

The Determinants of Households Having Savings Accounts in Rwanda

Charles Ruranga^{1*}
University of Rwanda

Scott Hacker²
Jönköping University, Sweden

Abstract

This paper analyses the determinants of Rwandan households having savings accounts using Integrated Household Living Conditions Survey (IHLCS) data of 2010/11. After a background discussion and literature review an empirical analysis is presented with different variables adopted and analysed as determinants of household's head having savings accounts. Poverty level, age, gender, residential area and level education of household head (literate or not) were considered as independent variables of the study. Findings from the estimations of logit models indicate the likelihood of a household having a savings account is positively and significantly related to each of the following: non-poor status of the household, the household residing in an urban area, the household head being male, and the household head being literate. Having the household head be literate tends to be more important for younger household heads and for non-poor households. The proportion of households having money in a savings account more than doubled over the decade between the IHLCS 2000/2001 survey and the IHLCS 2010/2011 survey. Government policies on savings and poverty reduction may explain the trend of increased cash balances in saving accounts.

Key Words: Savings, Bank Accounts, Households, Determinants,

1. Introduction

A high level of savings remains an important factor in order to guarantee sufficient capital for investment and future expenditure. A higher savings rate has been considered to be a major determinant of economic growth and development. Ruranga, Ocaya, and Kaberuka (2014) found that for the case of Rwanda “there is unidirectional causality from domestic savings to real gross domestic product”. Relationship between savings and growth is not only direct but also may be looked at indirectly through other economic indicators, for instance investment. An investigation into what affects savings is quite important for considering policies to improve economic growth and achieve sustainable development of the country.

This study investigates the determinants of Rwandan households having savings accounts. Whether a household has a savings account can reflect many issues. It can capture the issue of households having sufficient savings to warrant having a savings account, the issue of households feeling comfortable with having their money stored in an account at an established financial institution, and the issue of the risk-reduction that households will likely face if they place their financial wealth into an established financial institution.

A household having money placed into an account at an established financial institution is also indicative of that household being willing to have that money visible to tax authorities, so it may be reflective of that household being less involved in the informal sector. Since the action of having money in a savings account can capture any of these issues it is impossible to say it captures any one of them in particular. Nevertheless, we can suggest that if savings are growing proportionately for all segments of society, then an increasing

number of households will be wishing to have part of their financial savings placed into accounts at established financial institutions. Thereby we expect that generally there should be a positive correlation between the value of household savings and the percentage of households with savings account.

The following research questions have been formulated and guided this study:

1. Is there any relationship between poverty status, age, gender, residence, education and the likelihood of a household having a savings account in Rwanda?
2. What are the main determinants of the possibility that a Rwandan household has a savings account?
3. What policies can encourage households to change their savings behaviour and increase the amount saved?

Objective of this research is to perform an empirical analysis to deal with the first two research questions and based on those results recommend policies for promotion of household savings. One issue we are particularly interested in is the role of education in affecting the likelihood of a household having a savings account, as education is a variable over which the government has substantial influence through policies. Theoretically, greater literacy rates should increase the proportion of households with savings account, as illiterate individuals feel not comfortable in signing savings-account contracts they cannot read, and educated individuals know the benefits a savings account, and due to their greater job opportunities are perhaps less likely to be involved in the informal sector.

Nevertheless, whether greater literacy rates tend to increase the proportion of households having a savings account is an empirical question, one which this study intends to shed some light. Also, this study examines whether the relationship of literacy and the likelihood of that household having a savings account are influenced by the financial status, the age and residence? Answers to this question could have policy implications regarding where to put educational resources, and again it is an issue investigated in this paper.

Limited studies have been done in Rwanda on an empirical analysis of household savings behaviour. This study uses econometric techniques to investigate this issue and the findings are expected to contribute to the development of Rwanda. Also, the empirical model developed in this paper may be useful for similar investigations elsewhere in the world. This study can contribute to the enrichment and revision of national and international policies in order to achieve better economic performance. The findings can be used by the Government of Rwanda and its partners in elaboration of policies related to promotion of household savings. The findings from this study can also useful for other researchers dealing with related studies.

The paper is presented in six sections. Section two deals with the background of Rwanda's recent history regarding its economic situation, economic policies, and savings followed by literature review in section three covering the determinants of savings from previous studies, dealing with various countries around the world.

