AWARENESS OF FINANCIAL MARKET PRODUCTS IN GHANAIAN UNIVERSITIES: A CASE STUDY OF CHRISTIAN SERVICE UNIVERSITY COLLEGE, GARDEN CITY UNIVERSITY AND UNIVESRSITY OF EDUCATION, WINNEBA- KUMASI.

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DECLARATION

I hereby declare that this submission is my own work towards the Master of Science degree 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 acknowledge has been made in the test.

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ABSTRACT

Many studies document substantial heterogeneity in individual financial portfolios, including the fact that many consumers hold no stocks, a feature that is known as the non-participation puzzle (Mankiw and Zeldes, 1991; Haliassos and Bertaut, 1995). Limited financial market participation has important implications for individual welfare and the explanation of the equity premium puzzle. On the welfare issue, Cocco, Gomes and Maenhout (2005) calculated the welfare loss from non-participation in stock markets can be substantial, between 1.5 and 2% of consumption in calibrated life-cycle models. On the equity premium front, Mankiw and Zeldes (1991) treat share ownership as an exogenous individual characteristic and show that differences in the consumption patterns of stockholders and non-stockholders tend to lower the level of risk aversion necessary to justify the equity premium. Attanasio, Banks and Tanner (2002) estimate ownership probabilities to separate "likely" stockholders from non-stockholders, and don't reject the prediction of the consumption capital asset pricing model for the group of stockholders.

The thesis documents the awareness of the various investment products in the Ghanaian financial market by the staff of Christian Services University College, Garden City University College and University of Education, Winneba-Kumasi. The researcher used Logit regression model and found that there was about 68% likelihood of financial awareness among the sampled respondents in the study area, the youth and the single invest more than the aged and the married. Finally, most of the respondents prefer investing in single products than diversifying.

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CHAPTER 1

INTRODUCTION

1.0 Background to the study

Since ancient times a lot of different cultures had been concern about numbers and how to use them for different purposes, either if it was to establish patterns for agriculture, medicine, physics, chemistry or astrology or solving more complex problems. Mathematical knowledge has been developed trough time; and in our time, we still use this knowledge like the number pi π discovered by the Egyptians

Mathematics is a discipline encompassing quantity, structure, space and change; it evolved through the use of abstraction, and logical reason, from counting, calculating, measuring and studying the behavior of shapes and motions. The American Heritage Science Dictionary defines mathematics as the study of the measurement, relationships, and properties of quantities and sets, using numbers and symbols. Mathematics can express simple equations as well as interactions among the smallest particles and the farthest objects in the known universe. Mathematics allows scientists to communicate ideas using universally accepted terminology. It is truly the language of science.

Civilizations have changed and developed markets and money. A monetary unit used for the purchase of goods and services has been transformed from seeds, cowry shells or gold and silver coins into a more complicated instrument that people and countries use on a daily basis (Gomez, 2006)

In the olden days individuals engaged in barter trading because there was no monetary unit available. Also, services were exchanged for goods because of the same reason. As of now,

goods and services can be exchanged for money. As a result of that, individuals, organizations and countries are able to satisfy their various needs and wants by using a common medium of exchange, that is, money.

Incomes of people are spent, saved or invested in various instruments in order to reap higher returns in the near future. It is at this point that mathematics and finance start to have a closer relationship.

Finance is the set of activities dealing with the management of funds. More specifically, it is the decision of collection and use of funds. It is a branch of economics that studies the management of money and other assets. Finance is also the science and art of determining if the funds of an organization are being used properly. Through financial analysis, companies and businesses can take decisions and corrective actions towards the sources of income and the expenses and investments that need to be made in order to stay competitive.

It also studies the ways in which individuals, business and organizations raise, allocate and use monetary and even non monetary resources over time and the management and control of the assets; based primary in the use and develop of new mathematical models.

Two important economic groups can be identified in any economy; Surplus Spending Units (SSUs) and Deficit Spending Units (DSUs), the SSUs having funds whose value they wish to preserve or increase and the DSUs, needing financing for proposed projects or the expansion of their businesses (Gitman and Joehnk, 2001). This situation has created the need for financial markets comprising of various financial institutions acting as intermediaries in channeling funds from the SSUs to the DSUs thereby resulting in higher economic efficiency (Mishkin, 2004). They also ensure that this transaction is mutually beneficial to both parties.

Mathematical models and concepts in finance have helped shaped the financial markets. Financial Markets are markets for the exchange of capital and credit in the economy. Money markets concentrate on short-term debt instruments; capital markets trade in long-term debt and equity instruments. Examples of financial markets are stock market, bond market, commodities market and foreign exchange market. The application of mathematical theories to these markets has made their understanding very easy.

Over the time, enormous theories of how investments should be treated and how they have to be analyzed have been developed. A new type of mathematics has been created to help people deal with investments and money, called Financial Mathematical. Financial Mathematics is a collection of mathematical techniques that find applications in finance, e.g. Asset pricing: derivative securities, Hedging and risk management, Portfolio optimization, structured products.

The importance of mathematics in finance is amazingly high.It started in 1900 when Bachelier used Brownian motion as underlying process to derive option prices. Black and Scholes followed suit in 1973 when they published their PDE-based option pricing formula and finally in 1980, Harrison and Kreps introduced the martingale approach into mathematical finance. There has been a phenomenal increase in the interest in financial mathematics because of its impact on financial markets. The proliferation of financial mathematics was the subject of a Wall Street Journal article ("Wall Street Warms to Finance Degree with Focus on Math", 14 November 2006), by Ronald Alsop. It was also the cover story of the 23 January 2007 issue of Business Week. The subject matter was a main focus of a one-quarter program entitled "Quantitative Modeling in Finance and Econometrics" held in spring 2004 at the Institute for Mathematics and Its Applications.

Many people are financially illiterate in Ghana. Our nation's economic system and society's well-being depends in part on knowledgeable consumers. Family financial difficulties, influenced to some extent by low financial knowledge among our citizens, are reducing productivity in the work place (Fletcher, Beebout, and Mendenhall, 1997; Grable and Joo, 1998; Wechsler, 1997), affecting the health of the individual and their family physically (Allen, Edwards, Hayhoe, and Leach, 2007; Norvilitis, Szablicki, and Wilson, 2003), economically (Alhabeeb, 1999; Grable and Joo, 1998; Hayhoe, Leach, and Turner, 1999), and psychologically (Huston et al., 2003; Knapp, 1991; Norvilitis et al., 2003), and putting a tremendous burden on society (Alhabeeb, 1999; Norvilitis et al., 2003; National Endowment for Financial Education [NEFE], 2002). This burden can be seen throughincreased debt and bankruptcies (Alhabeeb, 1999; Klemme, 2002), lower savings and investments for retirement (Alhabeeb, 1999; Grable and Joo, 1998), unwise economic decisions(Miller, 2002; National Council on Economic Education [NCEE], 2003; NEFE, 2002), anddependency on government assistance (Bauer, Braun, and Olson, 2000; Blalock, Tiller, and Monroe,2004; Huston et al., 2003).

One problem may be that many individuals and families do not have the knowledge or skills to handle basic, let alone complex, financial decisions (Alhabeeb, 1999; Klemme, 2002; NEFE, 2002). Many might say, "I learned how to get a job and make money, but no one ever taught me how to manage money." Learning how to manage money is as important as earning it (Danes andHira, 1987; Lachance&Choquette-Bernier, 2004). The U.S. has the lowest individualsavings rate in the industrialized world, with rates continuing to drop. Between 1970 and 2000, consumer debt among U.S. families increased by 152% whereas median family income onlyincreased 13% (*Economic Report of the President*, 2006). Bankruptcies have risen by nearly400% over the last two decades affecting 1,759,503 U.S. households in 2006 (U.S. Courts Bankruptcy Filings,

2006). Social Security is on a path towards bankruptcy. There are currently3.3 workers per beneficiary. By 2031 there will only be 2.1 workers per beneficiary. Social Security will be paying out more than it takes in by 2017, and the Social Security trust funds are anticipated to be depleted by 2041 (Century Foundation Inc., 2005).

Mean while, the benefits that one gains as a result of being financially literate cannot be over emphasized. Research has shown that financial literacy is beneficial for individuals and families

(Blalock et al., 2004; Danes and Hira, 1987; Grable and Joo, 1998; Hibbert and Beutler, 2001; Kerkmann, Lee, Lown, and Allgood, 2000). It increases students' chances for saving and investing, getting out of debt, spending less than they earn, and living on a budget. It also decreases their chances for bankruptcy, receiving government assistance (Bauer et al., 2000;Blalock et al., 2004; Huston et al., 2003), and making poor consumer decisions (Grable and Joo,1998;Hayhoe, Leach, Turner, Bruin, and Lawrence, 2000). Students who lack financial knowledge have increased financial difficulties that continue into later years (Danes and Hira, 1987; HibbertandBeutler, 2001; Hira, 2002). Chen and Volpe (1998) found that students with less financial knowledge had more negative opinions about finances and made more incorrect financial decisions. They point out that having a low level of financial knowledge limits students' ability to make informed decisions. Danes and Hira related students' financial behavior to their future earning capacity. Danes (1994) mentioned that a higher level of financial knowledge was positively correlated to a higher level and regular source of income as well as a higher savings rate. The financial habits students have while in college tend to carry on into adult life. The better their financial literacy is when they leave college, the fewer financial hardships they may have in life (Grable and Joo, 1998).

Financial education influences financial knowledge, attitudes, and behaviors (Ajzen and Fishbein, 1980; Grable and Joo, 1998; Varcoe and Wright, 1991). Financial education increases financial knowledge and affects financial attitudes (DeVaney, Gorham, Bechman, and Haldeman, 1996; Grable and Joo, 1998; NEFE, 1998). For example, Fletcher et al., (1997) completed a preandpost-assessment of financial knowledge, attitudes, and behaviors to evaluate the effectiveness of Iowa State's personal finance workshops and found that participants had improved knowledge, attitudes, and behaviors. Increased financial knowledge was also found to influence students' attitudes positively toward business in general and their ability to be wise consumers in society (Langrehr, 1979). Lyons and Hunt (2003) found that college students want to receive financial information and have a preference about how financial education is taught, who teaches it, and what the content is. Also, although perceived economic well-being may differ by gender (Leach, Hayhoe, and Turner, 1999), Grable and Joo found that financial education "levels the playing field" in regards to gender differences and "is effective in changing knowledge, attitudes, and behaviors" (p. 213). Increasing financial knowledge through education was found to be significantly related to risk tolerance, financial attitudes, and saving and investing behavior.

