# UNIVERSITY OF GHANA

# DEMAND FOR TREASURY BILLS IN GHANA, LOOKING BEYOND RISK

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## DECLARATION

I do hereby declare that this thesis is the product of my own supervised research and has not been presented by anyone for any academic award in this or any other university. All references in the work have been duly acknowledged. I bear full responsibility for any shortcomings thereof.

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## CERTIFICATION

I certify that this thesis was supervised in accordance with procedure laid down by the University.

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# DEDICATION

To God, the Almighty, who has made everything beautiful.

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## ABSTRACT

Investment is a very important activity in the life of every income earner. It basically entails setting aside part of one's income into an investment vehicle to yield returns in a form of reserving and or increasing the value of the initial amount invested. Treasury bills are one of the avenues for investing by income earners since it yields guaranteed returns over various time periods/durations. This study investigates whether there are behavioral factors influencing the demand for treasury bills in Ghana. A convenient sampling method was adopted in the collection of data from workers in Greater-Accra region. A logistic regression analysis was conducted to determine the behavioral factors that drive investment in treasury bills in Ghana.

The study found that there are behavioral factors influencing the demand for treasury bills in Ghana. Education, sociability, number of years of work experience, occupation and saving motives were found to be the main behavioral factors that influence the demand for treasury bills in Ghana. However, financial literacy and age were found to be insignificant in influencing the demand for treasury bills. The study has implication for investment organizations that need to need to know the behavioral attributes of Ghanaian workers towards investing in order to strategize in selling their investment products.

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# CHAPTER ONE

# INTRODUCTION

## 1.1 Background

A financial market according to Brealey et al (2007) is a market in which financial assets such as shares and bonds can be bought or sold. One party transfers funds to the financial market by purchasing a financial assets previously held by another party. Largely financial institutions aid this type of transaction. A financial institution is an institution whose assets are financial assets or financial claims e.g. stocks, bonds and loans. Financial institutions serve the purpose of facilitating the accumulation and allocation of capital by channeling individual savings into loans to governments and businesses. The transactions of financial institutions therefore consist of making loans to customers and the purchase of investment securities in the market place. They also offer a wide range of other financial services such as insurance protection and managing pension funds. In addition, they provide a mechanism for making payments, transferring funds and storing financial information.

More profound understanding of the factors that affect individual investors' financial market participation decisions will help to improve the quality of financial information and financial advising and investors' awareness.

Traditional finance theory posits that investors willingness to take financial risks depends simply on investment opportunities and risk aversion ( Sharpe, 1964),whereas more advanced dynamic portfolio choice models allow for changing investment opportunities, wealth, and transaction and information costs to affect household financial decisions (e.g. Samuelson, 1969; Merton, 1969, 1971; Brennan, Schwartz & Lagnado, 1997;Xia, 2001).

As household behavior does not seem to comply with the existing models, studies in the field of behavioral finance have introduced several new factors that affect household financial decisions, and the search of variables able to explain the patterns of portfolio choice in microeconomic data continues in the empirical front. However, most of the prior research on financial market participation focuses on only one determinant or one area at a time in analyzing influential individual characteristics. Recent studies have provided insight into the effect of, for example, social activity (Hong, Kubik & Stein, 2004; Georgarakos & Pasini, 2011),trust, (Guiso, Sapienza & Zingales, 2004, 2008), cognitive skills (Christelis, Jappelli & Padula, 2010; Grinblatt, Keloharju & Linnainmaa, 2011) and health (Rosen & Wu, 2004) on stock market participation.

This thesis summarizes a wide range of variables presumed to have an effect on individual financial market participation. The aim is to check the robustness of these variables and to define the most influential factors behind households' decision to buy treasury bills.

### 1.2 Problem Statement

The risk return trade-off is a long standing phenomenon in investments analysis and is also the foundation of financial economics. Risk return trade-off is the first fundamental law of finance Ghysels, et al (2004). This is also explained by the capital asset pricing model (CAPM) as the relationship between risk and expected return and that is used in pricing risky securities.

This implies a direct relationship between market risk and return for the reason that risk-averse investors require extra compensation for assuming extra risk. Markets which are perceived by investors to be high risk are associated with higher returns in order to compensate the risk involved in investing in such markets. Similarly, lower risk markets are characterized by relatively lower returns.

T-Bills are an important component of a country's financial system and represent a critical component of central banks' monetary policy. They act as a benchmark interest rate and form part of the yield curve, which conveys important information for monetary policy (Biepke, 2004). For investors, traders and financial managers the T-Bill rate is crucial to pricing bonds, interest rate derivatives and hedging interest rate risk (Brenner *et al.*. 1996)

In recent times there has been an increase in the investment of government securities, for instance Aboagye (2004) noted that, in six out of the eleven years that he studied more funds were invested in government securities as compared with equities.

According to Egu (2009), the money market dominates the capital market due to the volatility and unattractive nature of the capital market.

Investing in Government of Ghana treasury bills is relevant for a variety of public policies ranging from taxation issues and financial regulation. From the financial regulation and legislation point of view, those who buy treasury bills and other financial assets may have different attitudes towards corporate taxation issues, investment income taxation issues and redistribution compared to those who choose not to buy (e.g. Sears & Funk, 1991; Claessens & Perotti, 2007; Heinemann & Hennighausen, 2010). More profound understanding of the factors that affect individual investor's decision to invest in treasury bills will help to improve the quality of financial information and financial advising and investors awareness.

As household behavior does not seem to comply with existing models, studies in the field of behavioral finance have introduced several new factors that affect household financial decisions and the search of variables able to explain the patterns of portfolio choice in microeconomic data continues in the empirical front.

Financial market participation may be influenced by social interaction (Hong, Kubik & Stein 2004). Social interaction can serve as a means of information exchange via word-of-mouth or "observational learning" (Banerjee 1992) Ellison & Fudenberg 1995). It is much easier to get information about the availability of financial instruments through friends and social networks. Usually friends and peers want to maintain the same consumption that their social group does.

This means that financial market participation may be influenced by social group (Bernheim 1998). Personal networks are the most common source of financial information and advice individuals use when making investment and savings decisions. It is more likely that individuals will get information or take advice from friends and relatives than resorting to bankers, financial planners, brokers and the media.

All these studies looked at limited stock market participation, but in Ghana investment in treasury bills is very popular as compared to stocks therefore there is the need for one to look at the behavioural aspect of people investing in treasury bills. My research seeks to find out the behavioural factors that influence an individual's or house hold decision to buy treasury bills.

### 1.3 Objectives of the study

The general objective of the study is to find out whether there are behavioral explanations to why individuals and households invest in treasury bills.

### 1.4 Research Questions

In line with the study objective the study seeks to answer the following questions.

- Is there a behavioral explanation why individuals invest in the Government of Ghana treasury bills?

- What are the behavioral factors?

### 1.5 Significance of study

This study shall identify the behavioral factors that determine an individual's or household decision to invest in treasury bills in Ghana. This will help policy makers in drafting better policies as treasury bills are the main medium through which the government of Ghana raises money to fund its developmental projects and also to finance budget deficits.

Additionally, T-Bills are an important component of a country's financial system and represent a critical component of central banks' monetary policy. They act as a benchmark interest rate and form part of the yield curve, which conveys important information for monetary policy (Biepke, 2004). For investors, traders and financial managers the T-Bill rate is crucial to pricing bonds, interest rate derivatives and hedging interest rate risk (Brenner *et al.*. 1996)

### 1.6 Scope and limitations

This study covers the behavioral explanation to the individual's and household's decision to invest in treasury bills in Ghana. There are 10 regions in Ghana but the study concentrates on the Greater-Accra region since it is the belief of the researcher that, it fairly represents the varying characteristics of the population of Ghana.

The study was limited to the behavioral factors that influence an individual or household to invest in treasury bills. The data collection will be restricted to only primary data due to the nature of the issue under investigation and the limited time at hand to conduct the investigation.

