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Determinants of Rural Households Saving in Goncha Siso Enesie Woreda: Evidence from Double-Hurdle Modeling Approach

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Abstract

Households' savings are crucial for the households themselves. It is a prerequisite for enhancing or preserving the household members' quality of life. Certain households require more consumer items, which are more expensive, and are impossible for average households to have unless they save for a long time. Hence, this study investigated, the factors influencing the saving habits of rural households in Goncha Siso Enesie Woreda, East Gojjam Zone, Amhara Region, Ethiopia. In order to address its objective, the study used the double hurdle model and descriptive methods of data analysis. The first hurdle (pobit) model results confirmed that age, marital status, and educational attainment of the household head have a positive and significant effect on households' decisions to save, while age square, dependency ratio and distance to financial institutions have a negative effect. The second hurdle (truncated) model findings revealed that amount that households save depends on a variety of factors. While festival expenses and dependency ratio significantly reduced household savings, the income of the head of the household, size of landholding, and livestock ownership affect the amount of savings positively and significantly. Hence, in order to improve households' saving habits, it is desirable that the government become involved in helping rural households to develop their capacity for information and education regarding savings, as well as in encouraging financial institutions to provide door-to-door service.

Keywords: Determinants; Saving; Double Hurdle Model; Goncha Siso Enesie; Ethiopia

1. Introduction

Saving is the most fundamental economic factor to be studied at individual and/or household levels within an economy. Savings is a macroeconomic factor that has a significant impact on the nation's economic expansion. However, to comprehend household saving behavior as well as factors of household saving, a microeconomic theory based on individual choices and preferences must be developed (Aidoo-Mensah, 2018).

The decline in agricultural savings has a noticeable impact on a farmer's ability to survive. It is well recognized that the more money saved, the higher the future return

would be gained (Mariano *et al*., 2012; Suvedi *et al*., 2017). Moreover, other household expenses like children's education, balancing consumption in off-seasons, and unplanned shocks like illness or other emergencies could be covered by increasing savings. This suggests that the welfare and development of rural residents depend on their savings (Ogheneruemu and Oladapo, 2021).

According to Aidoo-Mensah (2018), Ethiopia's saving rate, especially in rural regions, is incredibly low, and little is empirically known about its behavior and drivers. Agricultural income is the primary source of savings in rural Ethiopia. Because of the seasonality of employment availability and the income flow from the sale of agricultural products, it is sometimes described as periodic and irregular.

According to Aron *et al*. (2016), lack of incentives, low interest rates inadequate infrastructure, limited access to financial institutions, and the nation's high inflation rates are some of the major economic variables that have an impact on saving culture. Poor saving habits are mostly determined by societal attitudes toward consumption rather than saving.

Ethiopia's population is largely composed of rural households with low literacy rates. The bulk of the farming population consists of subsistence farmers who have limited access to loans, poor farmland, insufficient fertilizer, and poor-quality seeds (Zerssa *et al*., 2021). For this reason, poor income, low savings, and low capital accumulation are typical characteristics of smallholder farmers. Accordingly, inadequate loans, shoddy infrastructure, and ineffective transportation networks all impede rural development (Mazengiya *et al*., 2022).

Ethiopia is the second-most populous country in Africa after Nigeria, and it also has the fastest-growing economy in the region (World Bank, 2019). About 79% of the population in the country is in rural areas. Because of this, it is also among the least developed countries; the 2018 United Nations Human Development Index (UNHDI) ranked it 175th out of 189 nations worldwide. Human Development Index of the country in 2017 was 0.463 that was lower than the average for low-human-development countries (0.504) and Sub-Saharan African countries (0.537) (UNDP, 2017).

Ethiopia's population is mostly composed of rural households with low literacy rates. Subsistence farmers make up the bulk of the farming community because they lack access to financing and are unable to use improved lands, high-quality seeds, and adequate fertilizer. Consequently, low income, low savings, and low capital accumulation are typical characteristics of smallholders in the rural areas. Accordingly, inadequate infrastructure, inadequate transportation, and a lack of financing all impede rural development (Mazengiya *et al*., 2022).

Rural households in Amhara Regional State typically have low saving mobilization, as their low capacity to cover their basic requirements especially at times of shocks (Mazengiya *et al*., 2022). There are several reasons for this. First, most field research has been done at the macroeconomic level and has focused more on urban regions than rural ones at the individual or family level.

