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Institutions' Effect on Households' Choice of Saving Options in Kenya

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Abstract:

The study uses a multinomial/conditional probit model to analyze the effect of institutions on households' saving behavior in Kenya. Data from the Financial Access National surveys is used in the analysis. The key finding in the study is that institutional factors including access to a saving option, incentives in a saving option, information and saving expectations influence the choice of saving options in Kenya. This result suggests that institutional factors influence households' saving behavior particularly their participation in the savings options. Hence, easing access of savings options, motivating households through incentives, making households more informed of their saving choices and opportunities, and offering financial literacy to households on saving goals and targets are all critical in enhancing households saving participation in Kenya.

Keywords: Kenya, Institutions, households, saving options

1. Introduction

Kenya's savings rate remains low posing a significant development challenge. The savings rate has been lower than envisioned in Vision 2030, which aims to propel Kenya to a middle income industrialized country by the year 2030. For example, in the period 2009-2013, the realized gross national savings averaged 12.4% against a target average of 21.6%. Further, the gross national savings have been on the decline. Though the savings rate marginally increased to 11.1% in 2014 from 9.6% in 2013, this was lower than the 14% saving rate achieved in 2011. In 2015, and 2016 the saving rates were 10.9% and 10.2% respectively (Kenya National Bureau of Statistics, 2017).

The low saving levels experienced in Kenya implies that the desired levels of investments are not realized. The Medium-Term Plan 1 (2008-2012) targeted an investment rate of 23.2% in 2009, 24.6% in 2010, 27% in 2011, 29.7% in 2012 and 32.6% in 2013 (Republic of Kenya, 2007). The realized investment levels were however, 19.9% in 2009, 19.8% in 2010, 20.5 % in 2011, 20.1 % in 2012 and 27.3% in 2013 (Central Bank of Kenya, 2014). In 2014 and 2015 the investment levels realized were 22.4% and 21.6%. In 2016, the investment levels were 17.2 % against a target of 29.3 % (Kenya National Bureau of Statistics, 2017).

The low savings and investments levels have therefore failed to support high economic growth and employment creation as envisioned in Vision 2030. The economic growth rate was targeted to grow from 7% in 2007 to between 8% and 8.5% in 2009-2010 and to 10% in 2012. However, between 2007 and 2012, the economic growth rate averaged 4.4% (Central Bank of Kenya, 2014). Similarly, during the 2013-2016 period, the economic growth was low at an average of 5.7% (Kenya National Bureau of Statistics 2017). Low domestic savings also means that the economy is dependent on foreign financing of investments. This dependence exposes the country to the risk of capital reversal which can jeopardize the 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 et al., 1992; Obwona & Ddumba-Ssentamu, 1998). 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 (see 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. These include life cycle and precautionary motives (Romer, 2006). Saving for retirement and bequest and to finance expected lifetime expenditures (e.g. house purchases and education) are other motives for household saving (Callen & Thimann, 1997).

In Africa, households hold their savings more in non-financial assets than in financial assets (Aryeetey & Udry, 2000). In Kenya, households hold their formal savings in banks, Micro Finance Institutions (MFIs) and in Savings and Credit Cooperatives (Saccos). Informally, households hold their savings in Rotating and Savings Credit Associations (Roscas), Accumulating Savings and Credit Associations (Ascas), group of friends, family/friends and in secret places (Financial Sector Deepening Kenya and Central Bank of Kenya, 2009). The households' usage of these saving options may be daily, weekly, monthly, yearly or infrequent. The usage may however differ from one saving option to another.

Different households' characteristics affect their saving behavior (Gersovitz, 1988). However, the influence of institutions on households' saving behavior should not be ignored (Guy Peters, 1999). Institutions change behavior, opportunities, and outcomes (Neale, 1987). Institutions are humanly devised informal and formal constraints that structure political, economic and social interaction (North, 1991). Sherraden et al. (2003) indicates 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 in the institutional theory of saving, saving and asset building are largely a consequence of institutional factors entailing explicit connections, rules, incentives and subsidies.

This study therefore explores how institutional factors affect the Kenyan households' choice of saving options available to them. The literature on institutions' and households' saving behavior especially on choice of saving options is limited in Kenya. Hence, improving knowledge on how institutions affect households' saving participation is important in understanding saving performance in Kenya. Using data from the Financial Access National surveys (2006, 2009 and 2013), a multinomial/conditional probit model is used in this study to analyze the effect of institutions on households' choice of saving options in Kenya.

