Asset pricing and information efficiency of the Ghana Stock Market

By

Kofi A. Osei
School of Administration
University of Ghana

Table of contents

List of tables
List of figures
Abstract
Acknowledgements

List of tables

List of figures

Abstract

The study looks at two main objectives, the asset pricing characteristics and the response to annual earnings announcements of the Ghana Stock Market (GSM).

The study hypothesizes that the GSM, as a typical African emerging stock market, is not efficient with respect to annual earnings information releases to the market.

The assessment of the market response to information is done by measuring abnormal returns over a 17-week event window when the annual earnings information is released. Analysis of cumulative abnormal returns (CAR) is also carried out.

The study establishes that 13 out of the 16 stocks studied have systematic risk lower than the market risk. Three stocks have betas greater than the market beta of one. Five out of the 13 stocks with systematic risk lower than the market risk have negative betas. Their t-values are also not significant. There are considerable intra-industry differences in systematic risk values of the listed stocks.

On the market response to earnings information, the analysis of CAR shows that the market learns about the impending annual earnings announcements. The market drifts up for good news and down for bad news over the period before the event announcement date. The study establishes that the market continues drifting up or down beyond the announcement week, i.e., week zero. This is inconsistent with the efficient market hypothesis (EMH). The conclusion is that the Ghana Stock Market is inefficient with respect to annual earnings information releases by the companies listed on the exchange.

Acknowledgements

1. Introduction

Macroeconomic and financial statement information play a vital role in the functioning of stock markets. At both the individual and the institutional investor levels, information is important in the selection of portfolios of equity securities, bonds and other investments. At the aggregate market level, the role of macroeconomic and financial statement information for the capital market in establishing equilibrium pricing of investments cannot be overemphasized:

- Financial statement information is one of the many sources of information that capital markets (such as the Ghana Stock Market) use in revising the prices of the securities listed on the exchange.
- Macroeconomic information and financial statement information are important to the investment analysts because of the association between information and market returns.

Corporate management is extremely interested in issues concerning information. Management has discretion over the timing of information releases and sometimes even whether information such as forecast earnings should be released. Obviously, an understanding of how the capital market will react to the content and timing of information releases helps the development of an integrated corporate disclosure policy.

Regulatory agencies such as the Securities Exchange Commission are also interested in the issue of information and capital markets since they make decisions that affect the content and timing of information reported to the capital markets.

2. The problem and the need for the study

The fact that the topic "efficiency" has generated a lot of discussion among financial economists is an indication of its importance. An efficient market is one in which changes in information about the prospects of a given security are quickly reflected in the security's price. Favourable information is expected to cause an immediate price increase in a security, while unfavourable information will cause an immediate price decline.

Another important characteristic of efficient markets is that there is equality in pricing of securities by the market. With the given information, the market makes expectations of the prospects of the security and the market perceives a value for the security. Should the market price differ from the expected value, buying and selling will take place that will consequently cause the market price to rise or fall until the value placed on the

security by the market is reached. This means that under efficient markets, security price is a good estimate of the value placed on the security by the market at any point in time.

A considerable number of studies have been done in this area on advanced capital markets such as those of the United States, United Kingdom, Japan, etc. These markets have been found to impound information and incorporate such information almost immediately hence approaching an efficient market. The importance of this concept to investors cannot be overemphasized.

The case of emerging capital markets such as the Ghana Stock Market could be entirely different. Osei (1996) shows that a sizeable number of Ghanaian investors do not know much about the operation and mechanisms of the capital markets:

Level of knowledge of Ghanaian investors about stock markets	% of investors
No knowledge	23.3
Fairly knowledgeable	59.2
Highly knowledgeable	17.5
	100.0

With such distribution of investors on the Ghana Stock Market, what is the extent of the ability of the market to impound financial information and incorporate it into prices to match the risk? It has been indicated in many situations that there are varying degrees of the level of efficiency of the various stock markets, with the emerging capital markets being less efficient. The capital markets of Africa are expected to be even less efficient because of the lack of understanding and the poor state of communication to facilitate information flow.

African markets also do not possess strong intermediary institutions with sufficient capacity to carry out the myriad of analyses needed, nor do the existing intermediaries provide adequate guidance to investors. We therefore expect interesting results on market reaction to information on African markets and for that matter the Ghana Stock Market. We need to know the extent to which African markets can impound and assimilate information releases. The reaction of African capital markets to information such as earnings reports, dividend reports, macroeconomic data releases, etc., and how such information is converted into prices need to be critically examined for the interest of investors planning to invest in African capital market securities.

In Ghana, there are no known studies in this area. The only recent work on the stock market, by Osei (1996), looked at the institutional, regulatory and legal infrastructure of the Ghana Stock Market. The study also used the simultaneous listing of the Ashanti Goldfields Corporation (AGC) on both the Accra and London markets to test the Law of One Price. No study has been done on asset pricing and neither has the semi-strong efficiency been tested. This is surely a welcome study for the investors on the GSM. The timing of this research therefore could not be more appropriate.

Objectives of the study

The objectives of this study are:

- To assess the asset pricing characteristics of the Ghana Stock Market.
- To analyse the response of the Ghana Stock Market to listed firms' annual financial earnings information releases to the market (semi-strong form market efficiency).
- To draw policy recommendations for improving upon the performance of the GSM.

2. Literature review

Market efficiency has been defined in many ways in many contexts. In this study, a capital market is considered efficient with respect to an information item (labelled ϕ^a) if the prices of capital market securities fully impound the return implications of the item.

We may express this definition notationally as:

$$f(R_{i,t}, R_{j,t}...\mid\phi^M{}_{t-1}) = f(R_{i,t}, R_{j,t}...\mid\phi^M_{t-1}, \phi^a_{t-1})$$

where

$f(.)$	= a probability distribution function
$R_{i,t}$	= the return on security i in period t
ϕ^M_{t-1}	= the information set used by the market at t - 1
ϕ^a_{t-1}	= the specific information item placed in the public domain at t-1

Implications of the definition of market efficiency

There are several implications of the definition in the equation. First, the definition equation implies that an investor cannot use ϕ^a_{t-1} to earn non-zero abnormal returns. Using the arbitrage pricing model, an abnormal return occurs when a zero net investment portfolio yields a non-zero return. When the two-parameter capital asset pricing model is used, an abnormal return occurs when the relative risk-adjusted return on an investment is non-zero.

Another implication of the definition is that in an efficient market, when a new information item is added to ϕ^M, the revaluation implications for $f(R_{i,t}, \ R_{j,t}...)$ are instantaneously and unbiasedly impounded into the current market price.

There are three important aspects of this definition of market efficiency:

- The focus is on aggregate market variables such as security price or security return and not on the behaviour of individual participants.
- The focus is on the ex ante link between the distribution of security returns and information.
- Market efficiency can only be defined with respect to a specific information item or

set of items ϕ_{t-1}^{a}. One cannot therefore address the question of market efficiency without specifying the information item ϕ_{t-1}^{a}. This is to say that a market may be efficient with respect to ϕ_{t-1}^{a} but not with respect to ϕ_{t-1}^{b} or ϕ_{t-1}^{c}.

Other definitions of efficiency and asset pricing models

Market efficiency has attracted the interest of many financial economists and many definitions of market efficiency have been given in the literature. West (1975) distinguishes between external efficiency and internal efficiency when dealing with capital markets. On *external efficiency*, West indicates "efficiency implies that a market's equilibrium conditions are such that trading decisions based solely on existing information do not yield expected returns in excess of expected equilibrium returns" (pp. 30–31). West refers to *internal efficiency* as a well-equipped real-world securities market that establishes price levels that are right in the sense that they fully reflect available information as well as provide the types of transaction services buyers and sellers deserve at prices as low as possible given the costs of providing those services.

In the literature, the confusion surrounding efficiency is high and the prospect of this confusion increasing is even higher. In the empirical testing of market efficiency, the difficulties that may arise include:
- The specification of ϕ_{t}^{a} (the information item), who has access to it, and when the investor has access to it.
- The problem of specification of an acceptable asset pricing model.
- Linking the information item and the pricing model to specify an appropriate asset price response to the disclosure of the information ϕ_{t}^{a}.

Fama (1970) bypassed these problems by assuming that:
- The information item is equally and instantaneously available to all market participants.
- Information is costless.
- There are homogeneous expectations by all participants.

With these assumptions, it is obvious that given the information ϕ_{t}, the capital market reaction will be instantaneous and unbiased.

Fama (1970) defines an efficient securities market as one in which prices "fully reflect" the available information. He categorizes market efficiency into three, depending on the information set that is fully reflected in security prices:
- Weak form efficiency is when the information set is the past sequence of security prices.
- Semi-strong form efficiency is when the information set is publicly available information.
- Strong form efficiency is when the information set is all information, including insider information.