On the other hand, a lot has happened recently in the region in relation to the growth of financial institutions, which portrays life for the great majority of people who live in rural areas. Second, both rural and urban areas have been included in the meager empirical research on household savings that has been done in Ethiopia. This combined research ignores the differences in variability between rural and urban homes by assuming a representative household agent (Agergaard *et al*., 2019).

Consequently, since rural areas have gotten less attention in the district, so no research has attempted to identify factors influencing the saving habits of rural households within the study area. Thus, the objective of this study was to examine the main factors influencing rural households' savings habits at the household head level, with in the study area of Goncha Siso Enesie Woreda of the East Gojjam Zone.

2. Data and Methods

2.1.Description of the Study Area

This study was conducted in Goncha Siso Enesie Woreda which is found on the Northern part of the East Gojjam zone and the Southern part of the Amhara region. It is approximately 151 km from the capital city of the Amhara region, Bahir Dar and 336 km from the capital city of Ethiopia, Addis Ababa along the main road from Addis Ababa to Bahir Dar through Bichena and Motta. This woreda is bordered by the south Enarji Enawuga woreda, in the North South Gondor zone, in the West Hulet Eju Enesie and Sedie woredas and in the East Enbesie Sar Miderworeda.

It has a total population of 171,954 (52% female) and the remaining 48% are male. Regarding to religion, the study area is home to both Muslims and Orthodox Christians. 93.88 % of populations live in rural areas. The livelihood of the rural community depends on rain-fed agriculture and irrigation. Crop and livestock production are the main sources of income for households in the woreda (Goncha Siso Enesie Woreda Office of Agriculture, 2023).

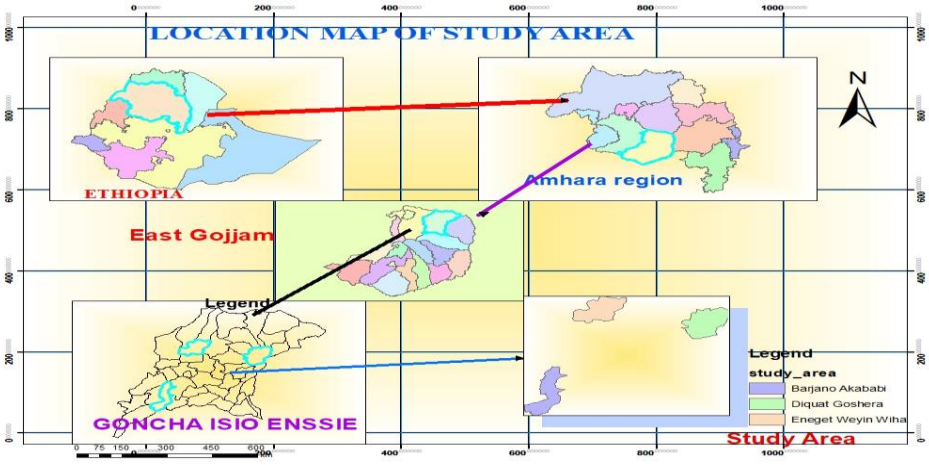

Figure 1. Map of the study area

Source: Own construction using ARC-GIS, 2023

2.2.Data Type and Source

To achieve its objective the study mainly made use of primary data collected from selected household heads. The required data gathered using a combination of closed-ended and open-ended structured questionnaires that relied on a number of institutional, socioeconomic, and demographic characteristics. To better communicate the questionnaire to the rural participants, it was translated into Amharic, the language spoken in the study area. Finally, data was gathered by trained and experienced data enumerators.

2.3.Sample size and Sampling Technique

This study adopted Yamane's (1967) simplified sample size determination formula to calculate the sample size at a 95% confidence level and a 5% precision level (e).

$$n = \frac{N}{1+Ne^2} = \frac{29319}{1+29319(0.05)^2} \cong 395$$

Where, N is the total number of rural households which was 29319 (Goncha Siso Enesie Woreda Office of Agriculture, 2023) in the rural Kebeles and e represents precision level (5%). As a result the formula determined the sample size of the study to be 395. Kebeles were selected based on stratified sampling procedure depending on their agro-ecology. Hence, Enegetwoinwuha, Barjano and Gosheradikuat kebeles were selected randomly from Kolla, Woina Dega and Dega agro-eclogies respectively. Finally, as indicated in Table 1, samples were selected based on the population proportion of each selected Kebele.

