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# More Than Just Credit: Household Demand for (Micro)Financial Services in Rural Ghana


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**Abstract:**
This paper argues that the study of the demand for financial services in developing countries leaves out part of the story, if it looks at only one of the three elements of the so called finance trinity, i.e. savings products, loans, or insurances, as is largely done in the literature. In contrast to previous research, it is assumed that households' choice for any of these services is strongly interconnected. Therefore, the paper simultaneously estimates the determinants of household demand for savings, loans and insurances by applying a multivariate probit model on household survey data from rural Ghana. On the one hand, the estimation results confirm the common finding that poorer households are less likely to participate in the formal financial sector than better off households. On the other hand, there is empirical evidence that the usage of savings products, loans and insurances does not only depend on the socio-economic status of households, but also on various other factors, such as households' risk assessment and the past exposure to shocks. In addition, trust in the providing institution and its products appear to play a key role.



**Keywords:** Rural financial markets, financial services, Sub-Saharan Africa, Ghana

**JEL Code:** G20, O16, R22



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# 1 Introduction

A number of empirical studies have investigated the determinants of households' demand for financial services of the growing microfinance sector in developing countries (Muradoglu and Taskin 1996, Jabbar et al. 2002, Pal 2002, Bhat and Jain 2006, Gine et al. 2007, Swain 2007, Barslund and Tarp 2008).[1] Most of these studies concentrate on either loans or savings or insurance with a clear prominence of the first. This goes hand in hand with the past concentration on (micro)credit in policy-making and academic circles: 'Whereas savings were called the forgotten half of finance during the 1980s [...] one may consider insurance the forgotten third of finance during the 1990s' (Zeller and Sharma 2002: 39). Yet, there is a recent transition towards a more holistic concept of (micro)finance as practitioners have come to realise that 'low-income households can profit through access to a broader set of financial services than just credit' (Armendáriz and Murdoch 2005: 147). Many financial institutions have thus established deposit accounts – to the extent that the number of deposit accounts is more than double the number of outstanding loans in sub-Saharan Africa today (Lafourcade et al. 2005)[2] - and (micro)insurances enter the market in many countries.

Therefore, we believe that the study of the demand for financial services in developing countries leaves out part of the story, if it looks at only one of the three elements of the so called finance trinity. More than that, we assume that households' choice for loans, savings products and insurances is strongly interconnected for several reasons. First, users of one service may simply have an informational advantage over non-users in the sense that they learn about additional services "by accident" when visiting their respective financial institution. Second, users may have a higher level of financial literacy than non-users, i.e. a better understanding of the functioning of financial services, and may therefore better recognise the utility they may gain from using another service as well. And third, the determinants of the demand for loans, savings and insurances may be similar, much more than the existing literature suggests. As will be shown below, several determinants have only been considered in studies of either credit demand or savings demand or insurance demand even though they may potentially influence the demand for the respective other services as well. This is not to say that the effect of certain determinants is necessarily of the same sign for credit, savings, and insurance demand. In fact, this would be an implausible assumption, since a household's motivation to demand any financial service can be quite different for the same service, but also between the three services. As Zeller (2001) points out, financial

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[1] Some authors investigate the access to financial services (Swain 2002, Zeller and Sharma 2002, Dehejia et al. 2005, Claessens 2006, World Bank 2008), which is related to the demand for financial services, but is by no means the same. Access has to do with the availability of a certain service for a particular household and the household's transaction costs for obtaining this service (Zeller and Sharma 2002).

[2] The region has therefore been called the big "savings exception" (MIX 2007, Basu et al. 2004).

services can be used for income generation on the one hand and for income and consumption smoothing on the other hand. Investment credit and savings deposits that earn interest income fall into the first category, while insurance[3], consumption credit and short-term savings products fall into the second. While insurance and savings are ex ante, i.e. preventive, strategies for consumption smoothing, consumption credit is typically used ex post to a hazard. Therefore, a household who has recently experienced a sudden drop in income due to a serious shock, such as illness or death of an income earning household member, could be expected to be more likely to demand a loan but less likely to demand savings and insurance. Shock experience would then be positively correlated with credit demand and negatively with the demand for the other two services. It is the objective of this paper to examine such differences and similarities in the determinants of demand for formal loans, savings and insurances in rural Ghana.

The analysis is based on a comprehensive survey of 350 households conducted in February 2008 in the Ghanaian Central Region. In Ghana, as in many other developing countries, the financial market is highly fragmented (Aryeetey et al. 1997). Only five to six percent of the population are reported to have access to the commercial banking sector (Basu et al. 2004), while 16 percent have access to an account with any financial intermediary (World Bank 2008). Several providers outside of the commercial sector have evolved and are generally serving a larger share of the population, but access remains restricted in rural areas. In fact, little is known in the academic and policy-making communities about the Ghanaian rural financial market and especially about what drives different types of households to demand different types of financial services. A few related studies show a strong focus on informal credit sources and are partly further confined to the demand for finance of small enterprises (La Ferrara 2003, Schindler 2007). An investigation into the determinants of rural households' demand for formal savings, loans, and insurances has not been done to our knowledge.

In this paper, demand is understood as satisfied demand, or in other words, the demand for services is here equated with their actual use. Even though we focus on the demand for formal services, we attempt to derive some conclusions on the access to these services and the demand for informal services as well: Households who do not use a particular formal financial service either have no access to it, do not demand it, or both. Due to a lack of adequate data, we cannot tell which households demanded formal services but did not receive them, and why this is so, and which households did not demand formal services even though they had access. It is in fact likely that there are certain supply side factors, such as requirements for collateral or certain procedural

[3] Consumption smoothing is the standard rationale for purchasing insurance. However, it may be questioned whether households always have this rationale in mind when signing an insurance contract, especially in developing countries. For example, in the case of credit life insurance, which is a very common product in the microinsurance business, the main motivation may not be to mitigate future shocks, but rather to have access to credit. This type of insurance takes care of credit repayment, if the borrower dies before the credit obligations are fulfilled and is often obligatory.

specificities, that lead to rationing in the rural financial market and restrict some people from using one service or the other. Zeller and Sharma (2002) point out that many Ghanaian households who do not apply for formal loans are indeed discouraged by such constraints. But it is equally likely that households do not want to use formal services because they prefer informal services for reasons such as lower transaction costs and greater flexibility. In any case, we assume that households who do not demand a particular formal financial service use this service informally, e.g. borrow money from relatives and friends, keep savings at home, or receive help from different types of social networks.[4] Since our period of interest covers the past five years, we consider this to be a realistic assumption. The below interpretation of the estimation results will take this complexity into account to the extent possible.

The paper is structured as follows. Following this introduction, section 2 offers a short review of the literature on the determinants of demand for financial services in developing countries. Section 3 outlines the structure of and the main actors in the rural financial market in Ghana. Section 4 describes the data, introduces the explanatory variables, and discusses our expectations. The estimation strategy is presented in section 5 and the results in section 6. Section 7 concludes.

