
Financial Capabilities: Multilevel Modeling of the Impact of Internal and External Capabilities of Rural Households

Gina Chowa, David Ansong, and Mathieu R. Despard

In recent years, discussion about the financial capability of rural households has increased. Although studies have conceptualized what financial capability means, there is a dearth of empirical evidence that addresses how the different components of financial capability interact to improve savings outcomes, especially in rural households in sub-Saharan Africa. In this article, the authors use data from an asset-building project in Masindi, Uganda, and a multilevel logistic regression approach to model the likelihood of households contributing to a savings account in a bank. The advantage of a multilevel modeling approach is that it will allow for understanding how contextual factors, such as proximity to the bank and the presence of informal savings mechanisms, affect how households save. Findings suggest that community characteristics affect rural households' financial capability. The study also shows that financial education and the existence of informal savings groups are associated with the households' saving behaviors and that internal and external factors are important in shaping them. The implications of the findings and the importance of using the correct method of analysis are discussed.

KEY WORDS: *bank savings; financial capability; multilevel modeling; rural households; Uganda*

Savings play an important role in the lives of poor residents of rural areas (Rutherford, 2005). People depend on their savings to pay for education and health care. Savings may also serve as a buffer during emergencies such as droughts, flooding, and accidents (Moser, 2007; Rutherford, 1999). Although theory on the effects of assets (savings) on well-being is still developing, a growing body of evidence in both sub-Saharan Africa (hereinafter, SSA) and developed countries like the United States points to positive associations between savings and several dimensions of well-being, including economic and financial well-being, physical and mental health, and educational outcomes.

In SSA, evidence on the impacts of savings and asset-building programs on economic and financial well-being comes mostly from East Africa. For example, results from a savings project in Kenya called Tap and Reposition Youth (TRY) show a statistically significant increase in participants' income, assets, and savings levels after the TRY savings program (Erulkar & Chong, 2005). In Uganda, Ssewamala and Ismayilova (2009) found that after 10 months of participation in the SUUBI (that is,

hope) asset-building program, participants had not only statistically significant higher savings levels, but also positive attitudes toward savings. Studies by Chowa and Sherraden (2009) and Chowa and Ansong (2010) used both pre- and posttest data from the AssetsAfrica project in Uganda and found positive effects of asset-building intervention on households' total wealth and net worth.

There is also evidence of the impact of savings on mental health, general health, and health-related behavior. In Uganda, Ssewamala, Han, and Neilands (2009) found that AIDS-orphaned youth who participated in a matched savings program experienced significant increases in their self-esteem and rate of participation in social groups. The TRY program in Kenya also found that after participation in the savings program, participants became more empowered and had more control over their sexual and reproductive behavior (Erulkar & Chong, 2005).

There is also emerging evidence of the impact of savings programs on educational outcomes. The SUUBI experimental study in Uganda found a positive impact of youth savings on grades and attitudes toward education (Curley, Ssewamala, & Han,

2010). Generally, we know little about the impact of savings on education in SSA. Most of what we know comes from the United States, where growing empirical evidence points to positive associations between savings and school attendance (Elliott & Beverly, 2011), graduation (Zhan & Sherraden, 2011), grades and test scores (Elliott, Kim, Jung, & Zhan, 2010; Loke & Sacco, 2011), grade completion/progression (Kaushal & Nepomnyaschy, 2009), and educational expectations (Kim, 2010).

As research on the impacts of savings on well-being grows, it is important that ample studies shed light on the pattern of use of savings mechanisms—especially among rural populations. In rural SSA, the rate of financial savings is lower compared to that of urban areas; however, this lower rate does not mean rural dwellers do not save. Besides accumulating physical assets—such as land, buildings, and livestock (Kiiza & Pederson, 2002)—most rural dwellers accumulate financial resources through informal saving mechanisms, such as keeping money under mattresses, with family members and friends, and in a *merry-go-round* (a group of individuals who make regular cyclical contributions to a common fund, which is given as a lump sum to one member in each cycle; Ansong & Chowa, 2010; Collins, Morduch, Rutherford, & Ruthven, 2009; Hirschland, 2005).

Although people in rural areas often find these informal mechanisms convenient, they are generally insecure and unreliable (Ansong & Chowa, 2010; Collins et al., 2009). Often many informal saving devices are not regulated and run the risk of abuse. For some people, the need to find a safe place to save trumps concerns about the high cost of savings (Rutherford, 1999). Data from Vijayawada in southeastern India revealed that slum dwellers were willing to pay a premium as high as 30% a year to save with trusted collectors (Rutherford, 1999).

Even though rural households may save through various informal mechanisms, Rutherford (1999) noted that it is important that they are able “to turn their savings into usefully large lump sums at both short and long-term notice” so that they can meet personal immediate needs (for example, loss of jobs, death) and other emergencies (for example, droughts, flooding, fire). Lump sums also enable people to invest in income-generating opportunities, such as a new business or land for agriculture

production. Even though people generally know they need lump sums, we know from the behavioral economic perspective that people do not always act rationally. The discipline to accumulate a lump sum is difficult to sustain. Hence, low-income households need saving mechanisms that place some constraints on the use of accumulated savings (Beverly et al., 2008).

In some cases, low-income households may have the discipline to save, but they might lack the institutional support to assist their efforts. As the institutional theory of saving posits, structured arrangements—such as explicit access, information, rules, incentives, restrictions, and security—are critical to successful asset accumulation (Beverly & Sherraden, 1999; Curley, Ssewamala, & Sherraden, 2009). Many rural dwellers do not have such institutional support to help them save in a secure place that facilitates more saving and less spending. A study conducted in Uganda by Wright and Mutesasira (2001) found that within a year, more than half (68%) of respondents who saved at home had their savings depleted mainly because of inconsequential spending and lending to neighbors. Moreover, money saved under the mattress, hidden on the farm, or buried in the earth loses its value overtime because of inflation (Rutherford, 1999).

If rural households are saving, as evidenced by their use of informal saving mechanisms (Eboh, 2000), then it is important to examine why they are not using formal financial services at the same rate. Hirschland (2005) suggested that a household’s distance from a financial institution is the major obstacle for using formal financial services. Although other ways of conducting financial transactions, such as branchless banking and mobile banking, are now available in some areas of SSA, not all rural areas have access to these alternative banking services. Other reasons for the low formal financial savings rate may be a lack of knowledge and information about financial services and products, high fees charged on bank accounts by some banks, and perceived complexity of saving with formal financial institutions (Hirschland, 2005). In rural areas where mobile banking is available, some people with less education may be able to use their mobile phones to transfer money; however, those with limited numeracy and basic arithmetic skills may not be able to fully use electronic and mobile phone banking services.

