The role of credit access on household savings behaviour: Evidence from an emerging economy

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Abstract

Although savings is a priority in the development agenda of many developing countries, policymakers often overlook the possibility that the best route to saving more is to pay down existing debt. But in some cases, the utility benefits of current consumption are high. Consequently, households tend to be tempted to increase their consumption in the current period and ultimately end up with reduced savings for future consumption or investments. Current consumption is further increased by easy access to credit which makes households borrow more in the current period and increase their savings, an issue which could change them from savers to non-savers or negative savers if they were initially not saving. This study sought to investigate the effects of access to credit on household savings. Specifically, the study disaggregated access to credit facilities and usage of savings products, and explored the effects of access to credit on household savings. Estimation results revealed a negative effect of access to credit on household savings. Increasing poor people's ability to use savings mechanisms effectively is fundamental to shifting the focus from access to credit alone to meaningful inclusive finance.

JEL Classification: E21; G20; G21
Keywords: Kenya; Savings; Credit; Financial Inclusion; Probit; FinAccess

1. Introduction

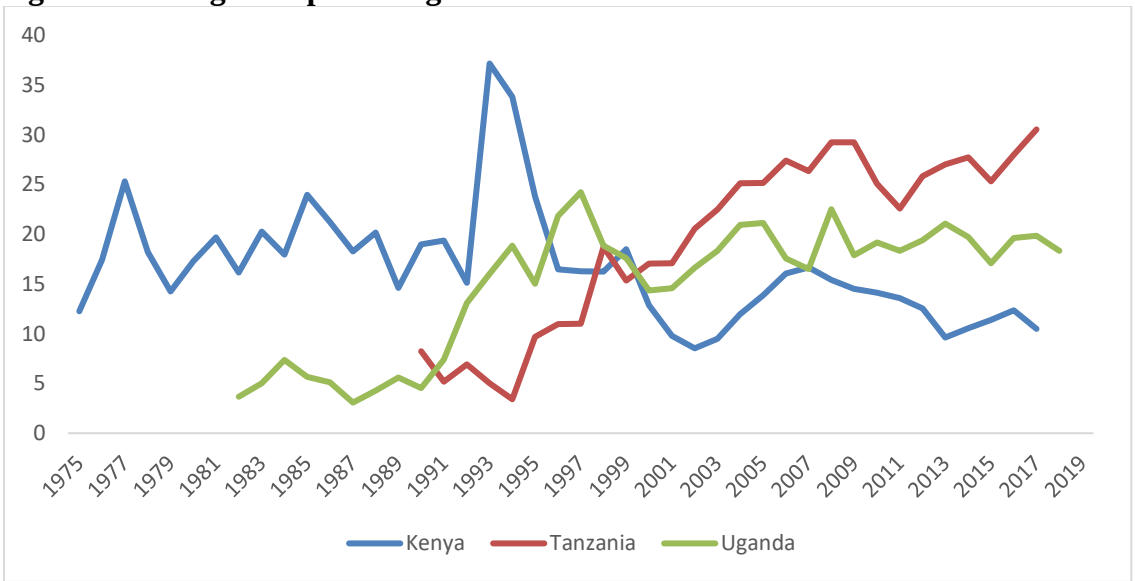
Saving promotes asset accumulation. This creates a buffer against shocks by easing credit constraints. This is an important pathway out of poverty. At the individual level, savings can smooth out consumption and increase productive investment (Demirgüç-Kunt, et al, 2017; Dupas & Robinson, 2013; Beck, et al, 2009) and especially among female entrepreneurs (Aterido et al, 2013). For small and medium enterprises, savings can boost investment as well as expand to a larger scale (Beck, et al, 2007). At the national level, savings rate is a strong predictor of future economic growth. Savings facilitate growth through investments and cushion the country against international capital inflow shocks (Romer, 1986). Countries with low savings rely on foreign borrowing or foreign direct investments for growth. Unfortunately, these sources are not effective in spurring growth because of tied conditions and high interest rates. Implicitly, meaningful growth can only be facilitated by domestic savings.

Savings rate is derived as a residual in the national accounts from expenditure and production data that are quite unreliable. Despite the importance of savings both at a national and a household level, most developing countries are still unable to effectively mobilize them from households. It is evident that savings are dominated by household savings (Prina, 2015) and primarily in the form

of non-financial assets (Demirgüç-Kunt, et al, 2020). There are different savings mechanisms. More than three-quarters of savers in high-income economies and just under half in developing countries save using a bank account. The most common alternative is saving informally through a savings club or by entrusting savings to someone outside the family (Demirgüç-Kunt, et al, 2020). As Deaton (1989) pointed out, factors that determine saving behaviour in developing countries are likely to differ from those of developed countries. Saving using informal channels may be attributed to banks' product designs that have not been able to target specific saving behaviour of the majority of the poor population, or lack of flexibility which may allow clients to tailor their usage of accounts to meet different savings needs.