There are several specific benefits of financial literacy. Increasing financial literacy is away to increase empowerment and improve the quality of life (Knapp, 1991; Voydanoff, 1990).Energy, thought, and time are spent pursuing money and limiting the unnecessary waste of money. Thus, when students gain more knowledge and more positive attitudes toward money, they make better decisions which saves resources and improves their situation (Knapp, 1991).Financial literacy also promotes self-confidence, control, and independence (Allen et al., 2007;Conger, Jewsbury, Matthews, and Elder, 1999). This comes by feeling in control and knowing how to function in a

complex marketplace. When consumers feel they are in control of their finances, they are more likely to participate in the marketplace (Knapp, 1991).

Another benefit of financial literacy is increased physical, emotional, and psychological well-being. Norvilitis et al., (2003) found that perceived financial well-being in college students appeared to be related to psychological well-being, an ability to be more in control of their lives,and having lower levels of dysfunctional attributes. Economic stress is associated with depression, anxiety, and psychological distress (Voydanoff, 1990) as well as emotional distressand internalizing problems (Conger et al., 1999). Sobolewski and Amato (2005) found that economic hardship negatively affects the parent-teen relationship, student's educational attainment, and student's earned income. Financial literacy goes beyond knowledge about money; it includes being a wise consumer of foods (increasing one's health) and other purchases such as cars (affecting their safety and the environment) (Knapp, 1991). Thus, increasing financial literacy can affect students' physical health and safety as well as their psychological well-being.

The financial literacy of students can also affect their current and future family relationships. Hibbert and Beutler (2001) confirmed previous studies that found financial issues to be a common source of conflict in personal, marital, and family relationships. These authors also found that the quality of family life was perceived to be greater where financial self-reliance was more highly valued. Families who spent less than they earned, paid bills on time, and avoided unnecessary debt had fewer family tensions and an increased sense of self-worth. Families who were poor managers of their finances experienced more unkindness, less communication, and a lower quality of life (Hibbert and Beutler, 2001). Voydanoff (1990) notedthat economic stress is associated with low levels of family satisfaction and that higher levels of income are modestly

associated with greater marital and family satisfaction. Student's sense of control and self-mastery are also lower when they experience economic distress (Conger et al., 1999). Thus, as financial literacy is increased, quality of life should improve.

Another benefit of increased financial literacy is an increase in marital satisfaction.Kerkmann et al., (2000) found that behaviors and perceptions of finances as well as problems and their perceived magnitude were significantly related to marital satisfaction. Some have suggested that financial problems are one of the leading causes of marital conflict and divorce(Amato and Rogers, 1997; Cleek and Pearson, 1985). Oggins (2003) found that in both the first andthird years of marriage the top reason for marital disagreement was finances. Conger et al.,(1990)found that economic difficulties affected family relationships through increased hostility in marital interactions while limiting warm and supportive behaviors expressed by the couple. Financial behaviors are important in marriage because good financial behaviors such as budgeting, paying down debt, saving, and spending less than one earns increase marital satisfaction more than just what one earns (Kerkmann et al., 2000), for example, Kerkmann et al found that when couples argue about finances, they tend to disagree more about how available finances should be managed or spent rather than about how much or how little they have.

Financial literacy is beneficial for individuals and families through making better financial decisions, increased physical and psychological well-being, and enhanced family and marital relationships, improving their overall quality of life.

This study will look at what mathematical finance is and its link with finance. Also it will bring to light the level of awareness of financial market and investment products among the staff of Christian Service University College.

1.1 Problem statement

Many studies document substantial heterogeneity in individual financial portfolios, including the fact that many consumers hold no stocks, a feature that is known as the non-participation puzzle (Mankiw and Zeldes, 1991; Haliassos and Bertaut, 1995). Limited financial market participation has important implications for individual welfare and the explanation of the equity premium puzzle. On the welfare issue, Cocco, Gomes and Maenhout (2005) calculated the welfare loss from non-participation in stock markets can be substantial, between 1.5 and 2% of consumption in calibrated life-cycle models. On the equity premium front, Mankiw and Zeldes (1991) treat share ownership as an exogenous individual characteristic and show that differences in the consumption patterns of stockholders and non-stockholders tend to lower the level of risk aversion necessary to justify the equity premium. Attanasio, Banks and Tanner (2002) estimate ownership probabilities to separate "likely" stockholders from non-stockholders, and don't reject the prediction of the consumption capital asset pricing model for the group of stockholders.

A lot has been done to create awareness of the Ghanaian financial system/ market and to encourage investment culture in the economy. In Ghana as of now, the ministry of finance and economic planning has set aside a week every year to educate the general public on the importance of financial literacy for poverty reduction and economic development. Also to

encourage a savings and investment culture in the country, the Government passed the Long-term Savings Bill in December, 2004 [Bill is however yet to be passed into law].

As financial institutions in Ghana extend services to more and more sections of the population, more people can participate in the growth of the nation's economy while improving their own well-being. Improving your understanding of financial services can, therefore, open new doors of opportunity for you. It is essential to learn about how financial institutions work and how anyone can benefit from the various products they offer. This is the only way to be able to take advantage of financial products such as savings, loans, investment and insurance which are available from financial institutions.

To this end various investment products such as Treasury Bills (T-Bills), Certificates of Deposits, Mutual Funds, Bonds, and Corporate Shares are being presented to Ghanaians. Thus, the Ghanaian who possesses excess funds is presented with the opportunities to preserve or increase the value of his or her funds. Those in need of extra funds are also presented with the opportunity to access funds at their convenience and at a lower cost.

However practical the above situation is, one factor that inhibits the realization of the above is awareness. Most Ghanaians are unaware of these investment opportunities in Ghana. Available statistics indicate that, the current level of savings in Ghana is 17 percent, compared to the over thirty (30) percent in Malaysia. The same also pertains in Africa. For instance, the 2005 ECA report shows that, only 11 out of the 50 countries saw their savings rate outpacing the already mediocre average savings rate of 21.1% of GDP within the Africa region during 2000-02.

With all that has been done in the creation of innovative investment products and the efforts of the stakeholders of the country to make the general public aware of such products the question

must be asked as to whether the staff of Christian Service University College, Garden City University College and University college of Education, Winneba-Kumasi Campus are aware of the existence of the various investment products.

1.2 Objective of the study

The main goal of the study is to help determine the level of awareness of financial market products in the Ghanaian financial market by the staff of Ghanaian Universities used in the study.

The specific objectives of the study are outlined as:

(i) To find out the demographic and socio-economic characteristics of the staff who are aware of the financial market products.

(ii) To determine the investment level of various financial market products among staff members with financial awareness.

(iii) To find the source of information about financial market products among staff members with financial awareness

(iv) To make recommendations to financial institutions on how to market their products.

1.3 Justification of the study

This study is justified of the grounds that it will help to bring to light the close relationship between mathematics and finance as well as find out the level of awareness and also determine

whether or not more awareness creation is needed to educate individuals on the various investment products, which would lead to sound investment decision-making. This, in the long run would facilitate the efficient functioning of the financial market, improve the understanding of people on financial services which can open new doors of opportunity for them.

The outcome of this research and the recommendations made will also assist the players in the financial markets in the marketing of their products. It will also serve as a point of departure for further studies in addition to the body of knowledge when published.

1.4 Limitations of the study

The inadequacy of the sample size of three hundred (300) and the fact that it was not truly representative of the whole population was however noted. In any case, the effect of this small size selected out of the population was noted as a limitation to this research.

1.5 Organization of the study

The study is organized into five chapters. The first chapter is the introductory chapter, which includes; background of the study, problem statement, objective and justification of the study, organization and limitations of the study.

The second chapter involves the scrutiny of researches and literature around the subject matter to present a complimentary background of studies in the subject matter.

The third chapter, which is the methodology, looks at methods used in selecting the sample and how data collected was analyzed.

Chapter 4 involves data presentation, analysis and discussions based on the stated method in chapter three. The final chapter presents conclusions of the study and recommendations on the subject matter.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

Financial markets are markets in which funds are transferred from people with surplus funds to people who have a shortage. Mishkin (2004) explains that, financial markets are crucial in promoting greater economic efficiency by channeling funds from people who do not have a productive use for them to those who do.

A financial market can also be seen as a 'transmission mechanism' between Surplus spending units (SSUs – individuals or organization who have surplus monies after their consumption has been taken out of their income) and Deficit spending units (DSUs - individuals or organizations who have shortage of monies that is their consumption is above their income). Through the use of a wide variety of techniques, instruments and institutions, financial markets mobilize the savings of millions and channel them into the hands of people or organization that need more funds than they have at hand. According to Baye and Jansen (2000), a financial market may or may not have a physical location.

Essentially, financial markets are channels through which funds are made available from those who possess excess funds to those who have need for them. This is however done for their mutual benefits. It can also be said as a place where financial products are traded. This intermediation brings about many advantages to the two identified parties. To the SSUs, advantages such as maturity flexibility, risk diversification, liquidity and convenience can be cited. To the DSUs however, advantages like convenience, low costs and access to a greater pool of resources also accrue. Financial markets apart from helping funds to flow from lenders to

borrowers, also provide means for making payments, handle services like insurance and help investors to make cheap and frequent adjustment to their portfolio of assets.

In financial markets, most of the financial instruments traded are not owned by the market makers; the participants just provide the physical location and the administrative and electronic tools to help the market works. Is important to mention that any kind of good or service can be sold or purchased in a market; and there are specific markets for every single instrument traded in the financial markets.

Financial markets are commonly liquid, meaning that any instrument can be bought or sold at a known price quickly, having no great change in prices from one trade to another. Current and potential buyers and sellers are willing to trade with instruments placing better buy or sell offers making the prices change and providing dynamism to the market.

One characteristic of the financial markets is the transaction cost. Transaction costs are all those money outcomes derived from trading in the financial markets, including the costs of reaching the market. The less they are the more efficient the market is.