### 1.7 Organization of the study

The study is organized into five chapters. The first chapter comprised an introduction, giving an overview of the study which serves as the introductory chapter to the entire research. This chapter also discusses the background of the study, the problem investigated, the aims and significance of study and the scope and limitations of the study.

The second chapter covers a review of relevant literature which is intended to act as a foundation to the rest of the research. This is to ensure familiarity with the existing body of knowledge and the position of this study, and therefore provides the conceptual framework for this study.

Chapter three explains the research methodology and discusses the data collection methods and justification of selected research techniques. The contribution of primary, secondary, qualitative and quantitative methods of data collection is demonstrated here.

The fourth chapter will present an evaluation, analysis and interpretation of collected data. The result of the methodology employed shall be analyzed and evaluated using Statistical Package for Social Sciences (SPSS), Microsoft excel and STATA 11. The chapter focuses on the actual analysis of data collected by establishing the extent to which theories reviewed differ from what pertains in practice.

The last chapter comprises a summary of findings, conclusions and recommendations. This draws information from the previous chapters to provide conclusions and recommendations which are organized in accordance with the research objectives.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

The literature review aims at helping readers discover and understand the theoretical framework that guides the study, its methodology, analysis and conclusion. The chapter covers the financial markets in Ghana, behavioral finance theories, the general determinants of financial market participation.

A financial market is market in which financial assets (securities) such as shares and bonds can be purchased or sold. One party transfers funds to the financial market by purchasing a financial assets previously held by another party. The financial markets are divided into the money and the capital markets. The money market, is a market for debt instruments with a maturity of one-year or less, plays the major economic role of providing a source of short-term funds to those needing liquidity and an income-yielding outlet for the short-term investment of funds. In Ghana the money market consist of the following instruments Treasury Bills, Bank of Ghana Bills, Negotiable Certificates of Deposit, Commercial Paper and Bankers Acceptances. The market is dominated by Treasury Bills maturing between 30 to 180 days.

Treasury Bills are short-term debt instruments (securities) issued by the Government of Ghana with a maturity of less than one year. They commonly have maturities of 91 days and 182 days. Treasury Bills are issued at discount from par, which means that rather than making fixed interest payments like conventional bonds, income is earned by the difference between the face value and the price of the security. Bank of Ghana also periodically issues short –dated bills to support its monetary

operations. Treasury Bills are instruments employed to finance government expenditure whilst the Bank of Ghana instruments are employed as control mechanisms for money supply within the economy. Investors in these instruments are usually households, individuals and corporate bodies who have excess funds and are willing to invest for a period of one year or less.

The default-free short-term interest rate is a fundamental concept to most theoretical and empirical finance (Brenner, Harjes & Kroner, 1996; Lanne & Saikkonen, 2003);

In many cases, faced with a market unwilling to take up long-term paper, and desiring to borrow at lower rates if the yield curve is significantly upwardly sloping, governments in Africa have tended to rely extensively on short-term debt finance. Three-month bills, for example, represent almost 50 percent of domestic debt in non-CFA3 sub-Saharan African countries (Christensen, 2004).

T-Bills are also typically advocated as a proxy for the true risk-free rate (see for example Reilly & Brown, 2006; Gitman *et al.* 2010) and as such they are used to estimate the real interest rate for a country, a country's sovereign risk premium, and are used as an important input in asset pricing models such as the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT). In theory, for an asset to be risk-free in an uncertain environment the variance must equal zero for the duration of the investment, implying that the actual returns earned over the period are always equal to the expected return (Sharpe, 1964; Reilly & Brown, 2006). In reality, however, "there is really no such thing as a truly riskless asset" (Brigham & Ehrhardt, 2005). T-Bills are not perfectly risk-free, and changing market conditions can result in great risk to governments having to roll over short-term debt three or four times a year (Christensen, 2004).

## 2.2 Behavioral Finance Theories

Behavioral finance started to take roots in the 1960s and 1970s with the revolutionary research work from theorists in finance, cognitive psychology, and behavioral economics. The pioneers of behavioral finance started blending the research principles of psychology and behavioral economics with specific investment and financial theories. Behavioral finance investigates the cognitive factors and emotional issues that individuals, financial experts and traders exhibit within the securities markets (Ricciardi, 2005). Behavioral finance encompasses research that drops the traditional assumptions of expected utility maximization with rational investors in efficient markets. The two building blocks of behavioral finance are cognitive psychology (how people think) and the limits to arbitrage (when markets will be inefficient). The growth of behavioral finance research has been fueled by the inability of the traditional framework to explain many empirical patterns, including stock market bubbles in Japan, Taiwan, and the US. (Ritter, 2003).

Behavioral finance is that part of finance, which seeks to understand and predict systematic financial market implications of psychological decision processes. Behavioral finance closely combines individual behavior and market phenomena and uses knowledge taken from both the psychological field and financial theory (Fromlet, 2001). According to Ricciardi & Simon (2000) behavioral finance attempts to explain and increase understanding of the reasoning patterns of investors, including the emotional processes involved and the degree to which they influence the decision making process. Behavioral finance scholars believe that individuals and households make decisions at different levels of rationality or satisfaction. Individuals are sometimes irrational and make decisions based on emotion rather than sound decision making.

We therefore rely on behavioral finance theories because the standard asset pricing models which stipulate rational investor behavior based on the risk-return relationship of assets has failed to adequately explain investor's behavior.

### 2.2.1 Heuristics

Refers to the process by which people find things out themselves, usually by trial and error. Trial and error often leads people to develop "rules of thumb" but the process often leads to other errors (Shefrin, 2000). Due to the fact that more and more information is spread faster and faster, life for decision-makers in financial markets has been more complicated.

Heuristics may help to explain why the market sometimes acts in an irrational manner which is opposite to the model of perfectly informed markets. The interpretation of new information may require heuristic decision making rules, which might later have to be reconsidered. Herd behavior is a form of heuristics where individuals are led to conform to the majority of individuals, present in the decision-making environment by following their decision.

However, herd behavior as with other heuristics may lead people astray when they follow e.g general market trends.

### 2.2.2 Herd behavior

A fundamental observation about human society is that people who communicate regularly with one another think similarly. Part of the reason people's judgment are similar at similar times is that they are reacting to the same information. The social influence has an immense power on individual judgment. People are influenced by social environment and they often feel pressured to conform. Herd behavior most recognized observation on financial markets in psychological context and can play a role in the demand for treasury bills in Ghana.

Another important variable to herding is the word of mouth; people generally trust friends, relatives and working colleagues more than the media. Talking to other people and other kinds of interpersonal communication are among the most important social connections humans have. It is therefore likely that, news about buying opportunities like treasury bills will rapidly spread.

### 2.2.3 Overconfidence

People are overconfident about their abilities. Entrepreneurs are especially likely to be overconfident. Overconfidence manifests itself in a number of ways. One example is too little diversification, because of a tendency to invest too much in what one is familiar with. Thus, people invest in local companies, even though this is bad from a diversification viewpoint.

Men tend to be more overconfident than women. This manifests itself in many ways, including trading behavior. Barber & Odean (2001) recently analyzed the trading activities of people with discount brokerage accounts. They found that the more people traded, the worse they did, on average. Additionally, men traded more, and did worse, than women investors.

### 2.2.4 Representativeness

People underweight long-term averages and tend to put too much weight on recent experience. This is sometimes known as the ‘‘law of small numbers.’’ As an example, when equity returns have been high for many years (such as 1982–2000 in the US and Western Europe), many people begin to believe that high equity returns are ‘‘normal.’’

### 2.2.5 Conservatism

When things change, people tend to be slow to pick up on the changes. In other words, they anchor on the ways things have normally been. The conservatism bias is at war with the representativeness bias. When things change, people might under react because of the conservatism bias. However, if

there is a long enough pattern, then they will adjust to it and possibly overreact, underweighting the long-term average.

### 2.2.6 Mental accounting

People sometimes separate decisions that should, in principle, be combined. For example, many people have a household budget for food and a household budget for entertaining. At home, where the food budget is present, they will not eat lobster or shrimp because they are much more expensive than a fish casserole. In a restaurant, however, they will order lobster and shrimp even though the cost is much higher than a simple fish dinner. If they instead ate lobster and shrimp at home, and the simple fish in a restaurant, they could save money. However, because they are thinking separately about restaurant meals and food at home, they choose to limit their food at home.

