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FINANCIAL LITERACY AND HOUSEHOLD SAVINGS IN KENYA

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ABSTRACT

Kenya has made significant progress towards access of financial services with the hope that increase in financial access would certainly raise household savings. Despite the significant progress made by the Kenyan government towards improvement in financial access and becoming highly inclusive compared to most Sub-Saharan African counties, the gross domestic savings as a percentage of Gross domestic product (GDP) has declined continuously from 8.231% in 2016 to 4.4451% in 2019 (World Bank). Given the current financial markets situations in Kenya and across the world, serious concerns have been raised concerning household's financial literacy. The development and widespread of financial service providers have certainly left households with a confusing wide range of investment and financial choices that ought to be selected. This therefore implies that more focus should be directed on how well-equipped individuals are in making financial decisions relating to savings and other investments. The study aimed to investigate the effects of financial literacy on Kenya's household's savings, to establish the level of financial literacy of Kenyan households and lastly, to explore other factors that affect savings among households in Kenya. Probit regression analysis on Kenya Fin access national household survey 2019 was carried out. The study points out that Kenyan households possess very low scores in relation to financial literacy with approximately 49.25% of individuals using their savings to repay available loan. Females, individuals aged 60 years and individuals with no education are less financially informed. Moreover, the households earning high monthly income and those located in urban areas are highly financially informed compared to those that earn low monthly income and located in rural settings. The estimates showed that household's financial literacy positively and significantly correlates with household's savings.

Key Words: *Financial literacy, financial illiteracy and Household savings.*

INTRODUCTION

Amidst the covid-19 crisis and the current economic situations in Kenya and across the world, serious concerns have been raised concerning household's financial situation. This is especially due to disruption in business, extensive income and job loss experienced by most individuals. More emphasis has been placed on citizens who are not well skilled to be able to withstand current economic market pressure and are less likely to take advantage of economic upsurges. Households have been urged to take serious responsibilities for a vast of majority of financial decisions they make on daily basis. The most important of these decisions being on how much they should save and how to allocate such savings for current consumption, future consumptions, emergencies and cases of economic crisis. It is very unfortunate many countries across the globe still experience widespread poor financial decisions and in cases of crisis, household's financial vulnerabilities are laid bare.

Lusardi & Mitchell, (2014) terms financial literacy as the capacity of an individual or household to understand the economic information and be able to make informed choices about their wealth accumulation, planning for finances, debt management and saving for their future. Financial literacy mostly relates to individual financial decisions, understanding concepts of time value of money, interest rates, savings, liabilities, and assets. Financial literacy can be further viewed as the extent to which an individual or organization can be able to undertake basic money demands and making choices in meeting their daily, midterm and long-term household needs (cole, sampson & Zia ,2011)

Financial literacy of individuals has been estimated to have an impact on the financial decisions of households. Studies indicate that households with low financial literacy have very low probability of planning for their retirement (Lusardi, Mitchell, 2007), they tend to have high debts since they borrow finances at higher interest rates (Stango & Zinman, 2007) they have little savings and rarely diversify (Van Rooij, AnnMaria Lusardi & M.Alessie, 2012). On the other end, households who are financially literate have high household wealth accumulation (Lusardi & Alessie, 2012) and have higher savings (japelli and Padula, 2012).

Financial institutions are important in provision of financial products and services to the households (Todaro and Smith, 2005). In Kenya, to reduce poverty, access to financial products and services have been incorporated as an important tool for development. Kenyan government through the Central Bank of Kenya (CBK) has undertaken various initiatives to enhance financial access including working with the commercial banks in developing an outline in which banks would carry on agent banking such as KCB Mtaani agents, Cooperative bank agents and Equity agents. These agents have enabled banking services to be easily accessed by every household including those living in rural areas. Introduction of mobile phone-based banking services and products by the commercial banks such as Timiza, M-Coop Cash, HFWhizz, M-Shwari, T-Kash and Eazzy loan have also been a major progress towards financial access.

Access to financial products and services by households positively affect country's economic growth. Financial access enhances savings, promotes entrepreneurship and household investments due to increased financial liquidity (Dupas and Robinson, 2013). Further, Access to financial products and services reduces poverty due to increased trading size. Therefore, households consumption and general welfare will be improved (Demirguc-kunt, 2008; World Bank, 2008, Todaro and Smith, 2005; World Bank, 2017).

The 2019 Kenya FinAccess national household survey findings clearly show that Kenya has made significant progress towards Access of financial services. The survey revealed that access of formal financial services increased from 75.3 % in 2016 to 82.9 % in 2019 while financially excluded population significantly reduced from 17.4% in 2016 to 11.0 % in 2019. On the other hand, those citizens who were using the informal sector services reduced from 7.2% in 2016 to 6.1% in 2019. On the aspect of usage dimension, the Kenya 2019

FinAccess survey indicates that mobile money recorded the greatest increase in usage among Kenyan population at 79.4% in 2019 serving roughly 19.9 million adults of the 25.1million adults who were analysed. MFI's and Informal group financial service providers recorded a drop in their usage to 1.7% and 30.1% respectively. This drop could be attributed to increase in uptake of mobile money financial services and digital loan apps. Improved government initiatives on health care led to an increase in NHIF usage from 23.2% in 2016 to 29.1% in 2019.