## 2 Literature Review

As already indicated, the literature on the demand for financial services in developing countries is characterised by analysing the demand for only one of the three elements of the finance trinity and by concentrating on (rural) credit. Many of these studies touch upon the issue of credit rationing in the formal financial market (Kochar 1997, Atieno 1997) and hence conduct a combined analysis of the demand for formal and informal loans (Pal 2002, Barslund and Tarp 2008). An important insight of these studies is that credit rationing is not the only determinant of the demand for formal vs. informal credit, but that there are distinct explanatory factors at work. Some of them further emphasise the differing effect of certain variables on the demand for either formal or informal loans in accordance with the distinctive underlying motivation to either use a loan for investment purposes or for consumption smoothing, the latter being more commonly the case for informal loans. Barslund and Tarp (2008) find countervailing impacts of education, number of dependants, assets, credit history and secure land rights on the demand for formal and informal loans, but most of the mentioned variables (except for assets) have a statistically significant effect only on either formal or informal credit demand. Other variables, such as connections to credit institutions, exhibit a positive significant impact on the demand for both formal and informal loans. Their analysis suggests that the demand for formal loans is largely

[4] With regard to loans, Zeller and Sharma (2002) show that this is not an implausible assumption: Between 50 and 70 percent of households borrowed from both formal and informal sources at least once during the recall period of one to two years in the ten countries they study.

driven by factors such as land holdings and hence geared towards production purposes and asset management, while informal credit demand is negatively associated with factors such as age and education and positively with a bad credit history and the number of dependants, indicating a household's tendency to use informal loans for consumption smoothing rather than investment. Pal (2002) shows that more land holdings and less labour income significantly increase the probability of using a formal loan, but this (or the opposite) relationship does not hold in the case of informal loans.

Other authors identify seasonal fluctuations in income (Pitt and Khandker 2002), sex and education of the household head, training, prevalence of an outstanding loan (Jabbar et al. 2002), family size, primary economic activity of the household head, interest rate, price of output, and area of operational holdings (Swain 2007) as additional determinants of the demand for formal credit. Zeller and Sharma (2002) point out that borrowing during adverse times is an integral part of the livelihood system of households in developing countries. This indicates that the experience of shocks should have an effect on the demand for loans, which is confirmed by Nguyen et al. (2002) who find that many borrowers in Burkina Faso do not take loans to start a new economic activity, but rather to supplement inadequate operating capital for their running business or to restart an activity after a break which could have resulted from a shock.

In comparison with the literature on credit demand, there are significantly less contributions on the savings behaviour of households in developing countries and in contrast to the first the latter generally do not focus on rural areas. Informal savings options, such as Rotating Savings and Credit Associations (ROSCAs), or non-financial savings (for example, livestock, stock of crops, or jewellery) have received more attention than formal options, especially in the sub-Saharan African context (Gurgand et al. 1994, Fafchamps et al. 1998, Kimuyu 1999, Aryeetey and Udry 2000, Hoogeven 2003). Those studies focusing on formal savings demand often analyse the savings pattern over a life time and hence regard age to be an important explaining factor. They find that the determinants of savings demand in developing countries usually differ from those in developed countries and often contradict the theoretical assumptions of the life-cycle theory (Ando and Modigliani 1963, Deaton 1992, Spio and Groenwald 1996) or the permanent income hypothesis (Friedman 1957, Kelley and Williamson 1968, Gupta 1970, Muradoglu and Taskin 1996). For example, strong family ties seem to make it less necessary to save for future retirement, and remittances appear to influence the timing of savings within the life cycle of a household (Spio and Groenewald 1996).

One of the few studies not concentrating on the test of either of these theories is Kiiza and Pederson (2002). The authors show that the decision to hold a bank savings deposit in Uganda is positively related with the information available to the household on the respective banking

system, the level of education and work experience of the household head and the proximity to the financial institution. The level of net deposits is further influenced by credit availability, transaction costs and the level of permanent income.

Contributions on the demand for insurance in developing countries are still rare. There are numerous studies on informal insurance (Townsend 1995, Morduch 1995, 1999, Dercon 2002, Churchill 2006), but not much is known about the demand for (market-based) formal insurance.[5] Given that many households lack adequate options to secure against shocks, several studies conclude that there must be high potential for (micro)insurance, but they do not investigate the determinants of demand for available insurance products (Loewe et al. 2001, Cohen et al. 2005, McCord et al. 2006). Studies on the determinants of health insurance in developing countries clearly outnumber those on other types of insurance, and in general only few apply econometric models based on quantitative household data in their approach (Wang and Rosenman 2006, Bhat and Jain 2006, Schneider and Diop 2004, Jütting 2003). To our knowledge, there is only one quantitative study that goes beyond health insurance, i.e. Gine et al. (2007) on rainfall insurance among small scale farmers in India.

Not surprisingly, all studies stress the positive role of wealth related factors as well as education for the demand for insurance, the latter of which is often related to the ability of people to assess risk and the way insurance would mitigate it (Wang and Rosenman 2006, Pauly 2004). Beside location specific variables, household demographic variables are usually analysed, often finding that household size and age have a significant positive influence on the demand for insurance (Wang and Rosenman 2006, Schneider and Diop 2004, Bhat and Jain 2006). Further, the studies show that the risk situation of households and the level of knowledge on insurance may play an important role (Gine et al. 2007, Bhat and Jain 2006), that proximity to the providing institution is significant (Wang and Rosenman, Schneider and Diop 2004), and that inclusion in certain networks can enhance the demand for insurance (Gine et. al 2007, Jütting 2003). Interestingly, Gine et al. (2007) find that risk aversion, as opposed to evidence from developed countries, does not lead to a higher probability of contracting insurance. This is attributed to the poor understanding of the insurance concept among the target households. Apparently, the demand for life-insurance as well as old age insurance in developing countries, both of which are part of the insurance product examined in this paper, has not been empirically investigated until now.

As this review shows, the strands of literature focusing on loans, savings, and insurance demand in developing countries are rather distinct and do not relate very much to each other. The present paper considers the demand for credit, savings and insurance in a more systematic way and

[5] This paper concentrates on market-based provision of financial services and therefore does not entail, for instance, the analysis of and reference to literature on health insurance provided within the framework of public social security systems.

models the three alternatives as simultaneously determined in a multivariate framework. It incorporates several insights of the literature and emphasises those factors that are likely to influence the demand for all three financial services. This will include variables, which have been tested in all presented strands of literature, such as certain demographic characteristics and wealth, but also variables, which have been tested for the demand for only one financial service. For example, we analyse the impact of remittances and risk exposure on the demand for credit, savings and insurance, although remittances have so far played a role only in the savings literature and risk exposure only in the insurance literature. At the same time, we take into account that differing motivations may also lead to differing effects of certain factors (such as shock experience) shaping the demand for either of these financial services, while other factors (such as proximity) may work in the same direction regarding all financial services.

# 3 The Rural Financial Market in Ghana

The rural financial market in Ghana is dominated by three main types of institutions: (1) formal institutions, such as rural and community banks (RCBs) and savings and loans companies, (2) semiformal institutions, such as non-governmental organisations (NGOs) and cooperatives, and (3) informal institutions, such as Susu collectors.