## 2.3 Determinants of financial market participation

Participation in financial markets depends on the characteristics of the financial assets traded in that market and the preference of potential investors (Herrera, 2005). For instance, in a financial market where short term, highly liquid and safe instruments are traded with well informed investors who are risk averse and seeking to commit funds for a very short periods participation is mostly likely going to be high.

The investment motive of an investor determines which type of financial market instrument an investor should invest in. For example if an investor is saving to meet a short term need then, money market instrument will be preferable and where investment is to meet long term need the capital market instrument will be preferable (Shum & Faig, 2006)

### 2.3.1 Education

Recent empirical studies have highlighted the existence of interactions between education and financial market participation choices. Controlling for wealth and wage, education is consistently found to be positively related to the probability of participating in the financial market. It is known that individual financial market participation interacts with some basic demographics, such as age, gender and marital status, and stock market participation has a general tendency to increase with education.

Educated households in Sweden diversify their portfolios more efficiently (Campbell, 2006). This suggest that the simple relationship between financial decisions and educational levels omits many other important factors, such as ability or family background that are likely to influence financial decisions.

Participation in financial markets instruments increases with educational levels. The more the education one has the more likely he is to participate in a financial market instruments (Van Rooij, Lusardi, & Alessie, 2007).

Education is found to have a strong positive effect on stock market participation of households even controlling for wealth and income (Haliassos & Bertaut, 1995). In addition, several studies have addressed the effect of education on financial decision-making in different contexts. Bernheim & Garrett (2003) report a significant increase in general and retirement savings rates with the provision of employer-based financial education. Woodward & Hall (2010) show that college education is associated with a notable reduction in average broker fees on mortgages suggesting that broker fees may be lower for sophisticated households as less sophisticated households are willing to pay higher fees.

### 2.3.2 Age

Several studies have documented the hump –shaped relationship between financial market participation and age (Aizcorbe, Kennickell & Moore, 2003). Also, Cocco, Gomes & Maenhout (2005) give the theoretical rationales to explain this pattern. To capture this non-linear age effect, the researcher uses age in the regression. A caveat of calling this an age effect is that, as Ameriks & Zeldes (2004) suggest, the age variable likely captures both a time and a cohort effect.

### 2.3.3 Sociability

Peer effects are important determinant of financial market participation (Hong, Kubik & Stein 2004) and Brown, Ivkovich, Smith & Weisbenner (2008). Cole & Shastry (2009) also found a similar effect of peers on financial market participation.

People's choices often look like the choices made by those around them, we wear what is fashionable, we have what they're having," and we try to keep up with the Joneses." Such peer effects have been analyzed across several fields of economics and social psychology. Banerjee (1992) and Bikhchandani et al. (1992).

Unsophisticated investors usually ask individuals perceived to be knowledgeable and expert for help whenever they want to invest and these people are usually their spouses and friends who do not necessarily qualify as experts (Benartzi & Thaler, 1999). Duflo & Saez (2000, 2002) in a study of retirement plan participation at 11 libraries in a large university found a strong relationship between peer effects and participation.

There are two reasons why a peer's act of purchasing an asset (or product, more generally) would affect one's own choice:

- One infers that assets (or products) purchased by others are of higher quality;

- One's utility from possessing an asset (or product) depends directly on the possession of that asset (or product) by another individual(Bursztyn et al 2012)

Kaustia & Knüpfer (2012) find that individual's stock market entry decisions are affected by the stock market performance of their local peers in the previous month.

### 2.3.4 Number of years worked

The number of years of work experience has impact on income therefore the likelihood of investing in treasury bills.

### 2.3.5 Occupation

Respondent occupation has been found by several studies to have an impact on their investment behavior and thus their participation in the stock market. The occupations in this study in accordance with Grinblatt et al 2011, have been categorized into finance professionals and others. The finance professionals include any worker in banking insurance, accounting, brokerage and other security firms, among others. The others include the civil servants who are not in accounting positions, the farmers, fishermen, traders, teachers, legal practitioners, security services (police, military etc) among others.

People who hold managerial occupations may have smaller opportunity costs to finding out about investment opportunities due to being involved in related professional activities (Bertaut, 1998). Managers also have more access to financial information and wider social network which also influence the financial market participation decisions (Hong, Kubik & Stein, 2004).

### 2.3.6 Savings Motive

Saving is what is left of disposable income after consumption is deducted. However, the average person sees savings as money put in bank accounts or other assets to protect one from future insecurities or to purchase goods and services (Katona, 1975; Lunt and Livingstone, 1991).

The business dictionary defines savings as the portion of disposable income not spent on the consumption of consumer goods, but accumulated or invested directly in capital equipment, by paying off a home mortgage or indirectly through the purchase of securities. The other form of savings is through putting money aside by saving it in a bank or financial services provider, investing in a pension plan or in other forms of income generating investments.

In economics, saving has been the object of intense theoretical and empirical consideration (i.e. Keynes's, Modigliani's, Friedman's and Duesenberry's theories); in psychology it has been treated from a variety of points of view. Since the early studies of Katona, some have focused on the influence of personality traits, such as the ability to delay gratification, self-control, aversion to risk, locus of control, time-preference (Daniel & Webley, 1998; Livingstone & Lunt, 1993; Lunt & Livingstone, 1991; Roman & Kaplan, 1995; Webley, Burlando, & Viner, 2000), and Cattell's personality factors (Brandstatter, 1996).

The decision to save, although influenced by economic factors, involves complex psychological and socio-psychological processes (Furnham & Argyle, 1998).

The importance of savings as a means to provide household financial security has been widely recognized by researchers and practitioners (Rha, Montalto & Hanna, 2006). Savings are one of the critical tools that households utilize to achieve financial goals and to improve financial well-being.

The theme of saving motives was first treated by Keynes (1936). He identified eight different motives:

- Precaution, which implies building up a reserve against unforeseen contingencies;
- Foresight, which includes providing for anticipated future differences between income and expenditure (the life-cycle motive);
- Calculation, which refers to the wish to earn interest;
- Improvement, which means to enjoy a gradually improving standard of living over time;
- Independence, which refers to the need to feel independent and to have the power to do things;
- Enterprise, which means having the freedom to invest money if and when it is favourable;
- Pride, which concerns leaving money to heirs (the bequest motive);
- Avarice or pure miserliness.

There is an addition to the motives above, the down-payment motive which is the desire to accumulate lump sums to use as down payments for expensive and durable goods such as a house or a car (Browning & Lusardi, 1996),

Warneryd (1995) distinguished four motives for saving and stressed that a person can save for one or more motives at the same time. Warneryd (1995, 1999) labels

- Saving as a continuous habit. This is a well-established habit of saving which is not related to any specific goal.

- Precautionary motive is due to uncertainty about the future.
- Bequest motive, which is saving for the well-being of the family after the person's death.
- Profit motive, consists of the wish to make an income from money put aside.

