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Who is the Customer? Identifying the Initial Adopters of Formal Savings. Field Evidence from Malawi

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WHO IS THE CUSTOMER? IDENTIFYING THE INITIAL ADOPTERS OF FORMAL SAVINGS. FIELD EVIDENCE FROM MALAWI

SUBMITTED TO

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Abstract

This thesis examines household characteristics as determinants of formal savings accounts in rural Malawi. The main questions answered in this paper include the effects of household characteristics on the probability of having formal savings, the amounts saved in these accounts, and the probability of adopting formal savings. The central discussion aims to identify the *initial adopters* of formal savings accounts, using a marketing approach previously unapplied to this area of research. This paper also contributes to the dialogue of the household composition by considering three untried variables: number of adults, number of children, and literacy of all household members. Results show that households are most likely to adopt formal savings, when provided access, if they have a head who can read Chichewa, a functional cellphone, more adults who can read Chichewa, and are close to the bank service. The field evidence comes from research conducted over a two year period 2008-2010 in sampled regions of Central Malawi.

Acknowledgements

I thank Professor Jeffrey A. Flory for guiding my thesis with his expertise in economic development, and allowing me to take a marketing perspective on the topic. Professor Flory was highly involved in this project throughout the eight month period of its development. I am particularly indebted for his exhaustive feedback and suggestions that have played an integral role in carving out this finished product. The Opportunity International Bank of Malawi, the Bill & Melinda Gates Foundation, the Wadonda Consullt, and the IRIS/FSA team at the University of Maryland deserve recognition for conducting, collecting, and reviewing the field evidence analyzed in this paper.

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I. Introduction

Traditionally, the term “microfinance” mostly referred to microcredit, but recently, researchers and practitioners are starting to see the benefits of microsavings as well. Introducing formal services of microsavings is an under-studied (yet, well questioned) method that adds liquidity to stagnant economies. Those who support such services focus on empowering the poor to escape poverty traps, and those who question these services often highlight the ethical issues that come with the pressures of transaction costs. Call it a man-made lake in a desert of poverty, or a pacemaker to the heartbeat of markets, microsavings has become a popular approach in efforts to alleviate poverty.

Microsavings, in particular, may prove to be an effective tool to suppress poverty because studies have shown that the poor *want* to save. In a study on access to financial services in Nepal, Prina (2013) found that even though the poor wanted to save, their demand for savings accounts was unmet. Her study revealed that when administrator and withdrawal fees were excluded, 84% of the sampled households opened formal savings accounts, all of which did not crowd out savings in other informal institutions.

It might be the case that a poor household demands access to formal savings, but is unable to adopt or regularly use the service due to conditions within the household. For example, if the fees for using formal accounts were not excluded in Prina’s study (2013), the take up of formal savings might have been lower than expected due to a household’s budget constraint, size, etc. That said, I believe that financial institutions can leverage the untapped demand for formal savings effectively by understanding how household characteristics may affect their decision to opt for formal savings accounts. Let us review some important

findings that deal with household characteristics of the poor.

The existing literature that looks at household determinants of financial services usage suggests that the reach and success of microsavings programs can be accelerated with improvements in policy design and implementation. To this end, many studies have experimented with, and examined different facets of micro-savings policies. For instance, Dupas and Robinson (2011) run a field experiment to examine whether access to formal savings services leads to business growth in poor countries. They find that women saved more in bank accounts than men. In fact, women took up savings accounts even with negative interest rates. The rationale they give is that banks offer women a more secure holding of their savings and make it less vulnerable to theft or loss. On the other hand, they argue that men were able to save more safely at home than women. This finding suggests that formal savings providers may achieve higher savings rates if they cater more to women than to men. We can extend this question to the household level by asking if the gender of the account owner has a similar effect if he or she is the head of that household. I find that the gender of the household head does affect the likelihood of having a formal savings account – male household heads are 8.6 percentage points more likely to have a formal savings account, significant at the .01 level[1].

Schaner (2011) looks at the effects of reducing ATM withdrawal fees on take up of formal savings accounts by men and women. She looks at how people of different genders respond to withdrawal of transaction costs for formal savings. She concludes that reducing ATM fees increased savings rates (by 40%) for accounts owned by men, but reduced savings rates (by a negligible/insignificant percentage) for accounts owned by women. Men save

[1] See Table 4 Column 1

higher amounts when transaction costs are low, but there aren't any increases in savings of women. This implies that the frequency of transactions of men's savings accounts might be more than women's. Therefore, women might take up savings accounts to have a secure place to store money but use less ATM withdrawals. This hypothesis is corroborated by Dupas, Robinson, Green, and Keats' findings in an experiment conducted in Kenya (2012). In a sample of 840 individuals over a period of 10-12 months, they found that the average number of withdrawals for men was 3.31 compared to only 0.96 for women.

Several other studies have looked at household income, gender of the household head, education, and expenditures as determinants of savings. Ackah and Acquah inquire which households use which financial services (in Ghana). They find that the household head's age is positively correlated to take up of formal savings. As the household head ages, he or she is 0.3 percentage points more likely to adopt formal savings. I find a similar weak effect of age: as the household head ages, he or she is 0.1 percentage points more likely to adopt formal savings when simply provided access[2]. Ackah and Acquah also find that household size is positive and significant indicator of savings take-up. This finding is consistent with my results as well. Each additional member in the household increases the likelihood of having a savings account by 1.2 percentage points, significant at the .01 level[3].

Woodruff and Martinez (2008), on the other hand, look at community level characteristics as determinants of savings adoption. They find that education and household assets have a significant impact on the opening of savings accounts in urban households; while wealth, expenditure, and ownership of agricultural business are significant in the

[2] See Table 7 Column 2
[3] See Table 2 Column 2

opening of savings accounts in rural households. Compared to the lowest schooling group, household heads with at least 6 years of schooling are 10 percentage points more likely to open a savings account. Such effect increases marginally with more years of education. The effect of literacy (measured as the ability to read) in our sample has similar results. For a household with a literate head, the probability of adopting a formal savings account increases by 2.4 percentage points, significant at the .01 level. In addition, the marginal effect of every literate household member is 4.6 percentage points, significant at the .01 level[4]. In addition, Woodruff and Martinez find that business ownership has no significant effect on the likelihood of opening a savings account. My findings are consistent with this result as well. Ownership of a business has no significant effect on adoption of a savings account for all observations[4].

Aggarwal and Klapper (2012) comment that less attention is given to savings constraints in developing or poor economies, which might reduce the efficiency of microsavings providers. In order to improve the efficiency of microsavings programs, we need to place a magnifying glass over their current operations and strategies. More efficient approaches of microsavings can cut operating costs to the organization and boost financial inclusion amongst poor populations. Mel, McIntosh, and Woodruff (2013) suggest one such improvement by experimenting with savings collection techniques of National Savings Bank (NSB) in Sri Lanka. They compare face-to-face deposit collection to a self-deposit lockbox for formal accounts in rural communities, and provide a cost cutting, more efficient result. They find that deposit collection through lockboxes increase savings balance when the lockboxes are placed less frequently (biweekly as opposed to weekly) in rural communities,

[4] See Table 7 Column 1

which lower operating costs. In addition, they find that frequent face-to-face deposit collection increases households' savings in the short run. Similar to these findings, there are a few guidelines that formal institutions can consider to become more efficient.

Simply expanding formal savings access into unreached poor locations or promoting formal savings in these areas may not grasp as many customers as a financial institution might expect. Individual household characteristics might discourage households from adopting formal savings for different reasons. For example, households with more salaried adults may choose to adopt because they accumulate more savings, or households with more dependents may choose not to adopt in order to avoid transaction fees. Therefore, it is important for financial institutions to take a closer look at the household level determinants of formal savings adoption. I believe that if formal savings providers are aware of household characteristics that maximize probability of savings adoption, they might be able to cut down operational costs by expanding access geared towards households with those characteristics.

While reviewing existing literature in microsavings, most of which is discussed earlier, I came across several studies that look at the effects of community level and household level characteristics on the take up and usage of formal savings accounts. I did not, however, come across a study specifically geared towards identifying common features of households that become the initial adopters of formal savings. That said, my study pushes the existing literature forward with this goal – to outline a "bulls eye" household for formal savings providers. With an explicit answer to "who is most likely to adopt formal savings account?", microsavings providers can strategically target households that become their first customers. I aim to answer this question in a two-fold manner: Who is most likely to adopt formal savings when simply granted access? And who is most likely to adopt formal savings

when exposed to the promotions and informational campaigns of a bank? Answers to these questions can allow savings providers to expand their services to households with a predicted savings adoption decision.

One of the purposes of this thesis is to serve the policy makers (governments, MFIs, development organizations, NGOs, financial institutions, and others) by providing a benchmark of the "most likely to save" household to target as the savings customer. I refer to these households as the "initial adopters" of formal savings. These households become the first customers of formal savings providers when they expand access to new locations. A detailed understanding of initial adopters is discussed below.

To better understand the dynamic of savings adoption, I use the *Revised Technology Adoption Life Cycle* as put forth by Geoffrey A. Moore in *Crossing the Chasm*[5]. The *Technology Adoption Life Cycle* translates well into understanding the time-line of growing savings adoption within a rural community. The model can be used to categorize the poor households (the "customers" of an MFI) into five groups (*Innovators, Early Adopters, Early Majority, Late Majority, Laggards*) and the model places them in order of their adoption behavior. The life cycle of formal savings adoption, as applied to Moore's model, is illustrated in figure 1:

[5] A. Moore, Geoffrey. 2002. *Crossing the chasm: Marketing and selling disruptive products to mainstream customers*. 3rd ed. Harper Business (HarperCollins Publishers) *Note:* Moore's *revised* model of the technology adoption is an extension of Everett M. Rogers' *Diffusion of Innovators* theory, originally published in 1962. I use Moore's revised version of the model because it introduces the concept of "gaps" between each group of customer, which I believe is essential to highlight the differences in these groups of adopters.

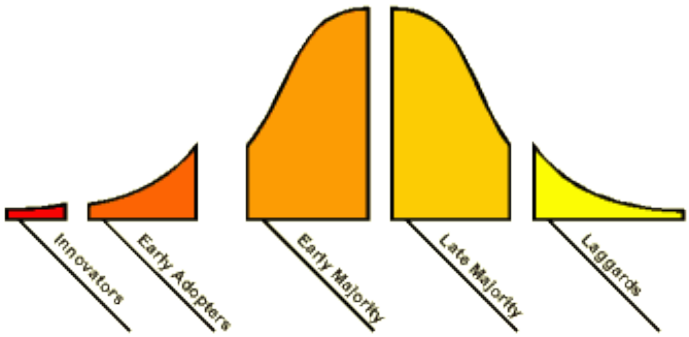

Figure 1: *The Revised Technology Adoption Life Cycle*, by Geoffrey A. Moore

As we move from the left to right along the bell curve, the area under the curve represents the population that takes up savings[6]. *Innovators* are the first small group to adopt savings*; Early adopters* are the next group to adopt savings*; Early majority* is the next large pool of households to adopt savings; and *Late majority* and *Laggards* follow.

As the first to adopt a new product or service, Moore writes that *Innovators* are new technology enthusiasts -"they seek them out even before a formal marketing program has been launched". In our experiment, *Innovators* are poor households who will adopt formal savings simply when provided access, without receiving any marketing or awareness about the benefits of savings. These households become the first customers of OIBM's new banking service.