In the literature, the two important equilibrium theories of equity expected returns are the capital asset pricing model (CAPM) put forward by Sharpe (1964) and the arbitrage pricing theory (APT) of Ross (1976). Sharpe's model is derived as:

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f]$$

R_f = return on the risk-free asset

R_m = return on the market portfolio, which comprises all the capital assets, i.e., stocks, bonds, real estate, etc., with each weighted according to the proportion of its current market value

β_i = a measure of security $i's$ responsiveness to movements in the market portfolio

$$\beta_i = Cov(R_i, R_m)/V(R_m)$$

$V(R_m)$ is the variance of the returns on the market portfolio and an attribute used to standardize $Cov(R_i, R_m)$ for each security.

The CAPM model shown above predicts that only the attribute of security (β_i) determines differences in expected return.

Thus $E(R_i) = f(\beta_i)$

Black (1972) derived a more general model of asset pricing in which R_f is replaced by $E(R_o)$, where $E(R_o)$ is the expected return on a minimum variance portfolio whose returns are uncorrelated with those of the market portfolio.

Litzenbergen and Ramaswany (1979) provided an extension of the CAPM model by including other attributes apart from β_i, such as dividend yield. Thus:

$$E(R_i) = f(\beta_i, DY_i)$$

Estimation of beta and variance

Estimates of β_i and $V(R_i)$ are used in security investment decisions as well as in other management decision making areas including cost of capital estimation and legal testimony on the security return effects of material nondisclosures in legal cases.

Among the procedures used in the estimation are security return-based estimation approaches and financial statement-based estimation approaches. In the literature, there are three main choices of time interval, daily, weekly or monthly. Many earlier works used monthly data. Lately, the trend is towards using daily data. The use of daily data provides more observations and improves the efficiency of the estimation. However, a potential problem with the use of daily data is the "non-trading" phenomenon. Some securities may not necessarily trade on a daily basis, giving zero returns. The non-trading

phenomenon may be more pronounced in the emerging markets where trading is thin. Scholes and Williams (1977) and Dimson (1979) outline econometric approaches that may be used to reduce the severity of the problem.

Another issue with security return data is the choice of the data period. A longer time period allows more observations for the estimation of β_i and $V(R_i)$ efficiently. A longer term also means that firms can make structural changes, which means that some of the data may not reflect the current situation of the firm. For monthly data, most studies use 60 to 84 observations. For daily and weekly data, shorter time periods are used.

Bildersee (1975), Beaver et al. (1970), and Thompson (1976) used the financial statement-based approach to estimate β_i and $V(R_i)$. Bildersee's study used a sample of 71 manufacturing and retail firms with both common and non convertible preferred stocks traded on the New York Stock Exchange (NYSE) over the 1956–1966 period. He used the correlation analysis to examine the correlation between the security returns estimates of beta and 11 accounting variables on a univariate basis. He also ran the multiple regression analysis and, using a step-wise regression programme, was able to choose the six accounting variables that contributed most in explaining variations in the dependent variable (β_i).

Hochman (1983) used 203 NYSE listed securities covering the period 1964–1968 to develop three different predictions of the beta for the 1969–1973 period.

Reaction of capital markets to announcements

The literature review now shifts to the reaction of the capital market to information, particularly securities information announcements. Three factors that may affect the information content of any release are:
(a) The expectation of the capital market as to the content and timing of the information.
(b) The implications of the release for the future distribution of security returns.
(c) The credibility of the information source.

Generally, the greater the uncertainty as to the content and timing of the corporate information release, the higher the potential for the release to cause a revision in security prices. Under (b) above, the larger the relative revision in expected cash flows, the larger the security price revaluation implication of the release. With respect to the credibility of the information source, the more credible the source of the information release, the larger the revaluation expected.

Market reaction to earnings announcement

One of the early classic studies on the effect of earnings information release on trading volume and variability of security return was done by Beaver (1968). Beaver controlled for the possibility of non-earnings related factors inducing trading volume at the time of earnings releases. Using a sample of 143 securities over the 1961–1965 period, he restricted the sample to non-December 31 fiscal year securities in order to minimize

the effect of December–January tax-induced trading volume. Beaver controlled for the effect of dividend announcement by restricting the sample to firms that had no dividend announcement in the week of the annual earnings announcement.

In this study, Beaver used the trading volume activity (TVA_{jt}) measure to examine weekly trading volume for a period over 17 weeks surrounding the earnings announcement week. Beaver's study showed a dramatic increase in trading volume in the announcement week (i.e., week 0). The second phase of Beaver's research looked at the variability of security returns in the same 17-week period surrounding the annual announcement as before. Using the security returns variability (SVR) measure, he analysed the variation in returns over the 17-week period. Security returns were found to be 67% higher in the earnings announcement week than in the non-earnings announcement period.

Patell and Wolfson (1984) have used earnings release information to study the intra-day behaviour of security returns of securities on the NYSE and American Stock Exchange (ASE). The study observed price changes in a 26-hour trading period surrounding each announcement. The conclusion drawn by the authors was that there is "a very strong reaction at the announcement, the major portion of which decays within two hours, but with detectable traces that linger into the following day".

Foster (1986) used the SRV_{it} measure to study 53 US securities in interim and annual earnings announcements over the 1963–1978 period. Foster further partitioned the sample into eight industries to see whether differences in SRV_{it} existed across the industries. The industries were photographic equipment and supplies; flat glass; motor vehicles and car bodies; bakery products; banks (all located in New York City); bottled and canned soft drinks; savings and loan associations; and radio and television broadcasters. Foster concluded that industry membership was an important variable in explaining the differences across firms of the values of the SRV_{it} statistic at the time of earnings release.

In identifying other variables to explain differences in the magnitude of the security return variability associated with earnings releases, Richardson (1984) studied 153 NYSE equities. The study focused on annual earnings reports made in the 1976–1978 period. Using the SRV_{it} measure, Richardson found a 40% increase in the variability of security returns in the earnings announcement week. Richardson partitioned the sample into firm-size deciles based on market capitalization. He then examined the mean the SRV_{it} and the mean of other variables for each of the deciles.

Other variables Richardson used included:
- Measures of the extent of information available to market participants, such as (a) the presence or absence of analyst earnings forecasts reported in *The Earnings Forecaster* and (b) the natural log of the number of *The Wall Street Journal* news items in the 12 months prior to the announcement.
- Measures of the extent of information available from macro sources. The proxy used was R^2 from a regression of each equity's earnings on an economy-wide earnings index. Richardson's motivation for this measure was that earnings reports for low R^2 firms tend to be less prompted by macro information sources, making earnings a relatively more important source of information for investors interested in such equities, compared to high R^2 equities.

Richardson's study came out with the following observations. Firms with higher security return variability in the week of their annual earnings release typically:
- Are of smaller size
- Have a lower frequency of a forecast being reported in the *Earnings Forecaster*
- Have fewer items reported in *The Wall Street Journal*
- Have a lower percentage of their earnings variability explained by an economy variable

Other studies have been conducted on exchanges apart from the NYSE or ASE. Grant (1980) and Morse (1981) used earnings announcements of securities listed on the over the counter (OTC) market to analyse SRV_{it}. Maingot (1984) reports results using 100 securities listed on the London Stock Exchange (LSE). In the case of the UK, earnings and dividends are announced at the same time. The examination therefore looks at the joint impact of both the earnings and the dividends.

Timeliness (difference between the actual release date and the expected information release date) of information release is another variable that has been used to explain the differences in sign and magnitude of abnormal security returns in the period surrounding earnings release.

Using a sample of 100 NYSE listed securities, Chambers and Penman (1984) noted the historical reporting dates of earnings of these securities. They then developed predictions for the release date of interim and annual earnings release for the 1970–1976 period. An early/late reporter was designated a firm that reported its earnings before/after the date predicted. The authors noted the mean abnormal security returns in the two-day trading period up to and including the announcement of earnings in *The Wall Street Journal.*

Their results included, among others, that firms that reported their earnings releases earlier than expected had positive abnormal security returns in the period surrounding their actual release date. Late reports had typically negative abnormal returns, meaning that the very act of delaying a report appeared to convey negative information to the capital market. Kross and Schroeder (1984) reported similar results in a study using 297 NYSE and ASE securities over the 1977–1980 period.

Market reaction to dividend announcements

Dividend announcement is an alternative signalling mechanism that also informs investors about the future profitability of their investments. Studies have been made to examine the reaction of security prices to dividend information releases. Asquith and Mullins (1983), Brickley (1983), and Dielman and Oppenheimer (1984) have conducted research in this area.