2.1 History of financial market in Ghana

Financial markets are mainly made up of money markets and the capital markets. Out of these markets exist other markets like the derivative markets, foreign exchange markets, the bond markets, the equity markets and their institutions and operational instruments. There are both domestic and international capital and money markets. Transactions in these markets are mainly on wholesale basis. Due to different regulations and economic developments of different

countries, there are different market structures, pattern of growth and different instruments traded in these markets. Usually the developed countries such as the United States, the United Kingdom and Japan have fully fledged financial markets than developing countries like Ghana and Nigeria. The financial markets in Ghana are made up of the bond markets, equity markets, foreign exchange markets and the derivative markets which just started in the late 1990's.The money markets dominate the financial markets in Ghana. The size of both the capital and money markets in Ghana is small relative to that of the UK for instance. The dominance or larger size of the money markets is due to the volatility and unattractive nature of the capital markets. Prices of goods and services, interest rates, inflation and foreign exchange are all not stable in Ghana. Furthermore, interests on government securities on the money markets are higher than securities on the capital markets such as bonds. For example, the poor performance of the one year government bond issued on the stock exchange in 1990 was far below the yield on treasury bills, which was in excess of 30% at that time. An evaluation on the real return on the stock exchange by the Bank of Ghana revealed that "the total annual returns on stocks listed on the Ghana stock exchange have followed an undulating pattern since 1991 falling every two years and rising every two years".

(Source: Bank of Ghana website) Again, the Cedi was 90 Cedis to US$1 in 1983. By 1993, 720 cedis was equivalent to US$1 and today it is 1.4880 cedis against the US$1.

The above factors cumulatively have made investors prefer to invest in high interest rate and risk free short- term securities where they can get their money back easily.

The main cedi money markets or instruments traded are the short and medium term government debt instruments (91 day Treasury bill, the 182 Treasury bill and the one year note) issued

weekly through banks, brokers and discount houses. Commercial papers issued by companies through the discount houses, 30 Days REPO, call money and inter- bank markets. The 91day government bills are the traded instrument in the money markets and it is also the benchmark for setting the interest rate. The major participants in the money markets are the brokers or discount houses, corporate, banks and other financial institutions.

2.2 Recent developments in the financial market in Ghana

A number of changes have taken place in the financial markets in Ghana with the aim of ensuring efficiency in the financial system and the banking system in particular.

One major change or development that has taken place recently is the establishment of the Home Finance Company that has brought about a great change in the loan portfolios of banks in Ghana. Since the introduction of Banks in Ghana, their loan portfolios have consisted of short- term facilities granted to their customers who were mostly international traders. But since the mid 1980s, most of the banks have started to expand their loan portfolios by granting mortgage facilities to customers. In order to provide secondary markets for the banks in this direction, the Home Finance Company Ltd. was established in 1987 to provide secondary mortgage finance (SMF) to the banks.

The SMF scheme is designed to enable Decree 225 which allows banks to grant mortgage facilities which can in turn be sold to Home Finance Company to improve the liquidity of the participating banks" (Anin,; cited by Glimeti,2004).

The SMF scheme apart from providing liquidity also helps the banks generate more income and also help them diversify their risk portfolio of assets. Secondly, it also enables the banks to grant long- term loans and reduce their risk exposures to default. Thus it can be said that, the SMF scheme provides the banks with the opportunity to manage their asset-liabilities and liquidity efficiently thereby preventing failures in the banking system.

In addition to the above, until 1992 the discount houses remained the main institutions providing intermediary function (secondary market) between the local banks and the bank of Ghana. The Banks could only buy or sell securities to the discount houses. They provided the daily liquidity needs of the banks. They were the only institutions that served as the primary market for the Bank of Ghana and secondary market for the commercial banks and other institutions for government of Ghana stocks and bonds, bank of Ghana bills, cocoa bills and bank acceptances. In 1992, there was a great change when the wholesale market was established to enhance competition in the secondary market for these instruments. Under this scheme, the banks are now allowed to deal directly with the Bank of Ghana through the establishment of the REPO MARKET. (A REPO Market is a market where contracts for the sale and future repurchase of financial assets; most often treasury securities are done. – REPO is a short form for repurchase agreement). The scheme also encouraged the establishment of inter - bank market to compete with the discount houses for short -term funds. In addition, selected brokerage firms have also been allowed to participate in the weekly wholesale auction.

The consequence of the above institutional changes has been an increased competition in the money market and led to the development of new instruments like the REPO in1992. This new change and development has provided a means for the banks to manage their liquidity better than before because they can now trade directly with the bank of Ghana. They can also trade among

themselves in the inter-bank market, brokers, and the discount houses. They now have a larger and better primary and secondary money market where they can easily borrow and lend when they are in short of funds or have excess liquidity. This is important as it reduces bank failures and systemic risk as a result of commercial banks important role in the payment system.

In addition to the above, in order to further increase the size of the secondary markets for the capital markets, the Ghana stock exchange was established in 1989 and started operations in 1990. After its establishment, it introduced the GSE all index in 1994 to help traders in the financial markets especially those who are concerned with general price movements to measure market trend (gives signals). This is expected to help investors in their investment decision making in the financial markets. Also, the GSE now serves as a secondary market where especially non bank financial institutions can both lend and borrow money through the equity and the bond markets. Hence, it is likely to expand the secondary capital market and also reduce the excessive reliance on banks for borrowed funds. This effect probably is yet to be seen as banks lending's continue to increase in Ghana.

The over reliance on banks for loans would mean the government has to bail out the big banks when they are in difficulties as their failure may cause panic and bank runs. But as the government bail out the failing banks, it may lead to moral hazard.

The banking law of 1970 was also replaced with the "1989 banking law decree (Decree 225)" which has a greater international dimension and the Bank of Ghana was also strengthened. Under this program not only was the management of the bank restructured but foreign expertise was included. More powers have also been given to the Central Bank to enable it perform its

supervisory functions effectively. The essence of this is to enable the central Bank to monitor the financial institutions effectively to ensure they comply fully with both conduct and prudential regulations therefore reducing inefficiencies in the banking system and reducing the risk of bank failures and its spread in the banking system.

The Forex Bureau was established in March 1988. This was to stabilize the cedi and also reduce inflation as a result of more foreign currencies being introduced into the financial markets and also reduce smuggling and illegal trading of currency which was escalating the depreciating of the Cedi against the major currencies such as the US Dollar, the Pound Sterling and the Euro and consequently making the financial markets attractive to investors. The effectiveness for the establishment of this policy is questionable as it was reported in 2003 that the government was losing billions of cedis as a result of illegal forex dealings.

2.3 Definition of investment

The basis for the concept of investments is savings. Savings is defined as the difference between an individual's current income and current consumption Agyei-Mensah, B.K. (2007). When an individual's current income exceeds his current expenditure, that individual is most likely to save. (Reilly and Norton 1999), called the actions undertaken by individuals with their savings to make it increase in value over time as investment.

Authors such as Mayo (1980, 2002), and Marcus (1992) all agreed on investment as being the commitment of current resources in order to receive certain future benefits.

In his book 'Investments: An Introduction', the writer Mayo categorizes investment into three (3) basic groups; Consumer Investment (investing resources in people with disabilities or family members), Business and Economic Investment and Financial Investment. From these categories, he comes out with what he calls a "satisfactory" definition of investment, where he defines investment as the "purchase of a security or securities that, upon an appropriate analysis, offers safety of principal and a satisfactory yield commensurate with the risks assumed". The definition given by Mayo is more in line with what he terms Financial Investment, which is the basis of this study.

2.4 Reasons why people invest (Investment objectives)

Investment objectives vary from investor to investor. Generally investors invest to earn desired amounts at a later time when they need their funds for their children's upkeep or education, acquisition of properties, retirement, education, among other things. Cheney and Moses (1992) support this generalization when they emphasize that any individual who invests does so to increase his or her wealth systematically.

An organization or a firm invests to increase its capital for expansion purposes or for diversification into the same line of business or different line of businesses.

An individual would invest because he was to save enough for children's upkeep or education, acquisition of properties, retirement, and education or even to raise enough capital to set up a business or to learn a trade. Other individuals would also invest because they desire to increase the value of their income. Most often people see the income they earn as inadequate considering their consumption levels. Thus, people would wish to invest to increase their income to be able

to live more comfortably. This argument has been accepted by Gitman and Joehnk, (2001). Some writers do a more detailed writing on people's reasons for investing. According to them, there are two (2) basic motives why individuals invest. These are 'profit' - which is an amount made on a transaction (primary) and 'subsidiary' - being a supplementary profit (secondary) motives.

2.5.0 Components of financial market

2.5.1 Money market

The money market is the market for short-term financial instruments. Money market instruments include Treasury bills, bankers' acceptances, commercial paper, Federal funds, municipal notes, and other securities. The common characteristic of money market instruments is that they all have maturities of one year or less, and often 30 days or less. The money market does not have one fixed physical location. Rather, trading in money market instruments takes place in large financial centers, like New York and London. Companies and investors often use money market securities as temporary "parking places" for storing cash. While the returns on money market instruments are relatively low, they are among the safest of investments. Indeed, most money market securities are considered cash equivalents and are included with cash on a company's balance sheet. A money market fund is a mutual fund that invests in money market securities. While money market instruments already have low risk, the diversity of instruments in a money market fund provides even greater safety. And although money market funds are not federally insured, they are highly regulated by the SEC.

2.5.2 Capital market

A capital market is a market for securities (debt or equity), where business enterprises (companies) and governments can raise long-term funds. It is defined as a market in which money is provided for periods longer than a year, as the raising of short-term funds takes place on other markets (e.g., the money market). The capital market includes the stock market (equity securities) and the bond market (debt). Financial regulators, such as the Ghana Securities and Exchange Commission,UK's Financial Services Authority (FSA) or the U.S. Securities and Exchange Commission (SEC), oversee the capital markets in their designated jurisdictions to ensure that investors are protected against fraud, among other duties.

Capital markets may be classified as primary markets and secondary markets. In primary markets, new stock or bond issues are sold to investors via a mechanism known as underwriting. In the secondary markets, existing securities are sold and bought among investors or traders, usually on a securities exchange, over the counter, or elsewhere.

2.5.3 Primary market

Primary market is where new stocks, corporate and government bonds are sold. According to Mishkin (2004) it is a market in which new issues of security, such as stocks or bonds are sold to the public initially by a company, corporation to expand its businesses, acquisition of machinery or new technology or diversification or government sourcing funds from the public for infrastructure or even to reduce the supply of money in the system so as to check inflation. The sellers in these markets are commonly companies, countries, states and cities who have capital

requirements and issue new instruments to cover these monetary needs. The bonds offered have different characteristics regarding maturity, interest rate and payment period. When the bonds are issued by governments they are sold in one of three different ways.

- Competitive Bid: The bond is sold to the buyer who submits the lowest interest rate according to the conditions of the issuer. The competitive bid could be compared to an acquisition where the buyer stating the best offer will get the instrument.
- Negotiated Sales: The instrument is issued by a government helped by a buyer. The buyer will set the price and conditions together with the issuer and will have the right to sell the instrument. The buyer is mostly an investment bank.
- Private Placement: The financial instrument will be sold directly to a small group of investor or a single investor.

