.43245
Jarque-Bera	4,905.603	24,652.90
Probability	0.000000	0.000000
Observations	**261**	**261**

The effectiveness of the insider information regulation was evaluated by examining the changes in the security returns. The measure of risk was done in terms of standard deviation and variance during pre and post regulation. The standard deviation of the portfolio returns was used to assess the significance of the event-window, average abnormal returns before and after the market was regulated. The cross sectional dependence is accounted for because the variability of the portfolio returns through time incorporates whatever cross-dependence that exists among the returns on individual securities. The results showed that the standard deviation and variance increased after the regulation was enacted. This is an indication that there was variability of stock returns after the regulation on insider trading. The mean average abnormal returns were positive and statistically significant for most of the days after regulation (at 5% significant level) for the 261 days event window period although the deviation was minimal. The results indicate that there was a wide variation in the mean and median levels before and after the insider rules and prohibitions. However there is existence of the abnormal returns before and after regulation which persisted up to the end of the event period suggesting that the investors enjoyed some abnormal returns within the event period suggesting inefficiency in the security market.

T-Tests - AAR Pre and Post Regulation
The t-tests were carried out between the dependent variable (index) and independent variable (Abnormal returns) to find the significance of the regulation on the stock market returns as shown on Table 2.

Table 2: T-Tests AAR Pre and Post Regulation

Event	R-squared	Adjusted R-squared	Coefficients	Std. Error	t-Statistic	Prob.
Pre	0.000669	-0.003189	0.000434	0.001041	0.416507	0.6774
Post	0.042064	0.038365	-0.010372	0.003076	-3.372368	0.0009

The pre and post regulation regression between the index and AAR was shown in equation (3) and (4).

$$Y = 3.36 + 0.000434x + \varepsilon_i \tag{3}$$

$$Y = 3.27 + 0.042064x + \varepsilon_i \tag{4}$$

The results on the t-tests indicate that AAR for both periods is significantly different from zero at the 1% level of significance during pre and post regulation. The following hypothesis was used in the study:

$H_o \qquad AAR = 0$

$H_1 \qquad AAR \neq 0$

The results indicate that there is the possibility to gain significant AAR by trading on publicly available information before and after the regulation. The null hypothesis $AAR = 0$ was rejected and accepting the alternative hypothesis $AAR \neq 0$ for the NSE. The results indicate that the regulation was not effective in protecting the investors from market manipulation. There was presence of insiders traders still trading on insider information. The investor

information effect was reflected by the changes in the distribution of returns earned by investors. Comparing the average abnormal returns for both pre and post-regulation the results indicate that the regulation changed the average returns earned by the investors. This is against the market efficiency theory where the investors are not expected to earn any abnormal returns on any information (Fama, 1970). In the case of the NSE market there was significant increase in the AAR earned by the investors following insider rules and prohibition information.

By comparing the variance between the pre and post-regulation periods the results strongly suggest that the dispersion of AAR was smaller in the pre-regulation period than the post-regulation. Smaller variance in pre-regulation than in post-regulation reflects increase in information regarding the future security performance and increased information asymmetry.

Analysis of Variance for AAR
The analysis of variance (ANOVA) for AAR and Index was carried out for further statistical proof. It was used to investigate whether there is any significant difference between returns for both pre and post regulation periods. The null hypothesis is as follows;

H_o There is no significant difference between returns in the two periods.

H_1 There is statistical difference between the two periods.

Statistical analysis gives an F: statistic of 242.5175 while the critical F statistic is 3.859403. Since the F statistic calculated is greater than the critical value, the null hypothesis is rejected implying that the difference is significant at 5% level as shown by Table 3. This implies that there is a change in returns due to announcement of the regulation by CMA. The variance results support the descriptive statistics showing that there is a difference between the pre and post regulation. There was existence of abnormal returns during the post regulation. The results for ANOVA and descriptive analysis indicate that AAR are significantly different at 5% confidence level and significantly greater than zero rejecting the null hypothesis and accepting the alternative hypothesis.

$$H_0 : \mu_1 = \mu_2$$
$$H_1 : \mu_1 \neq \mu_2$$

Table 3: AAR Analysis of Variance

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Pre AAR	261	56.10899	0.214977	0.358839		
Post AAR	261	301.4385	1.154937	0.59202		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	115.3	1	115.3	242.5175	3.69E-45	3.859403
Within Groups	247.2233	520	0.475429			
Total	**362.5233**	**521**				

Cumulative Average Abnormal Returns (CAAR) During the Pre and Post-Regulation Period

The CAAR is a useful statistical analysis in addition to the AAR because it helps in getting a sense of the aggregate effect of the regulation event on the stock returns. The CAAR is the sum of the average abnormal returns for the period of 261 days pre-regulation and 261 days post-regulation. The sum total of the average abnormal returns over the 261 days in the event window formed the cumulative average abnormal return (CAAR) as shown by equation (5) below.

$$CAAR_t = \sum_{t=1}^{T} AAR_t \qquad\qquad (5)$$

In order to find the significance of computed CAAR for insider trading regulation the following hypothesis was tested.