Asquith and Mullins worked on a sample of NYSE/ASE securities that either paid their first dividend in their corporate history or initiated dividends after omitting them for at least ten years. This study covered the 26-year period from 1954 to 1980. Brickley examined a sample of specially designated dividends (SDDs) labelled by management as "extra", "special", or "year end". The sample consisted of 165 SDDs made up of NYSE/ASE securities in the ten-year period 1969–1979. Dielman and Oppenheimer's

study looked at a sample of securities listed on the NYSE that made large dividend changes between 1969–1977. The sample was made up of 39 resumptions of dividend payments, 51 dividend *increases* of 25% or more, 59 dividend *decreases* of 25% or more, and 53 dividend omissions.

All three studies showed statistically significant abnormal returns in the (-1, 0) announcement period. Firms that increased dividends, announced special or extra dividends, or initiated dividend payments for the first time experienced positive abnormal returns. On the other hand, firms that decreased or omitted dividend payments realized significant negative returns.

Market reaction to non-announcing firms

Another aspect of capital market reaction to firm information releases is the reaction of other firms in the industry, that is the reaction of the non-announcing firms in the industry. The results of a study by Foster (1986) for 75 securities on interim and annual earnings announcement for the 1963–1978 period showed that earnings releases that were associated with positive/negative price changes for the announcing firm in the (-1, 0) days were also associated with positive/negative price changes for the other non-announcing firms in the same industry. The results mean that the capital market views the earnings releases as informative to the announcing firm as well as the non-announcing firms in the same industry. Clinch and Sinclair (1984) reported similar results from the Australian capital market.

Market reaction to stock listings overseas

A study by Howe and Kelm (1987) assessed how shareholders reacted to overseas stock listings by US multinational corporations (MNCs). The authors estimated abnormal returns in a period from 90 trading days before the actual listing to 40 trading days after the listing. The study found that the abnormal returns were consistently negative and in some cases statistically significant.

For the MNCs that had a second and a third overseas listing, the study found in general that the abnormal returns were significantly negative for both cases. The results suggest that shareholders react unfavourably toward overseas listings. This meant that the costs involved in overseas listing outweighed the potential benefits.

3. Methodology

Hypothesis

The main hypothesis of this study is that as a typical emerging African stock market in an environment of poor communication and other infrastructural facilities, the Ghana Stock Market is inefficient with respect to response to annual earnings information announcements by the listed companies.

Data collection

The study uses mainly secondary data obtained from the Ghana Stock Market. Information on stock prices, stock trading volumes, and end of financial year earnings figures and announcement dates were collected. Although there are currently 21 listed companies on the GSM, only 16 were used in the study. The remaining five stocks were rejected because either they had been listed for less than two years and did not have enough data points or they had stopped trading at some point in time and therefore had data gaps.

Other agencies from which secondary data were collected include the Central Bank, the Ministry of Finance and Economic Planning, and the Statistical Service.

Data analysis

We approached our first objective, which is assessing the asset pricing characteristics of the Ghana Stock Market, by using a standard market model that assumes a linear relationship between the return of a given security to the return of the market portfolio. The model can be stated as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + U_{it}$$

where

R_{it} = rate of return on asset i in period t
R_{mt} = rate of return on the market index in period t
α_i = constant in regression equation
β_i = slope of regression equation (beta value of asset i)
U_{it} = disturbance term

A beta value of one is expected if the systematic risk of a stock is not significantly different from that of the whole market. The test here provides an investigation of the relationship between the return earned by a particular stock compared with the value weighted return earned by the market as a whole.

Monthly data covering up to about 80 periods were used to determine the constant of regression and the slope of the regression equation. (Also see Appendix A for descriptive statistics.)

We analysed the GSM response to announcements using the methodology of *event studies*. Event studies involve the reaction of a market after the announcement of information. Of particular interest to this study is the reaction of the Ghana Stock Market to full-year earnings announcements of listed stocks.

For each announcement, three questions are answered:
1. What is the information?
2. When was it announced?
3. Were there abnormal returns associated with the announcement?

First, the announcement provides information only if the announced earnings information is different from that expected by investors. This happens because in an efficient market the effects of the expected information will already be reflected in the share price before the announcement. If the reported information is greater than expected, then the event is classified as good news and the market's response is said to be positive. If the reported news is less than expected, the event is classified as bad news.

Second, it is important to identify accurately the event date, that is, the exact date when the information became public knowledge. This is important in the sense that the market may react in anticipation of the announcement as investors revise their expectations. The market is also expected to react at the time of the announcement to any unanticipated information. However, the market should not continue to react after the date of the announcement since the response should be instantaneous and unbiased. We answer questions one and two using Table 1, which shows the earnings announcement date and value of companies' earnings as obtained from the files of the GSM.

Third, we calculate the response of the market to the announcement. Basically, the response is the percentage change in share price above or below what would normally be expected to occur. We measure abnormal returns, AR_{it}, on security i at time t as

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt}$$

The test involves estimating and examining abnormal returns before and after the announcement as well as the abnormal returns at the time of the announcement. Each announcement date is labelled time zero. Points in time before the announcement are labelled -1, -2, -3, etc., and points in time after are labelled +1, +2, +3, etc. This period of interest over which we measure the abnormal returns is known as the *event window*. In order not to bias the measurement of abnormal returns in the event window, we define an estimation window, which is usually the period before the event window. We estimate

our parameters for measuring normal returns in the estimation window. The abnormal returns therefore become the ex post return of a stock in the event window less the normal return of the firm over the event window.

In this study, we use weekly data and set the event window at eight weeks before and after the week of the earnings announcement date. This gives an event window of 17 weeks. Thus the event window is -8, -7,..,0, +1, +2,..+7, +8. Period zero (0) is the week of the announcement. The estimation window is therefore 35 weeks before each annual earnings announcement. The period of interest is 1993 to August 1997.

Cumulative abnormal returns (CAR) analysis

In order to draw an overall inference for the earnings announcements, we aggregate the average abnormal returns calculated over the event window as cumulative abnormal returns (CAR). This measure shows the behaviour of abnormal returns through time.

In event studies of this kind, earnings announcements have information content if the announced information is not expected. Thus, higher than expected earnings should bring about higher increases in the value of the shares termed "good news" and lower than expected earnings announcements will bring about decreases in stock prices termed "bad news". If the earnings are what is expected, there will be no news.

On the Ghanaian equity market, whereas the date of announcement and value of earnings are obtainable from the GSM, there are no sources of expected earnings forecasts from which one can compare actual and expected earnings for determining "good", "bad" or "no" news. None of the financial intermediaries has any such data.

To go round the problem of finding the expected earnings, we invoke the analysis of Fisher. The Fisher equation indicates that since investors are concerned with what they can buy with their money, they at least want to maintain their purchasing power. This means investors require a compensation for inflation. Investors will not therefore lend money unless the nominal interest is high enough to cover the expected inflation and also provide a real rate of return.

By similar reasoning, it is the expectation of Ghanaian investors that their companies report real rates of return on earnings. In this study, we assume that any earnings report that shows real earnings increase of 0–5% (about the growth rate of the GDP) is no news and real earnings increase greater than 5% is good news. A negative real earnings report is bad news. Using Ghana inflation figures for 1990–1997 as shown in Appendix B, we compute the real percentage growth in earnings (see Appendix C). Thus from above:

0–5% real increase in earnings – no news
> 5% real increase in earnings – good news
< 0% real increase in earnings – bad news

Using this categorization, there are 42 announcements considered good news, 28 considered bad news and 3 considered no news.