Although savings are critical for poor people's consumption smoothing, risk management and financing of important life goals, majority of the poor generally lack access to formal savings accounts (Banerjee & Duflo, 2007). For instance, 71% of adults in developed countries save as compared to only 43% of adults in developing countries (Demirguc-Kunt et al, 2018). This can be associated with low account ownership in developing countries. Barriers to saving exist for many. Market frictions, including transaction costs, regulatory barriers and lack of trust hinder the supply of savings products. Despite these barriers, evidence suggests that the poor have substantial demand for savings. The poor do have some surplus that they use for non-essential expenditures (Banerjee & Duflo, 2007). Even when formal savings products are unavailable or unaffordable, the poor often save under mattresses, in informal groups, and/or in livestock. Collins et al., (2009) highlights complexity in poor households' financial portfolios and the need for small irregular flows to be aggregated into lump sums for investments. Figure 1 shows that saving rates in Kenya have shown consistent decline compared to other East Africa nations since the advent of financial liberalization.

Figure 1: Savings as a percentage of GDP for selected East Africa countries.



Source: World Development Indicators, various years

The FinAccess[1] survey shows that Kenya's financial inclusion landscape has undergone a transformation since 2006. Formal financial inclusion has risen to 82.9 percent, up from 26.7 percent in 2006, while complete exclusion has declined to 11.0 percent from 41.3 percent in 2006. Kenya has the highest share of adults with a mobile money account, at 58 percent, followed by Somalia, Tanzania, and Uganda with about 35 percent. Figure 2 shows comparative performance of financial inclusion on selected Sub-Sahara economies. Kenya performed better in terms of reducing financial exclusion where only Mauritius reported lower levels of exclusion. Nevertheless, Mauritius has a highly developed financial sector and higher GDP per capita. Whereas policymakers hoped that increasing financial inclusion rates would ultimately boost savings rates, existing datasets do not give a direct conclusion of the afore prediction. For instance, whereas Kenya leads in financial inclusion in the East Africa Community, its saving rates as a percentage of GDP are the lowest. This implies that there is more to financial access and policymakers should shift their focus on not just financial access but also on the synergy of the financial products used by individuals in emerging economies to boost savings.

Figure 2: Comparison with selected Sub-Sahara Africa countries



Source: Global Findex 2017 database by Demirgüç-Kunt et al. (2018)

Access to credit includes via mobile money applications such as *M-pesa* & *Mshwari* and even digital loan apps such as *Tala* and *Branch*. The uptake of digital loans in Kenya rose to 8.3% in 2019 up from 0.6% in 2016 (FSD Kenya, 2019). However, most of the digital credit is unsecured and lenders have taken advantage of their superior information to extort borrowers who are financially illiterate through high interest rates. For instance, in a digital credit survey conducted in Kenya in 2017, 19% of the respondents reported to have been charged loan fees higher than expected, implying a lack of transparency and client manipulation from the lenders. That notwithstanding, the vast majority of Kenyans take up digital credit to solve short term liquidity emergencies and for consumption purposes (Kaffenberger, et al, 2018). It is, therefore, plausible

[1]FSD Kenya and Central Bank of Kenya. FinAccess National Survey 2019: Profiling developments in financial access and usage in Kenya. Nairobi, Kenya: FSD Kenya.

that credit uptake may have minimal effect on households savings. It might also be the case that the high interest rates associated with most loans, impacts negatively on savings. For instance, 49.4% of loan users reported to have withdrawn their savings to repay a loan in 2018 (FSD, 2019).

Although financial inclusion should translate to higher household savings, this has not been the case in Kenya. Increased availability of credit can affect the savings behaviour of individuals both positively and negatively. If credit is used for investment purposes, it can boost profitability of businesses leading to higher income levels and savings. Credit used for consumption purposes has little impact on savings. On the contrary, access to credit may discourage precautionary motives to save since borrowers are guaranteed access to credit in times of emergencies (Lee & Sawada, 2010). Borrowers are likely to prioritize the loan repayment rather than saving. In a study in Kenya by Mbuthia (2011), an extra Kshs. 1000 of monthly loan repayment reduced an individual's monthly savings by Kshs. 1260

One important gap in the 'access to finance' literature, which has been less analysed, is the role of access to credit in fostering savings. Literature on the effects of access to credit on household savings behaviour is scant. Most studies have focused on the effects of access to credit on household incomes, indebtedness, poverty reduction and resilience to economic shocks (see for example Kimosop, 2019;Ulwodi & Muriu, 2017; Momanyi & Wainaina, 2016; Kibet et al, 2009). There are also studies that have explored the effects of mobile phone usage on household savings in Kenya (Ouma, et al, 2017; Waweru & Kamau, 2017). Other related studies use datasets of non-representative samples and their results cannot be used for generalization of the national case. For instance, although Kibet et al, (2009) modelled savings as a function of socioeconomic characteristics in which access to credit was included as a variable, the study used a dataset of only 359 individuals from one county in Kenya. Furthermore, the study employed a cross-sectional dataset and its results cannot give a picture of the current relationship between access to credit and household savings. It is in this regard that this study investigates the effects of access to credit on household savings in Kenya.