Early adopters are the individuals who are most likely to respond positively to marketing and promotions of the new technology. Moore identifies them as individuals who "find it easy to understand, and appreciate the benefits of a new technology". In our study,

[6] Moore explains the gaps between each group of customer based on the fact that each group has different needs and wants. He suggests product improvements in order to "jump" to acquire next customer group. For the purpose of this paper, however, we will restrict ourselves to the understanding of who the "initial adopters" are and where they stand on the savings adoption life cycle. We will not discuss how we need to alter features of formal savings to meet the desired requirements of each group.

early adopters are the households who are most likely to adopt formal savings accounts when told about its features and benefits. They provide the first positive responses to the marketing campaigns of financial institutions – be it awareness programs, public meetings, in-person information sessions, etc. In our experiment, the treatment is this exposure to the marketing and informational campaigns provided by the OIBM bank. Therefore, the *early adopters* in our sample are households that adopted formal savings due to treatment.

The next three groups *Early Majority, Late Majority,* and *Laggards* ask for much more than information before promising commitment. In our study, the *Early Majority* are poor households that do not trust the financial institution immediately. They require time and feedback from others around them to adopt savings themselves. They *Late Majority* households will take even more time and additional confirmation on the new technology to be convinced of its worth. Lastly, *Laggards* consists of poor households that choose not to adopt savings for personal, social, or economic reasons. They are not responsive to any marketing or promotional strategies and do not buy into the technology.

A closer look at household characteristics can provide a clear idea of what group the household falls into. In this paper, I aim to identify households that fall into the *innovators* and the *early adopters* groups of formal savings. I call these two groups the *initial adopters* of formal savings. In addition to identifying the *initial adopters* group of households, I also take a look at how household characteristics affect the likelihood of owning a savings account, and the amounts saved in those accounts. Further, I also contribute to the existing literature in this field by including specifics of the household composition previously overlooked. These include the number of adults, the number of dependents, and the literacy amongst *all* household members.

I believe that it is important for savings providers to exclusively cater to the *initial adopters* of formal savings because they are their first promising pool of customers. The *innovators* adopt savings account without any marketing or promotional demands, thereby making it a low cost effort for the savings provider to reach out to them. The *early adopters* can give savings providers "their first big break" and "gain exceptional visibility" in a community, as worded by Moore. Especially amongst poor communities, it has become important for institutions to establish trust and popularity in the community to gain traction. Targeting the *initial adopters* of formal savings can reward institutions with both.

II. Empirical Setting and Sample Data

The data for this study is pulled from household surveys held in Malawi over two years, 2008 and 2010. The field evidence was run by the Opportunity International Bank of Malawi (OIBM) and funded by the Bill & Melinda Gates Foundation[7]. Considering the fact that households in the research area were far from formal banking services, OIBM spurred an intervention by driving a "bank on wheels" closer to these households. A mobile van-bank made six stops at trading centers across the Mchinji, Lilongwe, and Dedza districts of Central Malawi, bringing reachable access to formal savings to a sample of over 2,000 households.

Figure 2: Individuals make transactions at the van bank service provided by OIBM.
Photo credit to Jeffrey A. Flory

Figure 3: One of the six stops of the van bank service provided by OIBM.
Photo credit to Jeffrey A. Flory

In the first part of this section, I will introduce you to Malawi – its population and economic statistics. In the second part of this section, I will walk you through the details of the sample data and the methodology of this data collection. In the last part, I will define the variables included in this study.

[7] Field evidence was collected in collaboration with Wadonda Consult, the survey team in Malawi that collected data, and the IRIS/FSA team (at the University of Maryland, MD) that reviewed the data.

Malawi's bleak economic status puts a dent on its social development but makes it an attractive destination for a microfinance analysis. Malawi ranks high on the "World's worst economies in 2012" by Forbes and the "World's worst economies in 2013" by the International Monetary Fund (IMF). Malawi is one of the most densely populated and poorest developing countries in the world. Being landlocked, Malawi is neither blessed with a commercially productive geography nor has it significantly developed its institutions to spur economic growth. Consequentially, per capita GDP and poverty statistics are not in favor of the country:

	GDP (USD Billions)	**Per capita GDP (USD)**
2008	4.278	288.078
2010	5.397	343.454
2014	4.178†	237.344†

Table 1.1: GDP and per Capita GDP estimates for Malawi, for the years 2008, 2010, and 2014.
†IMF staff estimates. Source: World Economic Outlook Database, IMF Data and Statistics

Given that Malawi's population is on the rise, the IMF estimates that the per capita GDP might decline in future years. Within the two years of the panel data collected for this study (2008-2010), the per capita GDP of Malawi has increased by 19.22%, thanks to the positive increase in population accompanied by a positive increase in GDP. Unfortunately, the country's GDP growth and population are not expected to go hand in hand. In 2014, the IMF estimates the per capita GDP to decrease by 30.89% compared to 2010. Currently, more than half of Malawi's population lives under the poverty line (defined at PPP US$1.25 per day).

According to 2010 the Human Development Report by the United Nations, 66.7%

of Malawi's population falls under the poverty line[8]. The same report states that the Human Development Index (HDI) and the Multi-Dimensional Poverty Index (MPI) of Malawi were 0.413 and 0.334 respectively, placing it under the *Low Human Development* list of countries. This implies that in 2010, when the household survey collection concluded, Malawi ranked on the lower end for life expectancy, education, and standard of living. The low ranking of Malawi comes with no surprise given that food shortage, corruption, increasing population, and HIV/AIDS infection are prevalent conditions of the rural regions.

The issues discussed above not only affect the economic health of Malawi as a nation, but also affect the ability of poor households in Malawi to rise above the $1.25 per day poverty line. Let us predict the future of these households with the ongoing economic and social trends in Malawi. According to the Central Intelligence Agency report (2013), 65.3% of the population in Malawi is aged between 0-24years and the median age of the entire population is 17.3. We are, therefore, looking at a nation with a strong, young labor force. This can prove to be a blessing to the economy of Malawi, but a curse to the status of each individual household. On one hand, more youth can provide more productive labor on agricultural fields and more produce available for trade, thereby increasing the value of expected GDP for the country. In fact, Malawi's President Joyce Banda, in an interview with the *Wall Street Journal* (2012), said that she wants the country's economic foundation to move from aid to trade, leveraging on the agricultural produce of the country's labor. On the

[8] Human Development Report. in United Nations Development Programme [database online]. 2013 Available from www.hdr.undp.org. *The HDI is based primarily on international data from the United Nations Population Division, the United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS) and the World Bank.*

other hand, a heavier young population is expected to boost population growth. According to the 2010 estimates, the mean age of a mother at first birth is 18.9 and according to the 2013 estimate, there is an average of 5.26 children born to each woman. These statistics indicate increasing household sizes in the near future in Malawi.

Such demographic forecasts are worrisome because increasing household size can thwart savings as having more children creates more financial dependence, at least in the initial years. Further, Malawi's domestic economy is not enough strong to foster entrepreneurial ventures or business development within poor households. According to the latest Enterprise Surveys (2009) in the *Business Environment Snapshot for Malawi* conducted by the World Bank, access to finance is the main obstacle in starting a business in Malawi. In fact, the report states that 40.1% of firms have a line of credit or loans from financial institutions. Therefore, microfinance intervention has become a stent to the flow of liquid savings and loans in Malawi.

i. Sample and Data Collection

Malawi is divided into three regions: Northern, Central, and Southern. This study restricts itself to the Mchinji, Lilongwe, and Dedza districts of Central Malawi. The focus of this paper's analysis looks at the household-level patterns of savings. 46% of the households surveyed come from the Dedza district, 30% from the Mchinji district, and 24% from the Lilongwe district. The following table provides some comparative insights into these districts:

	Poor Population[9] (2005)	**Ultra-Poor Population[3] (2005)**	**Average Household Size (2008)**
Mchinji	59.60%	30.40%	4.7
Lilongwe	37.50%	11.70%	4.5
Dedza	54.60%	20.90%	4.3

Table 1.2: Poor population statistics for districts of Central Malawi.
Source: Malawi National Statistical Office, Integrated household survey, 2004-2005

As mentioned earlier, the data consists of over 2,000 household surveys conducted at baseline February to April 2008 and endline February to April 2010. It is important to note that this time period was the pre-harvest "hungry" season during which revenues from agricultural activities might be low and vulnerability to food shocks might be high. About 93% of the sampled households engage in farming, 66% of which also raise livestock and 44% work as wage laborers. Over 97% of the sampled households participated

[9] Poverty Line defined at MWK 16,165 (USD 146.28) per person per year, and Ultra Poverty Line defined at MWK 10,029 (USD 90.76) per person per year, by the National Statistical Office of Malawi. Currency conversion rates for 2005 [1 MWK = approx. 0.009049 USD].

in survey interviews, which lasted between 1.5 to 2.5 hours. The same households were interviewed in both years, and no monetary incentive or gifts were offered for the interview. The survey instrument was a 30-page structured questionnaire focused on household demographics, economic activities, poverty status, food security, asset ownership, salary, use of financial services, shocks experienced in the past, insurance mechanisms, and social capital. The questionnaire was translated into the local language *Chichewa,* and then back into English as well to confirm accurate translation. Some sources used to design the questionnaire were the World Bank Living Standard Measurement Surveys and USAID food-security questionnaires. The questionnaire was designed by the IRIS Center at University of Maryland as part of an impact assessment of the OIBM's "bank on wheels". The bank brought its services closer to the villages by making weekly stops at six trading centers in the research area.

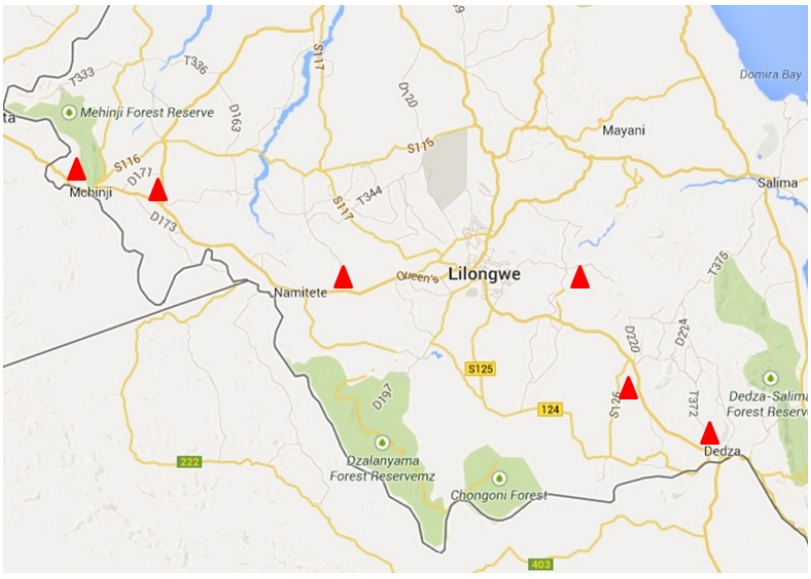

Figure 4: The map[+] illustrates the route of the van bank service provided by OIBM. The red triangles represent an approximate location of the six stops. [+]*Created with Google Maps*

The data was collected in order to analyze the impact of banking services provided by the Opportunity International Bank of Malawi (OIBM) in the rural parts of

Malawi. At the baseline, households in the research area had very low rates of financial inclusion. Only 11.55% of the 2,451 sampled households had at least one formal savings account, and about 14.7% of the sample reported using a formal savings account, formal loan, or both. To address this issue, OIBM provided financial services (formal savings and credit options) through a mobile van-bank which drove closer to sampled villages, bringing banking closer to households. Each of the six bank stops was made on the same day of every week, usually the "market day" so that individuals could conveniently deposit cash earned from sales the same day.