In the case of Uganda, the financial sector has greatly expanded, but access to financial services by rural households remains very low (Kasirye, 2007). Through the implementation of macroeconomic reform programs, the Ugandan government encouraged the extension of financial services to rural households. After a couple of attempts to increase this outreach through programs such as the Rural Farmers Scheme and *Entandikwa* scheme (a program for small business start-ups), a more recent credit scheme program called *Bonabaggavale* (“prosperity for all”) was implemented through the Post Bank. Notwithstanding these commendable efforts, financial institutions are still not within the reach of many rural households. The most recent national household survey found 17% of rural households have access to a bank within 10 kilometers, compared with 90% in urban areas (Ugandan Bureau of Statistics [UBOS], 2007). The survey also found that 40% of rural households have access to a microfinance institution within 10 kilometers, compared with 96% for urban households. Could the long distances to financial institutions in rural areas be affecting rural households’ use of formal financial services? These rural households already save with informal savings mechanisms but do not have access to safe and secure ways of saving that would yield higher returns.

This article uses Margaret Sherraden’s (2013) proposed financial capability framework to investigate the tendency of rural households to save with a formal financial institution (see Figure 1). The framework focuses on both the *ability to act* based on one’s knowledge, skills, confidence, and motivation and the *opportunity to act* because of access

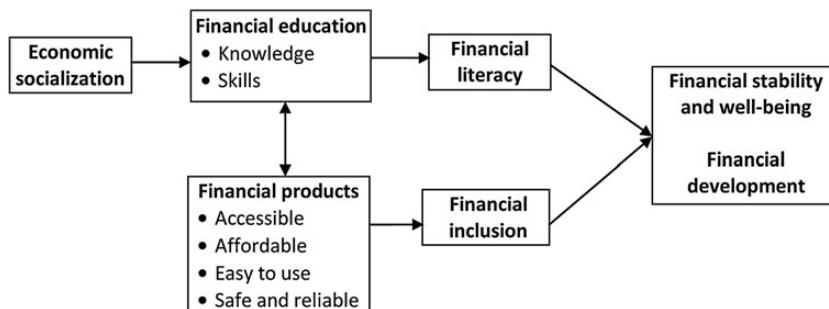
to quality financial services and institutions (Johnson & Sherraden, 2007; Sherraden, 2013). This capability approach is not purely individualistic but takes into account the external environment and the range of opportunities open to a person as well as the person’s internal capabilities (Nussbaum & Sen, 1993). In defining financial capability, Sherraden (2013) proposed a framework for understanding the interplay of economic socialization, financial education, and financial products that contribute to an individual’s financial stability and well-being as illustrated in Figure 1.

WHY FINANCIAL CAPABILITY FOR RURAL HOUSEHOLDS?

The literature on the impacts of financial services for households is characterized by a debate with one side emphasizing the importance of financial literacy or internal capabilities and the other side stressing the importance of financial inclusion and access or external factors. Financial capability proposes that both points are important. The acquisition of knowledge and skills to use the financial services will be minimized if potential users lack access to affordable, financially attractive, easy-to-use, safe, and reliable financial services and products (Sherraden, 2013). Likewise, if people have access to financial products and services but do not have the necessary information and knowledge about them, then those services and products will be underutilized.

In rural areas, lack of access to effective financial markets may constrain low-income households from accumulating lump sums, which are needed for improving financial well-being. However,

Figure 1: Conceptual Framework of Financial Capability



Source: Sherraden, M. S. (2013). Building blocks of financial capability. In J. Birkenmaier, J. Curley, & M. Sherraden (Eds.), *Financial capability and asset development: Research, education, policy, and practice* (pp. 3–43). New York: Oxford University Press.

access to financial institutions alone may not guarantee rural households' participation in transactions with financial institutions. Individuals need to have the knowledge and skills to use banks, but banking services have to be accessible and usable. [Kiiza and Pederson \(2002\)](#) provided empirical support for how internal and external factors shape people's financial capabilities. Their study found that in Uganda, the decision to deposit money in a formal financial institution was positively related to internal factors—such as information the household had about the particular banking system and the head of household's level of education and work experience—and external factors, such as the remoteness of households from any formal financial institution. Further, the extrapolation from [Sen's \(1993\)](#) discourse on the external environment and [Kiiza and Pederson's \(2002\)](#) finding suggested that external factors, such as community characteristics, were as important as the internal factors in promoting people's capabilities. Therefore, we hypothesize that community variables or external factors are important to increase individuals' financial capability (hypothesis 1). Although informal savings may qualify as a form of financial capability, the emphasis of this study is on formal savings because it is a safer, more secure way of saving, and it yields higher returns.

Internal Factors

In discussing the internal capabilities, [Sherraden \(2013\)](#) narrowed these to an individual's knowledge, skills, confidence, and motivation. When people are financially literate, they may be able to make better financial decisions and improve their saving actions ([Bell & Lerman, 2005](#); [Lusardi, 2008](#)). Research in developed countries suggests that financial knowledge is correlated with financial behavior. Using data from the 2001 Survey of Consumer Finances and University of Michigan's 2001 Survey of Consumers, [Hilgert and Hogarth \(2003\)](#) found that people with better knowledge of saving, investment, and cash-flow and credit management were more likely to exhibit sound financial behavior. In Uganda, the financial literacy level is generally low ([Tentena, 2010](#)). The Ugandan government has recognized the potential of financial literacy to improve saving habits and has initiated a partnership between the ministry of education and the Bank of Uganda to plan and incorporate financial literacy programs into the curricula of all levels of the public education system ([Ssempijja, 2010](#)).

Financial education takes place in both formal and informal settings. More and more, formal financial education is being incorporated into saving and asset-building interventions as a way to impart financial knowledge and responsibility. Research suggests that it takes approximately 10 hours of financial education to positively influence saving behavior ([Bell & Lerman, 2005](#)). However, in rural areas, financial knowledge and skills are normally acquired through informal social education from interactions with colleagues, family members, and role models ([Garrison & Gutter, 2010](#)). Although informal social education is a necessary part of financial literacy, it may not be sufficient to help rural households navigate the increasingly complex financial markets and take advantage of ever-expanding investment opportunities. Additional formal financial education may be needed to better empower rural households to make well-informed financial decisions. Therefore, it is hypothesized that the more financial knowledge one has, the higher the likelihood of saving in a bank (hypothesis 2).