The remainder of this paper is structured as follows. The next section offers brief literature review. Section 3 explains methodology and data employed. Section 4 reports the estimated results and interprets the findings, while the final section concludes.

2. Previous evidence

An inclusive financial system boosts credit uptake which translates to higher investments with implications on household welfare and poverty reduction (Demirguc-Kunt et al, 2018; World Bank, 2014). A growing literature shows that financial inclusion has significant benefits for individuals and poor households such as access to savings instruments (Ouma et al, 2017; Fungáčová & Weill, 2015) and easy access to credit (Neaime & Gaysset 2018; Hendricks & Chidiac, 2011). Several studies have revealed that several socioeconomic factors determine savings at the individual and household level. These determinants include, income of household, age of the household head, landholding, education, household size and dependency ratio (Jamal et al., 2014; Khan et al., 2013)). Some studies in more-developed countries have found that people get their savings and consumption decisions about right over the life-cycle (Scholz et al., 2006).

Literature on the role of access to credit on household savings is scant. Randomised controlled trials (RCTs) have become increasingly popular in overcoming many of the identification

problems that arise with non-experimental approaches. Augsburg et al (2015) carried out a randomized control trial on households who had been marginally rejected by a microfinance institution in Bosnia. The study findings revealed that better access to microcredit discourages savings and consumption. A major shortcoming of RCTs is that they are by necessity implemented in a particular setting, and therefore may not be generalized to other settings.

Access to credit is likely to boost savings partly because most lenders require a minimum amount of savings as collateral for loan acquisition. It could also boost income if credit is invested in income generating activities thus boosting savings. This hypothesis was tested by Kiiza & Pederson (2002) using a panel data in Uganda. The study revealed that credit availability encourages savings. Mbithi and Weil (2011) analysed the impact of M-PESA using a balanced panel of 190 sub-locations in Kenya. The study findings revealed that increased use of M-PESA lowered the propensity of people to use informal savings mechanisms such as ROSCAS. Existing literature has also revealed widespread adoption of mobile as a savings tool by both the wealthy and poor households (Jack & Suri, 2014, Shem et al., 2012).

Access to credit is likely to discourage savings for precautionary purposes and the marginal effect is larger for the wealthy individuals (Lee & Sawada, 2010). Using ordinary least squares estimation technique, Kimosop (2019) found that households that had higher income levels saved more than those that had lower income levels. Using survey data collected in 2010, Demombynes and Thegeya (2012) examined mobile savings phenomenon in Kenya and found that the usage of bank integrated mobile savings products remains limited and largely restricted to the wealthy group.

A vast majority of households prioritize loan repayment over savings. Using regression discontinuity design approach to establish how microcredit affected savings of individuals belonging to households in Bangladesh, Aktaruzzaman and Farooq (2017) established that having access to microcredit increased the chances of a household to save. This may be due to the monthly loan repayment obligations. Using ARDL model and time series data for the period 1960 to 2004, Jongwanich (2010) established a negative relationship between access to credit and household savings rate in Thailand. Thus, access to credit discourages households from saving for precautionary or speculative purposes as they are guaranteed access to credit in case of an emergency. These findings are consistent with Kibet et al (2009).

On other determinants of savings, Nwosu, Anumudu, and Nnamchi (2019) carried out a cross-sectional data analysis using the Harmonized Nigeria Living Standards survey data to model a household savings function. Employing two stage least squares estimation technique, the study revealed that households that were female-headed, owned land, and were engaged in agriculture saved more than their counterparts. Further, the study revealed a quadratic relationship between age and household savings with a turning point at 79 years. This was consistent with the life cycle hypothesis. Ulwodi and Muriu (2017) employed a seemingly unrelated regression model and the FinAccess 2016 and Finscope 2013 data for Kenya and Tanzania respectively. The study revealed that as people age, they prefer using other savings platforms instead of formal and informal savings platforms.

3. Methodology

3.1 Theoretical framework

This study is anchored on savings subject to borrowing constraints model developed by Deaton (1991). The model employs the utility maximization theory where the consumer's problem is to maximize inter-temporal consumption.

Consumers maximize their utility which is a function of current consumption. That is,

$$Max. U = f(C_t) \ldots\ldots 1$$

Assuming that U is constant across time, then the consumer's problem is to maximize:

$$V = E_t \sum U(C_t) \ldots\ldots 2$$

Subject to the budget constraint where lifetime consumption cannot be greater than lifetime income. That is;

$$\sum_{t=0}^{T-1} \frac{C_t}{(1+r)^t} \leq \sum_{t=0}^{T-1} \frac{Y_t}{(1+r)^t} \ldots\ldots 3$$

This model assumes a constant interest rate equal for both loans and savings.

A maximization of equation (2) subject to equation (3) yields an individual's optimal inter-temporal consumption choices represented in a form of a Euler equation as follows;

$$U'(C_t) = [\frac{1+r}{1+\delta}]\ E_t U_t(C_{t+1}) \ldots\ldots 4$$

This expression shows that an individual's optimal inter-temporal consumption choices depends on the rate of interest (r), expectations about the future (E_t), and the rate of time preference (δ).