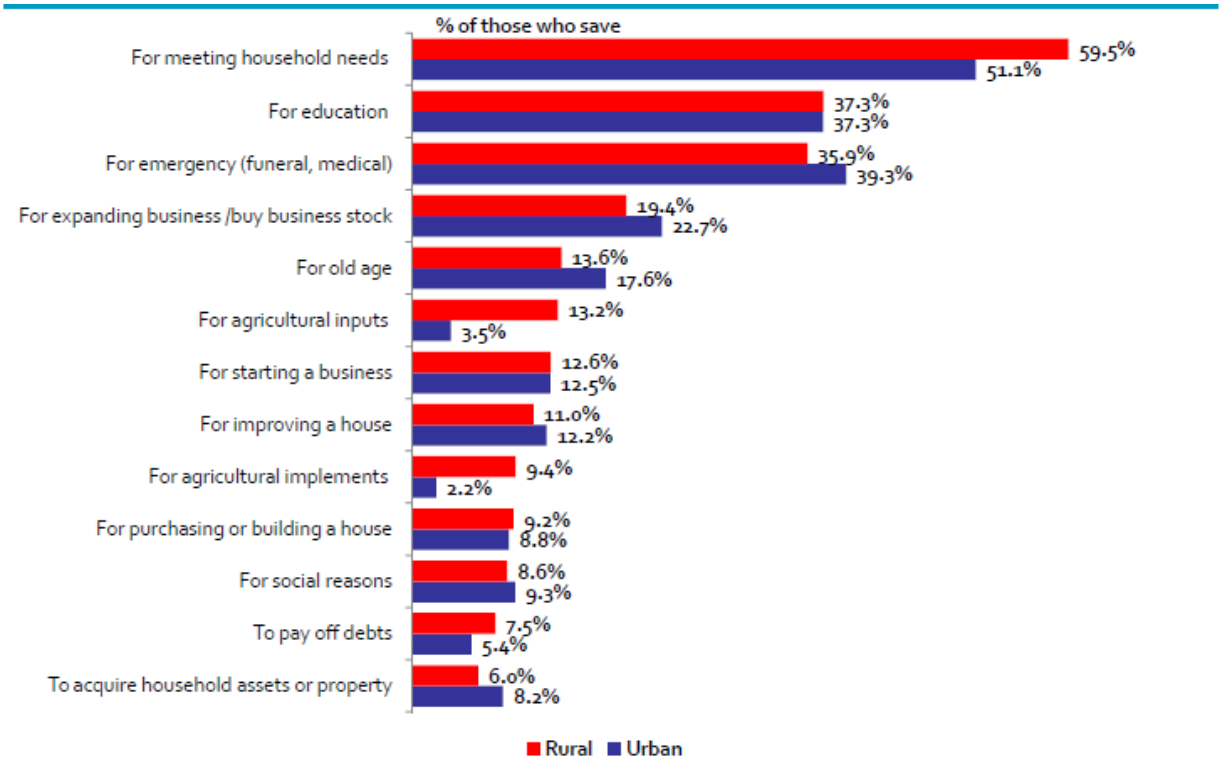
According to Wei and Zhang (2011) people save in order to improve their relative standing in the marriage market.

One of the most important economic theories regarding saving is the life cycle hypothesis proposed by Modigliani & Brumberg (1954). According to this theory, individuals save some of their earnings to provide for purchases in the final stages of life, when they will no longer be earning an income. In this context, the main motivation which drives an individual to save is the wish to accumulate money to use when he or she is retired (Modigliani, 1986). In an extension of the life cycle hypothesis, the permanent income hypothesis (Friedman, 1957), a further motivation appears: saving to leave an inheritance (Bequest motive).

Some studies have investigated the importance of different motivations to save. Katona's (1975) work, for example, showed that in the United States in 1960s, people saved, in order, for emergencies (ill-health, unemployment), to have funds in reserve for necessities, for retirement or old age, for their children's needs, to buy a house or durable goods and for holidays. Few claimed to save to earn future income (in the form of interest or dividends) or to leave money to their heirs.
In Ghana 64% of adults claim to save, two main reasons (meeting household needs and emergencies) indicate that Ghanaian adult save for the reasons which require that they have quick access to their money when they need it (FinScope Ghana,2010). This means that Ghanaian are likely to invest in financial products which allows them access to their monies in the short period of

time therefore short term investment products will be preferred. The graph below shows the percentage of Ghanaian adults and the reasons for savings as it shows in the Finscope Ghana survey.

**Table 2.1 Reasons for saving**




Source: Finscope Ghana 2010

Savings motives is found to be related to financial resources, with an increase in income the priority motive of families expand from daily necessities to saving for precautionary or emergencies to children, retirement and holidays (Xiao & Noring 1994, Xiao & Anderson 1997). Researchers have found that saving increases with age (Chang, 1994; Katona, 1975; Mirer, 1979). Furnham (1985) found age to be strongly and linearly related to respondents' attitudes toward saving and age has been found to determine how regularly a household saves. Yuh & Hanna (2010) found the predicted

probability of saving to be highest among respondents under age 30, with the predicted probability generally decreasing with age.

### 2.3.7 Financial Literacy

The terms financial literacy, financial knowledge, and financial education often have been used interchangeably both in the academic literature and in the popular media (Huston, 2010). Financial literacy can be defined as the ability to effectively evaluate and manage one's finances in order to make frugal decisions in order to reach life goals and achieve financial well-being (American Institute of Certified Public Accountants, 2003).

Garman and Forgue (2000) define financial literacy as knowing the facts and vocabulary necessary to manage one's personal finances successfully. According to Kim (2001) financial literacy is basic knowledge that people need in order to survive in modern society. Financial literacy involves knowing and understanding the often complex principles of spending, saving, and investing. Financial literacy also is the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being. It is an essential skill, increasingly seen as important to the long-term well-being of individuals and communities.

The Organization for Economic Cooperation and Development (OECD) defines Financial Literacy as: The combination of consumers'/investors' understanding of financial products and concepts and their ability and confidence to appreciate financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being.

Economists have tended to measure literacy through a rough self-assessment of respondents' financial sophistication; however, there is a second generation of studies based on detailed and

more reliable questions on finance. These surveys have established convincingly that a large proportion of the adult population knows very little about finance and that many individuals are unfamiliar with even the most basic economic concepts, such as risk diversification, inflation, interest compounding, and mortgage and other debt instruments (Lusardi, 2008).

Scholars have used different ways to measure financial literacy, but (Olga, 2011) identified two major approaches to measure financial literacy: self-assessments and objective measures like test scores.

Under the first approach respondents are asked to evaluate their literacy skills as well as to provide information about their attitudes toward financial decisions, knowledge and information. This approach has been used by Jappelli (2010), who performed an international comparison of literacy levels among 55 countries based on the indicator of financial literacy provided by IMD World Competitive Yearbook (WCY).

The second approach of measuring financial literacy relies on the objective test which assesses the respondents' knowledge of financial terms, understanding of various financial concepts and ability to apply numerical skills in particular situations related to finance. The objective test has been found to better assess the respondents financial knowledge than self-assessment (OECD, 2005).

The most popular test is based on three questions developed by Lusardi and Mitchel (2006), which they designed for 2004 Health and Retirement Survey (HRS) in the United States. Those three questions tested the respondents' understanding of compound interest, inflation and risk diversification, concepts vital for educated saving decisions and investment activity. The methodology of Lusardi and Mitchell (2006) has become widely used by researchers globally. Almenberg and Säve-Söderbergh (2011) use similar questions to assess financial literacy in

Sweden. Cole et al. (2008) follow this methodology in measuring literacy in India and Indonesia. Klapper & Panos (2011) assess financial literacy in Russia by using similar questions.

The extended methodology of Lusardi and Mitchell (2006) is applied by Alessie et al. (2008) who use Dutch DNB Household Survey, which includes two more questions on time discounting and money illusion.

Besides this most popular type of objective measures, other studies use other tests to assess financial literacy. Christelis et al. (2010) and Dewey and Prince (2005) study financial literacy based on The Survey of Health, Age and Retirement in Europe (SHARE) held for eleven European countries. In SHARE financial literacy is measured by testing respondents' ability to perform basic numerical operations and understand basic economic concepts. Guiso & Jappelli (2009) measure financial literacy related to portfolio choice based on the 2007 Unicredit Customers' Survey, which test respondents' understanding of interest rate and inflation, portfolio diversification and concept of risk.

Some researchers find that those who completed university or college degree are more likely to be financially knowledgeable than those with low education level (Cole et al. (2008), Worthington (2004), Lusardi & Mitchell (2006, 2008), Almenberg & Säve-Söderbergh (2011), Guiso & Jappelli (2005), Alexander et al. (1998)).

Financial education is necessary at all levels and for all segments of the population and economies functioned effectively if the population is financially literate and the studies had repeatedly demonstrated a strong link between education and the use of financial products.