RCBs, which are unit banks owned by community members, stand out as the largest financial player in terms of geographical coverage, depth of outreach and number of products in rural areas (Basu et al. 2004, Andah 2005). They play a much greater role than NGOs, which is unusual compared with many other African countries (Basu et al. 2004, GHAMFIN 2004). With 115 institutions operating at the end of 2001, the total number of recorded depositors was 1.2 million and the number of borrowers was 150,000.[6] Nevertheless, RCBs are generally rather small, especially in terms of the number of outstanding loans. Total loans advanced to clients by all RCBs were Ghana Cedi 115.10 million (about US$ 127 million) in 2006, having increased by 35.4 percent since 2005 (Bank of Ghana 2007). Originally, RCBs made standard commercial loans to individuals or groups, often related to agriculture, but later on they adjusted the terms of loans to become more microfinance like, including short-term duration periods, requiring weekly repayments, and retaining a compulsory up-front savings of 20 percent of the loan amount as a security (Steel and Andah 2003, Basu et al. 2004).

NGOs and cooperatives, such as credit unions, are considered to be semiformal, as they are formally registered, but not licensed by the Bank of Ghana. NGOs have facilitated the development of microfinance practices in Ghana by introducing internationally tested

[6] As this indicates, the rural financial market in Ghana exhibits a strong savings orientation, which is in contrast to many other developing countries.

methodologies, which were often based on group solidarity (Steel and Andah 2003). Their poverty focus leads them to achieve comparatively deep penetration to poor clients in rural areas, but microfinance is in most cases only one of their activities. Their total outreach remains limited to about 60,000 clients (Basu et al. 2004). Since NGOs are not licensed and hence allowed to take deposits, they have to rely on donor funds for providing microcredit. Credit unions were originally characterised by weak financial performance, mostly due to their welfare focus and their policy of low interest rates. Yet, performance improved through enhanced management and financial reporting, and as a consequence, the proportion of "unsatisfactory" credit unions decreased from 70 percent in 1996 to 60 percent in 2001 and of those in the worst categories from 42 percent to 15 percent (Basu et al. 2004).

The informal financial sector has been very important in Ghana, especially in rural areas. It covers a range of activities known as Susu, which are performed by individual savings collectors, rotating savings and credit associations, and savings and credit "clubs" run by an operator. Susu collection involves individuals saving outside the banking system to enable them to invest in projects, promote their welfare by way of business expansion, finance child education, funeral organisation and other ventures where lump sums are needed. In 2003, there were over 4,000 collectors nationwide, collecting the equivalent of an average of US$ 15 a month from approximately 200,000 clients (Steel and Andah 2003, Andah 2005). Recently, the Susu association in Ghana has signed on to a microinsurance scheme to insure their collectors in the case of accident, robbery or death.[7] Some RCBs and commercial banks (e.g. Barclays) have developed linkages with Susu collectors to expand their services, as they have, in some cases, adopted the savings mobilisation methods developed in the informal sector (Steel and Andah 2003). Furthermore, RCBs have also become bankers to some informal financial actors. Growing linkages between RCBs, NGOs and Susu collectors are an important precondition and foundation for greater outreach to rural poor clients, with RCBs providing a decentralised network of licensed financial institutions in rural areas and the others providing the grassroots orientation that permits reaching relatively poor, remote clients with small transactions (Steel and Andah 2003, Basu et al. 2004). These developments can be seen as first steps towards an integrated banking system.

As regards insurance, the largest share of the rural population lacks access to commercial insurance products. Beside health insurance, which is relatively widespread (National Health Insurance Scheme[8], mutual health organisations), the only product available in some rural areas is

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[7] See http://www.ghananewsagency.org/s_economics/r_4945/.

[8] The National Health Insurance Scheme (NHIS) was launched in 2004 and replaced the cash-and-carry health care system. It provides free of charge medical care at public hospitals, recognised private hospitals and health centres for contributors, their dependents and indigent people. The NHIS is well received, particularly in rural areas, where a majority of people had hitherto done without using health services altogether as a result of lacking resources and insurance alternatives.

the Anidaso policy (Anidaso = "Hope") offered by the Gemini Life Insurance Company (GLICO). This policy is a voluntary microinsurance product targeted at low-income people both in urban and rural areas. At present, GLICO cooperates with 26 RCBs all over the country for the sale and distribution of the policy. The range of Anidaso clients per RCB ranges from around 200 to over 1,000. The policy offers term life assurance up to age 60, accident benefits (income protection insurance with total/partial, temporary/permanent disability benefit lumped together), and in-hospitalisation benefits (calculated per each day spent in the hospital) for the policy holder, the spouse and up to four children. Contributions towards a so called investment plan, which serves as a savings scheme and pays the accumulated account at the expiry of the term, can be added on a voluntary basis.

In the area where we conducted the survey, formal financial services are provided by different providers, among them a RCB, a commercial bank, and private insurance providers. The Brakwa Rural Bank, whose headquarters are in Brakwa, provides savings products and loans with microfinance characteristics. In addition, the bank has been cooperating with GLICO for the distribution of the Anidaso policy since 2005. A branch of the Brakwa Rural Bank is located in the town of Asikuma in the same district, offering the same financial services as the head office. Furthermore, the Ghana Commercial Bank, the largest bank in Ghana, has a branch in Asikuma. It offers various types of savings products and loans, which do not have a microfinance focus. Beside GLICO, the private insurance provider Donewell is represented in the area offering different types of motor, accident, pension and life insurance.

# 4 Sources of Data and Definition of Variables

The analysis of this paper is based on a household survey conducted by the authors in two neighbouring villages (Brakwa and Benin) in the district Asikuma/Odoben/Brakwa of the Central Region in Ghana in February 2008. The survey was undertaken in the context of a pilot study for a research project on the demand for microinsurance among low-income households in sub-Saharan Africa. In an ex ante selection process, GLICO had been identified to be the only known insurance provider offering voluntary microinsurance beyond health insurance to low-income households in the region. All other providers that we were aware of either had an insufficient number of clients at that time, offered only compulsory insurance or provided no more than health or heavily subsidised agricultural insurance. [9] The survey area was chosen,

[9] In sub-Saharan Africa, the provision of microinsurance is mostly confined to health insurance or compulsory credit life insurance. However, since information on microinsurance providers and products is still fragmentary, it may well be that there exist more voluntary microinsurance products besides GLICO's Anidaso policy that we are not aware of.

because it guaranteed a high share of low-income people in the overall population[10] and offered a relatively high density of rural bank clients holding an insurance contract. The district is a highly agrarian local economy with over 80 percent of the population being engaged in farm activities, mostly at the subsistence level and to a small extent in cash-crop cultivation (i.e. cocoa). Activities outside farming concentrate on small scale industrial businesses and petty trading. Such an economic structure combined with an incomplete but developing financial market is typical for rural areas in the Southern part of Ghana.

For a meaningful statistical analysis, a sufficient number of households using microinsurance was required in the sample. As the number of households participating in the insurance scheme was too small to be adequately represented in a random sample of the total population, the sample had to be stratified along the insurance membership status. This included not only the participation in the microinsurance scheme (in this case Anidaso policy holders), but also participation in other insurance schemes, such as the National Health Insurance Scheme (NHIS) or those provided by Donewell. After listing all households in both villages, a total of 351 households were interviewed, including three strata of microinsured households, other insured households (e.g. NHIS and commercial products other than Anidaso) and non-insured households. Households within each stratum were chosen by random sampling, except for the microinsured stratum which was interviewed entirely. The survey questionnaire contained detailed sections on demographic and socio-economic household characteristics, household assets, the occurrence of shocks, risk management strategies, household attitudes towards risk and household financial knowledge. Further, information was gathered on the embedding of households in different financial institutions and the usage of loans, savings products and insurances. One household did not complete the entire questionnaire, which reduces the number of observations in our empirical analysis to 350 households.