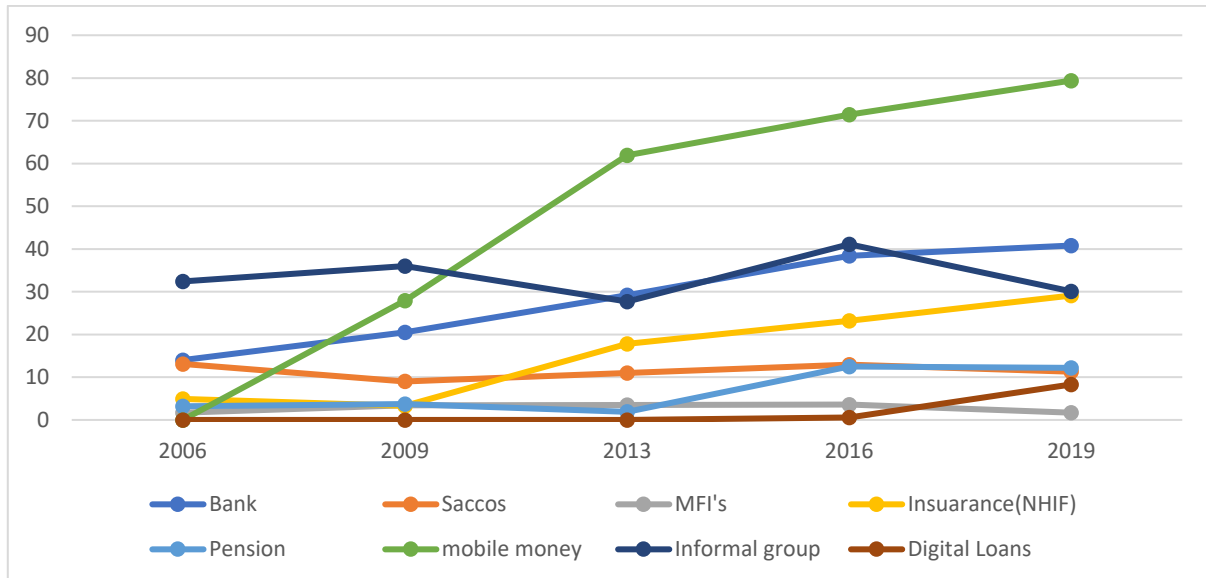


Figure 1: Usage of financial service providers from 2006-2019 (%)

Source: Fin Access national household survey report 2019

Kenya is categorized highly in financial inclusion compared to most sub-Saharan African Countries such as Rwanda, Namibia, Cameroon, Tanzania, Nigeria and Uganda. The finscope surveys for Kenya, Namibia, Cameroon, Rwanda, Tanzania, Nigeria and Uganda indicate that, formal financial access in Kenya was 82.9% in 2019, while formal financial inclusion in Rwanda as at 2016 was 68%. Further, formal inclusions in Namibia, Cameroon, and Nigeria were 73%, 49% and 48.7% respectively. In Tanzania, formal financial inclusion was recorded to be 65% while Uganda recorded the lowest level of formal financial inclusion in East African region at 58%. This generally implies that Kenya is expected to record highest level of savings as a percentage of GDP compared to Namibia, Cameroon, Rwanda, Tanzania, Nigeria and Uganda since improved financial inclusion would enhance more saving channels.

Household savings, corporate savings and government savings play a major role in improving economic growth of a country. For a country to have a long-term economic growth and development, one of the most important strategy should be mobilization of savings locally so as to generate more capital for investment (Rostow, 1960, Romer, 1986, Ahmad, 2001, Solow 1956). Savings increases the opportunities for households to smoothen their consumption and finance their education and health services (Gersovitz, 1988; Goldberg, 2014, Prina, 2015). Savings further enables households to fund small scale businesses and protect individuals against vulnerability later in life. Nationally, savings contributes to capital accumulation directly hence supporting other sectors such as manufacturing sector, health sector, infrastructural sector and housing sector thus affecting the economic growth of a country positively.

Despite the significant progress made by the Kenyan government towards improvement in financial access, becoming highly inclusive compared to most Sub-Saharan African countries, the gross domestic savings as a percentage of Gross domestic product (GDP) has declined continuously from 8.231% in 2016 to 4.4451% in 2019 according to 2016 and 2019 World Bank indicators. Consequently, savings as a percentage of GDP in Kenya represents a relatively low value compared to other countries in Sub-Saharan Africa countries such as

Rwanda, Namibia, Cameroon, Tanzania, Nigeria and Uganda whose mean savings as a percentage of GDP are 12.746 %, 4.388%, 18.156%, 32.059 % as at 2017, 19.834% and 19.677% as at 2019 respectively.

Due to low saving rates in Kenya, the government opt to finance most of their investments through foreign funding inform of loans and grants. Despite the huge amount of funding that the Kenya government receives, the impact of these funding on investment in Kenya has been very minimal. The low impact of foreign Aid is highly due to, mismanagement of funds through corruption as well as inadequate legal and policy framework in the use of this funds.