In primary market the funds go directly to the issuers of stocks or bonds; it is the first step in which the securities enter the market and after that any individual, institution or government who want to buy such instruments have to do that through the secondary market.

2.5.4 Secondary market

Secondary markets on the other hand, trade in stocks and bonds already sold to the public between current and potential owners (Reilly and Norton 1999).

Basically, this secondary market comes about when individuals or organizations do not wish to hold on to the stock or bonds bought initially at the primary market and want to retrieve its money invested.

The secondary markets have a trading regulation and are supervise by a trading commission to avoid unfair trading and malpractices. These markets have a specific trading place and trading hours. The information received by the investors should be the same in the market avoiding the use of privileged information. Some examples of these markets are the New Stork Stock Exchange (NYSE), The London Stock Exchange and the Tokyo Stock Exchange. The secondary market is the one where all values are resold and the funds go to the investors and not to the issuers. In this market, the holder can sell the security at any time. The market assures liquidity at all the time.

2.5.5 Over the Counter Markets (OTC-Markets)

With the Organized Exchanges Markets, exchanges are organized by trade markets where buyers and sellers of securities (or their agents) meet in one central location to conduct trades (Mishkin,2004). The major distinguishing feature is the fact that, transactions occur in a visible marketplace. Examples are the Ghana Stock Exchange (GSE) and the New York Stock Exchange (NYSE). These are exchanges where security trading is conducted by professional stockbrokers.

On the contrary, Over-the-Counter (OTC) markets have no physical location. Madura,(2001) simply describes such a market as a telecommunications network, where exchanges are done through the use of technology. An example of such a market is the NASDAQ (National

Association of Securities Dealer Automated Quotation) now known as NASDAQ OMX AB group due to a merger with OMX AB in 2008. (OMX AB is a Swedish-Finnish financial services company, formed in 2003). The Group's principal activities are the provision of products and services for trading in financial instruments and commodities. They provide quotation for OTCs not listed on other markets.

2.6.0 Classification of investment products

There are two (2) major classification of investment products traded in a financial market; Short-term investment products and Long-term investment products.

2.6.1.0 Short term products

2.6.1.1 Treasury Bills

These are relatively the commonest of all short-term investment products since they are the simplest form of borrowing from the financial market. Government treasuries usually issue them; they are means by which governments borrow from the citizens for infrastructure, as a means to check money supply in the system against inflation or to compensate for deficit in the Budget of a country. Individuals can purchase Treasury Bills with maturities ranging between three, six and twelve months from banks and other depository institutions or on the secondary markets from a government security dealer. They are usually sold at auction on a discount basis with a yield equal to the difference between the purchase price and the maturity value. Formally treasury bills could be purchased directly from Bank of Ghana but in 2002 Bank of Ghana

directed that these should be purchase from Banks. Treasury bills are highly liquid, that is, they can be easily converted to cash and sold at low transaction cost. Because of this high liquidity, the yield rate on treasury bills is normally lower than on longer-term securities. Prices of treasury bills do not usually fluctuate as much as those of other government securities but may be influenced by the purchase or sale of large quantities of bills by the central bank.

2.6.1.2 Certificates of Deposit (NCDs)

Certificate of Deposit is a receipt from a bank acknowledging the deposit of a sum of money. Among the common types are demand certificates of deposit and time certificates of deposit. Demand certificates of deposit are payable on demand but do not draw interest; they are used primarily by contractors as evidence of good faith when submitting a bid or as a guaranty of performance, and they may also be used as collateral to secure a loan. Time certificates of deposit bear interest and are payable on or after a specific date. Interest on time deposits is higher than for regular savings accounts. Because of this, a depositor who withdraws money deposited on a time basis before the maturity date of the certificate is subject to loss of interest.

2.6.1.3 Commercial Paper

Commercial paper, a third source of short-term credit, consists of well-established firms' promissory notes sold primarily to other businesses, insurance companies, pension funds, and banks. Commercial paper is issued for periods varying from two to six months. The rates on prime commercial paper vary, but they are generally slightly below the rates paid on prime business loans.

A basic limitation of the commercial-paper market is that its resources are limited to the excess liquidity that corporations, the main suppliers of funds, may have at any particular time. Another disadvantage is the impersonality of the dealings; a bank is much more likely to help a good customer weather a storm than is a commercial-paper dealer.

2.6.2.0 Long term products

2.6.2.1.0 Stock

A stock or share is a portion of the capital of a company owned by the holder. Shares are values whose profits cannot be determined by predefined calculations. Their profits are a function of the economic and financial development and the supply and demand relationship within the market. Stocks can be issued only by companies and can only be traded in established exchange markets also called bourses, word which derives from the Latin 'bursa' meaning purse. There are several types of stocks available in the market, common stocks, preferred stocks and treasury stocks.

The first stock appeared in year 1602 issued by Dutch East India Company; this idea rose the economic growth in Europe in the 17^{th} century.

The owners of a company or shareholders might want to raise the capital to invest in new projects, research or development. By issuing stocks they can sell a part or the whole company in many small portions to other companies or private investors interested in the organization. Each investor who holds even a single stock share the ownership of the organization and has the right to receive a fraction of the profits the company makes, these profits are known as dividends. Dividend amount and payment date have to be declared (announced) and can be paid to the investor in one of the following methods:

- Cash Dividends: This is the most common way of companies to share the profits and are those dividends paid in real cash being a form of investment interest- income.
- Stock dividends or scrip dividends: This profit sharing consists in giving each stockholder additional stocks of the issuing or other company, usually issued in portions of stocks owned.
- Property dividends or dividends in specie: theses dividends are the ones paid out in form of assets from the issuing or other corporation, commonly paid in form of goods or services provided by the company.

2.6.2.1.1 Common Stocks

Common Stocks or common shares are the ones which typically have voting rights in corporate decisions. This kind of stocks, as the name implies, are the more commonly held type of stocks in a corporation.

2.6.2.1.2 Preferred Stocks

Preferred stocks have priority in the distribution of dividends and assets carrying also additional rights above the common stocks. There are issued to distinguish between the control of and the economic interest of the company.

2.6.2.1.3 Treasury Stocks

Treasury stocks are the shares which are bought back in the market by the issuer company. Organizations buy their own stocks in the market in order to decrease the number of stocks

circulating or when they perceive the shares are undervalued for example. Treasury stocks does not pay dividends, have no voting rights and cannot exceed the 5% of total capitalization.

2.6.2.2 Bond

Bonds can be defined as long-term, fixed-obligation debt securities packaged in convenient, affordable denominations for sale to individuals and financial institutions. They are sold to the public and are considered fixed-income securities because they impose fixed financial obligations on the issuer who agrees to pay a fixed amount of interest periodically to the holder and repay a fixed amount of principal at the date of maturity.

Short term issues with maturities of one year or less are traded in the money market. Intermediate-term issues with maturities in excess of one year but less than ten years are instruments known as notes and the long-term obligations, with maturities longer than ten years are called bonds.

All bonds have different characteristics based on its intrinsic features, its type, its indenture provisions and the features that affect its cash flows and/or its maturity.

2.6.2.2.1 Intrinsic Features

There are some important intrinsic features in all bonds, this features are the following:

Coupon: the coupon of a bond indicates the income that the investor will receive over the life or holding period of the issue; this is known as interest income, coupon income or nominal yield.

Term of maturity: specifies the date or the number of years before the bond matures or expires. The maturity can be called a term bond, which has a single maturity date but can also be a serial obligation bond which has a series of maturities being each maturity a subset of the total issue.

Principal: The principal or par value represents the original value of the obligation. The principal is not the market value of the bond. The market price rises above or falls below the principal because of differences between the coupons and the prevailing market interest rate. If the market interest rate is above the coupon rate, the bond will sale at a discount par. If the market rate is below the bond's coupon, it will sell at a premium above par.

Ownership: bonds differ in terms of ownership. With a bearer bond, the holder or bearer is the owner, so the issuer keeps no record of ownership. Interest from a bearer bond is obtained by clipping coupons attached to the bond and sending them to the issuer for payment. In contrast, the issuers of registered bonds maintain records of owners and pay interest direct to them.

2.7 Capital market efficiency

Capital markets are markets for trading long term securities. Some of the securities are ordinary shares, long-term debt securities such as debentures, unsecured loan stock and convertible bonds, and, to a much lesser extent, preference shares. Capital markets have a lot of features. Dixon and Holmes (1992) suggested that transaction costs should be as low as possible, so that barriers to trading on the capital markets are reduces and operational efficiency is promoted. Primary markets should direct funds to their most productive uses so that capital markets have allocation efficiency. This calls for fair prices to be provided by the secondary markets, so activity on the primary market should have only a minimal effect on secondary market prices. This point's to

the need for pricing efficiency, which means that the prices of securities should reflect all relevant available information. Relevant information must be cheap to obtain and freely available to all, highlighting the need for informational efficiency.

2.7.1 Perfect Markets and Efficient Markets

According to Megginson (1997), a perfect market has the following characteristics:

- The absence of factors inhibiting buying and selling, such as taxes or transaction costs;
- All participants have the same expectations regarding asset prices, interest rates and other economic factors;
- Entry to and exit from the market is free;
- Information has no cost and is freely available to all market participants;
- A large number of buyers and sellers, none of whom dominates the markets.

The efficient market hypothesis is concerned with establishing the prices of capital market securities and states that the prices of securities fully and fairly reflect all relevant available information (Fama 1970). Market efficiency therefore refers to both the speed and quality of the price adjustment to new information.

In an efficient market the present value of the security's future returns is estimated by the investors and the investment value is equal to the market value at all times. The Fama Market Model explains this assumption.

The implication of this model is that if markets are perfectly efficient, investors cannot earn abnormal returns based on the information set because where is the difference in price at between what the price is and what investors expect.

If new information is received by the market changing this information should be incorporated to prices immediately and would have a direct impact in the Market efficiency has three different forms, the weak form in which current prices reflect all market information; the semi-strong efficiency means that prices adjust rapidly regarding all public information released and the strong efficiency form make the prices content all public and private information available in the market.

2.7.2 Efficient Markets

From the empirical evidence and theory of random walks arose the theory of efficient markets. Fama (1970, 1976) provides a comprehensive survey of the early literature on both the theoretical and empirical aspects of the Efficient Markets Hypothesis, whilst Cuthbertson (1996) summarizes the latest research developments.