The vector of explanatory variables includes different household characteristics, including demographic and wealth variables, education and economic activities of the household head, information about remittances and risk exposure, and a locational dummy. In the following, we describe the meaning and computation of the variables and outline our main expectations. Table 1 summarizes the definition of the variables and Table 2 provides the respective descriptive statistics.[11]

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[10] The poverty headcount in the Central Region amounted to 19.9 percent in 2005/06. We assume that the poverty headcount was much higher than the regional average in the two villages where we conducted the survey due to the rural conditions found there.

[11] In order to avoid potential problems of multicollinearity, we calculated the pairwise correlations between the independent variables as well as the variance inflation factors (using the *collin* command in STATA). We see no reason for concern as none of the variance inflation factors was higher than 1.6.

*Household Demographic Variables*

We assume that there is a strong relationship regarding certain demographic characteristics of the household and the probability of using one or more of the considered financial services. The size of households may influence the demand for savings products, credit and insurance in different ways, depending on the composition of the household. In our data, household size correlates very strongly with the number of dependants (correlation coefficient of 0.93); hence, larger households are here households with more children and elderly people and not households with more economically active adults. Therefore, we assume that household size negatively affects the demand for savings products and credit, as larger households are likely to consume a large share of their income and have less collateral. It is not clear what the relationship between household size and the demand for insurance will be. On the one hand, it may be positive as a higher number of household members increases the level of responsibility of the household head and therefore offers incentives for better risk protection. On the other hand, it may be negative due to the mentioned high consumption share of these households. A positive relationship is presumed with regard to age of the household head. We control for possibly decreasing marginal effects of age by including age squared. In line with other studies, we do not expect a life cycle effect for savings products, but we do expect one between age and the demand for credit as well as insurance: While rising age will enhance the demand for credit or insurance of a household head initially - because of growing experience regarding the benefits and risks of credit or insurance, an increasing need for financial input for economic activities, or increasing responsibility for other households members - this trend will reverse when a certain point in life is reached. Specifically, the need for loans is very probable to decrease when the household head retires, and the protective motivation to demand insurance would be reduced when younger household members leave the household to start their own families. Further, we control for female headship in order to take gender issues into account. The likelihood to demand savings products, credit or insurance is assumed to be lower in female-headed households, as these are often poorer than their male-headed counterparts.

*Education Characteristics*

In order to capture the education level of the household, we use the number of schooling years of the household head as an indicator for the human capital endowment of the whole household. In line with the literature, our assumption is that less years of schooling will reduce the likelihood of using any of the three financial services, and especially the demand for insurance, as less educated people may be less able to understand the concept behind insurance and the technical procedures attached to them. In addition, low education levels are often correlated to less

productive jobs and lower incomes, which in turn, can be expected to reduce access to credit (because of lacking collateral) and the likelihood of having extra money to save or spend for insurance. The positive effect of education is expected to be particularly strong for the demand for insurance or the demand for more than one service, as this goes along with higher sophistication.

*Wealth*

We constructed an asset index using factor analysis, which captures the ownership of physical assets five years ago. The considered assets contain consumer durables (bicycle, refrigerator, electric iron, mobile phone, radio, TV, stove), property (another house), and dwelling characteristics (use of electricity as main lighting source, building materials of higher quality, and toilet facilities of higher quality). In line with the literature, we expect a higher asset endowment of the household to have a positive effect on the choice of taking up one or more of the financial services. By relying on past asset endowments, we avoid potential problems of endogeneity as the use of financial services may have helped in obtaining certain assets. To our knowledge, this approach has not been applied in the related literature. We use the size of a household's land holdings as a further proxy for the level of wealth. In line with previous studies, we assume that households with more land holdings are more likely to take up a savings account, a loan or an insurance contract. Endogeneity does here not play a large role, as land in the survey area is generally not as easily purchased as other assets but rather acquired via matrilinear inheritance rules.

*Employment status*

We created three dummy variables indicating the employment status of the household head. The first dummy takes the value of 1 if the household head is employed in a (private or public) enterprise or organization or if she/he is an employer her/himself, and 0 otherwise. The second dummy takes the value of 1 if the household head is self-employed and works for her/his own account (either in small scale farming or in the non-farming sector), and 0 otherwise. And the third dummy takes the value of 1 if the household head is not employed for reasons such as young or old age, disability, etc., and 0 otherwise. We assume that households with a head who is either self-employed or not employed are less likely to demand formal financial services than households with an employed/employer head.

*Remittances*

As noted above, the role of remittances for the demand for financial services has so far been analysed only in the context of households' savings behaviour. Savings were there positively

correlated with remittances. We expect that the receipt of remittances also affects the choice of other financial service alternatives. The direction of the relationship is, however, not straightforward. On the one hand, remittances may well be substitutes for formal loans and insurance, and the relationship would thus be negative. On the other hand, it may be that remittances represent an additional income source and collateral, enabling households to access products they could otherwise not obtain. In our model, we use a dummy variable, which takes on the value of 1 if a household receives remittances from former household members who have migrated, and 0 otherwise.[12]

*Risk exposure*

In line with the literature, we expect that households who are more exposed to risks are more likely to contract insurance.[13] Beyond this relationship, we also assume that risk exposure has an effect on the demand for savings as well as loans, as both these financial services can serve as risk management strategies. Uninsured households may ask for loans or deplete savings after they experienced a shock in order to make up for income losses. Hence, we expect the likelihood of taking up a loan to increase and of demanding savings products to decrease when the household is more exposed to risks than others. We therefore include three dummy variables on risk exposure in our analysis. The first variable takes the value of 1 if a household experienced the death of a household member during the last five years and this had severe consequences and 0 otherwise. Severity is measured in the sense that the household needed more than one month to economically recover from the shock. The second variable takes the value of 1 if a household experienced severe illness during the last five years, and 0 otherwise. And the third variable takes the value of 1 if a household experienced any other severe shock during the last five years, and 0 otherwise. This category captures mostly idiosyncratic shocks beside death and illness. In addition, we include a variable that captures households' subjective assessment of risk. This variable is constructed by factor analysis and covers households' self-assessment of their exposure towards a range of risks, such as work accidents, health and economic shocks, relative to other households in their community, and their willingness to take risks. While this indicator of risk assessment is expected to have a positive influence on the choice of insurance and savings, a negative effect is expected for the choice of credit as taking up a loan may be perceived as an additional risk.[14]

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[12] We would have preferred to use the absolute value of remittances here but we do not consider the respective data to be reliable enough. We face the same problem with regard to information on income.

[13] This would reflect the common hypothesis of adverse selection discussed in the debate on insurance demand in developed countries.

[14] We cannot take account of risk aversion in our analysis, as suggested by the literature on insurance demand, since experimental methods used to measure personal risk aversion were not included in our survey and related standardised questions in our survey questionnaire did not reflect this attribute in a satisfactory way.