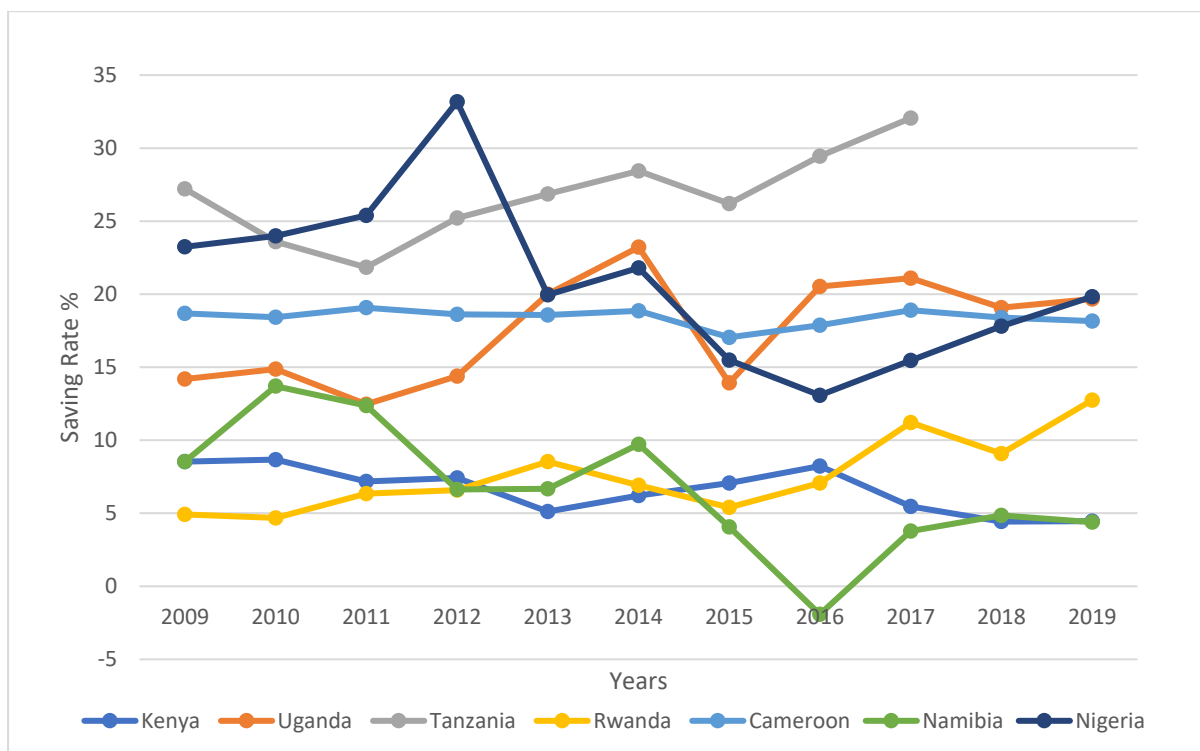


Figure 2: Savings as a percentage of GDP in sub-Saharan African countries

Source: World Bank indicators, 2009-2019

Savings as a percentage of GDP trend in Kenya indicates that access to financial products and services doesn't necessarily yield the development gains on savings as hoped by the Kenyan government policy makers. This highlights missing link exists between financial access and savings of households in Kenya implying that there is more to improving financial inclusion and development of financial sector. More focus should be directed on how well-equipped individuals are in making financial decisions relating to savings and other investments. Do Kenyan citizens possess sufficient financial literacy? Are individuals aware about the importance of household savings?

Amidst current developments in the financial markets, concerns have been raised about over-indebtedness of Kenyan individuals due to easy access to digital credit via unregulated mobile loan apps such as Branch, Tala, Mshwari and Fuliza. In addition, extensive listing of the Kenyan individuals to the Credit Reference Bureaus (CRB) shows the difficulty that many individuals experience in paying their loans. Technological development in financial markets have certainly left households with a confusing wide range of investment and financial choices that ought to be selected making households persistently rely on informal groups for financial services. It has now become very important for every Kenyan individual to be more knowledgeable and competent in administering their finances. In reference to that, this study therefore focused on individual financial literacy and its effect on household's savings decisions in Kenya.

Significant discussions continue to emerge concerning the role financial literacy plays in the economy and the challenges financial illiteracy signify. According to FinAccess household 2019, Kenya recorded an expansion in formal financial access from 75.3% in 2016 to 82.9% in 2019. Kenyan policy makers hoped that household's savings will improve as development in access of the financial services will enhance more savings channels, but this was not the case. Kenya still experiences low level of savings. This demonstrates that the issue to be addressed is not a problem of financial service and product access but rather a matter of the financial decisions that individuals are making while using the available financial products and services. The expected positive effect of access to financial products and services on savings rates will depend on financial literacy of individuals in the household. Unfortunately, research on role financial literacy is very scarce especially in developing countries.

Having an account at the bank, accessing credit using mobile money digital applications and accessing other financial products and services such MFI's, Saccos, Insurance and informal groups is an important step in engaging the financial markets, but this should not be an end to itself but rather means to an end (Demirguc-Kunt,2018). Unless Kenyans have the necessary skills relating to interest rates, transactions cost, savings, money management and risk diversification, these opportunities of access of finances can certainly lead to a financial disaster e.g., insolvency, higher debt, and mortgage defaulting. This is particularly true for the youth, the poor and women who are frequently the target by the Kenyan government when executing financial accessibility and availability programs.

Literature in Kenya on the effects financial literacy has on household's decision to save is very scarce. Most studies mainly focused on the impact that financial literacy has on personal financial management, retirement planning and entrepreneurial success. Most studies done on household savings in Kenya have ignored the effect that financial literacy has on household's decision to save. Kiptanui, (2017) using a sample size of 255 pensioners in Nyahuru town, Laikipia county, investigated the effect financial literacy has on pensioner's retirement saving. The findings of the study cannot however be generalized to represent the national population case since study emphasised on retirement security and the sample was restricted to a particular age bracket, that is, above 20 years and below 60 years. From the assessed literature, no nationally comprehensive research has been conducted on financial literacy and its impact on household's decisions to save in Kenya. This study therefore did investigate important factors that thereby influences savings among Kenyan households with special emphasis on household financial literacy using cross sectional data from Kenya National FinAccess 2019 data.

LITERATURE REVIEW

Theoretical literature

The life Cycle saving theory

Life cycle hypothesis was adopted by Ando and Modigliani (1963). This theory still explores the consumption function but in this case it assumes that the natural changes in income in a defined time period. The theory postulates that income growth is the main determinant of household savings behaviors. Households or individuals plan their consumption expenses to be permanently the same across all periods in their lives thus the marginal utility of expenses on consumption is equalized throughout their life. According to Life cycle hypothesis, lifetime of an individual has been divided into three periods categorized according to age. The three periods are; youth time (young individuals), middle time (working period) and old age period (retirement period).

The young individuals do not have a stable source of income since most of them have not been employed, they borrow to finance their basic needs and finance their education and will therefore save very little amount of money in case there is any money left. As they grow older, the youth will most likely get employed or run their own businesses and therefore income would increase compared to their expenses. It is at this time that savings

with be at the highest rate. They would use some of the savings to pay for the borrowed funds during their unemployed period and keep the other amount to be used during retirement. After retirement the individual's savings reduces and they start to dissave from funds saved during working period. Overall, the lifecycle hypothesis postulates that age and the income level of individuals determines household savings.

Financial literacy theory

Evans (2008) acknowledges that financial behaviour and decisions of an individual is influenced by intuition process of thinking (system 1) and cognitive thinking (system 2) as explained by the theory of dual-process. Stanovich & West (2000) further explains that, in order to implement any financial decisions this process of thinking is very important. Intuitive process (system 1) can be explained as being fast, associative, informal and involuntary (Gilinsky and Jude, 1994). Cognitive process is characterised as being conscious. The individual is very much aware of it hence very slow, voluntary, and deliberate (Stanovich & West, 2000). System 2 requires the individual to use financial knowledge acquired to think critically and they should be rational. Understanding of financial products and services will be replicated in individual's confidence when making financial decisions in system 2. This is in line with a two- period model developed that by Japelli & Padula (2013), investing on financial literacy informs the individual resulting in better financial decision relating to investments and individual savings. Further, Van Rooij (2011) depicts that financial informed households are associated with higher level of households wealth and savings. In submission to this it can be explained that if a household invests in financial education such household will most likely make better choices with regards to savings.