Table 1: Full year earnings announcement dates and earnings figures (earnings in millions of cedis rounded)

COMPANY	1991	1992	1993	1994	1995	1996	1997
ABL	1/11/91	13/7/92	3/8/93	20/7/94	16/8/95	18/9/96	1/9/97
	650	626	976	709	281	570	1640
AGC*				10/1/95	8/12/95	12/12/96	3/3/97
				$112	$106	$71	$81
CFAO		12/5/92	6/8/93	29/3/94	18/3/95	28/8/96	23/7/97
		69	499	249	524	95	39
EIC			26/4/93	26/4/94	2/5/95	29/4/96	3/4/97
			221	385	477	543	960
FML		21/2/92	5/3/93	?/3/94	27/3/95	20/3/96	12/3/97
		788	826	1046	502	1635	2742
GGL		26/3/92	?/3/93	19/4/94	31/3/95	29/3/96	27/3/97
		667	710	1820	4156	8128	11894
HFC					12/4/95	25/1/96	21/3/97
					264	721	1077
KBL		3/6/92	23/3/93	7/4/94	29/3/95	12/3/96	2/4/97
		(8)	369	535	614	1253	1641
MGL	8/11/91	26/8/92	20/10/93	4/7/94	10/8/95	22/10/96	8/10/97
	36	24	41	96	92	82	-962
MLC				2/6/94	16/5/95	21/3/96	2/4/976
				53	202	504	864
MOGL			3/6/93	5/4/94	24/4/95	22/3/96	2/4/97
			1212	1767	1641	4934	13475
PTC		14/2/92	22/2/93	4/3/94	27/2/95	4/3/96	28/2/97
		1044	735	1150	2080	2881	5353
PZ		16/10/92	3/9/93	26/10/94	11/8/95	19/9/96	13/10/97
		117	83	265	589	915	506
SCB		11/3/92	15/3/93	16/3/94	16/3/95	29/2/96	27/2/97
		1161	2787	4902	9698	15708	27356
SPPC			30/3/93	5/4/94	18/4/95	9/4/96	2/4/97
			129	-234	416	439	434
UNIL		3/4/92	15/3/93	24/3/94	13/4/95	27/3/96	27/3/97
		1010	3689	5045	8030	10771	11764

* AGC annual earnings figures in millions of dollars.
Source: From the files of the GSM.

4. Results

Asset pricing characteristics of the Ghana Stock Market

The results of the regressions on the asset pricing characteristics of the GSM are shown in Table 2. The table shows the beta (β_i) values of the listed stocks ranging from negative 0.8686 (-0.8686) for Mechanical Lloyd Company (MLC) to 1.33 for Fan Milk Ghana Ltd. (FML). Out of the 16 listed stocks studied, three—AGC, FML and GGL—have betas greater than one. The t-values of these three are all significant, meaning that the systematic risks of the three stocks are greater than the market beta of one.

Table 2 also shows that 8 out of the 16 stocks have positive betas that are less than the market beta of one. With the exception of CFAO, all the t-values of these stocks are significant. The R-squared-bar value of CFAO of -1.5% shows that the market return does not explain the variation in the returns of the CFAO stock.

Five stocks—Home Finance Co. (HFC), Mechanical Lloyd Co. (MLC), Pioneer Tobacco Co. (PTC), Peterson Zochonis (PZ) and Super Paper Products Co. (SPPC)—have negative betas. With the exception of SPPC, the t-values of these stocks are not significant. The R-squared-bar values for this group are also low, meaning little or no relationship between the variation in returns of these stocks and the returns of the market.

A number of questions may be posed: Are the estimated beta values appropriate? What range of values do we expect the stock betas to fall within? Are the results peculiar to the sectors of the economy? These kinds of questions cannot be answered since no previous beta estimations have been done.

However, the industrial categorization of the listed stocks (Appendix D) indicates that within the same industry there are considerable variations in systematic risk values of the GSM listed stocks. This is evident in the financial institutions, food and beverage, manufacturing retail industries. Within the food and beverage industry, for example, whereas Accra Brewery and Kumasi Brewery are less sensitive to economic downturns as shown by beta value of less than one, Guinness Ghana Ltd. and Fan Milk show cyclical behaviour.

In the financial institutions industry comprising Standard Chartered Bank (SCB), a commercial bank, and Home Finance Company (HFC) and Enterprise Insurance Company (EIC), both non-bank financial institutions, the systematic risk values are .65 for SCB, -.2494 for HFC and .3729 for EIC. The variations are not easily explained and the R-squared-bar values also show that about 30% of the variations of the returns of the group with the market returns are explained.

Table 2: Estimation of value weighted market model parameters of the GSM (monthly returns data) 1992–1997

COMPANY	α_i	$SE(\alpha_i)$	$t(\alpha_i)$	(β_i)	$SE(\beta_i)$	$t(\beta_i)$	$R^2 - bar$	DW	OBS
ABL	1.8663	2.9956	.6230	.6986	.2821	2.4762	.0805	2.0049	81
AGC	-.3581	.1141	-3.1385	1.1582	.0198	58.6022	.9902	1.9679	39
CFAO	.9500	2.6686	.3560	.2570	.2435	1.0551	-.0154	1.9901	65
EIC	.9885	1.8736	.5276	.3729	.1214	3.0726	.3292	1.9985	81
FML	2.0412	3.7225	.5483	1.3314	.2503	5.3202	.2767	1.9990	81
GGL	1.0368	1.9694	.5265	1.1583	.2040	5.6779	.2895	1.9837	81
HFC	1.2280	.5669	2.1662	-.2494	.1347	-1.8518	.1162	2.0040	29
KBL	1.9184	1.7702	1.0837	.3184	.1030	3.0912	.3193	1.9918	81
MGL	.9865	.9415	1.0478	.3038	.0831	3.6574	.1597	2.0074	69
MLC	5.8551	4.2603	1.3744	-.8686	.5250	-1.6545	.0331	2.0199	39
MOGL	2.9991	1.8548	1.6170	.5294	.1444	3.6669	.3314	2.0011	73
PTC	1.9092	1.7345	1.1007	-.00513	.1460	-.0352	.00121	1.9909	81
PZ	3.1313	2.2577	1.3869	-.2371	.1457	-1.6272	.1201	1.9920	81
SCB	2.0116	1.6351	1.2303	.6511	.0948	6.8694	.4742	1.9940	81
SPPC	-.2194	.7081	-.3099	-.1238	.0629	-1.9698	.0373	1.9832	62
UNIL	-.7397	1.5136	-.4887	.9090	.1329	6.8386	.3586	2.0022	81

Source: Regression results.

The manufacturing and retail groups show similar intra industry systematic risk variation that is not easily explained. Generally it appears that the systematic risk is related more to the type of product than to the totality of the industry.

The dominance of Ashanti Goldfields Corporation (AGC) on the GSM is reflected in the high value of R-squared-bar for AGC. As much as 99% of the variation in the returns of AGC is explained by the market portfolio returns. The market simply moves in tandem with any change in the price of AGC. The high t-value of 58.6 for AGC is further evidence of the role of AGC on the GSM.

In the regressions, the R-squared-bar generally are low, in a few cases below 10%. On the average the market returns explain about 30% of the variations in the returns of the individual stocks listed on the exchange.

The t-ratios for most of betas are significant even at the 1% level. The t-ratio for the intercept α_i, however, is not significant.

Analysis of Ghana Stock Market reaction to information releases

The regression results for generating the parameters for the computation of abnormal returns using weekly value weighted returns are shown in Appendix E (compare with Table 2 generated from monthly figures). Real earnings growth and the basis for classification of good, bad and no news are in Appendix B..

Table 3 : Analysis of CAR

Event Week	Good News		Bad News		No News	
	AR	CAR	AR	CAR	AR	CAR
-8	-.24592	-.24592	-.16397	-.16397	.09482	.09482
-7	.25083	.004883	-.38445	-.54841	.04109	.13590
-6	.72103	.725911	-.19831	-.74673	-.04441	.09149
-5	.54444	1 .27034	-.66542	-1.4121	-.02466	.06683
-4	-.24764	1 .02271	-.24775	-1.6599	-.07466	-.00784
-3	-.06606	.95665	-.67394	-2.3338	.02654	.01870
-2	.46950	1 .42615	-.30065	-2.6345	.04024	.05894
-1	.43836	1 .86451	.80681	-1.8277	.14360	.20254
0	-.04682	1 .81769	-.11622	-1.9439	.07300	.27555
+1	.38322	2 .20091	-.28693	-2.2308	.03898	.31453
+2	.30763	2 .50854	-.36333	-2.5942	.05860	.37313
+3	.20463	2 .71316	-.33293	-2.9271	.08324	.45637
+4	.57812	3.291228	-.4015	-3.3286	.06589	.52226
+5	.23631	3 .52760	-.21626	-3.5448	-.21196	.31030
+6	.21300	3 .74060	.04880	-3.4960	-.10072	.20958
+7	-.18411	3 .55649	.09047	-3.4056	.03383	.24341
+8	-.19661	3 .35988	.38603	-3.0195	-.07694	.16647

The response of the Ghana Stock Market to full-year earnings announcement as generated from 73 event observations made up of 42 good news observations, 28 bad news and 3 no news observations as analysed into abnormal returns (AR) and cumulative abnormal returns (CAR) are shown in Table 3. Plots of CAR are shown in Figure 1.

The results depicted in Figure 1 show that annual earnings announcements do convey information that the market uses in revising stock prices. The CAR plot shows evidence of the GSM responding to favourable or unfavourable earnings releases. The market learns about the impending announcement. The average CAR for the good news firms increases from event period -8 to 0. The drift upwards continues beyond week 0 until week +7.