*Location*

In line with most of the studies on the demand for credit and savings deposits, we assume that a household's proximity to an adequate financial institution is crucial for its demand for formal financial services, as proximity strongly determines transaction costs. We therefore included a dummy variable in the analysis, taking account of a household's residence in either Benin village or Brakwa village. As noted above, the Brakwa Rural Bank, which is the mostly attended financial institution in the villages, has its headquarters in Brakwa, but also a branch in Asikuma. Households residing in Benin can thus attend either of the branches, but in both cases must cover the respective distance. We therefore expect households from Brakwa to be more likely to demand one or more financial services.

# 5 Estimation Strategy

In the analysis, the three decision alternatives, demand for savings, demand for loans, and demand for insurance, are estimated simultaneously in the form of a multivariate probit model. The alternatives indicate whether or not households used formal savings, formal loans or formal insurance in the last five years. The qualification "formal" refers to services offered by RCBs, commercial banks, private insurance providers, microfinance institutions, and cooperatives.[15] Formal savings includes savings accounts, current accounts (which are often used for the purpose of savings) and other savings products offered by these institutions. Users of formal savings are only those households who can be identified to have intentionally decided to use such a product for the genuine purpose of savings or safe storage of money. This is important because some households were found to be "pseudo-savers" in the sense that they have opened a savings or current account as a precondition for receiving a loan or contracting insurance and have since not made use of their account for savings purposes. These households are excluded from the category of formal savings users. Formal loans include all loans taken up from the mentioned institutions. Formal insurance is confined to those types of insurance which are offered by private suppliers thereby excluding health insurance provided through the National Health Insurance Scheme. Hence, the category mainly includes the Anidaso policy and few other private insurances. Out of the 350 households analysed, 175 use formal savings, 84 formal loans, and 99 formal insurance. The demand for either of these services need not be exclusive; on the contrary, many of the households demand several of these services (Table 3). As we already pointed out,

[15] The survey data show that there are at least one microfinance institution and cooperative active in the survey area. During our field visit, we did not become aware of these and hence do not know their names. For simplicity, we include services from cooperatives, even though they are semi-formal institutions, in the formal category.

households' choice for loans, savings products and insurances is likely to be strongly interconnected.

The alternative choices in the estimation are represented by the three latent variables: demand for formal savings S*, demand for formal loans L*, and demand for formal insurance I*. Each latent response depends on a vector of explanatory variables X, three unknown parameters $\beta_S$, $\beta_L$, $\beta_I$, and the stochastic components of the error terms $\varepsilon_S$, $\varepsilon_L$, $\varepsilon_I$. The latter consist of those unobservable factors, which explain the marginal probability of making the decision for either of the choices. The set of explanatory variables included in vector X is identical in the three equations, assuming that each choice underlies the same decision making process.

$$S^* = X' \beta_S + \varepsilon_S \qquad (1)$$

$$L^* = X' \beta_L + \varepsilon_L$$

$$I^* = X' \beta_I + \varepsilon_I$$

The three equations from (1) may then be expressed into three binary variables $Y_j$ (j = S, L, I) that take the value of 1 if the household demands a formal financial service, and 0 otherwise.

$$Y_j = 1(X' \beta_j + \varepsilon_j > 0) \qquad j= S, L, I \qquad (2)$$

Each $\varepsilon_j$ is drawn from a J-variate normal distribution with a mean of zero, and a variance-covariance matrix Σ, where Σ has values of 1 on the leading diagonal and correlations $\rho_{jk} = \rho_{kj}$ as off-diagonal elements. These correlation terms represent the unobserved correlation between the stochastic component of each type of financial service (Cappelari and Jenkins 2003) .

The joint estimation of the three alternative equations (2) is based on a joint trivariate probability involving the evaluation of the loglikelihood over i=1, …, N observations

$$\ln L = \sum_{i=1}^{N} \ln \Phi_3(\mu_i ; \Omega) \qquad (3)$$

where $\Phi_3(.)$ is the trivariate normal density function with arguments $\mu_i$ and Ω, where

$$\mu_i = \left(k_{iS}\beta_S X'_{iS}, k_{iL}\beta_L X'_{iL}, k_{iI}\beta_I X'_{iI}\right) \qquad (3a)$$

where $k_{ij}$ are the corresponding sign variables that equal 1 if a household demands a given financial service, and minus 1 otherwise. In matrix Ω, the constituent elements are $\Omega_{jk}$, where

$$\Omega_{jj} = 1 \text{ for } j = 1,\ldots,3 \qquad (3b)$$
$$\Omega_{LS} = \Omega_{SL} = k_{iS}k_{iL}\,\rho_{LS}$$
$$\Omega_{IS} = \Omega_{SI} = k_{iI}k_{iS}\,\rho_{IS}$$
$$\Omega_{IL} = \Omega_{LI} = k_{iI}k_{iL}\,\rho_{LI}$$

To estimate this function, a computation of derivatives of third order integrals is necessary. While there is no general solution for this requirement, it may be addressed by currently developed simulation techniques. Most commonly used for evaluating multivariate normal distribution functions is the GHK (Geweke-Hajivassiliou-Keane) smooth recursive conditioning estimator (Greene 2003, Cappelari and Jenkins 2003). Under the assumption $\varepsilon \sim N(0,\Sigma)$ clarified above, the three correlation coefficients summarise the association between unobservable household-specific factors determining the likelihood of using different types of financial services. The GHK smooth recursive estimator exploits the fact that the multivariate normal distribution function with originally three-dimensionally correlated error terms may be expressed as the product of a sequentially conditioned univariate normal distribution function with a linear combination of uncorrelated one-dimensional standard variables, which may be easily and precisely evaluated. To estimate the resulting integral, random draws of these standard normal variables are taken from upper-truncated standard normal distributions. This process is replicated $D$ times and the arithmetic mean of the values of the simulated probabilities from each replication is used to estimate the simulated probability that enters the maximum likelihood function.

The average partial effects (APEs) on the marginal probabilities of the explanatory variables in each equation are estimated by averaging sample partial effects, calculated for each household.[16] For the calculation of APEs on the joint probabilities of using combinations of financial services, we apply a routine developed by Kis-Katos (2007). This routine also allows us to estimate standard errors of the APEs by an empirical Bayes procedure. Hereby, 500 replications of the estimated coefficient vectors $(\hat{\beta}_S, \hat{\beta}_L, \hat{\beta}_I, \hat{\rho}_{SL}, \hat{\rho}_{LI}, \hat{\rho}_{SI})$ are redrawn from a multivariate asymptotically normal distribution (characterised by the estimated variance-covariance matrix $\hat{\Sigma}$), and the standard deviation of the partial effects is computed as an approximation of the standard error of the partial effects.

[16] This has been done by the user defined Stata routine *margeff* (Bartus 2005).

# 6 Estimation Results and Interpretation

The outcome of the trivariate probit regression, which estimates the APEs of the explanatory variables on the marginal probability of each type of financial service, is presented in Table 4. The estimated correlation coefficients indicate that the residuals of the financial services functions are highly correlated. Hence, they confirm the strength of the interconnectedness of the demand for the three services. The correlation coefficient between the unexplained part of the (simultaneous) demand for savings and loans amounts to 0.88, between savings and insurance to 0.60 and between loans and insurance to 0.51. The positive and significant signs imply that the three financial services are complementary. Savings and loans appear to be the services with the most similar unobservable household-specific determinants. The hypothesis that the correlations between the error terms of each equation are all zero can be rejected at a high significance level, so that the multivariate probit model seems to be appropriate.