2. Literature Review

2.1. 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 & Kirsten, 2002). NIE 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. Menard and Shirley (2011) indicate that NIE consists of two distinct schools of thought. One school of thought is identified with Coase and Williamson's analysis of property rights at the firm level. The other school is identified with Douglass North's analysis of broader institutional environments and the role of the state.

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 therefore determining transaction and production costs and thus the profitability and feasibility of engaging in economic activity. While institutions provide for more certainty in human interaction (North, 1990), they have an influence on our behavior and therefore on outcomes like economic performance, efficiency, economic growth and development (Kheralla & Kirsten, 2002). Polski and Ostrom (1999), acknowledge that though institutions are everywhere governing our lives in fundamental ways, it's only not long ago that policy analysis has recognized the role of institutions in political economic behavior.

2.2. Institutional Theory of Saving

Sherraden et al. (2003) assert that economic models predict that all else 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.

The evolving institutional theory of saving asserts that institutional factors considerably affect the ability to save. Savings and asset accumulation are mainly as a result of institutional arrangements comprising explicit connections, rules, incentives and subsidies (Sherraden, 1991). Institutional factors shape and influence opportunities (Neale, 1987; North, 1990; Weaver & Rockman, 1993; Beverly & Sherraden, 1999; Guy Peters, 1999). The institutional theory of saving indicates access to saving services, incentives, information, facilitation and expectations as five important institutional constructs that influence saving and asset building behavior particularly amongst households with low incomes (Sherraden, 1991; Beverly & Sherraden, 1999; Sherraden, 1999; 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 involve institutional arrangements providing mechanisms which make savings more manageable. Such mechanism 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 compared to those without saving expectations.

2.3. Empirical Literature

Studies linking households' characteristics to choose of saving options show varied results. Kiiza and Pederson (2002) indicates that the probability of a household acquiring a formal deposit instrument increase significantly with level of households' head education 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 higher probability of acquiring a deposit instrument than a rural based household due to increased level of options and opportunities. Anderson and Baland (2002) showed that being female, age, years spent in the slum and native language (ethnic identity) were significant determinants of Roscas participation. The number of children was however negatively related to Roscas' participation. The general wealth level of the household had no significant effect on Roscas' participation in Kenya. Carpenter and Jensen (2002) showed that increased income leads to a greater desire to participate in some form of savings option, but as income increases more individuals shift to formal saving. Carpenter and Jensen (2002) showed that there was support that formal use is strongly influenced by literacy and numeracy; an indication that low education attainment and literacy rates can constrain formal saving.

Mbuthia (2011) found the household's head education level had a positive effect on the choice of formal saving option. While the age of household's head and household's head education level had a positive effect on the choice of a semi-formal saving option, household size had a negative effect. In the choice of an informal saving option, household's head age had a positive effect with being a male having a negative effect. The income levels had a positive effect on the choice of formal and semiformal saving options as well as the savings. Though the sourcing of main income from the formal sector positively affected the choice of a formal saving option, the effect on the choice of an informal saving option was negative. The location of a household in an urban area and the optimism about economic conditions positively affected the choice of a formal saving option. However, the location of a household in an urban area negatively affected the choice of semi-formal and informal saving options. Apergis and Christou (2012) revealed that income significantly influenced the saving behavior. In Malta, Gatt (2014) found that the demographic factors did not have an effect on the saving behavior. Bicevska et al. (2009) notes that household's income per capita and the age of the main income earner positively influenced household saving behavior.

On institutions, Kiiza and Pederson (2002) indicate that the probability of a household acquiring a formal deposit instrument increases significantly with the level of information made available to the household and the degree of household access to formal finance. Ouma and Rosner (2003) revealed that access, mainly high opening and minimum savings accounts balance requirement of formal financial providers (particularly banks) inhibited small and medium enterprises (SMEs) proprietors' ability and will to save. Van der Crujisen et al. (2011) used a Dutch household's survey data of 2103 respondents to analyze whether the households' savings behavior was affected by adverse experiences during the crises and knowledge (financial literacy) about banking supervision. Both factors affected the allocation of savings. Delafrooz and Paim (2011) indicated that financial management practices and financial literacy significantly predicted saving behavior. Chowa et al. (2012) showed that the institutional theory of saving explained a large part of variance in saving outcome. Proximity to saving option, financial education and financial incentives had positive association with higher saving performance. In the US, Turner and Manturuk (2012) showed that incentives and disincentives were key institutional factors influencing participation in saving program. Beckmann (2013) shows that financial literacy positively affected the saving behavior. Financial literate individuals were more likely to save using multiple earning interest saving methods. Heckman and Hanna (2015) show access, incentives and facilitation as crucial institutional factors determining the low-income households' saving behavior.