External Factors

External capabilities refer to the financial environment and how it affects those who wish to engage with formal financial services.

Distance to the Bank. Access to financial institutions involves both eligibility to access services and the practicality (for example, physical distance) of reaching the service provider ([Beverly et al., 2008](#)). In many rural areas, distance to service providers is a major obstacle for using financial services ([Beverly et al., 2008](#); [Deshpande, Pickens, & Messan, 2006](#)). Research in developed countries has suggested that the benefits of having more bank branches increase as branches are in closer proximity to neighborhoods ([Ergungor, 2010](#)). A country-level savings assessment by the Consultative Group to Assist the Poor (CGAP) revealed that Uganda has an average of one bank branch per every 200 square kilometers and 38 branches per 1 million inhabitants ([Deshpande, Pickens, & Messan, 2006](#)). Indeed, the ratio could be higher in rural areas because these statistics overlook the large rural-urban variation whereby most branches are clustered in towns and cities. All the same, these figures suggest that bank branches are not within reach of many rural areas in Uganda. In these areas, where electronic and mobile banking are not

widely used, the uptake and use of financial services may be hindered by the physical distance to a bank branch. One reason people prefer informal mechanisms over formal savings is that money saved through informal mechanisms, such as at home, is almost always accessible and carries no additional transportation cost to the saver (Deshpande et al., 2006; Hirschland, 2005). Hirschland (2005) summed up by saying, “For the poor [and most people], convenience is critical. Many clients will deposit their money only if they can do so quickly. For frequent small deposits, a service that requires an hour’s walk . . . may have little value” (p. 159).

Financial institutions also benefit from the close proximity of bank branches to communities. Ergungor (2010) suggested that distance between bank branches and service users is important because proximity not only enhances the relationship between service providers and users but also lowers the extra cost that service providers must incur collecting information on service users, particularly borrowers. When financial service providers spend extra resources to gather more information about borrowers, the costs of services are eventually borne by the service users through interest rates and other charges. The literature has suggested that physical accessibility to formal financial institutions may affect the saving actions of rural households, yet evidence of this relationship is lacking (Beverly et al., 2008). A deeper understanding is needed of how distance to financial institutions affects the likelihood that rural households in Uganda will use bank savings. It is hypothesized that the farther one is from the bank, the lower their likelihood of saving in a bank (hypothesis 3).

Easy to Use Financial Instruments: Rules and Procedures. In addition to the potential barriers that bank inaccessibility may pose to mobilization of rural savings, extensive banking rules and procedures may also prevent many people from depositing their money in the bank. In Uganda, documentation such as personal identification, a payment slip, proof of residence, and a reference letter that are required to open an account may prevent large portions of the population in the nonformal sector from accessing banking services. In a comparative study of barriers to banking around the world, Beck, Demirgüç-Kunt, and Peria (2008) found that in 2005, 50% and of Uganda’s \$324.9 gross domestic product per capita was

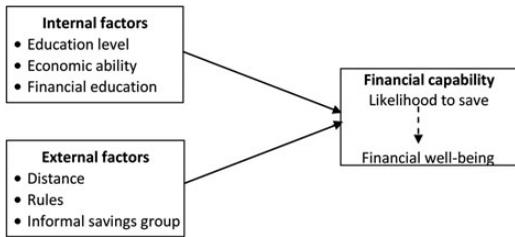
required to open, and 20% to maintain, a regular checking account. The same study also found that loan applications could be submitted only at a bank headquarters or branch in Uganda, unlike in other countries where nonbranch outlets, phones, and Internet could be used for such applications. In some cases, the rules and procedures form part of the central government compliance requirements (Beck, Fuchs, & Uy, 2009). Although these rules and procedures are generally meant to avert fraud and mismanagement in the banking sector (Beck et al., 2009), they may create disincentives for rural households to use banks.

Currently, we know very little about the extent to which banking rules and procedures or perceived difficulties in reading and understanding bank statements and documents discourage rural households from banking. In the United States, quantitative data from the American Dream Demonstration (ADD), which ran from 1997 to 2001, found no statistically significant relationship between flexibility of program rules and saving rate or deposit frequency, but the qualitative data suggested there is some relationship between flexibility of program rules and saving (Sewamala & Sherraden, 2004). Even though the data presented inconclusive results, they suggested that complicated rules may present a challenge to the use of financial services. Demands for documentation—such as identification cards, birth certificates, and photographs—especially at the time of account opening, can be arduous. Simplified rules and procedures could enhance the confidence of rural households who use banks. Therefore, it is hypothesized that rural households’ perception about the rules and procedures of formal banking shape their saving actions (hypothesis 4).

In light of what we know and do not know about the saving actions of rural households in Uganda, we use the financial capability model (see Figure 2) to test the following four hypotheses:

1. Community variables (external factors) shape a household’s likelihood to save in a bank. This is a general hypothesis that tests whether external capabilities or, in this case, community factors ought to be accounted for in modeling household saving actions. A null model will be used to test this hypothesis. A large variance component of the null model would support testing unspecified

Figure 2: Proposed Financial Capability Model



community variables within the context of a multilevel analysis, so that presumably a community-level effect is inclusive of a host of presumed, but unobserved/unspecified factors.

2. Participation in financial education training is associated with greater likelihood to save in a bank.
3. Shorter distance to a bank is associated with a greater likelihood to save in a bank.
4. Perception of greater flexibility in rules and procedures of banks would lead to greater likelihood to save in a bank.

PROJECT CHARACTERISTICS AND DATA SET

Data used in this study were obtained from the baseline survey of AssetsAfrica, a demonstration and research initiative designed to test asset-building innovations in Africa. Implemented in Masindi, Uganda, between 2004 and 2008, the pilot project used a quasi-experimental design, comparing results across treatment and comparison villages. The Center for Social Development at Washington University’s Brown School designed and carried out the research, while International Care and Relief-Uganda (ICR) implemented the intervention. ICR is an international nongovernmental organization that has implemented numerous multisector programs since its founding in 1996.