Table 5 presents the APEs on the joint trivariate probability of any given combination of financial services. Due to a very low number of households in our sample using only credit, only insurance, or credit and insurance (see Table 3), we do not report the results for these combinations of financial services as we expect them to be rather imprecise.[17] Hence, we report and interpret the APEs of our explanatory variables on the probability that a household demands no financial service, demands only savings, demands savings and credit, demands savings and insurance, and demands all three services. It is important to note that the outcome categories in Table 4 are not mutually exclusive; or in other words, that households who demand savings here include those who demand only savings and those who additionally demand credit, insurance, or both. This is different in Table 5, where the outcome categories are mutually exclusive. Therefore, the latter results will throw additional light on the factors determining whether a households demands a financial service at all, and if so, whether it demands any financial service in addition to savings.

In contrast to our expectation, an increase in the household size makes it significantly more likely that a household demands formal savings or loans, while household size is not significantly correlated with the demand for insurance (Table 4). This is essentially confirmed in Table 5, and the positive relationship between household size and the demand for savings and loans is not straightforward to explain. One possible, though admittedly vague, explanation could be that larger households are more exposed to shocks, such as illness, simply because of the higher number of household members. Hence, they may save more in order to build buffers for future

[17] However, they may be obtained from the authors on request.

hazards but they may also take up more loans in case of a hazard confronting them.[18] Female-headed households are significantly less likely to demand savings and credit, indicating that female heads are generally less able to make use of financial products (Table 4). Female headship is also negatively and significantly correlated with the demand for only savings, the demand for savings and credit, and the demand for all three financial services (Table 5). Combining savings and insurance, however, does not lead to significant results. The behaviour of men and women in terms of demanding insurance (in addition to savings) might thus not be very different from each other; a finding that also emerges from the insignificant coefficient for female headship in Table 4. The probability of not demanding any financial service is higher for female-headed than for male-headed households, which confirms our above interpretation.

With regard to age of the household head, our results show that age is significantly related with loan and insurance demand, and that there appears to be a life cycle effect for these two services (Table 4). As outlined above, this could imply that with increasing age household heads request more credit and more insurance since their experience with financial matters increases, their economic activities are more developed and their family responsibility is higher. Yet, this effect holds only up to a certain age, and then turns around. Precisely, the turning point for credit demand is at 61 years of age, and that for insurance demand at 47 years. These points support our assumption that the need for credit decreases with pension age[19] and the need for insurance with adult children leaving the household. In contrast to this, there is no significant correlation between age of the household head and the demand for savings. As outlined above, this is in line with the literature which shows that there are other dominating factors at work determining the savings behaviour of households in developing countries. Looking at combinations of financial services, the life cycle effect only becomes apparent for users of savings and insurance, and users of all three financial services (Table 5).

Education was expected to be a significant factor in determining households' choice to demand any of the three financial services. This is largely confirmed by the results in both Tables 4 and 5, even though some of the findings are only marginally significant. It is also shown that better educated heads are significantly less likely to use no formal financial service.[20] With regard to assets, a higher asset index is positively and significantly related with the demand for savings, loans, and insurance (Tables 4 and 5). The fact that assets work in the same direction for the

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[18] Since household size is strongly correlated with the number of dependants, i.e. economically inactive household members, we can exclude the possibility that the experience with financial products will rise with the number of household members.

[19] To be precise, pension age does not refer to any official age when people start to receive pensions from the social security system but rather to the point in life when their level of economic activity starts to decrease due to the consequences of ageing. The majority of the population in the survey area does not receive public pension payments as they work outside the formal sector.

[20] As a robustness check, we also substituted the number of schooling years of the household head for the number of schooling years of the mostly educated household member, which does not change the results qualitatively.

demand for any of the services may be due to the role of assets as collateral for loans on the one hand, and assets being an indication of the socio-economic status and hence of the financial literacy and the availability of liquid resources for savings and insurance on the other hand. This latter interpretation is in line with the literature, which shows that microfinance typically does not reach the poorest households (Hulme and Mosley 1997, Navajas et al. 2002, Datta 2004). An interesting finding emerges with regard to land size, which is positively and significantly correlated with the demand for loans but is not significantly linked with the demand for savings and insurance (Table 4). A similar picture emerges from Table 5 where the land coefficient is only significant for the savings plus credit and the all three services categories. This could imply that households with more land holdings have higher demand for loans since their (agricultural) businesses are larger. However, it could also be a sign of restricted access to financial services for some households in rural Ghana., as land ownership might serve as collateral for loans. In line with our assumptions, households with a head who is either self-employed or not employed are significantly less likely to demand savings, loans and insurance (Table 4) and are in turn more likely to demand no formal service at all (Table 5). This may be an indication that households engaged in self-employment and households without an economically active head are constrained in their access to formal financial services, possibly due to relatively irregular and low incomes.

In terms of the relationship between remittances and the demand for financial services, our results suggest that remittances are indeed a substitute for insurance, but as well a source for savings at a formal institution (Table 4). Looking at the joint probabilities, this result is further confirmed by the fact that there is a strong positive effect of remittances on demanding savings products only or in combination with credit, while this is reversed as soon as insurance is demanded in addition to savings (Table 5). Hence, households obviously regard insurance less necessary if they are potentially able to access remittances in cases of future shocks and emergencies.

We expected that households' risk assessment as well as experience of shocks would have an impact on the demand for financial services, which may differ across the examined types of products. We find that households who feel more exposed to risk than others are significantly less likely to demand savings, and there is also a negative but insignificant effect of the risk assessment dummy on credit and insurance demand (Table 4). Accordingly, households who assume that they are more vulnerable towards risk rather opt not to use any financial services at all and are especially unlikely to use insurance on top of other services, shown by a significant negative coefficient for the combined use of savings and insurance and all three services (Table 5). This result is quite in contrast to our expectation, particularly regarding insurance demand. It might be that risk sensitive households regard the use of formal services to be an additional risk,

possibly because they do not trust the providers or do not understand the functioning of the services, and hence prefer to use informal services. A similar conclusion was drawn in earlier studies on microinsurance (Gine and Yang 2007, Gine et al. 2007, Bhat and Jain 2006).

Households who have experienced a serious shock in the past five years are significantly more likely to demand savings, loans, or insurance (Table 4). However, which financial service they demand seems to be related to the type of shock. Households having experienced the death of a household member during the last five years are significantly more likely to save than others, a finding which is quite in opposite to our expectation. One tentative interpretation may be that, provided there is sufficient time between the event of death and the current savings status, households are sensitised towards the possible hazard of death and therefore save today for the future. A similar interpretation may of course hold for the experience of illness and other shocks as well, but our findings show that households behave differently in these cases. As far as illness is concerned, Table 4 suggests that households are more likely to use loans and insurance. However, looking at the combined use of services it becomes clear that the positive significant effect is rather confined to credit demand (Table 5). This finding is confirmed for the case of having experienced any other severe shock. While the experience of other severe shocks exhibits a significant positive coefficient in the savings as well as the credit demand function (Table 4), Table 5 shows that this holds only for the combination of savings with loans and is reversed for households using only savings or savings and insurance. These results are in line with the assumption that credit often serves as a coping mechanism ex-post to a shock. Contrary to a priori expectations, but corresponding to the outcomes of the subjective risk assessment variable, the demand for insurance, either on its own or in combination, does not seem to be influenced very much by the experience of shocks.