$H_0 \qquad CAAR = 0$

$H_1 \qquad CAAR \neq 0$

In a perfect market the information content is assimilated very fast into the stock prices as it is announced. In such a case the market is expected to earn no abnormal returns leading to $CAAR = 0$ therefore the days and months following this event should remain constant until a new announcement with information value is published.

The CAR for each company was aggregated for the 39 companies for the 522 days pre and post insider trading prohibition regulation to get the CAAR. The CAAR was subjected to graphical presentation and descriptive statistical analysis. The graphical presentation in Figure 4 and Figure 5 shows that there was growth in CAAR before and after insider prohibition regulation.
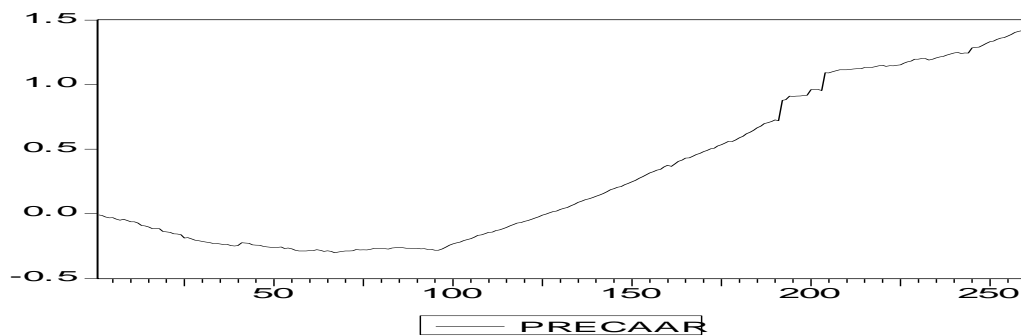

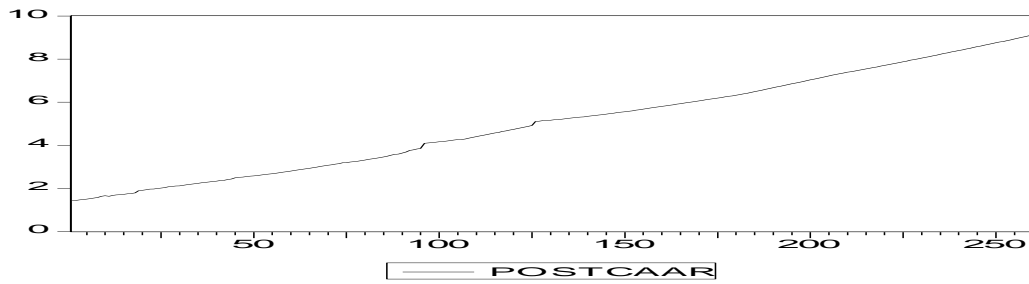**Figure 4: CAAR during the Pre-regulation**

Figure 5: CAAR during Post Regulation

By observing graphical presentation there was evidence of growth in CAAR from the pre-regulation towards the post-regulation up to the end of the event window period. The growth in CAAR means that there was anticipation of the regulation among the investors during pre-regulation as they wait for the enactment of the insider trading prohibition rules. CAAR ranges from 0.00 to 9 during the pre and post-regulation. The CAAR is expected to capture regulation information content of the total firm specific movements for the entire event period. In an efficient market it is expected that no investor enjoys any abnormal returns hence no traces of CAAR prior to the publication of the regulation and enactment. This means all the information content is incorporated into security prices. This was not evidenced in the case of the NSE market when the insider trading prohibition was enactment.

