KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, COLLEGE OF ARTS AND SOCIAL SCIENCES.

TOPIC:

STOCK PRICING, RISK AND RETURN OF COMPANIES ON THE GHANA STOCK EXCHANGE: AN EXAMINATION.

BY

ANNAN EBENEZER MENSAH
(BBA ACCOUNTING AND FINANCE)

A THESIS SUBMITTED TO THE DEPARTMENT OF ACCOUNTING AND FINANCE, KNUST SCHOOL OF BUSINESS, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PHILOSOPHY IN FINANCE.

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CERTIFICATION

This is to certify that the thesis report entitled **"STOCK PRICING, RISK AND RETURN OF COMPANIES ON THE GHANA STOCK EXCHANGE: AN EXAMINATION"** is a property and work done by ANNAN EBENEZER MENSAH and submitted in partial fulfilment of the requirement for the award of Master of Philosophy in Finance, Kwame Nkrumah University of Science and Technology, School of Business.

ANNAN EBENEZER MENSAH
(PG1656707)

....   30 – 06 – 09
Student Name and ID   Signature   ....
                                                                                                  Date

Certified By:

PROF. YAW AGYEMAN BADU

....
Supervisor's Name   Signature   Date

MR. J.M. FRIMPONG

....   20 – 10 – 09
Head of Department Name   Signature   ....
                                                                                                  Date

DECLARATION

I, Annan Ebenezer Mensah hereby declare that this submission is my own work towards MPhil. in Finance and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

ANNAN EBENEZER MENSAH
(PG1656707)
.... 30 -06-09
....
Student Name and ID   Signature   Date

Certified By:

PROF. YAW AGYEMAN BADU
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....
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I finally appreciate the effort of all my friends and loved ones including you.

DEDICATION

I dedicate this work to God Almighty for His Love and mercy which has seen me through this program. My next dedication goes to my mum for her love and support and the entire Annan family. Finally to my friends Willy, Effah, Dennis, Kisembe family, Osae family, Fayol, Abla and all my loved ones including you.

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ABSTRACT

The study looked at the relationship between stock pricing, risk and return of companies on the Ghana Stock Exchange. The CAPM model was used to calculate the expected returns of the listed stocks or shares. These returns were plotted on the Security Market Line to determine over priced, under priced and correctly priced stocks on GSE for ten years. It was discovered that there were under and over pricing of shares on the Ghana Stock Exchange for the ten year period. Again, the beta of a share impacts its returns. Therefore defensive shares with lower beta yielded lower returns and aggressive shares with beta greater than one yielded higher returns. Statistically, it was also proven that there exists a negative relationship between the price of a stock and returns of a company but a positive relationship exists between the systematic risk (beta) and the returns of shares of companies on the Ghana Stock Exchange.

CHAPTER ONE
GENERAL INTRODUCTION

1.0 INTRODUCTION

Capital markets have become an integral part of the economies of all countries which Ghana is of no exception and for that matter the Ghana Stock Exchange. Ghana is a West African country which shares boundaries with Burkina Faso to the North, Togo to the East, Cote D'ivoire to the West and Gulf of Guinea to the south on the African map. It is worth noting that the immense contributions stock exchanges offer to business operations over the world have necessitated its establishment in most developing countries including Ghana. The Ghana Stock Exchange (GSE) was established in 1989 almost two decades ago. It is a private company which is non-profit maximizing but receives government support.

Besides, the exchange trades in financial securities such as stocks or shares, bonds, debentures and others. Stock pricing, one of the fundamental activities of an exchange is the value of a listed company's share at a particular period. The manner in which stocks are priced and their performance in capital markets have also attracted the attention of researchers for long. As investors are concerned, does the pricing of stock give considerable returns to compensate the amount of risk taken and does the pricing affect the performance of the listed stocks? These questions and reasoning have necessitated a study on examining stock pricing, risk and return of listed stocks on the Ghana Stock Exchange.

The introductory chapter of this study examines the background of the study, problem statement, research questions, research objectives, methodology, scope, and significance of the study, limitations of the study and organization of the subsequent

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chapters. The terms *stock* and *share* as financial securities were used interchangeably for the purpose of this study.

1.1 BACKGROUND OF THE STUDY

Sourcing out for funds to finance business activities (Business finance), particularly for long term projects is a problem that confronts many aspiring business operators and organizations for purposes of capitalization within Ghana in particular, and the world in general. Financial institutions such as banks are often not prepared to commit funds into long-term projects. Banks are more interested in short-term projects with high profit potential. For this reason many companies, other forms of business ownership and financial institutions themselves rely on equity shares (stocks) and debentures (debts) to finance long term projects. It is sometimes possible to raise funds from friends and relatives to operate a business. However, the uncertainty associated with these last two sources make them very unreliable and therefore cannot guarantee a stable business operation.

The need for a stable and a reliable source of business finance makes stock exchange an important financial institution. Unfortunately, in spite of the immense contributions a stock exchange offers to business operations, its impact has not caught on well with many developing economies. It is for this reason that many developing economies do not have stock exchanges. It was only in 1989 almost two decades that Ghana established a stock exchange. The Ghana stock exchange is a private company which is non-profit maximizing but receives government support. At the beginning of 1990, there were only four stock exchanges in Africa. These were Ghana, Zimbabwe, Kenya and Nigeria.

1.1.1 MEANING OF STOCK EXCHANGE

According to Nickels *et. al* (2000), stock exchange is a market through which the securities (shares and bonds) of public companies are traded. They also added that a stock certificate is a tangible evidence of stock ownership. A stock exchange is a capital market for trading in long-term funds or capital. It is an organized financial institution that serves as a vehicle for mobilization of capital funds for growth and development; this is made possible through the issue of securities (stocks) to the general public. The exchange neither buys sells nor sets the price of its securities. The stock exchange merely provides a market- place where buyers and sellers of security meet to transact business. Individuals, organizations, and the government with idle funds may buy shares of other companies and become co-owners of companies. It is also a secondary market where already issued securities are bought and sold by members (Bodie, *et. al*, 2000). Sometimes it may become necessary for shareholders to dispose off their shares in a particular company and re-invest the same in another company or in some other project.

It must be mentioned, however, that it is not easy to get interested buyers to buy shares one wants to sell. It is in this direction that the importance of a stock exchange becomes evident. A stock exchange serves as a vital link between sellers and buyers of securities. Through the activities of the stock exchange, individuals, organizations, and the government with investible capital needs and those with idle savings to invest are brought together on the same floor of a stock exchange to transact business. This boosts business activities and leads to expansion in the economy thereby increasing employment rate as well as income, goods and services, etc.

1.1.2 STOCK EXCHANGE TRADED FINANCIAL SECURITIES

The significance of issuing and owning stocks for the purposes of capitalization and returns to a company and a stockholder respectively cannot be underestimated. That is, the company in question derives equity capital from stockholder(s) whereas the stockholder(s) also benefit(s) from the corporation's profit. This project therefore seeks to examine the pricing of stock (over or under pricing), its effect on the performance of the stocks of listed companies.

There are two major types of stock. These are common and preferred stocks. *Common stock,* also known as ordinary shares or common shares grant the holder a proportion of the company's dividends and voting rights. Shares that are traded and bought by retail investors are usually shares of common stock. This kind of stock reflects the basic ownership of the company and is subordinate in claims to preferred shares and other dilutive securities. This is because by purchasing a common stock, one is effectively an owner of the company which makes an investor a servant to other investors who have a claim on the company through debt or derivatives.

Preferred stock on the other hand, is a special stock sold to particular institutions or individuals that grant the holder priority over common stock holders in terms of dividends and bankruptcy claims. The drawback is that preferred stocks usually have no voting rights. The price of preferred stock in a company will usually differ from the price of common stock; a reflection of its different rights and privileges. However, common stock or ordinary share was the main area of concentration of this study.

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1.1.3 GHANA STOCK EXCHANGE- HISTORY

The idea to operate a stock exchange in Ghana occurred as far as back 1961 when the Convention People's Party (CPP) invited the British expert, Professor Lawrence C B Gower to assist in the preparation of the Companies Code. Gower stated in the Companies Code 1963 (Act 179) the need to establish a stock exchange, but the idea was shelved. Subsequent governments from the CPP, National Liberation Council (NLC), Progress Party (PP), National Redemption Council (NRC), Supreme Military Council (SMC), Armed Forces Revolutionary Council (AFRC) to the People's National Party (PNP) made successful attempts to establish a stock exchange. In spite of the unsuccessful attempts, the importance of a stock exchange was genuinely acknowledged by all the succeeding governments through the setting up of a number of committees to consider its establishment.

To consolidate the gains of the various committees set up by the past governments, a two-man committee was set up in 1986. It was under the chairmanship of Mr. J. S. Addo who was the Governor of the Bank of Ghana. The two-man committee was mandated to study the various reports submitted by the past committees on the establishment of stock exchange in Ghana. Consequently, the committee modified the various reports from the various committees under the succeeding regimes. In 1986, a nine-member committee was set up by the then Secretary for Finance and Economic Planning. This committee, under the chairmanship of Dr. G. K. Agama, who had then taken over as the Governor of the Bank of Ghana after the resignation of Mr. Addo was to consolidate the gains of all the previous committees. The final outcome of this committee was the establishment of the Accra Stock Exchange. The

Accra Stock Exchange led to the formation of a company on 25th July, 1989 called the Ghana Stock Exchange (GSE) which stated operations on 12th November, 1990.

The GSE is modeled along the British style. For this reason, the GSE has many of the characteristics like that of the British Stock Exchange. Buying shares on the stock exchange means investing your money in a company, which the stock exchange has approved for that purpose. During its inception, among the approved companies for which Ghanaians (other investors) could buy shares were Accra Brewery Ltd., CFAO, Enterprise Insurance Ltd., Fan Milk, Guinness Ghana Ltd., Kumasi Brewery Ltd, Metalloplastica Ltd., Mobil Oil Ltd., Pioneer Tobacco Ltd., PZ, SOQA, Supper Paper Product Ltd., Unilever, UTC, Ashanti Goldfields Ltd., and the Ghana Commercial Bank Ltd. People buy shares from companies whose shares increase in value and bring in more profits.

However, in recent years, its membership has grown to include more companies. It has thirty-five trading companies which include ABL, AGC, AADA, ALW, BAT, CFAO, CLYD, CPC, EIC,FML, GBL, GCB, GGL, HFC, MGL, MLC, MOGL, PAF, PBC, PZ, SCB, SPPC, SSB, SWL, TBL, UNIL, AGA, GGBL, CMLT, SPL, BOPP, CAL, GWEB, EDC and Golden Star. These listed and trading companies on the exchange formed the population of the study.

1.1.4 STOCK PRICING AND RETURNS

Stock pricing, risk and returns assessment has been a basic activity of stock exchanges over the world which the Ghana Stock Exchange is of no exception. As

companies go public for the purposes of increasing their capitalization, shareholders who are the investors and for that matter the owners of a company are particularly interested in maximizing the returns of their investment. In a manner of a contractual relationship, the companies exploit these funds promising an equivalent returns in the form of dividends to the shareholders.

Investors being rational always except to be compensated for the risk of investing their funds through the purchasing of stocks or shares of listed companies. According to the portfolio theory (Markowitz, 1952), investors require a higher return from the market portfolio than from risk free return investments. Hence, the relationship between risk and return in the stock markets has been one of the most investigated topics in financial economics. Although the risk-return relationship is of fundamental importance in an economy, the empirical asset pricing literature has not yet reached an agreement on the existence of such a positive risk-return trade off for stock market indices.

It is therefore evidenced that whenever the risk free rate is greater than the returns given to the shareholders in an economy within a particular period, then shareholders have not been compensated properly for the risk taken. It can therefore be concluded that their investment is not performing in terms of returns either in the form of capital gain or dividend yield. According to Brigham and Ehrhardt (2008), the phrases "outperformed the market" or beat the market are often used regarding performance. This can unfortunately be misleading when comparing a stock's (or portfolio's) return to the market return. In addition two considerations are omitted: (1) what is the appropriate market or benchmark and (2) risk. The most important question is

whether the returns on stock's performance are sufficient to justify additional risk? It is therefore against this background that the researcher is motivated to examine stock pricing, risk and return of listed companies on the Ghana Stock Exchange.

1.2 PROBLEM STATEMENT

In Ghana, the stock exchange has become an engine and major source of fund for most business operations. Moreover, as investors on the exchange require to be adequately compensated for the risk of investing in stocks; stock pricing which influences returns is paramount and therefore mispricing of stocks has become a challenge. The major questions are to find out how the stocks are priced and does the manner in which stocks are priced adequately compensate shareholders risk? To find answers to these questions, this study attempts to examine stock pricing, risk and return of listed stocks on the Ghana Stock Exchange.

1.3 RESEARCH QUESTIONS

The following questions were raised by the researcher to assist in achieving the objectives of this research.

a) Are the prices of stocks or shares on the GSE over or under valued?

b) Which stocks or shares on the Ghana Stock Exchange are riskier?

c) Is there any relationship between stock pricing, risk and returns?

1.4 RESEARCH OBJECTIVES

The objectives for undertaking this research include the following: to;

a) Study the over and undervalued or priced stocks or shares of companies listed on the Ghana Stock Exchange.

b) Find out listed companies with riskier securities and their Beta ranking on the Ghana Stock Exchange.

c) Examine the relationship between the risk and return and stock pricing and return of the companies on the Ghana Stock Exchange.

1.5 METHODOLOGY

Purposive sampling technique was used to select the number of shares or stocks for the study out of the listed stocks on the Ghana Stock Exchange. Eighteen (18) stocks or shares were selected based on the time frame and access to data on dividend per share and share prices. Historical data on stock prices of listed companies and dividend per share from the registrars of the Ghana Stock Exchange were also obtained. Annual share prices and dividend were used for the necessary analysis.

The financial model known as Capital Asset Pricing Model (CAPM) was used with the Security Market Line (SML) to determine shareholders expected return on their investment compared to the returns on their stocks or shares. Finally, regression analysis was used to determine the relationship between risk and return, stock pricing and performance in terms of returns to shareholders. Detailed explanations of these are given in chapter three of this study.

Even though it has been mentioned earlier that there were thirty-five (35) trading shares or stocks on the exchange, selected stocks from the total were used in the study. The selection was based on a time frame of ten years and access to data on the listed shares. This was significant to obtain a meaningful representation of the total population for the study.

1.6 SIGNIFICANCE OF THE STUDY

Examining stock pricing, risk and return of listed stocks on the Ghana Stock Exchange (GSE) is vital in many respects. These include its relevance to industry, academicians, investors and the nation as a whole. This study gives information on the performance of the various stocks listed on the Ghana stock market. It also informs and educates investors on how best to manage their investment at the exchange.

Since investment decisions are very difficult to come by, this research provides certain vital information to investors concerning share pricing and returns, and a guiding principle on when to buy or sell their investments. Also, the study offers a fair understanding and knowledge on how to hold portfolio of stocks or shares to maximize returns in a competitive environment.

This study creates awareness of investment opportunities on the GSE and encourages the general public to participate in the activities of the exchange. It again contributes to knowledge on stock pricing, risk and returns.

1.7 SCOPE OF THE STUDY

There are stock exchanges in Africa and the world at large trading in different stocks but this study was limited to the Ghana Stock Exchange situated in Accra, the capital of Ghana. The exchange trades in GSE All-Share Index and was established in July 1989. The Ghana Stock Exchange can be located at the Cedi house 4th and 5th floors. Currently, there are thirty-five (35) trading shares or stocks on the exchange.

1.8 LIMITATION OF THE STUDY

The major challenge that limited this study is gaining access to data. The scope of this study was initially planned to include all traded companies on the Ghana Stock Exchange for a period of ten years. Unfortunately, most of the listed companies do not have data for the ten-year period considered to be included in the study. Additionally, gaining the actual data for analysis on the stock prices and the dividend per share from the GSE and the registries was a challenge. Among the four registrars, some do not keep records of dividend per share of the listed companies under their registry. It therefore took the researcher more than two months to obtain few raw data from some registrars. This led to a selection of eighteen (18) listed companies as the sample size of the study.

Finally, the cost of obtaining data for the purpose and analysis to be completed posed a major threat to the success of this study. Despite these challenges, the researcher efficiently handled every aspect of this project to a successful completion as scheduled.

1.9 ORGANIZATION OF CHAPTERS

The study was grouped into five distinct chapters. Chapter one of the study was a general introduction on the research topic narrowed to Ghana. It also comprised the background of the study, problem statement, research questions and objectives, methodology, significance of the study, the scope and limitation of the study and finally the organization of subsequent chapters.

Chapter two was the literature review. This was a review of related literature from primary, secondary and tertiary sources on the subject under study. Articles, presentations, conference papers and other publications on stock pricing, risk and return formed part of this review.

Chapter three continued with the methodology. The major issues discussed under this chapter were the study area, study population, sampling methods and techniques, sources of data and the data analysis techniques. The financial models and statistical tools used for the analysis were also mentioned as part of the methodology.

Data analysis and discussion was the chapter four and this was where the actual study was done. Major issues discussed include data presentation, calculations, interpretations and regression analysis. Moreover, all the models mentioned in the methodology such as the CAPM and SML, were used on the raw data of stock prices and dividend per share, and Treasury bill rates (risk free rate) in Ghana.

Chapter five presents the summary of the major findings of the research, conclusions and recommendation.

CHAPTER TWO
LITERATURE REVIEW

2.0 INTRODUCTION

There have been extensive research findings on stock pricing, risk and return by most researchers in the forms including articles, publications, conference papers, etc. However, this study revealed some of these literatures. The literature review of this study therefore includes the following: definition of stock, determinants of stock pricing, stock risk and return and stock pricing models and returns.

2.1 DEFINITION OF STOCK

The capital raised by a corporation through the issue of shares entitling holders to an ownership interest (equity); "he owns a controlling share of the company's stock". A stock is defined as a security that represents ownership in a publicly traded company. Each of these shares denotes a part ownership for a shareowner or shareholder of that company. It can also be defined as ownership right in a corporation which can be bought and sold.

2.2 DETERMINANTS OF STOCK PRICING

Share prices are fundamentally determined by demand and supply. In stock market terminology, demand refers to bids and supply refers to offers. All other things remaining the same, the price of a share will go up if bids for the share exceed offers. Similarly, a share's price is most likely to fall if offers exceed bids for it. Bids and offers normally change in response to changing expectations of the investing public. Other factors behind demand and supply that affect share prices are *interest rates*,

expectations of the market, the economy, performance of the listed company, major news from the listed company and investor psychology (www.gse.com.gh).

Shiller (2000) argued that stock prices in the 1990s displayed the classic features of a speculative bubble. High prices are sustained, temporarily, by investor enthusiasm rather than real fundamental factors. Investors, according to Shiller, believe it is safe to purchase stocks, not because of their intrinsic value or because of expected future dividend payments, but because they can be sold to someone else at a higher price. Simply put, stock prices are driven by a self-fulfilling prophecy based on similar beliefs of a large cross section of investors.

When looking at broad stock market price indexes, such as the Standard & Poor's 500, Shiller's argument is largely based on two premises about the historical behavior of stock prices. First, Shiller asserts that market wide price dividend and price-earnings ratios have a tendency to revert toward their historical averages. This implies that high stock price valuations are not likely to persist. Second, dividend movements are not nearly volatile enough to rationalize stock price volatility. This suggests that changes in expectations about future dividends cannot be responsible for stock price movements.

In an article presented by Wohar (2006), it was reported that before 1981, much of the finance literature viewed the present value of dividends to be the principal determinant of the level of stock prices. However, LeRoy and Porter (1981) and Shiller (1981) found that, under the assumption of a constant discount factor, stock prices were too volatile to be consistent with movements in future dividends. This

conclusion, known as the excess volatility hypothesis, argues that stock prices exhibit too much volatility to be justified by fundamental variables. Several papers (Flavin 1983; Kleidon 1986; Marsh and Merton 1986; Mankiw, Romer, and Shapiro 1991) challenged the statistical validity of the variance bounds tests of LeRoy and Porter and Shiller, on the grounds that stock prices and dividends were non stationary processes; however, much of the subsequent literature found that stock price movements could not be explained solely by dividend variability, as suggested by the present value model with constant discounting (Campbell and Shiller 1987; West 1988a).

By relaxing the assumption of constant discounting, Campbell and Shiller (1988, 1989) and Campbell (1991) attempted to break up stock price movements (returns) into the contributions of changes in expectations about future dividends and future returns. They employed a log-linear approximation of stock returns and derived a linear relationship between the log price-dividend ratio and expectations of future dividends and stock returns. They further assumed that the data- generating process of dividend growth and the log price-dividend ratio could be adequately characterized by a low-order vector auto regression (VAR). By using the VAR to forecast future dividend growth and future stock returns, they were able to decompose the variability of current stock returns into the variability of future dividend growth and future stock returns. They attributed most of the movements in stock prices to revisions in expectations about future stock returns rather than to future dividend growth. Campbell and Ammer (1993) extended the log-linear approximation and the VAR approach to an examination of bond returns as well as

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stock returns. They found that expectations of future excess returns contributed more to the volatility of stock returns than did movements in expected future dividends.

Lev and Sougiannis (1996) speculated that the excess returns reflect either stock market mispricing, or represent compensation for the extra risk associated with R&D intensive firms. A follow-up study by Lev and Sougiannis (1999) after conducting a series of tests, they concluded that the excess returns are more likely a consequence of additional risk.

Later studies (Lev, Sarath and Sougiannis, 2000; and Penman and Zhang, 2002), however, switch their focus from R&D intensity defined based on the estimated amount of R&D assets to change in R&D assets because observations suggest that it's not the absolute levels of R&D assets that affect the persistence of earnings. These papers documented evidence consistent with the hypothesis that the market is, to some extent, fixated on earnings and does not fully understand the impact of R&D accounting on earnings quality.

A conference paper presented by Chambers, Jennings and Thompson provides more compelling evidence supporting the risk explanation and they show that earnings volatility of R&D intensive firms is high, which is consistent with prior findings (see Chan, Lakonishok and Sougiannis, 2000). Recent finance literature highlights the role of technological change in increasing firm specific and total stock price volatility (Campbell et al. 2001, Shiller 2000, Pastor and Veronesi 2005). The productivity literature on market value and innovation has already established a positive relationship between a firm's market value, its R&D intensity and its citation

weighted patents (Griliches 1981; Pakes 1985; Hall 1993, Hall, Jaffe and Trajtenberg 2005).