Table 1. Sample Size Determination

Agro-ecologies	Selected Kebeles from each Agro-ecology	Total Household (n)	Sample size $\boldsymbol{n1 = \frac{n * N1}{N}}$
Kola	Enegetwoinwuha	744	112
Woina dega	Barjano	995	150
Dega	Gosheradikuat	877	133
	Total	2616(N)	395(N1)

Source: Own computation, 2023

2.4. Estimation Techniques

Double-Hurdle model is a standard approaches for modeling decisions and the intensity of saving (Asfaw *et al*., 2023). Two distinct stochastic processes are used in this model, which is a generalization of the Tobit, to decide on participation and quantity. In the first hurdle, probit model was applied to examine the saving decisions of the studied households. In this case, saving decision is a dummy variable which takes the value 1 if a household decides to save and zero otherwise. In the second

hurdle, the extent (amount) of saving was analyzed using a truncated regression model (Mahoussi *et al*., 2021).

The double-hurdle model has a saving (D) decision with an equation:

$$D_i = 1, if\ D_i^* > 0, and$$

$$D_i = 0, if\ D_i^* \leq 0$$

$$D_i^* = \sum_{i=1}^{k} \alpha_i Z_i + u_i$$

Where D_i^* is a latent variable that takes the value 1 if a household decides to save and zero otherwise, Z is a vector of household characteristics which were expected to influence saving decision and α is a vector of parameters.

The intensity of saving (Y) has an equation:

$$Y_i = Y_i^*, if Y_i^* > 0, and\ Y_i^* > 0$$

$$Y_i = 0, Otherwise$$

$$Y_i^* = \sum_{i=1}^{k} \beta_i X_i + v_i$$

Where Y_i^* is the observed amount of saving, Xi is a vector of household characteristics which were expected to influence intensity of saving and β is a vector of parameter.

3. Results and Discussion

3.1. Descriptive Results

In the descriptive analysis of this study, the relationship between dependent and independent variables was assessed, compared, and examined using descriptive statistics (frequencies, percentages, means and standard deviation) and inferential statistics (chi squared test and t-test).

Table 3 compares categorical variables using the chi-squared test and frequency counts. This study shows that out of all the sampled households, 223 (56.46%) are non-savers and 172 (43.54%) are savers in a formal financial institution.

Regarding marital status, 77.91% (134) of the respondents were married, 5.81% were single, and the remaining 12.79% and 3.49%, respectively, were divorced and widowed. This proved that married households save a larger percentage of their income because marriages have a significant role in financial planning and are ethically and socially responsible for the interests of the community (Sinha, 1998). These results were in line with those of Temam and Feleke (2018), but they differ from a study by Girma and Alemu (2015).

The gender of the household plays a significant role in determining household savings. As a result, 395 respondents in all were included in the survey; of these, 271 respondents, or 68.61% of the respondents, were men, and 124 respondents, or 31.39%, were women. Even then, just 16.28% of the sampled households' respondents were female savers, out of a total of 172 respondents, while (83.72%) of the respondents were male savers.

Due to this study area, women's financial capacities are inadequate because they typically participate in less or unpaid activities. These findings were similar to Temam and Feleke (2018).

Table 2. Description and Hypothesis of Variables

Variables	**Type and Measurement**	**Expected Sign**
Decision to Save	Discrete (saver=1 and not saver=0)	Dependent variable
Amount of saving	Continuous (birr)	Dependent variable
Sex	Discrete (male=1 and female=0)	+/-
Age	Continuous (number of year)	+
Marital status	Discrete (single =0, married =1, divorced=2, widowed=3)	+
Education Level	Category (illiterate=0 and literate=1)	+
Family size	Continuous (Number)	-
Dependency ratio	Continuous (number of dependent within the household)	-
Income	Continuous (Annual income in birr)	+
Land size	Continuous (cultivated land size in hectare)	+
Festival Expense	Continuous (annual festival expense in Birr)	-
Livestock	Continuous (livestock ownership in TLU)	+
Distance to financial institution	Continuous (km)	-

Source: Own construction based on literature review, 2023

Table 3. Summary of Categorical variables by saving decision

Variables	Category	Decision to save		Total (=395)	Chi-square
		Saver (n=172)	Non-saver (n=223)		
Marital status	Married	134 (77.91%)	124 (55.61%)	258 (65.32%)	25.61***
	Single	10 (5.81%)	17 (7.62%)	27 (6.84%)	
	Divorced	22 (12.79%)	47 (21.08%)	69 (17.47%)	
	Windowed	6 (3.49%)	35 (15.7%)	41 (10.38%)	
Sex of household head	Male	144 (83.72%)	127 (56.95%)	271 (68.61%)	32.31***
	Female	28 (16.28%)	96 (43.05%)	124 (31.39%)	
Education level	Literate	123 (71.51%)	62 (27.80%)	185 (46.84%)	74.50***
	Illiterate	49 (28.49%)	161(72.20%)	210 (53.16%)	