CAAR Descriptive Statistics
The descriptive statistics was used to find out the effectiveness of the insider prohibition rules. This was done through the measure of risk in terms of standard deviation and variance during pre and post-regulation. The standard deviation of the portfolio returns was used to assess the significance of the event-window cumulative average abnormal returns. During pre-regulation the standard deviation and variance was 1.599566 and 1.599566 respectively. During post regulation period the standard deviation and variance was 3.624789 and 13.13909 respectively. This was a large deviation from mean of zero. The pre-regulation period had Jarque-Bera statistics of 29.80142 and the corresponding p-value of 0.00. After the regulation the Jarque-Berra statistics was 15.40766 with a corresponding p value of 0.000451 which was less than 5% significant level as summarized by Table 4.

Table 4: Descriptive Statistics for Average CAAR

Descriptive statistics	Pre regulation	Post regulation
Mean	1.642676	10.81698
Median	1.077506	10.81326
Maximum	5.025781	17.57156
Minimum	-0.013161	5.048957
Std. Dev.	1.599566	3.624789
Variance	2.55861	13.13909
Skewness	0.669196	0.152167
Kurtosis	2.025799	1.849271
Jarque-Bera	29.80142	15.40766
Probability	0.000000	0.000451
Observations	**261**	**261**

The CAAR mean values are positive and statistically significant (5% level) for both pre and post regulation announcements. This indicates that some investors earned abnormal returns before and after the regulation was enacted. The good deal of the regulation information seems to have been impounded into the prices prior to the enactment of the regulation. This could have been out of the companies' expectation to incorporate regulation requirements during that time. This could be attributed to the discussion of this regulation by parliament committees and lobbying of various stakeholders prior to enactment which caused anticipation.

T-Tests CAAR Pre and Post Regulation

The study further used t-tests to test the significance of the effect of regulation on security returns by regressing dependent variable (Index) and independent variable (Cumulative Average Abnormal Returns) to find the significance of the regulation on the stock market returns as shown on Table 5. The regression was done between the pre and post-regulation index and CAAR as shown by equation (6) and (7).

$$Y = 3.36 + 0.010757x + \varepsilon_i \tag{6}$$

$$Y = 3.338 - 0.86956x + \varepsilon_i \tag{7}$$

Table 5: T-Tests AAR Pre and Post Regulation

Event Period	R-squared	Adjusted R-squared	Coefficients	Std. Error	t-Statistic	Prob.
Pre	0.010757	0.006937	-0.001770	0.001055	-1.678196	0.0945
Post	0.869556	0.869052	-0.016109	0.000388	-41.55142	0.0000

The results on the t-tests indicate that CAAR for both periods is significantly different from zero at the 1% level of significance during implementation of insider trading regulation. The following hypothesis was used in the study:

$$H_o \qquad CAAR = 0$$

$$H_1 \qquad CAAR \neq 0$$

The growth of CAAR is an evidence of trading on publicly available information before and after the insider rules and prohibition. The results presented in Table 5 indicate that the regulation had significant effect on security returns before and after the regulation (P value 0.0945) and (P value 0.000) respectively implying that there was presence of information asymmetry during trading. The R-squared shows that the regulation had an effect during the pre-regulation though it's very small (0.010757) while and post regulation the regulation explained 0.869556 which is very high meaning that the model explains all the variability of the response data around its mean. The results supports the graphical and descriptive results that indicate that there was volatility of the security returns after the regulation. This is an indication of increased information asymmetry among the capital market stakeholders. The market was enjoying abnormal returns against the efficiency market hypothesis theory where no investor is required to make any abnormal returns out of any private information or public information as all relevant financial information is required to be disclosed to all market players. By observing the behaviour of the CAAR and descriptive statistics the null

hypothesis $CAAR = 0$ was rejected and accepting the alternative hypothesis $CAAR \neq 0$. For an efficient market CAAR should be 0 in the days before an announcement.

The enactment of the insider trading prohibition rules in the Capital Market Act of 2000 were expected to improve transparency and reduce information asymmetry among capital market participants. The results from this study contradict this as there existed AAR and CAAR before and after the regulations which was statistically significant. The standard deviation and variance of both pre and post regulation AAR and CAAR indicated share price volatility. There was existence of information asymmetry among the market stakeholders which was measured using means, standard deviation and variance of the security returns during the pre and post regulation as explained by Leuz and Verrecchia (2000), Leuz and Wysocki (2008) and Lang and Lundholm (1993). The low levels of volatility suggest lower information asymmetries but in case of this study there was high volatility an indication of high information asymmetry among the NSE stakeholders after the enactment of the insider trading rules contained in the Capital Market Act, 2000 cap 485 of the laws of Kenya.