The Uganda pilot was conducted in the Kigumba and Pakanyi subcounties in the Masindi district of central-western Uganda. In the project, an asset-building intervention was implemented with 200 people in Kigumba, which has three parishes, 45 villages, and a total of 4,791 households. It has a population of 17,466 male and 15,319

female residents. Fifty-three percent (17,391) of the population in Kigumba lives below the poverty line (UBOS, 2006). The furthest village in the Kigumba intervention group is 35 kilometers from Masindi town, which is the capital of the Masindi district. The closest village in the intervention is 1.8 kilometers from the main road. Agriculture is the major means of livelihood in this subcounty; the main food crops in Kigumba are maize (corn), sweet potatoes, and cassava. The main cash crops are coffee, sesame, and rice; the main livestock are cattle, pigs, goats, and chickens.

The comparison group in the study, which did not participate in the intervention, consists of 200 people from the Pakanyi subcounty, which has three parishes, 54 villages, and 4,687 households. The population is 18,190 males and 17,214 females. Forty-four percent of Pakanyi’s population (17,702 people) lives below the poverty line (UBOS, 2006). Pakanyi is 15 kilometers northeast of Masindi town and about 1.6 kilometers from the main road. The subcounty has, among other facilities, a health center, a market, schools, an agricultural center, an agricultural college, and a grocery store. Similar to Kigumba, the food crops in Pakanyi are maize (corn), sweet potatoes, and cassava. The cash crops are coffee, sesame, and rice; the main livestock are cattle, pigs, goats, and chickens. The geographical tips of Kigumba and Pakanyi are approximately 30 kilometers apart.

Selection Process

The sampling was not a random assignment. ICR and local government officials identified Kigumba as a subcounty that had been marginalized in terms of economic investment for some time and was therefore in need of some intervention. This intervention was perceived as a step toward improving the well-being of the people in the villages of Kigumba. Because of the nature of the project, a comparison group was needed, and Pakanyi was identified as similar to Kigumba in terms of infrastructure, agricultural undertakings, presence of a market, schools, and the presence of development projects. Both the Masindi local government officials and ICR agreed that these two subcounties are similar.

Each subcounty has existing local parish councils (LPCs), created by the local government for purposes of development in counties. These LPCs, in

conjunction with ICR, used criteria provided by the researchers to select participants for the intervention group in Kigumba and the comparison group in Pakanyi. There were two main guiding criteria for selection to the group: A person had to be considered poor and in need of assistance, and they had to have previously participated in an ICR project (this was included for ease of identification). This process was vetted by community leaders and other village representatives. Other logistics included having similar samples in terms of gender, age, and regularity of income receipt. Because of gender bias in asset accumulation in Uganda, representation of women was important for the project so that any gender differences in the impacts of the asset-building interventions could be assessed. Deliberate efforts were made to include women in the selection, because women typically own less assets than men in rural Uganda (Kes, Jacobs, & Namy, 2011; Rugadya, Obaikol, & Herbert, 2005). In terms of age, ICR targeted young people, ages 15 to 35. Older adults, ages 36 to 60, were also included. Most of the elderly in Masindi, like in other parts of Uganda, take care of orphans because of the HIV/AIDS pandemic that took the lives of many middle-aged Ugandans. The elderly caregivers need some financial and economic stability in their households to take care of these orphans. As previously stated, the main livelihood in this area of Uganda is agriculture, which means income is seasonal. To understand the saving habits of regular income earners versus seasonal income earners, regular income earners were also selected to participate in the project. At the time of enrollment, each research participant signed a letter of consent, agreeing to participate in the study for five years.

Data Collection

We collected the baseline data in August 2005 using a face-to-face survey administered by local interviewers. The survey consisted of more than 100 questions, most of which were adopted from the ADD. By using only the baseline data, we were able to eliminate the confounding effects of the AssetsAfrica intervention, which included specific assets management training, an agreement with Stanbic Bank to provide mobile banking services, provision of a 1:1 match rate, and HIV/AIDS

education. The AssetsAfrica baseline data set is a two-level nested data set. Level 1 (household level) consists of 374 household heads, and Level 2 (community level) is made up of 57 communities from the Pakanyi and Kigumba subcounties. These communities are separate geographic units. However, in some cases there are similarities in terms of language spoken, schools the children attend, and local market. Some communities run cereal banks and others do not, therefore the economic characteristics of these communities vary somewhat. Both sample sizes are deemed large enough for multilevel modeling.

MEASURES

Dependent Variable

Household bank savings is the outcome variable, referred to as *savings*. It is a binary variable that measures whether or not a household was saving in a bank at the time of Wave 1 data collection.

Predictors

Distance to the Bank. This is a community-level continuous predictor. The variable is a measure of the proximity of a formal financial institution to each community at the time of Wave 1 data collection. These are administrative data obtained from ICR and merged with the nested data for this study. The unit of measurement is kilometers.

Financial Education. This is a household-level continuous predictor that measures the total hours of financial education training a household head received within the past 12 months. The financial education training included topics such as general financial education, banking, business startup, budgeting, saving habits, and other financial issues.

Difficulty of Use. This is a household-level predictor that measures a household's perception about whether the rules, documentation, and procedures at banks are an obstacle to formal saving. The original question tapped into respondents' experience with understanding bank statements and rules using a four-point scale with the following responses: very hard, somewhat hard, a little bit easy, and very easy. The variable was collapsed into a binary variable. The responses very hard and somewhat hard were coded as yes (1) and a little bit easy and very easy were coded as no (0).

Control Variables

Informal Savings Group. This is a community-level dichotomous covariate that measures the availability of an informal savings group in each community at the time of Wave 1 data collection. ICR provided this data from their operational records from ongoing community evaluations that they conduct. These data were merged with the survey data. A response of 1 means there is at least one informal savings group in a community and a response of 0 means there are none. The informal savings groups in the communities were the National Agricultural Advisory Services, Village Savings and Loans Associations (VSLAs), and the Masindi District Farmers' Association (MADIFA). The VSLAs and MADIFA also served as social support groups.

The inclusion of informal savings groups as a covariate is based on the need to clarify two perspectives on how informal savings may be associated with formal savings. On one hand, there is the idea that when people are actively saving in an informal savings group they may be less compelled to explore formal savings mechanisms, especially if they are comfortable with their choice. The literature has also suggested that people who find formal savings to be inconvenient may be attracted to informal savings mechanisms (Robinson, 2001). The other perspective suggests that households typically use diverse savings mechanisms. Thus, when a household cultivates a saving habit they are likely to use a wide range of savings mechanisms, including formal and informal mechanisms (Carpenter & Jensen, 2002). This perspective is supported by studies that show that most people who use formal saving instruments also maintain some informal savings (Robinson, 2001). We use this variable to include other forms of savings the participants are using that may influence the results.