Note: *** stand for significance at 1% level of significance.
Source: Own survey, 2023

The results indicate that 123 households (71.51%) with literacy levels decided to save, compared to 49 households (28.49%) with illiteracy levels decided to save. More people were illiterate in the populations of underdeveloped nations. In the study area, 210 respondents (53.16%) were illiterate, compared to 185 respondents (46.84%) who were household heads who could read and write. It implies that literate households save more money than illiterate ones do. This result is consistent with a survey (Ashiku and Olldashi, 2016) that found household knowledge of saving rose in line with educational attainment.

Table 4. Summary of Continuous variables by saving decision

Variables	Decision to save		Total	t-test
	Saver (n = 172)	Non-saver (n=223)	(Combined)	
Age	39.09	43.56	11.59	-3.87
Family size	2.55	4.37	1.57	-13.88
Dependency ratio	0.09	0.36	0.21	-16.38
Land size	0.93	0.49	0.30	11.35***
Annual income	67688.95	47197.76	16172.58	16.04***
Distance to financial institution	12.67	19.74	4.58	
Livestock ownership(TLU)	4.37	2.67	1.36	
Annual festival expense	7449.42	10758.71	2826.77	-14.16

Note: *** stand for significance at 1% level of significance.
Source: Own survey, 2023

According to Table 4, the average size of land held by each household was 0.9 hectares for savers and 0.5 hectares for non-savers. The t-test supports the idea that land size is a factor in saving behavior for the sampled families, and there is a statistically significant positive correlation between household land and saving behavior.

From Table 4, on average, the land holding size per household was found to be on average 0.9 and 0.5 hectares for savers and non-savers, respectively. Therefore, land size is a means to being a saver for sampled households; this is justified by the t-test, and household land is statistically and positively related to the decision to save. The average annual income for savers and non-savers is on average 67688.95 and 47197.67 birr, respectively. The decision to save is statistically connected to annual income, as proven by the t-test. That is, the marginal tendency to save money is higher when income levels are higher.

For rural households in the research area, livestock is the most valuable asset. The size of cattle held by the studied households varied throughout the study area. The livestock number was converted to a tropical

livestock unit (TLU) in accordance with Strock *et al.* (1991). Based on the survey results (refer to Table 4), the sampled savers and non-savers had cattle with average sizes on average 4.37 and 2.67 TLU, respectively. The decision to save is statistically and favorably correlated with household livestock, as supported by the t-test.

3.2. Determinants of the Decision to Save

As it is indicated in table 5, about five of the seven explanatory variables that were included in the fitted model were shown to have a substantial impact on the saving decisions of the households. Households' age, education level, dependence ratio, marital status, and distance from a financial institution are all factors that greatly influence the decision to save in the first stage.

The results indicates that the married and divorced respondents were 14% and 12% respectively more likely decide to save than single respondents. According to this research married and divorced household heads make better decision to save compared from single households.

The results in Table 5 show that educated households are 9% more likely to save than non-educated households. This was due to the fact that educated household heads make wise financial decisions to save money for emergencies and future investments. It has a statistically significant effect on household head savings at the 1%. This is similar to the research conducted by Lidi *et al*. (2017). This is supported by the likelihood that education will raise households' capacity and knowledge of saving, as well as their likelihood of earning more money than less educated households.

As indicated in the regression result, dependency ratio has a negative sign. Moreover, dependency ratio has a statistically significant 1% level effect on household head savings in this study. This result is consistent with the study conducted by Saliya (2018) who revealed a negative influence of dependency ratio on the saving behavior of households.

The result in table 5 also show that a 1 km increase in the distance to financial institutions, on average leads to a decrease of 2.3% in the probability of decision to save by a household head. This is because distant financial institutions prevent families from accessing financial services (such as credit, loading, and saving), increase transaction costs, make it more difficult to obtain up-to-date financial information and services, and ultimately make them less inclined to save. This outcome agrees with the findings of Negeri and Kebede (2018).

