

**THE EFFECT OF INSTITUTIONS ON HOUSEHOLDS' SAVING BEHAVIOR IN
KENYA**

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university or any other award.

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DEDICATION

This work is dedicated to my late parents Abraham Njenga Gachagua and Sarah Wambui Njenga for their sacrifice towards my education.

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ABBREVIATIONS AND ACRONYMS

ADD	American Dream Demonstration
ASCAs	Accumulating Savings and Credit Associations
CBK	Central Bank of Kenya
CL	Conditional Logit
GDP	Gross Domestic Product
IDA	Individual Development Account
IIA	Independence of Irrelevant Alternatives
KNBS	Kenya National Bureau of Statistics
MFI	Micro Finance Institutions
MNL	Multinomial Logit
MNP	Multinomial Probit
NIE	New Institutional Economics
NL	Nested Logit
PIH	Permanent Income Hypothesis
ROSCAs	Rotating Savings and Credit Associations
SASRA	SACCO Societies Regulatory Authority
SACCOs	Savings and Credit Cooperatives
SMEs	Small and Medium Enterprises
SSA	Sub Saharan Africa

OPERATIONAL DEFINITION OF TERMS

Household: A person or a group of persons living together and sharing a common source of food

Institutions: Refers to five constructs: access, incentives, information, facilitation and expectations

ABSTRACT

Savings is a vital source of investment funds, especially for developing economies. It is thus essential that internal savings capacity in these economies is increased to enhance investment financing and economic growth. Since increased reliance on international capital flows can result to economic instability, achieving a higher national saving rate is a critical macroeconomic objective for many developing countries. However, domestic savings remain low in many of them including Kenya, posing a significant development challenge. Household savings contribute a sizeable share of domestic and national savings in both industrialized and developing countries. Therefore, one set of fundamental determinants of national savings is the choices households make about their savings. However, households should not be considered fully as autonomous actors without the influence of institutions which lead to economic performance, efficiency, economic growth and development. Institutional theory of saving indicates that institutional factors significantly affect the ability to save. This study, therefore, attempted to enhance understanding of Kenya's saving behavior through a close examination of the institutional theory of saving as a crucial framework that can assist in explaining its savings performance. The study used a multinomial/conditional probit model and a ranked ordered multinomial/conditional probit model to analyze the effect of institutions on households' saving behavior. Data from the Financial Access National surveys (2006, 2009 and 2013) was used in the analysis. The study found that institutional factors including travel cost to access a saving option, interest rate on savings, trust, information and saving expectations influence the saving behavior in Kenya. It is, therefore, important to address the travel cost through the promotion of non-traditional saving services, offering attractive interest on savings, building trust in saving options, and enhancing financial education in Kenya. Further, enhancing formal education, income levels and reducing gender gaps are crucial in improving saving participation and performance in Kenya.

CHAPTER ONE

INTRODUCTION

1.1. Background

Savings, defined as deferred consumption, assist in the accumulation of capital, which can produce further output for future consumption. Savings permit increases in income and consumption as well as smoothing consumption when uncertainty arises (Gersovitz, 1988). Indeed, the importance of savings in economic development is recognized. For example, Rostow's stages of growth assert that the preconditions for take-off include an initial ability to mobilize domestic savings (Rostow, 1956). Lewis' growth theory indicates that saving is necessary for growth because investment has to be matched by savings (Lewis, 2013). Further, the neo-classical paradigm asserts that sustained growth of output is possible only when there is an increase in the propensity to save and invest (Sahoo, Geethanji and Kamaiah, 2001).

By freeing up resources that can be employed to raise the productive capacity of the economy, savings contribute to economic growth (Mason, 1988). Literature, however, identifies domestic savings as a fundamental source of investment, especially in developing economies (Feldstein and Horioka, 1980; Feldstein, 1983; Gersovitz, 1988; Mason, 1988; and Wood, 1995). Elbadawi and Mwegu (2000) argue that in Sub Saharan Africa (SSA), domestic savings are crucial in increasing investment finance required to enhance economic growth. Indeed, Bresser-Pereira and Nakano (2002) underline the need to increase the internal savings capacity. Thus, to attain macroeconomic stability hence economic growth, there is need to narrow the savings–investment gap (Elbadawi and

Mwega, 2000). As Mason (1988) indicates, a higher national saving rate is a macroeconomic objective for a sizable number of developing countries.

In Sub Saharan Africa (SSA), the savings rate remains low, posing a significant development challenge. For example, in 2015 the gross national savings averaged 14 per cent of gross domestic product (GDP). In the same period, the saving rate in East Asia and Pacific was 36 per cent and 31 per cent for South Asia (World Bank, 2016). In Kenya, the gross national savings remain low.

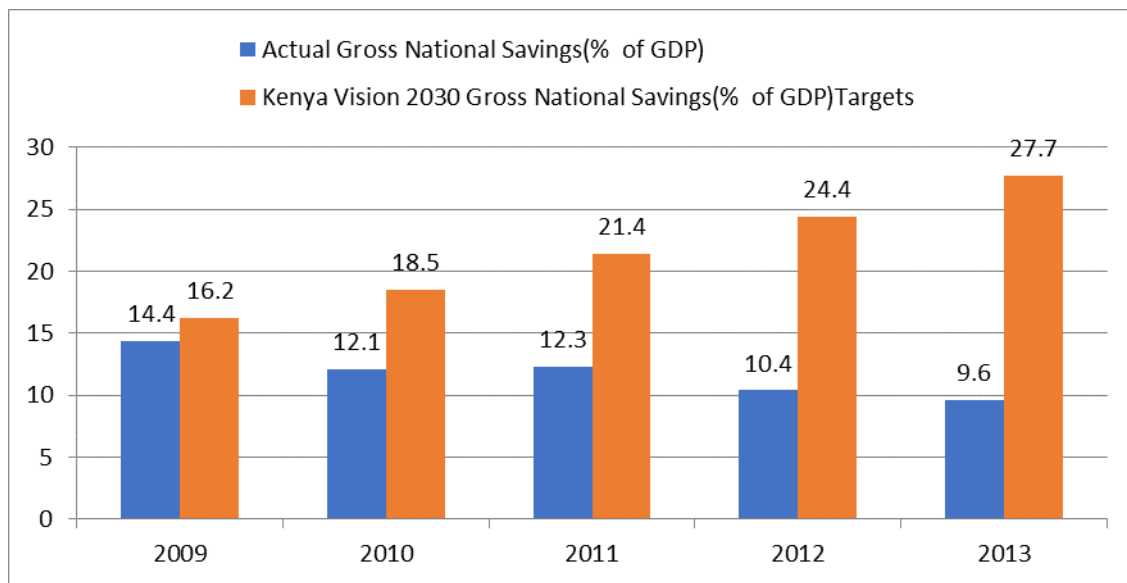


Figure 1.1: Gross national savings levels in Kenya (2009-2013)

Source of Data: Republic of Kenya (2013)

Figure 1.1 compares the trend of Kenya’s realized gross national savings and Kenya’s Vision 2030 targets as a per cent of GDP for the period 2009-2013. It is evident that Kenya has not realized Vision 2030 envisioned savings’ rates. In the period 2009-2013,

the realized gross national savings averaged 11.8 per cent, against a target average of 21.6 per cent of GDP. Further, the gross national savings rates have been on the decline. The savings rate decreased to 9.6 per cent in 2013 from 10.4 per cent in 2012, much lower than the 12.3 per cent achieved in 2011. In 2014-2017, the saving rates averaged 10.9 per cent (Kenya National Bureau of Statistics-KNBS, 2018).

The low saving rates experienced in Kenya mean the desired levels of investments as a per cent of GDP are not realized. For example, the Medium-Term Plan 1 (2008-2012) targeted an investment rate of 23.2 per cent in 2008/09, 24.6 per cent in 2009/10, 27 per cent in 2010/11, 29.7 per cent in 2011/12 and 32.6 per cent in 2012/13 (Republic of Kenya, 2007). The realized investment rates were however, 19.9 per cent in 2008/09, 19.8 per cent in 2009/10, 20.5 per cent in 2010/11, 20.1 per cent in 2011/12 and 27.3 per cent in 2012/13 (Central Bank of Kenya-CBK, 2014). In 2013/14 and 2014/15, the investment rates realized were 22.5 per cent and 21.2 per cent, respectively (KNBS, 2016). In 2015/16 and 2016/17, the investment rates averaged 18.3 per cent (KNBS, 2018).

The low savings and investments rates have failed to support high economic growth and employment creation as envisioned in the Kenya Vision 2030. The economic growth rate was targeted to increase from 7 per cent in 2007 to between 8 per cent and 8.5 per cent in 2009-2010, and to 10 per cent in 2012. However, between 2007 and 2012, the economic growth rate averaged 4.4 per cent (CBK, 2014). Similarly, during the 2013-2017 period, the economic growth rate was low at an average of 5.6 per cent (KNBS, 2018). Low domestic savings also mean that the economy is dependent on foreign financing for

investments, exposing the country to the risk of capital reversal, which can jeopardize anticipated economic growth.

The corporate, household and government savings are the three components of domestic savings. Household savings, however, form the more substantial part of domestic and national savings in both industrial and developing countries (Deaton, 1989; Schmidt-Hebbel, Webb and Corsetti, 1992; Obwona and Ddumba-Ssentamu, 1998). Khan, Nasir and Khan (1999) indicate that household savings contribute the largest share of domestic/national savings, particularly in predominantly agricultural developing lower income countries. In China for example, Yang, Zhang and Zhou (2011) indicate that household savings increased to 22 per cent of GDP in 2007 from 6-7 per cent in the late 1970s. In 2008, the savings rate among Chinese households was one of the highest in the world at 23 per cent of GDP. In Pakistan, households account for 75 per cent of the national savings (Khan *et al.*, 1999). Aryeetey and Udry (2000) assert that notwithstanding the problems of measurement, savings in Africa are dominated by household savings.

Households save from their disposable income and decide on the level of their savings (Gersovitz, 1988). Therefore, household saving rates measured as the ratio of household saving to household disposable income (Schmidt-Hebbel *et al.*, 1992) vary from one household to another, and indicate the intensity of saving for each household. There are various reasons why households save including life cycle and precautionary motives (Romer, 2006). Other motives are: saving for retirement and bequest, and to finance expected lifetime expenditures such as house purchases and education (Callen and Thimann, 1997).

In Africa, households hold their savings more in non-financial assets than in financial assets (Aryeetey and Udry, 2000). In Kenya, on the other hand, households save in banks, Micro Finance Institutions (MFIs) and in Savings and Credit Cooperatives (SACCOs). Informally, households save in Rotating and Savings Credit Associations (ROSCAs), Accumulating Savings and Credit Associations (ASCAs), group of friends and family and in secret places (Financial Sector Deepening Kenya and CBK, 2009). The households' usage of these saving options may be daily, weekly, monthly, yearly or infrequent. The usage, however, may differ from one saving option to another.

Choices by households about their savings determine national savings. Also, the different households' characteristics affect their saving behavior (Gersovitz, 1988). However, the influence of institutions on households' saving behavior should not be ignored (Peters, 1999). Institutions change behavior, opportunities, and outcomes (Neale, 1987). According to Kherallah and Kirsten (2002), institutions influence behavior, hence outcomes, for instance: economic performance, efficiency, economic growth and development. Indeed, Polski and Ostrom (1999) stresses that institutions are everywhere, governing our lives in fundamental ways.

Institutions are humanly devised informal and formal constraints that structure political, economic and social interaction (North, 1991). The informal constraints include: sanctions, taboos, customs, traditions and codes of conduct; while constitutions, laws, and property rights constitute the formal rules. Sherraden, Schreiner and Beverly (2003) indicate that institutions acknowledge that all else is usually not constant, and seek out to identify and assess some of the external conditions which could be stronger in influencing savings performance. The institutional theory of saving, therefore, insinuates that

institutional factors, to a great extent, influence the ability to save. Sherraden (1991) adds that saving and asset building are largely a consequence of institutional factors entailing explicit connections, rules, incentives and subsidies.

1.2. Statement of the Problem

Kenya's Vision 2030 is a long-term plan aimed at propelling the country to new heights of economic growth, with the principal target of making Kenya a middle-income country. The economy is expected to achieve a consistent annual economic growth rate of 10 per cent. To achieve this, the financial sector is expected to mobilize additional savings to support higher investment rates of above 30 per cent of GDP. The country has however, continued to experience low rates of savings. For example, the gross national savings (as a per cent of GDP) decreased from 14.4 per cent in 2009 to 10.43 per cent in 2012, below the Kenya's Vision 2030 Medium-Term Plan 1 (24.4 per cent). In 2013, the savings stood at 9.6 per cent against a target of 27.7 per cent (Republic of Kenya, 2007 and 2013). In 2014 and 2015, the savings marginally increased to 10.3 per cent and 11.4 per cent (KNBS, 2016). Further, in 2016-2017, savings averaged 11 per cent. Low savings, therefore, remain a key development challenge to achieving Kenya's Vision 2030 goals.

Like in other countries, households in Kenya contribute a significant part of national savings. Thus, it is important to find ways of encouraging households to save in order to boost the national savings. Using the traditional consumption and savings theories, the saving literature attempts to link aspects of household saving behavior to household members' demographics and economic factors. The institutional theory of savings however, argues that institutions play a crucial role in promoting savings (Sherraden *et*

al., 2003). The institutional model of saving notes that, savings in households mainly happen through institutional arrangements, and there are institutional constructs that lead to savings.

The literature on institutions' and households' saving behavior is scarce in Kenya, since only a few studies exist such as Ouma and Rosner (2003); Kibet, Mutai, Ouma, and Owour (2009); and Mbuthia (2011). A notable weakness of these studies is failure to include a majority of the institutional constructs (access, incentives, information, facilitation and expectations) in the analyses, as advanced by the institutional theory of savings. Further, these studies conduct a one period analyses of the effect of institutions on household saving behavior, which is limited since it does not reveal their effect over time.

Studies such as Kelley (1980), Mwegu, Ngola and Mwangi (1990), Oshikoya (1992), Azam (1996) and Anderson and Baland (2002), do not consider the institutions. Other existing studies are cross-country studies (Mwegu, 1997, Elbadawi and Mwegu, 2000, and Apergis and Christou, 2012). This study endeavors to improve the understanding of household saving behavior in Kenya through a close investigation of the institutional theory of saving as a crucial framework which can assist in explaining Kenya's saving performance. Besides including majority of the institutional constructs in the analysis, three cross-sectional data sets are used to capture the institutions' effect on household saving behavior over time.

1.3. Research Questions

This study sought to answer the following questions:

- i. What is the effect of institutions on households' choice of saving options conditional on decision maker attributes in Kenya?
- ii. What is the effect of institutions on households' choice of saving levels conditional on decision maker attributes in Kenya?
- iii. What is the effect of institutions on households' choice of usage of saving options conditional on decision maker attributes in Kenya?

1.4. Objectives of the Study

The main objective of this study was to analyze the effect of institutions on households' saving behavior in Kenya. Specifically, the study aimed to:

- i. Analyze the effect of institutions on households' choice of saving options conditional on decision maker attributes in Kenya
- ii. Analyze the effect of institutions on households' choice of saving levels conditional on decision maker attributes in Kenya.
- iii. Analyze the effect of institutions on households' choice of usage of saving options conditional on decision maker attributes in Kenya

1.5. Significance of the Study

The analysis of institutions and households' saving behavior is critical in designing policies and strategies that will increase domestic savings in Kenya. Higher savings will make Kenya achieve Vision 2030 goals. The results of this study are useful in providing information to design a policy of raising national savings. The findings will therefore be useful in promoting policy dialogue to such parties as Government of Kenya, Kenya

Vision 2030 secretariat, financial sector regulators and associations in the financial sector. This study also contributes to the existing knowledge given that previous studies on savings behavior in Kenya, did not fully investigate the institutional theory of saving as a crucial model which can assist in explaining Kenya's saving performance.

1.6. Scope and Organization of the Study

The objective of this study was to analyze the effect of institutions on households' saving behavior in Kenya. This study utilized three cross-section data sets collected from households to measure financial access landscape in Kenya. The surveys were nationally representative, and the respondents were individuals within households, randomly selected based on the rural and urban clusters. Eligible persons were 16 years old and above.

This thesis proceeds as follows: Chapter two presents the literature review, both theoretical and empirical and an overview of the same concentrating on the gaps in literature; while Chapter three constitutes the methodology where the theoretical framework of the specific objectives is outlined, and empirical model specified. Chapter four presents empirical results and discussions; and Chapter five presents the summary, conclusion, policy recommendations, limitations of the study and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter reviews both the theoretical and empirical literature. The traditional consumption and savings theories, and the institutional theory of saving in the new institutional economics are discussed in the theoretical literature section, while empirical literature section reviews the determinants of savings namely; demographics, economic variables and institutional factors. Finally, an overview of the literature is given at the end of the chapter highlighting gaps in the literature.

2.2. Theoretical Literature

2.2.1. Traditional Consumption and Saving Theories

Several traditional consumption and saving theories have been identified in the literature including the absolute income hypothesis by John Maynard Keynes in 1936, relative-income hypothesis by James S. Duessenberry in 1949, the permanent income hypothesis (PIH) by Milton Friedman in the 1950s and the life-cycle hypothesis proposed by Modigliani and Brumberg in 1954 and Ando and Modigliani in 1963. These theories have led to empirical studies which test demographic and economic factors as determinants of saving behavior. This study is however not testing these traditional consumption and saving theories, but uses the demographics and economic factors associated with these theories as control variables.