3. Research Methodology

3.1. Theoretical Framework

The theoretical foundation of this study is the choice theory. This is because the study is concerned with behavior given choices. The main common theoretical basis of choice models that is also more in line with the consumer theory is the random utility model. In this model the decision maker is assumed to have a perfect discrimination capability (Ben-Akiva & Lerman, 1985; Ben-Akiva & Bierlaire, 1999). However, there are observed inconsistencies in choice behavior as a result of observational deficiencies. Though, the individual is continually assumed to choose the alternative with utmost utility, the utilities are not known with certainty and are hence 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.

To exhibit uncertainty, the utility is thus modeled as a random variable. The utility that decision maker m associates with alternative k in the choice set C_m is expressed as:

$$U_{km} = V_{km} + \varepsilon_{km} \quad (1)$$

Where V_{km} is the deterministic (systematic part of utility) and ε_{km} is the random term capturing the uncertainty. The alternative with the highest utility is chosen. Therefore, the probability that alternative k is chosen by decision maker m from a choice set C_m is:

$$P(k | C_m) = P[U_{km} \geq U_{jm} \forall j \in C_m] = P[U_{km} = \max_{j \in C_m} U_{jm}] \tag{2}$$

3.2. Empirical Model Specification

This study uses a multinomial choice model. The probability that decision maker m chooses the j th alternative is:

$$P_{mj} = \Pr[y_m = j] = F_j(x_m, \beta), j = 1, 2, \dots, z, m = 1, 2, \dots, N \tag{3}$$

x_m 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. Diverse functional specifications for F_j however leads to various multinomial choice models.

We first model the expected utilities only in terms of characteristics of alternatives -herein referred to as institutional factors-(See Mcfadden, 1974) i.e.:

$$U(\text{Choice } j \text{ for } m | \theta) = U_j(m) = \lambda \theta_{mj} + \varepsilon_{mj} \tag{4}$$

Where θ_{mj} represents a vector of institutional factors of the j th alternative for decision maker m and ε_{mj} represents the random individual specific terms which are assumed to be independently distributed each with an extreme (Gumbel) distribution. Equation is a conditional logit model which 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 and thus adding another alternative won't change the choices by the decision maker (Cameron & Trivedi, 2005; Wooldridge, 2002). The IIA assumption therefore leads to unrealistic predictions.

The multinomial probit (MNP) model solves the IIA problem, but it's only able to capture the decision maker attributes. The MNP model (see Cameron & Trivedi, 2005; Mwangi & Sichei, 2011) is a d choice multinomial model, with utility of decision maker m from the j th choice expressed as:

$$U_{mj} = V_j(x_{mj}, \beta) + \varepsilon_j, m = 1, 2, \dots, N, j = 1, 2, \dots, z \tag{5}$$

U_{mj} : represents the utility derived by decision maker m from choosing alternative j .

x_{mj} : is the observed attributes of decision maker m and alternative j chosen

$V_j(x_{mj}, \beta)$ is the deterministic component of the utility

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

The errors in an MNP model are assumed to follow a multivariate normal distribution and are correlated across the choices i.e.

$\varepsilon \sim MND(0, \Omega)$ with $\Omega = I_z \otimes \Sigma$ and

$$\Sigma = E(\varepsilon_j \varepsilon_j) = \begin{bmatrix} \psi_{11} & \cdot & \cdot & \psi_{1z} \\ \psi_{21} & \cdot & \cdot & \psi_{2z} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ \psi_{z1} & \cdot & \cdot & \psi_{zz} \end{bmatrix}$$

Where \otimes is a Kronecker product.