2.7.3 Efficient Markets: Theory

The Efficient Markets Hypothesis (EMH) states that current prices always 'fully reflect' available information, so that the only reason prices change between time t and time $t + 1$ is the arrival of 'news' or unanticipated events. The EMH is based on the assumptions of zero transaction costs, freely available information and agreement among investors on the implications of information on the share price. As Fama (1970) notes, these conditions do not hold in the real world. It is not necessary though for each, or all, of these assumptions to hold for the EMH to remain true. For example, the market can still be efficient if an adequately large number of traders have access to the necessary information. Thus, whilst these conditions are sufficient, they are not necessary.

The EMH requires that only two necessary conditions be met. First, the market must be aware of all available information. Formally stated, this means that the information set used by the market in time $t$to determine the price of security at time t($\emptyset t$m) is equivalent to the true information set ($\emptyset t$). The type of information contained in the information set is determined by the strength of the EMH being tested. In a Weak Form efficient market, current prices fully reflect what is knowable from the study of historical prices and trading volumes. Thus, ($\emptyset t$) will contain the sequence of historical prices (p_t,p_{t-1},p_{t-2}, ...). If the Weak Form is valid, technical analysis becomes ineffective. Any information contained in past prices has been analysed and acted on by the market, so that shares are neither under-valued nor over-valued. In a Semi-Strong Form efficient market, current prices efficiently adjust to information that is publicly available. Therefore, ($\emptyset t$) will also contain publicly available information, such as earnings announcements, investments, dividends and capitalisation changes. If this form of the hypothesis holds true, then fundamental as well as technical analysis is also ineffective because all publicly available information has been thoroughly analysed, assessed and acted on by a vast number of analysts. Finally, in a Strong Form efficient market, current prices fully reflect all information, not just that included in the historical trading pattern or available through publicly released statements. Thus, if the Strong Form holds true, any attempt to make profitable use of monopolistic access to information is useless because this information has already been incorporated into the market price of the share.

The second necessary condition states that the market correctly uses the available information in assessing the expected return of the share in the future period.

Formally:

$$E(R_{t+1}/\emptyset_t) = \frac{E(P_{t+1}/\emptyset_t) - P_t}{P_t}$$

where E is the expected value operator, R_{t+1} is the return on the asset over period $t+1$, and P_{t+1} and P_t are the prices of the asset in period $t+1$ and t respectively.

Alternatively, it may be represented as:

$$r_{t+1} = E(R_{t+1}/\emptyset_t) + \varepsilon_{t+1}$$

Where $E(\varepsilon_{t+1}/\emptyset_t) = 0$. This second necessary condition is often referred to as the rational expectations element of the EMH, or informational efficiency. It means that actual returns can be randomly greater or lesser than expected returns, but on average, unexpected returns must be zero. The significant implication of the rational expectations element is that no system of trading rules can have greater expected returns than the equilibrium expected returns derived by the market. In other words, the hypothesis can be interpreted as a 'fair game' with respect to the information set due to the fact that expected excess returns are zero. The orthogonality property states that □*t+1* must be independent of any information available at time *t* or earlier. If the error term is serially correlated, then the orthogonality property is violated.

In essence, any test of the EMH is a joint test of firstly, whether the market makes efficient use of the information contained in the information set (the 'fair game' property), and secondly, of the market equilibrium expected return model incorporated into the hypothesized model. There are two important models of expected returns used in the early testing of the EMH. The first type tested was the constant expected returns model. An interpretation of the EMH is that a share's price represents the rational assessment by the market of fundamental value. Thus, the theory of share price asserts that a price is comprised wholly of a permanent or fundamental component.

However, this relationship may be modeled mathematically in a number of different forms depending upon the assumptions made in relation to the intertemporal behaviour of fundamental value.

The permanent component may be represented by a model which assumes that the behaviour across time may be represented as a random walk with drift so that it follows that

Ln Pt+1 = Permanent

=lnPt + § + Et+1

Where ln*Pt+1* is the natural log of the share price, § is the drift term and □t is an independent and identically distributed white noise error term. As the difference between the log of share prices is the actual continuously compounded return overthat period:

rt+1= ln Pt+1-lnPt

then in terms of the random walk with drift model, actual continuously compoundedreturns over that period are equivalent to the drift term (§) plus the error term (E*t*

rt+1= ln Pt+1-lnPt =§ + Et+1

If we assume rational expectations so that E (E t+1 / Øt) = 0 then:

E (R t+1 / Ø) = §

The unbiased estimator of expected returns *E*(*Rt+1/* Ø) is equivalent to the drift term §.

Thus, returns over all periods are expected to be constant because the drift term is independent of time and the information set.

Cuthbertson (1996) discussed how share prices are derived in an efficient market with constant expected returns. With some assumptions, the price of a share will equate to the present value of expected future dividends based on the information set. Thus, in an efficient market with constant expected returns, prices change because of fluctuations in expected fundamentals reflected in changing expectations of future dividends. These fluctuations in expectations are in turn caused by the release of new information. Price and return changes are unpredictable, with price responding only to new information or news. For example, 'good' news about earnings prospects would cause the price to move from A to B. The return on the share is unpredictable and past returns cannot forecast future returns. Simply put, any information available at time *t* is of no use in predicting expected returns in future periods.

The second type of model identified was the non-negative expected return model. It is based on an expectations model of share prices called a martingale with drift.

Formally, if the expected value of the log of share prices in the next period is equivalent to the log of the current period's price plus a drift term, and as expected continuously compounded returns are equivalent to the difference between the log of expected and actual prices over that period, then expected returns are equivalent to the drift term.

The implication of the martingale with drift is that the set of "one security and cash" mechanical trading rules which concentrate on individual securities and state when a trader should sell, buy and hold a share cannot have greater expected returns than the strategy of simply buying and selling securities in the normal process of investment diversification. The essential difference between the constant expected returns model and the nonnegative expected returns model used to test the weak form of the EMH is that the random walk incorporates a stronger restriction on

prices than the martingale (with drift). The random walk with drift rules out any linear or non-linear dependence amongst the error terms, whilst the martingale with drift only restricts the error terms to be uncorrelated. Furthermore, the martingale does not restrict the higher conditional moments such as the variance to be statistically independent as does the random walk with drift. The martingale with drift thereby allows the conditional variance of price changes to be predictable from past information. Note that these two models of expected returns are time-series models that examine multiple-period changes in prices, and so were used to empirically test the weak form of the EMH. As evidence in support of the Weak Form grew, empirical testing moved on to the stronger forms of the hypothesis. To achieve this, equilibrium expected return theories were developed to examine whether securities were efficiently priced in relation to one another. These models were cross-sectional, attempting to forward explanations of the causal relationships involved in the determination of equilibrium returns and asset prices in capital markets. In terms of the Semi-Strong Form of the EMH, the principal expected return theory used is the market model suggested by Markowitz (1959). It says that the return on an asset is positively-related to the return on the market. This theory has been used by such researchers as Fama, Fisher, Jensen and Roll (1969) to test the reaction of stocks to the announcement of such fundamental information as stock splits and dividend announcements.

The final expected return theory, used to test the Strong Form of the EMH, is the Capital Asset Pricing Model (CAPM) developed by Sharpe (1964) and Lintner (1965a, 1965b). It is the dominant theory of capital asset pricing in finance, with strong empirical support. The CAPM states that the expected return on a share is positively-related to the risk of the security.

From the CAPM, Jensen (1969) derived what has become known as the Jensen Index. It indicates the level of abnormal returns (or losses) that a portfolio has achieved. Jensen (1969)

used this index to assess the performance of mutual funds, which could be expected to have possible access to inside information, and thereby earn excess.

2.8 Price Behaviour

When viewed over long periods, the share price is directly related to the earnings and dividends of the firm. Over short periods, especially for younger or smaller firms, the relationship between share price and dividends can be quite unmatched.

In economics and financial theory, analysts use random walk techniques to model behavior of asset prices, in particular share prices on stock markets, currency exchange rates and commodity prices. This practice has its basis in the presumption that investors act rationally and without bias, and that at any moment they estimate the value of an asset based on future expectations. Under these conditions, all existing information affects the price, which changes only when new information comes out. By definition, new information appears randomly and influences the asset price randomly.

Empirical studies have demonstrated that prices do not completely follow random walks. Low serial correlations (around 0.05) exist in the short term, and slightly stronger correlations over the longer term. Their sign and the strength depend on a variety of factors.

Researchers have found that some of the biggest price deviations from random walks result from seasonal and temporal patterns.

Technical analysis uses most of the anomalies to extract information on future price movements from historical data. But some economists, for example Eugene Fama, argue that most of these patterns occur accidentally, rather than as a result of irrational or inefficient behavior of investors: the huge amount of data available to researchers for analysis allegedly causes the fluctuations.

Another school of thought, behavioral finance, attributes non-randomness to investors' cognitive and emotional biases. This can be contrasted with Fundamental analysis.

The first complete development of a model for distribution of security price changes is credited to Bachelier (1900). Bachelier's work went unnoticed, and his model was derived independently, but much later, by Osborne (1959). Bachelier and Osborne began assuming that price changes from transaction to transaction in an individual security are random drawings from the same distribution. This model assumes that successive price changes are independent and identically distributed. The model further assumes that transactions are uniformly spread across time. If the number of transactions per day, week or month is large, then price changes across these intervals are sums of many independent, identically distributed drawings. The central-limit theorem of statistics leads us to expect that the distribution of a sum of independent, identically distributed drawings generally approaches a normal distribution as the number of items in the sum is increased. Thus, in the Bachelier-Osborne model, distributions of daily, weekly, and monthly price changes are approximately normal.

This groundbreaking work went unrecognized by financial economists until the 1950's when evidence of randomness began to appear. Kendall (1953) calculated the first differences of twenty-two different speculative price series at weekly intervals ranging from 486 to 2,387

terms. Broadly speaking, he concluded that the random changes from one term to the next are so large as to swamp any systematic effect which may be present. In fact, Kendall (1953: 11) stated that 'the data behave almost like a wandering series'. Specifically, an analysis of share price movement revealed little serial correlation, with the conclusion that there was very little predictability of movements in share prices for a week ahead without extraneous information.