Relative Income hypothesis

The Relative Income hypothesis was put forward by an American economist Deusenberry J.S (1949). The theory was an attempt to offer a solution to the conflicts and inconsistencies present in the Keynesian's Absolute income hypothesis theory. Deusenberry (1949) argues that the average percentage of income that is consumed remains the same in the long run but there may be alterations between income and consumption in the short run. Households with relatively low incomes when compared to other members in the society will therefore record very low savings. Low-income households will still be consuming the same percentage of their income to meet their basic needs and still ensure that they are living in the same lifestyle standards as the rest of the members in the society. When the income of household's falls, their consumption level does not reduce much, this is mainly because households are accustomed to previously high level of consumption. Households would try maintaining this high level of consumption to protect their image in the society. This theory generally indicates that savings in households will be dependent on relative income rather than current income.

Permanent Income hypothesis

Friedman (1957) later came up with the new thinking referred to as Permanent Income hypothesis (PIH) to further improve previous thinking by the Keynesians. Friedman (1957) suggested that an individual consumption behaviour is strongly dependent on Permanent income rather than depending upon absolute or relative income. Permanent income in this case was considered by Friedman (1957) as the average amount of wealth that the household expects to have in their entire life. Permanent income hypothesis therefore in this case takes into consideration long time expectations. This theory assumes that the level of consumption of the household is sustained perfectly over the period planned by apportioning the given amount of wealth equally in each period. This theory therefore estimates that increase in savings will be due to increase in positive transitory income of households. Savings of individuals or households hence increases when the transitory income is high.

Empirical literature

Different researchers indicate that financial literacy is generally very low in most countries thus affecting the level of household's savings and wealth accumulation. Klapper, Lusardi & Oudheusden (2015) conducted a world-wide survey to measure the level of financial literacy around the world. Using a sample of 150,000

individuals selected randomly aged 15 years and above, the survey revealed that the world suffers from low financial literacy levels. Worldwide, only one out of every three individuals are financially literate. The study further estimated that, women, the less educated and the poor respondents have a higher probability of suffering from financial knowledge gap in both developed and developing countries and recorded lower level of savings. Individuals who had access to formal financial products and services recorded higher levels of financial literacy compared to those who had the lowest chances of accessing available formal financial services.

Beckmann (2013) analysed the relationship existing between financial literacy and household's savings in Romania using a cross sectional data from the Euro Survey Austrian Central bank. The study developed household's savings being a function of variables as Age, financial literacy, gender, income, education, and household size. Study results revealed that, financial literacy is significant and positively influences household's decision towards saving. Education, marital status and household size positively affected household savings. The study further revealed that women had lower level of financial literacy and recorded lower level of savings compared to men. Age was not significant in determining the level household's savings.

In a different study, Klapper & Panos (2011) analysed the association existing between individual financial literacy and household's plan on retirement in Russia. After controlling for age, education, Gender, Income, Marital status, labour market and household size, the results from estimated Ordinary least Squares (OLS) indicated that individual financial literacy positively impacts on the saving behaviour of households. Regarding the sociodemographic variables, Age and education were not significant in determining household savings while the level of income was significant in determining household savings. The study further revealed that, larger households saved more compared to smaller households, employed individuals were less likely to save compared to self-employed individuals.

Taofika (2015) conducted an analysis to understand the relation of fishermen financial literacy and fishermen household's savings in Indonesia. The research used primary data sampling 258 households aged between 25 to 50 years. Financial literacy was the only independent variable used to model household saving. Using logistic regression analytical tools, the results indicated that financial literacy played a major part in determining the saving behaviour of fishermen households. The study further revealed that only 15% of the fishermen in Indonesia were financially literate and they had savings account. However, the result from the study could be misleading since the study ignored the effect of sociodemographic characteristics which is very important when developing household's savings function.

In a related study, Jonubi & Abad (2013) conducted a survey to examine the factors that would determine the saving behaviour of individuals in Klang Valley Malaysia with the focus on financial literature. The survey used primary data collected from a sample of 200 respondents. Using Probit regression, the results indicated that financial literacy positively determined the level of individuals savings. Individuals who were more informed about finances saved more compared to individuals who were financially illiterate.

Lusardi & Olivia (2011) conducted a study to estimate the role financial knowledge play in retirement planning of the elderly in the United States. The study used secondary data from health and retirement survey to conduct their analysis. To measure financial literacy, basic financial concept questions regarding inflation, compound interest and stock risks were asked. The independent variables used to model retirement planning were financial literacy, level of education, ethnicity, and sex. The study showed that individuals who were financially informed had higher chances of planning for retirement therefore they accumulated more wealth in future. Women were less likely to save compared to male. Hispanics were less likely to correctly answer financial literacy questions and they were less likely save.

In a related study, using logit regression analysis, Mbuthia (2011) conducted a research to determine the factors that affect household's decision to save either in formal, informal or in semi-formal financial institutions in Kenya. The study revealed that, the level of household income was the main determinant of households saving

in Kenya. The age of the household head, transaction cost, education level and bank density positively influenced saving decisions of households in Kenya. The study further revealed that, households' expectations about the future and their perception about interest rate were not a significant factor in determining households saving. Contrary to the other researchers, education was negatively correlated with household's decision to save. The study revealed that advancement in education increases expenses and also increases the dependency ratio hence reducing household savings. However, this study ignored the impact of financial literacy when developing the households saving function.

Using Probit regression analysis, Kibet et al (2009) while determining savings behaviour of households in Nakuru county Kenya found out that, households that were headed by men saved more compared to female headed households. The level of income, access to credit and the level of education of individuals had a positive significance on household savings. Study further revealed that individuals who are running business saved more compared to those in teaching profession and those that engaged in farming. However, like Mbuthia (2011), the research did not include financial literacy while modelling saving performance of households.