The probability that decision maker m will select j is thus expressed as:

$$P_{mj} = \Pr[V_j + \varepsilon_j > V_q + \varepsilon_q, \forall q \neq j | x_{mj}, \beta] \tag{6}$$

This study therefore adopts the multinomial/conditional probit model since it takes into account both the institutional factors and the decision maker attributes; and entirely solves the IIA problem. Equation 5 is thus modified so that the utility derived from choosing alternative j depends on the institutional factors and the decision maker attributes i.e.

$$U_{mj} = \lambda \theta_{mj} + V_j(x_{mj}, \beta) + \varepsilon_j \tag{7}$$

Where θ_{mj} represents a vector of institutional factors that vary across choices.

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

$$\Pr[y_m = j] = \lambda \theta_{mj} + \beta x_{mj} + \varepsilon_j \tag{8}$$

(θ_{mj}): represents the institutional factors i.e. Access, incentive, information and expectations.

(x_{mj}): represents the decision maker attributes i.e. Age, gender, level of education, income, region, marital status and number of dependants.

3.4. Definition and Measurement of Variables

The dependent variable is the choice of savings options: Banks, MFIs, Saccos, and Ascas/Roscas. The measurement of independent variables is indicated in Table 1.

Variables	Measurement	Expectation	Explanation
Institutional factors			
<i>Access</i>	Travel cost to get to the nearest bank, Sacco, MFI or Ascas/Roscas: (1) High (0) Low	(-)	Making the saving process more available and less costly, increases participation.
<i>Incentive</i>	Banks', Saccos', MFIs' or Ascas/Roscas' interest rate on savings: (1) High (0) Low	(+)	An incentive increases participation.
	Trust on Banks, Saccos, MFIs or Ascas/Roscas: (1) High (0) Low	(+)	
<i>Information</i>	Source of financial advice is Bank, Sacco, MFI or Ascas/Roscas: (1) Most (0) Least	(+)	Awareness of savings options and opportunities, increases participation.
<i>Expectations</i>	Expectations to use savings in the bank, Sacco, MFI or Ascas/Roscas to deal with the highest risk; (1) High (0) Low	(+)	Having specific savings expectations increases participation.
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 thus increasing participation.
<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 savings and participation.
<i>Level of 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, & (7) University	(+)	Educated individuals are likely to earn more thus higher savings and participation.

Variables	Measurement	Expectation	Explanation
Income	Decision maker's monthly income per month in Kenya shillings (Proxied by total monthly expenditures)	(+)	Level of income exerts a positive influence on savings and hence higher participation
Region	A dummy given as 1 if decision maker resides in urban area ,0 otherwise	(+)	Lack of saving facilities in rural areas forces one to hoard cash at home instead of banking it, thus lower participation.
Marital status	A dummy given as 1 if decision maker is married, 0 otherwise	(+,-)	Indeterminate
Number of dependants	Decision maker's total number of dependants	(-)	The more the dependants, the lower the savings and participation.

Table 1: Independent Variables

Source: Author

3.5. Data Type and Sources

Three cross-sectional data sets from the Financial Access 2006, 2009 and 2013 national surveys are used in this study. The respondents were not the same in the three surveys but they have similarities. Financial Access Partnership which is a public-private partnership comprising the government of Kenya and its agencies, financial sector providers, research organizations and development partners conducted all the three surveys. The surveys measure the financial access landscape in Kenya (Financial Sector Deepening Kenya and Central Bank of Kenya, 2006, 2009 & 2013). The surveys were national representative with the sampling undertaken by the Kenya National Bureau of Statistics. In all the three surveys, alike questions were asked to the respondents. Thus, it is data from these alike questions that is used for the analysis across the three periods. In addition, the institutions' (whose effect is being analyzed in this study) environment is considered to have remained equally similar through the three periods of analysis.

The surveys' respondents were individuals in households, randomly chosen all over the country based on the rural and urban clusters. All individuals aged 16 years and above were qualified to take part in the surveys. However, for every household only one individual was sampled for the interview. The total number of respondents were 4,418 6,598 and 6,449 for period 2006, 2009 and 2013, respectively. In the choice theory which is the foundation of this study, the decision maker needs a decision rule to reach at a distinct choice from a choice set having two or more alternatives. Hence, individuals with multiple choice of a saving option do not conform to the decision rule and are subsequently excluded from the study's sample size. The final sample size realized was therefore 1,503, 2,430 and 1,843 respondents in 2006, 2009 and 2013, data sets respectively.

4. Results and Discussions

4.1. Descriptive Statistics

Table 2 present the summary statistics for the dependent and independent variables.