Amongst the Mchinji, Lilongwe, and Dedza districts of Central Malawi, the data was collected in units of 2-4 village clusters called "Enumeration Areas" (EAs). A total of 118 EAs were sampled. The Enumeration Areas were categorized by distance from the mobile van-bank (under 5 km, 5-10 km, or 10-12 km) and by population (high or low). Following this categorization, at least two EAs were randomly sampled from each population-distance group. Data sampling was divided based on a matched-pair design, where one member of each pair was randomly assigned to community-level information-treatment, and the other member was assigned to the control group. In total, 59 village clusters were randomly assigned to the treatment group, and an equal amount to the control group. To minimize spill-over effects from information-treated areas to non-treated areas, the sample was scrutinized to maintain a minimum distance of 3 km between the two EAs in any pair. Finally, within each treatment village cluster, the intervention coordinators randomly chose households to interview. This randomization consisted of writing each household's number on a piece of paper, folding it up, dropping it into a bag, and having a member of the community draw blindly from the bag. The interview was held at both baseline and endline, and followed

the questionnaire designed by the IRIS center.

During the two year gap between the baseline and endline (April 2008 to March 2010), OIBM adopted a Randomized Encouragement Trail technique to provide intensive marketing and awareness of its financial services to the treatment group in the sample[10]. Marketing techniques involved radio, public meetings, and "personal marketing" where information was delivered to clients' doorsteps. OIBM and the IRIS center designed information campaigns that explained the terms, conditions, and application processes of opening savings accounts to the randomly assigned treatment. Promotional materials also included t-shirts, fliers, posters, and referral cards. Village clusters that were assigned treatment were exposed to these promotional campaigns, and village clusters in the control group were not provided any promotional information. In section VII, we will examine how such campaigns altered the effect of household characteristics on the probability of savings adoption by differentiating between the effects of control and treatment groups.

[10] *For a complete report on the awareness and marketing techniques, please refer to:* Nagarajan, Geetha, and S. Ademan. "Does Intense Marketing Increase Outreach? The Case of Opportunity International Bank in Rural Malawi." *College Park, MD: IRIS Center, Assessing the Impact of Innovation Grants in Financial Services Project* (2010).

ii. Data Description: Variables in focus

I use a linear probability model to analyze the effects of household characteristics on the probability of the adoption of a formal savings account. The data set used for this study includes a broad spectrum of variables: from use of credit or adoption of savings, to past experiences with food or health shocks, to individual and household level demographics. For the purpose of this paper, I restrict my analysis to inclusion of the following variables:

$$Y_i = \alpha_0 + \alpha_1 (\text{Gender})_i + \alpha_2 (\text{Age})_i + \alpha_3 (\text{Age}^2)_i + \alpha_4 (\text{Married})_i + \alpha_5 (\text{Literacy})_i + \beta_1 (\text{Salaried members})_i + \beta_2 (\text{Literate members})_i + \beta_3 (\text{Business})_i + \beta_4 (\text{Distance})_i + \beta_5 (\text{Cellphone})_i + \Upsilon_1 (\text{Adults})_i + \Upsilon_2 (\text{Children})_i + \varepsilon$$

Table 1.3: Regression Equation

The list of independent variables included in this equation is mostly consistent with the literature examining formal savings. However, I extend the analysis by adding additional variables (such as literacy of the entire household), and disaggregating the household size variable.

The dependent variable is the use of a formal savings account. A "savings account" refers to any device used by the household to store monetary savings. At the location studied, households have several options to store their cash. In this study, I include the use of "formal" savings at any organization, including the five commercial banks (OIBM, National Bank, Standard Bank, NBS Bank, First Merchant Bank), the two-para-statal banks (Malawi Rural Finance Company and Malawi Savings Bank), the savings and credit cooperatives, and the NGOs in the area. Other "informal" savings

options include storing cash at home, at a relative's place, or in a Rotating credit and Savings Association (ROSCA). At the baseline, only 11.5% sampled households held formal saving accounts, while at the endline this number rose to 16.5%.

In addition to the use of formal savings, I will also analyze the effects of household characteristics on the amount saved in these formal accounts. This accounts for the second dependent variable included in this study. It would be interesting to see if the same household characteristics show different effects on savings adoption and on the amounts saved. This might raise interesting questions regarding adoption and savings behavior, which are discussed in sections V and VI.

I focus on three categories of household characteristics in this study. First, I include variables pertaining to the household head (*Gender, Age,* and *Married*). These variables can affect the household's decision to adopt savings, and the amount of savings in that account as well. Several other studies have looked the effect variables on the adoption and usage of financial services (Dupas, Robinson, Green, Keats (2012); Schaner (2011); Ackah, Acquah; Woodruff, Martinez (2008); Prina (2013)). These variables are shown as α_1 $(\text{Gender})_i$, α_2 $(\text{Age})_i$, α_3 $(\text{Age}^2)_i$, α_4 $(\text{Married})_i$, and α_5 $(\text{Literacy})_i$ in Table 1.3. The *Gender* variable takes the value 1 for male household heads and 0 for female household heads. The *Age* variables reflect the expected diminishing effect of the increasing age of the household head. The *Married* variable takes the value 1 for married household heads and 0 otherwise. Lastly, the literacy variable refers to the ability of a household head to read Chichewa, which takes the value 1 if the ability holds true.

Second, I include variables pertaining to all household members, not necessarily to the head. To account for the wealth of a household, I include a continuous variable for

the number of household members who are salaried, a dummy variable for ownership of at least one business, and a dummy variable for the ownership of a functional cellphone. I believe that these three characteristics highlight the wealth level of a household because we can expect wealthier households to have salaried members, at least one business, or a functional cellphone. On the other hand, the poorest of the sampled households might not exhibit any of these three characteristics. For instance, at the baseline, only 13.09% of the sampled households have a working cellphone, indicating that a majority of the sample is too poor to afford them. Further, of the 2461 sampled households, 73.69% do not own any businesses, and 22.24% own one business, and the remaining 4.07% own two to four businesses. Lastly, I include a distance variable to demonstrate the convenience of having formal savings options at arm's length, or the inconvenience of having it far away.

Third, I include variables explain the household size. To look at the household composition as a determinant of savings adoption, I divide the household size into *Adults* and *Children.* These are shown as Υ_1 $(\text{Adults})_i$ and Υ_2 $(\text{Children})_i$ in Table 1.3. The adults are aged above 17 and are assumed working. The children are aged 17 or below and are assumed financially dependent. I find that it is important to split household size into number of adults and number of children in order to accurately understand that effects of household literacy and household size within our sample. This rationale is discussed further in the section III.

III. Effects of Household Size and Literacy

The importance of splitting up household size into number of adults and number of children

A few studies have analyzed the effects of household size on the adoption or usage of financial services, be it formal or informal savings, though the results have been ambiguous (Ackah, Acquah; Prina (2013); Cole, Sampson, Zia (2011)). For instance, Ackah and Acquah find that household size has a positive and significant effect on the use of formal financial services. On the other hand, Prina (2013) finds that the estimated effect of household size is negative (but insignificant) on the take-up of savings, and negative and significant on usage of savings accounts. Through this study's findings, I believe that breaking up the composition of household size into number of adults and number of children gives a clearer picture of how the variables affect savings.

Table 2 compares the effect of splitting up household size into adults and children, with different literacy variables at the baseline. Column 1 shows the effect of splitting the household size variable into number of adults and number of children. Here, the literacy variable is a dummy (with value 1 if anyone in the household can read) that considers the literacy of any one individual in the household. Each additional adult in the household increases the likelihood of having formal savings by 1.8 percentage points (significant at the .05 level), and each additional child increases the likelihood by 1.1 percentage points (significant at the .05 level). These results are similar to the effect of household size taken as an aggregate variable, shown in column 2. Results show that

household size increases the likelihood of having a savings account by 1.27 percentage points, significant at the .01 level.

However, when I change the literacy variable to a continuous variable that accounts for the increase in number of household members who can read, the effects are in sharp contrast. Columns 3 and 4 in Table 2 illustrate these two effects. First, column 4 shows that household size has a negative and statistically insignificant effect on the probability of savings. If household size increases by one member, the probability of having formal savings decreases by 0.55 percentage points. Second, column 3 shows that number of adults has a negative yet statistically significant effect. For every additional adult in the household, the probability of having a savings account decreases by 2.7 percentage points, significant at the .05 level.

In Table 2, the continuous literacy variable in columns 3 and 4 accounts for the marginal effect of adding literate members into the household, as opposed to the dummy literacy variable in columns 1 and 2 which does not. By accounting for the literacy of all household members (and not just one member, as in columns 1 and 2), we notice two important effects. First, every additional *literate adult* in the household increases the likelihood of savings by 5.49 percentage points, significant at the .01 level. This might suggest that the more members in the household who can read, the more people who can understand and go through the process of opening a formal account. Second, every additional *adult* in the household (literate or not) reduces the likelihood of savings by 2.7 percentage points. This might be the case because increasing the number of adults living under one roof, despite their ability to read Chichewa, may put more strain on earnings as

expenditures may increase. There might be more burden on expenditures if each additional adult in the household is not earning or spending more than he or she earns.

Another important point to consider is that if we compare columns 2 and 4 in Table 2, we can see the effect of household size alter significantly as we change the way in which we control for literacy. In column 2, if we consider a dummy variable for anyone in the household who can read, the household size has a positive and statistically significant effect on the likelihood of having a savings account If a household has at least one member who can read Chichewa (this could be the household head as well), the probability of having a savings account increases by an estimated 1.27 percentage points, significant at the .01 level. This result is consistent with Ackah and Acquah's finding that household size increases the chances of having a savings account by a positive and statistically significant effect, when we account for the literacy of only one member in the household (in their case, the household head). However, when I change the literacy variable to a continuous one (accounting for every additional literate household member), the effect of the household size becomes negative and statistically insignificant. This underlines a concern that Ackah and Acquah's finding might have been due to an omitted variable bias of not accounting for all household members' literacy. It might be possible that if they had included a literacy variable for the entire household, the magnitude and statistical significance of the household size might have fallen to a negative effect.

Following the same path, let us look at the effects of different literacy variables on the estimated magnitude and significance of the effect of number of adults and number of children in a household. Columns 1 through 6 in Table 3 illustrates the effect of

changing literacy variables on the significance of household size variables (number of adults and number of children). In particular, pay attention to the changes in effects of number of adults and number of children as we change the literacy variables.

As we look across the results in columns 1 through 6, we notice three important patterns. First, all literacy variables are statistically significant in their respective regressions. Second, number of adults and number of children have a positive effect for *dummy* literacy variable regressions. Third, number of adults and number of children have a negative effect for *continuous* literacy variable regressions.