2.2.1.1. Absolute Income Hypothesis

The Keynesian approach assumes that current consumption, C , is a function of disposable income, $Y - T$ where Y is current income and T the level of direct taxes as follows:

$$C = (1 - \theta)(Y - T) \quad (2.1)$$

where $0 < \theta < 1$ denotes the marginal propensity to save. Equation 2.1 describes a simple approach reflecting the behavior subject to liquidity constraints. It is also a good description of consumption and savings behavior at very low levels of income, where subsistence is a predominant concern and inter-temporal considerations are absent. Keynes reasoned that as income falls relative to recent levels, people will protect consumption standards by not cutting consumption proportionally to the drop-in income, and conversely as income rises, consumption will not rise proportionally. This implies that the level of income positively influences saving (Wood, 1995; and Branson, 2003).

2.2.1.2. Relative-Income Hypothesis

The relative-income hypothesis is based on two principles (Branson, 2003). First, consumers are not concerned about their absolute level of consumption, but consumption relative to the rest of the population. Thus, the consumption behavior of individuals is interdependent. Second, present level of absolute and relative income, and levels of consumption attained in previous periods influence present consumption. It is harder to reduce a level of consumption once reached than the portion of income saved in any period. Hence, over time, consumption relations are irreversible. This principle implies that the aggregate ratio of saving to income depends on the level of present income

relative to previous peak income. As present income rises relative to its previous peak, the aggregate ratio of saving to income increases, and vice versa. Branson (2003) indicates that Duesenberry's theory has, however, not been successful in terms of acceptance among economists.

2.2.1.3. Permanent Income Hypothesis (PIH)

The PIH was first proposed by Milton Friedman in the 1950s. The term permanent income signifies the average income the household should expect over a long-time horizon (Sachs and Larrain, 1993). According to PIH, consumption responds to permanent income (Y_p) defined as an average of present and future incomes. Specifically, for a household with a fluctuating income stream, Y_p would be the steady income level giving the household similar inter-temporal budget constraints as it has with its fluctuating income stream.

The household's inter-temporal budget constraint (in two periods) is:

$$C_1 + C_2 / (1+r) = Q_1 + Q_2 / (1+r) \quad (2.2)$$

where C_1 is consumption in period 1 and C_2 is consumption in period 2. r represents the interest rate, and Q_1 and Q_2 are output in period 1 (present) and period 2 (future), respectively.

We get Y_p , the income level giving the household the same present value of its lifetime resources, as that implied by its inter-temporal budget constraint as follows:

$$Y_p + \frac{Y_p}{(1+r)} = Q_1 + \frac{Q_2}{(1+r)} \quad (2.3)$$

Solving for Y_p in terms of Q_1 and Q_2 in equation 2.3, we get

$$Y_p = \frac{(1+r)}{(2+r)} \left[Q_1 + \frac{Q_2}{(1+r)} \right] \quad (2.4)$$

In equation 2.4, Y_p would be an exact average of present and future output in the particular case in which the interest rate is zero (and in which the household inherits no stock of financial assets at time 1). Nonetheless, in general, the interest rate is not zero, thus Y_p is a kind of average of future output. Transitory income is the difference between the current and permanent income. The prediction that transitory income is entirely saved or more generally that saving and borrowing are used solely for consumption smoothing purposes has formed the basis for a number of empirical tests of the PIH in developing countries (Agenor, 2004). This is despite Snyder (1974) asserting PIH was difficult to test because of measurement problem.

2.2.1.4. Life Cycle Hypothesis

The life cycle hypothesis argues that income fluctuates in a systematic manner over the course of a person's life, therefore, personal saving behavior depends on one's stage in the life cycle (Sachs and Larrain, 1993). When people are young, their incomes are low, and they often go into debt because they know they will earn more later in their lives. During their working years, income rises to reach a peak at around middle age, and they repay the debt incurred earlier and save for their retirement. When retirement comes, income from work goes to zero and people consume their accumulated resources.

The life-cycle hypothesis is the most attractive theoretical basis for modeling relationship between saving and demographic factors. Obwona *et al.* (1998) however, assert that the hypothesis is designed for industrialized economies where the following three

assumptions may hold: in industrialized economies most individuals engage in wage labor; industrialized economies have perfect labor markets where human capital influences productivity, thus income plays an important role in determining the pattern of income over the lifetime; and lastly, on the basis of a utility function, individuals prefer to spread consumption more equally than income over their lifetime.

2.2.2. Theory of Institutions

The new institutional economics (NIE) incorporates the theory of institutions into economics. NIE is a dynamic and relatively new school of thought offering answers to some economic problems that neo-classical economists found difficult to address (Kherallah and Kirsten, 2002). It recognizes the cost of transacting – determined by institutions and institutional arrangements – as the key to economic performance. Zimbauer (2001), however, notes that though institutions were not completely omitted in the neo-classical theory, they did not play a major role in the analysis. Indeed, NIE argues that the analysis of institutions can be done within the neo-classical framework.

According to North (1991), institutions are humanly devised constraints that structure political, economic and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions and codes of conduct) and formal rules (constitutions, laws and property rights.). Given the standard constraints of economics, institutions define the choice set determining transaction and production costs, thus the profitability and feasibility of engaging in an economic activity. While institutions provide for more certainty in human interaction (North, 1990), they have an influence on behavior and on outcomes like economic performance, efficiency, economic growth and

development (Kheralla and Kirsten, 2002). Polski and Ostrom (1999) acknowledge that though institutions are everywhere governing our lives in fundamental ways, it is only recently that policy analysis has recognized the role of institutions in political economic behavior.

2.2.3. Institutional Theory of Saving

Sherraden *et al.* (2003) assert that economic models predict that when all else is constant, income increases savings and saving rates. However, from an institutional standpoint, not all else is usually constant since some external conditions could influence savings performance. Thus, the influence of these external conditions may be stronger than income in explaining savings performance. This argument has led to the development of the institutional theory of saving developed as a result of asset building research in the United States of America.

According to the emerging institutional theory of saving, institutional factors are predicted to affect the ability to save. Savings and asset accumulation are largely a consequence of institutional arrangements entailing explicit connections, rules, incentives and subsidies (Sherraden, 1991). Indeed, such institutional factors shape and influence opportunities (Neale, 1987; North, 1990; Weaver and Rockman, 1993; Beverly *et al.*, Sherraden, 1999; and Peters, 1999). The institutional theory of saving advances access to saving services, incentives, information, facilitation and expectations as five key institutional constructs important in influencing saving and asset building behavior, especially amongst households with low incomes (Sherraden, 1991; Beverly *et al.*, 1999; Sherraden, 1999; and Sherraden *et al.*, 2003).

The access construct refers to the institutional means that render the depositing process more available. The nearer an individual is to the saving services, the higher the participation and savings. The incentives construct represents efforts to motivate higher savings. The more attractive the incentives are, the greater the participation and savings. The information construct, normally offered through financial education, assumes that by making people more informed of their savings choices and opportunities, higher savings are attained. Facilitation construct involves institutional arrangements providing mechanisms which make savings more manageable. Such mechanisms can be in form of direct deposits and online banking services. Lastly, the expectations construct refers to the specific savings goals and targets. People with definite savings expectations are expected to have higher savings than those without. This study empirically tests the institutional theory of saving in Kenya.

2.3. Empirical Literature

2.3.1. Demographics and Economic Variables

Hyun, Adams and Hushak (1979) measured permanent income from cross section data to estimate the marginal savings behavior of rural households in South Korea for the period 1962-1976. The results showed that households saved a large share of their incomes. However, in the late 1960s, these savings were only about one-fifth of permanent incomes and four-fifths of transitory incomes. In Kenya, Kelley (1980) used cross-section data to analyze the interactions of household decisions; saving, investment in education, family size, labour force participation (income) and child deaths. Focusing on three urban areas namely; Nairobi, Kisumu and Mombasa, the study used two-stage least-squares regression on 401 Kenyan nuclear households to analyze the interactions of these

decisions. The results showed that the number of children did not influence a household's financial saving rate. However, they had an effect on the composition of saving, if expanded to include human capital formation, specifically expenditures on education.

Chowdhury (1987) tested models of household saving using the 1973/74 and 1976/77 data of household expenditure surveys in Bangladesh. The results showed that a Keynesian type relation described reasonably well the savings model of the households in Bangladesh, both in urban and rural areas. Further, savings out of transitory income component in rural areas were consistently and significantly higher than in urban areas.

Mwega *et al.* (1990) tested how real bank deposit rates affect private sector's savings in Kenya. The study used time series data for the period 1966-1985, and defined private savings as gross investment minus foreign and government savings. The study's result failed to support the McKinnon-Shaw hypothesis. Instead, it was found that private saving rate was not significantly responsive to a representative bank deposit rate of interest. Further, Oshikoya (1992) investigated whether real bank deposit rates raised the saving rate (the ratio of domestic saving to GDP) after financial liberalization in Kenya. The study used data for the period 1970-1989 and found that real deposit rates were not important in influencing savings.

Schmidt-Hebbel *et al.* (1992) uses household data in 10 countries covering the period 1970-1985 to estimate household saving functions. The study tested households' responses to income and growth, rates of return, monetary wealth, foreign saving and demographic variables. The results showed that while income positively affected savings, monetary wealth had a negative effect. The effect of inflation and the interest rate on

savings was not clear. However, household savings were negatively affected by foreign saving. In Pakistan, Khan (1993) examined the impact of income (permanent and transitory), unanticipated inflation and price uncertainty on savings behavior over the period 1959-1960 and 1987-1988. The results suggested that the real rate of return on deposits, unanticipated inflation and variability of inflation had a significant positive effect on aggregate savings. Aggregate real income was also found to be a key determinant of national, financial and physical savings.

Azam (1996) tested the effect of the real interest rate on national savings in Kenya for the period 1967-1990. The study controlled for external shocks and financial repression. According to the results, the real rate of interest and national saving rate (ratio of national saving to national income) had a significant positive relationship. However, no inference could be made for real interest rate above 5 per cent, since only one point was above it in the study sample.

Muradoglu and Taskin (1996) used a fixed effect model to study the households saving behavior in 30 developing and industrial countries. The study used household data generated by the United Nations system of national accounts for the period 1975-1989. The estimation results indicated that households' saving rates in industrial countries increased with permanent income. However, in developing countries, households tended to reduce savings with increase in permanent income. While the domestic real interest rates and inflation rate had a significant negative effect on savings rates for industrial countries, their effect in developing countries was not significant. In developing countries, the dependency ratio had negative significant effect on saving rates.

Ogaki, Ostry and Reinhart (1996) investigated household saving behavior in 13 countries using annual time series data covering the period 1968-1992. The study examined the responsiveness of savings to interest rate changes and whether there were any economically significant behavioral differences at various development stages of the 13 countries. The results indicated that income level systematically explained the cross-country variation in both the level of saving and responsiveness of saving to the real rate of interest.

Mwega (1997) carried out a comparative analysis of average private saving in 15 countries. The study primarily relied on the life cycle and permanent income inter-temporal models of household saving to estimate a private savings function. According to the study, the dependency ratio had a negative effect on private savings behavior in 15 African countries. More so, the level of per capita income (negative effect) was found to be one of the significant variables determining private savings in African countries. Moreover, Masson, Bayoumi and Samiei (1998) examined the determinants of private saving behavior in a cross-section of both industrial and developing countries. Despite some heterogeneity in the results, the estimates showed that the dependency ratio had a significant negative effect on private saving rates, while the real interest rate had positive effects.

Obwona *et al.* (1998) assessed the factors that influenced household saving behavior among rural and urban households in Uganda. A logit analysis of saving decisions (probability that a household saves in monetary form) was conducted separately for rural and urban households. The results indicated that the head of household education coefficient for the rural was positive and significant, compared to urban area. The effect

of the age of household head was insignificant for both the rural and urban households. The dependency ratio had a negative significant effect on the urban household monetary savings decisions, but not for rural households. Finally, income positively influenced household saving in the urban but not rural Uganda.

Elbadawi and Mwega (2000) investigated the determinants of private saving in Sub-Saharan Africa (SSA). Saving was regressed on a number of factors in three sub groupings from SSA (high, moderate and low savers) and three countries (Kenya, Zimbabwe and Botswana). The dependency ratio was found to make a net positive contribution to saving in low saving countries, relative to moderate saving countries. The results also indicated that income per capita positively contributed to the superior saving performance in high performing Asian economies relative to high and moderate African economies' savers.

Loayza, Schmidt-Hebbel and Serven (2000) examined the policy and non-policy factors responsible for savings disparities across countries and over time. Using a large cross-country time series data, the study adopted an encompassing approach based on reduced form linear equations. Both private and national saving ratios were used as dependent variables. The study revealed that both old-dependency and young-dependency ratios had negative effect on the private saving rates. Further, real interest rate and urbanization negatively impacted on the private saving rate. However, private saving rates rose with the level and growth rate of real per capita income. The effect of income was larger in developing countries than developed ones. Holding other factors constant, inflation (used as a proxy for macroeconomic volatility) had a positive effect on private saving.

Gibson and Scobie (2001) examined the household saving behavior in New Zealand using household economic survey data and constructed synthetic cohorts. Further, a variety of regression models were used to separate the effect of age, birth-year cohort and year on saving rates. The results suggested that younger cohorts had higher saving rates than older cohorts.

Kiiza and Pederson (2001) used panel data to analyze household saving in Uganda. The household data was for 1996 and 1997, collected in the central, eastern and western Uganda for a sample size of 370 households. A logit model was used to estimate the factors responsible for a household's choice for acquiring a deposit instrument. The study found that the probability of a household acquiring a formal deposit instrument increased significantly with the level of education of the household's head and the density of formal finance in the area where the household is located. Hence, urban households in areas with a higher bank density had a higher probability of acquiring a deposit instrument than a rural based household due to increased level of options and opportunities. Further analysis showed that higher permanent income had a positive influence on the level of net deposits.

Anderson *et al.* (2002) analyzed an individual's motive to participate in ROSCAs in Kibera slum in Kenya. The probit estimations showed that being female, age, years spent in the slum and native language (ethnic identity) were significant determinants of participation in ROSCAs. The number of children was, however, negatively related to individual's participation in ROSCAs. The general wealth level of the household had no significant effect on individual's participation in ROSCAs. Carpenter and Jensen (2002) applied household level data on 4,800 households to measure the micro-level

determinants of the choice of saving instrument either formal (bank) or informal (ROSCAs) in Pakistan. The study estimated bivariate probit models for participation in each of the two choices. The results showed that increased income leads to a greater desire to participate in savings, but as income increases more individuals shift to formal saving. Also, formal use was strongly influenced by literacy and numeracy; an indication that low education attainment and literacy rates can constrain formal saving.

Baliamoune and Chowdhury (2003) analyzed the determinants of private savings in Morocco in the presence of financial sector development using a co-integration and error-correction model framework. The results showed that while dependency ratio and per capita income had a positive effect, public savings had a negative effect on private savings. The study's results, however, indicated the direction of change during the early years of reform rather than the complete evolution of the reform effect on private savings.

Bloom, Canning and Graham (2003) included health and longevity to a standard model of life-cycle saving and used a cross-country panel of national savings rate. The results showed that under plausible assumptions, increases in life expectancy led to higher savings rate at every age, even when retirement was endogenous. In a constant population, these higher savings were offset by increased old age dependency. Cagetti (2003) also estimated a life-cycle model of consumption and saving in order to analyze the importance of precautionary savings for the accumulation of wealth in the US. The life-cycle profiles observed were consistent with a low degree of patience, a high degree of risk aversion, and differences in the degree of patience among various educational groups. Under such a configuration, saving was dictated by precautionary motives early in life and concerns for retirement were important only for older households.

Precautionary motives explained a large fraction of the median household's wealth. The amount of wealth at retirement implied by the model with precautionary savings was twice as high as that implied by a pure life cycle model without uncertainty.

Amimo, Larson, Bittencourt and Graham (2004) estimated the potential for financial savings in rural Mozambican households using ordinary least squares method. The dependent variable was the household's financial holdings. The household size had a negative effect on financial savings of households in the rural areas, with education and age of household head having a positive effect. Further, the study indicated that income and physical wealth positively determined a household's financial savings.

Odhiambo (2006) studied the impact of financial liberalization on South Africa's domestic savings, using an annual time series data covering 1968-2000. Specifically, the ratio of domestic savings to GDP was regressed on real deposit rate, financial depth, foreign savings, exports and lagged domestic savings. The results showed a distinct positive relationship between financial depth and domestic savings. However, they failed to find support for the effect of real interest rate on savings in South Africa.

Thanoon and Baharumshah (2007) used annual data from 1960-2000 to identify the main factors responsible for high saving rates in Malaysia. Concentrating on the role of foreign savings and economic growth, the study applied the Johansen co-integration procedure. The results revealed that in the long run, private saving rate was positively related to per capita income and foreign savings, but negatively related to dependency ratio, interest rate and taxes.

Reinhardt (2007) compared the saving behavior of 18 Latin American countries and 25 middle income developing countries from 1976 to 2000. The study used panel data to investigate the determinants of domestic saving (measured as a percentage of gross domestic income) for the pooled sample of the group of countries, and separately for each of the two groups. Inflation, interest rates, income and macroeconomic stability did not significantly determine domestic saving in Latin America.

Yasin (2008) investigated the effect of demography structure on national savings in 14 emerging markets in the Middle East and North African region. The study tested whether the national saving ratio significantly rises with a greater percentage of the working population, and if the national savings decrease with a larger percentage of children and retired population. The results indicated that age structure is a main determinant of national saving. More so, there is a significant positive (negative) relationship between the national saving ratio and the percentage of working (children) population groups in most of the countries.