However, the study on examining stock pricing and performance critically adopted and used the above literatures. In a summary, Shiller (2000) argued that self-fulfilling prophecy based on similar beliefs by investors affect stock pricing. In the article presented by Wohar (2006), researchers on stock pricing argued that present value of dividend is the principal determinant of stock prices. Again, Campbell and Shiller (1988, 1989) in the same article reported that stock price movements are caused by changes in expectations about future dividend and future returns. Additionally, Lev and Sougiannis (1996) also speculated that excess returns reflect either stock market mispricing or represent compensation for extra risk. Therefore excess returns are likely a consequence of additional risk. Most of these findings are based on institutions are significant to this study. These factors were therefore identified as determinants of stock pricing.

2.3 STOCK RISK AND RETURN

In a financial market, investments differ widely in their risk and return characteristics. Bank savings account offers returns immediately and has little risk while others such as shares may not offer immediate returns and have sustainable risk. In other to make sound investment decisions, it is important to have the ability to evaluate the return and risk of various investment alternatives (Mensah, 2008).

The relationship between risk and return in the stock markets has been one of the most investigated topics in financial economics. Although the risk-return relationship

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is of fundamental importance in an economy, the empirical asset pricing literature has not yet reached an agreement on the existence of such a positive risk-return trade off for stock market indices

Levy *et al.* (1995) discussed, the risk consists of two components: non-systematic and systematic. While the former can be avoided by using a diversified portfolio, the latter cannot, as it is due to the correlation of the asset's return with the returns that market provides. Higher beta is associated with bigger amount of systematic risk. Thus, CAPM implies that investors are paid for accepting higher systematic risk, not just for accepting risk as such.

The relationship between return and risk, as it is often defined by the variance or standard deviation, is a widely examined relationship in the literature of finance. According to the portfolio theory (Markowitz, 1952), investors require a higher return from the market portfolio than from risk free return investments. This market portfolio return depends on risk indicating a positive relationship. Merton (1973) shows that the conditional expected excess return on the aggregate stock market is a linear function of its conditional variance with a positive slope. French et al. (1987), Campbell (1987), Chou (1988), Chan et al. (1992), Chou, et al. (1992), Glosten et al. (1993), Harvey (1989, 2001), Bollerslev and Zhou (2005) and Ludvigson and Ng (2007) used daily data in order to examine the risk - return relationship with most of these studies to support the expected positive relationship. Bali and Peng (2006) investigated S&P 500 in the New York Stock Exchange and they found a positive and significant relation during the trading session.

There are a lot of researchers investigating intraday patterns in stock markets. One of the most interesting findings is that return, volume and volatility follow a U-shaped pattern during the trading session. Wood et al. (1985) first reported high positive returns at the beginning and at the end of the session. Especially at the end of the session, many researchers have mentioned this behaviour too [Harris (1986), McInish and Wood (1990), Lockwood and Linn (1990), Foster and Viswanathan (1993), Jang and Lee (1993), Brooks and Chiou (1995), Copeland and Jones (2000), Darrat et al. (2003)], and, for the Greek stock market, Alexakis and Xanthakis (2003) and Niarchos and Alexakis (2003)].

According to *Samuels et al.* (1999), research in both the UK and the USA shows that investors in financial securities demand higher returns from risky investments in equities than from comparatively risk – free government securities. In an article by Hasbrouck (1996), an econometric analysis of the information content of automated orders arriving at the New York Stock Exchange indicates that orders have information which is useful in predicting stock returns beyond the information contained in the reported trades. Results also indicate that program and index-arbitrage orders hold information beyond that available from the futures return and basis, which suggests that these orders do not merely passively convey common-factor information. Non-program, program and index-arbitrage orders were found to have roughly similar price impacts.

As far as it is concerned with risk - return relationship, there are a lot of papers that reported a non positive risk - return relationship but only for data based on daily observations. Harvey (1989) supports that the sign of the risk's coefficient depends

on the market trend. Chou et al. (1992), Whitelaw (1994), Lettau and Ludvigson (2004) show that the risk-return relationship may be time-varying and they suggest a risk specification problem. LeBaron (1989) refers that a negative risk - return relationship can be a result of non synchronous trading where the market is characterized by illiquidity. Bali and Peng (2006) use high frequency data and support a positive relationship. A possible explanation for the negative risk-return relationship that has been extracted from the analysis could be based on trading activity.

In view of the above literatures, it can be concluded that higher risk investors expect higher returns as compensation. However, a lot of papers reported different relationships between risk and returns based on certain factors. LeBaron (1989) stated that a negative risk - return relationship can be a result of non synchronous trading where the market is characterized by illiquidity. Bali and Peng (2006) used high frequency data and supported a positive relationship. A non positive relationship was mentioned to exist between risk and returns using daily stock prices on an exchange. This study used annual data on stock prices and returns to examine the relationship between risk and returns of shares or stocks on the Ghana Stock Exchange.

2.4 STOCK PRICING MODELS AND RETURNS

This section of the literature presents theories from articles, publications, paper presentations and others on stock pricing models and returns. In an article by James L. Davis (2001), he mentioned that any discussion of the theory of stock price behavior has to start with Markowitz (1952, 1959). The Markowitz model is a single-

period model, where an investor forms a portfolio at the beginning of the period. The investor's objective is to maximize the portfolio's expected return, subject to an acceptable level of risk (or minimize risk, subject to an acceptable expected return). The assumption of a single time period, coupled with assumptions about the investor's attitude toward risk, allows risk to be measured by the variance (or standard deviation) of the portfolio's return. Thus, as indicated by the arrow in Figure 2.4.1, the investor is trying to go as far northwest as possible.

Figure 2.4.1: Markowitz Portfolio Selection
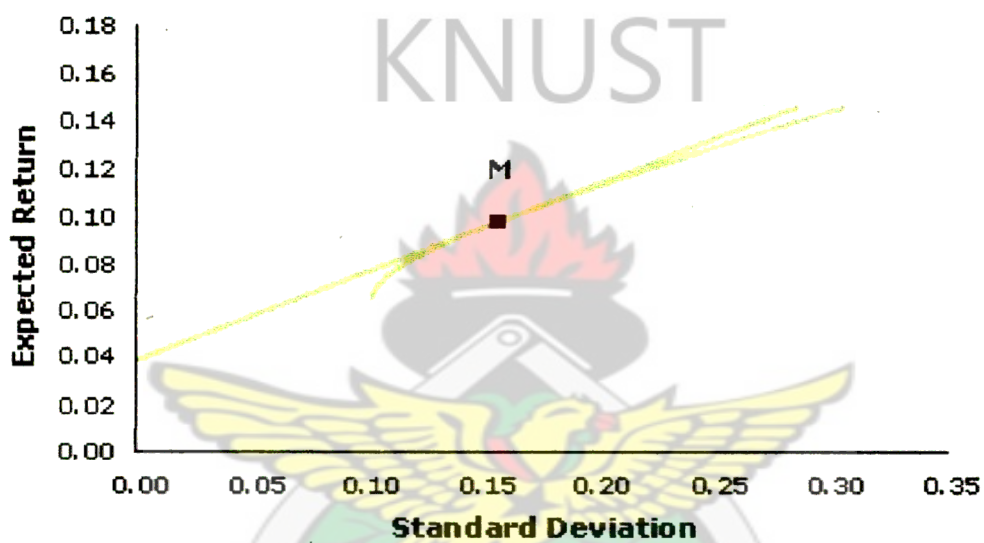
As securities are added to a portfolio, the expected return and standard deviation change in very specific ways, based on the way in which the added securities co-vary with the other securities in the portfolio. The best that an investor can do (i.e., the furthest northwest a portfolio can be) is bounded by a curve that is the upper half of a hyperbola, as shown in Figure 2.4.2. This curve is known as the efficient frontier. According to the Markowitz model, investors select portfolios along this curve, according to their tolerance for risk. An investor who can live with a lot of risk might

choose portfolio A, while a more risk-averse investor would be more likely to choose portfolio B. One of the major insights of the Markowitz model is that it is a security's expected return, coupled with how it co-varies with other securities, that determines how it is added to investor portfolios.

Figure 2.4.2: Markowitz Portfolio Selection
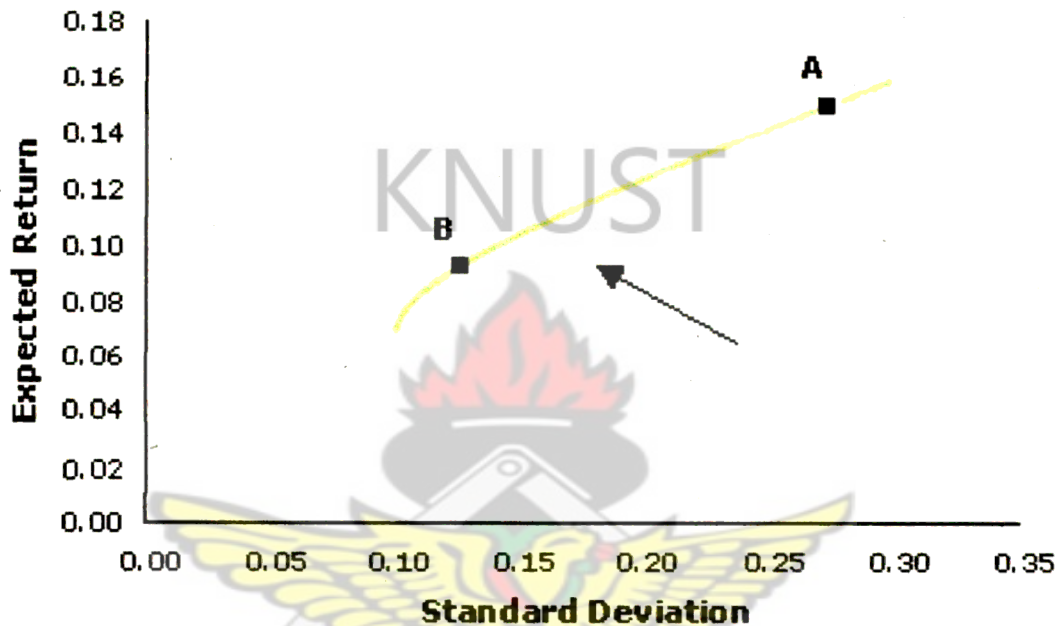
In the same article, it was presented that building on the Markowitz framework, Sharpe (1964), Lintner (1965) and Mossin (1966) independently developed what has come to be known as the Capital Asset Pricing Model (CAPM). This model assumes that investors use the logic of Markowitz in forming portfolios. It further assumes that there is an asset (the risk-free asset) that has a certain return. With a risk-free asset, the efficient frontier in Figure 2.4.2 is no longer the best that investors can do.

The straight line in Figure 2.4.1, which has the risk-free rate as its intercept and is tangent to the efficient frontier, is now the northwest boundary of the investment opportunity set. Investors choose portfolios along this line (the capital market line), which shows combinations of the risk-free asset and the risky portfolio M. In order for markets to be in equilibrium (quantity supplied = quantity demanded), the portfolio M must be the market portfolio of all risky assets. So, all investors combine the market portfolio and the risk-free asset, and the only risk that investors are paid for bearing is the risk associated with the market portfolio. This leads to the CAPM equation: **CAPM**

$$E(Rj) = Rf + \beta j \left[E(Rm) - Rf \right]$$

E(Rj) and E(Rm) are the expected returns to asset j and the market portfolio, respectively, Rf is the risk free rate, and βj is the beta coefficient for asset j. βj measures the tendency of asset j to co-vary with the market portfolio. It represents the part of the asset's risk that cannot be diversified away, and this is the risk that investors are compensated for bearing.

The CAPM equation says that the expected return of any risky asset is a linear function of its tendency to co-vary with the market portfolio. So, if the CAPM is an accurate description of the way assets are priced, this positive linear relation should be observed when average portfolio returns are compared to portfolio betas. Further, when beta is included as an explanatory variable, no other variable should be able to explain cross-sectional differences in average returns. Beta should be all that matters in a CAPM world.

Additionally, while the CAPM is a simple model that is based on sound reasoning, some of the assumptions that underlie the model are unrealistic. Some extensions of the basic CAPM were proposed that relaxed one or more of these assumptions (e.g., Black, 1972). Instead of simply extending an existing theory, Ross (1976a, 1976b) addresses this concern by developing a completely different model: the Arbitrage Pricing Theory (APT). Unlike the CAPM, which is a model of financial market equilibrium, the APT starts with the premise that arbitrage opportunities should not be present in efficient financial markets. This assumption is much less restrictive than those required to derive the CAPM. The APT starts by assuming that there are number of factors (n) which cause asset returns to systematically deviate from their expected values. The theory does not specify how large the number n is, nor does it identify the factors. It simply assumes that these n factors cause returns to vary together. There may be other, firm-specific reasons for returns to differ from their expected values, but these firm-specific deviations are not related across stocks. Since the firm specific deviations are not related to one another, all return variation not related to the n common factors can be diversified away. Based on these assumptions, Ross shows that, in order to prevent arbitrage, an asset's expected return must be a linear function of its sensitivity to the n common factors: **APT**

$$E(R_j) = R_f + \beta_{j1} \lambda_1 + \beta_{j2} \lambda_2 + ... + \beta_{jn} \lambda_n$$

$E(R_j)$ and R_f are defined as before. Each β_{jk} coefficient represents the sensitivity of asset j to risk factor k, and λ_k represents the risk premium for factor k. As with the CAPM, we have an expression for expected return that is a linear function of the asset's sensitivity to systematic risk. Under the assumptions of APT, there are n sources of systematic risk, where there is only one in a CAPM world.

However, both the CAPM and the APT are static, or single-period models. As such, they ignore the multi-period nature of participation in the capital markets. Merton's (1973) intertemporal capital asset pricing model (ICAPM) was developed to capture this multi-period aspect of financial market equilibrium. The ICAPM framework recognizes that the investment opportunity set (see Figures 2.4.1 and 2.4.2) might shift over time, and investors would like to hedge themselves against unfavorable shifts in the set of available investments. If a particular security tends to have high returns when bad things happen to the investment opportunity set, investors would want to hold this security as a hedge. This increased demand would result in a higher equilibrium price for the security (all else constant). One of the main insights of the ICAPM is the need to reflect this hedging demand in the asset pricing equation. The resulting model is: **ICAPM**

$$E(R_j) = R_f + \beta_{jM} \lambda_M + \beta_{j2} \lambda_2 + \ldots + \beta_{jn} \lambda_n$$

It must therefore be noted that the form of the ICAPM is very similar to that of the APT. There are subtle differences, however. The first factor of the ICAPM is explicitly identified as being related to the market portfolio. Further, while the APT gives little guidance as to the number and nature of factors, the factors that appear in the ICAPM are those that satisfy the following conditions:

1. They describe the evolution of the investment opportunity set over time.

2. Investors care enough about them to hedge their effects.

For example, there might be a priced factor for unexpected changes in the real interest rate. Such a change would certainly shift the investment opportunity set (for example, the intercept of the line in Figure 2.4.1 would move), and the effect would

be pervasive enough that investors would want to protect themselves from the negative consequences. We still don't know exactly how many factors there are, but the ICAPM at least gives us some guidance.

Furthermore, Davis (2001) reported that the consumption-based model of Breeden (1979) provides a logical extension of the previous work in asset pricing. Breeden's model is based on the intuition that an extra dollar of consumption is worth more to a consumer when the level of aggregate consumption is low. When things are going really well and many people can afford a comfortable standard of living, another dollar of consumption doesn't make us feel very much better off. But when times are hard, a few extra dollars to spend on consumption goods is very welcome. Based on this "diminishing marginal utility of consumption," securities that have high returns when aggregate consumption is low will be demanded by investors, bidding up their prices (and lowering their expected returns). In contrast, stocks that co-vary positively with aggregate consumption will require higher expected returns, since they provide high returns during states of the economy where the high returns do the least good. Based on this line of reasoning, Breeden derives a consumption-based capital asset pricing model (CCAPM) of theform: **CCAPM**

$$E(R_j) = Rf + \beta jC \, [E(Rm) - Rf]$$

In this model, βjC measures the sensitivity of the return of asset j to changes in aggregate consumption. βjC is referred to as the consumption beta of asset j, and the CCAPM's main result is that expected returns should be a linear function of consumption betas.

Despite the intuitive appeal of the consumption-based model, empirical tests have not supported its predictions (Breeden, Gibbons and Litzenberger, 1989). Accordingly, consumption-based asset pricing has not received as much attention in practice as the other models discussed here.

In spite of the unrealistic assumptions underlying the single-period CAPM, it still became the most widely used asset pricing model within a few years after its development. Its simplicity, coupled with empirical tests that supported most of its predictions (for example, Fama and MacBeth, 1973), made it the most widely taught asset pricing model in schools of business. The APT was tested in a number of empirical studies, but the CAPM received most of the financial world's attention.

Still in the article by Davis (2001), it was stated that early cross-sectional studies of stock returns (e.g., Nicholson, 1960) did not receive a great deal of attention, due to the small samples used to conduct the empirical tests. It was not until the CRSP and Compustat databases became available that researchers could construct samples large enough (and of sufficient quality) to produce reliable results. Consequently, for a few years after the development of the CAPM, there was no reliable way to test the model's predictions against variables like book-to-market equity or earnings/price.

One of the early studies that contradicted the predictions of the CAPM was Basu (1977). Using a sample period that stretched from April 1957 to March 1971, Basu showed that stocks with high earnings/price ratios (or low P/E ratios) earned significantly higher returns than stocks with low earnings/price ratios. His results indicated that differences in beta could not explain these return differences. In a

follow-up study, Basu (1983) showed that this "E/P effect" is not just observed among small cap stocks. A later study by Jaffe, Keim and Westerfield (1989) confirmed this finding and also showed that the E/P effect does not just appear in the month of January, as had been claimed by some researchers. The E/P effect is a direct contradiction of the CAPM; beta should be all that matters.

As cited in the article of Davis (2001), Banz (1981) uncovered another apparent contradiction of the CAPM by showing that the stocks of firms with low market capitalizations have higher average returns than large cap stocks. Other researchers (e.g., Basu, 1983) showed that the size effect is distinct from the E/P effect discussed above. Small firms tend to have higher returns, even after controlling for E/P.

Proponents of the CAPM are quick to point out that small firms tend to have higher betas than large firms, so we would expect to see higher average returns for small firms. However, the beta differences are not large enough to explain the observed return differences. Once again, the CAPM predictions are violated.

DeBondt and Thaler (1985) identify "losers" as stocks that have had poor returns over the past three to five years. "Winners" are those stocks that had high returns over a similar period. The main result of DeBondt and Thaler is that losers have much higher average returns than winners over the next three to five years. Chopra, Lakonishok and Ritter (1992) show that beta cannot account for this difference in average returns. This tendency of returns to reverse over long horizons (i.e., losers become winners) is yet another contradiction of the CAPM. Losers would have to have much higher betas than winners in order to justify the return difference. Chopra,

Lakonishok and Ritter (1992) showed that the beta difference required to save the CAPM is not there.

Rosenberg, Reid and Lanstein (1985) provide yet another piece of evidence against the CAPM by showing that stocks with high ratios of book value of common equity to market value of common equity (also known as book-to-market equity, or BtM) have significantly higher returns than stocks with low BtM. Since the sample period for this study is fairly short (1973-1984), the empirical results did not receive as much attention as some of the other studies discussed above. However, when Chan, Hamao and Lakonishok (1991) found similar results in the Japanese market, BtM began to receive serious attention as a variable that could produce dispersion in average returns.

Bhandari (1988) finds that firms with high leverage (high debt/equity ratios) have higher average returns than firms with low leverage for the 1948-1979 period. This result persists after size and beta are included as explanatory variables. High leverage increases the riskiness of a firm's equity, but this increased risk should be reflected in a higher beta coefficient. Consequently, Bhandari's results are yet another deviation from the CAPM predictions.

Jegadeesh (1990) found that stock returns tend to exhibit short-term momentum; stocks that have done well over the previous few months continue to have high returns over the next month. In contrast, stocks that have had low returns in recent months tend to continue the poor performance for another month. A study by Jegadeesh and Titman (1993) would later confirm these results, showing that the

momentum lasts for more than just one month. Their study also indicates that the momentum is stronger for firms that have had poor recent performance. The tendency of recent good performance to continue is weaker. Note that the pattern here is the opposite of that found in the long-term overreaction papers. In those studies, long-term losers outperform long-term winners. In the momentum studies, short-term winners outperform short-term losers.

The studies discussed in this section cast doubt on the ability of the CAPM to explain equilibrium relationships in the financial markets. These other variables should not be able to explain average returns better than beta. Stocks with high E/P, high BtM, high leverage, etc. should not outperform other stocks to the extent that they have. To make matters worse, Reinganum (1981) shows that the positive relation between beta and return that was observed in earlier studies (e.g., Fama and MacBeth, 1973) has weakened in more recent years. In spite of all this negative evidence, the CAPM was still the default view for most financial economists and practitioners going into the 1990s.

In 1992, an influential paper was published that pulled together much of the earlier empirical work. Fama and French (1992) brought together size, leverage, E/P, BtM, and beta in a single cross-sectional study. Their results were controversial. First, they showed that the previously documented positive relation between beta and average return was an artifact of the negative correlation between firm size and beta. When this correlation is accounted for, the relation between beta and return disappears. The positive relation between return and beta is highly linear, as predicted by the CAPM.

Based on this evidence, it appears that the CAPM nicely explains the higher returns that small firms have earned.

Given that beta does a poor job of explaining average returns, what variables can do a better job? This is the second main point of the Fama/French study. They compared the explanatory power of size, leverage, E/P, BtM, and beta in cross-sectional regressions that spanned the 1963-1990 period. Their results indicate that BtM and size are the variables that have the strongest relation to returns. The explanatory power of the other variables vanishes when these two variables are included in the regressions. The cross-section of average stock returns can be nicely described by two variables.

The Fama and French (1992) results dealt a severe blow to the view that the single-period CAPM is the way securities are actually priced. The model that has been taught more than any other in business school doesn't seem to work.