The level of financial literacy informs the choice of portfolio. Banks et al. (2009), McArdle et al. (2009), Guiso & Jappelli (2008) and Alessie et al. (2008). Moreover, several researchers stress that

financial literacy has an effect on the level of participation in the formal financial market and stock market (Hogarth et al. (1999), Christelis et al. (2010), Cole et al. (2008). However, lack of financial literacy may result in costly borrowing and high debt load (Lusardi & Tufano (2009), Moore (2003), Stango & Zinman (2009), Campbell (2006).

# CHAPTER THREE

# METHODOLOGY

## 3.1 Introduction

This chapter presents the methodology employed in the data analysis to achieve the set objectives. The study area, sample, data sources, method of analysis and approach in data collection are explained. The explanatory variables and their expected effect on the dependent variable are justified in this chapter.

## 3.2 Sources of Data.

The research adopted a survey approach and this involves the use of questionnaires in gathering data. The study used primary data from Greater Accra region this is because the areas have a heterogeneous population and also because of the size of the population living within the region. It is the region with 70% financial inclusion and with the highest banked adults (Finscope Ghana 2010)

The use of primary data collected using field surveys was also informed by the issues under study and the nature of the explanatory variables. Since the study focuses on behavioral factors informing individuals/household's decision to invest in treasury bills in Ghana, using a survey allowed the study to gather first hand and the direct views of respondents regarding their decision to invest in the government of Ghana treasury bills.

### 3.3 Method of Data Analysis

The study estimates an empirical model based on behavioral finance framework which has been used by several studies such as Shum & Fiag (2006).

### 3.4 Logistic Regression Model

The logistic regression model is a discrete choice model where the dependent variable takes on binary responses such as *yes or no*. This makes it appropriate for this current study. The robustness of this model is that it does not follow the assumptions of the Ordinary Least Square (OLS) regression. The important assumptions however are that of linearity and independence of the variables. The logistic function is stated as follows:

$$F(z_i) = \frac{e^{z_i}}{1+e^{z_i}} = \frac{1}{1+e^{-z_i}} \text{---------- (1)}$$

$$P_i = \frac{1}{1+e^{-(\beta_1+\beta_2 x_{2i}+\beta_3 x_{3i}+\beta_4 x_{4i}+\beta_5 x_{5i}+\beta_6 x_{6i}+\beta_7 x_{7i}+u_i)}} \text{--------- (2)}$$

Where:

$P_i$ = is the probability of an individual to buy treasury bills.

$X_i$ represents the explanatory variables.

$\beta_i$ is the corresponding coefficient of $X_i$

$\mu_i$ = error term

### 3.5 Definition and Justification of Explanatory Variables

The selection of the explanatory variables is guided by the theoretical literature on behavioral finance, financial market participation and the Finscope Ghana 2010 survey, the survey was a nationally representative study of consumers' perceptions on financial services and issues thus generating insights into how consumers source their income and manage financial lives. The survey sampled the entire adult population, rich and poor, urban and rural to form a basis for segmentation to support product development and policy targeting. The survey also provided data on the proportion of the population using financial products and services, the types of financial services on offer and the drivers and constraints affecting the deepening of the financial system. The explanatory variables are as follows:

#### 3.5.1 Educational level ($EDU_i$)

Education is documented to have positive relationship with financial market participation. Participation in financial markets instruments increases with educational levels. The more educated one is, the more likely he is to participate in a financial market instruments (Van Rooij, Lusardi, & Alessie, 2007). Educated households in Sweden diversify their portfolios more efficiently (Campbell, 2006). We expect that as education goes up participation in treasury bills will increase. The a priori expectation was that education should have a positive influence on demand for treasury bills. The number of years spent in school is taken as a measure of an individual's educational level.

#### 3.5.2 Age of respondents ($AGE_i$)

Several studies have documented the relationship between age and financial market participation. Investments in the financial market increases strongly with age (Cole & Shastry, 2009, Van Rooij, Lusardi & Alessie, 2007). They found out that approximately 17 percent of individuals report

positive investment income at the age of 35 and this number increases by 11 points by age 55. Participation in financial markets increases with age and it is consistent with the life cycle hypothesis (Gakidis, 1998).

We expect that, as age increases participation in the treasury bill market also increases. Age is measured by how old the respondent is in years.

### 3.5.3 Sociability ($SOC_i$)

Peer effects are important determinant of financial market participation (Hong, Kubik & Stein 2004) and Brown, Ivkovich, Smith & Weisbenner (2008). Cole and Shastry (2009) also found a similar effect of peers on financial market participation.

People's choices often look like the choices made by those around them (Banerjee 1992) and Bikhchandani et al. (1992).

Unsophisticated investors usually ask individuals perceived to be knowledgeable and expert for help whenever they want to invest and these people are usually their spouses and friends who do not necessarily qualify as experts (Benartzi & Thaler, 1999).

To measure sociability respondents were asked whether or not they have participated in social activities in the past four weeks. In Kubik & Stein 2004 the question to measure sociability was on whether respondents interact with their neigbours or attend church together. We have modified it to suit our situation in Ghana to include things that Ghanaians in general partake more often. Those who indicated to have participated were given the value of 1 and 0 otherwise. We expect that the more sociable an individual is the more likely he is to get information about treasury bills and subsequently investing in it.

### 3.5.4 Number of years worked ($NYS_i$)

Number of years worked is measured as a continuous variable where the respondent give the number of years they have been working. These years for analysis purposes were classified into those who have worked for 10 years or less and above 10 years. We expect that the longer one works the higher the likelihood of investing in treasury bills.

### 3.5.5 Occupation ($OCC_i$)

Respondent occupation has been found by several studies to have an impact on their investment behavior and thus their participation in the stock market. The occupations in this study in accordance with Grinblatt et al 2011, have been categorized into finance professionals and others. Finance professionals take a value of 1 and 0 otherwise. The finance professionals include any worker in banking insurance, accounting, brokerage and other security firms, among others. The others include the civil servants who are not in accounting positions, the farmers, fishermen, traders, teachers, legal practitioners, security services (police, military etc) among others. We expect that those who work in financial institutions or finance related work will invest in treasury bills than those who work in other professions.

### 3.5.6 Savings motive ($SAV_i$)

In the Finscope Ghana survey, there is a section on financial behavior. The useful variables for our purpose are the questions on saving motives. Respondents were asked to choose from a list provided by the interviewer their top reasons for saving. These reasons proxy for the short-/long-term liquidity needs of each household/individual. We grouped the list of reasons into two categories. They are short term and long term. We expect that respondents with short term savings

motive will invest in treasury bills in order to have quick access to their money as soon as they need it.

### 3.5.7 Financial literacy ($FIL_i$)

To measure financial literacy we relied on the objective test which assesses the respondents' knowledge of financial terms, understanding of various financial concepts and ability to apply numerical skills in particular situations related to finance. The objective test has been found to better assess the respondents financial knowledge than self-assessment (OECD, 2005).

The most popular test is based on three questions developed by Lusardi & Mitchel (2006), which they designed for 2004 Health and Retirement Survey (HRS) in the United States. Those three questions tested the respondents' understanding of compound interest, inflation and risk diversification. The methodology of Lusardi & Mitchell (2006) has become widely used by researchers globally. Almenberg & Säve-Söderbergh (2011) use similar questions to assess financial literacy in Sweden. Cole et al. (2008) follow this methodology in measuring literacy in India and Indonesia. Klapper & Panos (2011) assess financial literacy in Russia by using similar questions. Respondents who are able to get two out of the three questions on financial literacy correct were given a value of 1 and 0 otherwise.

### 3.5.8 Marital Status

The study further investigates whether a relationship exists between the marital status of respondents and their investment in treasury bills. For this reason, the following hypothesis was tested;

$H_0$: There is no relationship between marital status and investment in Treasury bill

$H_1$: There is a relationship between marital status and investment in Treasury bill

### 3.6 Data collection

Data for this study was collected using a semi-structured questionnaire. This is because the questionnaire was adapted from literature and the Finscope Ghana 2010 survey. The study is on the behavioral factors that account for individuals and households decision to invest in treasury bills in Ghana therefore a semi-structured questionnaire allowed respondents to freely expressed themselves without restriction as would have been in the case of structured questionnaires

The choice of populates Greater Accra as the population rests on the fact that the demographic composition of the population of Accra are uniquely heterogeneous and most likely reflect the entire Ghanaian population structure.