For regressions with a dummy literacy variable, there is an increase in the likelihood of having formal savings if anyone in the household can read Chichewa. The literacy variable is a dummy; therefore, it will take the value 1 if at least one member in the household can read Chichewa. Despite additional members being able to read Chichewa, the dummy variable keeps a value of 1. Therefore, increasing the number of adults who are literate does not affect the literacy variable. Due to the correlation between the literacy and household size variable, the negative effect of increasing the number of individuals under one roof is not captured by either variable. This hints at an omitted variable bias which occurs due to the absence of a continuous variable to capture the literacy of all household members. This may justify the positive effect of both literacy and number of adults variables (as seen in columns 1, 3, and 5).

For regressions with a continuous literacy variable, as we increase the number of adults who can read Chichewa, the literacy variable captures a positive effect on the probability of having a savings account. For every additional literate member in the

household, the likelihood of having a savings account increases by a positive and significant number in columns 2, 4, and 6. In these columns, as we increase the number of literate adults, we are also adding more people to that particular household. Columns 2, 4, and 6 capture two outcomes of adding members to a household. First, increasing number of literate adults increases the probability of savings (by the statistically significant coefficient of the literacy variable). This may be explained on the basis that more members in the household should be able to open formal savings for the entire household because they can read through the necessary documentation and process. Second, increasing the number of adults decreases the probability of savings (by the statistically significant negative coefficient of number of adults). One rationale behind this effect is that increasing the number of adults increases household size, which might increase expenses and lower the probability of having formal savings.

In conclusion, the regression in column 6 represents an appropriate combination of literacy and household variables applicable to this study. All other variables previously mentioned (including cellphone, business ownership, distance from the EA, etc) will be added into this regression for analysis. Since this paper is looking at the composition of the entire household, I include literacy variables that show the ability of all members in the household to read Chichewa. In a case where members of the household (other than the household head) can read Chichewa, they may be able to better understand the benefits of savings through the bank's marketing campaigns. These members can in turn influence the household head to adopt savings. But, if the household head can read Chichewa in the first place, he or she might want to adopt savings without the influence of other household members. If the household head can read Chichewa, there is an

"added plus" to the probability of the take up of savings. Therefore, I include a continuous variable for the *number of literate members* in the household (except the head) and a dummy variable *Literacy* of the household head.

I use a linear probability model to analyze the effects of various household characteristics on the likelihood of already having formal savings, the probability of adopting formal savings (post treatment), and on the amounts saved in formal savings.

$$Y_i = \alpha_0 + \alpha_1 (\text{Gender})_i + \alpha_2 (\text{Age})_i + \alpha_3 (\text{Age}^2)_i + \alpha_4 (\text{Married})_i + \alpha_5 (\text{Literacy})_i + \beta_1 (\text{Salaried members})_i + \beta_2 (\text{Literate members})_i + \beta_3 (\text{Business})_i + \beta_4 (\text{Distance})_i + \beta_5 (\text{Cellphone})_i + \Upsilon_1 (\text{Adults})_i + \Upsilon_2 (\text{Children})_i + \varepsilon$$

Table 1.3: Regression Equation

As shown above, the regression equation includes three categories of independent variables:

- Characteristics of the household head: age, gender, marital status, and literacy. These variables are preceded by coefficients α_1, α_2, α_3, α_4, and α_5.
- Non-head characteristics of the household: number of salaried members in the household, number of literate members in the household, ownership of business, distance from EA, ownership of a cellphone. These variables are preceded by coefficients β_1, β_2, β_3, β_4, and β_5.
- Household size: number of adults, number of children. These variables are preceded by coefficients Υ_1, and Υ_2.

IV. Household Determinants of Having Formal Savings

Across the baseline (2008) and the endline (2010) in Table 4, we can see a range of similarities and differences amongst independent variables and the probability that a household owns a savings account. Let us take a closer look in the three categories of regressors. Table 4 reports the likelihood of having a formal savings account at the baseline (2008) and at the endline (2010) as determined by household characteristics.

Characteristics of the household head

In Table 4, the effect of the household head's age on the probability of having a savings account is negligible in 2008 and 2010. Although in 2010 the estimated effect of age is higher than the effect in 2008, the coefficients are not statistically significant. This result is in contrast with Ackah and Acquah's finding that the effect of the age of the household head on using formal financial services is positive and statistically significant. I find that the effect is indeed opposite; negative and not statistically significant in both 2008 and 2010. Ackah and Acquah also note that in Ghana, the sampled average age of household heads with formal savings is 47. I find that the mean age of individuals with a formal savings account in Malawi is 42, which underlines a difference in our sample data.

On the other hand, the gender of the household head has notably different effects in 2008 and 2010. In 2008, if the household head is male, the probability of having a savings account increases by 8.6 percentage points. This result is statistically significant at the .01 significance level. The finding that male headed households are more likely to have a formal savings account is consistent with other literature in the field of

microfinance[11]. As illustrated in figure 3, 94.7% of the households that owned a savings account were male headed in 2008, and 90.8% of them were male headed in 2010.

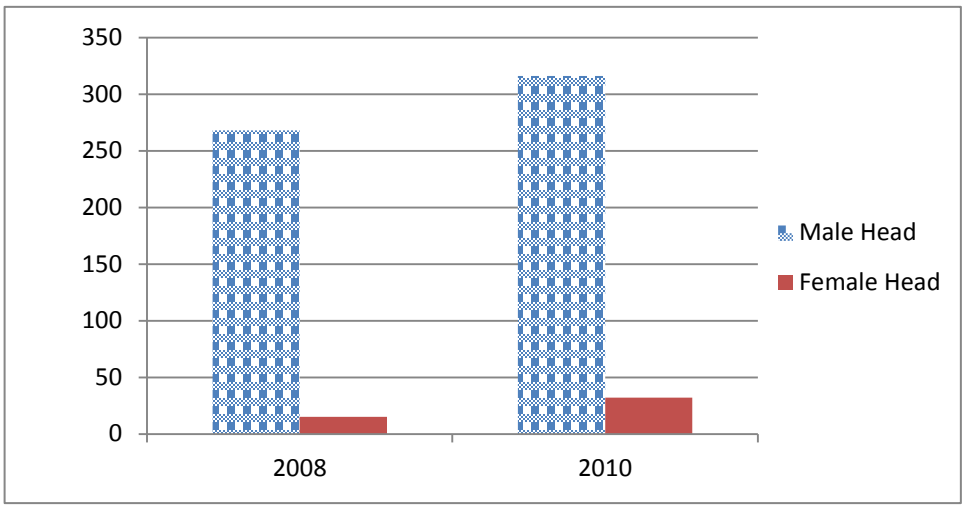

Figure 5: Sampled household heads' gender ratios for 2008 and 2010

The gender ratio is similar in the sample for both years, tipping more towards male headed households. A male headed household is a positive predictor of owning a formal savings account in the sample. One reason behind male household heads being more inclined towards formal savings (as opposed to informal savings) is that formal savings allows them to exercise self-discipline on temptation expenditures. If there is a cost attached to formal savings withdrawals, men who tend to spend "cash in hand"

[11] Ackah and Acquah find the male household heads were 0.7 percentage points more likely to use formal financial services.
Ackah, Charles, and Adjoa Acquah. Which households use which financial services? Evidence from Ghana.

Dupas, Green, Keats, and Robinson find that amongst unbanked individuals, men were 3.9 percentage points more likely to open an account compared to women.
Dupas, Pascaline, Sarah Green, Anthony Keats, and Jonathan Robinson. 2012. Challenges in Banking the Rural Poor: Evidence from Kenya's Western Province.

might reduce their expenditures[12]. Note that this particular regression shows that male headed households were more likely to have a formal savings account, but does not necessarily comment on the usage or amounts saved in these accounts. Therefore, it is possible that more households with male heads have accounts, and at the same time, more households with female heads have higher savings or frequency of deposits and withdrawals. If this is the case, male heads who opt for formal savings with an aim of saving more and spending less, do not stick to that aim. We will further examine the role of gender in take up of savings account and the actual amount in sections V and VI.

The magnitude of the effect and significance of the gender variable differs across the baseline and the endline. The probability of a household having a savings account was higher for households headed by a male in both years, the effect being positive and significant in 2008, and being positive and not significant in 2010. In 2010, if the household head is male, the probability of having a formal savings account increases by 1.2 percentage points. This result is not statistically significant. The same effect is almost

[12] "These constraints are often such that fees or restrictions on access to liquidity may actually help increase storage of savings. First, individuals may have to contend with time inconsistent preferences - if the temptation to spend out of readily accessible savings is too great, individuals may prefer to store resources in an account that is costly to access" *(Banerjee and Mallainathan 2010; Laibson 1997).*
Banerjee, Abhijit, and Sendhil Mullainathan. 2010. The Shape of Temptation: Implications for the Economic Lives of the Poor.
Laibson, David. 1997. Golden eggs and hyperbolic discounting. The Quarterly Journal of Economics 112 (2): 443-78.

Prina (2013) agrees: "A fully liquid account might have advantages and disadvantages for the poor. On the one hand, poor households might value a savings that is fully liquid so that they can dip into their savings to address a shock. On the other hand, liquidity might be an obstacle for those exercising self-control."
Prina, Silvia. 2013. Banking the poor via savings accounts: Evidence from a field experiment. Case Western Reserve, Working Paper.

7 times more in 2008, significant at the .01 level. One rational behind this sharp difference in the effect of gender might be explained by the contribution of treatment effects. The informational campaigns provided to treated households (included in 2010, but not in 2008) might have been more successful in female headed households. We will discuss the effect of treatment on gender effects in section VII.

Further, the ability of the household head to read Chichewa has a positive effect across the baseline and the endline. However, if the household head can read Chichewa, the probability of having a saving account increases by a higher percentage in 2010 than in 2008. In 2008, the household head's ability to read Chichewa increases the probability by 5.7 percentage points, while in 2010, it increases the probability by 8.6 percentage points. Both these results are statistically significant (at the .01 level) and are in agreement with Woodruff and Martinez's findings on literacy. In a sample of 3472 observations, Woodruff and Martinez (2008) find that the likelihood of having an account is 31.6 percentage points higher if the head had 12+ years of schooling and 13.7 percentage points higher is he or she could speak the indigenous language. Woodruff and Martinez' results are statistically significant at .01 level as well.

Non-head characteristics of the household

The ability of the household members to read Chichewa has a similar effect in both years. One reason that the ability of household members to read Chichewa might matter is that the bank's awareness program would be most effective if an individual can read about the benefits of savings and can go through the necessary documentation required to open a savings account. If there are several members in the household who

can read Chichewa, it shows the household's investment in education, which in turn can account for higher salaries and savings. In addition, it is safe to assume that the savings of a particular household are managed by its head; therefore the literacy of the household head is very important. In a case where members of the household (other than the household head) can read Chichewa, they will understand the benefits of savings through the bank's marketing campaigns. These members can in turn influence the household head to adopt savings. But, if the household head can read Chichewa in the first place, he or she might want to adopt savings without the influence of other household members. If the household head can read Chichewa, there is an "added plus" to the probability of take up of savings. The results corroborate this notion. The effect of household head's ability to read is a statistically significant and positive, on top of the effect of the household members' ability to read Chichewa.