The average CAR for the bad news firms generally drifts downwards. The downward drift continues consistently to week 0 and continues drifting downwards until week +5 when there is an upturn. There is a one-time upturn at week -2 but this is not sustained. The average CAR for no news firms generally is flat, moving horizontally with the X-axis. In cases of both good news and bad news, the market continues to react beyond the week of announcement. This is inconsistent with the efficient market hypothesis (EMH), which states that the reaction of market prices to new information must be instantaneous and unbiased. From the analysis therefore, it is apparent that the GSM is not efficient to annual earnings information released by the listed companies.

Shortcomings of the study

The study has a number of shortcomings that must be considered in weighing the results. These range from the thinness of trading activities to the dominance of AGC on the market.

Thin-trading problem

This arises because of the small volume of trading activities of the GSM. This means that it is not possible to obtain a set of simultaneous prices for all the shares contained in a portfolio. The impact is the introduction of errors into the measurement of portfolio returns, as spurious negative first-order serial correlation may result.

## Controlling for contemporaneous release of other information

Announcements of other information in the vicinity of the annual earnings announcement date could contaminate the results. Among the most important of such factors is the dividend announcement. Our enquiry shows that there are few earnings announcement dates that coincide with dividend announcement dates. These have not been controlled for because the announcement data for this study are annual data. Therefore controlling for many factors means eliminating substantial numbers of the data points.

Timeliness of earnings announcements

GSM regulations require companies to make their earnings announcement within six months from the end of the company's financial year. In certain situations, companies that are not able to submit the audited report within the stipulated time may submit a preliminary report initially and the audited final report later.

In this study, whenever such a situation arose the preliminary earnings announcement date was selected. It is suspected that the reaction of investors to interim figures and actual audited figures will not be the same.

Figure 1: Cumulative average abnormal return

Week relative to annual earnings announcement
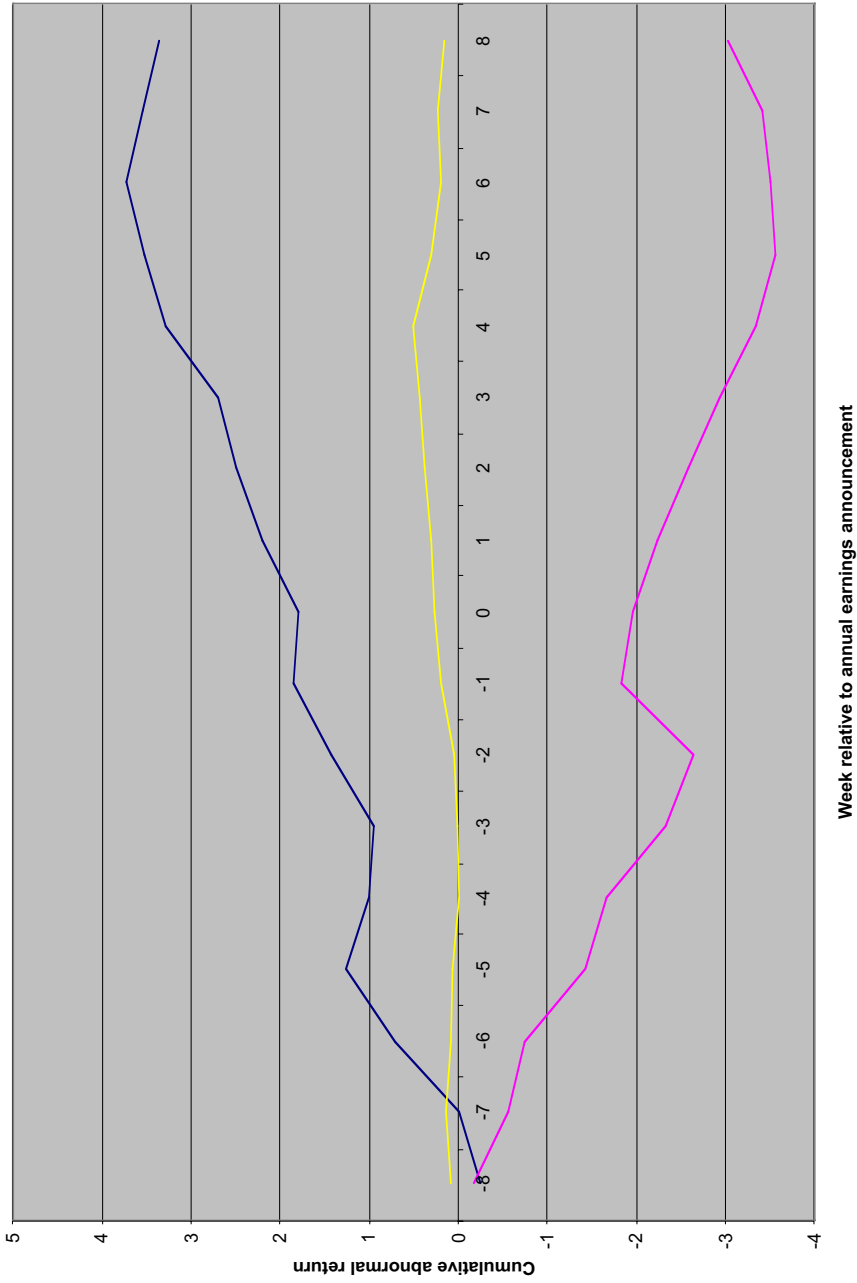
The use of inflation expectation measure

The measurement of good news and bad news has been done on the basis of inflation expectations. The usual measure used is earnings expectation. Under the present circumstances, with no available expected earnings data, inflation expectation is used as a good proxy for earnings expectation.

The massive capitalization of AGC

The large capitalization of AGC (about 75% of market capitalization) should not cause theoretical concerns. It may, however, cause statistical problems.

Statistical insignificance of some stock betas

Some stocks show statistically insignificant estimated betas. Such stocks may indicate a misspecification of the return generating process. It would have been more appropriate to eliminate these stocks from the CAR analysis. However, because of the limited number of listed stocks, excluding such stocks would have decreased the amount of data substantially and made the study unrealistic. All these stocks are therefore included in the CAR analysis and would consequently affect the analysis.

5. Summary of results and conclusions

The study is based on two main objectives: assessing the asset pricing characteristics of the GSM and analysing the response of the market to full-year earnings announcements.

Using monthly data the study establishes that 3 out of the 16 firms studied have systematic risk greater than the market beta. Eight have positive systematic risk significantly lower than the market beta and five have negative betas. There is no clear-cut pattern in the systematic risk values, even for stocks within the same industry.

The CAR analysis using weekly data shows that the GSM generally responds to annual earnings announcements. The market picks up signals of impending annual earnings announcements and responds to both good news and bad news. The study shows, however, that the market continues to respond to both types of news, which is inconsistent with the efficient market hypothesis.

In conclusion, the GSM is composed more of stocks whose systematic risk is lower than the market risk. There is considerable variation in systematic risk of firms within the same industry. The regression results explain only about 30% of the relationship between the returns of the stocks and the market returns.

6. Policy recommendations from study

Policy recommendations in several areas can be drawn from our study:

- Provide incentives for research in investment analysis: The government investment code must provide substantial incentives for research by investment companies. Investment analysis is highly technical and requires considerable expenditure on research.

  Policy incentives such as research tax breaks will help investment managers to do the kind of research needed to maximize the return on investors' funds given any level of risk. This kind of incentive-linking investment analysis is likely to bring more investors onto the Ghana Stock Market.

  For example, through such research analysis, investment managers will be able to identify mispriced assets and reconstruct their portfolios accordingly to maximize returns on their investments.

- Coordinate information dissemination by the GSM: The present system by which the GSM announces information during trading does not seem adequate. The GSM must find a wider information network through which to disseminate stock market information. The GSM must work in conjunction with the brokerage houses, the print media, and the audio and visual media for faster dissemination of stock market information such as earnings and dividend information for investors. A well coordinated dissemination programme will substantially improve the efficiency of the GSM and bring in more investors.

- Provide incentives for market information dissemination: The government must encourage the private print media, the radio, and other media through some kind of incentive, such as tax breaks, to carry stock market and other capital market reports. Such encouragement will substantially help improve information dissemination and market efficiency.

- Ensure timeliness of the release of public information: The GSM must insist on the timely release of accurate and quality information to foster public and investor confidence and improve market efficiency.

References

Archer, S.H., G. Choate, Marc, G. Racette. 1983. *Financial Management,* 2nd edition, John Wiley & Sons. New York: USA.

Asquith, P., and D.W. Mullins. 1983. "The impact of initiating dividend payments on shareholders' wealth". *The Journal of Business*: pp.77–96.

Beaver, W.H. 1968. "The information content of annual earnings announcements". Empirical Research in Accounting: Selected Studies, *Supplement to Journal of Accounting Research*: pp. 67–92.