### 3.7 Sampling procedure and sample size

The study used multistage sampling method in selecting respondents for the questionnaires. In Greater-Accra region, there are 2 Metropolitan assemblies (Tema, Accra), 6 municipalities (Ledzekuku-Krowor, Weija, Ga-West, Ga-East, Ashaiman, Adenta), and 2 districts (Dangme East, Dangme West), in the Greater Accra region. To avoid skewness of results a sample of 300 was taken to cover all these areas in the Greater Accra region. The study randomly selects respondents from each of these areas under the Greater Accra region. The sample size selection was in line with (Comrey and Lee, 1992) (Stevens 1996)

Occupation was the basis for the selection of respondents because certain professions are predominant in the Greater Accra Region. These occupations include finance professionals, education, legal practioners, fishermen, traders, security officers, public and civil servants. Samples from these professions were taken from each of the areas under the Greater Accra Region since we believe it reflect the entire population. Data for the demographics of the metropolitan assemblies,

municipalities and districts in the greater Accra region is not available therefore convenient sampling was used to pick the desired sample.

### 3.8 Summary

Methodological issues were highlighted in this chapter to explain how data collected from field work were analysed. The issues explained were the type and source of data used the sample size as well as the study area. The method used in achieving the stated objectives was also explained. In summary, primary data was collected from three hundred people in the Greater-Accra region and the logistic regression model was the econometric model used.

# CHAPTER FOUR

# RESULTS AND DISCUSSION

## 4.0 Introduction

This chapter presents and discusses the results obtained from the study. The chapter begins by looking at the demographic characteristics of respondents included in the study. It continues with the behavioral factors that influence an individual to purchase treasury bills in Ghana with focus on the empirical model. This chapter is guided by the objectives of the study.

## 4.1 Descriptive Summary Statistics

This section gives the descriptive summary statistics of the dataset used for the analysis.

**Table 4.1 Descriptive Summary Statistics**

| Variables | Mean | Standard Deviation | Minimum | Maximum | Observation |
|---|---|---|---|---|---|
| EDU | 15.19106 | 1.245433 | 9 | 16 | 246 |
| AGE | 35.61789 | 11.64055 | 20 | 70 | 246 |
| SOC | 0.5203252 | 0.5006052 | 0 | 1 | 246 |
| NYS | 8.971545 | 7.32254 | 1 | 40 | 246 |
| OCC | 0.4837398 | 0.5007544 | 0 | 1 | 246 |
| SAV | 0.4349593 | 0.4967624 | 0 | 1 | 246 |
| FIL | 0.3658537 | 0.4826507 | 0 | 1 | 246 |

The educational level (EDU) was represented by the number of years spent in each level of education with 9 being the lowest level of education and 16 being the highest. The mean of 15.19 indicates that average educational level of respondents was training college/polytechnic.

Age (AGE) was represented by the age of respondent at the time of responding to the questionnaire. It was realized that the minimum and maximum ages of the respondents were 20 and 70 respectively. The average age of respondents was 35.61 years.

The average number of years respondents have worked was 8.9 years with the minimum and maximum years being 1 and 40 years respectively.

## 4.2 Social Demographic and Economic Characteristics of Respondents

### 4.2.1 Gender of respondents

The study was meant to find behavioral factors influencing individuals and households to invest in treasury bills in Ghana. Respondents were asked to indicate their gender this is because gender has impact on who invests in risky or risk-free financial assets. There is a substantial variation in risk taking among men and women with women taking less risk than men (Dreber, 2011)

**Table 4.2 Gender of respondents**

| **Gender** | **Frequency** | **Percentage** |
|---|---|---|
| Male | 143 | 58 |
| Female | 103 | 42 |
| **Total** | **246** | **100** |

From the table above out of 246 respondents sampled for the study, 58 percent were males whiles the remaining 42 percent were females.

### 4.2.2 Marital status of respondents

Out of 246 respondents, majority of them were married. This is represented by 67 percent of respondent being married and the remaining 33 percent not married. The rationale behind the marital status of respondent is that as indicated in Guiso, Haliassos & Jappeli (2002) married people are likely to invest in a given financial instrument as there is likelihood that their partners are already investors in that asset.

**Table: 4.3 Marital Status of Respondents**

| Gender | Frequency | Percentage |
|---|---|---|
| Married | 164 | 67 |
| Not married | 82 | 33 |
| Total | 246 | 100 |

### 4.2.3 Age grouping of respondents

Respondents were grouped into various age brackets for analyzing the likelihood to invest in treasury bills with the different age brackets. The table indicates that majority of respondents fell within the 26-35 age brackets with overall percentage of 46 followed by the 36-46 age brackets. Clearly the table shows that majority of the respondents were young with the remaining in the age brackets of 46-55 and 56-65.

**Table: 4.4 Age groupings of Respondents**

| Age Grouping | Frequency | Percentage |
|---|---|---|
| 16-25 | 35 | 14 |
| 26-35 | 113 | 46 |
| 36-45 | 74 | 30 |
| 46-55 | 15 | 6 |
| 56-65 | 9 | 4 |
| Total | 246 | 100 |

### 4.2.4 Educational Level of respondents

Majority of respondents had university degree. Out of the total of 246 respondents 56% had university degree with the rest having qualifications below a university degree. This group includes training college/polytechnic, Senior high school, Middle/Junior high school and those without education at all.

**Table: 4.5 Educational level of Respondent**

| Educational level | Frequency | Percentage |
|---|---|---|
| Middle school/Junior High | 3 | 1.2 |
| Senior High school | 17 | 7.0 |
| Training College/Polytechnic | 88 | 35.8 |
| University degree | 138 | 56.0 |
| Total | 246 | 100 |

### 4.2.5 Occupation of respondents

Respondents were asked to state their occupation. These occupations have been grouped into two main categories; they are the finance professionals and non-finance professional. Finance professionals include those in banking, insurance, accountants, and other finance related jobs. Non finance professionals include civil servants, security service, traders, fishermen, judiciary etc.

**Table: 4.6 Occupation of Respondent**

| Occupation | Frequency | Percentage |
|---|---|---|
| Non finance professional | 120 | 49 |
| Finance professional | 126 | 51 |
| Total | 246 | 100 |

### 4.2.6 Numbers of years respondents have been working

The number of years of active working life has an impact on income and therefore it's likelihood of investing in a financial market instrument. Respondents were required to state the number of years they have been working. These years for analysis purposes were classified into those who have worked for 0 to 10 years and 10 years and above.

**Table: 4.7 Number of years respondents have worked.**

| Number of years | Frequency | Percentage |
|---|---|---|
| Less than 10 years | 169 | 69 |
| Above 10 years | 77 | 31 |
| Total | 246 | 100 |

The table indicates that out of the 246 respondents a majority of 69 percent have worked for at most 10 years. The remaining 31 percent of respondents have worked for more than 10 years. This to support the fact that majority of the respondents were young and therefore have worked for shorter period of time.

### 4.2.7 Sociability

Respondents were asked to indicate whether they have involved themselves in social activities for the last four weeks, those who indicated to have involved themselves in activities were given 1 and 0 otherwise. The table 4.8 below shows that 52% of respondents engaged in social activities and therefore likely to get information about financial market instrument hence its investment.

**Table: 4.8 Sociability of Respondents**

| **Sociability** | **Frequency** | **Percentage** |
|---|---|---|
| Sociable | 128 | 52 |
| Not sociable | 118 | 48 |
| Total | 246 | 100 |

The table indicates that 52 percent engaged in social activities within the last four weeks as stated in the questionnaire and the remaining 48 percent did not.

### 4.2.8 Savings Motives

Saving motives are important for predicting if an individual or household invests in treasury bills or not. Respondents were asked to choose from a list of savings motives their top three motives for savings. Respondents were given options to choose from, these options were converted into a

dummy assigning a value of 1 if it is chosen as one of the savings motives of the respondent and 0 otherwise.