However, unbeknownst to most investors, there has been a long running argument in academic circles on the CAPM and other pricing models, even within the milieu of traditional investments. Without going into the details of this debate, certain empirical studies have revealed "cross-sectional variations" in the CAPM questioning the "validity" of the model. In direct response to the challenge by Fama and French (1992), Jagannathan and Wang (1996) theorized that "...the lack of empirical support for the CAPM may be due to the inappropriateness of some assumptions made to facilitate the empirical analysis of the model. Such an analysis must include a measure of the return on *the aggregate wealth portfolio of all agents in the economy.*"

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Conventional investment theory states that when an investor constructs a well-diversified portfolio, the unsystematic sources of risk are diversified away leaving the systematic or non-diversifiable source of risk as the relevant risks. The capital asset pricing model (CAPM), developed by Sharpe (1964), Lintner (1965) and Black (1972) [zero-beta version], asserts that the correct measure of this riskiness is its measure known as the 'beta coefficient' or just "beta." Effectively, beta is a measure of an asset's correlated volatility relative to the volatility of the overall market. Consequently, given the beta of an asset and the risk-free rate, the CAPM should be able to predict the expected return for that asset, and correspondingly the expected risk premium as well.

In line with this literatures presented above on asset pricing models and returns, the CAPM was identified as one of the most preferred model for asset pricing. Besides, a lot of researchers have demonstrated their disagreement with this model as already discussed. However most of them also supported its ability and simplicity in asset pricing and therefore it is widely used by investors, companies and business schools. The study therefore adopted the capital asset pricing model to examine the relationship between risk and returns of shares or stocks of listed companies on the Ghana Stock Exchange.

CHAPTER THREE
METHODOLOGY

3.0 INTRODUCTION

This chapter of the study presents the methodology which explains the process for carrying out the research. The issues discussed include the study area, population, sampling techniques, data collection methods and data analysis techniques.

3.1 STUDY AREA

The study area of this research was the Ghana Stock Exchange situated in Accra at the Cedi House, Liberia road. Greater Accra, the study area is the capital and the largest city of Ghana and it is the commercial, manufacturing, and communications center. It is also a city in which almost all businesses in Ghana have their headquarters and major trading centers. It has a population of 1,847,000 according to 2003 estimate *(Microsoft ® Encarta ® 2009).*

3.2 STUDY POPULATION

The target population of the study was made up of listed stocks of companies on the Ghana Stock Exchange. Currently, there are almost forty-one listed companies but thirty-five traded shares or stocks on the Ghana Stock Exchange. The need to select a sample size from this population was necessitated by getting a representation of the total population to justify its findings. Moreover, all the listed stocks can not be included in this study due to a number of factors causing limitation to the sample size selection. These factors included access to data on stock prices, dividend payments

and a time frame of ten years. In selecting the sample size these were the factors considered.

3.3 SAMPLING

Sampling techniques provide a range of methods that enable a researcher to reduce the amount of data to be collected from a subgroup rather than all the possible cases or elements. There are two types of sample techniques and these are probability sampling and non-probability or judgmental sampling (Saunders et.al, 2007). However, purposive sampling which is a type of non – probability sampling technique was used in selecting the sample size of this study. The main reason for using purposive sampling was to allow a selection of specific listed stocks or shares based on time frame and availability of data.

Additionally, the sample size was obtained by using ten years *time frame* criteria, access to stock prices and dividend per share within these periods of the selected companies. It is so interesting to mention that as at 2002, there were 22 companies listed on the exchange. This increased to 26 in 2004 up to the current trading number of listed shares or stocks. As a result of this, twenty traded stocks out of the total population of thirty- five were initially selected. Access to data again compelled this number to be reduced to eighteen (18). Therefore, the *sample size* for this study was *eighteen (18)* traded shares or stocks on the Ghana Stock Exchange.

3.4 SOURCES OF DATA

The quality of research depends greatly on availability and accessibility of quality data. This makes data vital to research findings. For this reason, primary, secondary

and tertiary sources of data collection which includes articles, conference papers, book publications, literature surveys and many others on share or stock pricing, risk and return were collected and used in this research. Additionally, raw data from the following sources vital for the success of this study were collected. These sources include stock or shares prices of selected companies from the Ghana Stock Exchange, dividend per share from the registries of the listed companies and the Ghana Stock Exchange Factbook (2000 - 2007). Government of Ghana short term securities notes (i.e. 1-yr. Treasury bill rate or risk free rate), were all obtained from the Bank of Ghana. The overall GSE All-Share Index market returns from 1994 – 2008 was also obtained from the exchange for the necessary analysis.

3.5 DATA ANALYSIS TECHNIQUES

Getting access to these data which is vital to the success of this study deepened the motivation of writing this work. The next was to adopt the appropriate and applicable research techniques to analyze the data. It must also be mentioned that there are different data analyses techniques that are applicable for research activities. In this research however, the data was analyzed using a combination of statistical tools and financial models. Included in these models are the Capital Asset Pricing Model and the simple regression analysis. Microsoft Excel was also used in all the necessary computations.

3.5.1 USING CAPM

The Capital Asset Pricing Model (popularly known as CAPM) was used to calculate the risk (beta) of the listed stocks. This financial model is given as follows;

$$R = Rf + (Rm - Rf)\beta$$

Where: R = the required return on the stock or Expected return

Rf = the risk free rate

Rm = the return on the market

β = Beta (the associated systematic risk)

First, the returns on the market of all the listed stocks were calculated using the stock prices of the selected stocks. According to Samuels *et al.* (1999), it is usual to measure the periodic return from an investor point of view by taking into consideration both dividends received from the share and any change in value over the period concerned. This was done for all the selected shares or stocks by using the formula:

$$R_1 = \frac{D_1 + (V_1 - V_0)}{V_0}$$

Where: R_1 = the return in the period

D_1 = Dividend(s) received in the period

V_1 = Value of share at the end

V_0 = Value of share at the start of the period

The second step was to calculate the beta. The relationship between the risk and return was illustrated for each stock using the Security Market Line (SML). According to the Wikipedia, the free encyclopedia, in Modern Portfolio Theory, the Security Market Line (SML) is the graphical representation of the Capital Asset Pricing Model. It displays the expected rate of return for an overall market as a function of systematic, non-diversifiable risk (its beta). Beta is given as:

$$\beta i = \frac{Cov(R_i, R_m)}{Var(R_m)}$$

Where: β =   the beta of the stock or share,

Cov (R_i , R_m) =   the covariance of the market returns and the return on the stock and

Var (R_m)   =   the variance of the market returns.

The third step after estimating the beta was that, the return and risk relationship graph was drawn and used to determine under and overvalued stocks or shares. The Y-Intercept (beta=0) of the SML is equal to the risk-free interest rate. The slope of the SML is equal to the Market Risk Premium and reflects investors' degree of risk aversion at a given time.

Finally under the use of the CAPM, a single asset was plotted against the SML using its own beta and historical rate of return. If the plot of the asset falls above the SML it is considered to have a good rate of return relative to its risk (the asset is undervalued by the CAPM, and should be acquired), and vice versa if it falls below (the asset is overvalued, and should be sold). The CAPM was used in line with SML to achieve the first objective of the study. The second objective was also realized using the beta model to find out riskier shares or stocks of the selected companies on the Ghana Stock Exchange.

3.5.2 USING REGRESSION ANALYSIS

The simple regression analysis was also used to determine the relationship between the systematic risks (beta) of the selected shares or stocks and their average share or stock returns. The simple regression analysis model was used to address the third objective of the study. With this, the average share returns was the dependent variable and the systematic risk (beta) was the independent variable.

The regression formula below was used.

$$r^2 = \frac{b\,SS\,xy}{SS\,yy}; \quad r = \frac{SS\,xy}{\sqrt{SSxx\,SSyy}}$$

Where;

$$SSxy = \sum xy - \frac{(\sum x)(\sum y)}{n}$$

$$SSyy = \sum y^2 - \frac{(\sum y)^2}{n}$$

$$SSxx = \sum x^2 - \frac{(\sum x)^2}{n}$$

Additionally, the relationship between the average stock or share prices and the returns was also examined statistically. This was to analyze the relationship between share or stock prices and returns of the selected shares. Therefore share price was independent variable and the dependent variable was the returns on the shares. The above formula was again used to determine the relationship.
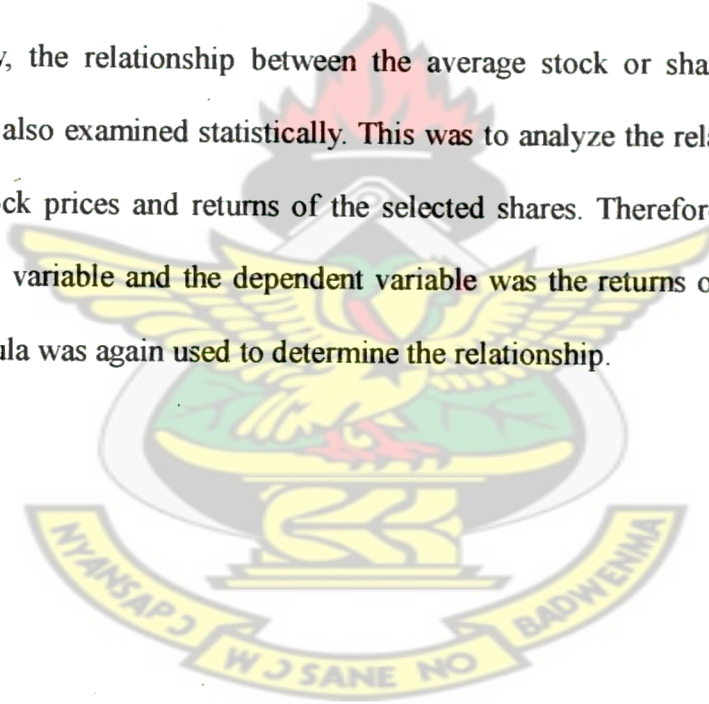
CHAPTER FOUR
DATA ANALYSIS AND DISCUSSION

4.0 INTRODUCTION

This chapter presents the analysis of the study using statistical tools, tables, charts and diagrams for the necessary interpretations. It comprises the evaluation of pricing of selected shares or stocks, beta ranking and share classification and analysis of stock pricing, risks and returns.

4.1 EVALUATING PRICING OF SELECTED SHARES OR STOCKS

One of the objectives for this study was to analyze the variations in stock or share pricing using Capital Asset Pricing Model (CAPM) and the Security Market Line (SML). In plotting, the beta (systematic risk) was plotted on the X-axis and the expected return on the Y-axis because the expected return is the dependent variable. The SML was obtained by plotting the risk free rate (RF) and market return (M) to a beta of zero (0) and one (1) respectively. Shares plotted above the SML are said to be under priced, below the SML are over priced and those on the SML are fairly priced. The analyses were done for ten different years for all the stocks or shares of the selected companies including Accra Brewery Limited (ABL), Anglogold Ashanti (AGA), Aluworks (ALW), British American Tobacco (BAT), CFAO Ghana Limited, Enterprise Insurance Company (EIC), Fan Milk Limited (FML), Ghana Commercial Bank (GCB), Guinness Ghana Breweries Limited (GGBL), Home Finance Company (HFC), Mechanical Lloyd Company (MLC), Mobil Oil Ghana Limited (MOGL), Pioneer Kitchenware Ltd (PKL), PZ Cussons Ghana Limited, Standard Chartered Bank (SCB), Super Paper Products Company (SSPC), SG-SSB Ltd and Unilever Ghana Ltd (UNIL). The sections below give the graphical presentation and

interpretations. The square pink colour indicates where a stock falls either above, below or on the Security Market Line (SML).

Figure 4.1.1: SML Showing Stock Price Analyses for 1998

GSE ALL-SHARE INDEX
SML SHOWING STOCK PRICES FOR 1998
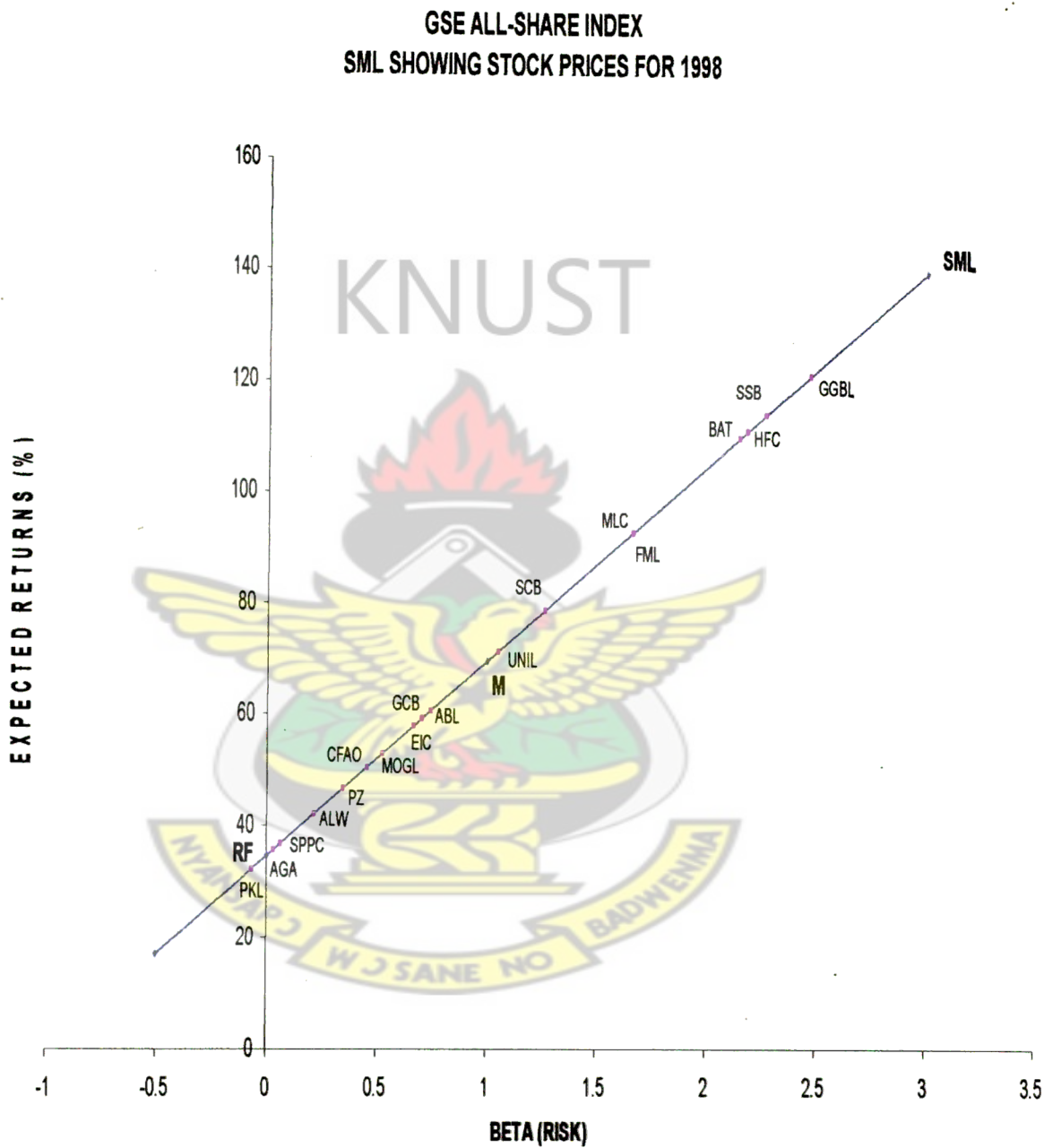
Source: Field Survey, 2009

Figure 4.1.1 shows the plotting of the expected returns and the beta (systematic risk) of the selected companies for 1998. The plotting indicates that only 1 share was below the Security Market Line whilst 17 shares were exactly on the SML. This statistics explains that in 1998, almost all the shares on the GSE All-Share Index were correctly priced. This is an indication that 94.44% of the selected shares gave expected returns which commensurate the amount of risk taken by shareholders that year. It is worth noting that those shares performed well according to the CAPM and the SML given annual risk free rate of 34.57% and a market returns of 69.69%

However, in the same year, it was only 5.56% share (i.e. 1 share) on the exchange which did not meet the Security Market Line. This means there was mispricing of that share at the exchange for that year. According to CAPM, this means in both cases either under or over priced, the expected returns given to shareholders do not commensurate the quantum of systematic risk taken. Shareholders of under priced shares will enjoy real returns above the expected returns by the Capital Asset Pricing Model. It also means over priced shares give their holders returns which are below the expected returns.

The effect of the above is that the over priced share which was the share of UNIL gave lower returns to its holders compared to those required by investors according to the CAPM. Therefore, investors will sell the over priced shares causing its price to fall and return to increase. The opposite occurs when shares are under priced at the stock market. It can be concluded that in 1998, majority of the shares of GSE All-Share Index were correctly priced except the share or stock of UNIL which was below the Security Market Line.

Figure 4.1.2: SML Showing Stock or Share Price Analyses for 1999

GSE ALL-SHARE INDEX
SML SHOWING STOCK PRICES FOR 1999
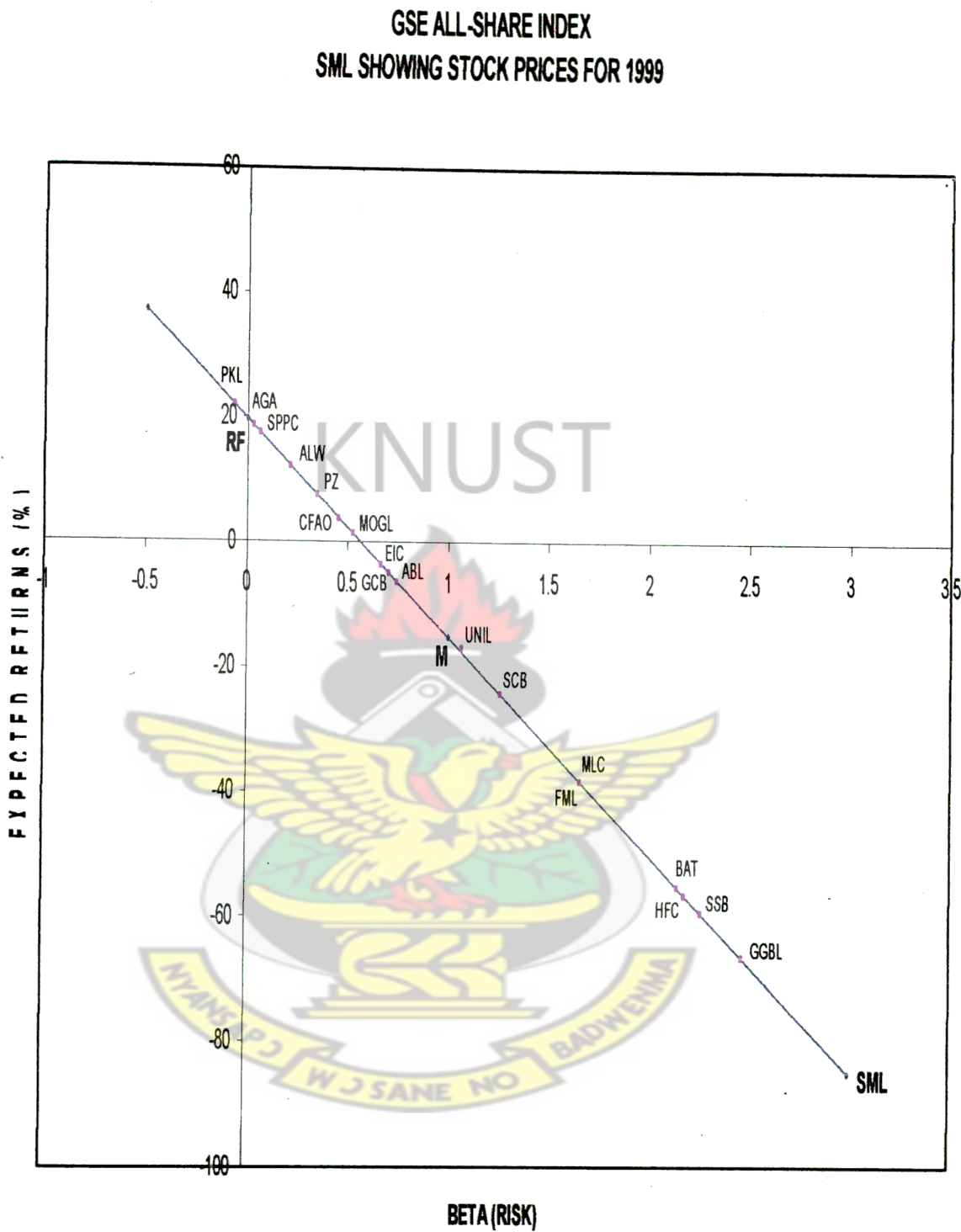
Source: Field Survey, 2009

From Figure 4.1.2, an interesting trend occurred in the year 1999 where the SML moved downwards from left to right. This was as a result of the GSE recording an overall market return of negative 15.22% which is below the average risk free rate of 19.65% for that year. Even though the market recorded a negative return on the GSE All-Share Index, 16 shares were correctly priced, 1 share each were under and over priced respectively.

The implication is that, by CAPM 88.89% of the selected companies in 1999 gave expected returns which proportionate the systematic risk of their shareholders. This also means all the shares were correctly or fairly priced and yielded the expected returns to their shareholders that year. Fair pricing of shares on an exchange positively affects the performance of companies in terms of dividend yield and capital gains in both the short and long terms. Therefore, a relationship exists between fair share pricing and returns.

Besides, the remaining 11.11% representing 2 shares on the exchange based on the data analyzed were not fairly priced and therefore mispricing. Again as observed in the 1998 data where almost 95.0% of the shares were fairly priced, this reduced by 5.56% in the year1999. Additionally, the 11.11% mispriced shares in the midst of negative market returns were close to the security market line. This is an indication of good performance by the managers of the investment of shareholders for that year. The share of UNIL was under priced given returns above the estimated return by the CAPM whilst the share of PKL gave lower return that year. The most rational decision for an investor is to sell shares which are over priced since they do not give returns which exactly compensate the quantum of risk. Again, the difference between

the fair and actual rate of return of a share is called the share's *alpha* which must be noted by investors.