Bicevska, Melihovs and Kalnberzina (2009) analyzed the saving behavior in Latvia using data from the household budget surveys for 2005 and 2006. The household's income per capita and the age of the main income earner positively influenced households' saving behavior. In the lower income households, the number of children negatively affected saving. Those in urban areas had lower savings rate than the rural ones.

Kibet *et al.* (2009) investigated the factors influencing savings among households of teachers, entrepreneurs and farmers in rural parts of Nakuru District in Kenya. The sample size selected through a multistage sampling technique was 359 households.

Applying an ordinary least squares technique, the study found that a household's saving was positively affected by income, gender of household head and level of education, but negatively affected by age and dependency ratio.

Abdelkhalek, Arestoff, de Freitas and Mage (2010) analyzed microeconomic factors explaining the household saving behavior in Morocco. The study used ordinary least squares method to estimate the relationship between income, monetary or non-monetary wealth, and socio-demographic variables in urban and rural areas. Household's size was found to have a negative effect on savings only in the urban case. When the interaction between gender and income was considered, Moroccan women saved more than men.

Mbuthia (2011) analyzed the households' saving decisions in Kenya for the period 2009 using bivariate logistic models. The study further examined the determinants of households' level of savings using the weighted ordinary least squares method. The level of education of the household's head had a positive effect on formal saving. While the age and education level of the household's head had a positive effect on a semi-formal saving option, household size had a negative effect. In an informal saving option, the age of the household's head had a positive effect with being male having a negative effect. While the level of education of the household's head had a negative effect on savings, the income levels had a positive effect on the formal and semi-formal saving options as well as the savings. Though the sourcing of main income from the formal sector positively affected a formal saving option, the effect on informal saving option was negative. The location of a household in an urban area and the optimism about economic conditions positively affected the formal saving option. However, the location of a household in an urban area negatively affected semi-formal and informal saving options.

Ur Rehman, Bashir and Faridi (2011) examined the determinants of household savings of various income groups in Pakistan using a multiple regression technique. In the lower income groups, expenditure on education and the size of the family had a negative effect on savings. For the middle-income groups, expenditure on education, marital status, size of family land and the value of the family house negatively affected savings. However, the aggregate dependency rate and the income levels positively influenced savings both in the lower and middle-income groups. While income and the size of the family land positively influenced savings in the higher income groups, household head's liabilities, expenditures on education and marital status had a negative effect.

In China, Yang *et al.* (2011) used data from the flow of funds accounts and urban household survey to analyze the sources and causes of China's high and rising saving rates in the government, corporate and household sectors. The results showed that income had a positive effect on a household's savings. Further, while households with elderly people experienced faster growth in saving than the whole sample, those with children tended to save less. Gedela (2012) investigated the determinants of the saving behavior of the tribal and rural households in India. The regression results from a sample of 120 households revealed that the household head's age, and dependency ratio negatively influenced the saving behavior in the entire sample. The analysis of tribal households showed that dependency ratio and medical expenditure had a negative effect on a household's savings. Income positively influenced the saving behavior.

Apergis and Christou (2012) used panel data to examine the effect of the age dependency ratio on domestic savings rates in 16 African countries. The study revealed that dependency rate had a negative effect on saving rate in 16 African countries, with overall

results showing that demographic variables were crucial for saving behavior in African countries. Oluwakemi (2012) examined the level of savings and its correlates in rural areas of Kwara State of Nigeria, using a Tobit regression analysis. The results revealed that the age of the household's head positively affected the saving rate, while household size had a negative effect. Investment in livestock had a negative effect on saving rate.

Girma, Belay, Bezabih and Jema (2013) analyzed major determinants of savings behavior of Ethiopian rural households using a Tobit model. The results from a sample of 700 households indicated that the level of education, income and investment of the household's head positively influenced the savings. Gatt (2014) studied the factors determining households' saving rate in Malta. The factors' marginal effect on the saving rate was tested using a parsimonious model. While the bank deposit rates had a positive effect on the saving rate, dependency ratio did not have an effect on the saving behavior.

Finlay and Price (2014) analyzed the households' saving behavior in Australia and the factors driving the increase in saving ratio. Using data from the *Household Expenditure Survey*, the study estimated a median saving ratio model. The results showed that although the households' saving increases with income, it decreases with wealth. Also, households with financial constraints saved more. Samantaraya and Patra (2014) used the autoregressive distributed lag method to examine the determinants of household savings in India. While the GDP and dependency rate had a positive significant effect on savings, interest rate and inflation had a negative effect.

In Pakistan, Ahmad (2015) analyzed the long-run and short-term relationship between the savings behavior and its determinants. Using time series data covering 1972 to 2012, the

study applied the Toda Yamamoto technique and Granger causality to test the long-run causality and short-run causality, respectively. The study found that the GDP per capita, inflation rate, financial development, dependency ratio and fiscal development were important determinants of savings. Soharwardi, Khan and Sheran (2015) using primary data studied households' saving behavior in a city in Bahawalpur district in Pakistan. The results from the ordinary least squares estimations showed that expenditures on education and the size of the family, negatively affected households' savings. However, income of the households' head, the sources of income and the size of land had positive effects on households' savings.

In Ukraine, Zhuk (2015) assessed the premise of structural breaks in households' savings formation from 1992 to 2013, after the world financial crisis in Ukraine. The study used a multiple linear regression model with an error correction term. The results showed that a structural break occurred only in 2010. However, the household consumption expenditures and gross national income had significant negative and positive effect respectively, on determined savings. Blanc, Porpiglia, Teppa, Junyi and Ziegelmeier (2016) analyzed saving motives and households' saving behavior in 15 countries in Europe using the *Household Finance and Consumption Survey* data for the period 2008-2011. Though decreasing with age, precautionary saving motive was found to be most common in all the countries.

Muktarbek (2016) investigated the saving behavior in Krygyz Republic focusing on gender aspects using the 2013 survey data of life. The logit and probit estimations results showed that irrespective of the gender of the household's head, the probability of saving increased with higher income. Further, the savings were higher in a household managed

by a woman or a married person. Also, a higher number of children and shocks in a family negatively affected savings.

2.3.2. Institutional Factors

Kiiza *et al.* (2001) used a logit model for a sample size of 370 households to examine the factors responsible for a household's choice for acquiring a deposit instrument in Uganda. The study found that the probability of a household acquiring a formal deposit instrument increased significantly with the level of information made available to the household and the degree of household access to formal finance. The net savings held by household's head who had financial institutions conveniently located, were constantly more than for those who did not have such proximity of financial institutions. There was, on average, a difference of US\$240 of net savings between the two groups of households.

Ouma *et al.* (2003) used cross-section data of urban Small and Medium Enterprises (SMEs) proprietors in Kenya to investigate their savings pattern. The study employed a logistic regression model to analyze the SMEs proprietors' saving options. The outcome variable took the value of 1, if the saving option was an informal financial provider and 0, if a formal financial provider was chosen. The results revealed that the urban SMEs proprietors saved frequently with the informal financial providers dominating. The study also found that access, mainly of high opening and minimum savings accounts balance requirement of formal financial providers (particularly banks), inhibited SMEs proprietors' ability and will to save.

In the US, Sherraden *et al.* (2003) used a Heckman two-step model to examine the relationship between income and saving in Individual Development Accounts (IDAs).

The study first estimated a probit model for non-savers, then used the transformed residuals from the estimations as regressors in the ordinary least squares regression for the remaining sample (savers). The analysis on savings outcomes indicated that while IDAs' savings rate decreased with income, savings amount did not increase with income. Though the analysis did not reveal the reason, institutional factors were hypothesized to have played an important role.

Ssewamala and Sherraden (2004) also examined factors that affected saving among participants in a subsidized saving program, who intended to use their savings to help capitalize a microenterprise. Data from the American Dream Demonstration (ADD) for 2,351 participants from 14 community-based organizations in the US was used. The study applied hierarchical multiple regression on the average monthly net deposit used as a measure of savings among the participants. According to the study's findings, individual level theories did not wholly explain the variance in savings, but institutional influences were predictive. The study found that general financial education may increase savings though up to a certain level, as savings' expectations may increase savings' performance. Further, convenience to savings deposit by participants was positively related to savings.

Grinstein-Weiss, Zhan and Sherraden (2006) used data from the ADD to compare savings performances of 2,364 married and unmarried low-income participants in a matched savings program. They further examined possible factors associated with IDAs savings performance for these two groups. The study applied the least squares method on two dependent variables; average monthly net deposit and deposit frequency. The results indicated that for both married and unmarried participants, and institutional factors (direct

deposit, match rate, financial education and monthly saving target) were positively associated with savings' performance. Further, the test for differences in regression slopes indicated that a number of institutional factors (match rate, financial education, and monthly saving target) and home ownership, had different associations with saving outcomes for married and unmarried participants. Financial education was associated with a greater increase in savings for married participants compared to unmarried ones.

Grinstein-Weiss, Curley and Charles (2007) analyzed experiences of low income rural participants in IDA. The ordinary least squares estimation results indicated that institutional factors including incentive, facilitation, expectation and information were key determinants of rural participants' saving performance. Curley (2009) also used data from ADD for the period 1997-2004 to examine the influence of institutions on saving for 2,211 low income households in IDAs. Saving was proxied by the mean monthly net deposit. Hierarchical multivariate regression suggested that overall, institutions including financial education, peer mentoring groups and saving targets positively influenced people's saving performance.

Kibet *et al.* (2009) applied an ordinary least squares technique to investigate the factors influencing savings in households owned by teachers, entrepreneurs and farmers in rural parts of Nakuru District in Kenya. The study found cost (service charge and transport cost) and incentives (credit access) had negative and positive influence respectively, on savings. Also, Mbutia (2011) included institutions when examining the determinants of a household's saving options and saving in Kenya using 2009 data. The estimates from the bivariate logistic models show that access (transaction cost to nearest bank and high

bank density), financial information and incentives (perception on interest rates and availability of credit) positively affected households' saving decisions.

Van der Crujisen, De Haan, Jansen and Mosch (2011) used a Dutch households' survey data of 2,103 respondents to analyze whether households' savings were affected by adverse experiences during the bank crises (bankrupt or bailout) and knowledge (financial literacy) about banking supervision. The study found that households with superior knowledge on banking supervision had a higher likelihood of gathering more information about banks and saving instruments, spreading their savings across banks and transferring them to other banks. Delafrooz and Paim (2011) analyzed the relationship between financial problems to financial literacy, financial stress, financial management practice and saving in a sample of 2,246 Malaysian workers. The study employed structural equation model with results indicating that financial management practices and financial literacy positively predicted saving behavior.

Grinstead, Mauldin, Sabia, Koonce, and Palmer (2011) examined factors influencing savings and savings goal achievement amongst individuals participating in IDA. The study employed micro data from the ADD and estimated a multinomial logit model. The results showed that the likelihood of savings and savings' goal achievement increased with the period of involvement in financial education programs and previous use of a savings account. Also in the US, Turner and Manturuk (2012) used a qualitative approach to analyze the experiences of low income participants of a matched savings program in New York City. Interviews were conducted with the participants using an interview guide, and the results showed that incentives (positive effect) and disincentives (negative effect) were key institutional factors influencing participation in a saving program.

Chowa, Masa and Ansong (2012) studied the broader determinants of saving and asset building amongst low income participants of an asset building program in rural Uganda. The study used data from an asset building intervention program consisting of 200 individuals of the intervention group and comparison group for each. Using the average quarterly net savings as a measure of saving performance at the end of the program, the hierarchical multiple regression results showed that the institutional theory of saving explained a large part of variance in the saving outcome. Proximity to saving option, financial education and financial incentives had a positive association with saving performance.

Mahdzan and Tabiani (2013) examined how financial literacy affects individual saving in Malaysia. According to probit regression results, financial literacy positively affected the individual saving. Beckmann (2013) studied the relationship between financial literacy and household savings in Romania. Using data from the Austrian Central Bank Euro survey, the study employed a multivariate regression analysis. According to the results, financial literacy positively affected a household saving. Financial literate individuals were more likely to save using multiple earning interest saving methods. Heckman and Hanna (2015) sought to understand factors influencing saving behavior in low income households in the US. A logistic regression model was estimated using data from the Survey of Consumer Finances. Access, incentives and facilitation positively determined the low-income households' saving behavior.

2.4. Overview of Literature

The traditional consumption and saving theories attempt to link aspects of saving behavior to demographics and economic factors. Indeed, empirical studies including Muradoglu *et al.* (1996), Obwona *et al.* (1998), Amimo *et al.* (2004), Balamoune *et al.* (2003), Thanoon *et al.* (2007), Kibet *et al.* (2009), Yang *et al.* (2011), and Gedela (2012) identify gender of household head, age of household head, household size, household education level, dependency ratio, interest rate, income, inflation, wealth variables and urbanization as important determinants of saving behavior. However, the institutional theory of saving under the new institutional economics warns that saving is not free from the influence of institutions (Sherraden *et al.*, 2003). Hence, five key institutional constructs namely; access, incentives, information, facilitation and expectations have been identified as important in predicting saving and asset building, mainly amongst households with low income (Sherraden, 1991; Beverly *et al.*, 1999; Sherraden, 1999; Sherraden *et al.*, 2003).

This study contributed to the literature by empirically testing the institutional theory of saving in Kenya. Existing literature on saving behavior in Kenya has mainly considered the traditional consumption and saving theories, with limited consideration on the institutional theory of saving (Ouma *et al.*, 2003; Kibet *et al.*, 2009, and Mbuthia, 2011). This study improved the understanding of saving behavior in Kenya, through a close investigation of the institutional theory of saving by including four of the five key institutional constructs namely; access, incentives, information and expectations.

Unlike other studies in Kenya (Kibet *et al.*, 2009 and Mbuthia, 2011) which used absolute savings as the dependent variable, this study analyzed the households' saving behavior

using the choice of saving option, choice of saving levels and choice of usage of a saving option as dependent variables. Further, it enriched the savings literature by using three cross-sectional data sets to examine the effect of institutions on households' saving behavior. A comparative analysis facilitates the design of appropriate policies geared towards improving the savings performance in Kenya.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

This chapter examines the research design, theoretical framework and empirical model applied in this study. It also includes definition and measurement of variables, data and data sources.

3.2. Research Design

The study adopted a non-experimental research design by utilizing three cross-section data sets collected from households to measure financial access landscape in Kenya (2006, 2009 and 2013). Given that the main objective of this study was to analyze the effect of institutions on households' saving behavior, cross-section data was the most appropriate to use. This is because it is rich in households' attributes and has been successful in explaining saving behavior (Masson *et al.*, 1998).

3.3. Theoretical Framework

This study was concerned with behavior given choices. The choice theory, which has been used extensively to analyze saving behavior by for example, Kiiza *et al.* (2001), Ouma *et al.* (2003) and Mbuthia (2011) formed the theoretical foundation of this study. Ben-Akiva and Lerman (1985) indicate that a choice theory is a collection of procedures that defines four elements. First, the decision maker, where the unit of decision making can be an individual, a family, a household, a firm or a government agency. Second, the alternatives, where the decision maker faces a universal set of alternatives, but only considers a subset of this universal set of feasible and known alternatives termed as a

choice set. Third, alternative attributes, where the attractiveness of an alternative is assessed in terms of a vector of attributes' values. The attribute values are quantified on a scale of attractiveness that can be ordinal or cardinal. Fourth, decision rule where a choice from a set containing two or more alternatives requires decision rule describing the internal mechanism used by the decision maker to process the information available and arrive at a unique choice. Decision rules are classified into four categories: dominance, satisfaction, lexicographical (importance) rules and utility.

In economics, the consumer theory provides the means for transformation of assumptions about desires into a demand function expressing the action of a consumer under given circumstances; that is, faced with a budget constraint, a consumer chooses a consumption bundle Q expressed as:

$$Q = Q\{q_1, q_2, q_3, \dots, q_L\} \quad (3.1)$$

where $q_1, q_2, q_3, \dots, q_L$ are the quantities of each of the commodities and services, $i=1,2,\dots,L$.

The consumer is assumed to have preferences over alternative consumption bundles. For example,

$$Q^i \geq Q^j \quad (3.2)$$

Equation 3.2 means that consumption bundle Q^i is at least as good as Q^j . It is also assumed that the consumer has the ability to compare all possible alternatives and behave rationally, hence chooses a consumption bundle that maximizes his utility given the prices and his income.

Random utility model is the common theoretical basis of choice models and is more in line with the consumer theory. The model assumes, as consumer theory, that the decision

maker has a perfect discrimination capability (Ben-Akiva *et al.*, 1985; Ben-Akiva and Bierlaire, 1999). However, there are observed inconsistencies in choice behavior as a result of observational deficiencies. The individual is continually assumed to choose the alternative with the highest utility. However, the utilities are not known with certainty and are treated as random variables. Manski (1977) noted four separate causes of uncertainty: unobserved alternative attributes, unobserved individual characteristics (also known as observed taste variations), measurement errors, and proxy or instrumental variables.

In order to reflect uncertainty, the utility is therefore modeled as a random variable. For example, the utility that decision maker n associates with alternative i in the choice set C_n is expressed as:

$$U_{in} = V_{in} + \varepsilon_{in} \quad (3.3)$$

where V_{in} is the deterministic (systematic part of utility) and ε_{in} is the random term capturing the uncertainty. The alternative with the highest utility is chosen. Hence, the probability that alternative i is chosen by decision maker n from a choice set C_n is:

$$P(i | C_n) = P[U_{in} \geq U_{jn} \quad \forall j \in C_n] = P[U_{in} = \max_{j \in C_n} U_{jn}] \quad (3.4)$$

3.4. Empirical Model Specification

Generalization of equation 3.4 to more than two alternatives was applied in this study.