In the fourth section the data and empirical methodology for this study are presented, along with a theoretical discussion about how we expect our explanatory variables to affect the likelihood of a household having a savings account. After that there is a section on findings and discussions, and the last section provides a conclusion.

2. Background

Government of Rwanda made substantial efforts to promote the private sector after the 1994 genocide, and since 2002, GDP growth in average was around eight percent even during the global financial crisis in which many problems faced Rwanda. Extreme poverty in Rwanda has dropped from 40% to 24% in 2000 and 2011 respectively. But, the share of the citizens below the poverty line was still high with 44.9% in 2011 (National Institute of Statistics of Rwanda, 2011). Sustained growth is necessary to lift a large number of people out of poverty, and if the economy does not have a vibrant private sector, for which savings are

very important, it is impossible to have sustained growth. The most dominant sectors in Rwanda are Agriculture and Services, which together contribute to greater than 80% of GDP.

Rwanda has recently had persistent current account and balance of payments deficits, which in part can be associated with the limited diversification of the Rwandan economy. As noted by Republic of Rwanda, Ministry of Trade and Industry (2010) the primary export earnings for Rwanda arise from few beverages in particular, tea, coffee, and some ores such as tin, niobium, tantalum and tungsten, which accounted for greater than 80% of Rwanda's export earnings during 1997 to 2007, and as a result of international price volatilities and this commodities-exports dependence, exports have declined over the years. This background shows that much needs to be done to diversify the Rwandan economy and increase its growth. Ultimately the availability of domestic and foreign savings will be important to promote the private sector in helping achieve these goals.

The evolution of domestic savings of Rwanda and other East African Community (EAC) countries members is displayed in Figure 1.

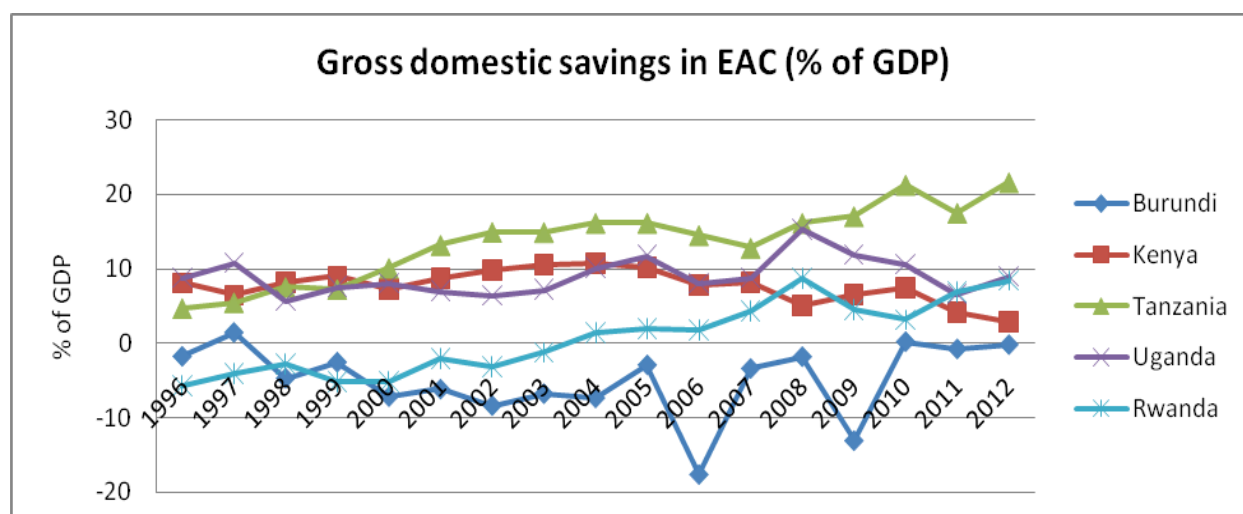


Figure 1: Gross domestic savings of countries in the East African Community
Source: World Bank (2013). World Development Indicators, November 2014

The figure demonstrates that there is an increase of gross domestic savings of Rwanda from -6% in 1996 to 8% in 2012 but it is still very low. For instance, a comparison of domestic savings of Rwanda and Tanzania shows that in 2012 domestic savings was 8% of GDP in Rwanda while it was 22% of GDP in Tanzania. The average of domestic savings between 1996 and 2012 was 0.7% of GDP in Rwanda and 14% of GDP in Tanzania. The domestic savings rate of Rwanda is among the lowest in the five countries of EAC. In order to have a sustainable economy with sufficient autonomy in investment it is very important to promote savings. This study is limited to investigating the behaviour of households regarding their savings.