We augment equation (4) with a borrowing constraint faced by households and assume that the interest rate is infinite so that households cannot borrow indefinitely as follows;

$$C_t \leq A_t + Y_t \ldots\ldots 5$$

Where C_t is the current consumption, A_t is the sum of all assets accumulated in the previous periods, and Y_t is the current income.

Saving in the current period enables the consumer to transfer assets in the next period to supplement their consumption in the next period. Assets transferred to the next period are thus given by:

$$A_{t+1} = (1+r)\ [A_t + Y_t - C_t] \ldots\ldots 6$$

The assumption of infinite interest rate implies that the consumer cannot borrow hence assets from the previous period must be non-negative. That is,

$$A_t \geq\ 0 \ldots\ldots 7$$

Introduction of constraint 5 and 7 in the Euler equation of optimal inter-temporal consumption yields:

$$U'(C_t) = maxU'\ [A_t + Y_t, \frac{1+r}{1+\delta}]\ E_t U_t(C_{t+1}) \ldots\ldots 8$$

Apart from the interest rate, expectations about the future based on the information currently available, and the per-period sub-utility discounting rate; the inter-temporal consumption choices of the individual also depend on the 'cash-on-hand' given by $A_t + Y_t$. The borrowing constraint holds only when r<δ. If r>δ, individuals would still save and the above constraint would not bind because for such individuals, future benefits of return on their savings are more enticing than the current consumption benefits. Implicitly, the borrowing constraint is applicable only when r<δ, a common feature with impatient consumers. This implies that individuals would forego savings in order to smooth their consumption until their $A_t = 0$ and then rely on subsequent period incomes

for consumption. Therefore, in case of any income shocks, consumers will be unable to meet their consumption needs in the future as they cannot borrow.

Equation (8) predicts that removing borrowing constraints negatively affects savings through several channels. First, removal of borrowing constraints could make impatient consumers borrow so as to increase their consumption in the current period. For risk-neutral people who used to save before, removal of borrowing constraints would discourage them from reducing current consumption in order to save since they can always access credit in case of any emergencies or income shocks. For the risk-averse individuals, their saving motives are likely to remain unaffected by removal of borrowing constraints. Therefore, access to credit lowers the level of savings on average.

3.2 Model specification

The theoretical model reveals that inter-temporal consumption substitution is influenced by borrowing constraints, expectations about the future, accumulated assets, income level, and interest rates. Consistent with the empirical literature, this study modelled savings' decisions as a function of access to credit, income, gender, age, marital status, household size, location of the household and the highest educational attainment of the household head. The estimation equation is specified as;

$$S = \beta_0 + \beta_1 C.A + \beta_2 I.G + \beta_3 GHH + \beta_4 A + \beta_5 A^2 + \beta_6 MS + \beta_7 EHH + \beta_8 HS + \beta_9 HHloc + \mu \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

Where S is the probability of a household to save, C.A is access to credit, I.G the income group to which the household's monthly income falls, GHH, A, A^2 , MS, EHH are gender, age, square of the age, marital status, and the education the household head respectively, HS is the household size, HHloc is the household location, and μ is the error term. The dependent variable is usage of savings products whether formal, semi-formal, or informal. It's a binary variable=1 if the household had a savings product and 0 otherwise. In defining credit constrained individuals, this study strictly followed Jappelli et al, (1998). Table A1 in the appendix shows definition and measurement of variables

3.3 Econometric approach

Due to the qualitative nature of the data, the study employed a probit estimation technique. This approach guarantees that the predicted probabilities are positive but less than 1 unlike the linear probability model (Gujarati, 2003). In a probit model, the probability that a household saves given a number of explanatory variables can be expressed as:

$$P = E(Y = 1|X) = \Phi(X\beta) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 11$$

Where $\Phi(.)$ is the standard normal distribution.

Further, consider an unobserved variable $Y^*_i = X'_i\beta + \mu \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 12$

which models the net benefit of saving as compared to not saving. In this case, $\mu \sim N(0,1)$, X is a vector of the independent variables, and β a vector of the parameters to be estimated.

We observe the binary variable Y^*_i instead of Y^*_i itself where;

$$Y_i = \begin{cases} 1 \; if Y^*_i > 0 \\ 0 \; if Y^*_i \leq 0 \end{cases} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 13$$

Given $X^*_i$the distribution of $Y_i$can be derived as:

$$P(Y_i = 1|X_i) = P(Y^*{}_i > 0|X_i) \quad \ldots 14$$

$$= P(X_i\beta + \mu_i > 0|X_i) \quad \ldots 15$$
$$= P(\mu_i > -X_i\beta|X_i) = 1 - \Phi(-X_i\beta)$$
$$= \Phi(X_i\beta) \quad \ldots 16$$