Additionally, Schützeichel (2019) emphasizes on the significance financial literacy play when households plan for retirement. In her study to analyse the effect of financial literacy specifically on saving for retirement in Kenya, Schützeichel (2019) used secondary cross-sectional data from 2016 national Finaccess household survey. Employing probit regression, the study revealed that, financially informed individuals were possibly more likely to save for their retirement compared to individuals who were financially illiterate. Additionally, the study revealed that income and household residence were significant in determining household's savings for retirement. The age of the respondent was significant though it was negatively correlated to saving for retirement. Conflicting with other researchers, gender and the level of education insignificantly determined the behaviour of households saving for retirement.

Using Secondary data from 2018 Malawi financial literacy and consumer protection household survey, Namate (2020) conducted a research to evaluate the determinants of household financial literacy and the association of the household financial literacy with saving behaviour of households in Malawi. Employing probit regression, the study revealed that financial literacy positively affected household's savings. Individuals living in urban areas, married, and educated recorded high financial literacy and had high probability of savings. Like most researchers, men were more informed in matters relating to finances compared to women. The study further revealed that those individuals who had a bank account and those that belonged to a saving group had higher chances of saving.

Cole, Sampson & Zia, (2011), conducted a research to explore the role financial literacy play in relation to savings in India and Indonesia. The study specifically focused on bank savings accounts. Using secondary data, individuals questioned on compound interest, inflation and time value of money. Results from both countries indicated that financial literacy is highly correlated with financial individual behaviour. Improvement in financial literacy led to higher chances of opening bank accounts.

Similarly, in understanding financial literacy and savings decisions of adult individuals in Zimbabwe, Murendo, C. & Mutsonziwa (2017) used cross sectional data from Finscope Consumer survey sampling 4000 individual who were above the age of 18years. The study modelled the saving behaviour of individuals in Zimbabwe as a function of ;Financial literacy, Gender, household size, Age, Age squared, location(rural or urban), education level, the head monthly income, information access (Radio, television ,mobile phone ownership,) and access to financial services and products(use of mobile money, saving in society club, saving account at the bank).Employing probit regression, the study explains that, adult financial literacy positively impacted on the individuals savings behaviour. Access to information, financial products and services also positively impacted on household savings. Individuals living in rural areas in Zimbabwe were observed to have lower savings as compared to those in urban areas. This was attributed mainly due to lower access to financial services and lower literacy levels at the rural area. In line with other researchers, the study also found out that women were not

very conversant with financial terms hence had lower savings compared to men. Contrary to other researcher, the study revealed that larger the household size recorded lower savings.

In a similar study, Manaba.Y, H.Funda and Ömer (2017) conducted a research to estimate the impact that financial literacy has on Usak university staffs personal savings in Turkey. The independent variables used to model personal savings were financial literacy, age, and risk tolerance, number of children, gender, employment terms and educational department. The study employed logistic analysis and found out that financial knowledge, education level of the individual, individual gender and age of the staff had positive impact on personal savings. Household's number of children, education department and term of employment was insignificant to personal savings of the university staff. Further the study showed that low risk tolerance individuals made more savings. Sayinzonga et al (2016) conducted a research to determine the correlation between financial training and financial behaviour of small-scale farmers in Rwanda. Using a two-stage regression structure, the study found out that financial training improved farmers savings behaviour. Financial training had also caused significant changes to farmers borrowing behaviour. However, the study indicated that financial training did not have an impact on farmer's income levels.

In another study, Kiptanui, (2017) analysed the association of pensioners' financial literacy and the pensioners' retirement savings in Nyahururu, Laikipia county. The study used primary quantitative data from a sample of 255 Pensioners. The independent variable used in the study were, financial literacy, gender, age, income level, education level, time value, interest rate, interest rate and gender. Adopting descriptive research design, the study found out that financial literacy positively affected the level of retirement savings among Pensioners. The study further revealed that age, income level, and education was significant in determining saving for retirement. Conflicting with other researchers, Irene (2017) found that gender was not significant in determining retirement saving for pensioners.

Prusty (2011), conducted a research to explore impacts of working individual financial literacy generally on their respective household's savings in India. The study used primary data from 5500 individuals aged between 50 and 55 years. The study results obtained revealed significant positive effect of financial literacy on savings of the working individuals.

A review of the empirical literature indicates that most countries across the world suffers from low financial literacy levels. Financial literacy deficiencies have been observed mostly in a particular group of individuals. Women, individuals with low levels of education and the poor who are mostly vulnerable in cases of crisis exhibit low financial literacy.

METHODOLOGY

Theoretical Framework

Theoretical framework in the study was based on the theoretical model developed by Japelli and Pedulla (2013). The model integrates financial literacy to intertemporal choice model. The theory of utility maximization is employed by the model where individual's problem in this case is maximizing their savings and individual intertemporal consumption with the assumption that an individual is rational and full informed. The assumption is that consumer's life covers two periods, i.e. period zero and period one. At period zero, Individuals earn income(y) and save and later in the life retire. In the first period, individual own initial stock of financial literacy (Φ_0), however they don't own any asset. The initial stock relates to financial information consumers possess before engaging in the market acquired from parents and friends and depreciates at δ rate.

At period one, individual receives, the interest rate, R , due to the return in savings made earlier. Japelli and Pedulla (2013) posits R as a function of financial literacy since increasing financial information leads to better saving investment opportunities and saves on avoidable costs.

$$R = {}^{\circ}F(\Phi_1) = \Phi_1^{\alpha} \quad (1)$$

α being the return of the financial literacy. Individuals can improve their level of financial literacy in period one by investing in financial education (ϕ). The cost incurred in investment, ρ , relates to both monetary expense and time expense incurred by the individual.

$$\Phi_1 = (1 - \delta)\Phi_0 + \phi \quad (2)$$

Consumers choose investing in financial literacy and savings maximizing their utility function subject to the following budget constraints

$$\text{Max } \ln C_0 + \beta n C_1 \quad (3)$$

Subject to:

$$Y = C_0 + S + \rho\phi \quad (4)$$

$$C_1 = \Phi_1^{\alpha} \cdot S \quad (5)$$

Where, $0 < \beta < 1$ Shows discount factor and S is savings. Maximization problem therefore generates following optimal outcome

$$\Phi_1^* = \frac{\alpha\beta}{1+\beta+\alpha\beta} \left[\Phi_0 (1 - \delta) + \frac{Y}{P} \right] \quad (6)$$

$$S^* = \frac{\rho\beta}{1+\beta+\alpha\beta} \left[\Phi_0 (1 - \delta) + \frac{Y}{P} \right] \quad (7)$$

The solution implies that discount factor and income impacts financial literacy stock positively. High savings is associated with high income, high financial literacy and high discount rate. Savings also is negatively affected by depreciation and the return on literacy.