Furthermore, Kendall found that although the distribution of price changes was leptokurtic, with too many values near the mean and too many values in the extreme tails, it was still approximately normally distributed. In 1959, Roberts elucidated that the intense interest in technical analysis was due to the fact that the usual method of plotting successive levels of share prices rather than changes gave the appearance of a pattern or trend in the data. He estimated the probability of different share price outcomes over time by using a frequency distribution of historical changes in the weekly market index, and assumed weekly changes were independently drawn from a normal distribution with a mean of + 0.5 and a standard deviation of 5.0. With this

simple chance model, Roberts generated a pattern of market levels and changes incredibly similar to that of actual levels and changes in the Dow Jones Industrial Index. He therefore suggested that changes in security prices behave nearly as if they had been generated by a simple chance model which insists on independence but makes no commitment about relative probabilities of different outcomes, except that they are stable over time.

The basic proposition behind the random walk theory is summarized by Cootner (1964). The fundamental concept is that competition in perfect markets would remove excess economic profits, except from those parties who exercised some degree of market monopoly. This meant that a trader with specialized information about future events could profit from the monopolistic

access to information, but that fundamental and technical analysts who rely on past information should not expect to reap excess returns. Thus, changes in share prices could just as well be determined by a flick of a coin as by any sophisticated trading system or thorough analysis of past statistical information.

Mandelbrot (1963) was the first to question seriously the hypothesis of normality for distributions of securities returns. He pointed out that arguments based on the central-limit theorem, like those of Bachelier and Osborne; do not uniquely lead to the normal distribution. In particular if distributions of sums of variables, such as price changes or continuously compounded returns approach a limiting distribution as the number of items in the sum is increased, then the limiting distribution of which the normal is a special case. Moreover, the symmetric non normal members of the stable class have the leptokurtic property observed in daily common stock returns; that is, non normal symmetric stable distributions are more peaked and assign higher probabilities to extreme observations than normal distributions.

Blume (1968) and Officer (1971) study in detail the distributional properties of returns on portfolios that vary widely in terms of both numbers of securities per portfolio and risk. Their result confirm both the conclusion that distribution of portfolio returns as of the same type as distribution s of returns on securities, and the conclusion that the normal distribution is a good working approximation for monthly security and portfolio returns in the post-world war II period.

CHAPTER 3

METHODOLOGY

3.0 Introduction

A good research involves a proper data collection and analysis that best represents the scope and elements under study (Yensu, 2007). Such careful selection provides a platform for an appreciable analysis of the importance of the research and the recommendation being considered for the area under study.

This chapter explores on the method of data collection and the study design to determine the level of financial awareness of financial products among the staff of tertiary institutions use in the study. It also seeks to ascertain the demographic and socio-economic characteristics of the respondents. Descriptive and quantitative methods are used for the data analysis. Specifically, the study used logit regression as the empirical method of estimation under quantitative method.

3.1 Method of Data Collection

Primary method of data collection was employed by this study. The reason for using primary data is that, the study used information from respondents which did not exist for analysis. The study used personally administered questionnaires to gather information related to the subject matter. Personally administered questionnaires are considered by researchers like Kumekpor (2002) to provide rich information because it is useful and appropriate with all categories of

populations, especially, low-level education and rural populations. It is also believed to provide greater sense of security because the collection of data is by face-to-face interaction with respondents.

In the preparation of the questionnaire, a number of vital factors were taken into consideration. These factors were mainly the nature of the respondents as well as the issue of time among others. To this end, simple questions with optional answers were designed. This was to ensure that misunderstanding of questions asked would not impair the validity of the research. It was also realized that respondents may not have enough time to respond to too many questions. Hence, questions asked were streamlined to bring out the most effective answers necessary for the purposes of the research.

Random sampling method was used by this study in selecting the individuals in the study area. The reason is that, each individual in the study area stood an equal chance or probability of being included or excluded in the final sample. In total the study used a sample population of 300 to represent all the staff in the study area.

Questionnaires were administered directly by research assistances who were trained by the researcher. Respondents gave information on age, income level, educational level, marital status, the financial products that they are aware of and how they got to know of them.

3.2 Data Analysis

Descriptive (qualitative) and quantitative methods are used for the data analysis. Descriptive methods provide a deeper analysis and allows for a richer and an in-depth understanding of how people make meaning of their situation or interpret phenomena (Denzin & Lincoln, 1994; Merriam, 1998). By descriptive statistics, the study used tables to describe the data on the sample population. Also, the study used bar charts to depict the various sources of information and level of investment about financial market products among staff members with financial awareness.

Quantitative study is usually based on causal inference and the use of standardized measures to produce qualified data that can be statistically analyzed (Patton, 2002). As Strauss and Corbin (1990) state, quantitative methods are useful to unveil knowledge and to facilitate our understanding on phenomenon that little is known about. This means that using quantitative method is appropriate for this study because it is relatively an unexplored topic of financial research in Ghana.

3.3 Empirical Estimation

Logit regression model is used by the study to determine the likelihood of financial awareness among staff members in the study area. The study used treasury bills, corporate shares, bonds and mutual funds to represent financial products in Ghana's financial market. If the study discovers that a staff member is aware of all the financial products under consideration, the staff member is financially literate. If on the other hand, the study discovers that a staff member is not aware of all the financial products under consideration, the staff member is financially illiterate.

Let F_i (Binary Variable) represents the observed response of each staff member in the study area. Therefore, $F_i = 1$ for financial awareness and $F_i = 0$ for lack of financial awareness. It follows that:

$F_i = g(Y_i)$

where g is the functional relationship between observed financial literacy (F_i) and the random variable (Y_i) which determines the probability of financial literacy. The equation to be estimated is given as:

$$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + \varepsilon_i$$

where Y_i = Qualitative dependent variable: 1 if there is financial awareness , 0 if there is no financial awareness.

X_2 = Dummy variable (1 if male, 0 if female)

X_3 = Dummy variable (1 if married, 0 if single)

X_4 = Dummy variable (1 if 20-35 years, 0 if otherwise)

X_5 = Dummy variable (1 if 36-45 years, 0 if otherwise)

X_6 = Dummy variable (1 if 46-55 years, 0 if otherwise)

X_7 = Dummy variable (1 if first degree, 0 if otherwise)

X_8 = Dummy variable (1 if masters degree, 0 if otherwise)

X_9 = Dummy variable (1 if doctorate, 0 if otherwise)

X_{10} = Dummy variable (1 if monthly income of GH¢1000.00 & below, 0 if otherwise)

X_{11} = Dummy variable (1 if monthly income between GH¢1001.00 &GH ¢2000.00, 0 if otherwise)

X_{12} = Dummy variable (1 if monthly income between GH¢2001.00 & GH¢3000.00, 0 if otherwise)

The probability (likelihood) of financial awareness among the sample population is given as:

$$\boldsymbol{P = e^{\beta X} / (1 + e^{\beta X})}$$

where βX = the mean of the predicted Y_i values.

If $P \approx 1$, there is a likelihood of financial awareness among the sample population. On the other hand, if $P \approx 0$, there is no likelihood of financial awareness among the sample population.

3.4 Expected signs of the estimated parameters

Males (X_2) are expected to be financially literate than females (control group). Therefore the expected sign of β_2 is positive.

The married (X_3) are not expected to be financially literate than singles (control group). Therefore the expected sign of β_3 is negative.

Staff members between 20 and 30 years (X_4), between 36 and 45 years (X_5) and between 46 and 55 years (X_6) are expected to be financially literate than staff members above 55 years (control group). Therefore the expected sign of β_4, β_5 and β_6 is positive.

Staff members with first degree (X_7), masters degree (X_8) and doctorate (X_9) are expected to be financially literate than staff members who are professors (control group). Therefore the expected sign of β_7, β_8 and β_9 is positive.

Staff members with monthly income of GH¢1000.00 and below (X_{10}), between GH¢1001.00 and GH¢2000.00 (X_{11}) and between GH¢2001.00 and GH¢3000.00 (X_{12}) are not expected to be financially literate than staff members with monthly income above GH¢3000.00 (control group). Therefore the expected sign of β_{10}, β_{11} and β_{12} is negative.

CHAPTER 4

ANALYSIS OF RESULTS

4.0 Introduction

This chapter uses descriptive statistics to analyze the data on the staff of tertiary institutions in Kumasi in the sample population and also to know the level of awareness of financial products known to the respondents. Logit regression estimates are used in the discussion of the likelihood of level of awareness among the sample population. Also, estimates from the logit regression are used for the analysis of the demographic and socio-economic characteristics of the staff of tertiary institutions who were used for the stay.

4.1 Descriptive Analysis

Table 1: Descriptive statistics of variables used in the empirical model

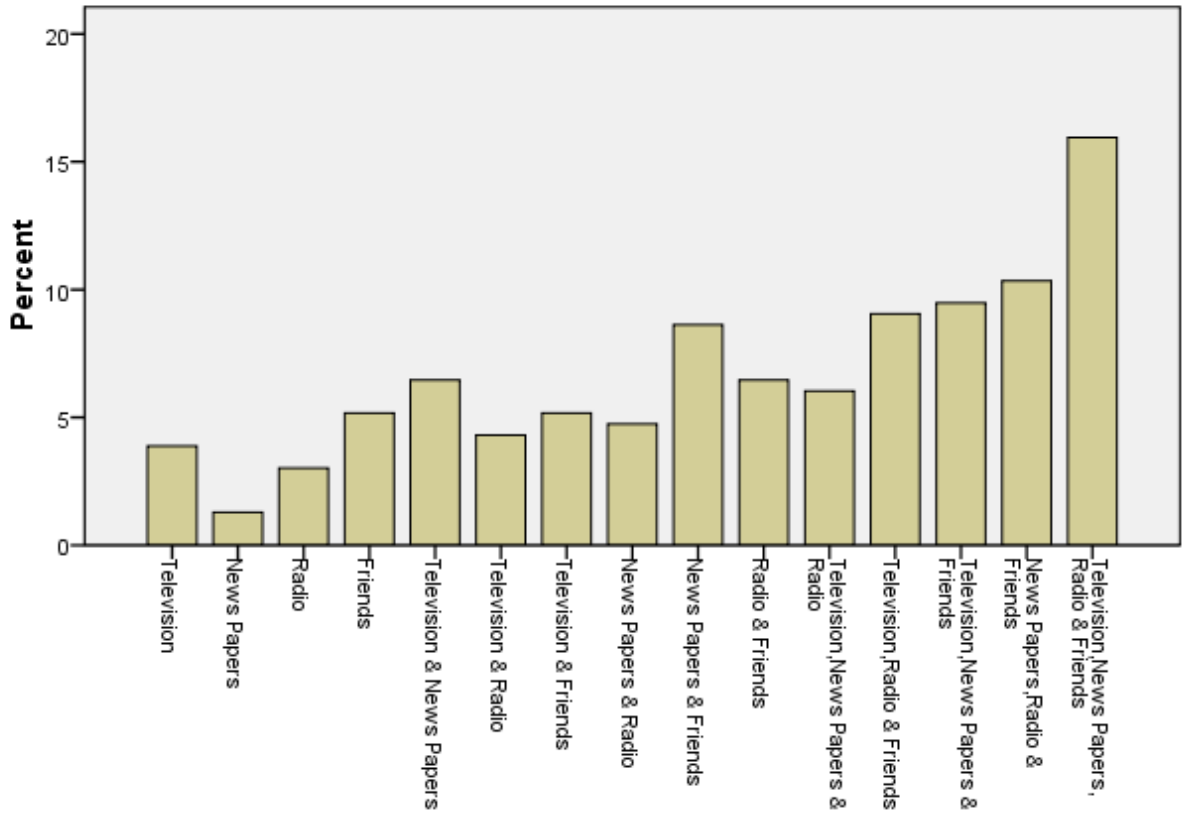
Variable	Mean Value	Standard Deviation	Minimum Value	Maximum Value
Awareness	0.773333	0.419375	0	1
Male	0.693333	0.461880	0	1
Married	0.500000	0.500835	0	1
20-35 years	0.586667	0.493254	0	1
36-45 years	0.253333	0.435647	0	1
46-55 years	0.093333	0.291385	0	1
First degree	0.486667	0.500657	0	1
Masters degree	0.353333	0.478804	0	1
Doctorate	0.120000	0.325504	0	1