Hence, a multinomial choice model was used.

3.4.1. Specification of a Generic Multinomial Choice Model

Assuming there are m alternatives and the dependent variable y is defined to take value j if the j th alternative is taken, $j = 1, 2, \dots, m$ (Cameron and Trivedi, 2005). The probability that alternative j is chosen is:

$$p_j = \Pr[y = j], j = 1, 2, \dots, m. \quad (3.5)$$

Suppose we introduce m binary variables for each observation y , such that:

$$y_j = \begin{cases} 1 & \text{if } y = j \\ 0 & \text{if } y \neq j \end{cases} \quad (3.6)$$

Thus, y_j equals one if alternative j is the observed outcome and the remaining y_k equals zero. Therefore, for each observation on y exactly one of y_1, y_2, \dots, y_m will be non-zero. Hence, the multinomial density for one observation can be written as:

$$f(y) = p_1^{y_1} \times p_2^{y_2} \times \dots \times p_m^{y_m} = \prod_{j=1}^m p_j^{y_j} \quad (3.7)$$

The probability that decision maker i chooses the j th alternative is:

$$p_{ij} = \Pr[y_i = j] = F_j(x_i, \beta), j = 1, 2, \dots, m, i = 1, 2, \dots, N \quad (3.8)$$

x_i are regressors and β is a vector of regressor coefficients. The functional form for F_j should be such that probabilities lie between 0 and 1, and sum over j to 1. Different functional specifications for F_j however, lead to different multinomial choice models.

3.4.2. Multinomial Choice Model with Institutional Factors Only

The expected utilities can be modeled in terms of characteristics of alternatives (herein referred to as institutional factors) rather than the attributes of the decision maker (Mcfadden, 1974), that is:

$$U(\text{Choice } j \text{ for } i|z)=U_j(i) = \gamma z_{ij} + \varepsilon_{ij} \quad (3.9)$$

where z_{ij} represents a vector of institutional factors of the j th alternative for decision maker i and ε_{ij} represents the random individual specific terms which are assumed to be independently distributed each with an extreme (Gumbel) distribution.

The model in equation 3.9 termed a conditional logit (CL) model, suffers from the independence of irrelevant alternatives (IIA) assumption or the red bus-blue bus problem. This is because the model assumes that the random terms are independent across alternatives, therefore adding another alternative does not change the choices by the decision maker (Cameron *et al.*, 2005; Wooldridge, 2002). Thus, the IIA assumption leads to unrealistic predictions.

3.4.3. Multinomial Choice Model with Decision Maker Attributes Only

3.4.3.1. Multinomial Logit Model

An alternative to the CL model is the multinomial logit (MNL) model. In a MNL model, the expected utilities are modeled in terms of decision maker attributes which do not vary over alternatives (Cameron *et al.*, 2005). The probability of choosing an alternative $j(j=1,2,\dots,m)$ from a set of m alternatives is expressed as:

$$P_{ij} = \frac{e^{\beta_j x_{ij}}}{\sum_{j=i}^m e^{\beta_j x_i}} \quad (3.10)$$

However, like the CL model, the MNL model suffers from the IIA assumption.

3.4.3.2. Nested Logit Model

A nested logit (NL) model is characterized by grouping (nesting subsets) alternatives that are more similar to each other with respect to excluded characteristics than they are to other alternatives. A generalized NL model is founded on the assumption that the joint distribution of the errors is the generalized extreme value distribution (Cameron *et al.*, 2005). Thus, a generalized NL model can be derived from the following function (Wen and Koppelman, 2001):

$$G(Y_1, Y_2, \dots, Y_n) = \sum_m \left(\sum_{n \in N_m} (\alpha_{nm} Y_n)^{1/\mu_m} \right)^{\mu_m} \quad (3.11)$$

where N_m is the set of all alternatives included in the nest m , α_{nm} is the allocation parameter characterizing the portion of alternative n assigned to nest m , μ_m is the log sum or dissimilarity parameter for nest m ($0 < \mu_m \leq 1$), and Y_n characterizes the value of each alternative.

Though correlation of the error terms of groups of alternatives is allowed in a NL model, not all correlations are captured. Hence, the NL model provides only a quasi-solution to the IIA problem. Further, whereas the NL model is ideal where there is clear nesting structure, not every choice problem lends itself to an obvious nesting structure (Cameron *et al.*, 2005).

3.4.3.3. Multinomial Probit Model

The multinomial probit (MNP) model (Cameron *et al.*, 2005; and Mwangi and Sichei, 2011) is a m choice multinomial model, with utility of decision maker i from the j th choice expressed as:

$$U_{ij} = V_j(x_{ij}; \beta) + \varepsilon_j, i = 1, 2, \dots, N, j = 1, 2, \dots, m \quad (3.12)$$

U_{ij} represents the utility derived by decision maker i from choosing alternative j ;

x_{ij} is the observed attributes of decision maker i and alternative j chosen;

$V_j(x_{ij}; \beta)$ is the deterministic component of the utility; and

ε_j is the error term denoting the random component of the utility.

In an MNP model, the errors are assumed to follow a multivariate normal distribution and are correlated across the choices, that is:

$\varepsilon : MND(0, \Omega)$ with $\Omega = I_m \otimes \Sigma$ and

$$\Sigma = E(\varepsilon_j \varepsilon_j') = \begin{bmatrix} \sigma_{11} & \cdot & \cdot & \cdot & \sigma_{1m} \\ \sigma_{21} & \cdot & \cdot & \cdot & \sigma_{2m} \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \sigma_{m1} & \cdot & \cdot & \cdot & \sigma_{mm} \end{bmatrix}$$

where \otimes is a Kronecker product.

The probability that decision maker i will select j is therefore expressed as:

$$p_{ij} = \Pr[V_j + \varepsilon_j > V_k + \varepsilon_k, \forall k \neq j | x_{ij}; \beta] \quad (3.13)$$

While the MNP model solves the IIA problem, it is only able to capture the decision maker attributes.

3.4.4. Multinomial Choice Model with Institutional Factors and Decision Maker Attributes

To achieve this study's objectives, there was need to estimate a model that captures both the institutional factors and the decision maker attributes. Both the multinomial/conditional logit model and the multinomial/conditional probit model capture the institutional factors and the decision maker attributes. However, the multinomial/conditional logit still suffers from the IIA problem. Hence, this study used the multinomial/conditional probit model because it captures both the institutional factors and the decision maker attributes and fully solves the IIA problem. To get a multinomial/conditional probit model, equation 3.12 was reformulated so that the utility derived from choosing alternative j depends on the institutional factors and the decision maker attributes; that is:

$$U_{ij} = \gamma Z_{ij} + V_{ij}(x_{ij}; \beta) + \varepsilon_j \quad (3.14)$$

where Z_{ij} represents a vector of institutional factors that vary across choices.

3.4.5. The Effect of Institutions on Households' Choice of Saving Options

To analyze the effect of institutions on households' choice of saving options, the probability that a decision maker i , chooses a saving option j was estimated as follows:

$$\Pr[y_i = j] = \gamma Z_{ij} + \beta x_{ij} + \varepsilon_j \quad (3.15)$$

(Z_{ij}) represents vector institutional factors; that is access, incentive, information and expectations.

(x_{ij}) represents the observed decision maker attributes; age, gender, level of education, income, region, marital status and number of dependants.

3.4.6. The Effect of Institutions on Households' Choice of Saving Levels

To analyze the effect of institutions on households' choice of saving levels, it was assumed that a decision maker i , ranks the choices of saving levels in order of the choices indices $k = 1, 2, \dots, k$, such that choice k is the preferred choice and choice 1 is the least preferred. Therefore, rank ordered multinomial/conditional probit model was fitted to estimate the probability of this ranking of choices as follows:

$$\Pr[y_i = k] = \gamma Z_{ik} + \beta x_{ik} + \varepsilon_k \quad (3.16)$$

$\Pr[y_i = k]$ is the probability that $P_{i,k-1} - P_{i,k} \leq 0$ and $P_{i,k-2} - P_{i,k-1} \leq 0, \dots$ and $P_{i,1} - P_{i,2} \leq 0$.

(Z_{ik}) and (x_{ik}) are the institutional factors and the decision maker attributes respectively, as explained in section 3.4.5

3.4.7. The Effect of Institutions on Households' Choice of Usage of Saving Options

To analyze the effect of institutions on households' choice of usage of saving option, it was assumed that a decision maker i , ranks the usage of a saving option in order of the choices indices $d = 1, 2, \dots, d$, such that choice d is the preferred choice and choice 1 is the least preferred. Therefore, a rank ordered multinomial/conditional probit model was fitted to estimate the probability of this ranking of choices as follows:

$$\Pr[v_i = d] = \gamma Z_{id} + \beta x_{id} + \varepsilon_d \quad (3.17)$$

$\Pr[y_i = d]$ is the probability that $P_{i,d-1} - P_{i,d} \leq 0$ and $P_{i,d-2} - P_{i,d-1} \leq 0$, and $P_{i,1} - P_{i,2} \leq 0$.

(Z_{id}) and (x_{id}) are the institutional factors and the decision maker attributes respectively, as explained in section 3.4.5.

3.5. Definition and Measurement of Variables

There were three dependent variables: choice of saving options, choice of saving levels and choice of usage of saving options.

Savings options: Banks, MFIs, SACCOs, and ASCAS/ROSCAs.

Option chosen =1, 0 otherwise.

Choice of saving levels: In a model of individual savings, an individual (decision maker) decides on the level of savings (Gersovitz, 1988). This means that each household has a different saving rate calculated as the ratio of household saving to household disposable income (Schmidt-Hebbel *et al.*, 1992). This study, therefore, used the household saving rates and assumed that households choose their level of savings as follows: low saving levels ($< \frac{1}{2}$ of monthly income); moderate saving levels ($= \frac{1}{2}$ of monthly income) and high saving levels ($> \frac{1}{2}$ of monthly income).

Option chosen =1, 0 otherwise.

Usage of saving options: High usage (daily and weekly usage), moderate usage (monthly usage), and low usage (annual usage).

Option chosen =1, 0 otherwise.

The measurement of independent variables is indicated in Table 3.1.

Table 3.1: Independent Variables

Variables	Measurement	Expectation	Explanation
Institutional factors			
<i>Access</i>	Travel cost to get to the nearest bank, SACCO, MFI or ASCA/ROSCA: (1) high (0) low	(-)	Making the saving process more available and less costly, increases the participation and savings
<i>Incentive</i>	Banks', SACCOs', MFIs' or ASCAs/ROSCAs' interest rate on savings: (1) high (0) low	(+)	An incentive increases participation and savings
	Trust on banks, SACCOs, MFIs or ASCAs/ROSCAs: (1) high (0) low	(+)	
<i>Information</i>	Source of financial advice is bank, SACCO, MFI or ASCA/ROSCA: (1) most (0) least	(+)	Awareness of savings options and opportunities, increases participation and savings
<i>Expectations</i>	Expectations to use savings in the bank, SACCO, MFI or ASCA/ROSCA to deal with the highest risk; (1) high (0) low	(+)	Having specific savings expectations increases participation and savings
Decision maker attributes			
<i>Age</i>	Age of decision maker in years	(+)	The age is positively related to one's ability to hold financial savings during the working period
<i>Gender</i>	A dummy given as 1 if decision maker is female, 0 otherwise	(+)	Being female, an individual tends to be more cautious in spending thus increasing participation and savings
<i>Education</i>	Highest level of formal education completed by the decision maker: (1) none, (2) some primary, (3) primary completed, (4) some secondary, (5) secondary completed, (6) technical training, and (7) university	(+)	Educated individuals are likely to earn more, thus higher participation and savings
<i>Income</i>	Decision maker's monthly income per month in Kenya shillings (proxied by total monthly expenditures)	(+)	Level of income exerts a positive influence on savings
<i>Region</i>	A dummy given as 1 if decision maker resides in urban area, 0	(+)	Lack of saving facilities in rural areas forces one

Variables	Measurement	Expectation	Explanation
	otherwise		to hoard cash at home instead of banking it
<i>Marital status</i>	A dummy given as 1 if decision maker is married, 0 otherwise	(+,-)	Indeterminate
<i>Number of dependants</i>	Decision maker's total number of dependants	(-)	The more the dependants, the lower the participation and savings

Source: Author

3.6. Data Type and Sources

This study used three cross-sectional data sets from the Financial Access 2006, 2009 and 2013 national surveys. Though, the respondents were different in the three surveys, they shared similarities. The three surveys were conducted by the Financial Access Partnership, a public-private partnership comprising the Government of Kenya and its agencies, financial sector providers, research organizations and development partners. The main goal of these surveys was to measure financial access landscape in Kenya (Financial Sector Deepening Kenya and CBK, 2006, 2009 and 2013a). The surveys were national representative with the sampling undertaken by the Kenya National Bureau of Statistics (KNBS) based on the National Sample Survey and Evaluation Program (NASEEP) IV (for 2006 and 2009 surveys) and V (for 2013 survey). Also, across the three surveys, similar questions were asked to the respondents. This study, therefore, used data from these similar questions to do the analysis across the three periods. Further, the institutions' (whose effect is being analyzed in this study) environment was assumed to have remained fairly the same during the period.

The surveys' respondents were individuals within households which were randomly selected throughout the country based on the rural and urban clusters. Every individual aged 16 years and above was eligible to participate in the survey. In each household, however, only one individual was sampled for the interview. The total respondents were

4,418 (2006); 6,598 (2009) and 6,449 (2013). According to the choice theory, which formed the foundation of this study, the decision maker requires a decision rule to arrive at a unique choice from a set containing two or more alternatives. Since the individuals with multiple saving options did not conform to the decision rule, they were eliminated from the study's sample size. The final sample size was 1,503; 2,430 and 1,843 respondents in 2006, 2009 and 2013 data sets, respectively.

3.7. Data Analysis

Prior to estimation, the three data sets were cleaned. In order to comprehend the data sets, a univariate analysis was carried out. The data sets were then reorganized to facilitate estimations using the maximum likelihood technique. The first objective of the study, which sought to analyze the effect of institutions on households' choice of saving options conditional on decision maker attributes was achieved by estimating equation 3.15, which is a multinomial/conditional probit model. The second objective of the study, which sought to analyze the effect of institutions on households' choice of saving levels conditional on decision maker attributes was achieved by estimating equation 3.16. This is a rank ordered multinomial/conditional probit model. The third objective of the study, which sought to analyze the institutions' effect on households' choice of usage of saving options conditional on decision maker attributes was achieved by estimating equation 3.17, which is a rank ordered multinomial/conditional probit model. A post-estimation diagnostic Wald test was subsequently done to determine the estimated models' fitness. To provide a better understanding of the estimations, marginal effects were computed.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1. Introduction

This chapter presents the study findings and discussions. The descriptive statistics and empirical results from the three cross-sectional data sets, as per the study objectives, are also presented and discussed.

4.2. Descriptive Statistics

Descriptive statistics reveal the salient features of the three cross-sectional data sets used in this study. Table 4.1 presents summary statistics for the three dependent variables.

Table 4.1: Descriptive statistics for the dependent variables

Variables	2006		2009		2013	
	No. of observations	%	No. of observations	%	No. of observations	%
Bank	203	13.51	363	14.94	290	15.74
SACCOs	239	15.90	278	11.44	326	17.69
MFIs	12	0.80	22	0.91	64	3.47
ASCAs/ROSCAs	1,049	69.79	1,767	72.72	1,163	63.10
Total	1,503	100	2,430	100	1,843	100
Saving levels						
Low saving levels	776	76.53	1,252	65.79	486	33.96
Moderate saving levels	189	18.64	430	22.60	410	28.65
High saving levels	49	4.83	221	11.61	535	37.39
Total	1,014	100	1,903	100	1,431	100
Usage of saving options						
High usage	-	-	808	33.25	619	35.19
Moderate usage	-	-	1,140	46.91	899	51.11
Low usage	-	-	477	19.63	241	13.70
Total	-	-	2,425	100	1,759	100

- means data missing

Source: Author's calculations based on the study data

Across the three years, ASCAs/ROSCAs were the most chosen saving options, with MFIs being the least chosen. The choice of ASCAs/ROSCAs however declined in 2013, but other options termed formal increased. This is consistent with financial inclusion results which showed an increase in formal financial inclusion of 10.5 per cent from 2009 to 2013, compared to 7.1 per cent increase between 2006 and 2009 (Financial Sector Deepening Kenya and CBK, 2013b). Over the years, the formal saving options (banks, MFIs and SACCOs) have been aggressive in promoting their services at the same time making them attractive for potential savers.

In terms of the saving levels, majority of the respondents preferred low saving levels; 76.5 per cent in 2006, and 65.8 per cent in 2009. However, in 2013, majority of the respondents (37.4 per cent) preferred high saving levels. On usage of the saving option, moderate usage was the most preferred at 46.9 per cent in 2009 and 51 per cent in 2013, followed by high usage at 33.3 per cent in 2009 and 35.2 per cent in 2013. The high and moderate usage preference increased in 2013, compared to 2009. Low usage of the saving option was preferred only by 19.6 per cent in 2009 and 13.7 per cent in 2013.