This study contradicts with Simon (1989) where the dispersion of abnormal returns was significantly lower following the Securities market Act of 1933, consistent with the argument that investors have access to more information after the Act. The study further explored more on the behaviour of the stock returns by analysing the significance of cumulative abnormal returns before and after the insider prohibition regulation which were found to be significant.

These results contradict with Zhang (2007) after investigating the economic consequences of the Sarbanes-Oxley Act through a study of market reactions around the legislative events prior and subsequent to the passage of SOX. The study found out that the cumulative abnormal returns around the legislative events leading to SOX were significantly negative. The abnormal returns were largely insignificant around the events related to the implementation of SOX. The evidence revealed that investors consider the Act to be costly and/or the information conveyed by the passage of the Act. In this study the NSE investors consider the Act as good news for the market as they traded out of the insider information before the enactment and after the enactment of the regulation. The information conveyed by the passage of the Act was good news for business as the cumulative market reaction to the rulemaking events was positive.

The NSE results contradicts with Diamond and Verrecchia's (1991) results when they examined the effect of insider trading regulations on market efficiency and found out that insider trading regulation enhance market liquidity by reducing the information asymmetry between the firm and investors, reducing the price impact. In the case of NSE there was increased information asymmetry depicting investors traded with the insider rules and prohibitions information.

The results for this study contradict with Jarrell (1981) and Officer (1973) who reported that mean returns were not changed by regulation. In the case of the NSE the mean returns changed. The results also contradict with Benston (1969 and 1975) who investigated the effects of the passage of the 1933 and 1934 Acts on security returns. He noted that there was no effect of the SEC Act, 1934 as there were no abnormal returns or variability of the security returns identified among the experimental group of companies during the post-regulation period. He argued that the SEC Act 1934 was not beneficial to the investors' in terms of improved returns or reduced variability. The results also contradicts with Officer's

(1973) who supported Benson's results after observing the decline in the general variability of security returns from 1926 to 1960.

The NSE results are consistent with Miller and Sabbarese (2012) when they examined the security market's anticipation of new information and reaction to the release of regulation adopted in 2000 using U.S. daily returns for 2000 through 2011. The empirical evidence supports that the security market anticipates new regulation information well before it was released and revises expectations in narrow windows near the release of the new regulation information. The study results also support Li (2004)'s results where they examined market reactions to the events by estimating the deviation of the market raw returns around the event days from the average raw return of non-event days in 2002.They found positive abnormal returns around the final rulemaking events and conclude that investors viewed SOX as beneficial.

Model Estimation during Overlap Period
The regulations were introduced successfully from one to the other with a few months difference. These regulations were identified with a dummy variable in order to find out the effects each on the other already implemented. This was performed by adding a dummy variable on the base GARCH model represented by the first regulation. The base GARCH model was estimated as shown by equation (8) below.

$$\sigma_t^2 = \omega + \alpha\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2 \tag{8}$$

The effects of insider trading rules and prohibitions on the mean and variance of total real stock returns was measured by adding event dummies variables on the GARCH-M model as exogenous variables. The dummy variable D1, D2, D3, D4 were introduced on the GARCH model to estimate the conditional mean and variance where β was used to measure the persistence of past shocks to the variance. The variability of the AAR calculated from regulation was taken as base GARCH Model as shown by Table 6.

Table 6: GARCH (1, 1) - Model Results Conditional Variance

Conditional Variance	AAR_1	$R(D_1)$	$R(D_2)$	$R(D_3)$
ω	0.012369 (0.0)	0.011504(0.0001)	0.015100(0.0)	0.012317(0.0001)
α	1.289571(0.0)	1.522595(0.0)	1.566571(0.0)	1.621736 (0.000)
β	0.333626(0.0)	0.278198(0.0)	0.230744(0.0)	0.247240(0.00)
$\alpha + \beta$	1.623197	1.800793	1.797315	1.868976
$R(D_1)$ Coefficients		-0.000774(0.9076)	-0.020613(0.0048)	-0.013604(0.1004)
$R(D_2)$ Coefficients			0.015482(0.0677)	0.008282(0.4312)
$R(D_3)$ Coefficients				0.018398(0.285)

The superscripts figures in the brackets represent statistically significance of the coefficient is at the 10% level.