Therefore, $P(Y_i = 0|X_i) = 1 - \Phi(X_i\beta)$ ……17

Combining equations (16) and (17) gives

$$F(Y|Xi) = \{\Phi(X_i\beta)\}^y\{1 - \Phi(X_i\beta)^{1-y} \quad \ldots 18$$

The log likelihood for the i^{th} observation is given as:

$$L_i(\hat{\beta}) = Y_i log\Phi(X_i\hat{\beta}) + (1 - Y_i)log(1 - \Phi(X_i\hat{\beta}) \quad \ldots 19$$

To obtain the estimated parameters (β(hat)) that maximize the log likelihood for the i^{th} observation, equation 19 is estimated using maximum likelihood estimation technique (Wooldridge, 2010). The estimation equation becomes:

$$P_i = P_r(Y_i = 1|X_i) = \Phi\ (\hat{\beta}_0 + \hat{\beta}_i X_i) \quad \ldots 20$$

Where $\Phi(.)$ is the standards normal distribution,P_i is the probability that the household uses a savings product, Xi is a vector of explanatory variables for each household, andY_i represents the household savings. The marginal effects of each explanatory variable on the probability of savings are further generated.

3.4 Data

This study used the 2019 Kenya National FinAccess household survey data. The survey employed a two-stage stratified cluster sampling to ensure representativeness of the sample at national and regional levels, rural and urban areas. The key respondent was the household head.

4. Empirical findings and discussions

Table 1 presents summary statistics. The respondents' age varies from 16 to 95 years. The average age of 39 years, implies that most respondents are in their economically productive age. Consistent with the life cycle hypothesis, the respondents' age lies within the savings bracket. Additionally, the mean household size is about four individuals per household. Large households tend to consume more than they save. The data reveals that 67% of Kenyans do save.

Table 1: Summary Statistics

Variable	Obs.	Mean	Std.Dev.	Median	Min	Max
Savings overall	8669	0.672	0.469	1	0	1
Credit access	8669	0.949	0.221	1	0	1
Location	8669	0.417	0.493	0	0	1
Age	8669	39.294	17.104	35	16	95
Income group	8669	1.915	0.99	2	1	6
Household size	8669	3.974	2.322	4	1	21
Gender	8669	0.423	0.494	0	0	1
Education	8669	2.393	0.889	2	1	5
Marital status	8669	3.024	1.285	4	1	5

Table 2 shows an insignificant gender gap in saving patterns. On the level of education, Table 3 shows that savings rate is higher for those with higher levels of education.

Table 2: Uptake of saving products by gender

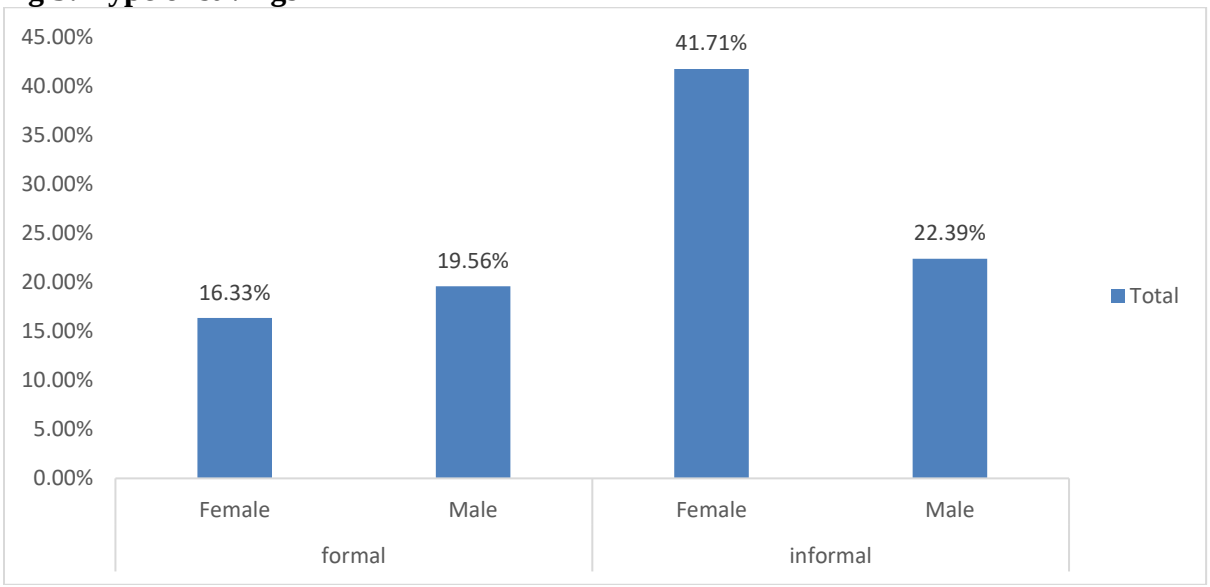
Savings overall	Gender		
	Male	Female	Total
Does not save	43.06	56.94	100.00
	33.39	32.30	32.76
Saves	41.86	58.14	100.00
	66.61	67.70	67.24
Total	42.25	57.75	100.00
	100.00	100.00	100.00