Dependent Variable	2006		2009		2013	
	N	%	N	%	N	%
Saving options						
Bank	203	13.51	363	14.94	290	15.74
Sacco	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
Independent Variables	2006		2009		2013	
	N	Mean	N	Mean	N	Mean
Institutional factors						
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

Decision maker attributes						
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

*Table 1: Descriptive Statistics for the Dependent and Independent Variables
- Means Data Missing*

Source: Author's Calculations Based on the Study Data

Across the three years, Ascans/Roscas was the most chosen saving option, with MFIs option being the least chosen. The choice of Ascans/Rosc as however declined in 2013, but the choice of other options termed formal increased. This is consistent with financial inclusion results which showed there was an increase in formal financial inclusion of 10.5% from 2009 to 2013 compared to 7.1% increase between 2006 and 2009 (Financial Sector Deepening Kenya and Central bank of Kenya, 2013). Over the years, the formal saving options (banks, MFIs and Saccos) have been aggressive in promoting their saving services at the same time making them attractive for potential savers.

On institutional factors, the perceived average travel cost to access the nearest saving option is high with a mean of 0.81 and 0.94 in 2009 and 2013, respectively. The means exceed the perceived low travel cost of accessing a saving option. The perceived average interest rate on savings is high at 0.49 in 2006 and 0.25 in 2013. Again, the mean figures are beyond the perceived low interest rate on savings. The mean values for the trust in a saving option are 0.45, 0.24 and 0.2 in 2006, 2009 and 2013, respectively. This shows that the perceived average trust in all the three periods of the study is high. The mean values of 0.64 in 2009 and 0.25 in 2013 divulge that the saving option chosen is on average the most source of financial advice. Finally, the mean values of 0.95 in 2009 and 0.6 in 2013 indicate that the expectations to use savings in the saving option to deal with the highest risk are on average perceived to be high.

On the decision maker attributes, the average age was 37.20, 40.17 and 37.21 years in 2006, 2009 and 2013, respectively. In all the three periods, the proportion of females was higher at 61% in 2006, 62% in 2009 and 64% in 2013. Primary school is the average level of education completed. This indicates low education level in all the three periods. The average income in 2009 was Ksh. 15,784 and Ksh. 10,922 in 2013. The respondents living in urban areas were less than 50% at 33%, 29% and 39% in 2006, 2009 and 2013 respectively. Majority of the respondents were married i.e. 65% in 2006, 68% in 2009 and 72% in 2013. Lastly, the average number of dependants was 2.59, 2.03 and 4.40 in 2006, 2009 and 2013, respectively.

4.2. Estimation Results

This study analyzes the institutions' effect 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 regression results from the three data sets are presented in appendix 1. A post-estimation diagnostic Wald test was done to determine the model's fitness. The Wald test results are presented in Table 3.

Year	2006		2009		2013	
	Chi2	Prob>chi2	Chi2	Prob>chi2	Chi2	Prob>chi2
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

Table 3: Wald Test for Independent Variables: Multinomial/Conditional Probit Model Estimates for Saving Option

Ho: All Coefficients Associated with Given Variable(S) = 0

Source: Author's Calculations

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

significant. Therefore, the Wald test results in Table 3 confirm 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

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***	-	-	-0.0009	-0.003	-	-0.05***	-	-	-
MFIs	-0.0002	-	-0.0009	0.0005	-	0.02***	-0.0002	-	-0.008**	0.0008	-	0.013**
Ascas/Roscas	-0.003	-	-	-	-	-0.008**	0.010	-	0.125***	-0.006	-	-0.072
Saccos	-0.0008	-	-0.013**	-	-	-0.009*	-0.006	-	-	0.007	-	0.09***
Trust												
Bank	0.10***	0.04***	0.10***	-0.004	-0.0002	-0.002	-	-	-0.08***	-	-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	-	-0.02
Ascas/Roscas	-	-	-0.08***	-0.006	-0.003*	-0.014**	0.23***	0.06	0.22***	-	-0.02***	-
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	-	-	-0.0004	-	-0.0094	-0.0173	-	-0.0001	-0.0048
MFIs	-	-	-0.0003	-	0.0008	0.007	-	-0.0007	-0.003	-	-	-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	-	-	-0.003	-	-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	-	-	-	-	-	-	-	0.09***	0.62***	-	-0.03***	-
Saccos	-	0.055***	0.223***	-	0.004**	0.037***	-	-	-	-	0.03***	0.36***
Saccos	-	-0.0007	-0.062**	-	-0.0001	-0.043	-	-	-0.36***	-	-	0.46***