**Table: 4.9 Responses from the Savings motive question**

| Savings Motive | | Frequency | Percentage |
|---|---|---|---|
| Building | No | 238 | 97 |
| | Yes | 8 | 3 |
| | | | |
| Education | No | 167 | 68 |
| | Yes | 79 | 32 |
| | | | |
| Emergency | No | 119 | 48 |
| | Yes | 127 | 52 |
| | | | |
| Old Age | No | 220 | 89 |
| | Yes | 26 | 11 |
| | | | |
| Business | No | 240 | 98 |
| | Yes | 6 | 2 |
| | | | |
| Household needs | No | 107 | 43 |
| | Yes | 139 | 57 |

Clearly it can be seen from the above table that majority of respondents chose household needs as one of their savings motive, followed by emergency savings motives. This shows that most of the respondents save for short term reasons. The saving motive of individual or household determines the type of financial asset the household or individual will go for. Therefore household whose savings motive is for the short term will obviously go for short term investments such as treasury bills.

### 4.2.9 Financial Literacy

Three questions were used in measuring financial literacy and these questions were the three questions developed by Lusardi & Mitchel (2006), which they designed for 2004 Health and Retirement Survey (HRS) in the United States with modifications to suit our environment. Each of these questions was a dummy, taking the value of 1 if the respondent gets it correct and 0 otherwise.

Below were the responses from each of the three questions:

**Table: 4.10Responses from the Financial Literacy questions**

| Financial Literacy | Answer | Frequency | Percentage |
|---|---|---|---|
| Question 1 | Correct | 90 | 37 |
| | Wrong | 156 | 63 |
| | | | |
| Question 2 | Correct | 130 | 53 |
| | Wrong | 116 | 47 |
| | | | |
| Question 3 | Correct | 82 | 33 |
| | Wrong | 164 | 67 |
| | | | |

The three questions used for measuring financial literacy are questions numbers 10, 11 and 12 at the appendix.

Three questions were used to measure financial literacy, each of the three questions was converted into a dummy variable taking the value of 1 when respondents answers it right and 0 otherwise and regressed against the dependent variable investment in treasury bills. For the three regressions run for financial literacy, the one with the most highly significant p-value of the $x^2$ statistic of the logliklihood ratio value of regression adequacy was therefore used in the main model to test for financial literacy.

### 4.3Behavioral Factors and investment in treasury bills in Ghana

This section investigates the relationships between the behavioral factors in the model and their relationship with the dependent variable, investment in treasury bills.

#### 4.3.1 Age and investment in treasury bills

Investments in the financial market increases strongly with age (Cole & Shastry, 2009). They found out that approximately 17 percent of individuals report positive investment income at the age of 35 and this number increases by 11 points by age 55. Participation in financial markets increases with age (Van Rooij, Lusardi & Alessie, 2007) and it is consistent with the life cycle hypothesis (Gakidis, 1998)

#### 4.2.2 Investor's socio-economic characteristics and investment in treasury bills.

It is known that individual financial market participation interacts with some basic demographics, such as age, gender and marital status, and financial market participation has a general tendency to increase with education (Campbell, 2006).

#### 4.2.3 Gender and investment in treasury bills

Gender is an influential factor in behavior and it has been shown that men are more willing to take risks than women, and that the differences between genders grow larger in single households (Jianakoplos & Bernasek, 1998; Sundén & Surette, 1998; Barber & Odean, 2001). Participation in risky financial instrument is found in Cole & Shastry, 2009 to be lower among and women than men. Many papers have documented that men trade more aggressively compared to women and they are risk averse and less likely to invest in risky financial assets.

Table 4.2 shows that 143 and 103 of respondents were males and females respectively. Out of the total sample of 246, 58% were males and the remaining 42% being females. Additionally out of the 143 males sampled 72% had investments in treasury bills whiles 103 female respondents had 82% of them having investments in treasury bills.

### 4.2.4 Marital status and investment in treasury bills

Marital status of individuals tends to affect their investment portfolio ( Jianakoplos & Bernasek, 1998). From the survey it was realized that 81.1 percent of married respondents have investments in treasury bills whiles 64.6 percent of unmarried respondents have investments in treasury bills.

### 4.2.5 Sociability

Financial market participation is influenced by social interaction (Hong, Kubik & Stein 2004). Using data from the Health and Retirement system finds that social households –those who interact with their neigbours, attend church are substantially likely to invest in financial market than non-socials. From the table clearly out of the 246 respondents 128 of them were sociable out of which 90.6 percent have invested in treasury bills. On the other hand 118 out of the 246 respondents 75.4 percent have investment in treasury bills. There was a higher participation level among those who were sociable and mingle with neigbours often than those who were not sociable. This goes to support the finding of Banerjee (1992) and Bikhchandani et al. (1992).

**Table: 4.11 How variables were captured**

| *Variables* | *Coding* |
|---|---|
| **Dependent variable** | |
| Investment in treasury bills | 1 if yes, 0 otherwise |
| **Independent variables** | |
| Education(EDU) | Continuous |
| Age(AGE) | Continuous |
| Number of years of work(NYS) | Continuous |
| Sociability (SOC) | 1 if yes, 0 otherwise |
| Occupation(OCC) | 1 if Finance professional, 0 otherwise |
| Savings Motive(SAV) | 1 if Short-term, 0 otherwise |
| Financial Literacy (FIL) | 1 if Financially Literate, 0 otherwise |

### 4.3 Correlation Analysis

The correlation matrix in table 4.12 gives an indication of the relation between demand for treasury bills and the independent variables. It is evident from the table that there are no high correlations amongst the variables, which indicates that all the variables are not highly correlated amongst each other to affect the results. Hence, the problem of multicollinearity is non-existent which therefore allows for all the variables to be included in the model.

**Table: 4.12 Correlation Matrix of explanatory variables**

| | DTB | EDU | AGE | SOC | NYS | OCC | SAV | FIL |
|---|---|---|---|---|---|---|---|---|
| **EDU** | 1 | | | | | | | |
| **AGE** | -0.0969 | 1 | | | | | | |
| **SOC** | 0.0322 | 0.0526 | 1 | | | | | |
| **NYS** | -0.0903 | 0.4842 | 0.0763 | 1 | | | | |
| **OCC** | 0.2033** | -0.0337 | 0.0738 | -0.0685 | 1 | | | |
| **SAV** | 0.1061 | -0.1009 | 0.0533 | 0.0038 | 0.0516 | 1 | | |
| **FIL** | 0.0666 | 0.1070* | 0.0719 | 0.0587 | -0.0230 | -0.0038 | 1 | |

***1% significance level ** 5% significance level *10% significance

DTB = Demand for Treasury bills, EDU = Education level of respondents AGE= Age of respondents SOC = Sociability NYS = Number of Years of work experience OCC = Occupation of respondents SAV= savings motive of respondents FIL = Financial Literacy of respondents.

### 4.4 Behavioral factors influencing the demand for treasury bills

A logistic regression analysis was employed to examine the behavioral factors that influence the demand for treasury bills. A logistic regression was employed in the analysis since the dependent variable (DTB) is a categorical variable taking the values of 1 for those who have invested in treasury bill and 0 otherwise. All the variables used in the correlation matrix in table were used in the regression model since there were no high correlations amongst any of them. The results of the logistic regression comprising the odds ratio, marginal effects, standard error and the associated probability of significance for each variable.