Rewriting S^* inform of Φ_1^* after solving for Φ_0 in equation 6 illustrates S^* as a linear function of Φ_1^*

$$S^* = \alpha^{-1} \rho \Phi_1^* \quad (8)$$

This case examined highlights high financial literacy results to high savings.

Empirical Model Specification

The empirical model ties those factors that actually affect households saving decisions as mentioned in the empirical literature. Based on the empirical literature; Murendo, C, and Mutsonzwa, K.,2017; Schützeichel, T.,2019; Namate, a. h.,2020; Sayinzoga et al, 2016; Klapper and Panos,2011 and theories explained, the variables included in the regression were; financial literacy, Age, gender, location, marital status, household size, income, Occupation, Education level, Mobile money use, Bank account. Therefore;

$$\begin{aligned} \text{Household Savings} = f(\text{Financial literacy, Age, Gender, Location,} \\ \text{Household Size, Income level, Marital status, Education level, Occupation,} \\ \text{Mobile money, Bank account}) \end{aligned} \quad (9)$$

Specifically the study estimated the following model;

$$S = \beta_0 + \beta_1 FL + \beta_2 A + \beta_3 MS + \beta_4 G + \beta_5 LO + \beta_6 HS + \beta_7 IL + \beta_8 OC + \beta_9 EL + \beta_{10} MM + \beta_{11} B + \varepsilon \quad (10)$$

Where, S is household savings, FL is financial literacy, A, G, MS, IL, EL, HS are the age, gender, marital status, income level, education level and household size of the individuals respectively, LO is the location of the household, MM is Mobile money, OC is occupation, B represents bank ownership and ε represents the error term.

Given the improvement in financial access in Kenya, the regression included variables that captured usage of available financial products and services such as usage of mobile money and current use of bank account. The study then assessed how these factors affect saving behaviour of households.

Econometric Approach

The study intended to find out whether the households were saving or not saving. Household saving variable therefore was binary in nature;

$$Y = \begin{cases} 1 & \text{if households save} \\ 0 & \text{otherwise} \end{cases} \quad (11)$$

This study therefore employed probit regression. Probit regression analysis was selected because of the assumption of normal distribution. The probability of particular household saving provided a number of explanatory variables as indicated was shown as;

$$p_i = \text{Prob}(Y_i = 1/X_i) = \Phi(\beta_0 + \beta_1 X_i) \quad (12)$$

Where, Y_i is the household's savings, p_i represents probability that household saves either in formal, informal or and semi-formal institutions, Φ represents the standard normal distribution and X_i shows explanatory variables.

In the study, household's savings was recorded as a dummy variable where 1 indicated if the individual saves either in formal sector, informal or semiformal sector and zero (0) otherwise. Measurement of financial literacy followed the approach previously used by OECD/INFE (2015) and later employed by Namate, (2020). Where, financial knowledge score was created from those questions that captured respondent's ability to calculate simple financial concepts, that is, interest rate and transaction costs calculations. The responses were binary where 1 indicated accurate response and 0 otherwise. Financial behaviour score created evaluated the respondent's perceptions about retirement planning, money budgeting, usage of available saving financial products, money management, emergency savings, financial attitude, loan repayment and gambling perception. The responses were binary where 1 represented favourable behaviour, otherwise 0. The final score of financial literacy was then captured by the mean overall performance of an individual.

Data description

This study used a widely relied household cross sectional data from the Kenya national FinAccess household survey 2019. The main researchers in this survey were the Central Bank of Kenya (CBK), financial sector deepening (FSD) and Kenya national bureau of statistic (KNBS). Compared to the previous surveys, the 2019 FinAccess not only focused on financial access but also provides additional data on financial literacy, financial health and usage frequency.

RESULTS AND DISCUSSIONS

Descriptive statistics

The summary statistics indicates that 5829 of the 8669 individuals representing 67.24% save either in formal or informal sector whilst 2,840 representing 32.76% do not save. More than half of the households are in rural areas at 58.35% while 41.65% are in urban areas. The youngest of the respondents was aged 16 and the eldest 95 years of which 25% are married, 25.15% are single, 10.70% are widowed and 5.79 are divorced. The average

age recorded at the household was 39 years and majority of respondents were within 25-34 age category. About 57.75% of the respondents were female and 42.25% reported to be males. We also observe that majority of the respondents had attained primary level education at 42.98%. Further, 29.78% of the respondents had attained secondary level education and only 12.01% had furthered their studies to tertiary level. Additionally, most of the respondents earned within ksh.1501-7500 monthly income range.

There exist significant differences in savings of individuals by location of a household. 74.22% individuals living in urban area saved compared to only 62.26% of households in rural areas. Further, in relation to gender, 66.7% of females and 66.61% of males save respectively. It was also worth noting that of the individuals who married, 71.86% were saved when compared to only 60.46% of those who were single.

Household's financial literacy performance revealed the existence of low financial literacy level among Kenyan households. Generally, mean overall financial literacy was estimated as 6.93 which was considered to be low. The mean score in relation to financial knowledge understanding and individual's financial behavior were further estimated as very low at 0.96 and 5.96 respectively. In respect of correct responses recorded, approximately 99.34% of all the respondents were unable to answer all the questions asked as desired. Vast majority of individuals about 10.6% were able to correctly respond to only 7 of all questions asked. Individuals who gave correct response to 15 and 14 questions accounted for only 1.12 % and 1.97% respectively. Moreover, 3.75% and 0.83% of all the respondents revealed the lowest understanding of financial concepts by only scoring 1 and 0 of all questions asked correctly.