Table 4: Saving Option Multinomial Choice: Institutional Factors' Marginal Effects for Multinomial/Conditional Probit Model
 ***, ** and * Denotes Statistical Significance at the 1%, 5% and 10% Levels Respectively. - : Means Data Missing
 Source: Author's Calculations

On institutional factors, the results on travel cost, interest rate, trust and expectations show a statistically significant relationship with the choice of a saving option as anticipated. The results on information are however not statistically significant. A perceived high travel cost to access a saving option reduces the probability to choose the option. The result shows that whenever the travel cost to get to the nearest bank is perceived to be high instead of low, the probability of choosing banks decreases by 10% and 31% in 2009 and 2013, respectively. However, the cross effect shows that the probability to choose Ascas/Roscas will increase by 10% in 2009 and 24% in 2013. The probability to choose Saccos also increases by 7% in 2013.

Whenever an individual perceives the travel cost to get to the nearest MFI to be high instead of low, the probability to choose MFIs reduces by 1% and 9% in 2009 and 2013 respectively. This increases the probability of choosing Ascas/Roscas by 1% in 2009 and 4% in 2013. Similarly, whenever an individual perceives the travel cost to get to the nearest Ascas/Roscas as high instead of low, the probability of choosing Ascas/Roscas reduces by 16% and 66% in 2009 and 2013 respectively. In the same period, the probability of choosing banks will however increase by 10% and 24%. The probability to choose MFIs will also increase by 0.8% in 2009 and 4% in 2013. In addition, the probability to choose Sacco also increases by 5.6% and 38.2 % in 2009 and 2013 respectively. Lastly, whenever an individual perceives the travel cost to get to the nearest Sacco to be high instead of low, the probability of choosing Saccos decreases by 6% and 49% in 2009 and 2013 respectively. The probability to choose other options increases correspondingly. The probability to choose banks increases by 6.5% in 2013. Also, the probability to choose Ascas/Roscas increases by 6% and 38% in 2009 and 2013 respectively.

The results in Table 4 show that the interest rate on savings affects the choice of a saving option. The probability of choosing banks increases by 6% in 2013 whenever an individual perceives interest rate on savings in banks to be high instead of low. Conversely, the probability of choosing AscAs/RosCAs and SaccOs declines by 4.5% and 1.3% respectively. The results also show that when the perception on interest rate on savings in MFIs is high instead of low, the probability of choosing MFIs increases by 2% in 2013. In contrast, the probability to choose AscAs/RosCAs and SaccOs reduces by 0.8% and 0.9% respectively. When an individual perceives interest rate on savings in AscAs/RosCAs to be high instead of low, the probability of choosing AscAs/RosCAs will increase by 12.5% in 2013. The probability to choose banks, MFIs and SaccOs correspondingly reduces by 5%, 0.8% and 7.2% respectively. Finally, whenever an individual perceives interest rate on savings in SaccOs to be high instead of low, the probability of choosing SaccOs increases 9%. The probability to choose banks and MFIs will also decline by 1.3% and 0.9% respectively.

The results also show that trust has an effect on the choice of a saving option. Whenever the trust in banks is perceived to be high instead of low, the probability of choosing banks increase by 10% in 2006, 4% in 2009 and 10% in 2013. In the same period however, the probability to choose AscAs/RosCAs will reduce by 7.8%, 3.8% and 8% in 2006, 2009 and 2013, respectively. The probability of choosing SaccOs also reduces by 2% in 2006 and 2.2% in 2013.