Several mid and long-term plans have been formulated and implemented in Rwanda to promote savings. Different cooperatives of credits and savings have been created for the lower economic segments of society as one of the strategies of increasing savings. Savings can be used in different activities like investment, job creation and income generation. Unfortunately, studies on determinants of savings are very limited in Rwanda.

3. Literature review

As noted by Lewis (1970) higher investment results from higher savings, and if there exist idle production factors—land, labour and capital—that higher investment will result in higher real output and employment. The following paragraphs discuss studies conducted on the importance of savings and factors that explain savings at household level.

From around the world the interface of “savings” and “growth” was analysed by researchers, but different methods, techniques and data have led to conflicting results. Some studies have found the causality between these variables running in both directions, so they reinforce each other (Schmidt-Hebber, Serven & Solimano, 1996). Other studies found unidirectional causality for instance Ruranga, Ocaya & Kaberuka (2014) and Ramesh (2011) found that effects come from savings to economic growth, with the reverse causality apparently absent, while Verma (2007), Mühleisen (1997), Sinha & Sinha (2007), and Samantaraya & Patra (2014) found the opposite, with growth causing saving but not vice versa. In contrast to all of the above findings on causality, Sinha (1996) found that causality was not observable in any direction.

Kulikov, Paabut, and Staehr (2007) conducted a study on determinants of Estonian household savings, came up with a number of findings. First, they found that the amount savings is positively affected by higher income levels. They also found the amount of savings is not affected by real-estate ownership, but lower savings were associated with possessing durable goods, e.g. automobiles. Furthermore, they found that household savings were reduced by a household’s accumulation of wealth in deposits and other forms of financial assets, and by the household having greater access to liquidity.

Additionally, they found that household savings tended to be lower when a household had greater debt and leasing liabilities and when a household had greater existing debt-servicing payments. Finally, they concluded the propensity to save is greater for households having young or old household heads, and savings are lower for households that have higher education as being the highest education level among the adult household members.

Abdelkhalek, Arestoff, Freitas, and Mage (2010) investigated urban-rural differences in the microeconomic determinants of Moroccan household savings. They determined that the amount of savings is strongly significant in affecting current income when considering urban households but that was not the case for rural ones, while for rural household’s literacy is a strong determinant of household savings in statistical significance, but that that is not the case for urban households. In considering how age of household head affected savings, they found no support for the life-cycle hypothesis. Regarding the size of the household, they found that that mattered for urban households, for which greater household size tended to lower household savings, and they found that except for those with the highest incomes, urban households having female heads tended to save more than male-headed urban households.

Mumin, Razak, and Domanban (2013) conducted a research on motivations of household’s savings using a logit regression. Their results indicate that the decision of household heads to save is positively and significantly affected by value of assets, educational status, having a commitment with a financial institution, and having recently faced a negative shock (funeral, job loss, or business loss). Their results also indicate that the decision of household heads to save is negatively affected by the number of net dependents (the number of dependents minus how many independent household members there are), the household head being male, and the household head being Muslim. Ogbokor and Samahiya (2014) in a cointegration-model determined that, regarding long-run relationships, the amount of savings is positively related to inflation and income and negatively related to the population growth rate.

This literature review has shown the results of different studies on different countries regarding the determinants of household savings and has shown that there are conflicting findings. Some factors are statistically significant in some countries but not significant in others, and also signs were positive in some countries and a negative in others. For instance, as noted above Kulikov, Paabut & Staehr (2007) found

higher education is associated with lower savings while Mumin, Razak & Domanban (2013) found it is associated with higher savings. This review shows that when considering what are the important determinants of household savings for any particular country, it is inappropriate to assume that they are the same as those found in a study for a different country. This has motivated us to conduct this study.

4. Data and Methodology

This study uses Integrated Household Living Conditions Survey 2010/11 data, which has detailed information on households' socio-economic characteristics. This data was collected by NISR through survey fieldwork. The information on household savings is limited to financial household savings. What is investigated in our empirical analysis is the likelihood of a household having a savings account. For this purpose, we use data on a variable that assumes the value of 1 if the answer on the household having savings in an established institution is yes and 0 for no. In this paper the terminology "having a savings account" is treated as equivalent to "having savings in an established institution."