Table 3 Savings by education level

Savings overall	Education level					
	None	Primary	Sec	Tertiary	Other	Total
Does not save	22.78	43.27	27.89	5.92	0.14	100.00
	49.58	32.98	30.67	16.14	26.67	32.76
Saves	11.29	42.84	30.71	14.98	0.19	100.00
	50.42	67.02	69.33	83.86	73.33	67.24
Total	15.05	42.98	29.78	12.01	0.17	100.00
	100.00	100.00	100.00	100.00	100.00	100.00

Figure 3 show that most households prefer informal savings platforms. 64% of savers exclusively use informal saving platforms. This corroborates Klapper, et al (2019) who shows that in Sub-Saharan Africa, adults who save typically don't do so at a financial institution where household savings are primarily in the form of non-financial assets. Financial savings are predominantly directed to informal markets and institutions. In terms of gender, the data points to more usage of informal saving platforms, by females relative to males. Out of the 64% of savers using informal saving platforms, about 42% are females.

Fig 3: Type of savings



With regard to the choice of institutions, Figure 4 demonstrates that savings in a secret hiding place and a group/chama were the most preferred channel of savings. This finding is also consistent with Dupas, et al, (2014), Karlan and Morduch (2010) who show that the poor largely save through informal mechanisms, such as storing cash at home, joining savings clubs, buying livestock and durable goods, which are illiquid and riskier than bank accounts. According to the Global Findex Database[2] in 2014, about 17 per cent of savers—in developing economies reported having saved using an informal savings club or a person outside the family in the previous 12 months. Moreover, the conventional formal saving platforms have been overtaken by newly established mobile money saving platforms. Although about 8% save in bank deposit accounts, 19% use mobile money saving platforms such as *mshwari*.

Fig. 4: Uptake of saving products by institution

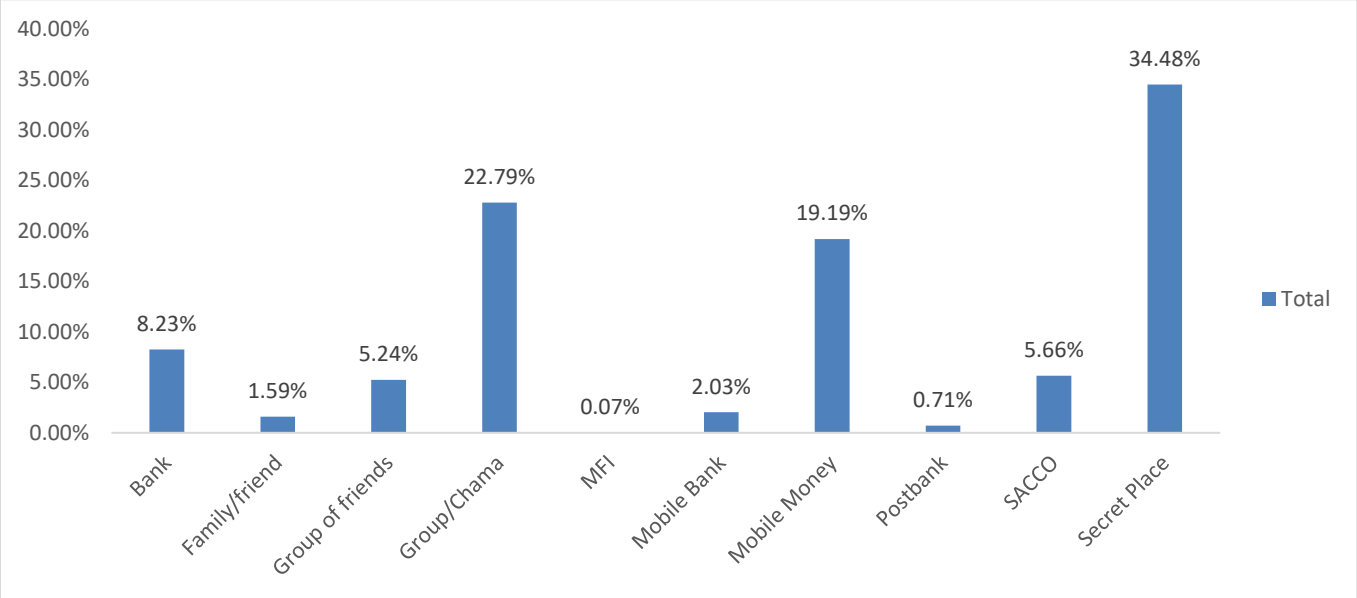


Figure 5 shows that most informal savers are located in the rural areas. This is contrary to the believe by policymakers that rural populations, particularly in Africa, have no margin for savings over consumption needs. In terms of wealth, most users of informal saving platforms are in the lowest wealth quintile suggesting an inaccessibility of formal saving platforms for the poor. This is further reinforced by Table 2 in the appendix where 77% of savers in the lowest wealth quintile use informal saving platforms.