Figure 4.1.3: SML Showing Stock Price Analyses for 2000

GSE ALL-SHARE INDEX
SML SHOWING STOCK PRICES FOR 2000
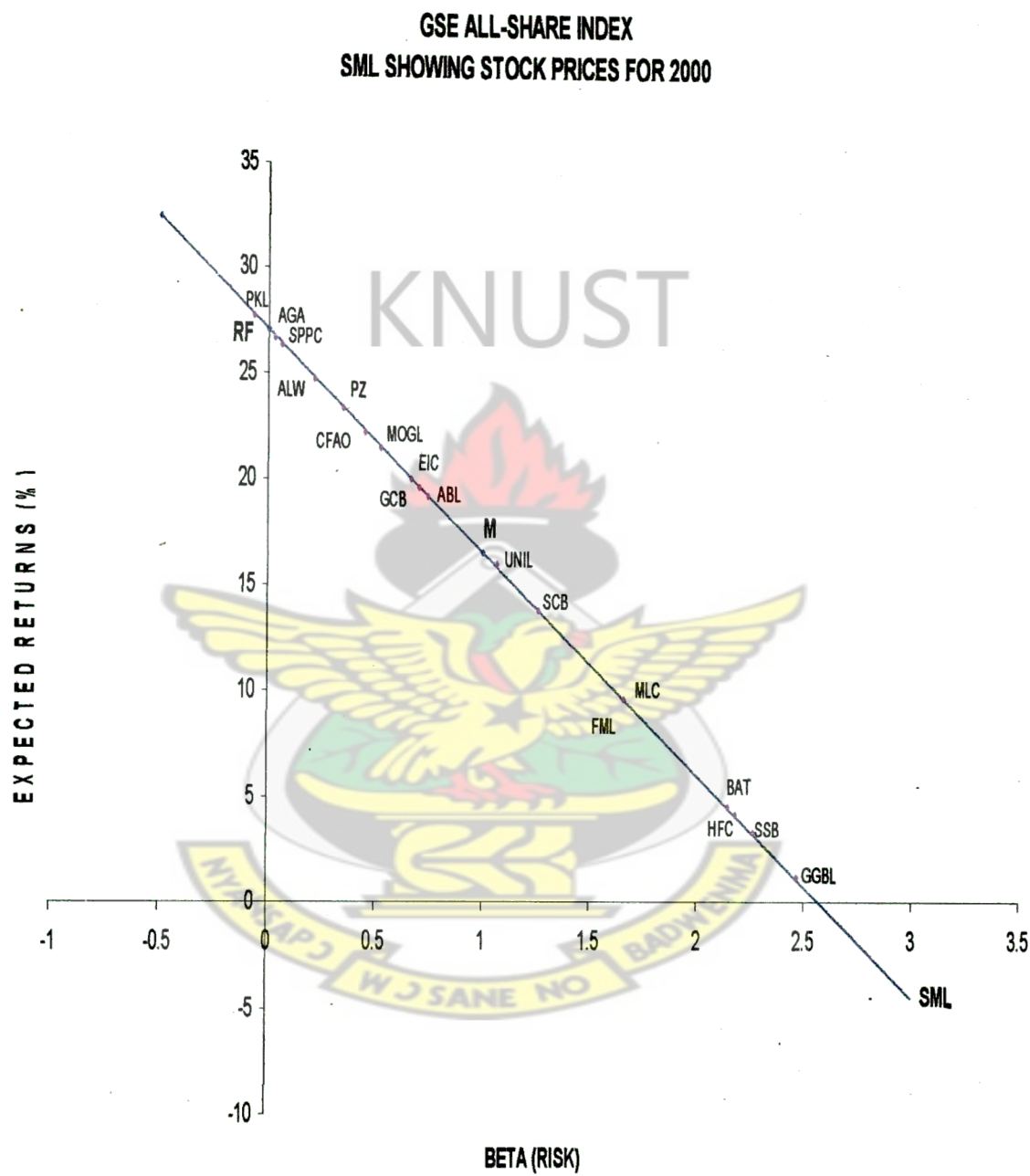
Source: Field Survey, 2009

In the year 2000, the SML again sloped downwards given an average annual risk free rate of 27.00% and the GSE All-Share Index market returns of 16.55%. As shown on Figure 4.1.3, the downward nature of the SML was as a result of the risk free rate being greater than the market returns. The statistics indicates that 4 shares [22.22%] out of the 18 selected shares were fairly priced and the remaining 14 shares [77.78%] were unfairly priced in the year 2000.

Thus, fairly priced shares which gave the expected returns to shareholders according the CAPM include SCB, ABL, EIC and GCB shares which represent 22.22% of the entire shares selected for this study. This means in year 2000, 22.22% of the shares on the GSE All-Share Index gave expected returns which were equal to the amount of risk taken by shareholders. The above information confirms that the number of fairly priced shares reduced from 88.89% in 1999 to 22.22% in year 2000. This could be attributed to the lower overall market performance.

However, the data also revealed that 77.78% of shares traded that year representing majority of the sample size were unfairly priced. The implication is that those shares again in year 2000 gave unfair returns to their shareholders compared to the risk and the expected return by the CAPM. Therefore, it is evidenced that most of the shares were mispriced. Within this category, 38.89% of the shares were under priced and the remaining over priced. It also means 38.89% of the shares gave returns which are above the expected return estimated by the Capital Asset Pricing Model. This includes UNIL, MLC, FML, BAT, HFC, SSB and GGBL. It must be mentioned that almost all the shares were close to the SML when plotted and it is an indication of good performance of the shares against the market returns.

GSE ALL-SHARE INDEX

SML SHOWING STOCK PRICES FOR 2001
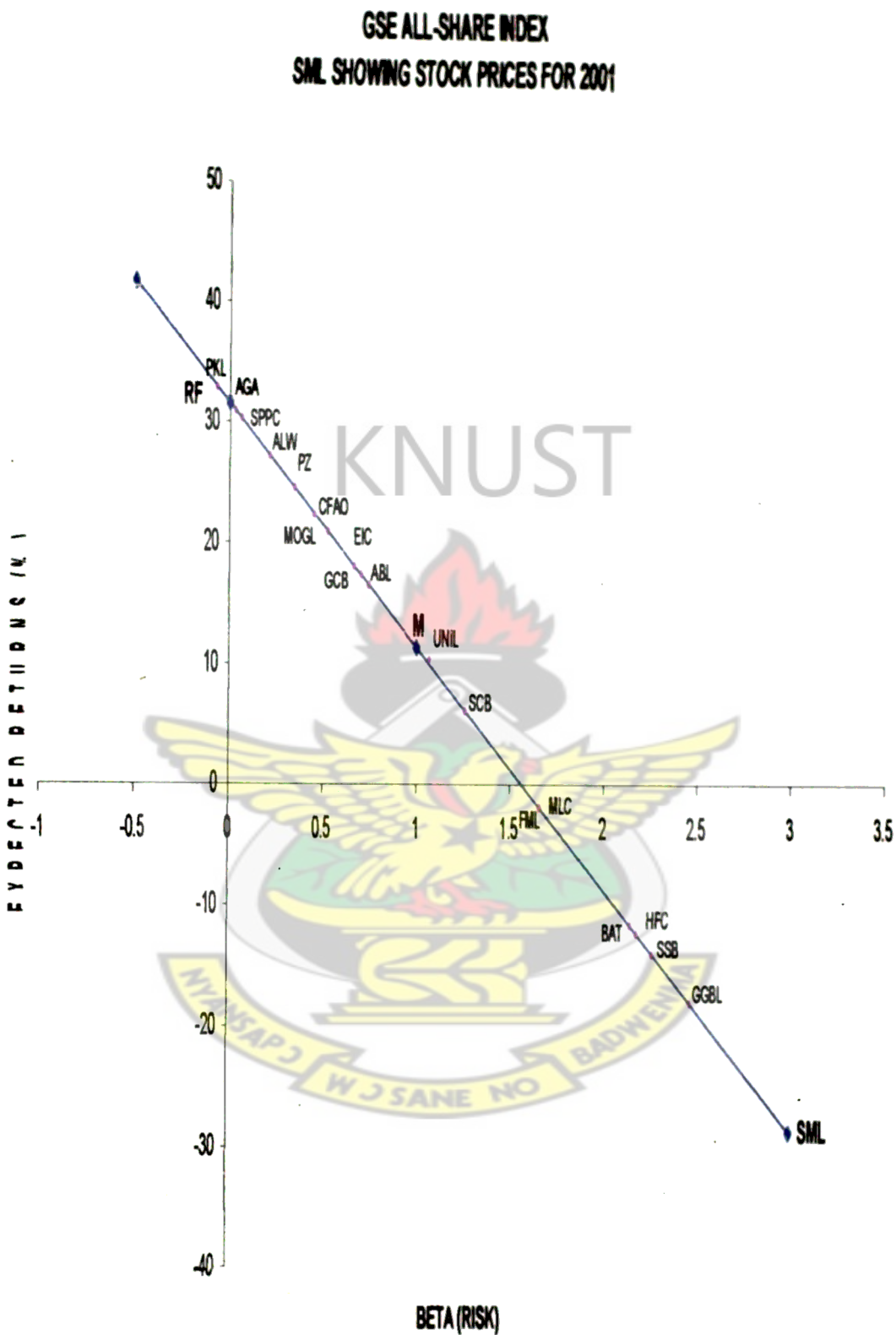
Source: Field Survey, 2009

In the year 2001, the SML again moved downwards from left to right showing a lower market return compared to the annual average risk free rate in that year as shown in Figure 4.1.4. The behavior of the GSE All-Share Index selected shares against the Security Market Line was identified. Out of a total of 18 shares, 15 shares which represent 83.33% of the selected shares were fairly priced that year. This suggests that these shares fairly compensated shareholders as estimated by the Capital Asset Pricing Model. That is, the risk premium (i.e. km-kf) plus the risk free rate was equal to the expected returns. Again, majority of shares on the exchange in the year 2001 were fairly priced. Among these shares are AGA, PKL, SPPC, ALW, PZ, ABL, HFC, MOGL, MLC, FML, BAT, GGBL, SCB, SSB and GCB.

However, the remaining 3 shares which represent 16.67% were unfairly priced that year. That is, the shares of CFAO, EIC, and UNIL were all unfairly priced. The shares of EIC and UNIL were underpriced and therefore gave higher returns to their shareholders compared to the volume of risk taken. The share of CFAO was closed to the SML but a little below which also gave a lower return to its shareholders. It is worth noting again that when shares are mispriced, these have impact on the returns of a company and shareholders.

When shares are over priced, shareholders may be compelled to sell their shares which will cause a fall in its price. An increase in dividend will attract investors. This increase in dividend payment will finally affect financing decisions and thereby forgoing the alternative of other investment projects vital to the company with same funds. Nevertheless, most of the mispriced shares were close to the Security Market Line.

Figure 4.1.5: SML Showing Stock Price Analyses for 2002

GSE ALL-SHARE INDEX
SML SHOWING STOCK PRICES FOR 2002
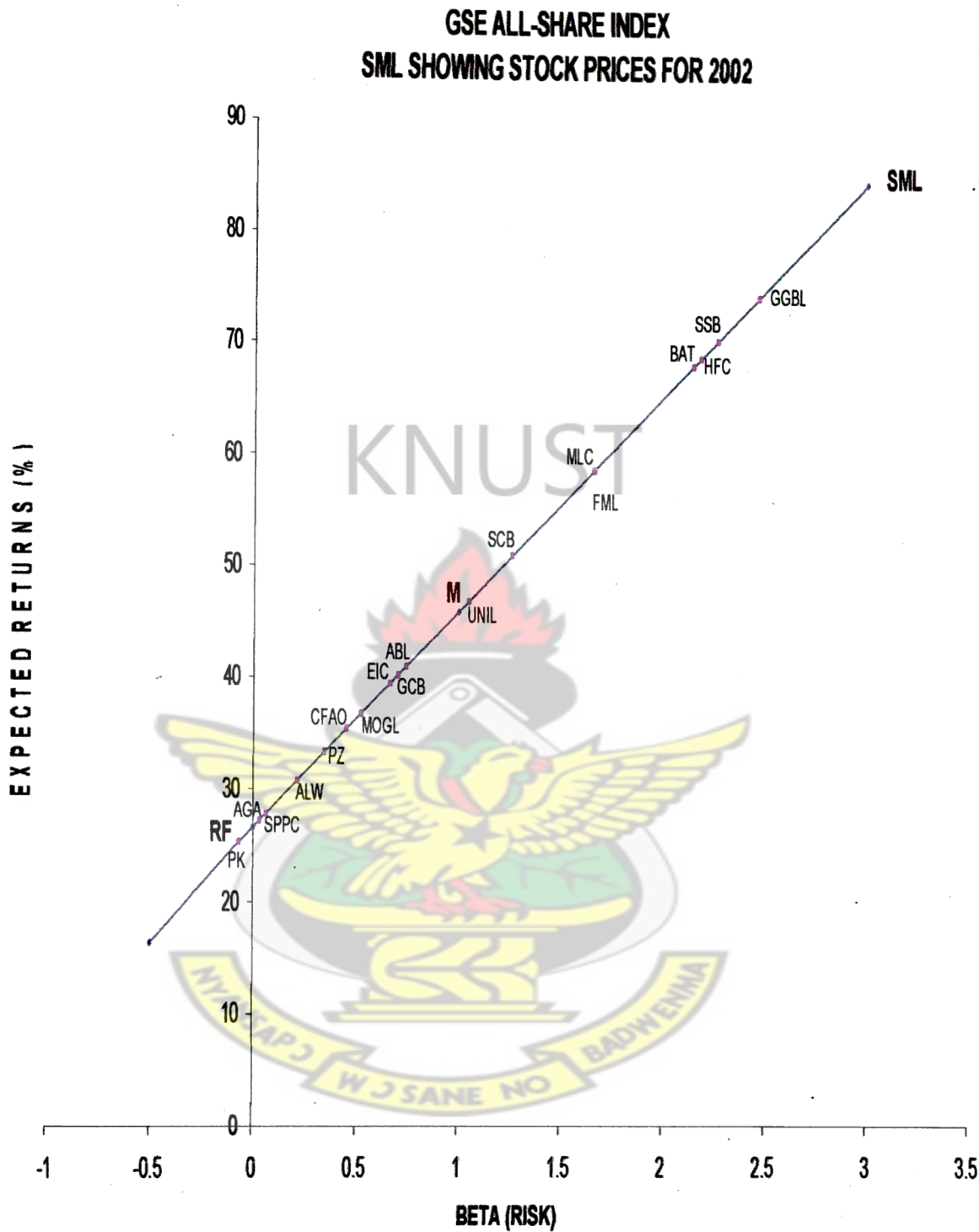
Source: Field Survey, 2009

Figure 4.1.5 shows the graphical representation of the Security Market Line and the behavior of individual shares in the year 2002. The SML moved in the normal upward direction from left to right indicating a higher market return compared to the annual risk free rate in 2002. The statistics from the graph shows that 16 shares which represent 88.89% of the selected stocks or shares were fairly priced. This means the expected returns and risk of these shares meet the security market line. It also indicates that almost 90% of the shares of the selected companies fairly compensated shareholders on the quantum of systematic risk taken.

The above information presupposes that majority of the shares traded on the exchange that year fairly compensated shareholders for their risk with the exception of the shares of SCB and CFAO which were slightly above the SML. This means they gave higher returns to their investors compared to the expected returns. The future consequences of under priced shares are increase in demand and a fall in the payment of dividend thereby forcing the price to move back to the security market line. It must therefore be concluded that under valuation or pricing of shares lead to a fall in the price when dividend decreases due to higher demand.

Additionally, none of the shares in the year 2002 were over priced. That is, over valuation or pricing means investors received lower returns compared to the expected return estimated by the Capital Asset Pricing Model. It could also be seen that some shares in the analyses moved in the same or similar trend. An example is the shares of FML and MLC and this is believed to be as a result of having almost the same beta (systematic risk). Therefore shares with the same beta may experience the same or similar volatility in returns to the Stock Market.

Figure 4.1.6: SML Showing Stock Price Analyses for 2003

GSE ALL-SHARE INDEX
SML SHOWING STOCK PRICES FOR 2003
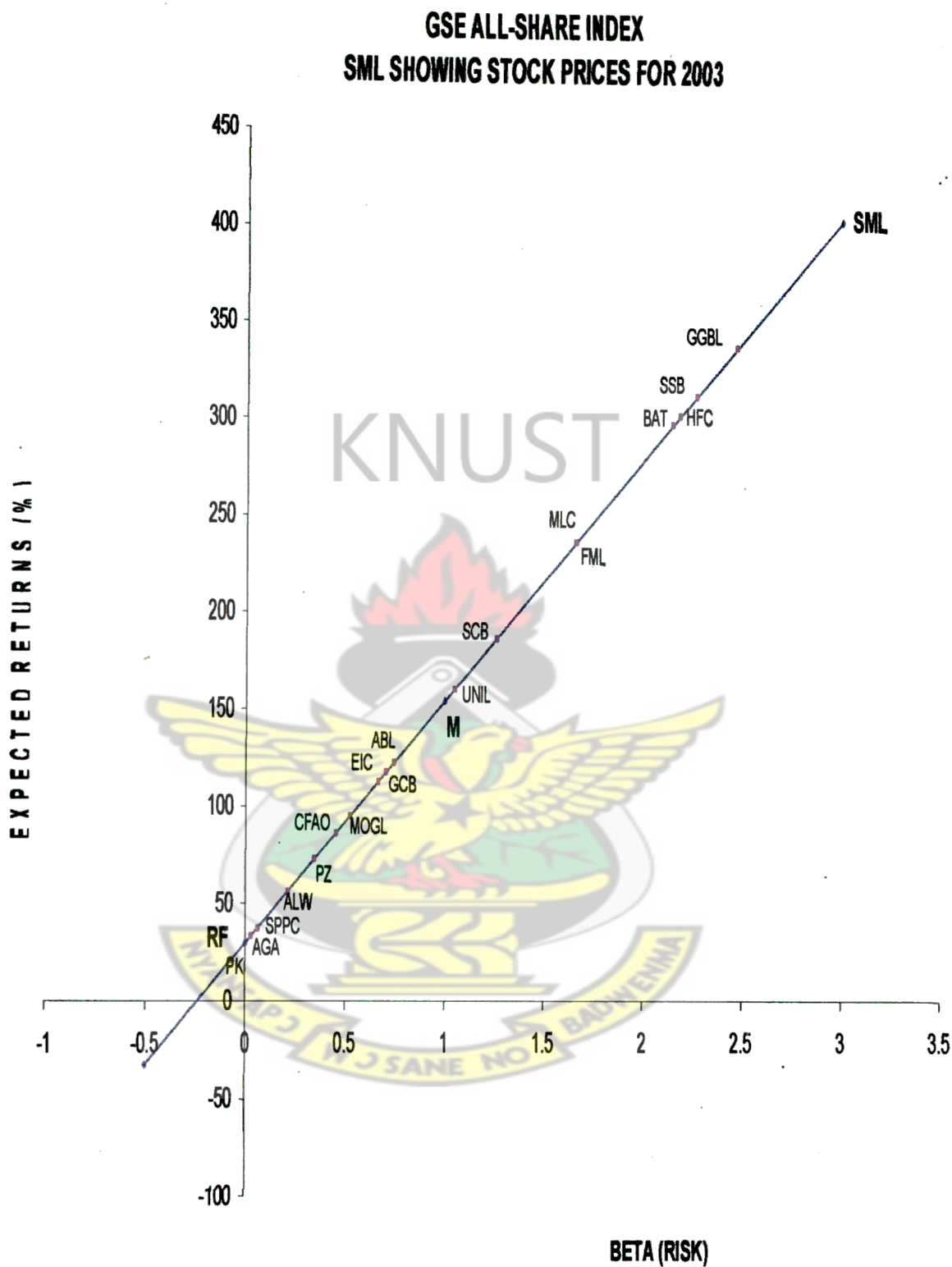
Source: Field Survey, 2009

In year 2003, the Security Market Line still moved in upward direction indicating a greater market returns compared to the annual average risk free rate. Figure 4.1.6 demonstrates the distribution of the fairly and unfairly shares of the GSE All-Share Index for year 2003. From the data, it was discovered that among the selected shares, 83.33% were correctly priced and the remaining 16.67% were under valued or priced. The correctly valued or priced shares for that year included all the traded shares that year except the shares of MOGL, GGBL and SSB. It again means above 80% shares of the selected companies yielded the exact expected returns to their investors.

However, the volume of mispriced shares on the GSE All–Share Index over the years under this study increased to just 16.67% in 2003. These shares were underpriced which means they gave their investors higher returns compared to the expected returns estimated by the CAPM. It is believed that shares are under piced by companies so as to attract investors with higher and better returns compared to other companies. Nevertheless, the future consequences of under priced shares to a company must be studied in a particular industry and if applicable adopted as a short term measure to attract investors and specific sectors within the Ghanaian economy.

Additionally, none of the shares in the same year were over priced. However, over priced shares give lower returns to the expected return by CAPM. All the shares which gave higher returns were having beta grater than one except MOGL which indicates the level of risk by investors. It must be concluded that defensive shares have lower volatility rate to market changes.