The independent variables for explaining the likelihood of a household having a savings account capture poverty status, age, gender, area of residence and education level. Poverty level has three categories based on the per-adult equivalent annual consumption of the household in January 2001 prices: *non-poor*—at least 64,000 Rwandan francs, *moderately poor*—below 64,000 Rwandan francs but at least 45,000 Rwandan francs, and *extremely poor*—below 45,000 Rwandan francs. According to NISR (2012), page 10, the "poverty line was set with reference to a minimum food consumption basket, which was judged to offer the required number of calories required for a Rwandan who was likely to be involved in physically demanding work, along with an allowance for non-food consumption" and the "extreme poverty line was also set as the cost of buying the food consumption basket if nothing was spent on non-food at all."

The main explanatory variables used in this study are given below.

1. *APL*: Dummy variable for being above the poverty line, where 1 stands for above the poverty line and 0 if not.
2. *AEPL*: Dummy variable for being above the extreme poverty line, where 1 stands for above the extreme poverty line and 0 if not.
3. *AGE*: Age of household head.
4. *MALE*: Dummy variable for the household head sex; 1 for male and 0 for female.
5. *URBAN*: Area of residence assumes the value of 1 for urban and 0 for rural.
6. *LIT*: Dummy for the household head education; where 1 stands for literate of household head and 0 for illiterate.

Given the definitions for *APL* and *AEPL*, a non-poor household would have both of these dummy variables take on a value of 1, a moderately poor household would have *APL* equal to 0 and *AEPL* equal to 1, and an extremely poor household would have both of these dummy variables take on a value of 0.

The empirical model for the current study is a logit model. The most basic form of that model used in this study is formulated as

$$L = \alpha_0 + \alpha_1 APL + \alpha_2 AEPL + \alpha_3 AGE + \alpha_4 MALE + \alpha_5 URBAN + \alpha_6 LIT + \varepsilon \quad (1)$$

where L is the log of the odds ratio of a household having a savings account against it not having a savings account, the explanatory variables *APL*, *AEPL*, *AGE*, *MALE*, *URBAN* and *LIT* are as defined above, α_j for $j = 0, 1, 2, \dots, 6$ are constants, and ε is the error term. We also extend the above model with interaction terms that involve *LIT*. It allows to understand the influence of literacy level on the estimated probability of having a savings account depends on the age of the household head, and whether literacy is more important or less important in urban than in rural areas for the likelihood of a household having a savings account.

Our *a priori* theoretical expectations on the signs of the coefficients in equation (1) are: The coefficients α_1 and α_2 we expect to be positive, as a greater financial resource base for a household (reflected by moving to above the poverty line or to above the extreme poverty line) is likely to be associated with a greater demand for having part of those resources placed in a savings account. Theoretically the coefficient α_3 could be argued to be positive as older household heads may be more concerned about the security of their savings—if they lose part of their savings, they have less expected years than younger household heads for earning back the equivalent amount—whereas it could also be argued to be negative as younger households may be more open to utilizing savings accounts, which were less frequently used in the past in Rwanda. Regarding α_4 we have no *a priori* sign expectation but do consider that gender of the household head could affect the likelihood of a household having a savings account due to possible differences between the genders regarding risk attitude and life expectancy.

The coefficient α_5 we expect to be positive as urban households are more likely to be near physical banks in which they can open a savings account and are more likely to be comfortable with the greater institutional support that urban life entails. The coefficient α_6 we also expect to be positive for reasons noted in the introduction—literacy is needed for the household head to feel comfortable with signing a savings-account contract, and higher-educated individuals would likely have a better understanding of the benefits from having a savings account and would be less likely to be involved in the informal sector due to the greater job opportunities available with more education.

5. Findings and discussion

5.1 Descriptive Statistics

Table 1 presents a comparative outlook of holding savings accounts from the results of Integrated Household Living Conditions Surveys (IHLCS) of 2000/01, 2005/06 and 2010/11. This table shows that the percentage of households with a savings account has increased from 22.5% in the 2000/01 survey to 59.4% in the 2010/11 survey. This more-than-doubling of the percentage of households with a savings account over a decade is suggestive that overall savings of households has increased dramatically. This increase can be attributed to the government's strategic efforts.