At the baseline and the endline, the effect of each additional member who can read Chichewa is positive and significant at the .01 level. For every additional member in the household who can read Chichewa, the probability of having a savings account increases by approximately 3 percentage points. This result may suggest that as we increase the number of literate members in the household, we increase the likelihood that the household will respond positively to the financial knowledge and the benefits of financial savings. In addition, it hints at the household's investment in education[13]. We can expect such a household to use a savings account in order to save for education investment. This fact is corroborated by two explanations: first, a plausible assumption

[13] Prina (2013) found that as the poor open savings accounts, their investments in health and education increases.

that the ability to read Chichewa would lead to a better understanding of savings benefits and second, Shawn, Thomas, and Zia's finding (2011) that financial literacy promotes asset accumulation.

Along the same path, ownership of a working cellphone has similar effects in 2008 and 2010. With both coefficients bring statistically significant, the probability of having a savings account increases by approximately 25 percentage points if the household owns a cellphone in working condition. Given the high percentage effect, this variable is an important predictor of the household's use of a savings account.

I expect that owning a business gives the household another reason adopt savings – to accumulate savings and invest in the business. Therefore, I expect the correlation between this variable and savings to be positive. Aggarwal, Klapper, & Singer (2012) also find that poor households opt for microcredit for expansion of existing businesses. In areas where microcredit is not as accessible, poor households are motivated to save in order to expand their businesses. It is interesting to note that if the household owns a business, the effect is positive and significant in 2008 (at the .1 level), but negative and not significant in 2010 on the probability of owning a savings account. At the baseline, the result is consistent with other findings (Woodruff, Martinez (2008); Cole, Thompson, Zia (2011))[14]. Households open accounts to save for future investment or expansion of

[14] Woodruff and Martinez (2008) find that if the account holder owns an agricultural or a non-agricultural business, his or her probability of having a savings account increases by 5.2% and 5.6% respectively. These results statistically significant. Woodruff, Christopher, and José Martínez. 2008. Assessing changes in household access to financial services in Mexico: An analysis of the BANSEFI/SAGARPA panel survey 2004 -2007. *(Footnote continued on next page…)*

their existing business. What affects the amounts actually saved in these accounts is discussed in the next section.

At the endline, however, we see that business ownership has a negative and not a significant effect on the probability of having a savings account. In 2008, 99 households who owned at least one business had a formal savings account. This number reduced to 96 in 2010. This drop could have been due to several reasons. Perhaps, some households chose to opt out of formal savings or increased their expenditures more and opted out of savings overall. Further, once the bank went mobile and more accessible at the end line, having a business might not matter as much in determining the usage of formal savings. In 2008, 35% of the banked households had a business, and in 2010, 27% of the banked households had a business. This drop in the number of banked households with a business suggests that once the bank went mobile, and came closer to the villages, all households (regardless of business ownership) had easier access to savings. Whereas, initially when the bank was not mobile, we can assume that wealthier households (i.e. households with businesses) could make the trip to the bank for savings. Once the bank went mobile, the effect of business was no longer statistically significant, and in fact, quite close to zero.

Cole, Sampson, and Zia find the ownership of a non-farm enterprise increases the probability of the household owning a formal bank account. This result is positive and statistically significant for the sample in Indonesia. Cole, Shawn, Thomas Sampson, and Bilal Zia. 2011. Prices or knowledge? What drives demand for financial services in emerging markets? The Journal of Finance 66 (6): 1933-67.

Household Size

In context of household size, I expect the correlation between the number of adults to the probability of savings take up to be positive, because the more the number of adults, the more earning hands in the household, and thus the higher the probability of savings. On the other hand, I expect the same correlation in the case of number of children to be negative because the more the dependents in the household, the more the expenses, and the less the probability of savings. The results how that the number of children has a negligible and statistically insignificant effect on the probability of having a savings account both at baseline and at endline. However, the effect of the number of adults differs in 2008 and in 2010. In 2008, the effect of having more adults in the household is negative and statistically insignificant, but in 2010, the same effect is positive and significant.

In 2008, before OIBM started a van-bank drive, poor households in the research area may not have had easy access to financial services due to far distances from the bank site. Financial services do not reach out to every village and members of a poor household would have to travel by foot to go to the bank. In this case, households with more adults may not choose to make the inconvenient and time consuming walk to a bank branch. Further, if a household has high number of adults, they may not want a savings account far from them because they want their savings to be within their reach. We can expect that the more the adults in a household, the more the consumption of cash. Therefore, if a household with more adults held a savings account, they would require routinely transactions to meet their consumption. That said, a household with more adults might choose to keep cash at home or at a relative's place. By keeping cash within reach,

these households not have the inconvenience of traveling to a make a bank deposit or withdrawal far away from their village. Therefore, if a household has more adults, they might accumulate their savings at home and feel a much lesser need for a formal savings account that is at a far distance. This behavior might explain the negligible and insignificant effect of number of adults on the probability of having a savings account at the baseline. Having more adults in a household may not matter at the baseline because the bank branch is too far to store savings.

By 2010, however, OIBM was providing banking services much closer to the household's reach. Through a van bank that made six stops at trading centers, OIBM literally drove people's savings deposits closer to their village. The convenience of having a bank closer to the village allows for routinely transactions and deposits. Households with more adults can open a savings account and make transactions much faster. For a household with more adults, the incentive to open a savings account was not only the convenience of the bank, but also the promise of security from theft or loss. That said, the more the number of adults in a household, the more the likelihood of one of at least the members making an occasional trip to a trading center (a stop for the van bank). Therefore, adults who travel to run errands occasionally might be incentivized to open a savings account. Or, if these individuals were unaware of the van-bank, they might happen to stumble upon OIBM's van bank services, and bring the information of this accessible bank back to their household. In either case, the more the number of adults in a household, the more the chances of having a formal savings account. Hence, at the endline, we see that each additional adult in the household increases the probability of having a savings account by 2.8 percentage points, significant at the .01 level.

V. Household Determinants of Having Formal Savings and Amounts Saved at the Baseline

Table 5 compares the effect of various household characteristics on the likelihood of having a formal savings account to the actual amount saved (conditional on having formal savings) at the baseline. Note the difference in the number of observations. It shows that 278 households out of the 2395 sampled at the baseline report having a formal savings account.

Characteristics of the Household head

The ability of the household head to read Chichewa has a positive effect on the probability of having a savings account (with significance at .01 level), but a negligible effect on the amount saved. If the household head is literate enough to read, he or she is more likely to better understand the procedure of opening and using a savings account. Shawn, Thomas, and Zia (2011) find that across India and Indonesia, households exhibit an increase in demand for financial products with an increase in financial education. It is intuitive to expect that the ability to read or to have a basic education background may be important to comprehend financial education, and as a result, opt for financial products. However, our sample suggests that the ability to read is often not strong enough by itself to provoke the use of financial services. The evidence lies at the baseline, where 69% of the sampled household heads can read Chichewa, but only 11.55% of them have a formal savings account. This brings us to microfinance literature which suggests that several other social issues, such as lack of trust in the organization, unmet documentation

requirements or other factors might thwart even a literate household from choosing to have a savings account (Aggarwal, Klapper (2012); Dupas, Robinson (2009); Cole, Sampson, Zia (2011))[15]. These might help explain why only 283 households having a savings account at the baseline when 1697 households have a literate head in the sample.

The gender and the marital status of the household head have different effects on the probability of having a savings account than on the amount saved. If the household head is a male, the household is 8.6 percentage points more likely to have a savings account, significant at the .01 level. However, amongst formal account owners, the significance of being a male household head disappears for the actual amount saved. This relates to past literature in microfinance looking at which gender saves more. There have been contradicting findings related to gender, mostly because several other factors besides gender affect savings amounts. Dupas & Robinson (2009) find that the average

[15] Aggarwal and Klapper write that unbanked individuals in developing countries might not opt for formal savings accounts due to lack of money, high costs of opening the account, distance from the bank, documentation requirements, or lack of trust in the institution.
Aggarwal, Shilpa, and Leora Klapper. 2012. Designing government policies to expand financial inclusion: Evidence from around the world. Unpublished Working Paper, World Bank, Washington, DC.

Dupas and Robinson find that savings accounts offered by savings cooperatives are not readily available because they are urban and employment based.
Dupas, Pascaline, and Jonathan Robinson. 2009. Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya.

Cole Shawn, Sampson Thomas, and Bilal Zia also discover in their experiments in India and Indonesia that financial literacy alone does not increase demand for financial products in the greater population.
Cole, Shawn, Thomas Sampson, and Bilal Zia. 2011. Prices or knowledge? What drives demand for financial services in emerging markets? The Journal of Finance 66 (6): 1933-67.

deposits for women were twice as high as the average deposits for men. Women (all of whom were market vendors) used their accounts more actively as well. On the contrary, in another study, Dupas, Keats, Green, and Robinson (2012) find that men had higher amounts in total and average savings deposits. We can infer that although gender might be an important determinant of who saves more, it is dependent on the circumstances (employment, social constraints, household size, etc) that affect gender's role in determining the amount saved.

Lastly, marital status of the household head has a positive and significant effect on the amount saved. If the household head is married, he or she may feel more responsible the family, including the dependents in the household. This behavior might encourage him or her to save more, thereby explaining the positive effect. One evidence for such behavior can be pulled from Dupas and Robinson's field experiments in Kenya 2009). Dupas and Robinson find that "having a joint account with spouse" has a positive effect on the "take-up and usage of a savings account" for both men and women. Therefore, households with married heads are more likely to save higher amounts in their savings accounts.

Non-head characteristics of the household

As seen in Table 5, the effect of number of members who can read Chichewa is positive and significant for both dependent variables. As an indicator of literacy, the ability to read may also imply that the household understands the financial benefits of saving. Hence, a household is more likely to save if more members can read. Also, the higher the number of household members who are salaried, the more the expected inflow

of income, and thus, the higher the expectation for savings. The effect of each additional salaried member in the household increases the likelihood of savings by 9.2 percentage points, significant at .01 level. Similarly, it increases the amounts saved by 14,531 kwacha ($103.27), significant at .05 level[16]. The effect of ownership of a business flows along the same path. If a household owns at least one business, the probability of savings increases by 2.6 percentage points, significant at the .1 level. Note that the amount of savings is most affected the ownership of a business enterprise. If a household owns a business, its savings are boosted by 33,285 kwacha ($236.55), significant at the .05 level. These results are statistically significant and consistent with other studies[17].

The effect is similar if someone in the household owns a working cellphone: the probability of having a savings account increases by 26.2 percentage points (significant at .01 level) and the amount saved increases by 8,238 kwacha ($58.54). Given that the effect of having a functional cellphone is compelling, this result is useful for microfinance institutions that operate through mobile banking. Ownership of a working cellphone not only increases the possibility of having a savings account (thereby boosting financial inclusion) but also increases the amounts of savings in those accounts. On

[16] Currency conversion based on the exchange rate in April 2008. 1 MWK = 0. 0.007107068 USD

[17] Cole, Sampson, and Zia find that demand for commitment savings increases by approximately 1 percentage point if the household owns a non-farm enterprise. This result is not statistically significant. In addition, they also find the ownership of a non-farm enterprise increases the probability of the household owning a formal bank account. This result is positive and statistically significant for the Indonesia sample, and positive and not significant for the India sample.
Cole Shawn, Sampson Thomas, and Bilal Zia: Prices or Knowledge? What Drives Demand for Financial Services in Emerging Markets? The Journal of Finance, Vol. LXVI #6 (December 2011)

challenge, however, in mobile banking amongst poor households is that only a limited number of individuals own cellphones in working conditions. In our sample, only 13.09% of the households own a cellphone that is functional.