Household Economic Ability. This is another household-level control variable. Using a five-point response scale, ranging from *very hard* to *very easy*, respondents were asked: "Overall, how hard or easy is it to make ends meet?" Descriptive results revealed invariable responses, with most people identifying with the extreme responses. As a result, the responses were collapsed into binary responses. We suspect that households that experience difficulties in feeding members may save less because they have little or no money.

Education. This is a household-level variable, which measures respondents' level of education at the time of Wave 1 data collection. It is an ordinal variable with the following responses: none, primary, secondary, and tertiary.

Other sociodemographic factors that have been shown to be potential confounders were included in all full models as additional control variables. These variables are age, gender, and household size.

DATA ANALYSIS

Version 2.10.0 of the *R* statistical software was used to run all analyses (R Development Core Team, 2010). The highest percentage of missing data was 6.5%, which is below the 10% or 20% cutoff recommended by Bennett (2001) and Peng, Harwell, Loiu, & Ehman (2006), respectively. Nevertheless, the data were further examined to check for biased results. No statistically significant associations were found, indicating a pattern of missing completely at random (MCAR). Further tests were conducted by using multiple imputation regression approach to replace the missing data (see Allison, 2000; Wayman, 2003). All multilevel analyses were rerun with the imputed data. Results of the models with and without imputed data were compared and no significant differences were found in the direction of the results. Because the missing values were MCAR and there were no significant differences between the full models for the imputed and unimputed data, the complete case analysis method was used.

In this study, a logistic multilevel modeling approach was used because it is able to model nested data with relatively fewer assumptions for the procedures used, compared with other procedures that deal with nested data (Osborne, 2000). Another key consideration for using a multilevel approach in this study is that contextual influences that may be overlooked by other statistical methods are accounted for. In the case of banking in rural Uganda, there may be differences between communities in terms of the access and availability of banks and other informal savings groups. With the use of traditional statistical methods like regular logistic regression, such differences may be overlooked, thereby introducing errors in prediction. Thus, multilevel methods make it possible to detect the influence of community characteristics on bank savings and at the same time, assess the effects of individual household characteristics.

To provide empirical justification for using a multilevel modeling approach, an intra-class correlation coefficient (ICC) was computed. Although there is no agreement on the ICC cutoff for multilevel modeling, Lee (2000) suggests an ICC greater than 10% is big enough to consider multilevel methods. A null model was fitted, and the household-level (level 1) and community-level (level 2) variance components were used to calculate the ICC as shown in Equation 1.

$$ICC = \frac{\sigma_{u0}^2}{(\sigma_{u0}^2 + \sigma_r^2)} \quad (\text{Equation 1})$$

where σ_{u0}^2 is the estimate of community level variance, and σ_r^2 is the estimate of household-level variance.

$$ICC = \frac{1.2512}{(1.2512 + 3.29)} = 0.2755 \text{ (that is, 27.55\%)}$$

The ICC was found to be about 27.55%, indicating that the community-level characteristics account for a large proportion of the variability in bank savings. This means that households within the same community save in a similar pattern compared with households across communities. Therefore, community variations in households' bank savings must be explored.

The full maximum likelihood estimation method was used throughout the analyses because it allows for comparison of nested models. Hypothesis 1 was addressed by examining the random effect variances associated with the null model. Hypotheses 2 and 3 were addressed by fitting two full models. The first full model (Model 1) had only household-level variables as predictors. That model was an intercepts-as-outcome model in which bank savings were regressed on seven household-level predictors (measures of internal capability), namely, age, gender, household size, education level, difficult banking rules, financial education, and perceived economic ability. The inclusion of household-level predictors was to verify if the internal capabilities of households predict significant variations in bank savings.

The second full model (Model 2) is a random intercepts model, which includes both household- and community-level variables as predictors. The two community-level predictors (measures of external factors), which were added

to the household-level predictors, were "proximity of banks" and "availability of informal savings groups." The addition of community-level predictors was to confirm if the factors external to households predict significant variation in the predisposition to save in a formal financial institution. In our final full model (Model 2), we assess the extent to which the intercommunity variability in the propensity to save can be explained by the community differences.

MODEL COMPARISON: FINAL MODEL SELECTION

A review of the Akaike information criterion (AIC) of all the models revealed that Models 2 and 3 fit the data best because they had the smallest AICs (360.24 and 375.37, respectively). Because Models 2 and 3 fit the data sufficiently, an analysis of variance (ANOVA) test was computed to determine the final model. The results showed no statistically significant difference between Models 2 and 3 ($\chi^2 = 12.873, p = .537$). Model 2 was therefore selected as the final model because it has the smallest AIC, it is more parsimonious, and most important, it yields the smallest variance component. The significant reduction in the variance component from 0.2755 in the null model to almost zero (0.0486) in Model 2 means that nearly all the variability in the odds of bank saving that may be caused by community differences have been modeled.

We also compared the fit of the final model and a classical logistic regression model. The log-likelihood difference test did not find statistically significant difference between the final model and classical logistic regression model (value = 1.06, $df = 1, p = .303$). Thus, we maintained the multilevel model as the final model. We also compared the fit of the final model and a classical logistic regression model. The log-likelihood difference test did not find statistically significant difference between the final model and classical logistic regression model (value = 1.06, $df = 1, p = .303$). Thus, we maintained the multilevel model as the final model. Other reasons that informed our choice of multilevel over classical logistic regression model include the ability to model variation between communities without significantly and substantially overestimating the effect of household predictors or underestimating the effects of the community-level factors (Gelman & Hill, 2007; Osborne, 2000).