Table 1: Households with saving accounts

	IHLCS 2000/01		IHLCS 2005/06		IHLCS 2010/11	
	Number	%	Number	%	Number	%
Yes	1,458	22.5	1,873	43.3	5,516	59.4
No	5,014	77.5	2,451	56.7	3,771	40.6
Total	6,472	100.0	4,324	100.0	9,287	100.0

Source: NISR, datasets of IHLCS 2000/01, IHLCS 2005/06 and IHLCS 2010/11.

Descriptive statistics on the relationship between saving in an established institution and variables used in this research are presented in Table 2. These descriptive statistics show that in urban areas 84% of households have a savings account and in rural areas it is only 55%. For non-poor the percentages of households having a savings account are 68% while it is 47% for the poor and 40% for the extremely poor. Based on household head characteristics, these percentages are 62% for males, 52% for females, 54% for literates and 41% for illiterates. The household-head age distribution covered in the full sample of 9287 households in the IHLCS 2010/11 survey is 16 to 98 years, with a mean of 44.31 years.

Table 2: Savings accounts by area of residence, poverty status, and gender and education of head

		Area of residence				Poverty status						Gender				Education			
		Urban		Rural		Extremel y poor		Moderate ly poor		Non- poor		Male		Female		Illiterate		Literate	
		Num ber	%	Num ber	%	Num ber	%	Num ber	%	Num ber	%	Num ber	%	Num ber	%	Num ber	%	Num ber	%
Saves in an establis hed institutio n	Yes	1306	84	4210	55	618	40	788	47	4110	68	4374	62	1142	52	1050	41	1732	54
	No	257	16	3514	45	924	60	872	53	1975	32	2713	38	1058	48	1497	59	1454	46
	Tot al	1563	10 0	7724	10 0	1542	10 0	1660	10 0	6085	10 0	7087	10 0	2200	10 0	2547	10 0	3186	10 0

Source: NISR, datasets of IHLCS 2010/11.

In the regressions discussed in the next session, not all of the 9287 observations in the survey will be used due to missing values for literacy status of the household head, which is an important variable to include in the regressions. Unfortunately limiting the observations to those in which literacy status is observable results in a 38% drop in the number of observations to 5733. The mean household-head age for these 5733 individuals rises from 44.31 to 46.86, and the minimum and maximum household-head ages are 17 and 97 rather than 16 and 98 found in the 9287 observations in the overall survey. In Table 3 we provide descriptive statistics on this more limited set of data regarding overall numbers on whether households have savings accounts, and how these numbers are related to residence, poverty and gender.

Table 3: Descriptive statistics on households having savings accounts, overall and according to residence, poverty and gender, based on data in which literacy status of head is reported

		Area of residence				Poverty status						Gender				Overall	
		Urban		Rural		Extremely poor		Moderate ly Poor		Non-poor		Male		Female			
		Num ber	%	Num ber	%	Num ber	%	Num ber	%	Num ber	%	Num ber	%	Num ber	%		
Saves in an establis hed institutio n	Yes	341	64	2441	47	448	38	495	42	1839	55	2027	50	755	45	2782	48. 4
	No	194	36	2757	53	738	62	680	58	1533	45	2029	50	922	55	2951	51. 5
	Tot al	535	10 0	5198	10 0	1186	10 0	1175	10 0	3372	10 0	4056	10 0	1677	10 0	5733	10 0

Source: NISR, datasets of IHLCS 2010/11.

In comparing Table 3 information to that presented in Tables 1 and 2, we can see substantial differences regarding percentages of households having a saving account. In the more general set of 9287 observations, 59.4% have a savings account, whereas in this more limited set of observations only 48.4% have one. In

comparing Tables 2 and 3, it seems that the categories affected most by this are urban households, non-poor households, and male-headed households, for which drop respectively to 20, 13, and 12 percentage. Consideration of the regression results in the next section should be considered carefully given this information about the effect of limiting the data to that in which literacy of the household head is reported. With the noted biases above on which groups are most affected by using this more limited data, we suspect that our results from the logit regressions are somewhat conservative in considering the positive effects from urban residency, non-poor status, and having a male head on the likelihood of a household having a savings account.

5.2 Empirical findings

Logit models were used in analysis of households having savings accounts and the findings from the estimations of those models are presented in Table 4. Column (I) provides the results from the estimation of equation (1), i.e. when there are no interaction terms. The results of this estimated logit model indicate a highly significantly positive relationship (i.e. at the 1% significance level), between the likelihood of a household having a savings account and each of the following:

- Household being non-poor rather than moderately poor
- Household residing in an urban area rather than a rural one
- Household having a male head rather than a female one
- Household having an older head
- Household having a literate head rather than an illiterate one.