The estimated coefficient for regulation AAR (insider trading regulation) from the variance equation was ω , α and β were 0.012369, 1.289571 and 0.333626 which were statistically

positive significant at 10%. This means the regulations have an effect on variance returns as estimated coefficients were significantly different from zero. The values for the coefficient when the dummy variable D1 (information disclosure regulation) was added to the model, the coefficient were D1 (0.000774), D2 (0.015482) and D3 (0.018398) respectively which were statistically significant at 10%. The results from the dummy variables analysis indicates that as each regulation is enacted it creates an impact on the AAR series. The regulation impacts on the AAR but the variability is not persistent. Each shock represents the introduction of a new regulation in the market. The sum of $\alpha + \beta$ increased from additional dummy variables and was more than one. This indicates the shock created on the AAR variance of returns as a result of regulation and changes in the persistence of shocks to the variance of returns.

Conclusion

The enactment of Capital Market Act of 2000, cap 485 of the laws of Kenya requires all the listed companies to disclose all the financial information to the public and prohibits insiders from trading on the material information at their disposal for investment decisions. This study found out that there were abnormal returns earned by the investors after the regulation was enacted. The regulation therefore did not enhance market efficiency as anticipated by the Capital Market Authority. This is an indication that the Act was slightly effective in ensuring that the market is efficient because no investor was expected to earn any abnormal returns from trading on insider information. This Act was enacted for purpose of promoting, regulating and facilitating the development of an orderly, fair and efficient Capital Markets in Kenya and for connected purposes.

When comparing the average abnormal returns for pre and post regulation, all the regulation results shows anticipation of the regulation enactment during the pre-regulation. The abnormal returns ranged from 0-9 with increase been visible during the post period event period. This is a sign of increased information asymmetry. The volatility was high during the post regulation period evidenced by the increased standard deviation and variance. The volatility was also evidenced by increased conditional mean and variance as measured by the GARCH model. This indicates that the market was not efficient after the enactment of the regulation. Information assimilation was continuous from the mid pre regulation as the effect was more at the end of the post regulation event period. The results on the t-tests also indicate that AAR for both periods is significantly different from zero at the 1% level. The null hypothesis was rejected and the alternative hypothesis was accepted that the implementation of insider trading rules and prohibitions had an effect on the stock returns reflected by the volatility of stock prices.

Recommendations

From the empirical evidence and conclusions drawn, CMA regulation over the capital market has bone benefits in terms of making the market more efficient. Though there was existence of the abnormal returns they minimised as the regulation was felt by the stakeholders during the implementation period. The results points towards the need for continued engagement by the Capital Markets Authority and other stakeholders to make the market even more efficient. The government through CMA should ensure compliance to security market regulation by all stakeholders. More is needed to find out how well the companies are implementing the regulation and ensure no price manipulation in the security market trading.

References

Akerlof, G.A. (1970). The market for "lemons": quality uncertainty and the market mechanism. *The Quarterly Journal of Economics 84*(3), 488-500

Aktas, N., E., de Bodt, Jan de S., & Ilham, R. (2007).Legal insider trading and stock market reaction: Evidence from the Netherlands. *Université catholique de Louvain, CORE & IAG Louvain School of Management*. Discussion Paper.

Asbell, D., & Bacon, F. (2010). Insider trading: A test of market efficiency. A paper Presenter at ASBBS Annual Conference at *Las Vegas*. 17(1).http://asbbs.org/files/2010/ASBBS2010v1/PDF/A/Asbell.pdf

Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research, 6* (2), 159–178.

Bhattacharya, U., & Daouk, H. (2002). The world price of insider trading. *The Journal of Finance, 57*(1), 75–108. doi:10.1111/1540-6261.00416

Benston, G. (1969). Political economy of women's liberation. *Monthly Review* (Sept. 1969)

Benston, G., (1975). Accountants' integrity and financial reporting. *Financial Executive*, Aug., 10- 14.

Binder, J. (1985b). Measuring effects of regulation with security price data*: A new methodology. *Rand Journal of Economics*, *16*(2), 167 - 183.

Christensen, H. B., Hail, L., & Leuz, C. (2016). Capital-market effects of securities regulation: Prior conditions, implementation, and enforcement (October 13, 2016). *Review of Financial Studies, 29*(11), 2885-2924.

Christensen H., Hail L., & Leuz C., (2012) Mandatory IFRS reporting and changes in enforcement. www.ssb.rochester.edu/faculty-and-research/conferences/...of.../ download .aspx?

Diamond, D., & Verrecchia, R. E. (1991). Disclosure, liquidity, and the cost of capital. *Journal of Finance*, *46*(4), 1325-1359.