The system of equations for the final model (Model 2) is as follows:

$$\begin{aligned} \text{Level 1: } & \text{Logit}(P(\text{Save} = 1)) \\ & = \beta_{0j} + \beta_{1j}(\text{Age})_{ij} + \beta_{2j}(\text{Gender: Male})_{ij} \\ & + \beta_{3j}(\text{Household size})_{ij} \\ & + \beta_{4j}(\text{Primary education}^\dagger)_{ij} \\ & + \beta_{5j}(\text{Secondary education}^\dagger)_{ij} \\ & + \beta_{6j}(\text{Tertiary education}^\dagger)_{ij} \\ & \times \beta_{7j}(\text{Difficult Rules: Yes})_{ij} \\ & + \beta_{8j}(\text{Financial education})_{ij} \\ & + \beta_{9j}(\text{Economicability: Yes})_{ij} \end{aligned}$$

$$\begin{aligned} \text{Level 2: } & \beta_{0j} = \gamma_{00} \\ & + \gamma_{01}(\text{Informal savings group: Yes})_j \\ & + \gamma_{02}(\text{Distance})_j + u_{0j} \\ & \beta_{1j} = \gamma_{10} \\ & \beta_{2j} = \gamma_{20} \\ & \beta_{3j} = \gamma_{30} \\ & \beta_{4j} = \gamma_{40} \\ & \beta_{5j} = \gamma_{50} \\ & \beta_{6j} = \gamma_{60} \\ & \beta_{7j} = \gamma_{70} \\ & \beta_{8j} = \gamma_{80} \\ & \beta_{9j} = \gamma_{90} \end{aligned} \quad (\text{Equation 2})$$

where $\text{Logit}(P(\text{Save} = 1))$ is the odds of saving in a bank for households i in community j . The grand mean is represented by β_{0j} , and β_{1j} through β_{9j} are the effects of a unit change in the predictors on the odds of saving in a bank. Where appropriate, the reference group has been appended to the variables. Education variables with \dagger mean the reference group is “no education.”

RESULTS

Descriptive Characteristics of the Sample

The average age of participants was 37 years (36 for those who saved in a bank and 39 for those

Table 1: Descriptive Characteristics of the Sample

Variable	Save in a Bank		Chi-Square/ t test
	Yes (n = 126)	No (n = 248)	
Household level			
Age (in years)	35.55	38.77	2.68**
Gender			
Male	68	147	
Female	58	101	0.96
Household size	7.85	7.47	-0.83
General education			
None	7	33	
Primary	41	132	
Secondary	29	64	
Tertiary	47	17	58.09***
Economically able			
Yes	84	107	
No	42	141	18.49***
Difficulty of bank rules			
Difficult	56	54	20.68***
Easy	70	194	
Financial education (in hours)			
	1.05	5.21	-4.71***
Community level			
Distance to bank (in km)			
	9.16	10.9	2.46*
Informal groups			
Yes	111	128	48.21***
No	15	120	

* $p < .05$. ** $p < .01$. *** $p < .001$.

who did not). The youngest household-head was 19 years and the oldest was 78 years. Slightly more than half of households (51.8%) believed they could make ends meet. Of this group, 56% did not save in a bank. Nearly half of respondents (46%) had acquired only primary-level education; the majority (76%) of this subgroup did not save in a bank. Of the 30.3% of households who did not perceive banking rules and procedures to be difficult to understand, 73% did not save in a bank. Respondents received an average of 2.07 hours ($SD = 6.43$) of financial training. Overall, majority of respondents did not save in a bank (66%). Descriptive statistics of the sample are presented in Table 1.

Random Effects

The null model in Table 2 presents the result for hypothesis 1. The between-community variation

Table 2: Multilevel Logistic Regression Results: Internal and External Factors Associated with the Propensity to Save in a Bank

Factor	Null Model (Baseline) OR	Model 1: Household Variables as Fixed Effects OR	Model 2: Addition of Community Variables OR	Model 3: Addition of Random Effects OR
Fixed effects				
Household level				
Intercept, γ_{00}	0.37***	0.28	0.02**	0.01**
Age, γ_{10}		0.99	1.00	1.01
Gender (Male), γ_{20}		1.33	0.97	1.03
Household size, γ_{30}		1.05	1.04	1.02
Education ^a				
Primary, γ_{40}		1.24	1.26	1.47
Secondary, γ_{50}		1.42	1.51	1.92
Tertiary, γ_{60}		9.45***	10.42***	25.42**
Difficult rules (Yes), γ_{70}		0.58	0.88	0.92
Financial education, γ_{80}		0.77	1.09***	1.09***
Economically able (Yes), γ_{90}		3.07***	2.41**	2.85**
Community level				
Informal savings group (Yes), γ_{01}			4.98**	5.44**
Distance, γ_{02}			1.05	1.06
Random effects (variance components)				
Community level, u_{0j}	1.251(27.55%)	0.435	0.168	1.387
Education ^a				
Primary, u_{4j}				0.221
Secondary, u_{5j}				1.395
Tertiary, u_{6j}				8.524
Economically able, u_{9j}				0.106
AIC	437.3	385.3	360.2	375.4
Deviance	433.3	363.3	334.2	321.4

Note: AIC = Akaike information criterion, Valid level-1 sample size = 355, Valid level-2 sample size = 51.

^aReference group = no education.

* $p < .05$. ** $p < .01$. *** $p < .001$.

associated with households' bank savings is 27.55%. About 72.45% of the variability in bank savings is associated with the differences at the household level. That is, even though differences between households account for most of the variability in bank savings, the differences between communities account for more than a quarter of the unexplained variability in bank savings. This finding supports the hypothesis that some of the variability in rural households' savings actions is associated with between-community differences.

Fixed Effects

Influence of Household-Level (Internal) Characteristics. Results of the final model (that is, Model 2), which has fixed effects for household-level variables, are presented Table 2. They show that the fixed effects coefficients for difficulty of rules (odds ratio [OR] = 0.88, $p = .70$), primary education

(OR = 1.26, $p = .69$) and secondary education (OR = 1.51, $p = .44$) are not statistically significant. The data do not support the hypothesis that a rural household's perception about the difficulty of understanding rules and procedures of formal financial institutions would shape the household's savings rate in a bank.

However, tertiary education (OR = 10.42, $p < .001$), financial education (OR = 1.09, $p < .001$), and economic ability (OR = 2.41, $p < .01$) are statistically significantly associated with the likelihood of saving in a bank. Thus, the hypothesis that rural households that participate in any form of financial education training are more likely to save in a bank is supported by the data. The odds of saving in a bank are 10.42 times greater for households whose heads have acquired tertiary education compared with those who have no formal education. Holding all other variables constant, an hour increase in

financial education is associated with a 5% increase in the odds of saving in a bank. Holding all other variables constant, the odds of saving in a bank are 2.41 times greater for households that think they are able to make ends meet compared with those who think they cannot make ends meet.

Influence of Community-Level (External) Characteristics. The fixed effects coefficient for one of the community-level characteristics was not statistically significant: distance ($OR = 1.05, p = .12$). That is, there is no statistically significant association between the proximity of banks and the likelihood of saving in a bank. Therefore, the data do not support the hypothesis that a shorter distance to a bank is associated with a greater likelihood of saving in a bank.