Table 4.2: Descriptive statistics for the independent variables: Institutional factors

Institutional factors	2006		2009		2013	
	No. of observations	Mean	No. of observations	Mean	No. of observations	Mean
Travel cost	-	-	2,430	0.81	1,581	0.94
Interest rate	1,503	0.49	-	-	939	0.25
Trust	1,503	0.45	2,430	0.24	1,489	0.2
Information	-	-	2,430	0.64	1,642	0.25
Expectation	-	-	2,416	0.95	1,527	0.6

- means data missing

Source: Author's calculations based on the study data

Table 4.2 presents the summary statistics for the institutional factors, herein used as independent variables. The mean perceived travel cost was 0.81 and 0.94 in 2009 and

2013, respectively. Hence, the perceived average travel cost to the nearest saving option was high, since the two figures were much closer to 1.0 representing perceived high travel cost to a saving option. In 2006, the average perceived interest rate on savings was 0.49, which indicated indifference in perception on savings' interest rates. However, in 2013, the average perceived interest rate was 0.25, showing low perception on savings' interest rates. On perceived trust in a saving option, the mean values were 0.45 in 2006, 0.24 in 2009 and 0.2 in 2013. This indicated that the perceived average trust in all the three periods of the study was low. On average, the saving option chosen was perceived to provide the most financial advice in 2009 (mean value was 0.64), but the least in 2013 (mean value of 0.25). Lastly, expectations to use savings in the saving option to deal with the highest risk were, on average, perceived to be high. The mean values of 0.95 in 2009 and 0.6 in 2013 are closer to 1.0.

Table 4.3: Descriptive statistics for the independent variables: Decision maker attributes

Decision maker attributes	2006		2009		2013	
	No. of observations	Mean	No. of observations	Mean	No. of observations	Mean
Age	503	37.20	2,430	40.17	1,745	37.21
Gender	503	0.61	2,430	0.62	1,843	0.64
Level of education	495	3.24	2,430	3.24	1,843	3.43
Income	-	-	2,429	15,783.80	1,785	10,921.61
Region	503	0.33	2,430	0.29	1,843	0.39
Marital status	481	0.65	2,429	0.68	1,842	0.72
Number of dependants	503	2.59	2,430	2.03	1,843	4.40

- means data missing

Source: Author's calculations based on the study data

The summary statistics for the decision maker attributes, also used in this study as independent variables, are presented in Table 4.3. The decision maker attributes were: age, gender, level of education, income, region of residence, marital status and the number of dependants. The average age was 37.20 years in 2006, 40.17 years in 2009 and 37.21 years in 2013. The proportion of females was higher in all the three periods at 61 per cent, 62 per cent and 64 per cent, respectively. The average level of education completed was primary school, indicating that the education status across the three periods of the study was low.

On income, the average was Ksh 15,784 in 2009 and Ksh 10,922 in 2013. In terms of region of residence, less than a half of the respondents (33 per cent) lived in urban areas in 2006, 29 per cent in 2009 and 39 per cent in 2013. Most of the decision makers were married at 65 per cent in 2006, 68 per cent in 2009 and 72 per cent in 2013. Finally, the average number of dependants was 2.59, 2.03 and 4.40, respectively.

4.3. Estimation Results

This section presents the estimation results of the three objectives of the study. In objective one, a multinomial/conditional probit model was estimated; while in objectives two and three, a rank ordered multinomial/conditional probit model was estimated. The decision to estimate these models was informed by the stringent assumption that multinomial/conditional logit models exhibit the IIA property, making the estimated results unrealistic. A multinomial/conditional probit model however, provides realistic results since it does not exhibit the IIA property.

4.3.1. The Effect of Institutions on Households' Choice of Saving Options

The first objective of this study sought to analyze the effect of institutions on households' choice of saving option conditional on decision maker attributes, by estimating a multinomial/conditional probit model for each of the three data sets used. The estimated results from the three data sets are presented in Appendix 1. A post-estimation diagnostic Wald test was subsequently done to determine the model's fitness, and the results are presented in Table 4.4.

Table 4.4: Wald test for independent variables: Multinomial/conditional probit model estimates for saving option

Year	2006		2009		2013	
	chi ²	Prob> chi ²	chi ²	Prob> chi ²	chi ²	Prob> chi ²
Institutional factors	9.87	0.0000	41.07	0.0000	75.56	0.0000
Decision maker attributes	31.88	0.0601	43.85	0.0000	43.25	0.0000

Ho: All coefficients associated with given variable(s) = 0

Source: Author's calculations

The Wald test results across the three periods of study rejected the null hypothesis that all coefficients associated with institutional factors and the decision maker attributes were equal to zero. The chi² statistic for the institutional factors in all the three periods of the study was statistically significant at 1 per cent significance level. Also, while the chi² statistics for the decision maker attributes in 2006 was statistically significant at 10 per cent significance level, in 2009 and 2013 the statistic had a 1 per cent significance level. Hence, the coefficients associated with both the institutional factors and the decision

maker attributes were jointly significant. Therefore, the Wald test results in Table 4.4 confirmed the model's fitness in each of the three data sets. The predicted institutional factors' marginal effects on the choice of banks, MFIs, ASCAs/ROSCAs and SACCOs are presented in Table 4.5.

Table 4.5: Saving option multinomial choice: Institutional factors' marginal effects for multinomial/conditional probit model

Saving option/Institutional factors	Bank			MFIs			ASCAs/ROSCAs			SACCOs		
	2006	2009	2013	2006	2009	2013	2006	2009	2013	2006	2009	2013
Travel cost												
Bank	-	-0.10***	-0.31***	-	0.0004	0.005	-	0.10***	0.24***	-	0.001	0.065**
MFIs	-	0.0004	0.005	-	-0.01*	-0.09***	-	0.008**	0.04**	-	0.0002	0.046
ASCAs/ROSCAs	-	0.10***	0.24***	-	0.01**	0.04**	-	-0.16***	-0.66***	-	0.06***	0.38***
SACCOs	-	0.001	0.07**	-	0.0002	0.046	-	0.056***	0.382***	-	-0.06***	-0.49***
Interest rate												
Bank	0.0043	-	0.06***	-0.0002	-	-0.0009	-0.003	-	-0.05***	-0.0008	-	-0.013**
MFIs	-0.0002	-	-0.0009	0.0005	-	0.02***	-0.0002	-	-0.008**	-0.0001	-	-0.009*
ASCAs/ROSCAs	-0.003	-	-0.045***	-0.0003	-	-0.008**	0.010	-	0.125***	-0.006	-	-0.072
SACCOs	-0.0008	-	-0.013**	-0.0001	-	-0.009*	-0.006	-	-0.072***	0.007	-	0.09***
Trust												
Bank	0.10***	0.04***	0.10***	-0.004	-0.0002	-0.002	-0.078***	-0.038***	-0.08***	-0.017**	-0.0005	-0.02**
MFIs	-0.004	-0.0002	-0.002	0.01**	0.003*	0.03***	-0.006	-0.003*	-0.013**	-0.003	-0.00009	-0.02
ASCAs/ROSCAs	-0.078***	-0.038***	-0.08***	-0.006	-0.003*	-0.014**	0.23***	0.06	0.22***	-0.15***	-0.02***	-0.13***
SACCOs	-0.02**	-0.0005	-0.022**	-0.003	-0.0001	-0.016	-0.15***	-0.02***	-0.13***	0.17***	0.02***	0.17***
Information												
Bank	-	0.01	0.022	-	-0.00004	-0.0004	-	-0.0094	-0.0173	-	-0.0001	-0.0048
MFIs	-	-0.00004	-0.0003	-	0.0008	0.007	-	-0.0007	-0.003	-	-0.00002	-0.003
ASCAs/ROSCAs	-	-0.009	-0.017	-	-0.0008	-0.003	-	0.016	0.048	-	-0.005	-0.028
SACCOs	-	-0.0001	-0.005	-	-0.00002	-0.003	-	-0.005	-0.028	-	0.006	0.036
Expectation												
Bank	-	0.06***	0.29***	-	-0.0002	-0.005	-	-0.06***	-0.22***	-	-0.0007	-0.06**
MFIs	-	-0.0002	-0.004	-	0.005*	0.086**	-	-0.004**	-0.037**	-	-0.0001	-0.04
ASCAs/ROSCAs	-	-0.055***	-0.223***	-	-0.004**	-0.037***	-	0.09***	0.62***	-	-0.03***	-0.36***
SACCOs	-	-0.0007	-0.062**	-	-0.0001	-0.043	-	-0.031***	-0.36***	-	0.03***	0.46***

***, ** and * denote statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively

- means data missing

Source: Author's calculations

On institutional factors, the marginal effects' results on travel cost, interest rate, trust and expectations showed a significant relationship with the choice of a saving option as anticipated. The marginal effects' results on information were, however, not significant. A perceived high travel cost to access a saving option reduced the probability of its choice. The result showed that whenever the travel cost to the nearest bank was perceived to be high instead of low, the probability of choosing banks decreased by 10 per cent and 31 per cent in 2009 and 2013, respectively. However, the cross effect showed that the probability of choosing ASCAs/ROSCAs increased by 10 per cent in 2009 and 24 per cent in 2013; and that of SACCOs by 7 per cent in 2013.

Whenever an individual perceived the travel cost to the nearest MFI to be high instead of low, the probability to choose it reduced by 1 per cent and 9 per cent in 2009 and 2013, respectively. This increased the probability of choosing ASCAs/ROSCAs by 1 per cent and 4 per cent, respectively. Similarly, whenever an individual perceived the travel cost to the nearest ASCAs/ROSCAs as high instead of low, the probability of choice reduced by 16 per cent and 66 per cent in 2009 and 2013, respectively. In the same period, the probability of choosing banks, increased by 10 per cent and 24 per cent; and that of MFIs by 0.8 per cent and 4 per cent. In addition, the probability to choose SACCOs increased by 5.6 per cent and 38.2 per cent, respectively.

Lastly, whenever an individual perceived the travel cost to the nearest SACCO to be high instead of low, the probability of choice decreased by 6 per cent and 49 per cent in 2009 and 2013, respectively. The probability to choose other options increased correspondingly with that of banks increasing by 6.5 per cent in 2013, and ASCAs/ROSCAs by 6 per cent and 38 per cent in 2009 and 2013, respectively.

The results in Table 4.5 show that the interest rate on savings affected the choice of a saving option. The probability of choosing banks increased by 6 per cent in 2013 whenever an individual perceived interest rate on savings in banks to be high instead of low. Conversely, the probability of choosing ASCAs/ROSCAs and SACCOs declined by 4.5 per cent and 1.3 per cent, respectively. The results also showed that when the interest rate on savings in MFIs was perceived to be high instead of low, the probability of choosing MFIs increased by 2 per cent in 2013. In contrast, the probability to choose ASCAs/ROSCAs and SACCOs reduced by 0.8 per cent and 0.9 per cent, respectively.

When an individual perceived interest rate on savings in ASCAs/ROSCAs to be high instead of low, the probability of choosing them increased by 12.5 per cent in 2013. The probability to choose banks, MFIs and SACCOs reduced by 5 per cent, 0.8 per cent and 7.2 per cent, respectively. Finally, whenever an individual perceived interest rate on savings in SACCOs as high instead of low, the probability of its choice increased by 9 per cent; while that of banks and MFIs declined by 1.3 per cent and 0.9 per cent, respectively.

The results also showed that trust had an effect on the choice of a saving option. Whenever the trust in banks was perceived to be high instead of low, the probability of choosing banks increased by 10 per cent in 2006, 4 per cent in 2009 and 10 per cent in 2013. In the same period however, the probability to choose ASCAs/ROSCAs reduced by 7.8 per cent, 3.8 per cent and 8 per cent in 2006, 2009 and 2013, respectively. The probability of choosing SACCOs also reduced by 2 per cent in 2006 and 2.2 per cent in 2013.

The probability of choosing MFIs increased by 1 per cent in 2006, 0.3 per cent in 2009 and 3 per cent in 2013 when the trust in MFIs was perceived to be high instead of low. In contrast, the probability to choose ASCAs/ROSCAs reduced by 0.3 per cent in 2009 and 1.4 per cent in 2013. When the trust in ASCAs/ROSCAs was perceived to be high instead of low, the probability of choosing them increased by 23 per cent in 2006 and 22 per cent in 2013. Conversely, the probability to choose banks decreased by 7.8 per cent in 2006, 3.8 per cent in 2009 and 8 per cent in 2013. Similarly, the probability to choose MFIs declined by 0.3 per cent in 2009 and 1.3 per cent in 2013; and that of SACCOs by 15 per cent, 2 per cent and 13 per cent, respectively.

Lastly, the probability to choose SACCOs increased by 17 per cent in 2006, 2 per cent in 2009 and 17 per cent in 2013 when the trust in them was perceived to be high instead of low. However, the probability to choose other options reduced for banks by 1.7 per cent in 2009 and 2 per cent in 2013; and for ASCAs/ROSCAs reduced by 15 per cent, 2 per cent and 13 per cent in 2006, 2009 and 2013, respectively.

According to the results in Table 4.5, saving expectations affected the choice of a saving option. When expectations to use savings in the bank to deal with the highest risk were perceived as high instead of low, the probability of choosing banks increased by 6 per cent in 2009 and 29 per cent in 2013. The probability to choose ASCAs/ROSCAs correspondingly declined by 5.5 per cent and 22.3 per cent in 2009 and 2013, respectively; and that of SACCOs by 6.2 per cent in 2013.

Likewise, perceiving expectations to use savings in the MFIs to deal with the highest risk to be high instead of low, increased the probability of choosing MFIs by 0.5 per cent in

2009 and 8.6 per cent in 2013. However, the probability to choose ASCAs/ROSCAs declined by 0.4 per cent and 3.7 per cent in 2009 and 2013, respectively. In 2009 and 2013, when expectations to use savings in the ASCAs/ROSCAs to deal with the highest risk were perceived to be high instead of low, the probability of choice increased by 9 per cent and 62 per cent, respectively. Conversely, the probability to choose banks reduced by 6 per cent in 2009 and 22 per cent in 2013; MFIs by 0.4 per cent and 3.7 per cent; and SACCOs by 3.1 per cent and 36 per cent, respectively.

Lastly, when expectations to use savings in SACCOs to deal with the highest risk were perceived to be high instead of low, the probability of choosing them increased by 3 per cent and 46 per cent in 2009 and 2013, respectively. In contrast, the probability to choose banks declined by 6 per cent in 2013; as well as that of ASCAs/ROSCAs by 3 per cent and 36 per cent in 2009 and 2013, respectively.

The results on institutional factors conform to the institutional theory of saving which advances access (travel cost) to saving services, incentives (interest rate on savings and trust), and expectations as key institutional constructs in predicting saving behavior. As predicted, travel cost, interest rate, trust and expectations had a significant relationship with choice of banks, MFIs, ASCAs/ROSCAs and SACCOs. These results were also consistent with the findings of other studies including Kiiza *et al.* (2001), Ouma *et al.* (2003) and Mbuthia (2011). The implications of these results are that institutional factors influence the choice of saving options in Kenya.

Table 4.6: Saving option multinomial choice: Decision maker attributes' marginal effects for multinomial/conditional probit model

Saving option/Decision maker attributes	Bank			MFIs			ASCAs/ROSCAs			SACCOs		
	2006	2009	2013	2006	2009	2013	2006	2009	2013	2006	2009	2013
Age	0.049	-0.043	-0.005	0.016	0.004	-0.001	0.18**	0.005	0.002	0.112	0.034**	0.0043
Age squared	-0.00002	0.00002*	0.00006	-4.1e-06	-3.9e-06	0.00001	-0.00004	-7.6e-06	-0.00005	-0.00003	-3.3e-06	-0.00003
Income	-	0.011**	0.034***	-	0.0006	0.003	-	-0.02***	-0.066	-	0.004*	0.029**
Education	0.129***	0.034***	0.046	0.016	-0.001	0.005	-0.17***	-0.032**	-0.042	0.035	-0.0009	-0.009
Gender	-0.06***	-0.06***	-0.10***	-0.005	-0.004	0.003	0.16***	0.088***	0.18***	-0.09***	-0.027**	-0.09***
Marital	-0.019	-0.001	0.037	-0.003	0.001	0.007	0.01	-0.0008	-0.069	0.011	0.0008	0.026
Number of dependants	0.022*	-0.009	-0.018	0.004	-0.002	0.004	-0.041*	0.016*	0.005	0.016	-0.005	0.008
Region	0.096***	0.02*	0.036	0.009	-0.00003	0.01	-0.16***	-0.006	-0.006	0.05**	-0.013*	-0.039

***, ** and * denote statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively

- means data missing

Source: Author's calculations

Table 4.6 shows the decision maker attributes' marginal effects on the choice of a saving option. Only income, education, gender, number of dependants and region affected the choice of a saving option. A 1 shilling increase in income beyond Ksh 15,783.80 in 2009 and Ksh 10,921.61 in 2013 increased the probability to choose banks by 1.1 per cent and 3.4 per cent, respectively. Also, a 1 shilling increase in income beyond Ksh 15,783.80 in 2009 and Ksh 10,921.61 in 2013 increased the probability to choose SACCOs by 0.4 per cent and 2.9 per cent, respectively. However, a 1 shilling increase in income beyond Ksh 15,783.80 in 2009 reduced the probability to choose ASCAs/ROSCAs by 2 per cent. These results agreed with Carpenter *et al.* (2002) who indicated that as income increased, individuals shifted more towards formal saving options. Ouma *et al.* (2003) found that the probability of SMEs' proprietors saving with informal options declined with increasing income. Mbuthia (2011) also indicated that the income level had a positive effect on formal saving options.

As educational level increased, the probability of saving in banks increased while that of ASCAs/ROSCAs declined. An increase in 1 level of education beyond the primary level increased the probability to choose banks by 12.9 per cent in 2006 and 3.4 per cent in 2009. An increase in 1 level of education beyond the primary level however, reduced the probability to choose ROSCAs/ASCAs by 17 per cent in 2006 and 3.2 per cent in 2009. With a higher level of education, one is likely to earn more leading to an increase in income. This increases one's probability of choosing formal finance than informal finance (Carpenter *et al.*, 2002; Ouma *et al.*, 2003; and Mbuthia, 2011).