The probability of choosing MFIs increases by 1% in 2006, 0.3% in 2009 and 3% in 2013 when the trust in MFIs is perceived to be high instead of low. In contrast, the probability to choose AscAs/RosCAs reduces by 0.3% in 2009 and 1.4% in 2013. When the trust in AscAs/RosCAs is perceived to be high instead of low the probability of choosing AscAs/RosCAs increases by 23% in 2006 and 22% in 2013. Conversely, the probability to choose banks decreases by 7.8% in 2006, 3.8% in 2009 and 8% in 2013. Similarly, the probability to choose MFIs declines by 0.3% in 2009 and 1.3% in 2013. The probability to choose SaccOs also declines by 15%, 2% and 13% in 2006, 2009 and 2013, respectively. Lastly, the probability to choose SaccOs increases by 17% in 2006, 2% in 2009 and 17% in 2013 when the trust in SaccOs is perceived to be high instead of low. However, the probability to choose other options reduces. The probability to choose banks reduces by 1.7% in 2009 and 2% in 2013. Also, the probability to choose AscAs/RosCAs reduces by 15%, 2% and 13% in 2006, 2009 and 2013 respectively.

According to the results in Table 4, saving expectations affect the choice of a saving option. When expectations to use savings in the bank to deal with the highest risk is perceived to be high instead of low, the probability of choosing banks increases by 6% in 2009 and 29% in 2013. The probability to choose AscAs/RosCAs correspondingly declines by 5.5% and 22.3% in 2009 and 2013, respectively. Also, the probability to choose SaccOs declines by 6.2% in 2013. Likewise, perceiving expectations to use savings in the MFIs to deal with the highest risk to be high instead of low increases the probability of choosing MFIs by 0.5% in 2009 and 8.6% in 2013. However, the probability to choose AscAs/RosCAs declines by 0.4% and 3.7% in 2009 and 2013, respectively. In 2009 and 2013, when expectations to use savings in the AscAs/RosCAs to deal with the highest risk are perceived to be high instead of low, the probability of choosing AscAs/RosCAs increases by 9% and 62%, respectively. Conversely, the probability to choose banks reduces by 6% in 2009 and 22% in 2013. Also, the probability to choose MFIs reduces by 0.4% and 3.7% in 2009 and 2013 respectively. In 2009 and 2013, the probability to choose SaccOs also reduces by 3.1% and 36%, respectively. Lastly, when expectations to use savings in SaccOs to deal with the highest risk is perceived to be high instead of low, the probability of choosing SaccOs increases by 3% and 46% in 2009 and 2013, respectively in contrast, the probability to choose banks declines by 6% in 2013. Also, the probability to choose AscAs/RosCAs reduces by 3% and 36% in 2009 and 2013, respectively.

These results correspond to the institutional theory of saving which advances access to saving services, incentives and expectations as important institutional constructs predicting saving behavior. As predicted, travel cost, interest rate, trust and expectations have a statistically significant relationship with choice of banks, MFIs, AscAs/RosCAs, and SaccOs. These results are also consistent with the findings of other studies including Kiiza and Pederson (2002), Ouma and Rosner (2003) and Mbutia (2011). The implications of these results are that institutional factors such as travel cost, interest rate on savings, trust and expectations influence the choice of saving options in Kenya.

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

Table 5: Saving Option Multinomial Choice: Decision Maker Attributes' Marginal Effects for Multinomial/Conditional Probit Model

***, ** and * Denotes Statistical Significance at the 1%, 5% and 10% Levels Respectively - : Means Data Missing

Source: Author's Calculations

The decision maker attributes' marginal effects on the choice of a saving option are shown in Table 5. Only income, education level, gender, number of dependants and region affect the choice of a saving option. A one shilling increase in income beyond Ksh. 15,783.80 in 2009 and Ksh. 10,921.61 in 2013 increases the probability to choose banks by 1.1% and 3.4%, respectively. Also, a one shilling increase in income beyond Ksh. 15,783.80 in 2009 and Ksh. 10,921.61 in 2013 increases the probability to choose Saccos by 0.4% and 2.9%, respectively. However, a one shilling increase in income beyond Ksh. 15,783.80 in 2009 reduces the probability to choose Ascasc/Roscasc by 2%. These results agree with Carpenter and Jensen (2002) who indicate that as income increases, individuals shift more towards formal savings options. Ouma and Rosner (2003) also found that the probability of SMEs proprietors to save with informal savings options declines with increasing income. Mbuthia (2011) also indicates that the income level has a positive effect on the choice of formal saving options.

As the educational level increases, the probability to save in banks increases but the probability to save in Ascasc/Roscasc declines. An increase in one level of education beyond the primary level increases the probability to choose banks by 12.9% in 2006 and 3.4% in 2009. An increase in one level of education beyond the primary level however, reduces the probability to choose Roscasc/Ascasc by 17% in 2006 and 3.2% in 2009. With a higher level of education, one is likely to earn more leading to an increased income. This increase in income increases one's probability to choose formal finance rather than informal finance (Carpenter and Jensen, 2002; Ouma & Rosner, 2003; and Mbuthia, 2011).