In the final model, the community-level variable “informal savings group” is statistically significantly associated with bank savings ($OR = 4.98, p < .01$). Holding all other variables constant, the odds of saving in a bank are 4.98 times greater for households in communities that have informal savings groups.

DISCUSSION

Findings from this study support to a large extent Sherraden’s (2013) conceptualization of financial capability as requiring internal and external capabilities. This study demonstrates the importance of external (availability of informal savings group) and internal (tertiary education, financial education, and economic ability) factors in shaping the financial capabilities of rural dwellers. Because of the weak-to-moderate support for the external capabilities part of the Sherraden’s model, more research is needed to shed light on how different measures of banking rules and proximity in rural areas may affect the uptake and use of formal financial services.

Internal Capability

Financial Literacy. Overall, this study provides strong support for the role of internal capabilities in shaping rural household use of formal savings channels. The data support the proposition that financial literacy shapes the saving and investment behavior of people. In this study, households that are headed by people who have no formal education are less likely to save with a bank than those headed by people with formal education. This may be because using a bank is perceived as, or in some cases requires, a certain level of reading and writing proficiency. English is the formal language

for verbal and written communication in Uganda, so low levels of English literacy may be a considerable barrier to transacting. Likewise, a lack of basic numeracy skills, such as an ability to understand and calculate interest rates, may exacerbate the perceived stress in transacting with a bank.

The study also found that financial education predicts saving actions. Financial education equips people with knowledge and information that facilitate their use of formal financial products and services. When people do not have enough information about saving and investment options nor benefits of formal financial services, their use of formal financial services may be limited. This finding is consistent with the financial literacy literature, which has suggested that people’s saving and investment actions improve when they receive financial education (Beverly et al., 2008).

Perceived Economic Ability. This study also demonstrates that people’s perceptions about their economic ability shape their saving actions. This finding is consistent with the self-efficacy literature, which suggests that people’s self-beliefs shape their actions (Bandura, 1997). If household members feel they do not have adequate resources to fend for themselves, they may be less motivated to accumulate savings. People form beliefs about their economic ability based on their material hardship. Such beliefs predict savings because people act in ways that conform to their perceptions.

External Capabilities

Informal Savings Channels. The significant result for informal savings groups is consistent with a community-level effect perspective which argues that the presence of savings in the environment, be it informal or formal savings mechanism, will have an effect on the savings behavior of the residents of that community. The stronger the saving norm is in the community, the stronger the savings habits of the people. Therefore, there will be differences in the savings behavior of people in communities with savings groups and those which do not have such savings groups. Perhaps, people who live in communities with informal savings groups receive more cues and reminders (these may be through peers) to save in a bank or perceive savings to be advantageous. In other words, people who are exposed to informal saving mechanisms may be more receptive to the idea of saving, including formal savings, because of their environment. Indeed,

studies have shown that most people who use formal saving instruments also maintain some informal savings (Robinson, 2001).

Bank Rules and Procedures. This study did not find support for the influence of banking rules and procedures on the likelihood of saving in a bank. This means that even though about 70% of respondents felt bank rules were difficult, such rules did not matter much in their decision to transact with a bank. This finding is contrary to the perception that the more complicated the rules, especially during account opening, the more people would shy away from dealing with formal financial institutions. There may be a couple of reasons for this result. Generally, the intent of these bank rules and procedures is to prevent fraud and abuse. Therefore, it is possible that even though people generally find the rules cumbersome, many may feel that these rules are there to protect their savings and investment from fraud and abuse. In other words, in this study there was no clear pattern of how rules affected savings. Both tough and flexible rules affect savings equally. Therefore the relationship between rules and savings is not significant. This may be because some people accept the rules as part of banking procedures and will save anyway. However, more research needs to be done in this area.

Although rules were found to have no effect on saving in this study, this finding may support the institutional theory of saving, which posits, among other things, that disincentives and restrictions shape saving habits. Although such restrictions and disincentives can be unattractive, some of them are relevant to help low-income households to save (Beverly et al., 2008). The behavioral economics literature has suggested that some rules are necessary to regulate self-control problems and the tendency to spend. Perhaps if in this study we had measured withdrawal rules separately from deposit rules, we may have found mixed effects of rules. Perhaps when rules governing withdrawals are more restrictive than those governing account opening and deposits, it may be possible that account “take up” increases while saving after opening increases as well, because withdrawals are limited.

Even though perceived difficulty did not predict saving, future studies may want to examine this more closely to match the perceived difficulty of certain specific products and services with probability of use of said products and services.

Proximity of Banks. This study also did not find a significant effect for the proximity of banks on rural dwellers’ likelihood of saving with a bank, contrary to findings by Kiiza and Pederson (2002). The mixed finding in this study may be explained by the differences in the measures of bank proximity. Kiiza and Pederson (2002) used bank density in rural versus urban areas as proxy for bank proximity whereas the current study investigates the physical distance from communities to the nearest bank. Moreover, Kiiza and Pederson sampled rural and urban households whereas the current study focuses only on rural households. Thus, the contextual differences between rural and urban communities may account for differences in the findings.

Nevertheless, the statistically nonsignificant finding suggests that, other things being equal, proximity does not predict likelihood of saving. It may be that proximity covaries with an unobserved variable, such as access to and use of transportation and proximity of banks to one’s home and place of business. In other words, the ease of accessing services is just as important as the physical distance to a bank. Financial institutions may be physically far, but if they are relatively easy to reach (because of, for example, good roads, affordable transportation), then an individual would likely use a banking service.

Last, the statistical approach—multilevel modeling—used in this study ensured that in addition to accounting for individual household differences, some differences in community characteristics were accounted for. Although rural communities often have a lot in common, they are also unique in terms of sociodemographics and the availability of institutions and infrastructure. The number of people below the poverty line in Pakanyi (44%) is larger than in Kigumba (40%). It could be that residents of Pakanyi may have less financial resources to save in a bank. Geographically, communities in Pakanyi subcounty are less cut off (15 kilometers) from Masindi, the major trading center, compared with communities in Kigumba (35 kilometers). It can be inferred from this variation that residents in Kigumba may have to bear additional cost to access the facilities and bank in Masindi. Some residents of Kigumba may not be aware of the bank in Masindi because of the distance.