Household Size

As discussed in section IV, the effect of having more adults in a household lowers the probability of having a savings account because of the cost of convenience. However, if a household already owns a savings account in 2008, the effect of having more adults under one roof is positive and not significant on the amount saved in that account. One rationale behind this finding is that the more the number of adults, the more labor in the household, and the more earnings we can expect. This would increase the amounts saved by the household in the savings account. This analysis brings about an interesting finding that the effect of each additional child within the household decreases the amount saved in the savings account by a 5923 kwacha (USD 42.09), significant at the .01 level. Since we expect children in these households to be dependent and non-earning, it is expected that their survival would drain out the savings of the households. Therefore, we can account for the negative effect on the amount saved.

VI. Household Determinants of Having Formal Savings and Amounts Saved at the Endline

This analysis compares the effect of household characteristics on the probability of having a savings account, and on the actual amount saved (conditional on having a savings account) at the endline. Table 6 compares the effects of household characteristics on the likelihood of having a formal savings account and the amount saved in those accounts, at the endline. Note that observations in both columns of this table include the treatment groups (those exposed to the informational campaigns of the bank) and the control groups (those who did not receive any marketing). Table The fact that column 2 only has 330 observations implies that at the endline, only 330 observations reported having a formal savings account. Compare this statistic to the number of observations in column 2 of Table 5 in section V. At the endline only 278 households reported having formal savings, while at the endline, this number rose to 330 (including both treatment and control groups).

Characteristics of the Household head

Amongst the variables focused on the household head, the gender and ability to read Chichewa present the most interesting results. If the household head is male, the probability of having a savings account is more, but the amount saved in the account is less. However, both these results are not statistically significant. Further, if the household head can read Chichewa, the household is more likely to have a savings account (by 8.6 percentage points, significant at the .01 level) but less likely to have high amounts of

savings. Compare this result to column 1 in Table 5 of section V. We see a similar effect of the literacy variable in both 2008 and 2010. This may imply that literacy can be an important variable in understanding the importance of savings and going through the procedure of opening an account. However, given that the staple Malawian occupation is agriculture, it is possible that the ability to read Chichewa is not as useful as other factors (such as labor efficiency, energy, etc) in generating a larger inflow of agricultural income. Therefore, while literacy may predict the likelihood of having saving account, it might not increase the actual amount saved in the account.

Non-head characteristics of the household

Some characteristics of a household have a similar effect on the probability of having a savings account and on the amount saved. These include number of members who are salaried (positive and not significant), number of non-head members who can read Chichewa (positive), and distance from the bank (negative). Most importantly, if the household owns a cellphone in working condition, it is 25 percentage points more likely to have a savings account and expected to have 19,440 MWK more in savings. Both these results are statistically significant at the .01 level.

On the other hand, ownership of a business has different effects on each of the dependent variables. If a household owns at least one business, it is 0.9 percentage points less likely to have a formal savings account, but on average, has 8,315 MWK more in savings if it already owns an account. Both these results, however, are not statistically significant.

Household Size

In context of the household size, the number of children in the household does not significantly affect either of the dependent variables. For each additional child in the household, the probability of having a savings account increases by 0.1 percentage points and the amount saved in an account increases by 765.9 MWK (approx. 5.07 USD)[18]. On the contrary, number of adults has a contrasting effect. For every additional adult in the household, the probability of having a savings account increases by 2.8 percentage points (significant at the .01 level) but the amount saved decreases by a statistically insignificant value of 2,614 MWK (approx. 17.31 USD).

This implies that the number of adults in a household matters more for predicting the likelihood of having a savings account than predicting the amount saved by a household, conditional on having an account. Note that this result at the endline is opposite of the result we came across at the baseline. At the baseline, number of adults is a positive (yet, not statistically significant) predictor of the amount of savings. This difference in effect may be explained by the accessibility of the bank. By 2010, the bank went mobile and became more accessible, which could be an excuse for easier and faster withdrawals. Therefore, the more the number of adults in the house, the more the number of individuals who could access a savings account to withdraw money. Thus, having more adults in the household could have brought more amounts into savings account when the bank was less accessible, but it may have caused more withdrawals when the bank went mobile. It is important to keep in mind that these results are not statistically

[18] Currency conversion based on the exchange rate in April 2010. 1 MWK = 0.0066225166 USD

significant in either 2008 or 2010 (see columns 2 of Table 5 and Table 6), and therefore might not be truly representative of actual behavior. That said, there is room for future research to test the significance of the *number of adults* variable as it differs at the baseline and at the endline.

Summary of section V and VI Results

The results of sections V and VI draw a distinction between variables that matter to achieve more financial inclusion and variables that matter to encourage the poor to save more amounts. Table 1.4 summarizes the most important variables that are positive, ranked in order of the magnitude of their effect:

	Household characteristics that increase the **probability of having a savings account**	Household characteristics that increase the **amount saved in the savings account**
2008 (Baseline)	1. Ownership of a functional cellphone*** 2. Number of salaried members*** 3. Gender of household head is male***	1. Household owns a business** 2. Household head is married** 3. Number of salaried members**
2010 (Endline)	1. Ownership of a functional cellphone*** 2. Household head can read Chichewa*** 3. Number of members who can read Chichewa***	1. Ownership of a functional cellphone***

Table 1.4: Comparison of household determinants of having formal savings and the amounts saved, at the baseline and at the endline. *** indicates significance at the 1% level, and ** indicates significance at the 5% level.

Table 1.4 shows the characteristics of households who are most likely to be financially included (with formal savings accounts), and households that use these accounts to save the most amount. It draws a distinction between the focus of financial

inclusion to get more individuals to open savings accounts, and the focus of encouraging poor households to save money in those accounts. This information might be useful for microfinance institutions that research the behaviors and saving patterns of poor households.

In summation, I conclude that a household with a functional cellphone is most likely to have a savings account; a household with a business and a married head is likely to save the most; at the baseline (2008), a household with the highest number of salaried members has the high probability of having a savings account, and the most amounts of savings as well; and lastly, at the endline (2010), a household with a functional cellphone has the high probability of having a savings account, and the most amounts of savings as well.

VII. Household Determinants of Adopting Formal Savings

This section compares the effect of variables on the probability of *adopting* a formal savings account i.e. the determinants of whether a household (which did not own a savings account at the baseline) will have adopted a savings account at the endline. Table 7 table illustrates the effects of household characteristics on the likelihood of adopting a formal savings account. The analysis is split into three regressions; First, I will discuss the effect of household characteristics on savings adoption for all 1,828 observations that did not own a savings account in 2008. This includes both the treatment and the control groups, as shown in column 1 of Table 7.

Second, I will discuss the effect of household characteristics on savings adoption for households in the control group. In this case, the household characteristics affect savings adoption in absence of any marketing and awareness campaigns of OIBM banking services. However, they still had access to the newly introduced van bank service. Column 2 shows that 940 households were not exposed to the marketing efforts of OIBM. If you recall the *Technology Adoption Life Cycle* curve discussed in section I, it shows that such households are the "innovators" in adoption of formal savings. These households do not need to be targeted by the bank to provide any marketing or awareness of the financial service. They are the first ones to adopt formal savings regardless.

Third, I will discuss the effect of household characteristics on savings adoption for households in the treatment group. In this case, the household characteristics affect savings adoption differently. The marketing and awareness campaigns of OIBM banking

services alter the effect of household characteristics on its savings adoption decision. Column 3 shows that 1,828 households were exposed to the marketing efforts of OIBM. Given that these households choose to adopt formal savings when targeted by the marketing campaigns, they are the early adopters of microsavings.

The difference between the treatment and the control effects should exhibit the "added effect" the OIBM banking marketing outreach on the household's decision to adopt a formal savings account. To estimate this difference, I run another linear probability regression with household variables interacted with a dummy treatment variable "T". The revised regression equation for testing the results of treatment is shown in Table 1.5:

$$Y_i = \alpha_0 + \alpha_{00}T + \alpha_1 (\text{Gender})_i + \alpha_{11} (\text{Gender})_i*T + \alpha_2 (\text{Age})_i + \alpha_{22} (\text{Age})_i*T + \alpha_3 (\text{Age}^2)_I + \alpha_{33} (\text{Age}^2)_i*T + \alpha_4 (\text{Married})_i + \alpha_{44} (\text{Married})_i*T + \alpha_5 (\text{Literacy})_i + \alpha_{55} (\text{Literacy})_i*T + \beta_1 (\text{Salaried members})_i + \beta_{11} (\text{Salaried members})_i*T + \beta_2 (\text{Literate members})_i + \beta_{22} (\text{Literate members})_i*T + \beta_3 (\text{Business})_i + \beta_{33} (\text{Business})_i*T + \beta_4 (\text{Distance})_i + \beta_{44} (\text{Distance})_i*T + \beta_5 (\text{Cellphone})_I + \beta_{55} (\text{Cellphone})_i*T + \Upsilon_1 (\text{Adults})_i + \Upsilon_{11} (\text{Adults})_i*T + \Upsilon_2 (\text{Children})_i + \Upsilon_{22} (\text{Children})_i*T + \varepsilon$$

Table 1.5: Regression equation for variables exhibited in Table 7. *T indicates interaction of household characteristics with the treatment variable. The coefficients of these variables exhibit the "added effect" of treatment on that household determinant of savings.

One of the purposes of this paper is specifically to identity the *initial adopters* of formal savings. Column 3 in Table 7 shows that regardless of the household characteristics, the exposure to the marketing of OIBM's savings services increases the

probability of savings adoption by 8.25 percentage points amongst the group of treated households. Although this result is not statistically significant, it may imply that the awareness of OIBM's new van bank service can have a positive effect on poor households' decisions to open savings accounts. In other words, had OIBM bank not provided any promotional campaigns for its van bank, and had silently continued driving the van bank service closer to villages, the adoption rate could have been quite lower.

i. Identifying the Innovators

Column 2 in Table 7 lists the effects of household characteristics for observations that may choose to adopt formal savings provided by the new van bank service, without receiving any informational campaign. Households from the control group that choose to adopt savings are the *innovators*. Characteristics of such households are discussed below:

Characteristics of the household head

Column 2 shows that household head's literacy carries the most significance (at the .05 level) amongst this category of variables. If the household head can read Chichewa, the household's inclination to adopt savings is estimated to increase by 5.09 percentage points. This may imply that if a household head can read Chichewa, he or she may be able to open a formal savings account without any help from OIBM bank's promotional assistants and coordinators. A literate household head may be able to reach out to the bank, read through the required documentation, and open an account without any assistance in understanding basic bank requirements.

Results show, without significance however, that female household heads are more likely to adopt formal savings in the control group. Further, if the household head in the control group is married, the estimated increase in the probability of savings adoption is 0.5 percentage points, with no statistical significance.