Figure 4.1.7: SML Showing Stock Price Analyses for 2004

GSE ALL-SHARE INDEX
SML SHOWING STOCK PRICES FOR 2004
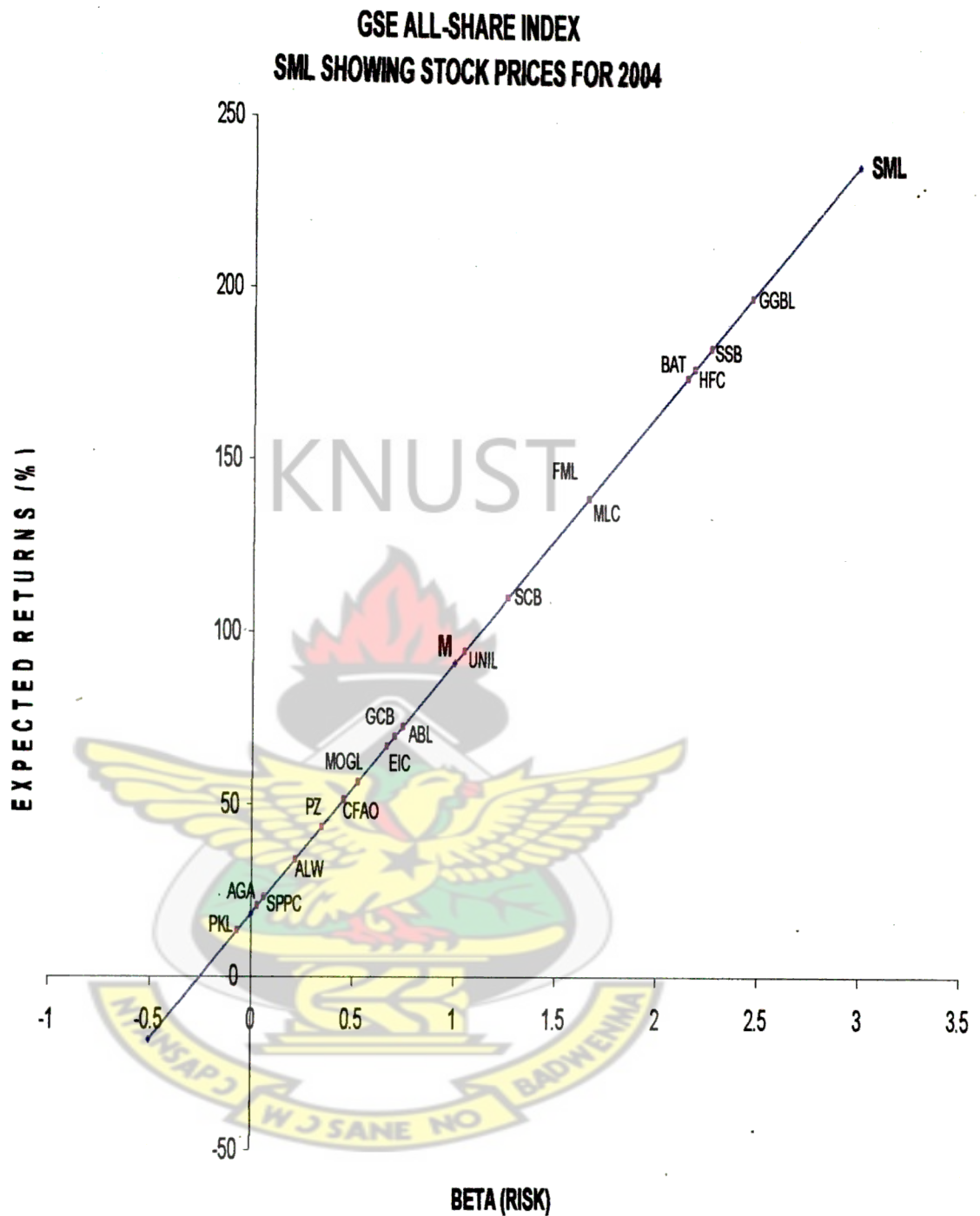
Source: Field Survey, 2009

The year 2004 also experienced an upward trend movement in the Security Market Line since the GSE All-Share Index market returns of 91.33% was greater than an average annual risk free rate of 18.45%. It must also be mentioned that the market risk premium (i.e. Rm - Rf) in that year was good and compensated investors for investing in financial securities including shares. Figure 4.1.7 illustrates the behavior of the shares in 2004. It was discovered that 77.78% of the selected shares were fairly priced and the minority of the shares representing 22.22% were mispriced.

The data revealed that 14 shares [77.78%] which were correctly priced given all the market indicators of risk free rate and market returns included SPPC, ALW, PZ, CFAO, MOGL, EIC,GCB, FML, MLC, BAT, SSB, UNIL, HFC and GGBL. According to the CAPM's expected returns, these companies compensated their investors with returns which commensurate the measure of systematic risk taken that year. The managers of these shares therefore performed well in managing the fund of shareholders on the exchange.

Nevertheless, 22.22% shares were mispriced. Among the under valued shares which gave higher returns to their investors compared to the estimated returns by CAPM are AGA, ABL and PKL. The share of PKL with negative market volatility gave higher returns than the CAPM estimate. This is an indication of good management of that share on the exchange even though it has the lowest market volatility rate. It is therefore evidenced from this data and subsequent ones that under the Capital Asset Pricing Model, there has been mispricing of shares on the Ghana Stock Exchange.

Figure 4.1.8: SML Showing Stock Price Analyses for 2005

GSE ALL-SHARE INDEX
SML SHOWING STOCK PRICES FOR 2005
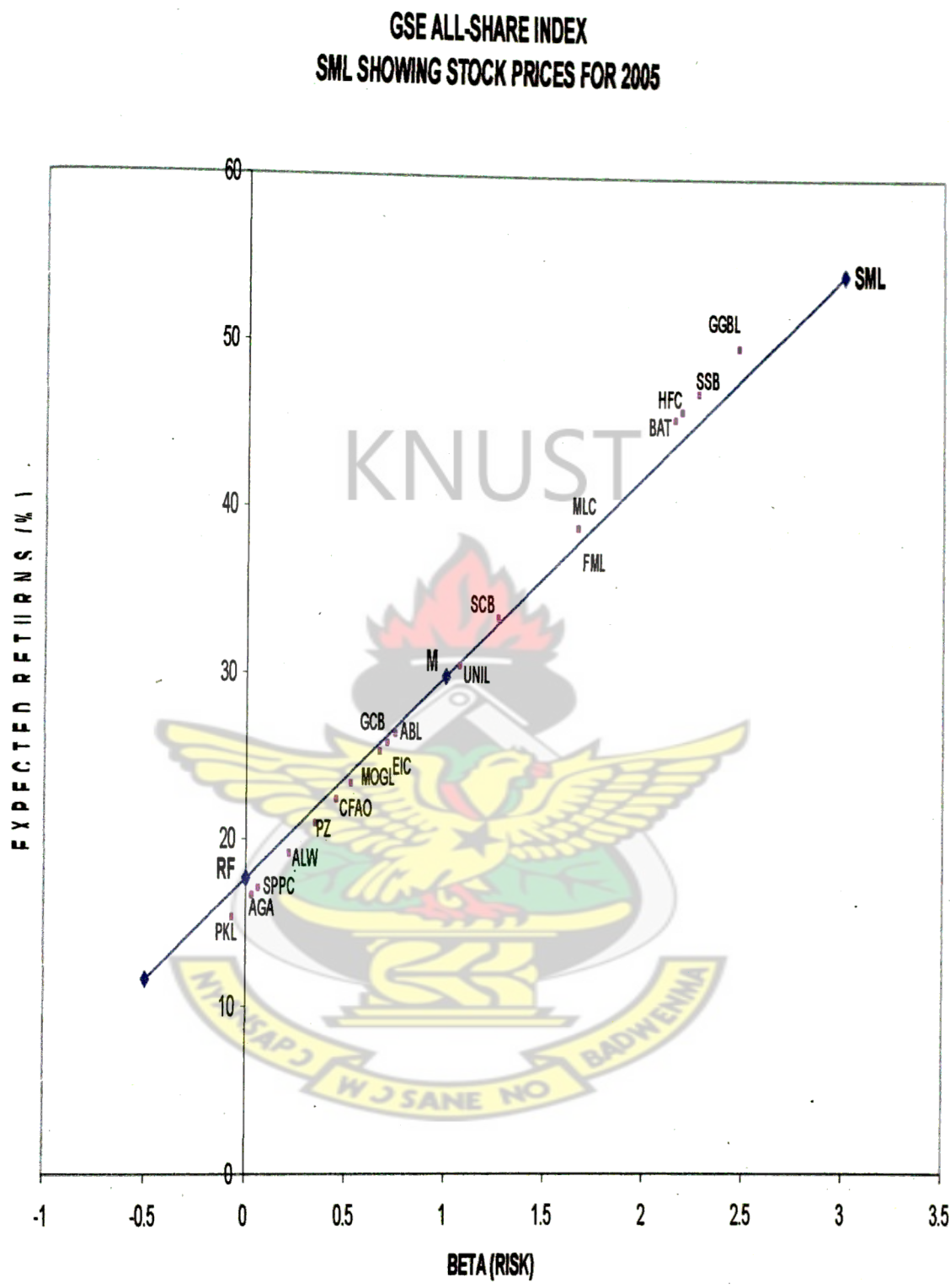
Source: Field Survey, 2009

The year 2005 observed a flatter Security Market Line as a result of a close difference between the average annual risk free rate of 16.28% and market returns of 29.85%. The margin of market risk premium reduced in year 2005 compared to that of 2004. The implication is that, investors experienced a lower rate as market risk premium to compensate them for investing in securities at the stock market that year.

From Figure 4.1.8 it was discovered that none of the shares out of the selected 18 shares were fairly priced in that year. Thus, according to the CAPM, all the shares were either over priced or under priced that year. This also means shareholders were not properly compensated on their investment. However, 7 shares representing 38.89% were above the SML indicating higher returns to compensate shareholders than the estimated return by the CAPM. These shares include MLC, FML, BAT, HFC, SSB, SCB, and GGBL. This is good news to investors since it will benefit them by maximizing their value in terms of returns.

On the other hand, majority of the shares in the year 2005 were over priced. Thus, the remaining 61.11% shares gave returns lower to the estimated returns to shareholders. The implication of this is that, investors will be losing whilst the companies involved will benefit. It is therefore a clear indication that on yearly bases shares on the Ghana Stock Exchange are mispriced. Even though other random variable unidentified could contribute to this, the pricing of its shares was a major factor. That is to echo that price influences the returns of shares and therefore performance of a listed company. Again, mispricing of shares do exists on the Ghana Stock Exchange as evidenced from subsequent data over the years in the analyses.

Figure 4.1.9: SML Showing Stock Price Analyses for 2006

GSE ALL-SHARE INDEX
SML SHOWING STOCK PRICES FOR 2006
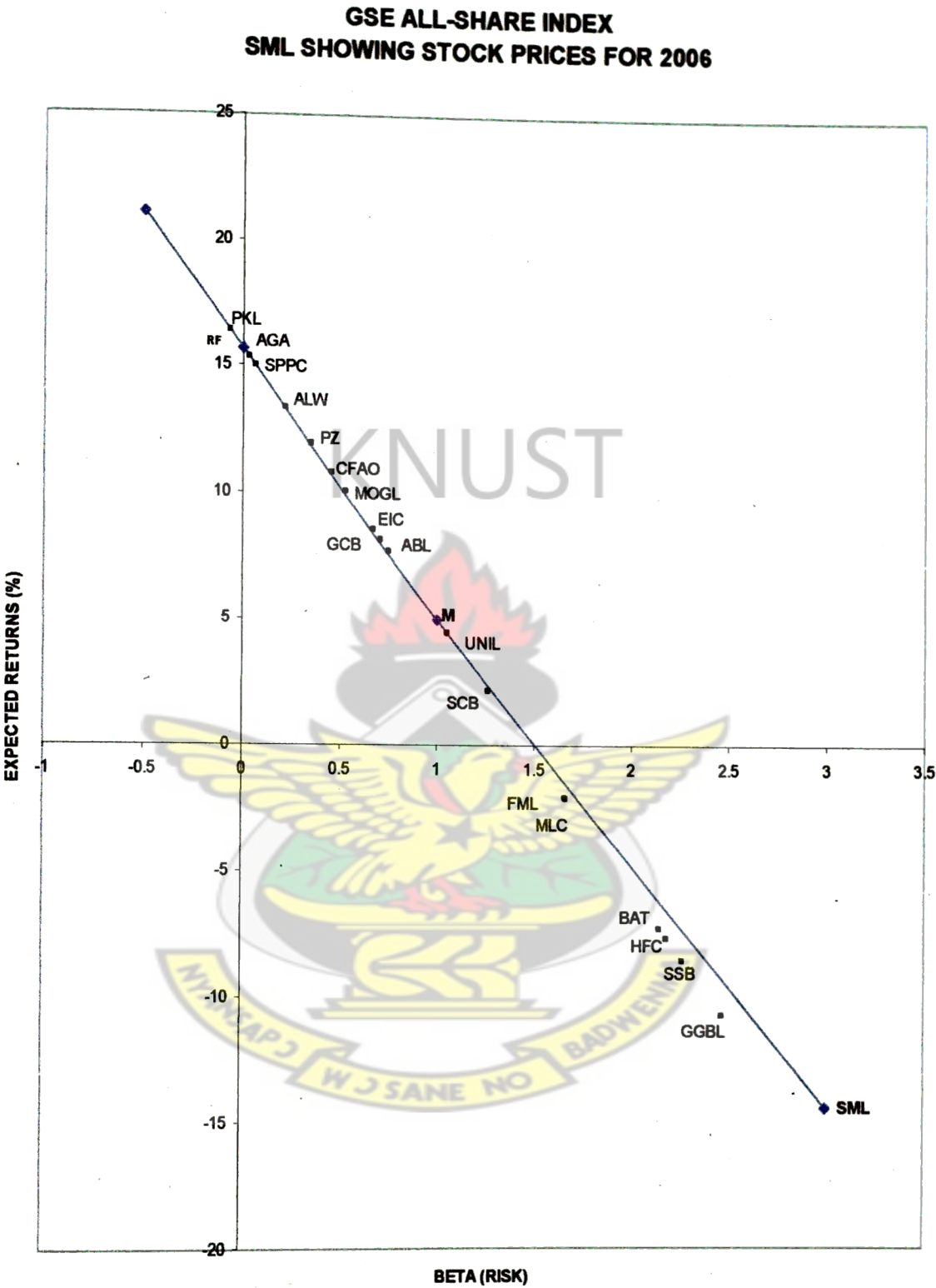
Source: Field Survey, 2009

The movement of the Security Market Line in the year 2006 took a downward slope from left to right indicating a lower market returns compared to the short term security rate. The annual average risk free rate (T'bill rate) was 15.67% and the GSE All-Share Index for 2006 recorded a market return of 4.97% which was also lower than the risk free rate. This compelled the SML to move in the downward direction. It must therefore be emphasized that the movement of the SML is dependent on two factors which are the risk free rate and the overall market return for a particular period.

In the analysis, Figure 4.1.9 indicated that 22.22% of the selected shares for this study were fairly priced. This shows an increase in the number of fairly priced shares from 0.0% in 2005 to 22.22% in 2006. The number of fairly priced shares that year included PKL, AGA, SPPC and ALW which gave fair returns as estimated by the Capital Asset Pricing Model and the Security Market Line.

Conversely, majority of the selected shares for that year were mispriced. 38.89% shares were over priced by the CAPM and the remaining shares were under priced. It again holds that majority of the shares on the exchange were mispriced. Among the under valued or priced shares were PZ, CFAO, MOGL, EIC, GCB, ABL and UNIL which gave their shareholders returns above that of the estimated returns by the CAPM. In the same year, the shares of SCB, FML, MLC, BAT, HFC, SSB and GGBL representing 38.89% were all over priced. The conclusion was that majority of the shares (77.78%) on Ghana Stock Exchange in year 2006 were mispriced.

Figure 4.1.10: SML Showing Stock Prices Analysis For 2007

GSE ALL-SHARE INDEX
SML SHOWING STOCK PRICES FOR 2007
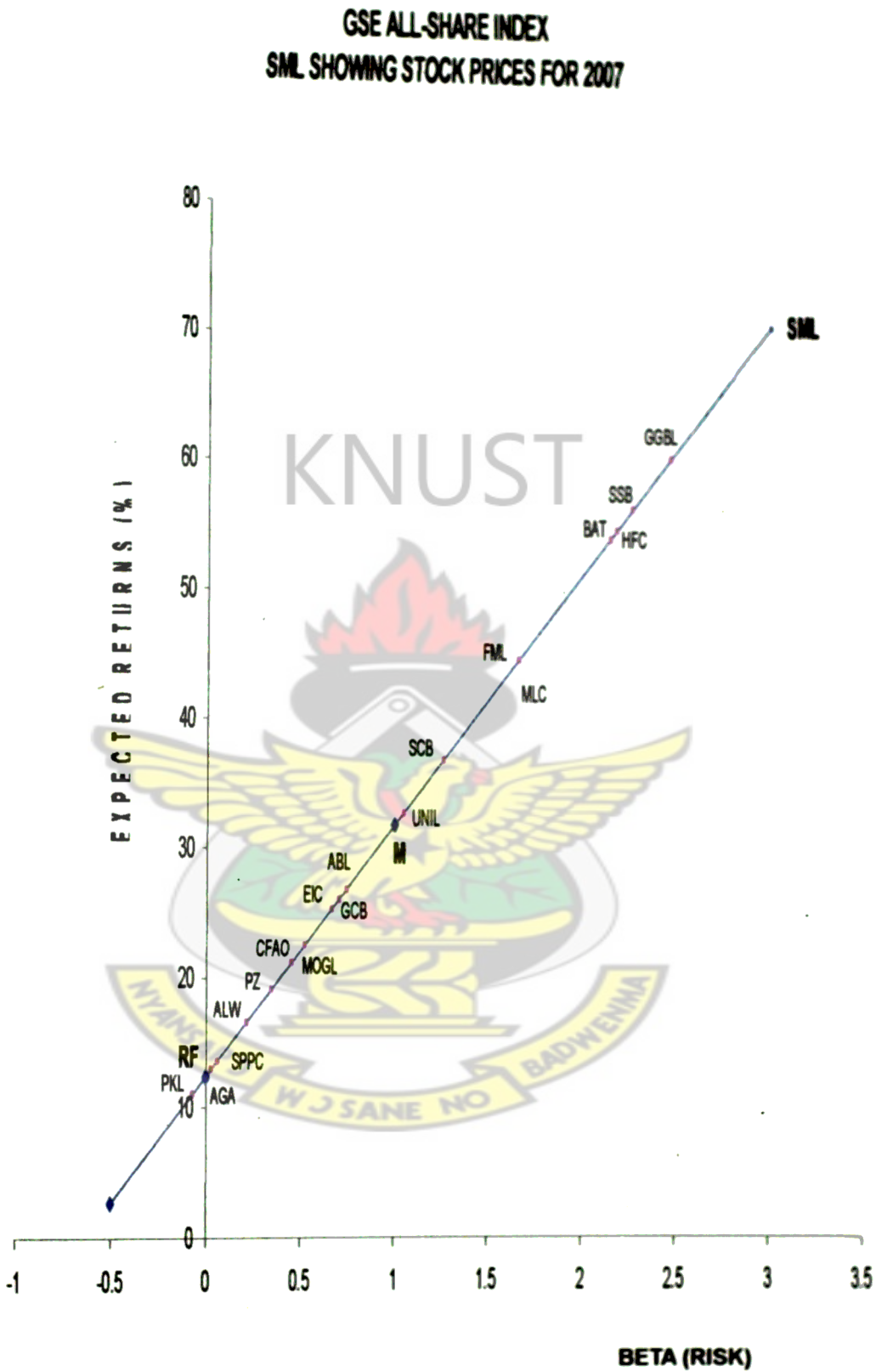
Source: Field Survey, 2009.

The normal upward movement of the Security Market Line from left to right was experienced in 2007. This occurred as a result of the relationship between the risk free rate and the overall market returns. Since the market returns of 31.84% was greater than the annual average risk free rate of 12.41%, the SML moved in the direction depicted by Figure 4.1.10.

It was discovered that 13 shares out 18 were fairly priced in 2007. This represents 72.22% of the selected shares which fairly compensated shareholders for their investment. It is appealing that when this performance is compared to the previous years, most shares according to the CAPM fairly gave expected returns which commensurate shareholders risk. It also means the shares of these companies ALW, MOGL, EIC, SCB, FML, MLC, BAT, AGA SPPC, CFAO, GCB, ABL and GGBL fairly compensated their shareholders and performed adequately well.

In contrast, 27.78% of selected shares for the same year were mispriced. This also gives a clear indication that despite the majority of fairly priced shares as estimated by the CAPM, there was mispricing of shares of companies. It therefore holds to the fact that mispricing of shares exists on the Ghana Stock Exchange. The shares of UNIL, PKL, SSB, HFC and PZ were close to the SML and very difficult to determine their position. However, it was discovered that these shares were under priced, meaning they gave higher returns to their shareholders compared to the CAPM estimates. None of the shares were over priced in the year 2007.

Based on the analyses above, it can be deduced that under and over pricing of shares do exist on the Ghana Stock market. As evidenced, more than one-third of the shares

on the exchange were mispriced. A conclusion can therefore be drawn that mispricing exists on the Ghana Stock Exchange. This finding answers the research question; are there mispricing of shares on the GSE?

4.2 BETA RANKING OF SELECTED COMPANIES

The beta of a share reflects the relative volatility of that share in comparison with the market as a whole. If the beta is three (3), then the share is thrice as volatile as the average share where average share has a beta of one. A beta value greater than one (1) means a more risky share and therefore called Aggressive share. A value of less than one on the other hand is a less risky share and also called Defensive share (Mensah, 2008). To achieve the second objective of the study, the beta of the selected companies were analyzed, ranked and classified as shown on Table 4.2 below.

Table 4.2: Beta Ranking and Classification

GSE ALL-SHARE	BETA OF COMPANIES	RANKING	SHARE CLASSIFICATION	
			AGGRESSIVE	DEFENSIVE
ABL	0.7454	9		0.7454
AGA	0.0295	17		0.0295
ALW	0.2148	15		0.2148
BAT	2.1468	4	2.1468	
CFAO	0.4541	13		0.4541
EIC	0.6662	11		0.6662
FML	1.6600	6	1.6600	
GCB	0.7043	10		0.7043
GGBL	2.4685	1	2.4685	
HFC	2.1821	3	2.1821	
MLC	1.6613	5	1.6613	
MOGL	0.5244	12		0.5244
PKL	-0.0685	18		-0.0685
PZ	0.3468	14		0.3468
SCB	1.2609	7	1.2609	
SPPC	0.0622	16		0.0622
SSB	2.2653	2	2.2653	
UNIL	1.0488	8	1.0488	

Notes: Estimates are based on annual returns from 1998 to 2007. 5% Significant level.

Source: Field survey, 2009.

From the above table, a beta of 2.4685 which is approximately 2.5 of GGBL was ranked first based on the returns of the selected companies. A beta of 2.5 means if the GSE All-Share index moves up by 10%, the share will also move up by 25%. However, when the GSE All-Share Index falls by 10%, the share will fall by a proportion of 25%. Therefore high beta shares are more risky. It therefore suggests that the highest ranked beta of the selected companies for the study is the share of GGBL. Based on volatility, shares with higher beta which signifies the quantum of risk have higher expected returns to their investors. However, should a share with a higher beta yield a lower return to investors, then there has been over pricing of that share or stock on the exchange. The theory of risk and returns justifies this statement that the higher the risk of an investment, the higher the returns.

Additionally, a beta of 0.74 which is below 1 means if the GSE All-Share Index moves up by 10%, the share will only move up by 7.4%. Similarly a fall of 10% in GSE All-Share Index will cause the share to fall by 7.4%. It is worth noting that low beta shares are less risky on an exchange. Less risky shares must therefore give lower expected return to their holders. Should a less risky share gives a return which does not commensurate the risk, then there is mispricing of that share on the Ghana Stock Exchange.