¢1000 & below	0.420000	0.494383	0	1
¢1001-¢2000	0.340000	0.474500	0	1
¢2001-¢3000	0.153333	0.360911	0	1

A summary of the demographic and socio-economic characteristics of the sampled respondents in the study area revealed that, the actual mean estimates for the variables in the empirical model did not show much variation. Majority (69%) of respondents in the sample population were males and the remaining 31% as females. The married in the sample population were 50% equally as the singles. 59% of the sampled respondents were between 20-35 years, 25% between 36-45 years, 9% between 46-55 years and 7% above 55years. On academic qualification, staff members with first degree, masters' degree, doctorate and professorship were 49%, 35%, 12% and 4% respectively of the sample population. 42% of staff members had monthly income of GH¢1000.00 and below, 34% had month income between GH¢1001.00 and GH¢2000.00, 15% had monthly income between GH¢2001.00 and GH¢3000.00 and 9% had monthly income above GH¢3000.00.

This section analyses the response of (232) staff members with financial awareness on the source of information about financial market products. The bar chart below presents the results of the interview with sampled respondents:

Figure 1: Source of information about Financial Market Products among staff members with Financial Awareness

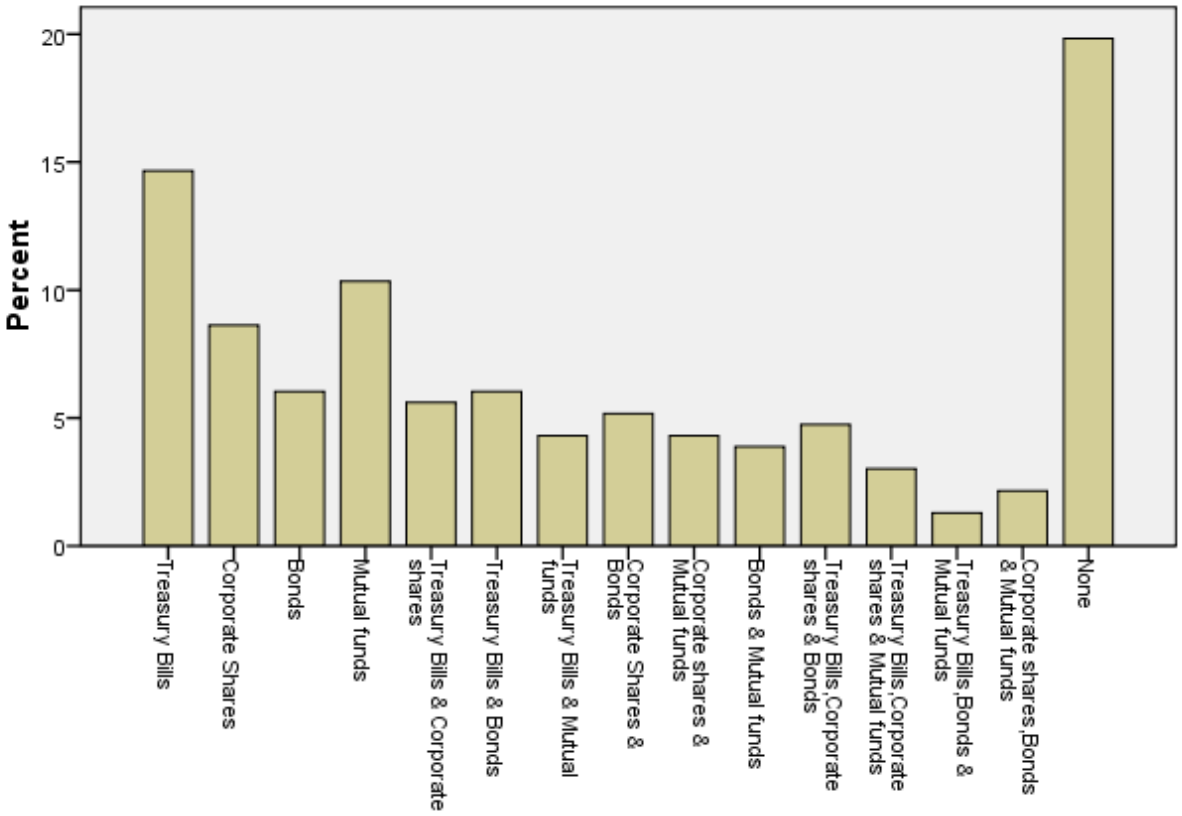


From the diagram above, multiple source of information comprising Television, News papers, Radio and Friends is the bar with the highest (frequency) percentage of (37) 15.9%, followed by News papers, Radio and Friends bar and Television, News papers and Friends bar with the (frequency) percentage of (24) 10.3% and (22) 9.5% respectively. Newspapers as a single source of information about financial market products recorded the lowest (frequency) percentage of (3) 1.3%. It can therefore be concluded from the diagram above that, multiple source of information about financial market products has greater influence on the level of financial awareness among the sample respondents compared to single source of information about financial market

products. In other words, financial awareness is highly influenced by multiple source of information than single source of information as far as the sample evidence for this study is concerned.

This final section under descriptive statistics analyses the investment level of the various financial market products among (232) staff members with financial awareness. The bar chart below represents the results of the interview with sampled respondents:

Figure 2: Investment level of various Financial Market Products among staff members with Financial Awareness



From the diagram above, the bar with the highest (frequency) percentage of (46) 19.8% is the one that represents staff members with financial awareness who have not yet invested in any financial market products. Also it can be seen from the diagram above that, not a single staff member has invested in all the financial market products under consideration for this study. From the diagram again, most of the staff members with financial awareness have invested singularly in treasury bills and mutual funds at the percentage of 14.7% and 10.3% respectively. The implication is that, a greater number of sampled respondents were risk averse. In conclusion, the diagram above has shown that, the culture of single investment in financial market products is prominent among staff members in tertiary institutions compared to multiple investments in financial market products according to the sample evidence at hand.

4.2 Quantitative analysis

The regression results of the logit model: $Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + \varepsilon_i$ are presented in the table below;

Table 2: Dependent Variable: Financial awareness (Y_i)

Explanatory Variable	Coefficient	Standard Error	P-Value
Constant	-0.496519	1.17766	0.67331
Gender			
Female	-	-	-
Male	0.439029	0.352072	0.21240
Marital Status			
Single	-	-	-

Married	-1.0983	0.363256	0.00250
Age Categories			
Above 55 years	-	-	-
20-35 years	1.40827	0.658267	0.03241
36-45 years	1.21923	0.621642	0.04984
46-55 years	26.0773	62003	0.99966
Educational Level			
Professor	-	-	-
First degree	0.01694	0.98323	0.98625
Masters degree	-0.53424	0.99830	0.59255
Doctorate	1.14284	1.02519	0.26495
Income Level			
Above 3000	-	-	-
¢1000 & below	0.68886	0.89231	0.44011
¢1001 & ¢2000	0.67047	0.86939	0.44057
¢2001 & ¢3000	2.16002	1.00636	0.03184

McFadden R^2 = 0.188839

Likelihood Ratio (LR Statistic) = 60.642 (ρ value: 0.00000)

Number of observations = 300

Mean of predicted Y= 0.773

$P = e^{\beta X}/(1+e^{\beta X})$

Where βX= the mean of the predicted Y values

$\beta X = 0.773$

$P = e^{0.773}/1+e^{0.773}$

$P = 0.6842$

Since P = 0.6842 is closer to one than zero, there is a likelihood of financial awareness among staff members in the study area. In other words, with the sample evidence at hand, about 68% of the sampled respondents are financially literate.

The above logit regression results using Gretl software package shows that most of the coefficients are consistent with hypothesized relations and their test of significance (ρ values) help to indicate their importance in explaining financial awareness among the sample population. The results above indicate that apart from marital status, age brackets (20-35 years and 36-45 years) and monthly income level (¢2001.00- ¢3000.00), all other variables in the model were not statistically significant at 5% error level. The explanation is that gender, educational level, age bracket (46-55 years) and monthly income levels (¢1000.00 and below, and ¢1001.00-¢2000.00) have no effect on financial awareness according to statistical evidence at hand. However, together all the regressors have a significant impact on financial awareness, as the LR statistic is 60.642, whose ρ value of 0.00 is the lowest.

The negative sign and significance of Married (X_3) in the model implies that marital status is an important factor that influences financial awareness among the sampled respondents. In other words, the negative relationship between married and the likelihood of financial awareness among the sample population has met the expectation of the study. Taking the antilog of the married (X_3) coefficient of -1.0983 provides 0.3334 ($\approx e^{-1.0983}$). The study multiplied 0.3334 by 100 to obtain 33.34. This means that the married are less than 33 times likely to be financially literate than singles, holding all other variables constant. Thus, singles are financially literate than the married.

The positive sign and significance of age 20-35 years (X_4) and age 36-45 years (X_5) in the model implies that, age to an extent is an important factor that influences financial awareness among the sampled respondents. In other words, the positive relationship between age (20-35 years) and the likelihood of financial awareness among the sample population has met the expectation of the study. Taking the antilog of age 20-35 years (X_4) coefficient of 1.40827 provides 4.0889 ($\approx e^{-1.0983}$). Because logit model takes probability values from 0 to 1, the study subtracted 4 from 4.08889 and multiplied the result by 100 to obtain 8.89. This means that staff members of age 20-35 years are more than 9 times likely to be financially literate than staff members above 55 years, holding all other variables constant.