Non-head characteristics of the household

With each additional member in the household who can read Chichewa, the probability of adopting formal savings increases by 1.9 percentage points, significant at the .1 level. This may be the case because the more literate adults under one roof, the more people who can go through the documentation and the process of opening an account without any promotional help, or at least assist the household head in doing so. Further, if someone in the household head owns a cellphone, the probability of adopting a savings account increases by approximately 10 percentage points, significant at the .05 level. This may be an important finding for banks as they could potentially expect households with a functional cellphone (or with the wealth level to afford a working cellphone) to be their first customers.

As the number of salaried household members increases, we can expect a positive increase in the probability of savings adoption (by 4.7 percentage points). One rationale behind this result might be that households with more salaried members may be motivated to store all their savings in one secure location, regardless of a formal bank informing them of their services. This result, however, is not statistically significant. Similarly, the effect of owning a business is small and not statistically significant in the control group. If a household owns at least one business, it is 1.1 percentage points more likely to adopt formal savings without the bank approaching them personally. On the other hand, the effect of distance holds significance. The closer the household to the bank, the higher the probability that it will adopt formal savings without receiving any promotions. In our sample, households closer to the trading center might stumble upon

the van bank service being offered, and as a consequence, may choose to open an account.

Household size

In terms of household size, results show that with every additional adult in the household, the probability of savings adoption increases by 3.5 percentage points, significant at the .05 level. If a household has more adults, it may have more chances of coming across the ban services without the bank specifically reaching out to the household head. In our sample, the more the number of adults in a household, the more the chances that one of those adults came across the van bank service at one of the trading centers. Thus, it is possible that banks can expect households with more adults to reach out to their services. On the other hand, the effect of having an additional child in the household increases the likelihood of savings adoption by a negligible and statistically insignificant value.

ii. Identifying the Early Adopters

The coefficients of the interaction variables in Table 7 Column 3 exhibit the "added effect" of marketing banking services on the decision to adopt formal savings. Results of this added effect are illustrated by the interaction variables of household characteristics and the treatment variable. A majority of these results in column 3 do not hold enough significance to accurately represent the actual effect of marketing on household characteristics. This opens room for future research on finding the added effect of marketing on adoption decisions with statistical significance. In this section, I will discuss the effects of treatment by drawing attention to the magnitude of variables in focus. Although the lack of significance does not cement an accurate definition of the early adopters, nonetheless, it gives us an idea of what an estimated early adopter looks like.

The treatment variable by itself implies that despite the household characteristics, simply providing treatment (exposure to the awareness of OIBM banking services) increased the likelihood of an unbanked household adopting a savings account by approximately 9 percentage points. The characteristics of an early adopter household are discussed below:

Characteristics of the household head

Exposure to marketing and awareness of bank services damps the effect of increasing age of a household head. Results show that as the household head gets older, exposure to the bank's marketing efforts may reduce the probability of formal savings

adoption by 0.22 percentage points. This implies that a bank may be better of reaching out to younger household heads. For example, a household head aged 30 is approximately 22 percentage points more likely to adopt formal savings than a household head aged 40, when exposed to the bank's promotions.

We can see a similar effect of treatment on the effect of gender. Providing a male household head with exposure to a bank's marketing services increases his likelihood of savings adoption by 2.09 percentage points. This result may indicate that male household heads may not be as willing to reach out to the bank independently as female household heads, and may require information on the benefits and process of opening formal savings.

Note that treatment also reverses the effect of the literacy variable. If a household head can read Chichewa, he or she is approximately 5 percentage points more likely to adopt formal savings, significant at the .05 level. Reaching out to these households, as part of a marketing or promotional campaign, lowers this effect by approximately 1 percentage point. This result may suggest that banks may be better off allocating resources to provide information and assistance to household heads who cannot read Chichewa. Lastly, if the household head is married, the added effect of treatment is 1.5 percentage points. These effects lack the significance to be estimated as a characteristic of an early adopter.

Non-head characteristics of the household

Treatment has an added positive effect of 0.82 percentage points for each additional member in the household who can read Chichewa. It may be the case that

members who can read Chichewa can better understand the informational sessions provided by OIBM, or can better respond to the marketing efforts of OIBM. Therefore, as more literate members in a household are exposed to treatment, the higher the probability of savings adoption.

While the effect of treatment on the literacy variable is quite low, its effect on the ownership of a cellphone is high. If a targeted household owns a cellphone, it is 9.96 percentage points more likely to adopt savings when provided access, significant at the .05 level. If we provide treatment to such a household, the probability of savings adoption increases by 12.2 percentage points, significant at the .10 level. Therefore, if banks provide access and marketing to households in which someone owns a functional cellphone, they boost the likelihood of formal savings adoption significantly by 22.16 percentage points.

Household Size

In context of household size, if a household is exposed to the awareness programs of the bank, the effect of having an additional child decreases the probability of savings adoption by 0.8 percentage points. Given the negligible and insignificant value of this result, it is ambiguous how the number of children in a household alters its adoption decision upon receiving marketing from the bank. On the other hand, for every additional adult in the household, the likelihood of adopting a formal savings account increases by 1.3 percentage points in the treatment group. One takeaway from these results is that the magnitude of adults interacted with treatment is higher than the magnitude of children interacted with treatment. But the significance of both variables it too weak to make an

expectation that formal savings promotions can negatively affect the adoption decisions of bigger households.

Summary of section VII results

Based on the estimated results in Table 7 Column 3, an *early adopter*, or a household most likely to adopt formal savings due to the marketing efforts of a bank has a functional cellphone, and may have a small size, a young, male head who cannot read Chichewa, and adults who can read Chichewa. Apart from the predicted effects of cellphone ownership, this estimation calls for further research and confirmation in significance.

Compare this "early adopter" household to an "innovator" household. Both groups are similar in the fact that households own a functional cellphone and that non-head members can read Chichewa. The fact that ownership of a functional cellphone boosts the probability of savings adoption (for both control and treatment groups) concludes that households with a functional cellphone are most likely to be the *intial adopters* of formal savings.

In conclusion, based on the differences between the characteristics exhibited by the *innovators* and the *early adopters*, banks are most likely to acquire customers when they provide access to households that have a head who can read Chichewa, a functional cellphone, more adults who can read Chichewa, and are closer to the bank center. On the other hand, banks may be more cost and time efficient in their marketing efforts if they target their marketing efforts towards smaller households with a young, male head, who owns a functional cellphone.

VIII. Conclusion

In order to broaden their reach with a promising rate of financial inclusion, microsavings programs should understand three aspects of the poor households they serve: *who* these households are, *why* they save, and *how* they save. This paper takes the first step in that direction – identifying *who* these households are (at least two groups of them – the *innovators* and the *early adopters*). Organizations might be tempted to employ an aggressive drive to reach out to all households with the same promotional strategy at the same time. However, the results might not be promising. For instance, Ramji (2009) finds that an expansion of formal savings to unbanked households in the Gulbarga district of India had an insignificant impact, despite an aggressive drive to maximize financial inclusion. At the end of the drive, 70% of the sample still remained unbanked. In addition, results show that the accounts were opened by individuals who had pre-existing savings accounts.

Achieving financial inclusion in any given community takes time and a strategic approach. Financial institutions must *acquire* households group by group (innovators, early adopters, early majority, late majority, and finally, laggards), *retain* commitment by catering to specific savings needs, and *grow* until they reach their desired financial inclusion goal. The first step in that direction is identifying *who* the initial adopters are. In this paper, we identified the *innovators* and the *early adopters* of formal savings - households that are the first customers of microsavings. The *innovators* group of households adopted formal savings accounts at the new van bank simply when OIBM

expanded access closer to their villages. On the other hand, the *early adopters* group of households adopted formal savings accounts at the new van bank when OIBM expanded access accompanied by an informational campaign in their village. Based on the definitions of these two groups, a bank can save time and cut down marketing expenses by *not* targeting the innovators, and instead gearing the promotional campaigns towards the early adopters.

My results show that the following characteristics boost the probability of a household willing to adopt formal savings *simply when granted access to the service*: household head can read Chichewa; someone in the household owns a functional cellphone; households consists of adults who can read Chichewa; and the household is close to the bank. With this information, a formal savings provider can grasp an idea of *who* to expand access to in order to acquire more customers.

Following the group of households mentioned above, who adopt savings simply when provided access, *early adopters* are the next big pool of customers that a financial institution serves. I find that households in the *early adopters* own a functional cellphone, which increases their likelihood of savings adoption significantly when exposed to a bank's promotions. However, since results for other characteristics are only suggestive of what an early adopter household could look like, there is room for additional research on accurately identifying the early adopters of formal savings. One way to identify the early adopters could be to run a similar field experiment, where the treatment is exposure to the marketing campaigns of a bank's services, followed by an examination of the differences in household level determinants of formal savings adoption. In addition, similar research

can identify the initial adopters of informal savings, credit, insurance programs, and other services of microfinance institutions. For organizations that provide a range of services to the poor, information on the initial adopters or individuals for each of those services can broaden the breadth of their reach. Lastly, some results in this paper are only suggestive of actual household behaviors and offer avenues for further research. For example, section VI poses a question to see how the number of adults within a household affects the amounts in formal savings accounts when the bank is driven closer to the household.

Once the *initial adopters* have been identified, microfinance institutions can take strategic measures to approach these individuals in a way that maximizes probability of adoption. Research on the interaction between a bank agent and a household can provide answers to a broad array of questions. For instance, how does the gender of the financial organization's information provider affect a household head's decision to take up savings? Does a specific milieu of interaction (be it through public meetings, one on one interaction in the household, group interaction at the bank, etc) increase the likelihood of savings adoption? As economists and social entrepreneurs, such questions are crucial to ask because they can improve the efficiency of microsavings efforts. For the populations of poor who want to save but are waiting for access, formal savings services might be their springboard to rise above poverty. The process of expanding financial services to poor households may be sensitive to several factors; the more we are aware of them, the more we can maximize chances of financial inclusion for every poor household.