Furthermore, the shares of the selected companies were classified based on their respective beta. With this classification, shares with beta less than one are called defensive shares and shares with beta greater than one are called aggressive shares. The classification of aggressive shares of the selected companies is within the ranking of 1 to 8 and the defensive shares from a ranking of 9 to18. Investors who

are risk averse are therefore advised based on this study to purchase defensive shares and those who are risk oriented must invest in aggressive shares since they give higher returns compared to defensive shares.

It was also discovered that 10 shares out of the selected 18 shares for this study which represents 55.56% are classified as defensive. The remaining 8 shares representing 44.44% are aggressive. It can therefore be concluded that most of the shares listed on the Ghana Stock Exchange are defensive. That is, the GSE All-share Index has 55.56% which are less risky compared to 44.44% shares which are more risky. In general, this information suggests that most shares on the GSE are less risky and therefore will yield exact required returns to potential investors.

4.3 STOCK PRICING, RISK AND RETURN

The relationship between the systematic risk (beta) and the returns of the 18 selected companies and the annual average stock prices and performance in terms of returns were examined. The simple regression analysis was used in both approaches to arrive at a conclusion. In examining the relation between the beta (systematic risk) and the returns of the companies, the following variables were used:

- X: the risk (beta), which is the independent variable
- Y: the returns, which is the dependent variable.

Given the model below, the regression and the co-efficient of determination values were also obtained. The computation of these values has been summarized in table 4.3.1 in the next page.

$$r^2 = b\frac{SS\,xy}{SS\,yy}; \qquad r = \frac{SS\,xy}{\sqrt{SSxx\,SSyy}}$$

$$\frac{261.09}{\sqrt{12.20 \times 8914.28}} = 0.79$$

$$r^2 = 63\%$$

Where;

$$SSxy = \sum xy - \frac{(\sum x)(\sum y)}{n}$$

$$= 1257.22 - (18.93 \times 975)/18 = 261.09$$

$$SSyy = \sum y^2 - \frac{(\sum y)^2}{n}$$

$$= 61726.78 - (975^2)/18 = 8914.28$$

$$SSxx = \sum x^2 - \frac{(\sum x)^2}{n}$$

$$= 30.99 - (18.39^2)/18 = 12.20$$

Table 4.3.1: Regression Analysis: Risk (Beta) and Return

COMPANIES	Risk (X)	RETURNS (Y)	X^2	Y^2	XY
ABL	0.7454	77.47	0.5556	6001.6009	57.7461
AGA	0.0295	6.01	0.0009	36.1201	0.1773
ALW	0.2148	32.46	0.0461	1053.6516	6.9724
BAT	2.1468	79.37	4.6088	6299.5969	170.3915
CFAO	0.4511	34.79	0.2035	1210.3441	15.6938
EIC	0.6662	46.39	0.4438	2152.0321	30.905
FML	1.6600	84.49	2.7556	7138.5601	140.2534
GCB	0.7043	56.77	0.496	3222.8329	39.9831
GGBL	2.4685	72.12	6.0935	5201.2944	178.0282
HFC	2.1821	70.87	4.7616	5022.5569	154.6454
MLC	1.6613	58.95	2.7599	3475.1025	97.9336
MOGL	0.5244	38.58	0.275	1488.4164	20.2314
PKL	-0.0685	33.26	0.0047	1106.2276	-2.2783
PZ	0.3468	56.56	0.1203	3199.0336	19.615
SCB	1.2609	76.87	1.5899	5908.9969	96.9254
SPPC	0.0622	16.41	0.0039	269.2881	1.0207
SSB	2.2653	72.36	5.1316	5235.9696	163.9171
UNIL	1.0688	60.87	1.1423	3705.1569	65.0579
SUM	18.3899	975	30.993	61726.7816	1257.219
NUMBER (n)	18				
Ssxy	261.0994				
SSyy	8914.2816				
SSxx	12.2048				
r	0.7916				
b(slope)	21.3932				
r^2	0.63				

Source: Field Survey, 2009

Table 4.3.1 above examined the relationship between the risk of the related companies and the returns. A positive regression of 0.7916 was obtained and this means there is a strong positive relationship between the beta (systematic risk) and the returns. An increase in the independent variable (i.e. risk) will cause corresponding increase in the returns. This also holds and supports the risk and returns theory in investment management which states that the higher the risk, the higher the return.

A coefficient of determination of 63% (i.e. r^2 = 63%) means 63% of the total variation in the dependent variable occurred as a result of the independent variable and the remaining percent is due to randomness and other variables. It can therefore be concluded that there is a strong positive relationship between the beta (systematic risk) and the returns of shares on the Ghana Stock Exchange. An increase in the beta which is the independent variable will trigger a corresponding increase in the returns.

The second relationship between stock prices and performance (returns) were also examined using the model. The X and Y variables for the relationship between share prices and the returns are stated below: Table 4.3.2 shows the excel computations of the regression values.

- X: the share price, which is the independent variable and
- Y: the returns, which is the dependent variable.

$$r^2 = \frac{b\,SS\,xy}{SS\,yy}; \qquad r = \frac{SS\,xy}{\sqrt{SSxx\,SSyy}}$$

$$\frac{-3346934.16}{\sqrt{13772329256 \times 8914.28}} = -0.30$$

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Where;

$$SSxy = \sum xy - \frac{(\sum x)(\sum y)}{n}$$

$$= 11044661.67 - (265691 \times 975) / 18 = -3346934.16$$

$$SSyy = \sum y^2 - \frac{(\sum y)^2}{n}$$

$$= 61726.7816 - (975^2) / 18 = 8914.28$$

$$SSxx = \sum x^2 - \frac{(\sum x)^2}{n}$$

$$= 176974081783 - (265691^2) / 18 = 13772320256$$

$$r^2 = 0.08 = 8\%$$

Table 4.3.2: Regression Analysis: Average Share Prices and Returns

COMPANIES	SHARE PRICE (X)	RETURNS (Y)	X^2	Y^2	XY
ABL	829	77.47	687241	6001.6009	64222.63
AGA	104957	6.01	11015971849	36.1201	630791.57
ALW	5160	32.46	26625600	1053.6516	167493.6
BAT	2283	79.37	5212089	6299.5969	181201.71
CFAO	158	34.79	24964	1210.3441	5496.82
EIC	5543	46.39	30724849	2152.0321	257139.77
FML	7177	84.49	51509329	7138.5601	606384.73
GCB	5053	56.77	25532809	3222.8329	286858.81
GGBL	4702	72.12	22108804	5201.2944	339108.24
HFC	3370	70.87	11356900	5022.5569	238831.9
MLC	1142	58.95	1304164	3475.1025	67320.9
MOGL	29353	38.58	861598609	1488.4164	1132438.74
PKL	611	33.26	373321	1106.2276	20321.86
PZ	4146	56.56	17189316	3199.0336	234497.76
SCB	74033	76.87	5480885089	5908.9969	5690916.71
SPPC	311	16.41	96721	269.2881	5103.51
SSB	7840	72.36	61465600	5235.9696	567302.4
UNIL	9023	60.87	81414529	3705.1569	549230.01
SUM	**265691**	**975**	**17694081783**	**61726.7816**	**11044661.67**
NUMBER (n)	18				
Ssxy	-3346934.163				
SSyy	8914.2816				
SSxx	13772320256				
r	-0.3021				
B(slope)	-0.0002				
r^2	0.08				

Source: Field Survey, 2009

Statistically, a regression of -0.301 was obtained in the two variables. This means, there is a negative relationship between share prices and their performance (or returns). This is a weaker relationship which explains that an increase in the independent variable will not trigger a corresponding increase in the dependent variable. Therefore higher share prices of companies are not indications of good performance in terms of returns.

Moreover, higher priced or valued shares on the Ghana Stock Exchange have no bearing on the amount of dividend paid to shareholders. In this case, a significant change in the independent variable which is the price of a share will not lead to a correspond change in the returns given to shareholders. Thus, the prices of shares and returns relate in opposite direction and therefore an increase in one could lead to a decrease in the other.

Additionally, r^2 of 0.08 or 8% means the total variation in the dependent variable (the returns on shares) occurred because of the variation in the independent variable and the remaining percentage is due to randomness and other variables. 8% coefficient of determination explains that the model is not strong to support the relationship between the variables. 92% of randomness and other variables could predict the relationship better than variables considered in this analysis. However, the fact still remains that there is a weak negative relationship between the prices and returns of shares on Ghana Stock Exchange.

CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS AND
RECOMMENDATIONS

5.0 INTRODUCTION

The final chapter of the study presents the summary of the major findings of the research, the conclusion and the recommendation. It is worth noting that, the findings, conclusions and recommendations made for this study was based on average annual returns of 18 selected stocks or shares of companies on the Ghana Stock Exchange from the periods 1998 – 2007.

5.1 SUMMARY OF MAJOR FINDINGS

The summary of the major findings of the study on Stock Pricing, Risk and Return of Companies on the Ghana Stock Exchange include the following. The first objective was to study over, under priced (mispriced) and correctly priced shares or stock on the Ghana Stock Exchange. The issue of mispricing of shares being a pillar of the research was examined using the Capital Asset Pricing Model and the Security Market Line. It was discovered that for the ten - year period under the study, there was unfair pricing of shares which is either over or under valuation. The data analyzed confirmed that more than one-third of the shares on the Ghana Stock Exchange were unfairly priced. This gives clear evidence that there were mispricing of shares according to the CAPM on the exchange. A summary of this is as follows. In 1998, only one share [i.e. 5.56%] of the selected stocks was unfairly priced. This means that share gave returns which was lower or higher than the expected return estimated by CAPM. This number increased in the year 1999 to 11.11%. In year

2000, the rate of unfairly priced shares increased to 77.78% indicating that mispricing really exists on the GSE.

Additionally, in years 2003, 2004 and 2006, the Ghana Stock Exchange recorded continuous and higher rate of fair pricing of shares according to the CAPM. However, in year 2005, there was 100.00% unfair pricing of shares on the exchange. This was the highest based on the analyses of the study. This is an indication that under and over valuation of shares existed on the exchange. However, in the final year (i.e. 2007) of the analyses, the percentage of fairly priced shares increased to almost 95.0%.

According to the capital asset pricing model and the security market line, when expected returns on a share and its beta meets the SML, then shares are fairly priced and the opposite means shares are unfairly priced. Table 5.1 illustrates this information concerning share pricing from year 1998 to 2007.

Table 5.1 Summary of Fairly and Unfairly Priced Shares

YEAR	FAIRLY PRICED SHARES	UNFAIRLY PRICED SHARES	
		OVER PRICED	UNDER PRICED
1998	17	1	0
1999	16	1	1
2000	4	7	7
2001	15	1	2
2002	16	0	2
2003	15	0	3
2004	14	0	4
2005	0	11	7
2006	4	7	7
2007	13	0	5
TOTAL	114	66	

Source: Field Survey, 2009

It was discovered that 36.67% of the shares on the Ghana Stock Exchange have been unfairly priced over the years according to the CAPM. It can therefore be concluded that mispricing exists on the Ghana Stock Exchange. The confirms the finding on the first objective of the study.

In share or stock pricing using the CAPM, it was discovered that, the security market line is determined by two major factors. These are the risk free rate (Rf) and the overall market returns (Rm) with betas 0 and 1 respectively. The relationship between the two factors determines the direction or slope of the SML.

A finding on the relationships between the risk free rate and the market return in Ghana and GSE All-Share Index are as follows;

Note: *Rf* = *the risk free rate or treasury bill rate; and*

   Rm = *the overall market returns of the Ghana Stock Exchange.*

When;

1. Rf = Rm: The risk free rate is equal to the market returns, the SML moves parallel to the systematic risk (beta).

2. Rf < Rm: The risk free rate is less than the market returns, SML will move upwards from left to right.

3. Rf > Rm: The risk free rate is greater than the market returns, SML will move downwards from left to right.

This information is depicted in the diagram below.

Expected Returns

Systematic Risk (Beta)
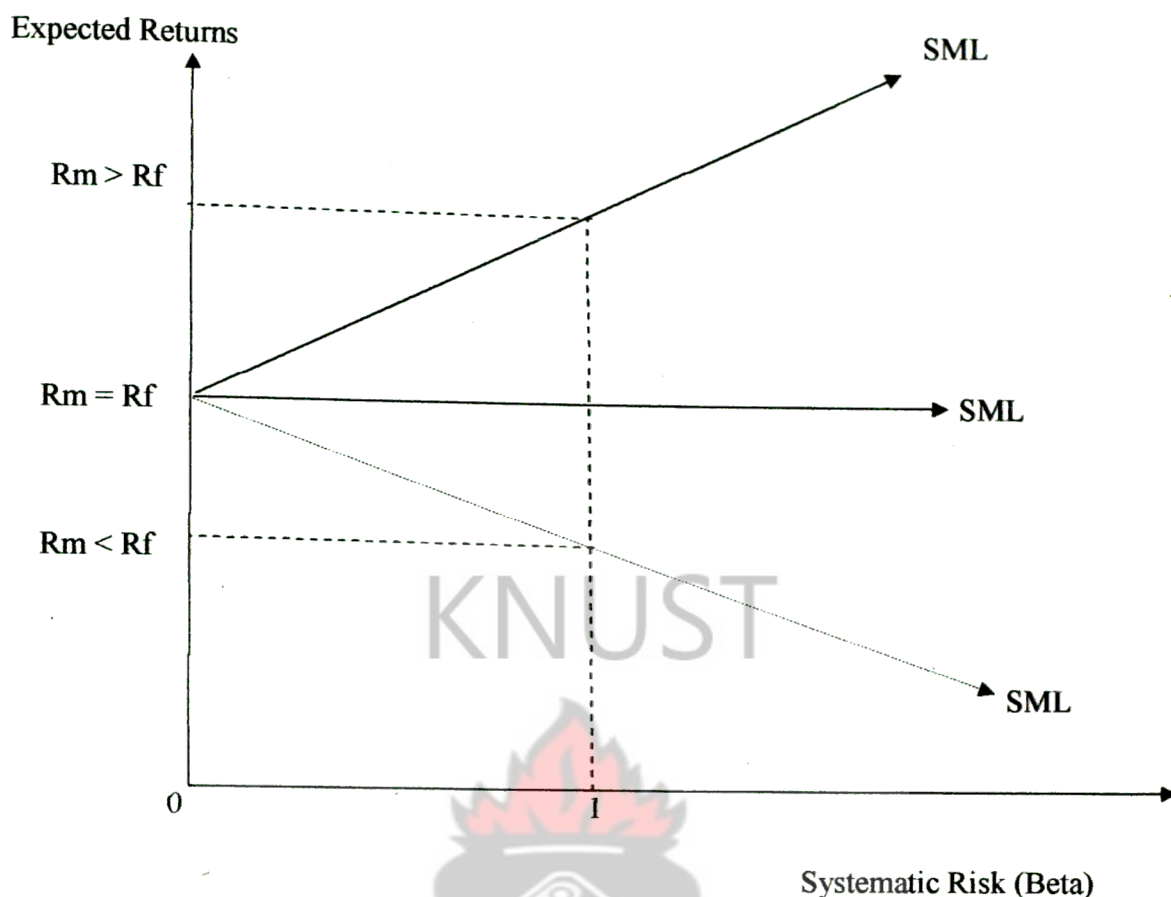
The finding to the second objective of the study was as follows. Again, when the beta of the selected shares were calculated and ranked, the highest beta on the exchange for the selected companies for a period of ten years calculated on annual basis was 2.4685 and -0.0685 as lowest. 44.44% of the selected shares under the study have beta greater than one and these are classified as aggressive shares. The remaining 55.56% shares have beta less than one making them defensive shares. Defensive shares are less risky yielding less return for their investors and the aggressive shares are more risky and therefore yield higher returns to their investors.

It was revealed that shares with the same or similar beta experienced the same or similar volatility in returns. Moreover, when shares are under priced, demand

increases and this causes a decrease in payment of future dividend due to ownership dilution.

As investments are made in stock markets in expectation of returns in excess of the risk-free rate, the relationship between risk and returns has become paramount. This study in an attempt to analyze stock prices also examined the relationship between the risk and return of selected shares on the Ghana Stock Exchange as third objective. It was discovered that there is a strong positive relationship between risk and return of stocks on the exchange. This means investors who purchased aggressive shares (shares with their beta greater than one) showing higher risk level were compensated fairly with higher returns.

Additionally, it was also discovered that there exist a weak negative relationship between the prices of shares and performance (returns) of the selected companies for this study. This means high share price on the exchange is not an indication of good performance. Again increases in share prices of companies do not mean those companies are performing well in terms of returns to their shareholders. Therefore share pricing and returns are negatively related and an increase in one could lead to a decrease in the other.

Another finding was that excess returns on shares or stocks reflect either stock market mispricing or represent compensation for extra risk.

Again, prior information to investors on future market expectations and performance influence returns.

In a CAPM world, *alpha* is the difference between expected returns and real returns. In mathematical terms, alpha could therefore be negative or positive. A negative alpha means expected returns of shares by CAPM are greater than real returns and a positive alpha means expected returns are less than real returns. A negative alpha also means shares are over priced on the stock exchange and vice versa for a positive alpha.

5.2 CONCLUSIONS

In conclusion, the study examined mispricing of shares on the Ghana Stock Exchange for a ten-year period in relation to risk and return of selected shares. The specific objectives were to study the over and under priced shares, to examine beta ranking of selected shares and finally investigated the relationship between share pricing and risk and the relationship between risk and returns of GSE All- Share Index selected shares. The CAPM and the SML and the simple regression analysis with Microsoft Excel were used for calculations and analysis.

It was also revealed that 36.67% of shares were unfairly priced from 1998 to 2007 and this is evidenced that there is mispricing of shares on the stock exchange. Moreover, shares with beta greater than one $[\beta>1]$ were more risky and classified as aggressive shares whilst those with beta less than one $[\beta<1]$ were less risky and also classified as defensive shares. In general, it was also discovered that there is a weak negative relationship between stock prices and returns of companies on the Ghana Stock Exchange. However, there exists a strong positive relationship between the systematic risk (beta) of shares and their returns.

It is therefore recommended that investors who are risk averse should purchase defensive shares whilst those who are risk lovers purchase aggressive share. It must be mentioned that the beta of a security or project must be investigated before investing into it.

5.3 RECOMMENDATIONS

The following recommendations are available to benefit researchers, investors and investment managers on the topic, examining stock pricing and performance of listed stocks on the Ghana Stock Exchange.

As investment decisions are very difficult to make, risk averse investors are advised to purchase defensive shares whilst risk lovers are to purchase aggressive shares. Investors who want to be risk neutral are advised to invest in risk free assets since their return are always certain.

Investors who are planning to invest in shares on exchange or hold a portfolio of stocks should consider the beta of those securities to the market volatility. It is good to know the beta of shares or stocks when planning to hold a portfolio of stocks. Investors and portfolio managers are therefore advised to hold a portfolio of defensive and aggressive shares.

In appraising investment projects, the capital asset pricing model can be used by investors or project managers. This model is therefore recommended for managers for its simplicity in evaluating projects. Also, in the determination of weighted

average cost of capital (WACC) for an entity, capital asset pricing is good compared to other models.

Additionally in using capital asset pricing model (CAPM) for project evaluation, beta is paramount variable and therefore must be critically analyzed and considered.

According to the CAPM, investors on the Ghana Stock Exchange are advised to acquire shares when they are undervalued or priced. They should sell those shares that are overpriced at the exchange to maximize returns on their investment. Individual investors on the exchange are to study the beta of listed stocks to enable them make effective investment decision. However, it is recommended that where investors lack knowledge on investment securities and their betas, then experts must be consulted for better investment decision making.

In the course of the study issues on causes of mispricing and the dynamics in risk free rate and the market returns were discovered. A further research is therefore recommended on the following topics.

- Examine the causes of share or stock mispricing.
- Study the dynamics in risk free rate and overall market returns.