Also, the positive relationship between age (36-45 years) and the likelihood of financial awareness among the sample population has met the expectation of the study. Taking the antilog of age 36-45 years (X_5) coefficient of 1.21923 provides 3.3846 ($\approx e^{1.21923}$). Because logit model

takes probability values from 0 to 1, the study subtracted 3 from 3.3846 and multiplied the result by 100 to obtain 38.46. This means that staff members of age 36-45 years are more than 38 times likely to be financially literate than staff members above 55 years, holding all other variables constant.

The positive sign and significance of monthly income (¢2001.00-¢3000.00) in the model implies that, income to an extent is an important factor that influences financial awareness among the sampled respondents. In other words, the positive relationship between monthly income (¢2001.00-¢3000.00) and the likelihood of financial awareness among the sample population has not met the expectation of the study. Taking the antilog of monthly income (¢2001.00-¢3000.00) X_{12} coefficient of 2.16002 provides 8.6713 ($\approx e^{2.16002}$). Because logit model takes probability values from 0 to 1, the study subtracted 8 from 8.6713 and multiplied the result by 100 to obtain 67.13. This means that staff members with monthly income (¢2001.00-¢3000.00) are more than 67 times likely to be financially literate than staff members with monthly income above ¢3000.00, holding all other variables constant.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The study was carried out mainly to find out the awareness of financial market products among staff members of selected university institutions in Kumasi. This chapter therefore reviews the major findings from the data analysis and the overall conclusion of the study after which policy recommendations are made.

5.1 Summary of Major Findings

The study revealed that, there was about 68% likelihood of financial awareness among the sampled respondents in the study area. In other words, the likelihood of financial unawareness among sampled respondents in the study area was 32%. However, about 20% of staff members with financial awareness were yet to invest in financial market products. The implication is that, there is even lack of motivation for investment among individuals with financial awareness.

Also, the study found that, the married are less than 33 times likely to be financially literate than singles, holding all other variables in the empirical model constant. The implication is that, with the sample evidence at hand, financial awareness among singles is greater than among the married.

Again, the study discovered that, staff members of age 20-35 years are more than 9 times likely to be financially literate than staff members above 55 years, holding all other variables in the

empirical model constant. The implication is that, financial awareness among the youth is greater than among the aged according to the sample evidence for the study.

In addition, the study revealed that, staff members with monthly income of GH¢2001.00-GH¢3000.00 are more than 67 times likely to be financially literate than staff members with monthly income above GH¢3000.00, holding all other variables in the empirical model constant. Thus, with the sample evidence at hand, financial awareness among GH¢2001.00-GH¢3000.00 earners is greater than those who earn above GH¢3000.00.

Furthermore, the study has shown that, the culture of single investment in financial market products is prominent among staff members in the study area compared to multiple investments in financial market products. The implication is that, greater number of staff members in the study area are risk neutral and to a larger extent risk lovers.

Finally, with the sample evidence at hand, the study has revealed that, financial awareness is highly influenced by multiple source of information than single source of information.

5.2 Conclusions and Recommendations

It can be concluded from the findings above that, greater percentage of staff members in the study area are financially literate. The set objectives in chapter one are fully achieved. However, efforts must be put in place to further reduce the level of financial unawareness among section of staff members in university institutions, thereby improving the rate of investment at large in the Ghanaian economy. The study recommends that:

i. Financial institutions should gear their marketing and advertising activities toward the youth.

ii. Sales professionals in financial institutions should do cross-selling (selling other products to existing clients).

iii. Financial institutions should resort to multiple advertising channels in advertising their products at the same time.

iv. Ministry of Finance should not just embark on their annual financial literacy programmes but should encourage individuals to invest.

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Appendix 1: QUESTIONNAIRE

Awareness of financial market products in Ghanaian universities: A case study of staff members at Christian Service University College, Garden City University College and University College of Education, Winneba-Kumasi Campus.

This research is being conducted in partial fulfillment of the requirements for the award of a second Degree in Industrial Mathematics. All information received would be used for academic purposes only and treated in the strictest of confidence.

Instructions
Please tick or fill the blank spaces where appropriate.

1. Gender M ( ) F ( )

2. Marital Status M ( ) S ( )

3. What is your age range?
   20-35 ( ) 36-45 ( ) 46-55 ( ) Above 55 ( )

4. What is your level of education?
   First Degree ( ) Masters Degree ( ) Doctorate ( ) Professor ( )

5. What is the range of your monthly income (GH¢)?
   0-1000.00 ( ) 1001.00-2000.00 ( ) 2001.00-3000.00 ( ) Above 3000.00 ( )

6. Are you aware of the following financial products in the Ghanaian financial market?
   : **Treasury Bills, Corporate shares, Bonds and Mutual funds.**
   Yes ( ) No ( )

7. How did you get to know about the products above?
   Television ( )
   News paper ( )
   Radio ( )
   Friends ( )

8. Which of the following financial products have you invested in?
   Treasury Bills ( )
   Corporate Shares ( )
   Bonds ( )
   Mutual funds ( )

Appendix 2: Investment level of various financial market products among staff members with financial awareness.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Treasury Bills	34	14.7	14.7	14.7
	Corporate Shares	20	8.6	8.6	23.3
	Bonds	14	6.0	6.0	29.3
	Mutual funds	24	10.3	10.3	39.7
	Treasury Bills & Corporate shares	13	5.6	5.6	45.3
	Treasury Bills & Bonds	14	6.0	6.0	51.3
	Treasury Bills & Mutual funds	10	4.3	4.3	55.6
	Corporate Shares & Bonds	12	5.2	5.2	60.8
	Corporate shares & Mutual funds	10	4.3	4.3	65.1
	Bonds & Mutual funds	9	3.9	3.9	69.0
	Treasury Bills, Corporate shares & Bonds	11	4.7	4.7	73.7
	Treasury Bills, Corporate shares & Mutual funds	7	3.0	3.0	76.7
	Treasury Bills, Bonds & Mutual funds	3	1.3	1.3	78.0
	Corporate shares, Bonds & Mutual funds	5	2.2	2.2	80.2
	None	46	19.8	19.8	100.0
	Total	232	100.0	100.0	

Appendix 3: Source of information about financial market products among staff members with financial awareness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Television	9	3.9	3.9	3.9
	News Papers	3	1.3	1.3	5.2
	Radio	7	3.0	3.0	8.2
	Friends	12	5.2	5.2	13.4
	Television & News Papers	15	6.5	6.5	19.8
	Television & Radio	10	4.3	4.3	24.1
	Television & Friends	12	5.2	5.2	29.3
	News Papers & Radio	11	4.7	4.7	34.1
	News Papers & Friends	20	8.6	8.6	42.7
	Radio & Friends	15	6.5	6.5	49.1
	Television, News Papers & Radio	14	6.0	6.0	55.2
	Television, Radio & Friends	21	9.1	9.1	64.2
	Television, News Papers & Friends	22	9.5	9.5	73.7
	News Papers, Radio & Friends	24	10.3	10.3	84.1
	Television, News Papers, Radio & Friends	37	15.9	15.9	100.0
	Total	232	100.0	100.0	

Appendix 4: Logit estimates using 300 observations

Dependent variable: Aware

Variable	*Coefficient*	*Std. Error*	*t-statistic*	*p-value*	
const	-0.496519	1.17766	-0.4216	0.67331	
Male	0.439029	0.352072	1.2470	0.21240	
Married	-1.0983	0.363256	-3.0235	0.00250	***
Age1	1.40827	0.658267	2.1394	0.03241	**
Age2	1.21923	0.621642	1.9613	0.04984	**
Age3	26.0773	62003	0.0004	0.99966	
Degree1	0.0169396	0.983228	0.0172	0.98625	
Degree2	-0.534238	0.998296	-0.5352	0.59255	
Doctorate	1.14284	1.02519	1.1148	0.26495	
Income1	0.688863	0.892306	0.7720	0.44011	
Income2	0.670474	0.869358	0.7712	0.44057	
Income3	2.16002	1.00636	2.1464	0.03184	**

Mean of Aware = 0.773
Number of cases 'correctly predicted' = 239 (79.7%)
f(beta'x) at mean of independent vars = 0.025
McFadden's pseudo-R^2 = 0.188839
Log-likelihood = -130.244
Likelihood ratio test: Chi-square(11) = 60.642 (p-value 0.000000)
Akaike information criterion (AIC) = 284.488
Schwarz Bayesian criterion (BIC) = 328.934

Hannan-Quinn criterion (HQC) = 302.275

Appendix 5: Summary Statistics of variables in the empirical model

Variable	Mean	Median	Minimum	Maximum
Aware	0.773333	1.00000	0.000000	1.00000
Male	0.693333	1.00000	0.000000	1.00000
Married	0.500000	0.500000	0.000000	1.00000
36-45 years	0.253333	0.000000	0.000000	1.00000
46-55 years	0.0933333	0.000000	0.000000	1.00000
20-35 years	0.586667	1.00000	0.000000	1.00000
Degree1	0.486667	0.000000	0.000000	1.00000
Degree2	0.353333	0.000000	0.000000	1.00000
Doctorate	0.120000	0.000000	0.000000	1.00000
1000 & Below	0.420000	0.000000	0.000000	1.00000
1001-2000	0.340000	0.000000	0.000000	1.00000
2001-3000	0.153333	0.000000	0.000000	1.00000

Variable	Std. Dev.	C.V.	Skewness	Ex. kurtosis
Aware	0.419375	0.542295	-1.30571	-0.295132
Male	0.461880	0.666173	-0.838557	-1.29682
Married	0.500835	1.00167	0.000000	-2.00000
36-45 years	0.435647	1.71966	1.13431	-0.713346
46-55 years	0.291385	3.12198	2.79593	5.81723
20-35 years	0.493254	0.840775	-0.351995	-1.87610
Degree1	0.500657	1.02875	0.0533523	-1.99715
Degree2	0.478804	1.35511	0.613661	-1.62342
Doctorate	0.325504	2.71254	2.33874	3.46970
1000 & Below	0.494383	1.17710	0.324176	-1.89491
1001-2000	0.474500	1.39559	0.675521	-1.54367
2001-3000	0.360911	2.35376	1.92428	1.70284