Beaver, W.H., P. Kettler, and M. Scholes. 1970. "The association between market-determined and accounting-determined risk measures". *The Accounting Review*: pp.654–682..

Bildersee, J.S. 1975. "The association between a market determined measure of risk and alternative measures of risk". *The Accounting Review*: pp.81–98.

Black, F. 1972. "Capital market equilibrium with restricted borrowing". *The Journal of Business*: pp.444–455.

Brickley, J.A. 1983. "Shareholder wealth, information signalling and the specially designated dividend". *Journal of Financial Economics*: pp.187–209.

Chambers, A.E. and S.H. Penman. 1984. "Timeliness of reporting and the stock price reaction to earnings announcements". *Journal of Accounting Research*: pp.21–47.

Clinch, G. and N.A. Sinclair. 1984. "Intra-industry information transfers associated with earnings releases: A recursive systems approach". *Working Paper*. Monash University: Australia.

Demirguc-Kunt, A. and R. Levime Ross. 1993. "Stock market development and financial intermediary growth: A research agenda". *Working Paper* No.1159: The World Bank.

Dielman, T.E., and H.R. Oppenheimer. 1984. "An examination of investor behaviour during periods of large dividend changes". *Journal of Financial and Quantitative Analysis*. pp.197–216.

Dimson, E. 1979. "Risk measurement when shares are subject to infrequent trading". *Journal of Financial Economics*: pp.197–226.

Foster, G. 1986. *Financial Statement Analysis*, 2nd edition, Prentice Hall International Editions. Englewood Cliffs: New Jersey: USA.

Grant, E.B. 1980. "Market implications of differential amounts of interim information". *Journal of Accounting Research*. pp.255–268.

Hochman, S. 1983. "The beta coefficient: An instrumental variables approach". In *Research in Finance*, Vol.4:4. Greenwich, Cann.: JAI Press.

Howe, J.S. and K. Kelm. 1987. "The stock price impacts of overseas listings". *Financial Management:* pp 51–56.

Korajczyk, R.A. 1995. A Measure of Stock MarketIntegration. Paper Presented at World Bank Conference, February 16 & 17, 1995.

Kross, W. and D.A. Schroeder. 1984. "An empirical investigation of the effect of quarterly earnings announcement timing on stock returns". *Journal of Accounting Research*. pp.153–176.

Litzenbergen, R.H. and K. Ramaswany. 1979. "The effect of personal personal taxes and dividends on capital asset prices: Theory and empirical evidence". *Journal of Financial Economics*.pp.163–195.

Maingot, M. 1984. "The information content of UK annual earnings announcements: A note". *Accounting and Finance*. pp.51–58.

MacKinlay, A. C. 1997. "Event studies in economics and finance". *Journal of Economic Literature* Vol.XXXV pp.13-39

Morse, D. 1981. "Price and trading volume reaction surrounding earnings announcements: A closer examination". *Journal of Accounting Research*. pp.374–383.

Osei, K. A. 1996. " Analysis of factors affecting the development of an emerging capital market:The case of the Ghana stock market". *AERC Research Paper 76*. Nairobi: Kenya.

Patell, J.M. and M.A. Wolfson. 1984. "The intraday speed of adjustment of stock prices to earnings and dividend announcements". *Journal of Financial Economics*. North-Holland Publishing Company, Amsterdam:pp. 223–252.

Pearson, G. Bird, Ron; R. Brown and H. Peter. 1990. *Business Finance.* McGraw-Hill Book Company, Sydney, Australia. 5th Edition.

Richardson, G.D. 1984. "The information content of annual earnings for large and small firms: Further empirical evidence". *Working Paper*:University of British Columbia.

Ross, S.A. 1976. "The Arbitrage Theory of Capital Asset Pricing".*Journal of Economic Theory*. pp.341–360.

Scholes, M. and J. Williams. 1977. "Estimating betas from non synchronous data". *Journal of Financial Economics*. pp.309–327.

Sharpe, W.F. 1964. "Capital asset arices: A theory of market equilibrium under conditions of ris<u>k</u>". *Journal of Finance*. pp. 425–442.

Thompson, D.J. 1976. "Sources of systematic risk in common stocks". *The Journal of Business.* pp.173–188.

West, R.R. 1975. "On the difference between internal and external market efficiency", *Financial Analyst Journal*. pp.30–34.

Appendix A: Descriptive statistics of company stock returns

Stock	Mean	Maximum	Minimum	Stdev.
ABL	.0097	1.985075	-.583333	.137126
AGC	.0004	.17757	-.072	.025281
CFAO	.0036	.33333	-.214286	.068641
EIC	.0045	.337349	-.18	.037339
FML	.0107	.307692	-.184783	.058433
GGL	.0080	.392857	-.230769	.060374
HFC	.0041	.154545	-.133858	.031074
KBL	.0063	.3391	-.117647	.038516
MGL	.0062	.344262	-.173913	.035787
MLC	.0088	.363636	-.119048	.053851
MOGL	.0099	.170732	-.253731	.046488
PTC	.0039	1.25	-.8	.100096
PZ	.0048	.346457	-.423077	.05085
SCB	.0097	.217993	-.092593	.032793
SPPC	-.0013	.140187	-.167702	.030541
UNIL	.0014	.238462	-.802198	.056456

Source: Calculated from stock market trading data.

Appendix B: Ghana inflation figures

Year	T-bill (%)	G CPI (%)	G GDP (%)
1990	21.78	37.2	3.4
1991	29.23	18.1	5.3
1992	19.38	10.0	3.9
1993	30.95	24.9	5.0
1994	27.72	24.9	3.8
1995	35.38	74.3	4.5
1996	45.00	45.0	4.1
1997	45.00	32.6	-

Source : IMF statistics.

Appendix C: Real growth in earnings of companies listed on the GSME (%)

Note: 0%–5% = no news; >5% = good news; negative = bad news

COMPANY	1991	1992	1993	1994	1995	1996	1997
ABL		-12.36	24.85	-41.85	-77.22	39.71	116.82
AGC					-8.21	-34.94	11.47
CFAO			475.35	-60.06	20.72	-87.56	-68.69
EIC			-22.24	39.51	-28.93	-21.46	33.21
FML			-16.01	1.31	-72.44	124.52	26.38
GGL			-14.76	105.23	31.02	34.86	10.28
HFC						88.48	12.58
KBL			36.13	16.14	-34.08	40.66	-1.32
MGL		-40.09	36.68	89.81	-45.47	-38.58	
MLC					119.56	72.29	29.28
MOGL			37.89	16.75	-46.72	107.31	105.82
PTC			-43.64	25.37	3.77	-4.47	40.00
PZ		122.49	-43.02	154.40	27.59	7.17	
SCB			92.26	40.81	13.49	11.71	31.24
SPPC			4.99	-244.53	116.85	-27.26	
UNIL			192.36	9.51	-8.68	-7.50	-17.70

Source : Calculated from Table 1 and inflation figures.

Appendix D: Sectoral division of GSM listed stocks

1. **Food, beverages and tobacco**
   Accra Brewery Ltd. (ABL)
   Guinness Ghana Ltd. (GGL)
   Kumasi Brewery Ltd. (KBL)
   Fan Milk Gh. Ltd. (FML)
   Pioneer Tobacco Ltd. (PTC)

2. **Financial institutions**
   Standard Chartered Bank (SCB)
   Home Finance Co. (HFC)
   Enterprise Insurance Co. (EIC)

3. **Manufacturing**
   Metalloplastica Gh Ltd. (MGL)
   Super Paper Products Co (SPPC)
   Peterson Zochonis (PZ)
   Unilever (UNIL)

4. **Retail**
   CFAO
   Mechanical Lloyd (MLC)
   Mobil Oil Gh Ltd. (MOGL)

5. **Mining**
   Ashanti Goldfields Corporation (AGC)

Appendix E: Estimation of abnormal returns using weekly value weighted returns

COMPANY	α_i	$SE(\alpha_i)$	$t(\alpha_i)$	(β_i)	$SE(\beta_i)$	$t(\beta_i)$	$R^2 - bar$	DW	OBS
ABL	.7568	1.0789	.7014	.6451	.3566	1.8092	.0088	2.0032	225
AGC	-.09214	.0368	-2.5061	1.1334	.0162	70.1171	.9796	1.9871	106
CFAO	.1015	.78596	.1291	.6223	.2300	2.7060	.1322	2.0007	178
EIC	.2091	.42306	.4943	.1839	.1115	1.6487	.1136	1.9935	178
FML	.14927	.39849	.3746	.2593	.1284	2.0192	.1968	1.9962	185
GGL	.38393	.37413	1.0262	.5460	.1497	3.6483	.1235	2.0071	180
HFC	.33079	.2514	1.3157	-.0250	.2009	-.1246	.0507	2.0104	79
KBL	.41127	.25753	1.597	.1194	.1096	1.0900	-.0039	1.9961	171
MGL	.24843	.23417	1.0609	.2174	.0719	3.0239	.0536	1.9927	199
MLC	.9129	.86946	1.05	-.5791	.3404	-1.7012	.0774	1.9976	106
MOGL	.40818	.5146	.7932	.3409	.2618	1.3021	.0214	2.0302	139
PTC	.60131	.72404	.8305	1.6695	.4045	4.1275	.1257	2.0036	186
PZ	1.1	.68071	1.6186	-.0708	.1470	-.4814	.0820	2.0190	165
SCB	.64029	.25937	2.4686	.7089	.1012	7.0046	.2497	2.0090	182
SPPC	-.3509	.1511	-2.3231	.0520	.0902	.5765	.0094	2.0067	147
UNIL	.16989	.45164	.3762	.3645	.0929	3.9260	.4348	2.0032	179

Source: Regression results.