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Note: Average annual Returns on Shares, the Risk free Rate and the Market Returns were used in the calculations. The meanings of the abbreviations in the tables are as follows:

- $P0 =$ Price per share at the beginning of the year
- $P1 =$ Price per share at the end of the year
- $D =$ Dividend per share for the
- $r =$ Returns on the share for the year
- $R =$ Average (mean) returns of the shares for ten years per company
- $RM =$ Market returns for the year
- $Rm =$ Average (mean) Market returns for the ten years
- $Rf =$ Average Risk free rate for the year

SELECTED COMPANIES:

ABL	ACCRA BREWERY LIMITED
AGA	ANGLOGOLD ASHANTI LIMITED
ALW	ALUWORKS
BAT	BRITISH AMERICAN TOBACCO COMPANY LIMITED
CFAO	CFAO GHANA LIMITED
EIC	ENTERPRISE INSURANCE COMPANY
FML	FAN MILK LIMITED
GCB	GHANA COMMERCIAL BANK
GGBL	GUINNESS GHANA BREWERIES LIMITED
HFC	HOME FINANCE COMPANY
MLC	MECHANICAL LLOYD COMPANY LIMITED
MOGL	MOBIL OIL GHANA LIMITED
PAF/ PKL	PIONEER ALUMINIUM FACTORY / PIONEER KITCHENWARE LTD
PZ	PZ CUSSONS GHANA LIMITED
SCB	STANDARD CHARTERED BANK GHANA LIMITED
SPPC	SUPER PAPER PRODUCTS COMPANY LTD.
SSB	SG-SSB LIMITED
UNIL	UNILEVER GHANA LTD

BETA AND CAPM ESTIMATIONS (ABL): AVERAGE SHARE RETURNS, RISK FREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns (r)	(r–R)	(r–R)^2	RM	(RM-Rm)^2	RM - R	(r -R) (RM –Rm)	Rf (%)	CAPM: E(R)
1998	745	850	20	0.1678	-0.0069	0	0.6969	0.0654	0.2558	-0.0018	0.3457	0.6075
1999	850	458	0	-0.4612	-0.6359	0.4044	-0.1522	0.352	-0.5933	0.3773	0.1965	-0.0634
2000	458	630	0	0.3755	0.2008	0.0403	0.1655	0.076	-0.2756	-0.0553	0.27	0.1921
2001	630	320	0	-0.4921	-0.6668	0.4446	0.1142	0.1069	-0.3269	0.218	0.3158	0.1655
2002	320	410	0	0.2813	0.1066	0.0114	0.4596	0.0003	0.0185	0.002	0.2665	0.4104
2003	410	552	14.99	0.3829	0.2082	0.0433	1.5467	1.2224	1.1056	0.2302	0.2973	1.2286
2004	552	1480	15	1.7083	1.5336	2.3519	0.9133	0.223	0.4722	0.7242	0.1845	0.7277
2005	1480	1300	15	-0.1115	-0.2862	0.0819	0.2985	0.0203	-0.1426	0.0408	0.1628	0.264
2006	1300	1150	15	-0.1038	-0.2785	0.0776	0.0497	0.1532	-0.3914	0.109	0.1567	0.0769
2007	1150	1150	0	0	-0.1747	0.0305	0.3184	0.0151	-0.1227	0.0214	0.1241	0.2689
SUM				1.7472		3.4859	4.4106	2.2346		1.6658		
MEAN				0.1747			0.4411					
VARIANCE						0.3486		0.2235				
COV(r, RM)										0.1666		
BETA										0.7464		

BETA AND CAPM ESTIMATIONS (AGA): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns (r)	(r –R)	(r –R)^2	RM	RM - R	(RM-Rm)^2	(r -R) (RM –Rm)	Rf (%)	CAPM: E(R)
1998	17000	18000	0.1	0.0588	-0.0013	0	0.6969	0.2558	0.0654	-0.0003	0.3457	0.3661
1999	18000	18700	0	0.0389	-0.0212	0.0004	-0.1522	-0.5933	0.352	0.0126	0.1965	0.1882
2000	18700	18600	0	-0.0053	-0.0654	0.0043	0.1655	-0.2756	0.076	0.018	0.27	0.2669
2001	18600	18800	0	0.0108	-0.0493	0.0024	0.1142	-0.3269	0.1069	0.0161	0.3158	0.3099
2002	18800	27000	0	0.4362	0.3761	0.1415	0.4596	0.0185	0.0003	0.007	0.2665	0.2722
2003	27000	28650	0	0.0611	0.001	0	1.5467	1.1056	1.2224	0.0011	0.2973	0.3342
2004	28650	28650	0	0	-0.0601	0.0036	0.9133	0.4722	0.223	-0.0284	0.1845	0.206
2005	300,000	300,000	0	0	-0.0601	0.0036	0.2985	-0.1426	0.0203	0.0066	0.1628	0.1668
2006	300,000	300,000	0	0	-0.0601	0.0036	0.0497	-0.3914	0.1532	0.0235	0.1567	0.1535
2007	300,000	300,000	0	0	-0.0601	0.0036	0.3184	-0.1227	0.0151	0.0074	0.1241	0.1298
SUM				0.6005		0.163	4.4106		2.2346	0.0666		
MEAN				0.0601			0.4411					
VARIANCE						0.0163			0.2235			
COV(r, RM)										0.0066		
BETA										0.0295		

BETA AND CAPM ESTIMATIONS (ALW): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns (r)	(r –R)	(r –R)^2	RM	RM - R	(RM-Rm)^2	(r –R)(RM -Rm)	Rf (%)	CAPM: E(R)
1998	2500	2500	361	0.1444	-0.1802	0.0325	0.6969	0.2558	0.0654	-0.0461	0.3457	0.4211
1999	2500	2489	396	0.154	-0.1706	0.0291	-0.1522	-0.5933	0.352	0.1012	0.1965	0.1216
2000	2489	4350	799	1.0687	0.7441	0.5537	0.1655	-0.2756	0.076	-0.2051	0.27	0.2476
2001	4350	4300	500	0.1034	-0.2212	0.0489	0.1142	-0.3269	0.1069	0.0723	0.3158	0.2725
2002	4300	3700	600	0	-0.3246	0.1054	0.4596	0.0185	0.0003	-0.006	0.2665	0.308
2003	3700	4000	400	0.1892	-0.1354	0.0183	1.5467	1.1056	1.2224	-0.1497	0.2973	0.5657
2004	4000	10000	450	1.6125	1.2879	1.6587	0.9133	0.4722	0.223	0.6081	0.1845	0.341
2005	10000	5003	446	-0.4551	-0.7797	0.6079	0.2985	-0.1426	0.0203	0.1112	0.1628	0.1919
2006	5003	7251	0	0.4493	0.1247	0.0156	0.0497	-0.3914	0.1532	-0.0488	0.1567	0.1337
2007	7251	7100	0	-0.0208	-0.3454	0.1193	0.3184	-0.1227	0.0151	0.0424	0.1241	0.1658
SUM				3.2456		3.1894	4.4106		2.2346	0.4795		
MEAN (R)				0.3246			0.4411					
VARIANCE						0.3189			0.2235			
COV(r, RM)										0.048		
BETA												0.2148

BETA AND CAPM ESTIMATIONS (BAT): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns (r)	(r –R)	(r –R)^2	RM	RM - R	(RM-Rm)^2	(r –R) (RM -Rm)	Rf (%)	CAPM: E(R)
1998	346	400	57	0.3208	-0.4729	0.2236	0.6969	0.2558	0.0654	-0.121	0.3457	1.0997
1999	400	469	69	0.345	-0.4487	0.2013	-0.1522	-0.5933	0.352	0.2662	0.1965	-0.5521
2000	469	400	127	0.1237	-0.67	0.4489	0.1655	-0.2756	0.076	0.1847	0.27	0.0457
2001	400	627	235	1.155	0.3613	0.1305	0.1142	-0.3269	0.1069	-0.1181	0.3158	-0.117
2002	627	1001	324	1.1132	0.3195	0.1021	0.4596	0.0185	0.0003	0.0059	0.2665	0.681
2003	1001	5200	354	4.5485	3.7548	14.0985	1.5467	1.1056	1.2224	4.1513	0.2973	2.9795
2004	5200	7700	410	0.5596	-0.2341	0.0548	0.9133	0.4722	0.223	-0.1105	0.1845	1.7491
2005	7700	3050	0	-0.6039	-1.3976	1.9533	0.2985	-0.1426	0.0203	0.1993	0.1628	0.4541
2006	3050	3300	0	0.082	-0.7117	0.5065	0.0497	-0.3914	0.1532	0.2786	0.1567	-0.073
2007	3300	4266	0	0.2927	-0.501	0.251	0.3184	-0.1227	0.0151	0.0615	0.1241	0.5412
SUM				7.9366		17.9705	4.4106		2.2346	4.7979		
MEAN				0.7937			0.4411					
VARIANCE						1.7971			0.2235			
COV(r, RM)										0.4798		
BETA												2.1468

BETA AND CAPM ESTIMATIONS (CFAO): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns (r)	(r-R)	(r-R)^2	RM	RM-R	(RM-Rm)^2	RM-Rm	Rf (%)	CAPM: E(R)
1998	38	50	0	0.3158	-0.0321	0.001	0.6969	0.2558	0.0654	-0.0082	0.3457	0.5052
1999	50	38	0	-0.24	-0.5879	0.3456	-0.1522	-0.5933	0.352	0.3488	0.1965	0.0382
2000	38	51	0	0.3421	-0.0058	0	0.1655	-0.2756	0.076	0.0016	0.27	0.2225
2001	51	60	0	0.1765	-0.1714	0.0294	0.1142	-0.3269	0.1069	0.056	0.3158	0.2243
2002	60	67	0	0.1167	-0.2312	0.0535	0.4596	0.0185	0.0003	-0.0043	0.2665	0.3542
2003	67	75	0	0.1194	-0.2285	0.0522	1.5467	1.1056	1.2224	-0.2526	0.2973	0.8647
2004	75	220	0	1.9333	1.5854	2.5135	0.9133	0.4722	0.223	0.7486	0.1845	0.5154
2005	220	400	0	0.8182	0.4703	0.2212	0.2985	-0.1426	0.0203	-0.0671	0.1628	0.2244
2006	400	399	0	-0.0025	-0.3504	0.1228	0.0497	-0.3914	0.1532	0.1371	0.1567	0.1081
2007	399	350	9	-0.1003	-0.4482	0.2009	0.3184	-0.1227	0.0151	0.055	0.1241	0.2123
SUM				3.4792		3.5401	4.4106		2.2346	1.0149		
MEAN				0.3479			0.4411					
VARIANCE						0.354			0.2235			
COV(r, RM)										0.1015		
BETA										0.4541		

BETA AND CAPM ESTIMATIONS (EIC): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r-R	(r-R)^2	RM	RM-R	(RM-R)^2	(r-R)(RM-R)	Rf (%)	CAPM:E(R)
1998	955	2400	120	1.6387	1.1748	1.3802	0.6969	0.2558	0.0654	0.3005	0.3457	0.5797
1999	2400	1880	145	-0.1563	-0.6202	0.3846	-0.1522	-0.5933	0.352	0.368	0.1965	-0.0358
2000	1880	2700	220	0.6532	0.0893	0.008	0.1655	-0.2756	0.076	-0.0246	0.27	0.2004
2001	2700	3050	271	0.23	-0.2339	0.0547	0.1142	-0.3269	0.1069	0.0765	0.3158	0.1815
2002	3050	4600	321	0.6134	0.1495	0.0224	0.4596	0.0185	0.0003	0.0028	0.2665	0.3951
2003	4600	10500	170	1.3196	0.8557	0.7322	1.5467	1.1056	1.2224	0.9461	0.2973	1.1297
2004	10500	8000	70	-0.2314	-0.6953	0.4834	0.9133	0.4722	0.223	-0.3283	0.1845	0.67
2005	8000	6856	203	-0.1176	-0.5815	0.3381	0.2985	-0.1426	0.0203	0.0829	0.1628	0.2532
2006	6856	8818	0	0.2862	-0.1777	0.0316	0.0497	-0.3914	0.1532	0.0696	0.1567	0.0854
2007	8818	13000	256	0.5033	0.0394	0.0016	0.3184	-0.1227	0.0151	-0.0048	0.1241	0.2535
SUM				4.6391		3.4368	4.4106		2.2346	1.4887		
MEAN				0.4639			0.4411					
VARIANCE						0.3437			0.2235			
COV(r, RM)										0.1489		
BETA										0.6662		

BETA AND CAPM ESTIMATIONS (FML): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r−R	(r−R)^2	RM	RM−R	(RM−R)^2	(r−R)(RM−R)	Rf (%)	CAPM:E(R)
1998	486	1100	75	1.4177	0.5728	0.3281	0.6969	0.2558	0.0654	0.1465	0.3457	0.9287
1999	1100	916	90	-0.0855	-0.9304	0.8656	-0.1522	-0.5933	0.352	0.552	0.1965	-0.3823
2000	916	850	0	-0.0721	-0.917	0.8409	0.1655	-0.2756	0.076	0.2527	0.27	0.0965
2001	850	950	100	0.2353	-0.6096	0.3716	0.1142	-0.3269	0.1069	0.1993	0.3158	-0.0189
2002	950	1785	150	1.0368	0.1919	0.0368	0.4696	0.0185	0.0003	0.0036	0.2665	0.587
2003	1785	3800	192	1.2364	0.3915	0.1533	1.5467	1.1056	1.2224	0.4328	0.2973	2.3713
2004	3800	20000	300	4.3421	3.4972	12.2304	0.9133	0.4722	0.223	1.6514	0.1845	1.3943
2005	20000	15800	400	-0.19	-1.0349	1.071	0.2985	-0.1426	0.0203	0.1476	0.1628	0.3881
2006	15800	18002	460	0.1685	-0.6764	0.4575	0.0497	-0.3914	0.1532	0.2647	0.1567	-0.0209
2007	18002	23900	575	0.3596	-0.4853	0.2355	0.3184	-0.1227	0.0151	0.0595	0.1241	0.4466
SUM				8.4488		16.5907	4.4106		2.2346	3.7101		
MEAN				0.8449			0.4411					
VARIANCE						1.6591			0.2235			
COV(r, RM)										0.371		
BETA										1.66		

BETA AND CAPM ESTIMATIONS (GCB): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r−R	(r−R)^2	RM	RM−R	(RM−R)^2	(r−R)(RM−R)	Rf (%)	CAPM:E(R)
1998	800	1300	100	0.75	0.1823	0.0332	0.6969	0.2558	0.0654	0.0466	0.3457	0.6931
1999	1300	760	175	-0.2808	-0.8485	0.72	-0.1522	-0.5933	0.352	0.5034	0.1965	-0.0491
2000	760	1505	250	1.3092	0.7415	0.5498	0.1655	-0.2756	0.076	-0.2044	0.27	0.1964
2001	1505	1570	400	0.309	-0.2587	0.0669	0.1142	-0.3269	0.1069	0.0846	0.3158	0.1738
2002	1570	3516	500	1.658	0.9903	0.9807	0.4696	0.0185	0.0003	0.0183	0.2665	0.4025
2003	3516	8170	250	1.3948	0.8271	0.6841	1.5467	1.1056	1.2224	0.9144	0.2973	1.1773
2004	8170	10150	375	0.2882	-0.2795	0.0781	0.9133	0.4722	0.223	-0.132	0.1845	0.6978
2005	10150	6740	400	-0.2966	-0.8643	0.747	0.2985	-0.1426	0.0203	0.1232	0.1628	0.2584
2006	6740	6150	400	-0.0282	-0.5959	0.3551	0.0497	-0.3914	0.1532	0.2332	0.1567	0.0813
2007	6150	9950	342	0.6735	0.1058	0.0112	0.3184	-0.1227	0.0151	-0.013	0.1241	0.2609
SUM				5.6771		4.2261	4.4106		2.2346	1.5743		
MEAN				0.5677			0.4411					
VARIANCE						0.4226			0.2235			
COV(r, RM)										0.1574		
BETA										0.7043		

BETA AND CAPM ESTIMATIONS (GGBL): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r – R	(r – R)^2	RM	RM - R	(RM -R)^2	(r -R)(RM -R)	Rf (%)	CAPM:E(R)
1998	650	800	50	0.3077	-0.4135	0.171	0.6969	0.2558	0.0654	-0.1058	0.3457	1.2126
1999	800	950	70	0.275	-0.4462	0.1991	-0.1522	-0.5933	0.352	0.2647	0.1965	-0.6643
2000	950	900	70	0.0211	-0.7001	0.4901	0.1655	-0.2756	0.076	0.1929	0.27	0.012
2001	900	901	90	0.1011	-0.6201	0.3845	0.1142	-0.3269	0.1069	0.2027	0.3158	-0.1818
2002	901	1050	175	0.3596	-0.3616	0.1308	0.4596	0.0185	0.0003	-0.0067	0.2665	0.7432
2003	1050	5650	250	4.619	3.8978	15.1928	1.5467	1.1056	1.2224	4.3094	0.2973	3.3814
2004	5650	12700	300	1.3009	0.5797	0.3361	0.9133	0.4722	0.223	0.2737	0.1845	1.9835
2005	12700	7740	372	-0.3613	-1.0825	1.1718	0.2986	-0.1426	0.0203	0.1544	0.1628	0.4978
2006	7740	9248	418.01	0.2488	-0.4724	0.2232	0.0497	-0.3914	0.1532	0.1849	0.1567	-0.1074
2007	9248	12300	97	0.3405	-0.3807	0.1449	0.3184	-0.1227	0.0151	0.0467	0.1241	0.6037
SUM				7.2124		18.4443	4.4106		2.2346	5.5169		
MEAN				0.7212			0.4411					
VARIANCE						1.8444			0.2235			
COV(r, RM)										0.5517		
BETA										2.4685		

BETA AND CAPM ESTIMATIONS (HFC): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r -R	(r - R)^2	RM	RM - R	(RM -R)^2	(r -R)(RM -R)	Rf (%)	CAPM:E(R)
1998	235	750	24	2.2936	1.5849	2.5119	0.6969	0.2558	0.0654	0.4054	0.3457	1.1121
1999	750	750	29	0.0387	-0.67	0.4489	-0.1522	-0.5933	0.352	0.3975	0.1965	-0.5644
2000	750	952	37	0.3187	-0.39	0.1521	0.1655	-0.2756	0.076	0.1075	0.27	0.042
2001	952	952	44.35	0.0466	-0.6621	0.4384	0.1142	-0.3269	0.1069	0.2164	0.3158	-0.1241
2002	952	955	67	0.0735	-0.6352	0.4035	0.4596	0.0185	0.0003	-0.0118	0.2665	0.6879
2003	955	4000	70.61	3.2624	2.5537	6.5214	1.5467	1.1056	1.2224	2.8234	0.2973	3.0236
2004	4000	10000	86.02	1.5215	0.8128	0.6606	0.9133	0.4722	0.223	0.3838	0.1845	1.7748
2005	10000	6000	45.67	-0.3954	-1.1041	1.219	0.2986	-0.1426	0.0203	0.1574	0.1628	0.4589
2006	6000	5400	55.82	-0.0907	-0.7994	0.639	0.0497	-0.3914	0.1532	0.3129	0.1567	-0.0768
2007	5400	5400	100	0.0185	-0.6902	0.4764	0.3184	-0.1227	0.0151	0.0847	0.1241	0.5481
SUM				7.0874		13.4712	4.4106		2.2346	4.8772		
MEAN ®				0.7087			0.4411					
VARIANCE						1.3471			0.2235			
COV(r, RM)										0.4877		
BETA										2.1821		

BETA AND CAPM ESTIMATIONS (MLC): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r –R	(r – R)^2	RM	RM - R	(RM -R)^2	(r –R)(RM –R)	Rf (%)	CAPM:E(R)
1998	194	200	7	0.067	-0.5225	0.273	0.6969	0.2558	0.0654	-0.1337	0.3457	0.9291
1999	200	151	7.01	-0.21	-0.7995	0.6392	-0.1522	-0.5933	0.352	0.4743	0.1965	-0.3828
2000	151	135	0	-0.106	-0.6955	0.4837	0.1656	-0.2756	0.076	0.1917	0.27	0.0964
2001	135	145	22.5	0.2407	-0.3488	0.1217	0.1142	-0.3269	0.1069	0.114	0.3158	-0.0191
2002	145	270	24	1.0276	0.4381	0.1919	0.4596	0.0185	0.0003	0.0081	0.2665	0.5873
2003	270	700	29.99	1.7037	1.1142	1.2414	1.5467	1.1056	1.2224	1.2319	0.2973	2.3729
2004	700	3100	30	3.4714	2.8819	8.3053	0.9133	0.4722	0.223	1.3608	0.1845	1.3953
2005	3100	2500	30	-0.1839	-0.7734	0.5981	0.2985	-0.1426	0.0203	0.1103	0.1628	0.3882
2006	2500	2100	40	-0.144	-0.7335	0.538	0.0497	-0.3914	0.1532	0.2871	0.1567	-0.0211
2007	2100	2100	60	0.0286	-0.5609	0.3146	0.3184	-0.1227	0.0151	0.0688	0.1241	0.4469
SUM				5.8951		12.7069	4.4106		2.2346	3.7133		
MEAN				0.5895			0.4411					
VARIANCE						1.2707			0.2235			
COV(r, RM)										0.3713		
BETA										1.6613		

BETA AND CAPM ESTIMATIONS (MOGL): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r –R	(r – R)^2	RM	RM - R	(RM -R)^2	(r –R)(RM –R)	Rf (%)	CAPM:E(R)
1998	8230	17000	1173	1.2081	0.85	0.7225	0.6969	0.2558	0.0654	0.2174	0.3457	0.5299
1999	17000	13800	1820	-0.0812	-0.4393	0.193	-0.1522	-0.5933	0.352	0.2606	0.1965	0.0136
2000	13800	18600	2500	0.529	0.1709	0.0292	0.1656	-0.2756	0.076	-0.0471	0.27	0.2152
2001	18600	18500	2536	0.131	-0.2271	0.0516	0.1142	-0.3269	0.1069	0.0742	0.3158	0.2101
2002	18500	19730	2550	0.2043	-0.1538	0.0237	0.4596	0.0185	0.0003	-0.0028	0.2665	0.3678
2003	19730	35001	3650	0.959	0.6009	0.3611	1.5467	1.1056	1.2224	0.6644	0.2973	0.9525
2004	35001	39000	3646	0.2184	-0.1397	0.0195	0.9133	0.4722	0.223	-0.066	0.1845	0.5667
2005	39000	38000	0	-0.0256	-0.3837	0.1472	0.2985	-0.1426	0.0203	0.0547	0.1628	0.234
2006	38000	54030	0	0.4218	0.0637	0.0041	0.0497	-0.3914	0.1532	-0.0249	0.1567	0.1006
2007	54030	54910	0	0.0163	-0.3418	0.1168	0.3184	-0.1227	0.0151	0.0419	0.1241	0.226
SUM				3.5811		1.6687	4.4106		2.2346	1.1724		
MEAN				0.3581			0.4411					
VARIANCE						0.1669			0.2235			
COV(r, RM)										0.1172		
BETA										0.5244		

BETA AND CAPM ESTIMATIONS (PKL): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r–R	(r–R)^2	RM	RM–R	(RM–R)^2	(r–R)(RM–R)	Rf (%)	CAPM:E(R)
1998	179	400	29.94	1.4019	1.0693	1.1434	0.6969	0.2558	0.0654	0.2735	0.3457	0.3216
1999	400	300	35.93	-0.1602	-0.4928	0.2429	-0.1522	-0.5933	0.352	0.2924	0.1965	0.2204
2000	300	267	47.91	0.0497	-0.2829	0.08	0.1655	-0.2756	0.076	0.078	0.27	0.2772
2001	267	800	0	1.9963	1.6637	2.7679	0.1142	-0.3269	0.1069	-0.5439	0.3158	0.3296
2002	800	750	0	-0.0625	-0.3951	0.1561	0.4596	0.0185	0.0003	-0.0073	0.2665	0.2633
2003	750	740	24.97	0.02	-0.3126	0.0977	1.5467	1.1056	1.2224	-0.3456	0.2973	0.2117
2004	740	800	0	0.0811	-0.2515	0.0633	0.9133	0.4722	0.223	-0.1188	0.1845	0.1346
2005	800	800	0	0	-0.3326	0.1106	0.2985	-0.1426	0.0203	0.0474	0.1628	0.1635
2006	800	800	0	0	-0.3326	0.1106	0.0497	-0.3914	0.1532	0.1302	0.1567	0.164
2007	800	800	0	0	-0.3326	0.1106	0.3184	-0.1227	0.0151	0.0408	0.1241	0.1108
SUM				3.3263		4.8831	4.4106		2.2346	-0.1533		
MEAN				0.3326			0.4411					
VARIANCE						0.4883			0.2235			
COV(r, RM)										-0.0153		
BETA										-0.0685		