3.3. Determinants of intensity (amount) of saving

As it is indicated in the second hurdle results (Table 5), only six of the ten explanatory factors that were included in the fitted model were shown to significantly affect the households' intensity to save. Factors that significantly explain the saving amount include; marital status, annual income of the household, dependency ratio, land size, annual festival expense, and number of livestock owned. As anticipated in theoretical and empirical literature, the amount of savings is significantly and positively influenced by the household head's annual income.

Table 5. Estimation of Double Hurdle Model

Variables	Double hurdle model				
	Probit (first hurdle)			Truncated (second hurdle)	
	Coef.	Std. Err.	ME	Coef.	Std. Err.
Sex	0.44	0.37	0.02	-177.47	225.63
Age	0.26**	0.13	0.16	125.39	76.24
Age square	-.003**	0.002	-0.0002	-1.56	0.915
Marital Status					
Married	2.06***	0.73	0.14	-1060.77***	396.99
Divorced	1.72**	0.82	0.12	-1230.26***	464.75
Widowed	1.45	1.02	0.10	-1730.59***	589.84
Education	1.22***	0.33	0.09		
Dependency ratio	-8.10***	-0.48	-0.48	-2122.25***	806.75
Family size				194.61	152.78
Annual income				0.025***	0.008
Land holding size				2079.23***	375.04
Annual festival expense				-0.11**	0.05
Livestock Ownership				167.6 **	81.87
Distance to financial institution	-.39***	0.06	-0.023		
Constant	0.04	2.50		-5.23	3.957

Note: ME denotes the marginal effect of the explanatory variables

***, ** and * indicates statistically significant at p<0.001, p<0.05, and p<0.1, respectively

Source: Own Survey, 2023

Households who earn more money are more likely to contribute the money they save. According to the double hurdle model, as the income of the household heads increases by 1 birr as a result of participating in various revenue-generating activities, their savings at formal financial institutions increase by 0.025 birr. This outcome is comparable to Obayelu (2012). This is also in line with the previous empirical research conducted by Qin and Ndiege (2013) and Horioka and Wan (2007).

The dependency ratio is the proportion of children and the elderly above 65 years of age relative to the working age. As indicated in the regression result, the dependency ratio has a negative sign and statistically

significant at 1%. The findings indicate that there was a decline to 2122.25 birr in amount to save among households with an increase in dependency ratio by one. This outcome is comparable to that of Obalola *et al*. (2018). This is because as the dependency ratio increases, households are expected to allocate more of their income on consumption expenditures, so there will be low or no income left for saving. As a result the amount of savings by a household head may decrease as the dependency ratio increases.

Livestock is considered as one of the determinants of household savings. As the tropical livestock increased by one unit, household savings increased by 167.6 birr on average, which is statistically significant at 5%. The results of this study were consistent with the research of Asfaw *et al.* (2023), who noted that the quantity of savings was positively and significantly correlated with livestock ownership. Similarly, Hailu *et al.* (2022) found a strong and positive correlation between the amount saved and livestock holding.

Annual expenditure on festival is measured in money that the household head spends on each festival in a year. Accordingly, the annual expenditure has a negative effect on household savings and is statistically significant at 5%. The regression result indicates that increase in expenditure on annual festivals decreases household head savings.

4. Conclusion and Recommendations

In order to achieve sustainable economic growth, it is important to increase the amount of savings going to actual investments through official, supervised financial institutions and to consolidate relatively small private savings into more substantial financial blocks that can be utilized to finance significant, lucrative investments. Economic literature attest that one of the policy tools used in Ethiopia to help rural households raise their output and productivity, encourage the adoption of new technology, expand the supply of inputs, and raise income is the mobilization of savings through microfinance institutions. This helps the households to lower their poverty and achieve food security.

The study revealed that variables such as annual income, age of household head, land size, level of education, access to financial institutions, expenditure on annual festivals, dependency ratio, marital status, and number of livestock owned by households were statistically significant explanatory variables that affect rural household savings in the study area.

The findings of this study led to the following recommendations. In rural areas, the accessibility and availability of financial institutions should be improved as a priority in policy interventions to encourage saving since their decisions to save and the amount they saved were negatively and statistically significantly impacted by the distance to financial institutions. Moreover, financial institution should expand their service by opening new branches and introducing door-to-door service which will improve the study area's investment and saving functions.

It is anticipated that as household education levels rise, so will public knowledge of the value of saving and saving institutions.

Therefore, focus should be placed on raising and enhancing households understanding of the need to save through formal education and awareness-building for rural households. Farmers will save more and experience less poverty if their knowledge and understanding on saving is improved, as they will have a more optimistic outlook on saving.

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