The results indicated that compared to males, females had a lower probability of choosing banks and SACCOs but a higher probability of choosing ASCAs/ROSCAs. In 2006, 2009 and 2013, a female's probability to choose banks was lower than that of a male by 6 per cent, 6 per cent and 10 per cent, respectively. Also in the same period, a female's probability to choose SACCOs was 9 per cent, 2.7 per cent and 9 per cent respectively, lower than that of a male. However, a female's probability to choose ASCAs/ROSCAs was higher than that of a male by 16 per cent in 2006, 8.8 per cent in 2009 and 18 per cent in 2013. These results were consistent with other studies such as Mbuthia (2011) who showed that being a male had a positive effect on choice of formal finance. Anderson *et al.* (2002) also found that informal finance (for example ROSCAs) participation was higher among women than men.

On dependants, an increase in 1 dependant beyond 2.6 dependants increased the probability of choosing banks by 2.2 per cent in 2006. The results on the choice of ASCAs/ROSCAs were mixed. While an increase in 1 dependant beyond 2.6 in 2006 reduced the probability of choosing ASCAs/ROSCAs by 4.1 per cent, an increase in 1 dependant beyond 2 dependants in 2009 increased the probability by 1.6 per cent. Though results on ASCAs/ROSCAs were mixed, households with more dependants are less likely to save with ASCAs/ROSCAs and more with formal options in order to safeguard their savings and the interest of their dependants. This is because unlike informal finance, formal finance generally benefits from legal protection (Ouma *et al.*, 2003).

Urban residence was associated with a higher probability of choosing banks. The results indicated that in 2006 and 2009, urban residents' probability to choose a bank was higher

than that of rural residents by 9.6 per cent and 2 per cent, respectively. Though the urban residents' probability to choose SACCOs was 5 per cent in 2006 higher than that of rural residents, it was in 2009 lower by 1.3 per cent. However, the urban residents' probability to choose in ASCAs/ROSCAs was 16 per cent lower than that of rural residents in 2006. According to Atieno (2001), location in urban area positively affects a formal saving option because formal finance is more predominant in urban than in rural areas.

4.3.2. The Effect of Institutions on Households' Choice of Saving Levels

The second objective of this study sought to analyze the effect of institutions on households' choice of saving levels, conditional on decision maker attributes. In order to achieve this objective, a rank ordered multinomial/conditional probit model was estimated for each of the three data sets used. The regression results from the three data sets are presented in Appendix II. A post-estimation diagnostic Wald test was subsequently done to determine the model's fitness. The Wald test results are presented in Table 4.7.

Table 4.7: Wald test for independent variables: Rank ordered multinomial/conditional probit model estimates for saving levels option

Year	2006		2009		2013	
	chi ²	Prob> chi ²	chi ²	Prob> chi ²	chi ²	Prob> chi ²
Institutional factors	44.68	0.0000	53.15	0.0000	6.14	0.2928
Decision maker attributes	71.99	0.0000	134.51	0.0000	15.67	0.4762

Ho: All coefficients associated with given variable(s) = 0
 Source: Author's calculations

The Wald test results for the 2006 and 2009 periods of study rejected the null hypothesis that all coefficients associated with institutional factors and the decision maker attributes were equal to zero. The chi² statistics for the institutional factors and decision maker

attributes in 2006 and 2009 were statistical significant at 1 per cent significance level. Hence, the coefficients associated with the institutional factors and the decision maker attributes in these periods were jointly significant. However, the test results for the 2013 period did not reject the null hypothesis that all the coefficients associated with the institutional factors and the decision maker attributes were not jointly significant. Therefore, the Wald test results in Table 4.7 confirm the model's fitness in 2006 and 2009 data sets. Table 4.8 presents the institutional factors' marginal effects on choice of saving levels.

Table 4.8: Saving levels rank ordered multinomial choice: Institutional factors' marginal effects for rank ordered multinomial/conditional probit model

Saving option/Institutional factors	Bank			MFIs			ASCAs/ROSCAs			SACCOs		
	2006	2009	2013	2006	2009	2013	2006	2009	2013	2006	2009	2013
Cost												
Bank	-	-0.024***	-0.011	-	0.004***	-0.0003		0.002	0.0005	-	0.001*	-0.0001
MFIs	-	0.004***	0.03	-	-0.013***	-0.003		0.006	0.003	-	0.0003**	-0.00007
ASCAs/ROSCAs	-	0.02***	-0.041	-	0.008***	0.003		-0.0007	-0.004	-	0.0002	0.00006
SACCOs	-	0.008***	-0.136	-	0.001***	-0.006		-0.00009	-0.002	-	-0.0006**	-0.0003
Interest rate												
Bank	0.001	-	0.021	0.00004	-	-0.002	-0.011		0.0005	-0.005	-	0.005
MFIs	0.001	-	0.028	0.0002	-	0.02	-0.0003		0.002	-0.0004	-	-0.004
ASCAs/ROSCAs	-0.001	-	0.008	-0.0001	-	0.02	0.014		0.006	-0.002	-	0.004
SACCOs	0.0009	-	0.008	-0.0001	-	-0.003	-0.002		-0.005	0.007	-	0.005
Trust												
Bank	0.0065**	0.004***	0.013	0.0002	-0.0007**	0.001	-0.0747***	-0.0005	0.002	-0.03***	-0.0003	-0.00004
MFIs	-0.006**	-0.001	0.034	0.001	0.003***	0.013	-0.002**	0.0001	0.01	-0.003***	0.00007	-0.00006
ASCAs/ROSCAs	-0.007***	-0.003***	-0.047	-0.006	-0.002***	-0.014	0.09***	0.0002	0.005	-0.013***	0.00003	-0.00005
SACCOs	-0.005**	-0.002**	-0.011	-0.009	-0.0002**	0.006	-0.013***	0.0002	0.00008	0.045***	0.0001	0.00006
Information												
Bank	-	0.011**	0.003	-	-0.002***	0.012	-	-0.004	-0.003	-	-0.0002	-0.007
MFIs	-	0.001	0.0001	-	0.005***	0.001	-	0.0002	-0.012	-	0.0001	-0.007
ASCAs/ROSCAs	-	-0.004**	-0.003	-	-0.002***	0.0006	-	0.003	0.014	-	0.00005	-0.009
SACCOs	-	-0.002**	0.006	-	-0.0004**	-0.0008	-	0.0004	-0.00005	-	0.0003	0.0001
Expectation												
Bank	-	0.11***	0.003	-	-0.008***	0.006	-	-0.0005	0.003	-	0.0003	0.003
MFIs	-	-0.005	-0.0001	-	0.075**	0.0005	-	-0.003*	0.034	-	-0.001**	-0.003
ASCAs/ROSCAs	-	-0.011***	0.002	-	-0.0009***	-0.006	-	0.001**	0.008	-	0.0001	-0.013
SACCOs	-	-0.006**	0.0005	-	-0.004**	0.004	-	-0.003***	-0.033	-	0.005**	0.01

***, ** and * denote statistical significance at 1 per cent, 5 per cent and 10 per cent levels, respectively

- means data missing

Source: Author's calculations

The results showed that institutions affected savings as anticipated. A perceived high travel cost to a saving option was associated with a low probability of saving in it. When the travel cost to the nearest bank was perceived to be high instead of low, the probability of that individual saving in a bank decreased by 2.4 per cent in 2009. Conversely, the probability of saving in MFIs, ASCAs/ROSCAs and SACCOs increased by 0.4 per cent, 2 per cent and 0.8 per cent, respectively.

Also in 2009, the probability of saving in MFIs decreased by 1.3 per cent when the travel cost to the nearest one was perceived to be high instead of low. In the same period however, the probability of saving in banks, ASCAs/ROSCAs and SACCOs increased by 0.4 per cent, 0.8 per cent and 0.1 per cent, respectively. The results also showed that when the travel cost to get to the nearest SACCO was perceived to be high instead of low, the probability of saving in it reduced by 0.06 per cent. Correspondingly, the probability of saving in a bank increased by 0.1 per cent, and for MFI by 0.03 per cent.

Trust in a saving option and savings were positively related. When the trust in banks was perceived to be high instead of low, the probability of saving in them increased by 0.65 per cent in 2006 and 0.4 per cent in 2009. However, the probability of saving in MFIs reduced by 0.6 per cent in 2009; and that of ASCAs/ROSCAs by 0.7 per cent in 2006 and 0.3 per cent in 2009. Lastly, the probability of saving in SACCOs reduced by 0.5 per cent and 0.2 per cent in 2006 and 2009, respectively.

Similarly, when the trust in MFIs was perceived to be high instead of low, the probability of saving in MFIs increased by 0.3 per cent in 2009. In the same period however, the probability of saving in banks, ASCAs/ROSCAs and SACCOs declined by 0.07 per cent,

0.2 per cent and 0.02 per cent, respectively. Trust in ASCAs/ROSCAs and savings were also positively related. When trust in ASCAs/ROSCAs was perceived to be high instead of low, the probability of saving in them increased by 9 per cent in 2006. On the other hand, the probability of saving in banks, MFIs and SACCOs declined by 7.47 per cent, 0.2 per cent and 1.3 per cent, respectively. When the trust in SACCOs was perceived to be high instead of low, the probability of saving in them increased by 4.5 per cent in 2006. Conversely, the probability of saving in banks, MFIs and ASCAs/ROSCAs reduced by 3 per cent, 0.03 per cent and 1.3 per cent, respectively.

The results also indicated a positive relationship between the source of financial advice and savings. The probability of saving in a bank increased by 1.1 per cent in 2009 whenever the bank was perceived to provide the most rather than the least source of financial advice. The probability of saving in ASCAs/ROSCAs and SACCOs however, reduced by 0.4 per cent and 0.2 per cent, respectively. Also, whenever the MFI was perceived to provide the most instead of the least financial advice, the probability of saving in it increased by 0.5 per cent. However, the probability of saving in banks, ASCAs/ROSCAs and SACCOs declined by 0.2 per cent, 0.2 per cent and 0.04 per cent, respectively.

Saving expectations affected savings. In 2009, the probability of saving in banks increased by 11 per cent whenever the expectation to the savings to deal with the highest risk was perceived to be high instead of low. The probability of saving in ASCAs/ROSCAs and SACCOs in contrast, declined by 1.1 per cent and 0.6 per cent, respectively. Also, the probability to save in MFIs increased by 7.5 per cent when expectation to use the savings to deal with the highest risk was perceived to be high

instead of low. However, the probability to have savings in banks, ASCAs/ROSCAs and SACCOs reduced by 0.8 per cent, 0.09 per cent and 0.4 per cent, correspondingly.

Saving expectations also affected savings in ASCAs/ROSCAs. Whenever the expectation to use savings in ASCAs/ROSCAs to deal with the highest risk was perceived to be high instead of low, the probability of saving in them increased by 0.1 per cent in 2009. However, the probability to save in MFIs and SACCOs reduced by 0.3 per cent in each. Finally, the probability of saving in SACCOs increased by 0.5 per cent whenever the expectation to use the savings to deal with the highest risk was perceived to be high instead of low. The probability of saving in MFIs subsequently, decreased by 0.1 per cent.

The results on institutional factors conform to the institutional theory of saving which advances access (travel cost) to saving option, incentives (trust), information (financial advice) and expectations as important constructs in predicting saving behavior. As predicted, the travel cost to the saving option, trust in the saving option, saving option providing the most source of financial advice and saving expectations had a significant relationship with savings. A perceived high travel cost was associated with reduced probability to save in the option. Also, high trust in the saving option and providing the most source of financial advice affected savings positively. Lastly, the expectations to use savings to deal with the highest risk had a positive association with savings.

These results were consistent with the findings of other studies. In their study in Kenya, Kibet *et al.* (2009) found that higher transport costs had a negative effect on saving habits. Chowa *et al.* (2012) also showed that in Uganda, proximity to the saving option,

financial education and incentives had a positive association with saving performance. The implications of these results are that institutional factors including travel cost to access a saving option, trust in a saving option, information and saving expectations influence savings in Kenya.

Table 4.9: Saving levels rank ordered multinomial choice: Decision maker attributes' marginal effects for rank ordered multinomial/conditional probit model

Saving option/Decision maker attributes	Bank			MFIs			ASCAs/ROSCAs			SACCOs		
	2006	2009	2013	2006	2009	2013	2006	2009	2013	2006	2009	2013
Age	-0.006	-0.012*	0.012	-0.0005	-0.0002	-0.009	-0.069	0.001	-0.003	-0.01	0.0006	0.002
Age squared	1.7e-06	2.3e-06	-6.8e-07	5.7e-08	1.8e-07	9.2e-07	0.0008***	-9.8e-08	-2.4e-07	0.00005***	-1.3e-08	-8.3e-07
Income	-	0.003***	-0.002	-	0.003	0.002	-	5.4e-06	-0.0004	-	0.00003	--0.003
Education	0.0176**	0.002**	-0.006	0.002	0.004***	0.009	-0.26***	0.0002	-0.003	0.074***	0.0001	-0.003
Gender	0.006	-0.006**	0.008	-0.0004	-0.005	-0.005	0.149***-	-0.0001	-0.003	-0.054***	-0.0002	0.011
Marital	-0.007	-0.001	-0.003	-0.001	-0.0008	0.0011	0.016	0.00006	0.001	0.046	0.00004	0.009
Number of dependants	0.004	-0.001**	0.0007	0.0002	-0.002*	0.0004	-0.019	-0.00004	-0.001	-0.035**	-0.00004	-0.0013
Region	0.013**	0.007*	-0.002	0.0007	0.008*	0.0003	-0.151***	0.00002	0.002	0.008	0.00002	0.002

***, ** and * denote statistical significance at the 1 per cent, 5per cent and 10per cent levels, respectively

- means data missing

Source: Author's calculations

Table 4.9 shows the decision maker attributes' marginal effects on savings. The results showed that only income, education level, gender, number of dependants and region affected savings. On income, a 1 shilling increase beyond Ksh 15,783.80 in 2009 increased the probability of saving in banks by 0.3 per cent. According to the absolute income hypothesis, the level of income positively influences savings. Therefore, as income increases, the probability of saving increases.

An increase in 1 level of education beyond the primary level increased the probability of saving in banks and SACCOs by 1.8 per cent and 7.4 per cent respectively, in 2006. Also in 2009, an increase in 1 level of education beyond the primary level increased the probability of saving in banks and MFIs by 0.2 per cent and 0.4 per cent, respectively. However, an increase in 1 level of education beyond the primary level reduced the probability of savings in ASCAs/ROSCAs by 26 per cent in 2006. With a higher level of education, one is likely to earn more income leading to higher savings. Similar results have been found by other studies (e.g. Kibet *et al.*, 2009). However, as income increases, one's probability to save in a formal finance rather than informal finance increases (Carpenter *et al.*, 2002; Ouma *et al.*, 2003; and Mbuthia, 2011).

The results in general indicated that compared to males, females had a lower probability of saving in banks and SACCOs but a higher probability of savings in ASCAs/ROSCAs. A female's probability of saving in banks was lower than that of a male by 0.6 per cent in 2009. Also in 2006, a female's probability of saving in SACCOs was lower than that of a male by 5.4 per cent. However, in 2006, a female's probability of saving in ASCAs/ROSCAs was higher than that of a male by 14.9 per cent. These results were

consistent with the literature that women participation in informal finance is higher than that of men (Anderson *et al.*, 2002).

On dependants, an increase in 1 dependant beyond 2 dependants reduced the probability of saving in banks and MFIs by 0.1 per cent and 0.2 per cent in 2009, respectively. Also, an increase in 1 dependant beyond 2.59 dependants reduced the probability of saving in SACCOs by 3.5 per cent in 2006. An additional dependant can lead to a higher household expenditure leading to reduced savings. This finding was consistent with the literature on savings, including Kibet *et al.* (2009).

Urban residence was associated with a higher probability of saving in banks and MFIs. The results indicated that in 2006 and 2009, urban residents' probability of saving in banks was higher than that of rural residents by 1.3 per cent and 0.7 per cent, respectively. Also, urban residents' probability of saving in MFIs was higher than that of rural residents by 0.8 per cent in 2009. However, their probability of saving in ASCAs/ROSCAs was 15.1 per cent lower than that of rural residents in 2006. According to Atieno (2001), location in urban area positively affects the choice of a formal saving it is more predominant in urban than rural areas.

4.3.3. The Effect of Institutions on Households' Choice of Usage of Saving Options

The third objective of this study sought to analyze the effect of institutions on households' choice of usage of saving options conditional on decision maker's attributes. Like in the second objective, a rank ordered multinomial/conditional probit model was estimated for each of the two data sets used. The regression results from the 2009 and 2013 data sets

are presented in Appendix III. A post-estimation diagnostic Wald test was done to determine the model's fitness. The Wald test results are presented in Table 4.10.

Table 4.10: Wald test for independent variables: Rank ordered multinomial/conditional probit model estimates for usage option

Independent variables	2009		2013	
	chi ²	Prob> chi ²	chi ²	Prob> chi ²
Institutional factors	537.88	0.0000	269.46	0.0000
Decision maker attributes	197.33	0.0000	59.14	0.0001

Ho: All coefficients associated with given variable(s) = 0

Source: Author's calculations

The Wald test results across the two periods of the study rejected the null hypothesis that all coefficients associated with institutional factors and the decision maker attributes were equal to zero. The chi² statistics for the institutional factors and decision maker's attributes in 2009 and 2013 were statistical significant at 1 per cent significance level. Hence, the coefficients associated with the institutional factors and the decision maker attributes in these periods were jointly significant. Therefore, the Wald test results in Table 4.10 confirmed the model's fitness in 2009 and 2013 data sets. Table 4.11 presents the institutional factors' marginal effects on choice of usage of saving options.