Also, in this study some communities did not have any informal savings group, whereas others

had up to three. The presence of these savings groups may draw some communities' attention to saving options. Because of scarce resources, many rural communities do not have their own institutions such as banks and often have to share with neighboring communities. Hence, communities cannot always be assumed to be the same. Technically, all communities may have access to services and institutions in neighboring communities, but the degree of accessibility may vary substantially. In this study, the distance from banks to communities varied widely, from 0.2 kilometers to 25 kilometers, with a standard deviation of nearly 7 kilometers. Thus, depending on the community in which a household is located, different modes of transportation would be used. This example is but one that illustrates how differences between rural communities may have different implications on how people use financial services. Therefore, it is imperative that research in rural areas take into account contextual differences in these communities. Compared with traditional multiple regression analyses, multilevel modeling is a superior approach to assessing these clustering effects.

PRACTICE AND POLICY IMPLICATIONS

Having savings can improve rural SSA households' material security, particularly lower-income households that need savings to cope with irregular income and financial shocks, like drought or illness. This study identified internal and external factors that are associated with the likelihood of saving among households in rural Uganda that have implications for both practice and policy.

Social workers who wish to help rural SSA households increase their savings might consider financial education as an intervention tool. Financial education has been found in matched savings account studies to be associated with a greater likelihood of savings and achieving savings goals (Clancy, Grinstein-Weiss, & Schreiner, 2001; Grinstead, Mauldin, Sabia, Koonce, & Palmer, 2011). However, financial education should be tailored to the needs and circumstances of people with fewer financial and material resources (Anderson, Zhan, & Scott, 2007), be adapted for persons with limited literacy and numeracy skills, and include opportunities to use formal financial services (MasterCard Foundation, Microfinance Opportunities, & Genesis Analytics, 2011).

Through matched savings account programs in the United States, social workers work closely with banks to find ways to make financial services accessible and user friendly for lower-income households. Social work agencies play an intermediary role between lower-income communities and banks, arranging visits to agencies by bank officials to explain products and offer financial education and helping individuals make savings deposits. Social workers in SSA could play a similar role by working with banks and microfinance institutions to make savings products more accessible to rural households. This might include incorporating some informal savings methods (Ajetomobi & Olanju, 2000), such as the use of collectors who visit customers' houses and workplaces to collect a pre-determined installment from customers on a daily or weekly basis. However, customers may still need access to informal systems like rotating savings and credit associations to help cope with irregular cash flows (Collins et al., 2009) and may not trust banks if the country's formal financial services sector is poorly regulated.

Our finding that perceived economic ability is associated with saving suggests that families experiencing material hardship may not have the means to save. In such cases, social workers should consider intervention models like the Bangladesh Rural Advancement Committee's Targeting the Ultra Poor. Using this model, agencies help meet poor households' basic subsistence needs while offering training and assistance to enhance households' income-generating activities so they can eventually begin to save and access small amounts of credit for their microenterprises (Hulme & Moore, 2007).

Our finding concerning community-level variance in saving suggests that the interventions to promote saving need to be tailored to the needs of each community and that saving may not be the best strategy. For example, residents of rural farming communities that are vulnerable to volatile commodity markets and natural disasters may benefit more from crop insurance schemes than from help in saving. Conversely, communities in which a greater proportion of residents derive steadier income from formal sector employment or microenterprise may benefit more from programs to promote saving.

Finally, social workers can advocate for changes in public policies that will promote greater saving among rural households in SSA. Government

officials need to know when policies intended to expand traditional brick and mortar financial institutions or mobile banking platforms fail to result in increased access in rural communities. Social workers can also advocate for savings strategies to be linked with other social protection and development policies and programs. For example, Ghana recently launched a conditional cash transfer (CCT) program targeting very poor households modeled after Brazil's Bolsa Familia program. Social workers can advocate that CCTs be linked with savings accounts, which can reduce CCT operating costs and make delivering public assistance more secure (Jackelen & Zimmerman, 2011).

LIMITATIONS

Some limitations of this study should be noted. First, it did not use a randomized sample and therefore possible selection bias and its effects cannot be completely ruled out. Also, the use of complete case analysis method to handle missing data may have resulted in loss of statistical power and possibly yielded biased parameter estimates. Nevertheless, missing data were rigorously examined and deemed to be MCAR. Statistical results from imputed and unimputed data were not significantly different. Hence, any effect of missing data on parameter estimates is expected to be limited and insignificant. Also, the reason for modeling distance in this study was to assess how reachable banks were to communities. However, the measure of distance to bank may not have adequately tapped into all the difficulties that households and communities may face reaching the bank, including transportation cost. The lack of a standardized measure of accessibility of banks presents an opportunity for future research to focus on developing standardized scales for these constructs. Lastly, limited community-level variables were included in the statistical analyses. Although external factors (community-level variables) were a key part of this study's conceptual framework, this accounted for only two community-level (Level-2) variables. Replication of this study with a dataset that has more community-level variables from other developing regions of the world would be appropriate.

CONCLUSION

Although, the findings of this study cannot be generalized to the rest of SSA, the results will be the first step toward recognizing that the financial

environment cannot be ignored in the quest to understand the financial capability of the rural households. When households in rural communities have to decide whether to save in a formal financial institution or how much to save, the proximity of the institution and the perception about banking rules may not be the deciding factor. Perhaps what matters more is whether the household is financially literate, whether the household thinks there are enough funds to save, and whether the household is exposed to other forms of saving.

A broader implication of the positive influence of the presence of informal savings groups is that banks may target communities with informal savings groups because the community norms may signal a favorable market condition. However, more research may be needed for this hypothesis. Also, the fact that some communities have informal saving groups whereas others do not warrants further research to determine whether social and economic disadvantages account for the disparity. If certain factors and circumstances are to explain this disparity, identifying leverage points for efforts to promote informal savings as a precursor to formal banking will help.

Finally, although rural communities often have a lot in common, they are unique in many ways. Communities cannot always be assumed to be the same. Asset-building research and interventions in rural communities ought to be contextualized to account for differences between communities. Even though the findings on the proximity of financial institutions are inclusive, future research will be necessary to investigate what the differences are in the effects of physical infrastructure (branch banking) and mobile banking on rural households' financial savings. **SWR**

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Gina Chowa, PhD, is assistant professor, **David Ansong, PhD**, is assistant professor, and **Mathieu R. Despard, MSW**, is clinical associate professor, University of North Carolina at Chapel Hill. Address correspondence to David Ansong, 325 Pittsboro Street, #3550, Chapel Hill, NC 27599; e-mail: ansong@email.unc.edu.

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RESEARCH NOTES

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