Quite surprisingly, residence in Brakwa, as an indicator of relative proximity to the main financial institution in the survey area, is negatively and significantly correlated with the demand for savings and insurance (Table 4). More precisely, for a household to live in Brakwa raises the probability to use none of the services, and therefore be more engaged in informal financial mechanisms. At the same time, it reduces the probability that insurance is used on top of the other financial services although households are closer to the financial institution compared to their counterparts in the other community, Benin (Table 5). One possible explanation for this is that the Personal Insurance Adviser, who is GLICO's main local agent in the Brakwa rural bank and responsible for the sale and distribution of the Anidaso policy in this area, lives and is part of the social community in Benin. We assume that trust into the insurance product is enhanced through this personal contact resulting in a higher likelihood of households using insurance if

they are residing in Benin village. Consistent with the hypothesis, however, the demand for credit (in combination with savings), is indeed positively affected by residence in Brakwa.

# 7 Conclusion

With this paper, we intend to add value to the discussion about the demand for formal financial services in rural areas of developing countries. Specifically, we consider all three components of the so called finance trinity, i.e. savings, loans, and insurances, and not just one of them as often done in the literature. We simultaneously investigate the similarities and differences in the determinants of demand for these services, taking into account that households may use more than one service at a time. Based on household survey data, which we collected in two villages in the Central Region of Ghana, we study the relevance of demographic characteristics, asset endowments, economic activities of the household head, the receipt of remittances, risk assessment and shock experience, and the location of residence for households' choice of savings, loans, and insurances. Our results confirm several standard findings of earlier contributions on credit demand, savings behaviour, and insurance purchase. We find that education level, asset endowment and regular (formal) employment status likewise enhance financial service uptake. This supports the widespread assumption that poorer households are more probable to be excluded from the formal financial sector than better off households. An equally common result in the literature is that female headship decreases the likelihood of households to be engaged in the formal financial market. Our data approve this relationship for savings and loans but interestingly show that female-headed households are no more or less likely to contract insurance than their male-headed counterparts.

Beyond repeating these standard findings, our approach allows for additional interesting insights into the functioning of the rural financial market in Ghana. We include several potential determinants that have not been tested in the same way for the demand for all three services under consideration. The resulting evidence reveals that the usage of formal financial services does not only depend on the socio-economic status of households, but also on various other factors, which may have different impacts across different services. First, in line with much of the literature we find that there is no life cycle effect for savings. Instead, we show that there is such an effect for loans and insurance, which has so far not been acknowledged in earlier studies. Second, it turns out that households who receive remittances exhibit a different demand behaviour than comparable households who do not receive them. On the one hand, remittances increase the available financial sources for savings, and on the other hand, they appear to be substitutes for insurance. This indicates that informal ways to manage risks compete with formal mechanisms, at least to a certain extent. Third, we illustrate that households who feel more

exposed to risk than others are less likely to demand financial services, particularly insurance. This is in stark contrast to our assumptions and implies that these households are generally more cautious towards the formal financial sector and may be inadequately informed about risks and how insurance could mitigate them. Instead, they seem to perceive insurance to be an additional risk. Fourth, we find that households who experience severe shocks often borrow from the formal financial sector, apparently to smooth consumption in the aftermath of the hazard. Fifth, households with more land holdings demand significantly more credit as well, which may rather reflect the use for investment reasons. Finally, we demonstrate that even though the proximity to the financial institution seems to play a role for the demand for financial services, trust in this institution in general and its staff in particular may even be more important.

A general conclusion of our research is that consumption smoothing and income generation both seem to be important rationales to demand formal financial services in a typical rural context of Ghana with a highly agrarian economy that is characterised by an incomplete but developing financial market. Although it appears to be mainly loans that are currently used for consumption smoothing, the other two services may in fact be much more appropriate to serve this purpose and their supply should therefore be further extended. Having said that, it may not be sufficient to increase supply; but equally important may be to build trust and increase financial literacy, as our findings suggest. In order to better understand the relationship between these two factors and the demand for financial services, we see extensive scope for further research.

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# Appendix

**Table 1: Definition of explanatory variables**

| Variable | Description |
|---|---|
| Household size | Household size |
| Female head | Dummy variable, 1 if household is headed by a female, 0 otherwise |
| Age | Age of the household head |
| Age squared | Age of the household head squared |
| Schooling | Number of schooling years of the household head |
| Assets | Assets (bicycle, another house, refrigerator, electric iron, mobile phone, radio, TV, stove, use of electricity as main lighting source, building materials of higher quality, and toilet facilities of higher quality) owned by the household five years ago, index created by factor analysis |
| Land | Size (in acres) of land used by the household |
| Self employed | Dummy variable, 1 if household head is self-employed in either agriculture or non-agricultural activities, 0 otherwise |
| Not employed | Dummy variable, 1 if household head is not employed due to young or old age, disability, or similar reasons, 0 otherwise |
| Remittances | Dummy variable, 1 if household receives remittances from former household members who have migrated, 0 otherwise |
| Risk assessment | Household's assessment of risk own risk situation (subjective exposure to health shocks, road or work accidents, and economic shocks compared with neighbours, own rating of willingness to take risks), index created by factor analysis |
| Death | Dummy variable, 1 if household experienced the death of a household member in the last five years and this shock had serious consequences, i.e. household needed more than one month to recover, 0 otherwise |
| Illness | Dummy variable, 1 if household experienced the illness of a household member in the last five years and this shock had serious consequences, i.e. household needed more than one month to recover, 0 otherwise |
| Other shock | Dummy variable, 1 if household experienced a shock other than death or illness of a household member in the last five years and this shock had serious consequences, i.e. household needed more than one month to recover, 0 otherwise |
| Brakwa | Dummy variable, 1 if household resides in Brakwa, 0 otherwise |

Source: Authors' illustration.

**Table 2: Descriptive statistics**

| Variable | Mean | Stand. error |
|---|---|---|
| Household size | 4.37 | 0.148 |
| Female head | 0.42 | 0.030 |
| Age | 47.01 | 0.941 |
| Age squared | 2479.54 | 95.736 |
| Schooling | 6.50 | 0.317 |
| Assets | -0.18 | 0.050 |
| Land | 3.55 | 0.374 |
| Self employed | 0.80 | 0.023 |
| Not employed | 0.06 | 0.013 |
| Remittances | 0.28 | 0.027 |
| Risk assessment | 0.10 | 0.058 |
| Death | 0.42 | 0.030 |
| Illness | 0.36 | 0.029 |
| Other shock | 0.15 | 0.021 |
| Brakwa | 0.80 | 0.023 |

Source: Authors' calculation.