Table 4.11: Usage rank ordered multinomial choice: Institutional factors' marginal effects for rank ordered multinomial/conditional probit model

Saving option/ Institutional factors	Bank		MFIs		ASCAs/ROSCAs		SACCOs	
	2009	2013	2009	2013	2009	2013	2009	2013
Cost								
Bank	-0.003***	-0.264***	0.00002	0.036	0.125***	0.004	--0.0005	0.21***
MFIs	0.006***	0.533***	-0.0002***	-0.103***	0.429***	0.019*	0.01***	0.137***
ASCAs/ROSCAs	0.009***	0.001	0.0002***	0.461***	-0.102***	-0.025*	0.041***	0.055***
SACCOs	0.00002	0.27***	2.8e-07	0.60***	0.201***	0.003	-0.05***	-0.642***
Interest rate								
Bank	-	0.01***	-	-0.001	-	0.0001	-	-0.008***
MFIs	-	-0.021***	-	0.004***	-	-0.0007*	-	-0.054***
ASCAs/ROSCAs	-	-0.00004	-	-0.018***	-	0.001*	-	-0.002**
SACCOs	-	-0.011***	-	-0.023***	-	0.0001	-	0.064***
Trust								
Bank	0.00005**	0.009***	2.9e-06	-0.001	-0.022***	0.0001	0.0001	-0.007**
MFIs	-0.0001**	-0.018***	0.00003**	0.004**	-0.075***	-0.0006*	-0.002***	-0.048***
ASCAs/ROSCAs	-0.0002**	-0.00004	-0.00003**	-0.016***	0.018***	0.001*	-0.007***	-0.002**
SACCOs	-4.0e-06	-0.009***	-5.0e-08	-0.021***	-0.201***	0.0001	0.009***	0.057***
Information								
Bank	0.0001**	0.006*	-5.2e-06	-0.0008	-0.039	-0.00008	-0.0002	-0.005
MFIs	-0.0002**	-0.012*	0.00005**	0.002	-0.135	-0.0004	-0.003***	-0.032*
ASCAs/ROSCAs	-0.0003**	-0.00001	-0.0001**	-0.012	0.032	0.0006	-0.013***	-0.001
SACCOs	-7.2e-06	-0.006*	-8.9e-08	-0.014	-0.063	-0.00005	0.016***	0.038*
Expectation								
Bank	0.003***	0.28***	-0.0002	-0.038	-0.298***	-0.004	0.005	-0.223***
MFIs	-0.006***	-0.566***	0.002***	0.11***	-0.443***	-0.02*	-0.101***	-0.462***
ASCAs/ROSCAs	-0.009**	-0.001	-0.002***	-0.49***	0.06***	0.026*	-0.426***	-0.058**
SACCOs	-0.0002	-0.287***	-2.9e-06	-0.638***	-0.084***	-0.003	0.522***	0.74***

***, ** and * denote statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively

- means data missing

Source: Author's calculations

The results showed that institutions affected the usage of a saving option as anticipated. A perceived high travel cost to a saving option was associated with reduced usage. Whenever the travel cost to the nearest bank was perceived to be high instead of low, the probability of a bank's usage decreased by 0.3 per cent and 26.4 per cent in 2009 and 2013, respectively. In contrast, the probability of MFIs' usage increased by 0.6 per cent in 2009 and 53.3 per cent in 2013. Also, the probability of ASCAs/ROSCAs' usage increased by 0.9 per cent in 2009, and that of SACCOs by 27 per cent in 2013.

The results also showed that when the travel cost to the nearest MFI was perceived to be high instead of low, the probability of MFI's usage decreased by 0.02 per cent and 10.3 per cent in 2009 and 2013, respectively. On the other hand, the probability of ASCAs/ROSCAs' usage increased by 0.02 per cent in 2009 and 46.1 per cent in 2013; and that of SACCOs' by 60 per cent in 2013.

Whenever the travel cost to the nearest ASCAs/ROSCAs was perceived to be high instead of low, the probability of their usage declined by 10.2 per cent and 2.5 per cent in 2009 and 2013, respectively. The probability of banks' usage, however, increased by 12.5 per cent in 2009; and that of MFIs by 42.9 per cent in 2009 and 1.9 per cent in 2013. The probability of SACCOs' usage also increased by 20.1 per cent in 2009.

Finally, when the travel cost to the nearest SACCO was perceived to be high instead of low, the probability of its usage decreased by 5 per cent and 64.2 per cent in 2009 and 2013, respectively. Subsequently, the probability of banks' usage increased by 21 per cent in 2013, and that of MFIs by 1 per cent in 2009 and 13.7 per cent in 2013. The

probability of ASCAs/ROSCAs' usage also increased by 4.1 per cent in 2009 and 5.5 per cent in 2013.

Interest rates on savings and usage of a saving option had a positive relationship. The probability of banks' usage increased by 1 per cent in 2013, whenever the interest rate on savings was perceived to be high instead of low. Subsequently, the probability of MFIs' and SACCOs' usage reduced by 2.1 per cent and 1.1 per cent, respectively. Also in 2013, the probability of MFIs' usage increased by 0.4 per cent when the interest rate on savings in MFIs was perceived to be high instead of low, while ASCAs/ROSCAs' and SACCOs' usage declined by 1.8 per cent and 2.3 per cent, respectively.

The probability of ASCAs/ROSCAs' usage increased by 0.1 per cent in 2013, when the interest rate on savings in ASCAs/ROSCAs was perceived to be high instead of low. Similarly, the probability of MFIs' usage declined by 0.07 per cent. Also in 2013, SACCOs' usage increased by 6.4 per cent when interest rate on savings was perceived to be high instead of low. The probability of banks', MFIs' and ASCAs/ROSCAs' usage conversely declined by 0.8 per cent, 5.4 per cent and 0.2 per cent, respectively.

The trust in a saving option and its usage were positively related. In banks, when trust was perceived to be high instead of low, the probability of its usage increased by 0.005 per cent in 2009 and 0.9 per cent in 2013. However, the probability of MFIs' usage reduced by 0.01 per cent in 2009 and 1.8 per cent in 2013, that of ASCAs/ROSCAs by 0.02 per cent in 2009, and SACCOs' usage by 0.9 per cent in 2013.

The probability of MFIs' usage increased by 0.003 per cent in 2009 and 0.4 per cent in 2013, whenever trust in MFIs was perceived to be high instead of low. Correspondingly,

the probability of ASCAs/ROSCAs' usage reduced by 0.003 per cent in 2009 and 1.6 per cent in 2013, and that of SACCOs by 2.1 per cent in 2013. On ASCAs/ROSCAs, the probability of their usage increased by 1.8 per cent in 2009 and 0.1 per cent in 2013, when the trust in them was perceived to be high instead of low, while that of banks and SACCOs reduced by 2.2 per cent and 20.1 per cent respectively in 2009. The probability of MFIs' usage also reduced by 7.5 per cent in 2009 and 0.06 per cent in 2013.

Finally, when trust in SACCOs was perceived to be high instead of low, the probability of usage increased by 0.9 per cent in 2009 and 5.7 per cent in 2013. Subsequently, the probability of banks' usage reduced by 0.7 per cent in 2013, that of MFIs by 0.2 per cent in 2009 and 4.8 per cent in 2013, and for ASCAs/ROSCAs by 0.7 per cent and 0.2 per cent in 2009 and 2013, respectively.

The results also showed a positive relationship between the source of financial advice and the usage of a saving option. Table 4.13 shows that when banks were perceived to be the most rather than the least source of financial advice, the probability of their usage increased by 0.01 per cent in 2009 and 0.6 per cent in 2013. However, that of MFIs reduced by 0.02 per cent in 2009 and 1.2 per cent in 2013, ASCAs/ROSCAs by 0.03 per cent in 2009, and that of SACCOs by 0.6 per cent in 2013.

In 2009, the probability of MFIs' usage increased by 0.005 per cent, whenever they were perceived to be the most rather than the least source of financial advice. Subsequently, the probability of ASCAs/ROSCAs' usage reduced by 0.01 per cent. Finally, when SACCOs were perceived to be the most rather than the least source of financial advice, the probability of their usage increased by 1.6 per cent in 2009 and 3.8 per cent in 2013.

On the other hand, the probability of MFIs' usage reduced by 0.3 per cent in 2009 and 3.2 per cent in 2013, and that of ASCAs/ROSCAs by 1.3 per cent in 2013.

Saving expectations affected the usage of a saving option. Table 4.11 indicates that when the expectation to use savings in banks to deal with the highest risk was perceived to be high instead of low, the probability of banks' usage increased by 0.3 per cent and 28 per cent in 2009 and 2013, respectively. The probability of MFIs' usage however, declined by 0.6 per cent in 2009 and 56.6 per cent in 2013. Similarly, the probability of ASCAs/ROSCAs' and SACCOs' usage reduced by 0.9 per cent and 28.7 per cent, respectively.

When the expectation to use savings in MFIs to deal with the highest risk was perceived to be high instead of low, the probability of MFIs' usage increased by 0.2 per cent in 2009 and 11 per cent in 2013. Conversely, the probability of ASCAs/ROSCAs' usage reduced by 0.2 per cent in 2009 and 49 per cent in 2013; and that of SACCOs by 63.8 per cent in 2013.

The results also show that when the expectation to use savings in ASCAs/ROSCAs to deal with the highest risk was perceived to be high instead of low, the probability of their usage increased by 6 per cent in 2009 and 2.6 per cent in 2013. However, that of banks and SACCOs reduced by 29.8 per cent and 8.4 per cent, respectively; and MFIs by 44.3 per cent in 2009 and 2 per cent in 2013.

Finally, the probability of SACCOs' usage increased by 52.2 per cent in 2009 and 74 per cent in 2013 whenever the expectation to use savings to deal with the highest risk was perceived to be high instead of low. Correspondingly, the probability of banks' usage

reduced by 22.3 per cent in 2013, and that of MFIs and ASCAs/ROSCAs by 10.1 per cent and 46.2 per cent; and 42.6 per cent and 5.8 per cent in 2009 and 2013, respectively.

The results on institutional factors conformed to the institutional theory of saving which advances access (travel cost) to saving option, incentives (interest rate and trust), information (financial advice) and expectations as important constructs in predicting saving behavior. As predicted, the travel cost to access the saving option, interest rate on savings, trust in the saving option, information and expectations had significant relationship with the usage of a saving option. A perceived high travel cost to access to the saving option was associated with reduced probability of its usage. Also, high interest rate on savings and trust in the saving option positively affected the usage of a saving option. A saving option being the one providing the most source of financial advice had a positive effect on its usage, and the expectations to use savings to deal with the highest risk had a positive association with usage of a saving option.

Table 4.12: Usage rank ordered multinomial choice: Decision maker attributes' marginal effects for rank ordered multinomial/conditional probit model

Saving option/ Decision maker attributes	Bank		MFIs		ASCAs/ROSCAs		SACCOs	
	2009	2013	2009	2013	2009	2013	2009	2013
Age	-0.00005	- 0.0006	-0.00003	0.001	0.063	-3.2e- 06	-0.006	-0.004
Age squared	1.0e-07	2.9e-6	2.4e-08**	-0.00001	- 0.00002	9.9e-08	9.2e- 06***	0.00004
Income	0.0001**	-2.1e- 07	0.00002**	4.2e-07*	0.013	1.7e-08	0.008***	-4.0e- 07
Education	0.0001**	0.0007	0.00002**	0.004	0.003	0.0003	0.005***	0.005
Gender	- 0.0009***	0.008	- 0.0001***	- 0.044***	0.009	0.002**	-0.031***	0.038
Marital	0.00001	-0.002	0.00001	0.013	-0.033	0.0003	0.003	-0.023
Number of dependants	- 0.00006**	0.0007	- 0.00001**	-0.002	0.0004	- 0.00007	- 0.004***	0.001
Region	0.0002	-0.002	0.00003	-0.001	-0.033	-0.001	-0.0001	-0.004

***, ** and * denote statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively
 - means data missing

Source: Author's calculations

Table 4.12 presents the decision maker attributes' marginal effects on usage of a saving option. According to the results, income, education level, gender and number of dependants had an effect on the usage of a saving option. In 2009, a 1 shilling increase in income beyond Ksh 15,783.80 increased the probability of banks', MFIs' and SACCOs' usage by 0.01 per cent, 0.002 per cent and 0.8 per cent, respectively. In 2013, a 1 shilling increase in income beyond Ksh 10,921.61 increased the probability of MFIs' usage by 0.000042 per cent. According to the absolute income hypothesis, the level of income positively influences savings. Therefore, as income increases, savings also increase, most likely increasing the probability of usage of a saving option.

The results on education indicate that in 2009, an increase in 1 level of education beyond the primary level increases the probability of banks', MFIs' and SACCOs' usage by 0.01 per cent, 0.002 per cent, and 0.5 per cent, respectively. A possible explanation of these results is that those with high education increase their ability to earn more income. Therefore, as income increases, their savings also increases, most likely increasing the probability of usage of a saving option.

On gender, the results in general indicated that compared to males, females had a lower probability of banks', MFIs' and SACCOs' usage by 0.09 per cent, 0.001 per cent and 3.1 per cent respectively, in 2009. In 2013, a female's probability of MFIs' usage was 4.4 per cent lower than that of a male. However, a female's probability of ASCAs/ROSCAs' usage was 0.2 per cent higher than that of a male in 2013. The saving literature indicates that women's participation in informal finance is higher than that of men (Anderson *et al.*, 2002).

An increase in 1 dependant beyond 2 dependants decreased the probability of banks', MFIs' and SACCOs' usage by 0.006 per cent, 0.001 per cent and 0.4 per cent respectively, in 2009. An additional dependant can lead to a higher household expenditure, hence reduced savings. This finding is consistent with the literature on savings including Kibet *et al.* (2009). Low levels of saving may cause reduced probability of usage of a saving option.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1. Introduction

This chapter gives a summary of the study, draws the study conclusions and suggests policy implications emanating from the study findings. Finally, limitations of the study and areas for further research are suggested.

5.2. Summary of the Study

This study sought to analyze the effect of institutions on households' saving behavior in Kenya. The specific objectives of the study were; analyze the effect of institutions on households' choice of saving options conditional on decision maker attributes in Kenya; analyze the effect of institutions on households' choice of saving levels conditional on decision maker attributes in Kenya; and analyze the effect of institutions on households' choice of usage of saving options conditional on decision maker attributes in Kenya.

Low savings in Kenya are a key development challenge to achieving Kenya Vision 2030 goals. This study, therefore, endeavored to improve the understanding of saving behavior in Kenya by empirically testing the institutional theory of saving. Existing literature on saving behavior in Kenya has considered the traditional consumption and savings theories, with limited consideration on the institutional theory of saving. Also, contrary to most studies which use only the absolute savings as the dependent variable, this study analyzed the households' saving behavior using the choice of saving option, choice of saving levels and choice of usage of a saving option as dependent variables. Further, this

study enriched the savings literature by using three cross-sectional data sets to examine the effect of institutions on households' saving behavior over time. The results of this study are useful in providing information on relevant policies to promote savings in Kenya.

To meet the objectives of the study, three cross-sectional data sets from the Financial Access 2006, 2009 and 2013 national surveys were used. The surveys' main goal was to measure financial access landscape in Kenya. In the first objective, a multinomial/conditional probit model for all the three data sets was estimated. In objectives two and three, a rank ordered multinomial/conditional probit model was estimated. The maximum likelihood technique was used in all the estimations. A post-estimation diagnostic Wald test was subsequently done to determine the estimated models' fitness. In order to provide a better understanding of the estimations, marginal effects were computed.

In the first objective, the study established that institutions influenced the choice of saving options (banks, MFIs, SACCOs and ASCAs/ROSCAs) in Kenya. A perceived high travel cost to access a saving option reduced its probability of choice. The results showed that the interest rate on savings affected the choice of a saving option. The probability of a saving choice increased whenever the interest rate on savings in it was perceived to be high instead of low. The results also showed that trust in a saving option had an effect on its choice. Whenever the trust in a saving option was perceived to be high instead of low, the probability of choosing it increased. According to the results, saving expectations affected the choice. When the expectation to use savings in a saving

option to deal with the highest risk was perceived to be high instead of low, the probability of choosing it increased.

On decision maker attributes, income, education level, gender, number of dependants and region affected choice of a saving option. An increase in income increased one's probability of selecting a formal saving option (banks, SACCOs and MFIs) rather than an informal one (ASCAs/ROSCAs). Also, as the educational level increased, the probability of selecting a formal saving option (banks) increased, while that of an informal option declined. On gender, the results in general indicated that compared to males, females had a lower probability of choosing formal saving options, but a higher probability of choosing informal ones. An increase in the number of dependants increased the probability of selecting a formal saving option (banks), and this increased or reduced the probability of selecting an informal one. Urban residence was associated with a higher probability of saving in formal options, especially banks.

In the second objective, the study established that institutions influenced savings in Kenya. A perceived high travel cost to a saving option was associated with a reduced probability of saving in it. Trust in a saving option and savings were positively related. A perceived high trust in a saving option increased the probability of saving in it. The source of information (financial advice) also had a positive effect on savings. Lastly, the expectations to use savings to deal with the highest risk had a positive association with savings.