On gender, the results in general indicate that compared to males, females have a lower probability of choosing banks and Saccos but have a higher probability of choosing Ascasc/Roscasc. In 2006, 2009 and 2013, a female's probability to choose banks was lower than that of a male by 6%, 6% and 10%, respectively. Also, in 2006, 2009 and 2013, a female's probability to choose Saccos was 9%, 2.7% and 9% respectively lower than that of a male. However, a female's probability to choose Ascasc/Roscasc was higher than that of a male by 16% in 2006, 8.8% in 2009 and 18% in 2013. These results are consistent with other studies. Mbuthia (2011) showed that being a male had a positive effect on choice of formal finance. Anderson and Baland (2002) also find that informal finance (e.g. Roscasc) participation is higher among women than men.

An increase in one dependant beyond 2.6 dependants increases the probability of choosing banks by 2.2% in 2006. The results on the choice of Ascasc/Roscasc are mixed. While an increase in one dependant beyond 2.6 in 2006 reduces the probability of choosing Ascasc/Roscasc by 4.1%, an increase in one dependant beyond 2 dependants in 2009 increases the probability by 1.6%. Though results on Ascasc/Roscasc are mixed, households with more dependants are less likely to save with Ascasc/Roscasc 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 & Rosner, 2003).

Urban residence is associated with a higher probability of saving in banks. The results show that in 2006 and 2009 urban residents' probability to save in a bank was higher than that of rural residents by 9.6% and 2%, respectively. Though the urban residents' probability to save in Saccos was 5% in 2006 higher than that of rural residents, it was in 2009 lower by 1.3%. However, the urban residents' probability to choose Ascasc/Roscasc was 16% lower than that of rural residents in 2006. Location in urban area positively affects the choice of a formal saving option because formal finance is more predominant in urban than in rural areas. (Atieno, 2001).

5. Conclusions and Policy Implications

The study establishes that institutions influence the choice of saving options in Kenya. A perceived high travel cost to access a saving option reduces the probability to choose the option. The results show that the interest rate on savings affects the choice of a saving option. The probability to choose the option increases whenever the interest rate on savings in it is perceived to be high instead of low. The results also show that trust in a saving option has an effect on the choice of the saving option. Whenever the trust in a saving option is perceived to be high instead of low, the probability of choosing the option will increase. According to the results, saving expectations affect the choice of a saving option. When the expectation to use savings in a saving option to deal with the highest risk is perceived to be high instead of low, the probability of choosing the option will increase.

On decision maker attributes; income, education level, gender, number of dependants and region affect the choice of a saving option. An increase in income increases one's probability to choose a formal saving option (banks and Saccos) rather than an informal saving option (Ascasc/Roscasc). Also, as the education level increases, the probability to choose a formal saving option (banks) increases but the probability to choose an informal saving option (Ascasc/Roscasc) declines. On gender, the results in general indicate that compared to males, females have a lower probability of choosing formal saving options (banks and Saccos) but have a higher probability of choosing informal saving options (Ascasc/Roscasc). On dependants, an increase in one dependant increases the probability of choosing a formal saving option (banks). At the same time, an increase in one dependant may increase or reduces the probability of choosing an informal saving option (Ascasc/Roscasc). Though these results are mixed, households with more dependants are less likely to save with informal saving option and more with formal saving 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. Urban residence is associated with a higher probability of saving in formal options especially the banks. This is because formal finance is more predominant in urban than in rural areas. The finding of this study imply that institutional factors influence households' saving behavior especially their participation in the savings options. Consequently, easing access of savings options, motivating households through incentives, making

households more informed of their saving choices and opportunities, and offering financial literacy to households on saving goals and targets are all significant in increasing households saving participation in Kenya.

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Appendix
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 dependents	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 dependents	-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)
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)
Variables	2006	2009	2013
Marital	0.2551 (0.213)	0.0395 (0.180)	-0.1252 (0.221)
Number of dependents	-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

Table 6: Base category is Banks option

***, ** and * denotes statistical significance at the 1%, 5% and 10% levels respectively - : Means data missing

Standard errors in parenthesis

Source: Author's calculations