The findings also reveal a positive relationship between the likelihood of a household having a savings account and the household being moderately poor rather than extremely poor, but the significance there is between the 5% and 10% level.

The signs of the coefficient estimates are consistent with our *a priori* expectations noted at the end of Section 4. Based on the coefficient estimate magnitudes, it appears that among the variables that are simply dummy variables (i.e. all of them except *AGE*), the strongest effects on a household having a savings account come from having it reside in an urban area, having it contain a literate head, and having it be above the poverty line.

Table 4: Logit model estimates

	(i) No interaction terms	(ii) With five interaction terms involving <i>LIT</i>	(iii) With two interaction terms involving <i>LIT</i>
Above the poverty line (<i>APL</i>)	0.462*** (0.070)	0.290*** (0.106)	0.319*** (0.946)
Above the extreme poverty line (<i>AEPL</i>)	0.159* (0.085)	0.205* (0.125)	0.164* (0.085)
Age of household head (<i>AGE</i>)	0.014*** (0.002)	0.017*** (0.003)	0.018*** (0.003)
residence in an urban area (<i>URBAN</i>)	0.608*** (0.096)	0.639*** (0.152)	0.598*** (0.096)
Male household head (<i>MALE</i>)	0.209*** (0.065)	0.147* (0.088)	0.216*** (0.065)
Literate household head (<i>LIT</i>)	0.566*** (0.059)	0.653** (0.255)	0.773*** (0.192)
Literate household head and above the poverty line (<i>LIT</i> × <i>APL</i>)		0.290 (0.141)	0.241** (0.112)
Literate household head and above the extreme poverty line (<i>LIT</i> × <i>AEPL</i>)		-0.080 (0.171)	
Literate household head times age (<i>LIT</i> × <i>AGE</i>)		-0.006* (0.004)	-0.007*** (0.004)
Literate household & urban (<i>LIT</i> × <i>URBAN</i>)		-0.071 (0.196)	
Literate household & male (<i>LIT</i> × <i>MALE</i>)		0.154 (0.131)	
Constant	-1.630*** (0.133)	-1.706*** (0.187)	1.765*** (0.000)
Pseudo R ²	0.0382	0.0395	0.0393

Dependent variable: Logit based on household having a savings account (1) or not (0).

Number of observations is 5733. Standard error is shown in parentheses.

***=significant at 1% level, **=significant at 5% level, *=significant at 10% level.

Column (ii) estimates a similar model, with five interaction terms included, interacting whether the household head is literate or not with each of the other explanatory variable in column (i). We see here rather weak statistical significance of these interaction terms. Among the results we see here is that the effect of the household being in an urban area on the savings account does not appear to depend much on whether the household head is literate or not, and the effect of the household being literate on the likelihood of the household having a savings account does not appear to depend much on whether the household is residing in an urban area or not.

The three least significant estimates among the interaction terms were those for *LIT* × *AEPL*, *LIT* × *URBAN*, and *LIT* × *MALE*. After dropping these interaction terms, the remaining two interaction terms, for *LIT* × *APL* and *LIT* × *AGE*, do obtain reasonably significant coefficient estimates. When comparing the estimates

from columns (i), (ii) and (iii), the non-interaction independent variables seem to have similar estimates, although with interaction terms the magnitude of the *APL* coefficient estimate falls while the magnitude of the *LIT* coefficient estimate rises.

We considered providing a presentation of the marginal effects for each independent variable for each of the three models, with the marginal effect being that from one independent variable on the estimated probability of a household having a savings account, assuming other variables were at their means. However that is arguably a misleading exercise given (a) most of the “other” variables typically cannot take on their mean values in reality since they are dummy variables (so they can only be 0 or 1) and (b) the all-else-equal assumption cannot be implemented in some cases, particularly due to the inclusion of three categories for poverty status of the household (non-poor, moderately poor, and neither of those two, i.e. extremely poor) and the inclusion of the interaction terms in models (ii) and (iii).