On the distribution of responses by the financial question type, the study disclosed that most households were poor when it comes to money management. Approximately 72.55% of all the respondents had difficulty in making money earned last between those times they will receive money. About 59.15% of individuals were unable to correctly estimate interest rate charged however, most of respondents were able to respond to transaction cost correctly at about 55.29%. Very few households approximately 25% borrowed money from other financial institution to repay the existing loan. Moreover, majority of households at about 61.48% and at 69.09% didn't consider putting some money aside for cases of emergencies and for a particular reason as an important household financial decision. Although 49.52% of household used their savings to repay loan, averagely 57.11% planned on how they will cater for their needs in old age and only 32.23% considered gambling as the best way they can be able to make money.

On financial literacy performance across the different socio-demographic, the study noted that variations existed within variables. Similar to observations made by Jappelli and Padula (2013), Table 8 indicates that female respondents had a lower overall financial mean score at 6.77 compared to the male counterparts whose overall level was 7.14. With reference to location, households located in urban areas performed better with a score of 7.71 compared to households in the rural region whose score was 6.37. This possibly could have been due exposure to most financial products compared to individuals in rural areas who rarely interact with different financial products. Similar to Klapper, Lusardi & Van Oudheusden, (2015), Jonubi, & Abad (2013) and Murendo & Mutsonziwa (2017), the study notes that respondents with tertiary level of education and young respondents scored highly compared to those who had no education and respondents above 60 years. Similarly, higher level of income above 70,000 corresponds with higher level of financial score of 11.09.

Majority of the respondents approximately 38.49% relied confidently on their own personal financial experiences to make financial decisions. Moreover, reliance on family and friends for financial advice was high at 36.6% despite low levels of financial literacy estimated. Media formed an important means of financial advice at 11.40% and only 5.32% of the respondent opted to seek financial advice from formal financial institutions.

Model Estimation Results

Prior to regression analysis, pairwise correlation matrix was employed to investigate the correlation strength of the independent variables thereby presence of multicollinearity was tested. Results indicated that all the pairwise correlation fell below 0.8 therefore signalling no problem of multicollinearity. To explore the impact that financial literacy has on respondent's savings, analysis was conducted using probit model. Marginal effects and estimates of probit model are presented in Table 1.

Table 1: Probit and Marginal Effect Results

Variables	Probit Model	Marginal Effects
Financial literacy	.144*** (0.006)	0.041*** (0.000)
Age		
25-34	.138** (0.054)	0.040** (0.011)
35-44	.153** (0.06)	0.044** (0.011)
46-60	.103* (0.061)	0.030* (0.089)
Above 60	.098 (0.07)	0.028 (0.159)
Household size		
5-9	-.079** (0.035)	-0.022** (0.023)
10-15	-.285*** (0.111)	-0.083** (0.013)
Above 15	-.111 (0.716)	-0.032 (0.879)
Household location		
Urban	.085** (0.036)	0.024** (0.017)
Gender		
Male	-.163*** (0.034)	-0.046*** (0.005)
Education Level		
Primary Education	.264*** (0.046)	0.076*** (0.000)
Secondary Education	.197*** (0.054)	0.058*** (0.000)
Tertiary education	.158** (0.075)	0.046** (0.034)
Others	.15 (0.416)	0.044 (0.711)
Marital status		
Divorced or separated	-.026 (0.077)	-0.007 (0.735)
Widowed	.058 (.073)	0.016 (0.421)
Married or living together	-.02 (0.047)	-0.006 (0.667)
Others	.487 (0.639)	0.122 (0.384)
Income level		
1501-7500	.194*** (0.044)	0.057*** (0.000)
7501-30,000	.235*** (0.054)	0.069*** (0.000)
30001-70000	.54*** (0.13)	0.149*** (0.000)
Above70,000	.81*** (0.282)	0.209*** (0.000)
Occupation		
Employed	-.008 (0.069)	-0.002 (0.905)
Casual worker	-.171*** (0.044)	-0.049*** (0.000)
Self employed	.08 (0.055)	0.022 (0.139)
Unemployed	-.259*** (0.049)	-0.076*** (0.000)
Mobile Money Use		
Currently use	.544*** (0.037)	0.169*** (0.000)
Bank		
Currently use	.045 (0.05)	0.013 (0.364)

Constant	-1.165*** (0.081)	
Mean dependent var	0.672	--
Pseudo r-squared	0.211	--
Chi-square	2315.987	--
Akaike crit. (AIC)	8709.759	--

In line with the theoretical explanation, financial literacy was found to statistically positively influence individual behaviour towards savings. Increase in the score of financial literacy increases an individual likelihood to save. Moreover, understanding of one more additional financial literacy question by the respondent increased savings by 4.1 percent at a significant level of one percent. This therefore implies that individuals who are well informed in matters relating to financial concepts understand the need to save compared to those who are financially illiterate. This outcome were consistent with the previous findings of Murendo & Mutsonziwa (2017), Schützeichel (2019), Klapper and Panos (2011), Beckmann (2013), Namate (2020), Cole, Sampson & Zia (2011) and Lusardi & Olivia (2011).

The findings further demonstrates a positive significant implication of income on respondent's savings. As individual record an increase in monthly income the probability of savings increases significantly. Households earning above Ksh70, 000 have higher chances of savings compared to households earning way below Ksh.1, 500. By implication, households with higher earnings are able to save after successfully satisfying their important needs while Individuals with low earnings are barely able to meet their needs hence rarely consider savings as important. The results of the marginal effects evidently indicates that in cases where an individual earns income between Ksh.30000-70000 and above Ksh.70,000 the individual increases the possibility of savings by 14.9 and 20.9 percent respectively both at one percent significance level. Our findings therefore confirms Keynes' absolute-income hypothesis and the findings of studies done by Mbuthia (2011), Kibet et al (2009), Beckmann (2013) and Kiptanui (2017).

The marginal effect coefficient of age confirms theoretical life-cycle hypothesis. The coefficient implies a non-linear association exists between respondent's age and their likelihood to save. Individuals aged 25-34 and those aged 35-44 indicate rising positive significance on individual savings by 4.0 and 4.4 percent respectively. Respondents aged above 46-60 and those above 60 showed weaker but still a positive association in respect to savings by 3.0 and 2.8 percent respectively at 1% significance. The findings explains that individuals who are young and those who are old saved less compared to those deemed to be within working age group. This can be explained by the fact that working individuals try to secure their own future periods by savings and later on in life at old age dissave to meet their daily needs. This finding agrees with the studies done by, Mbuthia, (2011), Kibet et al, (2009), Murendo & Mutsonziwa (2017) and Jappelli and Padula (2013).