Fig. 5: Saving products by location

[2] Global Findex Survey 2014

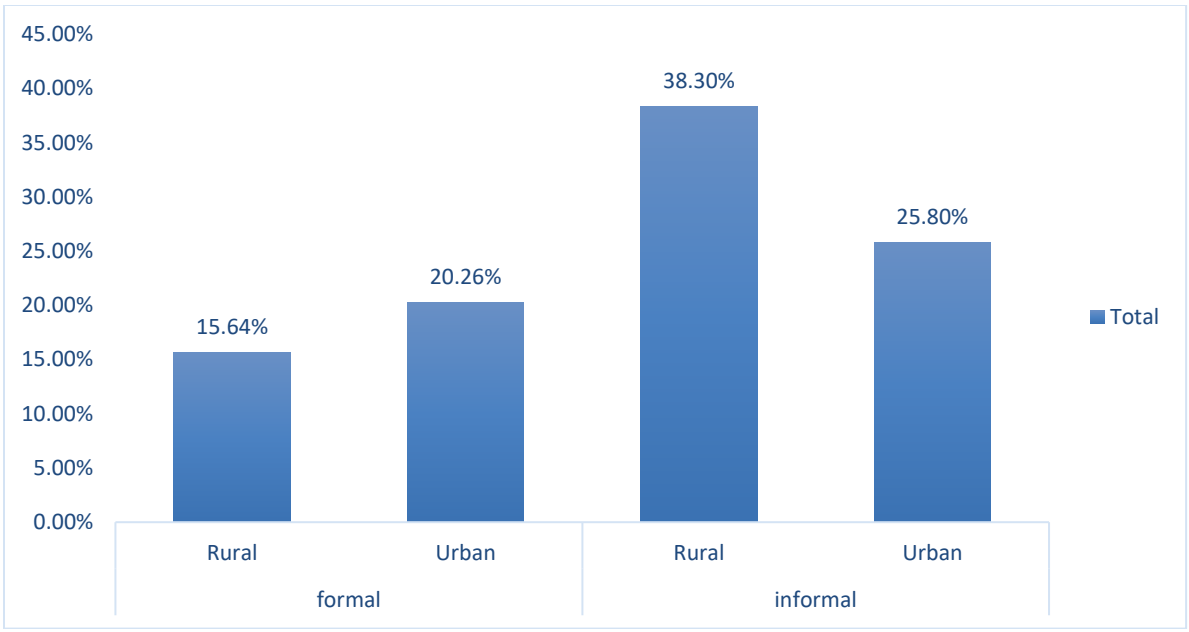


Table A3 in the appendix reports the correlations matrix. All the bivariate correlations are lower than the 0.7 threshold implying that multicollinearity is not a problem. To achieve the study objectives, a probit regression model was estimated. Although both logit and probit models give close estimates, a probit model was chosen because it assumes normality of the dataset. Estimation results are reported in Table 4.

Estimation results reveal that access to credit reduces the household's probability to save. This finding corroborates Kibet et al. (2009) and Jongwanich (2010). Therefore, access to credit discourages savings for precautionary and for investment purposes as people are guaranteed of access to credit in cases of emergencies. It may be the case that the borrowed amount is used for consumption smoothing. Turning to the control variables and consistent with Keynes' absolute income hypothesis (1936), this study finds a positive relationship between income levels and a household's probability to save which lends credence to Kiiza and Pederson (2002), Kibet et al (2009), and Ulwodi and Muriu (2017).This finding is not surprising. The amount of household's holding depends on assets that can easily be converted into cash. However, the study reveals a negative effect of income on a household's savings for the high income which supports Lee and Sawada (2010). This may be attributed to the fact that wealthier households have better access to credit facilities in cases of emergency as compared to poor households.

We further established that heads of households with some education were expected to hold more financial savings. However higher levels of education are associated with higher financial savings. Higher education levels translate to higher financial literacy which is crucial for understanding the importance of savings. Relatively low financial literacy levels exacerbate consumer and financial market risks as increasingly complex financial instruments enter the market (Klapper & Lusardi 2019; Lusardi et al (2020). These findings are consistent with Kibet et al, (2009), and Ulwodi and Muriu, (2017).

With regard to gender, the estimation results reveal a higher probability of savings amongst female-headed households compared to male-headed households. The study also confirms the life-

cycle hypothesis with a non-linear relationship between age of the household head and the probability that the household saves. While younger household heads do not have enough resources to save, elderly heads of household can afford to save some of their financial earnings. The hypothesis that household location may influence savings behaviour is not supported here. Similarly, household size and marital status do not influence savings behaviour.

Table 4: Estimation results

Variables	Coefficients
Access to credit	-0.3080***
	(0.0993)
Urban	0.0691
	(0.0436)
Male	-0.1600***
	(0.0455)
Age	0.0217***
	(0.0068)
Age squared	-0.0003***
	(0.0001)
Kshs. 3,001-15,000	0.3100***
	(0.0448)
Kshs. 15,001-70,000	0.7450***
	(0.0719)
Kshs. 70,001-400,000	1.4260***
	(0.3180)
Kshs. 400,001 and above	-1.1780*
	(0.6760)
Primary education	0.3020***
	(0.0551)
Secondary education	0.4230***
	(0.0660)
Tertiary education	0.5590***
	(0.0881)
Divorced/ Separated	-0.1240
	(0.0854)
Widowed	-0.0444
	(0.0822)
Married/Living with partner	0.0078
	(0.0652)
Household size	-0.0097
	(0.0100)
Constant	-0.0074
	(0.1870)
Observations	4,964

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 shows the marginal effects on savings behaviour where credit access influences households' probabilities to save more than income and education.