**Table: 4.13 Logistic Regression Results**

Dependent Variable: Investment in treasury bills

| Variable | Odds Ratio | Std. Err. | P-Value | Marginal Effects |
|---|---|---|---|---|
| **EDU** | 1.853859 | 0.2943009 | 0.000*** | 0.1250 |
| **AGE** | 1.005152 | 0.0198112 | 0.794 | 0.0010 |
| **SOC** | 3.979074 | 1.3455970 | 0.000*** | 0.2766 |
| **NYS** | 1.164449 | 0.0421475 | 0.000*** | 0.0308 |
| **OCC** | 1.864228 | 0.6187900 | 0.061* | 0.1252 |
| **SAV** | 0.263160 | 0.0940472 | 0.000*** | -0.2896 |
| **FIL** | 0.918442 | 0.3127462 | 0.803 | -0.0173 |

***1% significance level ** 5% significance level *10% significance levels

Number of obs. = 246

LR Chi2(7) = 82.83

Prob> Chi2 = 0.0000

Pseudo R2 = 0.2622

Log likelihood = -116.51717

DTB = Demand for Treasury bills, EDU = Education level of respondents measured as the number of years spent in School, AGE= Age of respondents SOC = Sociability= Whether or not a respondent has engaged in social activities for the past four weeks, NYS = Number of Years of work experience, OCC = Occupation of respondents, SAV= Savings Motive of respondents, FIL = Financial Literacy of respondents.

It was found that education was significant in influencing the demand for treasury bills and had a positive sign. This implies that individuals and households with higher education tend to invest in treasury bills than those with lower level of education. Highly educated people are 85.38% likely to invest in treasury bills than those with lower education. In other words, a unit increase in education holding all other things constant will increase the probability of the individual purchasing treasury

bills by 0.1250. The reason could be that educated individuals are able to understand what is happening on the financial market and are able to make decisions whether or not to invest in a particular financial instrument. Educated individuals and households are able to understand the dynamics of the financial markets in Ghana and choose their investment products as such.

This result appears to be consistent with empirical studies such as (Van Rooij, Lusardi, & Alessie, 2007) who found out that participation in financial markets instruments increases with educational levels. (Campbell, 2006) found out educated households in Sweden diversify their portfolios more efficiently.

Number of years of work experience is found to be significant and positively related to individual's decision to invest in treasury bills. It implies that individuals who have worked for longer period of time are more likely to invest in treasury bill. Those who have worked for a longer period of time are 16.44% likely to invest in treasury bills. The table also indicates that a unit change in the number of years of work experience of an individual increases the person's probability of investing in treasury bills by 0.0308. The number of years of work experience has impact on income of an individual therefore the higher the number of years worked by an individual the higher the person's income will be and the higher the likelihood of the person investing in treasury bills.

Occupation is found to be positively significant in determining the demand for treasury bills. Those who are in finance related jobs are 86.42% likely to invest in treasury bills. For finance professionals their likelihood of investing in treasury bills goes up by 0.1252 units. This is consistent with previous studies on financial market participation.

People who work in finance related occupations may have smaller opportunity costs to finding out about investment opportunities due to being involved in related professional activities (Bertaut,

1998). Managers also have more access to financial information and wider social network which also influence the financial market participation decisions (Hong, Kubik & Stein, 2001). Those who are involved in professional activities are

Saving motive is found to be statistically significant at 1% which means that the savings motive of an individual or household goes influence the financial decision of the person if the saving motive is for the short term. Specifically if the savings motive is for the short term, the person is 26.31% likely to invest in treasury bills. However a unit change in the savings motive decreases the likelihood of investing in treasury bills by 0.2896.

Financial literacy was found to be insignificant; however a unit change in the level of financial literacy decreases the likelihood of an individual/household investing in treasury bills by 0.0173.

Age was also found to be insignificant meaning that age does not influence the decision to purchase treasury bills. Two other regressions were run; dropping and adding Age (AGE) and Number of years (NYS) at different times but their effects was insignificant.

### 4.5 Marital status and investment in Treasury bill

The data collected showed a significant relationship between marital status and investment in Treasury bills as 81% of respondents who invested in Treasury bills were married as shown in the table below. Following this finding therefore, the null hypothesis is rejected.

**Table: 4.14 Marital Status and investment in treasury bills**

| | | Investment in Treasury bills | | Total |
|---|---|---|---|---|
| | | Yes | No | |
| **Married** | Frequency | 133 | 31 | 164 |
| | Percentage | 81.1 | 18.9 | 100 |
| | % of total | | | 67 |
| **Not Married** | Frequency | 53 | 29 | 82 |
| | Percentage | 64.6 | 35.4 | 100 |
| | % of total | | | 33 |
| Total | Frequency | 186 | 60 | 246 |
| | Percentage | 75.6 | 24.4 | 100 |
| | % of total | | | 100 |

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 5.1 Introduction

This chapter outlines the conclusion, major findings and recommendation of the thesis. Based on the analysis and discussions, summarized answers are provided for the research questions. The inferences drawn from the review of literature coupled with the empirical findings constitute the basis for the conclusion made.

## 5.2 Summary

This study set out to examine the behavioral factors that determine the demand for treasury bills in Ghana. A convenient sampling technique was adopted to obtain primary data by the use of comprehensive questionnaires to solicit for information from workers in the Greater Accra Region. This region was chosen because it has a heterogeneous population with people from diverse backgrounds. A sample of 300 people was taken with a response rate of 82% (246 respondents) with occupation being the basis for selecting respondents. The respondents consist of 143 males and 103 females out of which 165were married and 81 were single. A logistic regression model was used to determine the behavioral factors that affect individual's decision to invest in treasury bills, based on the data obtained. Majority of the respondent fell within the 26-35 age bracket. The respondents were mostly university graduates who had less than 10 years working experience and were found to have invested in treasury bills.

The study found education, sociability, number of years of work experience and occupation to be significant and positively related to investment in treasury bills. Savings motive was however found to be negatively related to investment in Treasury Bills. Based on the sample, it was also found that

investment in Treasury Bills was independent of age and financial literacy as these variables were insignificant.

### 5.3 Conclusion

Indeed the study found out that there were behavioral factors accounting for the investment in the Government of Ghana treasury bills. These factors are education, sociability, occupation, savings motive and number of years worked. However age and financial literacy were found not significant.

### 5.4 Recommendations

Clearly, it was seen from the finding that education influences the investment in treasury bills. The government should promote the education of the general public on investment, particularly in treasury bills as it is important to the economy of Ghana, being a major source of domestic credit to government. This can be done using the educational institutions and the media to inform the general public about the treasury bill market.

It is also recommended that, the government should consider the behavioral factors when issuing out treasury bills as these factors affect the purchase or sale of treasury bills apart from risk.

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## APPENDIX

### Questionnaire

**Kindly note that, your answers to the questions below will be used for academic purposes only and will be treated with utmost confidentiality.**

Please tick the appropriate box to indicate your preferred answer.

1. Please indicate your gender Male ☐ Female ☐
2. Please indicate your marital status Married ☐ Not Married ☐
3. Please indicate your age----------years
4. Please indicate your highest level of education
   - Middle School/ Junior High School ☐
   - Senior High School ☐
   - Training College/Polytechnic ☐
   - University Degree and above ☐
   - Other ----------
5. Please indicate your occupation…….
6. How long have you been working……years
7. Do you know anything about treasury bills? Yes ☐ No ☐
8. Have you ever bought treasury bills in any financial institution?

   Yes ☐ No ☐

9. Which of the under listed are your reasons for saving money.

- For meeting household needs ☐
- For education ☐
- For emergency (funeral, medical) ☐
- For old age ☐
- For starting a business ☐
- For purchasing or building a house ☐

10. Suppose you had GHS100 in a savings account and the interest rate was 2% per year. After 5years, how much do you think you would have in the account if you left the money to grow?

- More than GHS102; ☐
- Exactly GHS 102; ☐
- Less than GHS 102; ☐
- Do not know; ☐
- Refusal. ☐

11. Suppose you had GHS 100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?

- More than GHS 200; ☐
- Exactly GHS 200; ☐
- Less than GHS 200; ☐
- Do not know; ☐
- Refusal. ☐

12. Assume a friend inherits GHS10, 000 today and his sibling inherits GHS10, 000 3 years from now. Who is richer because of the inheritance?

- My friend; ☐
- His sibling; ☐
- They are equally rich; ☐
- Do not know; ☐
- Refusal. ☐

13. Which of the under-listed activities have you participated in within the last four weeks

- Attendance of funeral,wedding,church, ☐
- None of these ☐