Other publications in the AERC Research Papers Series:

Structural Adjustment Programmes and the Coffee Sector in Uganda, by Germina Ssemogerere, Research
    Paper 1.
Real Interest Rates and the Mobilization of Private Savings in Africa, by F.M. Mwega, S.M. Ngola and N.
    Mwangi, Research Paper 2.
*Mobilizing Domestic Resources for Capital Formation in Ghana: The Role of Informal Financial
    Markets,* by Ernest Aryeetey and Fritz Gockel, Research Paper 3.
The Informal Financial Sector and Macroeconomic Adjustment in Malawi, by C. Chipeta and M.L.C.
    Mkandawire, Research Paper 4.
The Effects of Non-Bank Financial Intermediaries on Demand for Money in Kenya, by S.M. Ndele,
    Research Paper 5.
Exchange Rate Policy and Macroeconomic Performance in Ghana, by C.D. Jebuni, N.K. Sowa and K.S.
    Tutu, Research Paper 6.
A Macroeconomic-Demographic Model for Ethiopia, by Asmerom Kidane, Research Paper 7.
Macroeconomic Approach to External Debt: The Case of Nigeria, by S. Ibi Ajayi, Research Paper 8.
The Real Exchange Rate and Ghana's Agricultural Exports, by K. Yerfi Fosu, Research Paper 9.
The Relationship between the Formal and Informal Sectors of the Financial Market in Ghana, by E.
    Aryeetey, Research Paper 10.
Financial System Regulation, Deregulation and Savings Mobilization in Nigeria, by A. Soyibo and F.
    Adekanye, Research Paper 11.
The Savings-Investment Process in Nigeria: An Empirical Study of the Supply Side, by A. Soyibo,
    Research Paper 12.
Growth and Foreign Debt: The Ethiopian Experience, 1964–86, by B. Degefe, Research Paper 13.
Links between the Informal and Formal/Semi-Formal Financial Sectors in Malawi, by C. Chipeta and
    M.L.C. Mkandawire, Research Paper 14.
The Determinants of Fiscal Deficit and Fiscal Adjustment in Côte d'Ivoire, by O. Kouassy and B.
    Bohoun, Research Paper 15.
Small and Medium-Scale Enterprise Development in Nigeria, by D.E. Ekpenyong and M.O. Nyong,
    Research Paper 16.
The Nigerian Banking System in the Context of Policies of Financial Regulation and Deregulation, by A.
    Soyibo and F. Adekanye, Research Paper 17.
Scope, Structure and Policy Implications of Informal Financial Markets in Tanzania, by M. Hyuha, O.
    Ndanshau and J.P. Kipokola, Research Paper 18.
*European Economic Integration and the Franc Zone: The Future of the CFA Franc after 1996. Part I:
    Historical Background and a New Evaluation of Monetary Cooperation in the CFA Countries,* by
    Allechi M'Bet and Madeleine Niamkey, Research Paper 19.
Revenue Productivity Implications of Tax Reform in Tanzania by Nehemiah E. Osoro, Research Paper 20.
*The Informal and Semi-formal Sectors in Ethiopia: A Study of the Iqqub, Iddir and Savings and Credit
    Cooperatives,* by Dejene Aredo, Research Paper 21.
Inflationary Trends and Control in Ghana, by Nii K. Sowa and John K. Kwakye, Research Paper 22.
Macroeconomic Constraints and Medium-Term Growth in Kenya: A Three-Gap Analysis, by F.M.
    Mwega, N. Njuguna and K. Olewe-Ochilo, Research Paper 23.
The Foreign Exchange Market and the Dutch Auction System in Ghana, by Cletus K. Dordunoo,
    Research Paper 24.
*Exchange Rate Depreciation and the Structure of Sectoral Prices in Nigeria under an Alternative Pricing
    Regime, 1986-89,* by Olu Ajakaiye and Ode Ojowu, Research Paper 25.
Exchange Rate Depreciation, Budget Deficit and Inflation - The Nigerian Experience, by F. Egwaikhide,
    L. Chete and G. Falokun, Research Paper 26.
Trade, Payments Liberalization and Economic Performance in Ghana, by C.D. Jebuni, A.D. Oduro and
    K.A. Tutu, Research Paper 27.
Constraints to the Development and Diversification of Non-Traditional Exports in Uganda, 1981–90, by
    G. Ssemogerere and L.A. Kasekende, Research Paper 28.

Indices of Effective Exchange Rates: A Comparative Study of Ethiopia, Kenya and the Sudan, by Asmerom Kidane, Research Paper 29.

Monetary Harmonization in Southern Africa, by C. Chipeta and M.L.C. Mkandawire, Research Paper 30.

Tanzania's Trade with PTA Countries: A Special Emphasis on Non-Traditional Products, by Flora Mndeme Musonda, Research Paper 31.

Macroeconomic Adjustment, Trade and Growth: Policy Analysis Using a Macroeconomic Model of Nigeria, by C. Soludo, Research Paper 32.

Ghana: The Burden of Debt Service Payment under Structural Adjustment, by Barfour Osei, Research Paper 33.

Short-Run Macroeconomic Effects of Bank Lending Rates in Nigeria, 1987–91: A Computable General Equilibrium Analysis, by D. Olu Ajakaiye, Research Paper 34.

Capital Flight and External Debt in Nigeria, by S. Ibi Ajayi, Research Paper 35.

Institutional Reforms and the Management of Exchange Rate Policy in Nigeria, by Kassey Odubogun, Research Paper 36.

The Role of Exchange Rate and Monetary Policy in the Monetary Approach to the Balance of Payments: Evidence from Malawi, by Exley B.D. Silumbu, Research Paper 37.

Tax Reforms in Tanzania: Motivations, Directions and Implications, by Nehemiah E. Osoro, Research Paper 38.

Money Supply Mechanisms in Nigeria, 1970-88, by Oluremi Ogun and Adeola Adenikinju, Research Paper 39.

Profiles and Determinants of Nigeria's Balance of Payments: The Current Account Component, 1950-88, by Joe U. Umo and Tayo Fakiyesi, Research Paper 40.

Empirical Studies of Nigeria's Foreign Exchange Parallel Market I: Price Behaviour and Rate Determination, by Melvin D. Ayogu, Research Paper 41.

The Effects of Exchange Rate Policy on Cameroon's Agricultural Competitiveness, by Aloysius Ajab Amin, Research Paper 42.

Policy Consistency and Inflation in Ghana, by Nii Kwaku Sowa, Research Paper 43.

Fiscal Operations in a Depressed Economy: Nigeria, 1960–90, by Akpan H. Ekpo and John E. U. Ndebbio, Research Paper 44.

Foreign Exchange Bureaus in the Economy of Ghana, by Kofi A. Osei, Research Paper 45.

The Balance of Payments as a Monetary Phenomenon: An Econometric Study of Zimbabwe's Experience, by Rogers Dhliwayo, Research Paper 46.

Taxation of Financial Assets and Capital Market Development in Nigeria, by Eno L. Inanga and Chidozie Emenuga, Research Paper 47.

The Transmission of Savings to Investment in Nigeria, by Adedoyin Soyibo, Research Paper 48.

A Statistical Analysis of Foreign Exchange Rate Behaviour in Nigeria's Auction, by Genevesi O. Ogiogio, Research Paper 49.

The Behaviour of Income Velocity in Tanzania 1967–1994, by Michael O.A. Ndanshau, Research Paper 50.

Consequences and Limitations of Recent Fiscal Policy in Côte d'Ivoire, by Kouassy Oussou and Bohoun Bouabre, Research Paper 51.