Regarding the interpretation of these coefficient estimates we will focus on the last model—that presented in column (iii)—and consider how the probabilities vary for different assumptions of household head’s poverty, residence, and the age and literacy status. Table 5 presents a selected set of scenarios regarding these characteristics. The first scenario, referred to as the “base case” uses assumptions on these characteristics that are closest to those most commonly found in the households in the survey in which information on the literacy of the household head is available: a rural non-poor household headed by 47-year-old literate male. For such a household, the estimated probability of the household having a savings account is 73.9%.¹

¹ This calculation and similar calculations in Tables 5, 6, and 7 are based on finding the estimated logit value \hat{L} from the logit regression for a given set of explanatory variable values, i.e. an estimate for $\ln\left(\frac{p}{1-p}\right)$ where p is the probability of the household having a savings account, and then setting $\ln\left(\frac{\hat{p}}{1-\hat{p}}\right) = \hat{L}$ and solving for \hat{p} to get an estimate of the probability a household has a savings account. This results in the applied formula $\hat{p} = \frac{\exp(\hat{L})}{1 + \exp(\hat{L})}$.

Table 5: Estimated Probabilities for a Household Having a Savings Account for Various Scenarios^a

Scenario	Assumed Variable Values: <i>APL/AEPL/AGE/URBAN/MALE/LIT</i>	Estimated percentage	Percentage point change in estimated probability compared to base case
Base case	1/1/47/0/1/1	60.9%	0
Moderately poor	0/1/47/0/1/1	47.1%	-13.8
Extremely poor	0/0/47/0/1/1	43.1%	-17.8
22-year-old head	1/1/22/0/1/1	54.5%	-6.4
Urban	1/1/47/1/1/1	73.9%	13.0
Female head	1/1/47/0/1/1	55.7%	-5.3
Non-literate head	1/1/47/0/1/0	44.4%	-16.5
Extremely poor & Rural & 22-year-old non-literate female head	0/0/22/0/0/0	20.2%	-40.7

^aBased-on estimate results from model (iii) in Table 4.

The other scenarios presented in Table 5 are the same as the base scenario except with noted changes in one or more variables. If the household is moderately poor instead of non-poor, but otherwise has the same characteristics as in the base case, then the probability of the household having a savings account drops to 47.1% and if it is extremely poor instead that probability drops by 17.8 percentage points to 43.1%. If the household has a non-literate household head instead of a literate one, but otherwise has the same characteristics as in the base case, then the probability of the household having a savings account drops by 16.5 percentage points to 44.4% – a stronger effect than dropping to moderate poverty but not as strong of an effect as dropping to extreme poverty. In comparison to the base case, if the household is in an urban area the probability of having savings account rises 13 to 73.9%. If the household is an extremely poor rural one with a 22-year-old non-literate female head, then the likelihood of it having a savings account is 20.2%, 40.1 percentage points lower than the base case.

In order to determine the likelihood of having a savings account we have considered the interaction between literacy and the poverty status of the household. In table 6 we have presented various scenarios varying the literacy status and poverty status. Table 6 indicates that, having the household head be literate increases the estimated probability of having a savings account by 16.5 percentage points (44.4% to 60.9%) for non-poor households, but it increases that probability for the moderately poor by only 10.4 percentage points (36.7% to 47.1%) and for the extremely poor by only 10.1 percentage points (33.0% to 43.1%).

Table 6: Estimated Probabilities for Having a Savings Account for Various Scenarios, for a Rural household with a 47-year-old Male Head^a

	Extremely poor	Moderately poor	Not poor
Literate head	43.1%	47.1%	60.9%
Non-literate head	33.0%	36.7%	44.4%

^aBased-on estimate results from model (iii) in Table 4.

Table 7 considers the interaction between literacy and the age. In considering the positive effect that having a literate head has on the likelihood a household having a savings account, what we see is that this effect is stronger for households with younger household heads. As indicated by Table 7, having the household head be literate increases the estimated probability of having a savings account by 20.7 percentage points (33.8% to 54.5%) for households with 22-year-old heads, but it increases that probability for households with 47-year-old heads by only 16.5 percentage points (44.4% to 60.9%).

Table 7: Estimated Probabilities for Having a Savings Account for Various Scenarios, for a Non-Poor Rural household with a Male Head^a

	Age 22	Age 47
Literate Head	54.5%	60.9%
Non-Literate Head	33.8%	44.4%

^aBased-on estimate results from model (iii) in Table 4.

In considering the policy implications of these results, it is useful to note that the literacy, the area of residence, and the poverty all have strong effects on a household's probability of having a savings account. Policies that support expanding the literacy rate in the nation and that support poverty reduction would tend to lift the number of households having a savings account. Fortunately, such policies are hardly controversial—reducing poverty and improving literacy rates are admirable goals in themselves and help the nation in many ways.