Table 5: Marginal effects

Variables	Marginal effects

Access to credit	-0.1030***
	(0.0303)
Household location	0.0332**
	(0.0140)
Gender	-0.0329**
	(0.0135)
Age	0.0074***
	(0.0021)
Age squared	-0.0001**
	(0.0000)
Income group	0.0435***
	(0.0070)
Education	0.0723***
	(0.0080)
Marital status	0.0081
	(0.0065)
Household size	-0.0030
	(0.0032)
Observations	4,964

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion

At the onset, this study sought to establish the influence of access to credit on household savings in Kenya. Consistent with theory and the savings model under borrowing constraints the study established a negative effect of access to credit on household savings. Further, household income and education level have positive impacts towards increasing household savings. Since income is highly significant in boosting savings, creating more income generating opportunities would ultimately lead to higher savings. There is also need for up scaling financial literacy on households' credit usage to ensure that uptake of credit is channeled to investments and not for consumption smoothing. This will deal with the fungibility problem on access to credit. When households are financially literate, they make informed financial decisions and improve their saving actions. The study also supports the life cycle hypothesis that age has a positive relationship and age squared is negatively related to household savings. Therefore, lending institutions should adopt a savings-first approach to lending. The study concludes that existing economic and financial policies have led to the neglect of savings mobilization in general. There is need to enhance women savings by increasing their participation in the labour market in order to boost their incomes.

Financial policy reform that would deepen the credit market is therefore necessary so as to raise domestic savings. There is a need for savings to be promoted more prominently and more explicitly within the broader financial inclusion agenda. The promotion of savings is strongly influenced by government regulation and financial inclusion policies. More importantly, governments and policymakers should emphasize on strategies that would increase savings for low-income clients. These may include the widespread adoption of national financial inclusion strategies, the implementation of regulation of digital lending and widespread regulation allowing the use of agents to facilitate account opening. Increasing poor people's ability to use savings mechanisms effectively is fundamental to shifting the focus from access to credit alone to meaningful financial inclusion.

Funding sources
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Appendix Tables

Table1: Definition and measurement of the variables

Variable	Notation	Measurement	Predicted effect	Data source
Credit access	C.A	Household's access to credit, indicated by 1 if the observation is made and 0 if otherwise.	Negative	FinAccess 2019 survey
Household's income group	I.G	Income category to which a household's income falls. It was captured in 5 categories of income groups where: Group 1 income range was Kshs. 0-3,000, group 2 is Kshs. 3,001-15,000, group 3 was Kshs. 15,001-70,000, group 4 was Kshs. 70,001- 400,000, and group 5 was Kshs. 400,001 and above.	Positive	FinAccess 2019 survey
Gender	GHH	Gender of the household head. It was indicated by 1 for male and 0 for female.	Positive/Negative	FinAccess 2019 survey
Household size	HS	Number of persons in the household.	Negative	FinAccess 2019 survey
Age	A	The age of the household head in years.	Positive	FinAccess 2019 survey
Age squared	A^2	The square of the age of the household head.	Negative	FinAccess 2019 survey
Education	EHH	The highest educational attainment of the household head. It was captured as a dummy variable where 1 indicated none or no education, 2 indicated primary education, 3 for secondary, 4 for tertiary, and 5 for other	Positive/ Negative	FinAccess 2019 survey
Marital status	MS	Marital status of the household head. It was captured as a dummy where 1 indicated the single/ never married, 2 for divorced/separated,3 for the widowed, 4 for the married/ living with the partner, and 5 for other.		FinAccess 2019 survey
Household location	HHloc	The type of a cluster in which the household is located. It was captured as dummy where 1 indicates urban and 0 indicates rural.	Positive	FinAccess 2019 survey

Table 2: Savings by Wealth quintile.

Savings type	Estimated Wealth Quintile					
	Lowest	Second Lowest	Middle	Second Highest	Highest	Total
Formal	23.28	32.92	35.97	41.23	45.15	35.90
Informal	76.72	67.08	64.03	58.77	54.85	64.10
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table 4: Correlation matrix

	Credit access	Location	Gender	Age	Income group	Education	Marital status	Household size
Credit access	1							
Location	-0.0543***	1						
Gender	-0.0122	0.0205	1					
Age	0.0227*	-0.162***	0.0251*	1				
Income group	-0.0168	0.199***	0.114***	0.0207	1			
Education	-0.0804***	0.284***	0.136***	-0.318***	0.212***	1		
Marital status	0.000243	-0.105***	-0.0382***	0.332***	0.0840***	-0.190***	1	
Household size	0.0413***	-0.198***	-0.0267*	-0.151***	-0.0994***	-0.141***	0.147***	1

Note: '*p< 0.05, **p< 0.01, ***p< 0.001' indicate the level of significance.