Douglas, C., Sofia, J., Dan, Li. (2009). Exchange trading rules and stock market liquidity. *Journal of Financial Economics,* 99 (3), 651-671.https://doi.org/10.1016/j.jfineco.2010.10.001.

Fama, E.F. (1965). The behavior of stock-market prices. *Journal of Business, 38*(1), 34- 105. https://doi.org/10.1086/294743

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of security prices to new information. *International Economic Review 10*(1), 1–21.

Fama, E.F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, 25(2), 383-417.

Fama, E.F. (1998). Market efficiency, long-term returns, and behavioural finance. *Journal of Financial Economics*, 49(3), 283-306

Fernandes, N., & Ferreira, M. (2008). Does international cross-listing improve the information environment? *Journal of Finance and Economics*, 88(2), 216-244.

Ferrell, A (2004). The case for mandatory disclosure in securities regulation around the world. Harvard John M. Olin Center for Law, Economics, and Business. Discussion Paper No. 492

Gakeri, J.K. (2011). Maurer School of Law, Indiana University Enhancing Securities Markets in Sub-Saharan Africa: An overview of the legal and institutional arrangements in Kenya. *International Journal of Humanities and Social Science,1*(9),134-169.

Government of Kenya (2000). *The Capital Markets Act, Laws of Kenya*. Chapter 485, Government printers.

Gul, F. A., Wu, D., & Yang, Z. (2013). Do Individual Auditors Affect Audit Quality? Evidence from Archival Data. *The Accounting Review* 88 (6), 1993-2023.

Government of Kenya (2007). Kenya Vision 2030. A Globally Competitive and Prosperous Kenya.*www.treasury.go.ke/.../422-public-admin-a-international-relations-sector* on 23rd February, *2014.*

_____. (1989). *The Capital Market Authority Act*. Government printers.

_____ (2000).*The Capital Markets Act*. Government printers.

Jarrell, G. A. (1981). The economic effects of federal regulation of the market for new securities issues. *Journal of Law and Economics 24,* 613-676.

Jarrett, J.E. (2008). Predicting daily stock returns: A lengthy study of the hong kong and tokyo stock exchanges. *International Journal of Business and Economics, 7*(1), 37- 51.

Jarrett, J. E., & Kyper, E. (2005). Daily variation, capital market efficiency and predicting stock market returns. *Management Research News, 28*(8), 34-47.

Kibaara, B. (2008). The impact of financial crisis on developing countries. *Tegemeo institute of Agricultural Policy and Development*. Egerton University, Kenya.

Lee, S.G., & Varela, O. (1997). An investigation of event study methodologies with clustered events and event day uncertainty. *Review of Quantitative Finance and Accounting 8*(3), 211–228.

Li, Z. (2004). *Financial development, equity market liberalization, and economic growth*. Ph.D. thesis. Princeton University, Princeton, NJ.

Liu, T., Santoni, G. J., & Stone C. C. (2009). Federal securities regulations and security market returns.Retrieved from http://web.bsu.edu/cob/econ/research/papers/bsuecwp200803liu.pdf

Miller, T.W. & Sabbarese, D. (2012). An economic indicator for the state of the economy in the south-eastern U.S. *Journal of Regional Analysis and Policy 42*(1), 1-27 ·

Officer, R. R. (1973). The variability of the market factor of New York Stock Exchange. *Journal of Business, 46*, 434-453.

Olatundun, J. (2009). The impact of the regional cross-listing of security on firm value in Sub-Saharan Africa. *IMF Policy Discussion Paper International*, Monetary Fund WP/09/99

Sharpe, W. F. A (1963). Simplified model for portfolio analysis. *Management Science, 9*(2), 277-293

Simon, A. (1989). *A model of channel response in disturbed alluvial channels.* https://doi.org/10.1002/esp.3290140103

Spence, M. (1973). Job market signalling. *The Quarterly Journal of Economics, 87*(3), 355-374.

Stigler, G. (1964). Public regulation of the securities markets. *Journal of Business* 37, 117-142.

Stigler, G. J. (1971). The Theory of Economic Regulation. *The Bell Journal of Economics and Management Science*, 2(1)3-21

Stiglitz, J.E. (2002b) Information and the change in the paradigm in economics*, American Economic* Review, 92,460-501.

Taylor, M. (1986).The product-cycle model: A critique. *Environment and Planning A: Economy and Space* – Sage Journals.

Zhang, I. X. (2007). Economic consequences of the Sarbanes-Oxley Act of 2002. Journal of Accounting and Economics*, 44*(1-2), 74-115.