* * * *

Table 2: Results of splitting the household size with changing literacy variables

VARIABLES	(1) Has savings (2008)	(2) Has savings (2008)	(3) Has savings (2008)	(4) Has savings (2008)
Age	0.000564	0.000680	0.000133	-0.000207
	(0.000499)	(0.000491)	(0.000489)	(0.000499)
Gender	0.0490***	0.0518***	0.0592***	0.0493***
	(0.0151)	(0.0147)	(0.0145)	(0.0142)
Number of salaried members	0.177***	0.177***	0.150***	0.152***
	(0.0368)	(0.0366)	(0.0308)	(0.0314)
Ownership of business	0.0569***	0.0575***	0.0500***	0.0488***
	(0.0147)	(0.0147)	(0.0145)	(0.0143)
Number of literate members (dummy)	0.0829***	0.0848***		
	(0.0119)	(0.0117)		
Number of adults	0.0181**		-0.0274**	
	(0.00910)		(0.0105)	
Number of children	0.0113**		-0.00221	
	(0.00440)		(0.00432)	
Household size		0.0127***		-0.00558
		(0.00383)		(0.00408)
Number of literate members (continuous)			0.0549***	0.0500***
			(0.00650)	(0.00592)
Constant	-0.137***	-0.137***	-0.0253	-0.0341
	(0.0244)	(0.0243)	(0.0258)	(0.0255)
Observations	2,395	2,395	2,395	2,395
R-squared	0.087	0.087	0.126	0.124

Notes: This table compares the effect of splitting up household size into adults and children, with different literacy variables at the baseline. Column 1 includes number of adults, number of children, and a dummy variable for household literacy (1 if anyone in the household can read Chichewa). Column 2 includes the household size, and a dummy variable for household literacy (1 if anyone in the household can read Chichewa). Column 3 includes number of adults, number of children, and a continuous variable for household literacy (adding on the value of each member who can read Chichewa). Column 4 includes the household size and a continuous variable for household literacy (adding on the value of each member who can read Chichewa). Robust standard errors are reported in parentheses, adjusted for 118 clusters. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 3: Effect of literacy variables on the magnitude of household size variables

VARIABLES	(1) Has savings (2008)	(2) Has savings (2008)	(3) Has savings (2008)	(4) Has savings (2008)	(5) Has savings (2008)	(6) Has savings (2008)
Age	0.000564	0.000133	0.000438	-0.000122	0.000911*	0.000280
	(0.000499)	(0.000489)	(0.000499)	(0.000504)	(0.000489)	(0.000495)
Gender	0.0490***	0.0592***	0.0557***	0.0739***	0.0290*	0.0519***
	(0.0151)	(0.0145)	(0.0152)	(0.0149)	(0.0151)	(0.0150)
Number of salaried members	0.177***	0.150***	0.176***	0.156***	0.168***	0.150***
	(0.0368)	(0.0308)	(0.0361)	(0.0313)	(0.0357)	(0.0310)
Ownership of Business	0.0569***	0.0500***	0.0564***	0.0535***	0.0526***	0.0491***
	(0.0147)	(0.0145)	(0.0149)	(0.0145)	(0.0147)	(0.0145)
Number of literate members (dummy)	0.0829***					
	(0.0119)					
Number of adults	0.0181**	-0.0274**	0.0118	-0.0266**	0.0192**	-0.0239**
	(0.00910)	(0.0105)	(0.00917)	(0.0110)	(0.00893)	(0.0111)
Number of children	0.0113**	-0.00221	0.00904**	-0.00292	0.0126***	-0.000776
	(0.00440)	(0.00432)	(0.00434)	(0.00453)	(0.00436)	(0.00450)
Number of literate members (cont.)		0.0549***				
		(0.00650)				
Number of literate members, except the head (dummy)			0.0877***			
			(0.0154)			
Number of literate members, except the head (cont.)				0.0568***		0.0498***
				(0.00760)		(0.00746)
Literacy (dummy)					0.104***	0.0767***
					(0.0130)	(0.0117)
Constant	-0.137***	-0.0253	-0.107***	0.00606	-0.138***	-0.0447
	(0.0244)	(0.0258)	(0.0240)	(0.0284)	(0.0254)	(0.0285)
Observations	2,395	2,395	2,395	2,395	2,395	2,395
R-squared	0.087	0.126	0.094	0.117	0.101	0.127

Notes: Columns 1 and 2 Table 3 are the same as columns 1 and 3 in Table 2. All columns include number of adults and number of children, instead of one household size variable. Each column accounts for a different literacy variable: Column 1 includes a dummy for at least one member who can read, column 2 includes a continuous variable for number of members who can read, column 3 includes a dummy for at least one member (except the head) who can read, column 4 includes a continuous variable for at least one member (except the head) who can read, column 5 includes a dummy only for the head's ability to read, and column 6 includes one continuous variable for number of members (except the head) who can read *and* a dummy for the head's ability to read. Clustered robust standard errors are reported in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 4: Household determinants of having a formal savings account:

VARIABLES	(1) Has savings (2008)	(2) Has savings (2010)
Age	-0.000146	-0.00220
	(0.00243)	(0.00316)
Age^2	6.61e-06	2.10e-05
	(2.68e-05)	(3.28e-05)
Gender	0.0868***	0.0127
	(0.0260)	(0.0361)
Number of salaried members	0.0923***	0.0386
	(0.0233)	(0.0279)
Ownership of business	0.0261*	-0.00924
	(0.0142)	(0.0176)
Literacy	0.0569***	0.0864***
	(0.0115)	(0.0167)
Number of literate members	0.0324***	0.0306***
	(0.00583)	(0.00682)
Number of adults	-0.0158	0.0289***
	(0.00998)	(0.00990)
Number of children	0.00413	0.00159
	(0.00449)	(0.00516)
Marital status	-0.0437	-0.000805
	(0.0293)	(0.0364)
Ownership of cellphone	0.262***	0.252***
	(0.0333)	(0.0312)
Distance from EA	-0.00452	-0.00649*
	(0.00318)	(0.00366)
Constant	-0.00777	0.0481
	(0.0589)	(0.0788)
Observations	2,395	2,057
R-squared	0.197	0.141

Notes: This table reports the likelihood of having a formal savings account at the baseline (2008) and at the endline (2010) as determined by household characteristics. The observations at the baseline and the endline include both the assigned control and treatment households. Robust standard errors are reported in parentheses, adjusted for 118 clusters. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 5: Household determinants of formal savings adoption and amounts saved at the baseline

VARIABLES	(1) Has savings (2008)	(2) Amount in account (2008)
Age	-0.000146	1,480
	(0.00243)	(1,644)
Age^2	6.61e-06	-15.91
	(2.68e-05)	(16.65)
Gender	0.0868***	3,021
	(0.0260)	(8,825)
Number of salaried members	0.0923***	14,531**
	(0.0233)	(7,192)
Ownership of business	0.0261*	33,285**
	(0.0142)	(13,578)
Literacy	0.0569***	97.22
	(0.0115)	(11,575)
Number of literate members	0.0324***	5,608**
	(0.00583)	(2,399)
Number of adults	-0.0158	152.8
	(0.00998)	(4,448)
Number of children	0.00413	-5,923***
	(0.00449)	(2,243)
Marital status	-0.0437	19,240**
	(0.0293)	(8,354)
Ownership of cellphone	0.262***	8,238
	(0.0333)	(7,358)
Distance from EA	-0.00452	-619.2
	(0.00318)	(814.3)
Constant	-0.00777	-40,944
	(0.0589)	(52,996)
Observations	2,395	278
R-squared	0.197	0.112

Notes: This table compares the effects of household characteristics on the likelihood of having a formal savings account and the amount saved in those accounts, at the baseline. Observations in column 1 include all households in the sample (except the ones missing for specific variables). Observations in column 2 include only the households that reported having a formal savings account. Clustered robust standard errors are reported in parentheses. In column 2, the reported currency is Malawian Kwacha, where the exchange rate is 1 MWK = 0. 0.0071 USD for the year 2008. . Robust standard errors are reported in parentheses, adjusted for 118 clusters. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 6: Household determinants of formal savings adoption and amounts saved at the endline

VARIABLES	(1) Has savings (2010)	(2) Amount in account (2010)
Age	-0.00220	-215.1
	(0.00316)	(726.6)
Age^2	2.10e-05	2.561
	(3.28e-05)	(7.029)
Gender	0.0127	-2,935
	(0.0361)	(11,349)
Number of salaried members	0.0386	1,725
	(0.0279)	(6,403)
Ownership of business	-0.00924	8,315
	(0.0176)	(5,769)
Literacy	0.0864***	-3,169
	(0.0167)	(3,551)
Number of literate members	0.0306***	982.5
	(0.00682)	(2,272)
Marital status	-0.000805	8,505
	(0.0364)	(9,089)
Ownership of cellphone	0.252***	19,440***
	(0.0312)	(6,967)
Distance from EA	-0.00649*	-623.6
	(0.00366)	(515.4)
Number of adults	0.0289***	-2,614
	(0.00990)	(2,272)
Number of children	0.00159	765.9
	(0.00516)	(1,359)
Constant	0.0481	14,801
	(0.0788)	(19,804)
Observations	2,057	330
R-squared	0.141	0.079

Notes: This table compares the effects of household characteristics on the likelihood of having a formal savings account and the amount saved in those accounts, at the endline. Observations in column 1 include all sampled households and observations in column 2 include only the households that reported having a formal savings account. Clustered robust standard errors are reported in parentheses. In column 2, the reported currency is Malawian Kwacha, where the exchange rate is 1 MWK = 0.0065 USD for the year 2010. Robust standard errors are reported in parentheses, adjusted for 118 clusters. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 7: Household determinants of adopting formal savings

VARIABLES	(1) Has Savings (2010)	(2/**Control**) Has Savings (2010)	(3/**Treatment**) Has Savings (2010)
Age	4.76e-05	0.00141	0.00141
	(0.00307)	(0.00339)	(0.00338)
Age* T			-0.00226
			(0.00617)
Age^2	-7.42e-06	-2.12e-05	-2.12e-05
	(3.19e-05)	(3.55e-05)	(3.54e-05)
Age^2* T			2.16e-05
			(6.33e-05)
Gender	-0.0168	-0.0277	-0.0277
	(0.0324)	(0.0420)	(0.0418)
Gender* T			0.0209
			(0.0655)
Number of salaried members	0.0169	0.0479	0.0479
	(0.0268)	(0.0316)	(0.0315)
Number of salaried members* T			-0.0556
			(0.0526)
Ownership of business	-0.00393	0.0116	0.0116
	(0.0177)	(0.0244)	(0.0243)
Ownership of business* T			-0.0321
			(0.0350)
Literacy	0.0468***	0.0509**	0.0509**
	(0.0149)	(0.0214)	(0.0213)
Literacy* T			-0.0105
			(0.0298)
Number of literate members	0.0247***	0.0194*	0.0194*
	(0.00732)	(0.0107)	(0.0107)
Number of literate members* T			0.00826
			(0.0148)
Marital status	0.0118	0.00564	0.00564
	(0.0343)	(0.0461)	(0.0459)
Marital status* T			0.0151
			(0.0692)
Ownership of cellphone	0.169***	0.0996**	0.0996**
	(0.0348)	(0.0465)	(0.0463)
Ownership of cellphone* T			0.122*
			(0.0670)
Distance from EA	-0.00571*	-0.00637*	-0.00637*
	(0.00295)	(0.00364)	(0.00362)
Distance from EA* T			0.000876
			(0.00606)
Number of adults	0.0276***	0.0351**	0.0351**
	(0.0100)	(0.0143)	(0.0143)
Number of adults* T			-0.0135
			(0.0201)
Number of children	0.000864	0.00459	0.00459
	(0.00488)	(0.00535)	(0.00533)
Number of children* T			-0.00824
			(0.0101)
Treatment			0.0908
			(0.157)
Constant	0.0252	-0.0208	-0.0208
	(0.0773)	(0.0830)	(0.0827)
Observations	1,828	940	1,828
R-squared	0.074	0.065	0.079

Notes: This table illustrates the effects of household characteristics on the likelihood of adopting a formal savings account. Column 1 includes all 1,828 observations (both control and treatment) that did not own formal savings in 2008. Column 2 includes the control group, which was excluded from receiving any marketing of OIBM's van bank. Column 3 illustrates the "added effect" of treatment on household characteristics as they affect the likelihood of adopting formal savings. Column 2 represents characteristics of the *innovators* and and column 3 represents the *early adopters.* Robust standard errors are reported in parentheses; adjusted for 118 clusters in column 1, for 60 clusters in column 2, and 58 clusters in column 3. ***indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

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