**Table 3: Demand for financial services**

| | Number of households in the sample | Estimated number of households in the survey region | Estimated proportion in the survey region |
|---|---|---|---|
| None | 164 | 1275 | 62.44 |
| Savings only | 49 | 359 | 17.56 |
| Credit only | 1 | 9 | 0.43 |
| Insurance only | 9 | 14 | 0.67 |
| Savings and credit | 37 | 245 | 12.00 |
| Savings and insurance | 44 | 67 | 3.30 |
| Credit and insurance | 1 | 1 | 0.05 |
| Savings, credit, and insurance | 45 | 72 | 3.55 |
| Total | 350 | 2042 | 100 |

Source: Authors' calculation.
Note: Households in the sample are weighted according to their sampling probabilities, which explains the discrepancy between the proportion of households in the different categories in the sample and the estimated proportion in the survey region.

**Table 4: Multivariate probit results on the demand for financial services**

| Variable | Demand for savings | | | Demand for loans | | | Demand for insurance | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | APE | t-statistic | Coefficient | APE | t-statistic | Coefficient | APE | t-statistic |
| Household size | 0.053 | 0.020 | 4.24*** | 0.056 | 0.013 | 3.33*** | -0.039 | -0.004 | -0.96 |
| Female head | -0.527 | -0.208 | -8.42*** | -0.303 | -0.084 | -2.76*** | 0.048 | 0.006 | 0.74 |
| Age | 0.020 | 0.008 | 1.04 | 0.060 | 0.014 | 4.23*** | 0.137 | 0.014 | 3.41*** |
| Age squared | -0.0001 | -0.00004 | -0.67 | -0.0005 | -0.0001 | -2.49*** | -0.001 | -0.0002 | -3.16*** |
| Schooling | 0.079 | 0.031 | 4.64*** | 0.048 | 0.012 | 1.68* | 0.074 | 0.009 | 3.23*** |
| Assets | 0.366 | 0.144 | 4.55*** | 0.308 | 0.080 | 5.13*** | 0.289 | 0.037 | 1.85* |
| Land | 0.001 | 0.0004 | 0.16 | 0.012 | 0.003 | 13.01*** | 0.011 | 0.001 | 1.44 |
| Self employed | -1.190 | -0.448 | -5.96*** | -0.653 | -0.170 | -3.27*** | -0.589 | -0.076 | -3.68*** |
| Not employed | -1.129 | -0.326 | -5.53*** | -1.516 | -0.152 | -6.30*** | -0.195 | -0.017 | -1.89* |
| Remittances | 0.441 | 0.172 | 3.45*** | 0.122 | 0.028 | 0.90 | -0.313 | -0.028 | -2.01** |
| Risk assessment | -0.075 | -0.030 | -1.77* | -0.050 | -0.014 | -0.79 | -0.110 | -0.019 | -0.73 |
| Death | 0.270 | 0.104 | 2.53** | 0.090 | 0.020 | 0.99 | -0.069 | -0.011 | -0.39 |
| Illness | 0.325 | 0.126 | 1.21 | 0.512 | 0.122 | 12.74*** | 0.368 | 0.040 | 1.75* |
| Other shock | 0.201 | 0.078 | 4.41*** | 0.739 | 0.207 | 8.14*** | -0.132 | -0.012 | -0.50 |
| Brakwa | -0.220 | -0.085 | -2.50** | 0.146 | 0.031 | 1.07 | -0.734 | -0.099 | -3.55*** |
| Est. correlation coeff. | $\varrho_{21} =$ 0.886 | | 36.12*** | $\varrho_{31} =$ 0.563 | | 4.12*** | $\varrho_{32} =$ 0.492 | | 3.99*** |

Source: Authors' calculation.

Note: Results of the trivariate probit model are estimated by SML with 20 pseudorandom draws. t-statistics refer to the estimated coefficients and are based on robust standard errors. Average partial effects (APE) are calculated with respect to the marginal probability of each type of financial service. The model also includes a constant. Sample size is N = 350 observations. The asterisks indicate level of significance: ***significant at 1 percent, ** significant at 5 percent, * significant at 10 percent.

**Table 5: Average partial effects on joint probabilities of using no, one, or more than one financial service**

| Independent variables | No use | | Savings only | | Savings and credit | | Savings and insurance | | All three | |
|---|---|---|---|---|---|---|---|---|---|---|
| | APE | t-statistic | APE | t-statistic | APE | t-statistic | APE | t-statistic | APE | t-statistic |
| Household size | -0.011 | -4.18*** | 0.006 | 2.01** | 0.010 | 2.10** | -0.002 | -1.08 | 0.0008 | 0.25 |
| Female head | 0.116 | 4.82*** | -0.073 | -6.63*** | -0.053 | -2.57** | -0.002 | -0.27 | -0.016 | -1.99** |
| Age | -0.014 | -2.47** | -0.008 | -1.19 | -0.002 | -0.44 | 0.004 | 1.78* | 0.011 | 1.88** |
| Age squared | 0.0001 | 1.86* | 0.0001 | 1.37 | 0.00003 | 1.00 | -0.00004 | -1.77* | -0.0001 | -1.74* |
| Schooling | -0.019 | -3.88*** | 0.007 | 4.86*** | 0.004 | 1.63 | 0.003 | 4.07*** | 0.007 | 1.92* |
| Assets | -0.098 | -3.97*** | 0.026 | 1.79* | 0.028 | 2.15** | 0.010 | 1.17 | 0.032 | 1.78* |
| Land | -0.001 | -0.93 | -0.001 | -1.02 | 0.0007 | 2.91*** | -0.00007 | -0.15 | 0.001 | 3.67*** |
| Self employed | 0.298 | 5.05*** | -0.148 | -2.03** | -0.085 | -2.79*** | -0.024 | -2.21** | -0.084 | -2.67*** |
| Not employed | 0.250 | 7.58*** | -0.085 | -2.49** | -0.106 | -3.22*** | 0.006 | 0.77 | -0.066 | -1.94* |
| Remittances | -0.081 | -1.83* | 0.086 | 10.24*** | 0.049 | 5.46*** | -0.008 | -1.72* | -0.009 | -0.43 |
| Risk assessment | 0.022 | 1.97** | -0.005 | -1.34 | -0.0004 | -0.05 | -0.005 | -2.00** | -0.010 | -3.35*** |
| Death | -0.052 | -3.10*** | 0.041 | 2.15** | 0.027 | 1.24 | 0.002 | 0.21 | 0.0001 | 0.02 |
| Illness | -0.098 | -1.90* | -0.003 | -0.07 | 0.044 | 3.39*** | 0.002 | 0.13 | 0.044 | 2.92*** |
| Other shock | -0.086 | -7.79*** | -0.040 | -3.10*** | 0.095 | 2.54** | -0.020 | -2.03** | 0.018 | 0.69 |
| Brakwa | 0.066 | 2.20** | -0.015 | -0.88 | 0.042 | 2.25** | -0.049 | -1.97** | -0.036 | -3.68*** |

Source: Authors' calculation
Note: Estimation results are based on the trivariate probit model. The average partial effects (APE) are calculated with respect to the joint trivariate probability of each outcome. No use of financial services refers to the outcome P(S=0, L=0, I=0), savings only to P(S=1, L=0, I=0), savings and credit to the outcome P(S=1, L=1, I=0), savings and insurance to P(S=1, L=0, I=1), and all three financial services to P(S=1, L=1, I=1). t-statistics are based on standard errors estimated approximately by parametric bootstrap. Sample size is N=350 observations.