As anticipated, increase in household's size negatively impacts respondent's savings. The results elaborates that those households that recorded high number of households members saved less when compared those who were smaller in size. The estimations shows that household sizes of ten to fifteen members and household sizes of five to nine members decreases the likelihood that the households would save by 8.3% and 3.2 % respectively. Larger households experience high dependency ration thus high expenditure ratio when compared to income earned by the household. Such households records low savings compared to small size households. Low savings in Kenya could be attributed to high dependency ratio considering majority of the individuals are youth who are not working. The findings were not different from the findings of Baidoo, S. T., Boateng, E., & Amponsah, M. (2018) and Kharchenko, O. (2011) . The findings however differed with Manaba, Funda and Ömer (2017) who stated that household size didn't have an impact on savings.

In reference to education level, respondent's behaviour towards savings vary differently with respect to the level of education acquired. Consistent with those results of Mbuthia (2011), education level acquire by an individual

significantly had an effect on savings. As the individual advanced their education the marginal effects was seen to be positive though decreases with advancement in education. Precisely, attainment of primary, secondary and tertiary level increases the respondent's likelihood of saving individually by 7.6 percent, 5.8 percent and 4.4 percent respectively. Respondents having primary education saved more compared to those with secondary education and those with tertiary education saved the least. The findings can be attributed to high cost of education with advancement in education in Kenyan Schools hence high expenditure to income ratio crowding out saving. Furthermore, individual with tertiary education indicated better understanding of financial concepts and most of these individuals opt to take advantage of available less costly loans to invest in long-time investments. This therefore limits their ability save at a high rate. Most of individuals with primary education and below are financially illiterate hence may shy away from taking available less costly loans in the financial markets. In order to secure their future or if they wish to invest in long-term investments, such individuals prefer saving hence recording higher savings. These findings however differed with, Namate (2020), Kharchenko (2011); Beckmann (2013) who evaluated a positive association of education level acquired by individual and their savings.

The study further notes that self-employed individuals have a higher likelihood of saving when compared the employed individuals and those undertaking casual work. Being self-employed increases the likelihood of an individual to save by 2.2 percent. Additionally, being employed, undertaking casual jobs and being unemployed reduces the chances of individual to save by 0.2 percent, 4.9 percent and 7.6 percent respectively. Individuals who are unemployed and who are casual workers have very low levels of income, for that reason, almost all of their incomes will be for provision of basic needs therefore little or nothing will be left for saving. These findings are not any different from results by Baidoo, Boateng & Amponsah (2018) and Namate (2020).

In relation to marital status, being married reduces individual possibility of having to save by 0.6 percent although not significant statistically. The marginal effects in relation to gender illustrates low possibility of savings amongst male individuals. The study notes that being male reduces possibility of savings by 4.6% significantly. Additionally, similar to findings noted by Namate (2020) and Murendo & Mutsonziwa (2017), location of an individual has positive association with their saving decisions. Specifically, individuals in urban areas saved more when likened to household's located rural areas. Living in Urban areas increases the possibility of individuals to take-up savings by 2.4 percent at 5% rate significance level. By implication, wide spread of financial products in urban areas enables individual participate in financial markets.

Resonating with Jappelli and Padula (2013) and Murendo & Mutsonziwa (2017) mobile money is interestingly estimated to significantly positively influence individual decision to save. It is worth noting that if an individual uses mobile money, their likelihood of saving increases by 16.9 per cent. Similarly, having everyday use bank account impacts on savings positively although insignificant. The results elaborates that current usage of bank account promotes savings by 1.3 percent. This highlights the need to promote usage of financial products in Kenya.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Conclusion

In examining relationship between individual financial literacy and individual savings, the analysis finds a positive statistically significant relationship exists between individuals' financial literacy and their savings. This highlights that understanding one more additional financial concepts improves the ability an individual to navigate daily financial decisions hence improves savings. The results also discloses that income relates with savings positively indicating that individuals' decisions to save is based their levels income. Education, age, income, gender, occupation, household size and use of mobile money were significant in determining savings of households in Kenya. Further, the results discloses that marital status and current use of bank account as insignificant in determining savings of household.

Policy Recommendations

The study findings contributes valuable policy implications. First, the findings highlights the need of financial education is vital given low household's score of financial literacy. The better an individual is at navigating daily household financial decision the better an individual will be in eliminating financial vulnerabilities and will highly save. Financial education can be enhanced by the government through government finance ministries. This can be through financial awareness campaigns and ensuring that financial awareness programs are introduced in primary school curriculum. In addition, financial providers could also organize customer's financial training for new users of the financial services and ensure ongoing training for the existing customers due to growing rapid changes in financial markets. The consequence will be such that, individuals will be aware of their personal financial choices. In addition, individuals will understand how important savings is at individual level as well as the importance of savings on a national perspective.

Further, when enhancing financial education programs, the government should put special attention and much focus on financially vulnerable individuals. Old individuals, those who reside in rural areas, individuals with no education, females and individuals earning low monthly income should be highly considered when designing this implementation programs. Such individuals may easily be manipulated in the complex fast growing financial markets.

Given the implication that household income has on savings, policy makers should come up with policies enhancing household's income. Improving household's income not only improves individual welfare but encourages household's savings as well. Since the main source of monthly income among Kenyan households is farming, policies that enhances farmer's monthly income would be vital. Such policies may include subsidizing agricultural inputs prices, giving farmers tax incentive and standardization of prices of farm products so that farmers don't easily run into losses. Improved income implies that households will have enough for daily consumption and for savings.

Additionally, there is a need for Kenyan government to encourage households to participate, engage and make use of the available financial products in the market. This arises due to significant positive association on savings due to the use on mobile money and current use of bank accounts. Participating in the developed financial sector enables an individual to learn new emerging financial concepts and enhances their financial confidence. This would eventually results to higher savings.

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