Decision maker attributes; income, education level, gender, number of dependants and region, affected savings. As income increased, the probability of saving in formal options

also increased. An increase in one's level of education beyond the primary level increased the probability of saving in formal options but reduced the probability of saving in informal ones. On gender, the results indicated that compared to males, females had a higher probability of saving in informal options. An increase in the number of dependants reduced the probability of saving in formal options. Urban residence was associated with a higher probability of saving in formal options, however the probability of saving in informal ones was lower than that of rural residents.

In the third objective, the study established that institutions influenced the usage of a saving option in Kenya. As predicted, the travel cost to the saving option, interest rate on savings, trust, information (financial advice) and expectations had a significant relationship with the usage of the saving option. A perceived high travel cost to the saving option was associated with reduced probability of its usage. Also, perceived high interest rate on savings and high trust in the saving option positively affected its usage. A saving option providing the most source of financial advice had a positive effect on its usage. Lastly, the expectations to use savings in a saving option to deal with the highest risk had a positive association with its usage.

Income, education level, gender and number of dependants had an effect on the usage of a saving option. A rise in income increased the probability of formal saving options usage. An increase in 1 level of education beyond the primary, increased the probability of formal saving options usage. Further, compared to males, females had a lower probability of formal saving options usage. However, a female's probability of informal saving option usage was higher than that of a male. On dependants, an increase in the number of dependants decreased the probability of formal saving options usage because

an additional dependant can lead to a higher household expenditure, hence reduced saving levels. Low levels of saving may cause reduced probability of use of a saving option.

5.3. Conclusion

The institutional theory of saving was developed to increase knowledge of how, mostly, the low-income people save. This theory was developed as a result of asset building research in the United States of America. However, the results of this study indicated that the institutional theory of saving explains the factors that affect saving performance in Kenya, where majority of the households have low incomes. This study, therefore, established that institutions affected the saving behavior in Kenya. The implications of these results are that institutional factors including the travel cost to a saving option, interest rate, trust, information (source of financial advice) and saving expectations influenced the choice of a saving option, savings and usage. The study also established that the decision maker attributes which include income, education, gender, number of dependants and region of residence, affected the saving behavior in Kenya.

5.4. Policy Implications

Based on the empirical findings, this study draws the following policy implications that can be used in enhancing savings in Kenya.

(a) Promotion of non-traditional means of saving services

According to the empirical results, saving participation and performance is hindered by travel cost to a saving option. Travel cost to physical (commonly known as ‘Brick and Mortar’) branches, therefore, reduces saving participation and performance. Easy access

of a saving option is important for its uptake and use. When saving services become easily accessed, there are benefits to both the financial providers and users.

To address the travel cost to a saving option, there is need to promote and leverage on digital innovation in provision of saving services. Though the mobile phone penetration is over 90 per cent of the population, only 18 per cent use mobile banking services. The national government and mobile phone services providers in collaboration with financial services providers, therefore, need to promote the use of these services. Further, such collaboration needs to develop sustainable digital services that are affordable to low income households. The government should secure these digital services to promote their wide adoption.

The use of agents by saving services providers should be encouraged. Currently, only commercial banks use agents with only 14 per cent of total population utilizing these services. The financial sector regulators, especially the CBK and SACCO Societies Regulatory Authority (SASRA) should allow financial services providers including MFIs and SACCOs to use agents to offer saving services. Further, these regulators need to enhance promotion and awareness of agency saving services to encourage their use.

(b) Promotion of savings through incentives

The interest rate on savings, which is an incentive to savers, affects their saving participation and performance. The more attractive the interest rate, the greater the participation and savings performance. The interest rate on deposits in Kenya is now 70 per cent of the Central Bank Rate, following enactment of the Banking (Amendment) Act 2016 that caps the interest rates. The monetary policy committee of the CBK is the one

that determines the Central Bank Rate, and should ensure interest rate deposits are attractive to savers.

This study has also established that trust in a saving option affects the saving behavior and performance. Savers need to be assured that their savings are safe for them to trust the saving services providers, and this will have a positive effect on their savings' participation and performance. The CBK and SASRA who are key financial sector regulators need to do their supervisory role diligently in order to stem out any mistrust of the saving services providers by the savers. Savers may not use the available saving services, if they do not trust the service providers to keep their savings safe.

(d) Promotion of financial education

Financial advice offered through financial education is important in enhancing savings participation and performance. When individuals are knowledgeable about their saving choices and opportunities, savings participation and performance is bound to improve. Financial advice is associated with a higher probability of savings and realization of savings goals. Savers underutilize saving services when they do not have enough information and knowledge about them. Financial education, therefore, is important because it equips savers with knowledge and information facilitating their use of saving products and services. When people are financially literate, they make better financial decisions and improve their saving actions. There is need for the commercial banks, SACCOs and MFIs to offer substantial financial education to their clients. However, this education should be tailored to the needs and circumstances of the specific clients. Financial sector regulators including the CBK and SASRA need also to be at the forefront in offering financial education to the public.

(e) Investment in formal education

Education is important in enhancing saving participation and performance. The higher the education level, the higher the probability of saving participation and performance. The national government should continue with its efforts to boost education in the country. There should be adequate funding at all levels of the education sector. The provision and promotion of a conducive environment for sustainable public-private partnerships is important in boosting investment in the education sector. There is also need to explore innovative ways of funding education through such partnerships.

(f) Income generation policies

The income level has an effect on the saving participation and performance. The higher the income levels, the higher the probability of saving participation and performance. The national government and county governments need to boost employment levels by providing an enabling environment for doing business in Kenya. Therefore, there is need to offer better infrastructure, reduce the cost of doing business and enhance security to increase the profitability of the existing businesses leading to their expansion. These efforts will also attract new investors in the country. The two levels of government (National and County) also need to continue enhancing the use of technology to improve productivity and quality of goods and services for majority of Kenyans who are in self-employment. This is important because by boosting the incomes in these enterprises, savings in the country will be enhanced, reducing the dependency rates which negatively affects saving participation and performance.

(g) Promotion of formal finance among women

There are gender differences in participation in saving and performance. Generally, females have a lower probability than males of saving participation and performance in formal saving options because they tend to have low earnings, consequently low saving participation and performance. Therefore, there is need to implement policies and programs specifically to empower women. Increasing women participation in the labor market can enhance their incomes. Promotion of skills development programs targeting women by the national government can enhance women participation in the labor market. Vocational training is a crucial component of skills development in women.

The national government has already established programs aimed at economically empowering women such as women enterprise and Uwezo funds. It is, therefore, important to ensure these programs are well managed in order to reap the intended benefits. Also, there is need for the national government to allocate more resources to the funds so that more women, who are the majority in Kenya, can benefit. The county governments need to supplement these efforts by starting similar programs.

5.5. Limitations of the Study

This study used three cross sectional data sets. Therefore, the assumption was that the institutions' (whose effect was being analyzed in this study) environment remained fairly the same across the three periods of analysis. However, if this assumption does not hold, the generalization of results across the three periods was limited. Also, some of the variables used in the estimations were missing in some data sets. Nonetheless, if all the variables were available in the data sets, the estimations could have yielded different results. Lastly, the measurement of the institutional factors in this study was based on the

data available, hence, if the same factors are measured differently, the results may change.

5.6. Areas for Further Research

This study only analyzed the effect of four institutional factors on the households' saving behavior in Kenya. One institutional factor (facilitation) was not included in the analysis because of lack of data. Future research should endeavor to include all the institutional factors in the examining their effect on households' saving behavior in Kenya. Future research also needs to test the interaction effects amongst the institutional factors; for example, where an institutional factor may not be predictive, the interaction with another factor might have an effect.

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APPENDICES

APPENDIX I: MULTINOMIAL/CONDITIONAL PROBIT MODEL RESULTS: SAVING OPTION

Variables	2006	2009	2013
Institutional variables	Coefficient	Coefficient	Coefficient
Access: Travel cost	-	-0.5145***(0.245)	-0.0907***(0.332)
Incentive: Interest rate	0.0475(0.098)	-	0.3962***(0.088)
Incentive: Trust	0.1025**(0.353)	0.5704***(0.122)	0.7016***(0.106)
Information	-	0.14335(0.135)	0.1512(0.145)
Expectation	-	0.8350***(0.169)	0.9503***(0.275)
MFIs: Decision maker attributes			
Constant	-3.6225(5.299)	-3.2143(4.375)	0.8232898(1.262)
Age	1.0421(1.615)	1.3869(1.531)	0.0028273(0.046)
Age squared	-0.0004(0.0006)	-0.0009(0.0006)	-0.0001329(0.0004)
Income	-	-0.0598(0.188)	-0.1045287(0.101)
Education	-0.8303*(0.456)	-0.7068**(0.324)	-0.1841313(0.314)
Gender	-0.0111(0.4451)	0.1443(0.281)	0.5228891*(0.294)
Marital	-0.0732(0.459)	0.2740(0.352)	-0.0196443(0.303)
Number of dependants	0.1751(0.333)	-0.1583(0.258)	0.2239967(0.243)
Region	0.0783(0.512)	-0.2590(0.343)	-0.040613(0.272)
ASCAs/ROSCAs: Decision maker attributes			
Constant	7.2014**(2.920)	1.0456(1.495)	3.7213***(0.984)
Age	0.7720(0.599)	0.6338(0.472)	0.0285(0.0317)
Age squared	-0.0002(0.0002))	-0.0002(0.0001)	-0.00042(0.0003)
Income	-	-0.1732***(0.075)	-0.2700***(0.096)
Education	-1.5337***(0.584)	-0.5064***(0.186)	-0.3189(0.223)
Gender	0.7705**(0.309)	0.6850***(0.175)	0.7339***(0.207)
Marital	0.2060(0.1795)	0.0176(0.143)	-0.3070(0.224)
Number of dependants	-0.2865(0.174)	0.1428(0.120)	0.1123(0.174)
Region	-1.052***(0.387)	-0.2589*(0.145)	-0.2141(0.199)

Variables	2006	2009	2013
SACCOs: Decision maker attributes	2006	2009	2013
Constant	1.9799(2.236)	-3.2148(1.958)	1.3070(0.925)
Age	-0.0834(0.634)	0.5025**(0.617)	0.0405(0.036)
Age squared	7.75e-06(0.0002)	-0.0003*(0.0002)	-0.0004(0.0003)
Income	-	-0.0526(0.089)	-0.0957(0.089)
Education	-0.1299**(0.504)	-0.5189**(0.214)	-0.3022(0.215)
Gender	0.0841(0.211)	0.1544(0.165)	0.2555(0.191)
Marital	0.2551(0.213)	0.0395(0.180)	-0.1252(0.221)
Number of dependants	-0.1436(0.183)	-0.0031(0.143)	0.1425(0.173)
Region	-0.5756*(0.294)	-0.7313*** (0.218)	-0.3379*(0.203)
No. of observations	5920	7008	3176
No. of cases	1480	1752	794
Wald chi-square statistic	36.71	62.34	108.96
Prob> chi-square	0.0348	0.0002	0.0000

Base category is Banks option

***, ** and * denote statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively

- means data missing

Standard errors in parenthesis

Source: Author's calculations

**APPENDIX II: A RANK ORDERED MULTINOMIAL/CONDITIONAL PROBIT MODEL RESULTS: SAVING LEVEL
OPTION**

Variables	2006	2009	2013
Institutional variables	Coefficient	Coefficient	Coefficient
Access: Travel cost	-	-0.9204208***(0.133)	-0.038035(0.338)
Incentive: Interest rate	0.0891859(0.0824)	-	0.23416(0.174)
Incentive: Trust	0.5660344***(0.0904)	0.186219***(0.049)	0.414518(0.219)
Information		0.3003597***(0.078)	0.5758102(0.304)
Expectation		0.631534***(0.452)	0.110057(0.258)
MFIs: Decision maker attributes			
Constant	1.371147(2.264)	-5.363875***(1.917)	-0.8977375(2.688)
Age	-0.2221725(0.732)	0.2706917(0.641)	-0.2615603(0.767)
Age squared	0.0001((0.0002)	-0.0000799(0.0002)	0.0000272(0.0002)
Income	-	0.1240295(0.106)	0.0596842(0.127)
Education	0.4310894*(0.224)	0.2310977***(0.063)	0.2714857(0.247)
Gender	--0.0320893(0.202)	-0.110274(0.175)	-0.1407947(0.274)
Marital	-0.0275233(0.221)	-0.0465464(0.184)	0.0348265(0.251)
Number of dependants	-0.3640044*(0.193)	-0.0675927(0.057)	0.0095955(0.0721)
Region	-0.2766157(0.227)	0.3860178*(0.206)	0.0118555(0.345)
ASCAs/ROSCAs: Decision maker attributes			
Constant	5.629967***(2.108)	0.5126812(0.754)	2.41268(2.923)
Age	-0.4778988(0.640)	0.3862331*(0.222)	-0.6170114(0.988)
Age squared	0.0004***(0.0002)	-0.0002***(0.00006)	0.0000431(0.0002)
Income	-	-0.1335909***(0.04)	-0.0627623(0.133)
Education	0.559293***(0.285)	-0.0874732***(0.027)	-0.4936718*(0.279)
Gender	0.854345***(0.205)	0.438613***(0.083)	-0.5183082*(0.311)
Marital	-0.0243411(0.191)	0.0089078(0.068)	0.3036551(0.291)
Number of dependants	-0.2052355(0.169)	0.0679782***(0.022)	-0.2039207**(0.101)

Variables	2006	2009	2013
Region	-0.9248745***(0.221)	-0.1293155*(0.077)	0.2643706(0.385)
SACCOs: Decision maker attributes	2006	2009	2013
Constant	-1.677422(2.18)	-3.745463***(1.056)	-1.513883(4.712)
Age	-0.2707398(0.696319)	0.6034265**(0.296)	0.2463939(1.527)
Age squared	0.0004**(0.0002)-	-0.0000768(0.00007)	-0.0000764(0.0004)
Income	-	0.0314499(0.049)	-
Education	0.4954137**(0.211)	0.118388***(0.034)	-0.1397804(0.516)
Gender	-0.4015168**(0.198)	-0.4424226***(0.095)	-0.4561683(0.473)
Marital	0.5860384(0.224)	0.0893616(0.089)	0.2889573(0.490)
Number of dependants	-0.5117295***(0.195)	-0.0496129**(0.025)	-0.7148431*(0.421)
Region	-0.157473(0.219)	-0.1237393(0.102)	0.3175233(0.498)
No. of observations	4016	7568	2439
No. of cases	1004	1892	813
Wald chi-square statistic	90.19	143.52	180.21
Prob> chi-square	0.0000	0.0000	0.0000

Base category is Banks option

***, ** and * denote statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively

- means data missing

Standard errors in parenthesis

Source: Author's calculations

APPENDIX III: RANK ORDERED MULTINOMIAL/CONDITIONAL PROBIT MODEL RESULTS: USAGE OPTION

Variables	2006	2009	2013
Institutional variables	Coefficient	Coefficient	Coefficient
Access: Travel cost	-	-0.398896***(0.081)	-0.71601***(0.857)
Incentive: Interest rate	-	-	0.49782***(0.084)
Incentive: Trust	-	0.2458399***(0.057)	0.4403811***(0.105)
Information	-	0.440299***(0.112)	0.2970171*(0.157)
Expectation	-	0.49042***(0.915)	0.50613***(0.965)
MFIs: Decision maker attributes			
Constant	-	2.249184**(1.021)	-0.4508161(0.604)
Age	-	-0.4827282(0.304)	-0.0009021(0.026)
Age squared	-	0.0001427*(0.00008)	0.0001412(0.0003)
Income	-	-0.1045331*(0.054)	6.48e-06(4.69e-06)
Education	-	-0.0718099**(0.035)	0.0063022(0.053)
Gender	-	-0.3033639***(0.089)	-0.095676890.153)
Marital	-	0.2783413(0.097)	-0.0654381(0.171)
Number of dependants	-	0.007772(0.026)	-0.0087581(0.033)
Region	-	-0.1021984(0.114)	0.0536199(0.162)
ASCAs/ROSCAs: Decision maker attributes			
Constant	-	4.168959***(1.187)	-1.844407**(0.7830)
Age	-	-0.2405487(0.357)	-0.002115399(0.034)
Age squared	-	0.0000607(0.00009)	0.00019989(0.0004)
Income	-	-0.2413546***(0.063)	0.0000138**(5.36e-06)
Education	-	-0.1922088***(0.043)	0.161385**(0.069)
Gender	-	0.007953***(0.114)	-0.8122001***(0.213)
Marital	-	0.16895709(0.109)	0.1122765(0.233)
Number of dependants	-	0.0938043***(0.033)	-0.044765(0.043)
Region	-	-0.3111679**(0.129)	-0.03402349(0.214)

Variables	2006	2009	2013
SACCOs: Decision maker attributes	2006	2009	2013
Constant	-	1.491894(0.995)	-0.0739062(0.612)
Age	-	-0.4678032(0.299)	-0.0303754(0.026)
Age squared	-	0.0002325***(0.00008)	0.000414(0.0003)
Income	-	-0.006623(0.054)	2.81e-06(4.40e-06)
Education	-	-0.0314656(0.035)	0.04814091(0.178)
Gender	-	0.1144898(0.091)	0.1956974(0.163)
Marital	-	0.26283***(0.096)	-0.2224091(0.178)
Number of dependants	-	-0.0282352(0.026)	-0.0011159(0.038)
Region	-	-0.2738079**(0.112)	0.0140584(0.167)
No. of observations	-	9636	3660
No. of cases	-	2409	915
Wald chi-square statistic	-	625.26	318.10
Prob> chi-square	-	0.0000	0.0000

Base category is Banks option

***, ** and * denote statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively

- means data missing

Standard errors in parenthesis

Source: Author's calculations