Effects of Inflation on Ivorian Fiscal Variables: An Econometric Investigation, by Eugene Kouassi, Research Paper 52.

European Economic Integration and the Franc Zone: The Future of the CFA Franc after 1999, Part II, by Allechi M'Bet and Niamkey A. Madeleine, Research Paper 53.

Exchange Rate Policy and Economic Reform in Ethiopia, by Asmerom Kidane, Research Paper 54.

The Nigerian Foreign Exchange Market: Possibilities For Convergence in Exchange Rates, by P. Kassey Garba, Research Paper 55.

Mobilizing Domestic Resources for Economic Development in Nigeria: The Role of the Capital Market, by Fidelis O. Ogwumike and Davidson A. Omole, Research Paper 56.

Policy Modelling in Agriculture: Testing the Response of Agriculture to Adjustment Policies in Nigeria, by Mike Kwanashie, Abdul-Ganiyu Garba and Isaac Ajilima, Research Paper 57.

Price and Exchange Rate Dynamics in Kenya: An Empirical Investigation (1970–1993), by Njuguna S. Ndung'u, Research Paper 58.

Exchange Rate Policy and Inflation: The Case of Uganda, by Barbara Mbire, Research Paper 59.

Institutional, Traditional and Asset Pricing Characteristics of African Emerging Capital Markets, by Ino L. Inanga and Chidozie Emenuga, Research Paper 60.

Foreign Aid and Economic Performance in Tanzania, by Timothy S. Nyoni, Research Paper 61.

Public Spending, Taxation and Deficits: What is the Tanzanian Evidence? by Nehemiah Osoro, Research Paper 62.

Adjustment Programmes and Agricultural Incentives in Sudan: A Comparative Study, by Nasredin A. Hag Elamin and Elsheikh M. El Mak, Research Paper 63.

Intra-industry Trade between Members of the PTA/COMESA Regional Trading Arrangement, by Flora Mndeme Musonda, Research Paper 64.

Fiscal Operations, Money Supply and Inflation in Tanzania, by A.A.L. Kilindo, Research Paper 65.

Growth and Foreign Debt: The Ugandan Experience, by Barbara Mbire, Research Paper 66.

Productivity of the Nigerian Tax System: 1970–1990, by Ademola Ariyo, Research Paper 67.

Potentials for Diversifying Nigeria's Non-oil Exports to Non-Traditional Markets, by A. Osuntogun, C.C. Edordu and B.O. Oramah, Research Paper 68.

Empirical Studies of Nigeria's Foreign Exchange Parallel Market II: Speculative Efficiency and Noisy Trading, by Melvin Ayogu, Research Paper 69.

Effects of Budget Deficits on the Current Account Balance in Nigeria: A Simulation Exercise, by Festus O. Egwaikhide, Research Paper 70.

Bank Performance and Supervision in Nigeria: Analysing the Transition to a Deregulated Economy, by O.O. Sobodu and P.O. Akiode, Research Paper 71.

Financial Sector Reforms and Interest Rate Liberalization: The Kenya Experience by R.W. Ngugi and J.W. Kabubo, Research Paper 72.

Local Government Fiscal Operations in Nigeria, by Akpan H. Ekpo and John E.U. Ndebbio, Research Paper 73.

Tax Reform and Revenue Productivity in Ghana, by Newman Kwadwo Kusi, Research Paper 74.

Fiscal and Monetary Burden of Tanzania's Corporate Bodies: The Case of Public Enterprises, by H.P.B. Moshi, Research Paper 75.

Analysis of Factors Affecting the Development of an Emerging Capital Market: The Case of the Ghana Stock Market, by Kofi A. Osei, Research Paper 76.

Ghana: Monetary Targeting and Economic Development, by Cletus K. Dordunoo and Alex Donkor, Research Paper 77.

The Nigerian Economy: Response of Agriculture to Adjustment Policies, by Mike Kwanashie, Isaac Ajilima and Abdul-Ganiyu Garba, Research Paper 78.

Agricultural Credit Under Economic Liberalization and Islamization in Sudan, by Adam B. Elhiraika and Sayed A. Ahmed, Research Paper 79.

Study of Data Collection Procedures, by Ademola Ariyo and Adebisi Adeniran, Research Paper 80.

Tax Reform and Tax Yield in Malawi, by C. Chipeta, Research Paper 81.

Real Exchange Rate Movements and Export Growth: Nigeria, 1960–1990, by Oluremi Ogun, Research Paper 82.

Macroeconomic Implications of Demographic Changes in Kenya, by Gabriel N. Kirori and Jamshed Ali, Research Paper 83.

An Empirical Evaluation of Trade Potential in the Economic Community of West African States, by E. Olawale Ogunkola, Research Paper 84.

Cameroon's Fiscal Policy and Economic Growth, by Aloysius Ajab Amin, Research Paper 85.

Economic Liberalization and Privatization of Agricultural Marketing and Input Supply in Tanzania: A Case Study of Cashewnuts, by Ngila Mwase, Research Paper 86.

Price, Exchange Rate Volatility and Nigeria's Agricultural Trade Flows: A Dynamic Analysis, by A.A. Adubi and F. Okunmadewa, Research Paper 87.

The Impact of Interest Rate Liberalization on the Corporate Financing Strategies of Quoted Companies in Nigeria, by Davidson A. Omole and Gabriel O. Falokun, Research Paper 88.

The Impact of Government Policy on Macroeconomic Variables, by H.P.B. Moshi and A.A.L. Kilindo, Research Paper 89.

External Debt and Economic Growth in Sub-Saharan African Countries: An Econometric Study, by Milton A. Iyoha, Research Paper 90.

Determinants of Imports In Nigeria: A Dynamic Specification, by Festus O. Egwaikhide, Research Paper 91.

Macroeconomic Effects of VAT in Nigeria: A Computable General Equilibrium Analysis, by D. Olu Ajakaiye, Research Paper 92.

Exchange Rate Policy and Price Determination in Botswana, by Jacob K. Atta, Keith R. Jefferis, Ita Mannathoko and Pelani Siwawa-Ndai, Research Paper 93.

Monetary and Exchange Rate Policy in Kenya, by Njuguna S. Ndung'u, Research Paper 94.

Health Seeking Behaviour in the Reform Process for Rural Households: The Case of Mwea Division, Kirinyaga District, Kenya, by Rose Ngugi, Research Paper 95.

Trade Liberalization and Economic Performance of Cameroon and Gabon, by Ernest Bamou, Research Paper 97.

Quality Jobs or Mass Employment, by Kwabia Boateng, Research Paper 98.

Real Exchange Rate Price and Agricultural Supply Response in Ethiopia: The Case of Perennial Crops, by Asmerom Kidane, Research Paper 99.

Determinants of Private Investment Behaviour in Ghana, by Yaw Asante, Research Paper 100.

An Analysis of the Implementation and Stability of Nigerian Agricultural Policies, 1970–1993, by P. Kassey Garba, Research Paper 101.

Poverty, Growth and Inequality in Nigeria: A Case Study, by Ben E. Aigbokhan, Research Paper 102.

The Effect of Export Earnings Fluctuations on Capital Formation in Nigeria, by Godwin Akpokodje, Research Paper 103.

Nigeria: Towards an Optimal Macroeconomic Management of Public Capital, by Melvin D. Ayogu, Research Paper 104.

International Stock Market Linkages in Southern Africa, by K.R. Jefferis, C.C. Okeahalam and T.T. Matome, Research Paper 105.

An Empirical Analysis of Interest Rate Spread in Kenya, by Rose W. Ngugi, Research Paper 106

The Parallel Foreign Exchange Market and Macroeconomic Performance in Ethiopia, by Derrese Degefa, Research Paper 107.

Market Structure, Liberalization and Performance in the Malawian Banking Industry, by Ephraim W. Chirwa, Research Paper 108.

Liberalization of the Foreign Exchange Market in Kenya and the Short-Term Capital Flows Problem, by Njuguna S. Ndung'u, Research Paper 109.

External Aid Inflows and the Real Exchange Rate in Ghana, by Harry A. Sackey, Research Paper 110.

Formal and Informal Institutions' Lending Policies and Access to Credit by Small-Scale Enterprises in Kenya: An Empirical Assessment, by Rosemary Atieno, Research Paper 111.

Financial Sector Reforms, Macroeconomic Instability and the Order of Economic Liberalization: The Evidence From Nigeria, by Sylvanus I. Ikhide and Abayomi A. Alawode, Research Paper 112.

The Second Economy and Tax Yield in Malawi, by C. Chipeta, Research Paper 113.

Promoting Export Diversification in Cameroon: Toward Which Products, by Lydie T. Bamou, Research Paper 114.