BETA AND CAPM ESTIMATIONS (PZ): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r–R	(r–R)^2	RM	RM–R	(RM–R)^2	(r–R)(RM–R)	Rf (%)	CAPM:E(R)
1998	330	900	10	1.7676	1.192	1.4209	0.6969	0.2558	0.0654	0.3049	0.3457	0.4675
1999	900	800	10	-0.1	-0.6656	0.443	-0.1522	-0.5933	0.352	0.3949	0.1965	0.0756
2000	800	400	10.5	-0.4869	-1.0525	1.1078	0.1655	-0.2756	0.076	0.2901	0.27	0.2338
2001	400	1010	55	1.6625	1.0969	1.2032	0.1142	-0.3269	0.1069	-0.3586	0.3158	0.2459
2002	1010	2005	57.8	1.0424	0.4768	0.2273	0.4596	0.0185	0.0003	0.0088	0.2665	0.3335
2003	2005	2700	11	0.3521	-0.2135	0.0456	1.5467	1.1056	1.2224	-0.236	0.2973	0.7306
2004	2700	4700	72	0.7674	0.2018	0.0407	0.9133	0.4722	0.223	0.0953	0.1845	0.4372
2005	4700	6500	7	0.3845	-0.1811	0.0328	0.2985	-0.1426	0.0203	0.0258	0.1628	0.2099
2006	6500	6660	0	0.0246	-0.541	0.2927	0.0497	-0.3914	0.1532	0.2117	0.1567	0.1196
2007	6660	8312	23	0.2515	-0.3141	0.0987	0.3184	-0.1227	0.0151	0.0385	0.1241	0.1915
SUM				5.6557		4.9127	4.4106		2.2346	0.7754		
MEAN				0.5656			0.4411					
VARIANCE						0.4913			0.2235			
COV(r, RM)										0.0775		
BETA										0.3468		

BETA AND CAPM ESTIMATIONS (SCB): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r –R	(r - R)^2	RM	RM - R	(RM -R)^2	(r -R)(RM –R)	Rf (%)	CAPM:E(R)
1998	8100	24000	2506	2.2723	1.5036	2.2608	0.6969	0.2558	0.0654	0.3846	0.3457	0.7885
1999	24000	19000	3208	-0.0747	-0.8434	0.7113	-0.1522	-0.5933	0.352	0.5004	0.1965	-0.2432
2000	19000	21500	3208	0.3004	-0.4683	0.2193	0.1655	-0.2756	0.076	0.1291	0.27	0.1382
2001	21500	20500	4200	0.1488	-0.6199	0.3843	0.1142	-0.3269	0.1069	0.2026	0.3158	0.0616
2002	20500	28700	7727	0.7769	0.0082	0.0001	0.4596	0.0185	0.0003	0.0002	0.2665	0.51
2003	28700	61001	8765	1.4309	0.6622	0.4385	1.5467	1.1056	1.2224	0.7321	0.2973	1.8727
2004	61001	170000	9574	1.9438	1.1751	1.3809	0.9133	0.4722	0.223	0.5549	0.1845	1.1034
2005	170000	130000	12095	-0.1641	-0.9328	0.8701	0.2985	-0.1426	0.0203	0.133	0.1628	0.3339
2006	130000	158000	13000	0.3154	-0.4533	0.2055	0.0497	-0.3914	0.1532	0.1774	0.1567	0.0218
2007	158000	260000	14500	0.7373	-0.0314	0.001	0.3184	-0.1227	0.0151	0.0039	0.1241	0.3691
SUM				7.687		6.4718	4.4106		2.2346	2.8182		
MEAN				0.7687			0.4411					
VARIANCE						0.6472			0.2235			
COV(r, RM)										0.2818		
BETA										1.2609		

BETA AND CAPM ESTIMATIONS (SPPC): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r –R	(r - R)^2	RM	RM - R	(RM -R)^2	(r -R)(RM –R)	Rf (%)	CAPM:E(R)
1998	158	251	0	0.5886	0.4245	0.1802	0.6969	0.2558	0.0654	0.1086	0.3457	0.3675
1999	251	150	0	-0.4024	-0.5665	0.3209	-0.1522	-0.5933	0.352	0.3361	0.1965	0.1748
2000	150	260	22	0.88	0.7159	0.5125	0.1655	-0.2756	0.076	-0.1973	0.27	0.2635
2001	260	341	20	0.3885	0.2244	0.0504	0.1142	-0.3269	0.1069	-0.0734	0.3158	0.3033
2002	341	387	0	0.1349	-0.0292	0.0009	0.4596	0.0185	0.0003	-0.0005	0.2665	0.2785
2003	387	390	0	0.0078	-0.1563	0.0244	1.5467	1.1056	1.2224	-0.1728	0.2973	0.375
2004	390	390	0	0	-0.1641	0.0269	0.9133	0.4722	0.223	-0.0775	0.1845	0.2298
2005	390	390	0	0	-0.1641	0.0269	0.2985	-0.1426	0.0203	0.0234	0.1628	0.1712
2006	390	225	0	-0.4231	-0.5872	0.3448	0.0497	-0.3914	0.1532	0.2298	0.1567	0.15
2007	225	330	0	0.4667	0.3026	0.0916	0.3184	-0.1227	0.0151	-0.0371	0.1241	0.1362
SUM				1.641		1.5795	4.4106		2.2346	0.1393		
MEAN				0.1641			0.4411					
VARIANCE						0.158			0.2235			
COV(r, RM)										0.0139		
BETA										0.0622		

BETA AND CAPM ESTIMATIONS (SSB): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r – R	(r - R)^2	RM	RM - R	(RM -R)^2	(r -R)(RM -R)	Rf (%)	CAPM:E(R)
1998	1700	2250	199.78	0.441	-0.2826	0.0799	0.6969	0.2558	0.0654	-0.0723	0.3457	1.1413
1999	2250	1984	233.12	-0.0146	-0.7382	0.5449	-0.1522	-0.5933	0.352	0.438	0.1965	-0.6934
2000	1984	2040	378.57	0.219	-0.5046	0.2546	0.1655	-0.2756	0.076	0.1391	0.27	0.0333
2001	2040	2200	599.97	0.3725	-0.3511	0.1233	0.1142	-0.3269	0.1069	0.1148	0.3158	-0.1409
2002	2200	3966	479.98	1.0209	0.2973	0.0884	0.4596	0.0185	0.0003	0.0055	0.2665	0.7039
2003	3966	21000	739.57	4.4815	3.7579	14.1218	1.5467	1.1056	1.2224	4.1547	0.2973	3.1276
2004	21000	27000	900	0.3286	-0.395	0.156	0.9133	0.4722	0.223	-0.1865	0.1845	1.8366
2005	27000	7200	487	-0.7153	-1.4389	2.0704	0.2986	-0.1426	0.0203	0.2052	0.1628	0.4702
2006	7200	6000	450	-0.1042	-0.8278	0.6853	0.0497	-0.3914	0.1532	0.324	0.1567	-0.0857
2007	6000	12500	739	1.2065	0.4829	0.2332	0.3184	-0.1227	0.0151	-0.0593	0.1241	0.5642
SUM				7.2359		18.3578	4.4106		2.2346	5.0632		
MEAN				0.7236			0.4411					
VARIANCE						1.8358			0.2235			
COV(r, RM)										0.5063		
BETA										2.2653		

BETA AND CAPM ESTIMATIONS (UNIL): AVERAGE SHARE RETURNS, RISKFREE RATE AND MARKET RETURNS (1998-2007)

	P0	P1	D	Returns	r – R	(r - R)^2	RM	RM - R	(RM -R)^2	(r -R)(RM -R)	Rf (%)	CAPM:E(R)
1998	1100	1600	173	0.6118	0.0031	0	0.6969	0.2558	0.0654	0.0008	0.3457	0.714
1999	1600	1850	195	0.2781	-0.3306	0.1093	-0.1522	-0.5933	0.352	0.1961	0.1965	-0.1692
2000	1850	1600	270	0.0108	-0.5979	0.3575	0.1655	-0.2756	0.076	0.1648	0.27	0.1604
2001	1600	2300	532	0.77	0.1613	0.026	0.1142	-0.3269	0.1069	-0.0527	0.3158	0.1044
2002	2300	4805	699	1.393	0.7843	0.6151	0.4596	0.0185	0.0003	0.0145	0.2665	0.469
2003	4805	14041	896	2.1086	1.4999	2.2497	1.5467	1.1056	1.2224	1.6583	0.2973	1.6077
2004	14041	22000	896	0.6307	0.022	0.0005	0.9133	0.4722	0.223	0.0104	0.1845	0.9489
2005	22000	15400	896	-0.2593	-0.868	0.7534	0.2986	-0.1426	0.0203	0.1238	0.1628	0.3051
2006	15400	15400	1050	0.0682	-0.5405	0.2921	0.0497	-0.3914	0.1532	0.2116	0.1567	0.0445
2007	15000	21100	1019	0.4746	-0.1341	0.018	0.3184	-0.1227	0.0151	0.0165	0.1241	0.3279
SUM				6.0865		4.4216	4.4106		2.2346	2.3441		
MEAN				0.6087			0.4411					
VARIANCE						0.4422			0.2235			
COV(r, RM)										0.2344		
BETA										1.0488		

BETA AND RETURNS OF SELECTED COMPANIES:

RISK FREE RATE AND MARKET RETURNS (1998 - 2007)

COMPANIES	BETA (X)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ABL	0.7454	60.75	-6.34	19.21	16.55	41.04	122.86	72.77	26.4	7.69	26.89
AGA	0.0295	35.61	18.62	26.69	30.99	27.22	33.42	20.6	16.68	15.35	12.98
ALW	0.2148	42.11	12.16	24.76	27.25	30.8	56.57	34.1	19.19	13.37	16.58
BAT	2.1468	109.97	-55.21	4.57	-11.7	68.1	297.95	174.91	45.41	-7.3	54.12
CFAO	0.4541	50.52	3.82	22.25	22.43	35.42	86.47	51.54	22.44	10.81	21.23
EIC	0.6662	57.97	-3.58	20.04	18.15	39.51	112.97	67	25.32	8.54	25.35
FML	1.66	92.87	-38.23	9.65	-1.89	58.7	237.13	139.43	38.81	-2.09	44.66
GCB	0.7043	59.31	-4.91	19.64	17.38	40.25	117.73	69.78	25.84	8.13	26.09
GGBL	2.4685	121.26	-66.43	1.2	-18.18	74.32	338.14	198.35	49.78	-10.74	60.37
HFC	2.1821	111.21	-56.44	4.2	-12.41	68.79	302.36	177.48	45.89	-7.68	54.81
MLC	1.6613	92.91	-38.28	9.64	-1.91	58.73	237.29	139.53	38.82	-2.11	44.69
MOGL	0.5244	52.99	1.36	21.52	21.01	36.78	95.25	56.67	23.4	10.06	22.6
PKL	-0.0685	32.16	22.04	27.72	32.96	25.33	21.17	13.46	15.35	16.4	11.08
PZ	0.3468	46.75	7.56	23.38	24.59	33.35	73.06	43.72	20.99	11.96	19.15
SCB	1.2609	78.85	-24.32	13.82	6.16	51	187.27	10.34	33.39	2.18	36.91
SPPC	0.0622	36.75	17.48	26.35	30.33	27.85	37.5	22.98	17.12	15	13.62
SSB	2.2653	114.13	-59.34	3.33	-14.09	70.39	312.76	183.55	47.02	-8.57	56.42
UNIL	1.0488	71.4	-16.92	16.04	10.44	46.9	160.77	94.89	30.51	4.45	32.79
	-0.5	17.01	37.09	32.36	41.66	16.31	-32.38	-17.99	11.61	23.04	2.7
RF	0	34.57	19.65	27.09	31.58	26.65	29.97	18.45	17.69	15.67	12.41
M	1	69.69	-15.22	16.55	11.42	45.96	154.67	91.33	29.85	4.97	31.84
SML	3	139.93	-84.96	-4.53	-28.9	84.58	404.07	237.09	54.17	-14.41	70.7

APPENDIX III

SHORT TERM SECURITIES RATE PROFILE (ONE YEAR)

GHANA: RISK FREE RATE FROM: 1994 – 2008

MONTH	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
JAN	31.25	33.75	39.00	42.76	42.80	19.04	23.30	31.00	28.73	27.00	19.38	17.91	16.46	12.92	12.30
FEB	28.25	36.00	39.00	42.79	42.80	19.00	22.16	31.00	25.95	27.28	19.52	18.00	16.38	12.73	12.30
MAR	28.25	36.00	39.25	42.80	42.80	19.00	22.27	31.00	25.73	27.54	19.95	18.00	16.08	12.50	12.50
APR	28.25	36.00	39.49	42.80	42.80	19.00	22.37	31.62	25.83	30.68	19.45	18.00	15.71	12.40	12.80
MAY	28.25	36.00	39.45	42.80	42.14	19.00	22.21	31.76	25.91	32.32	18.41	18.00	15.50	12.30	14.50
JUN	28.25	36.00	39.51	42.80	34.95	19.00	26.67	32.00	26.22	32.97	17.79	18.00	15.50	12.30	16.20
JUL	28.25	36.00	40.01	42.80	33.20	19.00	30.81	32.00	26.61	33.52	17.73	18.00	15.50	12.30	17.81
AUG	28.57	36.00	40.50	42.80	33.12	19.00	31.00	32.00	26.99	33.54	17.8	18.00	15.50	12.30	19.88
SEP	29.05	36.75	41.53	42.80	31.65	19.52	31.16	32.00	26.89	31.74	17.75	17.63	15.50	12.30	20.00
OCT	29.05	39.00	41.99	42.80	27.17	19.65	31.08	32.00	26.98	31.33	17.87	17.18	15.50	12.30	20.00
NOV	31.78	39.00	42.21	42.80	22.24	22.24	31.00	32.00	27.00	30.04	17.84	16.95	15.50	12.30	20.00
DEC	32.55	39.00	45.52	42.80	19.12	22.31	31.00	30.61	27.00	21.72	17.86	16.63	14.88	12.30	20.00
AVG	29.313	36.625	40.62167	42.79583	34.56583	19.6467	27.08583	31.5825	26.6533	29.9733	18.44583	17.69167	15.6675	12.4125	16.52417

Source: Bank of Ghana

APPENDIX IV

DEFINITION OF TERMINOLOGIES

CAPM: It is the capital assets pricing model of a stock or security.

SML: It is the graphical representation of the expected return-beta relationship of the CAPM.

Risk Free Rate: It is the interest rate that can be earned with certainty.

Over Priced Stock: Stock which beta and expected returns plotted is below the SML.

Under Priced Stock: Stock which beta and expected returns plotted is above the SML.

Returns: Profit on capital investment or security.

Systematic Risk: Risk that affects a large number of assets, each to a greater or less degree. Systematic risk is also called market risk or common risk.

Unsystematic Risk: Risk that specifically affect a single assets or a small group of assets.

Risk Free Asset: An asset with a certain rate of return often taken to be short term T-bills.

Risk Averse Investors: Investors who consider risky portfolios only if they provide compensation for risk via a risk premium.

Risk Neutral Investors: Investors who find the level of risk irrelevant and consider only the expected return of risk prospects.

Risk Lover Investors: Investors willing to accept lower expected returns on prospects with higher amount of risk.

Risk premium: An expected in excess of that on risk-free securities. The premium provides compensation for the risk of an investment.

Stock: Ownership right in a company. It is commonly referred to as share. Stock and share are therefore used interchangeably.

Stock Price: This is the value of a stock or a share at a particular period.

Securities: These are financial assets which can be bought and sold.

## GHANA STOCK EXCHANGE MARKET STATISTICS

GHANA STOCK EXCHANGE — *Market Statistics* — **July 2009**

MARKET HIGHLIGHTS

Month	No. of trading days	Number listed Companies	CSE All-Share Index	Market Cap. (GH¢ m.)	Traded Volume (m.)	Traded Value (GH¢ m.)	Corporate Bonds HFC Housbonds (US$ m.)	Traded Value $	Government Bonds Value Listed (GH¢ m.)	Traded Value (GH¢ m.)
Jul-09	22	35	5230.49	15,139.50	6.28	4.82	6.4	0	1,136.38	0
Jun-09	22	35	5,423.98	15,279.49	2.64	2.01	6.40	0	1,174.45	0
May-09	19	35	7,496.02	16,787.22	2.21	12.08	6.40	0	1,205.42	0
Apr-09	20	35	8,822.91	17,751.90	19.30	9.82	6.40	0	1,284.71	0
Mar-09	21	35	9,247.17	18,041.20	5.16	4.94	6.40	0	1,341.39	5.7945
Feb-09	21	35	9,836.84	18,465.15	4.88	2.49	6.40	1,000	1,451.13	0.0047
Jan-09	21	35	10,220.99	17,872.87	7.28	6.35	6.40	0	1,535.06	0.3400
TOTAL	146				47.75	42.51				

MARKET CAPITALIZATION 2009/2008
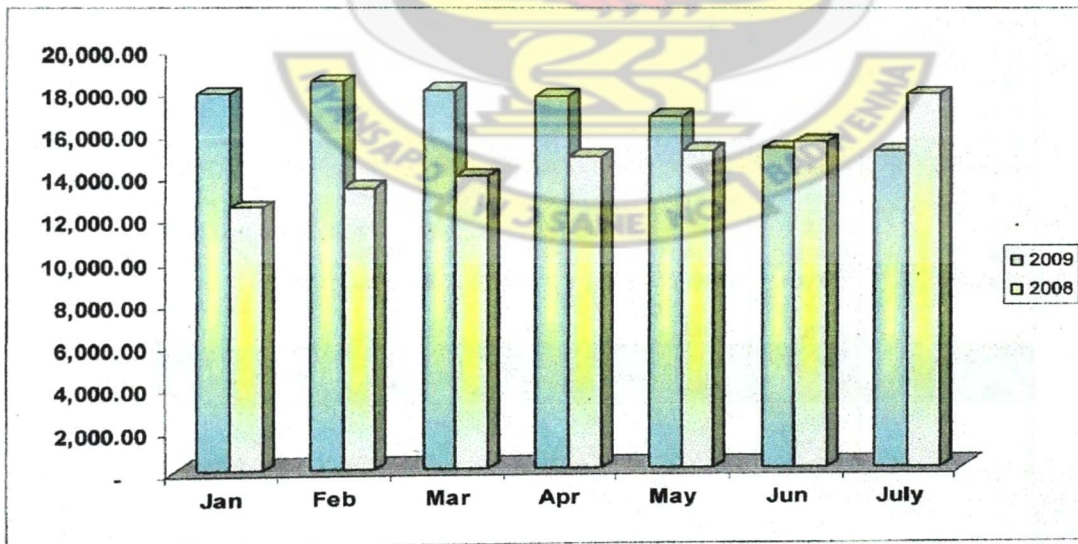
Index Summary (1990—2009)

	High	Date	Low	Date	End of Period	% Change
1990 (Nov. - Dec.)	77.65	Nov-12	70.08	Dec-21	70.08	-
1991	69.77	Jan-04	55.49	May-17	64.51	(7.95)
1992	72.90	Oct-06	60.15	Jun-23	62.17	(3.63)
1993	132.88	Dec-30	63.29	Jan-05	132.88	113.74
1994	334.02	May-17	132.91	Jan-04	298.10	124.34
1995	322.11	Oct-25	296.32	Mar-22	316.97	6.33
1996	385.80	Sep-13	307.42	Jan-12	360.76	13.82
1997	524.21	Dec-08	346.66	Jan-31	511.74	41.85
1998	1,201.08	May-06	511.66	Jan-07	868.35	69.69
1999	903.17	Feb-05	735.39	Dec-22	736.16	(15.22)
2000	873.35	Sep-22	737.16	Jan-03	857.98	16.55
2001	1,025.78	Aug-01	856.00	Feb-07	955.95	11.42
2002	1,395.31	Dec-30	955.95	Jan-02	1,395.31	45.96
2003	3,553.42	Dec-31	1,395.36	Jan-02	3,553.42	154.67
2004	7,469.04	Aug-25	3,558.96	Jan-02	6,798.59	91.33
2005	6,901.36	Jan-28	4,751.17	Dec-22	4,769.02	29.85
2006	5,006.02	Dec-29	4,692.84	Jan-31	5,006.02	4.97
2007	6,599.77	Dec-31	5,001.15	Jan-11	6,599.77	31.84
2008	10,931.36	Oct-03	6,595.92	Jan-02	10,431.64	58.06
2009	10,431.64	Jan-02	5,201.25	Jul-28	5,230.49	(49.86)

History Of Market Activities

Period	Totals		Year-end	Value of Listed Bonds	
	Volume Traded (000)	Value Traded (GH ¢ m)	Market Cap. - Equities (GH ¢ m.)	Government Bonds GH ¢ m.	Corporate Bonds US$ m.
Nov - Dec 1990	222.00	0.0064	3.05	0.50	-
1991	1,825.80	0.0105	2.96	0.50	-
1992	2,044.40	0.0173	4.38	0.50	-
1993	37,945.47	0.32	9.65	0.50	-
1994	93,037.63	7.31	196.84	0.50	-
1995	55,838.60	2.71	239.90	-	-
1996	35,749.99	2.79	286.27	-	2.55
1997	125,629.14	9.34	255.28	-	4.80
1998	91,446.52	13.40	324.56	-	6.80
1999	49,568.22	6.96	320.54	-	9.50
2000	30,717.09	5.06	365.50	-	11.01
2001	55,295.87	9.23	390.40	100.37	10.20
2002	44,124.20	8.94	618.38	132.69	10.98
2003	96,330.00	38.93	1,261.68	144.24	8.98
2004	104,349.30	65.59	9,761.48	51.63	6.28
2005	81,400.00	46.44	9,185.73	22.50	8.78
2006	98,286.00	47.60	11,249.60	326.15	2.50
2007	287,221.70	140.71	12,368.60	1,333.07	6.40
2008	531,660.00	365.51	17,895.12	1,237.46	6.40
2009	47,752.59	42.51	15,139.50	1,174.45	6.40
Total: Dec. 1990 to July 2009	1,870,444.42	813.37			

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