This study indicates that lifting literacy rates among young adults and among the non-poor would be especially useful in lifting the proportion of households with a savings account, but with the latter finding one must also consider that lifting literacy among the extremely poor and moderately poor can improve their financial situation which can also increase their likelihood of having a savings account. Policies that support urbanization of the population would also help improve the probability of households having savings accounts, but in this case, there could be questions of whether greater urbanization is desirable or not when considering the overall welfare of the country.

6. Conclusion

An analysis of the determinants of whether Rwandan households have savings accounts or not has been conducted in this study using estimates of logit models. The explanatory variables covered household head's poverty status, age, gender, urban or rural residence and education (literate or not). Among the results are that more urbanization, greater literacy rates, and less poverty would tend to increase the proportion of households with savings accounts. Also, households having male heads and those having older heads have higher probability of having a savings account than those who do not.

Observing the trend of the proportion of households with a savings account from surveys in 2000/01 and 2010/11, we can see that that proportion has more than doubled over a decade. This may have been driven by greater urbanization, higher literacy rates, and lowering poverty during this period, and arguably has also been driven by government policies aimed at increasing gross domestic savings. Fortunately, policies aimed at the non-controversial goals of increasing literacy rates and decreasing poverty are consistent with the goal of increasing the proportion of households with savings accounts, which, we can hope, would be associated with higher savings generally.

References

1. Abdelkhalek, T., Arestoff, F., Freitas, N. & Mage, S. (2010). A Microeconometric Analysis of Households Savings Determinants in Morocco. *African Review of Money Finance and Banking*, pp. 7-27.
2. Kulikov, D., Paabut, A., & Staehr, K. (2007). A Microeconometric Analysis of Household Saving in Estonia: Income, Wealth and Financial Exposure, Bank of Estonia. *Working Paper Series 8/2007*.
3. Lewis, A. (1970). *Theory of Economic Growth*, George Allen and Unwin Limited, London.
4. Mühleisen, M. (1997). Improving India's Saving Performance, *IMF Working Paper WP197/4*.
5. National Institute of Statistics of Rwanda (NISR) (2011). *The third Integrated Household Living Conditions Survey -EICV3, Main Indicators Report*.
6. National Institute of Statistics of Rwanda (NISR) (2012). *The Evolution of Poverty in Rwanda from 2000 to 2011: Results from the Household Surveys (EICV)*.
7. Mumin, Y. A., Razak, A., & Domanban, P. B. (2013). Analysis of household heads' decision-to-save with financial institutions in Ghana. *Asian Economic and Financial Review*, 3(11), 1466-1478.
8. Ogbokor, C.A., & Samahiya, O. M (2014). A Time Series Analysis of the determinants of Savings in Namibia, *Journal of Economics and Sustainable Development*, 5 (8), 52-63.
9. Ramesh, J. (2011). Causal Relationship between Saving, Investment and Economic Growth for India – What does the Relation Imply? Reserve Bank of India Occasional Papers 32 (1), summer 2011.
10. Republic of Rwanda, Ministry of Trade and Industry (2010). *Rwanda Trade Policy*, Kigali, September 2010.
11. Ruranga, C., Ocaya, B., & Kaberuka, W, (2014). VAR Analysis of Economic Growth, Domestic Investment, Foreign Direct Investment, Domestic Savings and Trade in Rwanda. *Greener Journal of Economics and Accountancy*, 3 (2), 030-041.
12. Samantaraya, A., & Patra, S. K. (2014). Determinants of Household Savings in India: An Empirical Analysis Using ARDL Approach. *Economics Research International*, Volume 2014, Article ID 454675, pp. 1-8.

13. Schmidt-Hebber, K., Serven, L., & Solimano, A. (1996). Saving and Investment: Paradigms, Puzzles, Policies. *The World Bank Research Observer*, 11(1), 87-117.
14. Sinha, D. (1996). Saving and economic growth in India. *Economia Internazionale* 4(49), 637-647.
15. Sinha, D., & Sinha, T. (2007). Relationships among Household Saving, Public Saving, Corporate Saving and Economic Growth in India, MPRA Paper No. 2597.
16. Verma, R. (2007). Savings, investment and growth in India: an application of the ARDL bounds testing approach. *South Asia Economic Journal*, 8(1), 87-98.