



**FINANCIAL SERVICES ASSESSMENT**

**Measuring Spillover Impacts of  
Formal Savings in Rural Malawi:**  
*Effects on the most Vulnerable Non-  
Users*

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*Financial Services Assessment* project can be found on  
the web at <http://www.fsassessment.umd.edu/>

## ABOUT THE PROJECT

The *Financial Services Assessment* project is designed to examine the impact of financial services on the lives of poor people across the developing world. This project is funded by the Bill & Melinda Gates Foundation, which is committed to building a deep base of knowledge in the microfinance field. The IRIS Center at the University of Maryland, College Park, together with its partner, Microfinance Opportunities, will assess a diverse range of innovations in financial services. The results of this project will shed light on the design and delivery of appropriate financial products and services for the poor and the potential to scale up successful innovations to reach larger numbers of low-income households.



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## REPORT SERIES

This report is part of a series that will be generated by the *Financial Services Assessment* project. The reports are disseminated to a broad audience including microfinance institutions and practitioners, donors, commercial and private-sector partners, policymakers, and researchers.

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## ABSTRACT

Despite numerous impact analyses of microfinance and its effects on poverty, the spillover effects on the very poor of expanding financial services remain largely unknown. Little is understood about changes in pre-existing village practices of inter-household assistance as the community begins adopting newly available financial services, or about the resulting impacts on the poorest households, who are typically among the last to start using formal financial services. Using a panel dataset of over 2,000 households collected during a rapid expansion of formal savings services in Central Malawi, this paper shows that exogenously boosting use of formal savings in rural areas sharply increases inter-household transfers during peak periods of hunger. The impact on transfer receipts is strongest among the poorest households, a *de facto* financial services-ineligible group, among whom the effects are also linked to significant changes in welfare. These impacts on non-users indicate broader effects of formal savings than would be suggested by focusing only on service-users. The findings also highlight the sensitivity of traditional safety nets and welfare outcomes among the most vulnerable to expansion of formal services.

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## ACRONYMS

|         |   |
|---------|---|
| BMGF    | Bill & Melinda Gates Foundation             |
| CGAP    | Consultative Group to Assist the Poor       |
| FBPAs   | Field-Based Promotional Assistants          |
| FINCOOP | Finance Cooperative Ltd.                    |
| HFIAP   | Household Food Insecurity Access Prevalence |
| HFIAS   | Household Food Insecurity Access Scale      |
| MFI     | Microfinance Institutions                   |
| MIS     | Management Information Systems              |
| MK      | Malawi Kwacha                               |
| MRFC    | Malawi Rural Finance Company                |
| NGO     | Non- Governmental Organization              |
| OIBM    | Opportunity International Bank in Malawi    |
| PAT     | Poverty Assessment Tool                     |
| PPP     | Purchasing Power Parity                     |
| SACCOs  | Savings and Credit Cooperatives             |

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## Executive Summary

For microfinance programs and policy interventions in developing economies, spillover impacts on those not directly affected by the program may be just as important as direct effects, even over the immediate term.

This paper, using data from Malawi, examines the spillover effects of formal savings from users onto non-users. In doing so, it shows that formal financial services can strongly interact with pre-existing informal safety nets for the poorest households and affect their welfare outcomes. The short-term impacts found on non-users indicate microfinance can have much broader effects than suggested by studies which focus exclusively on service-users themselves.

In 2007, the Bill & Melinda Gates Foundation provided funding to Opportunity International Bank in Malawi (OIBM) for a fully-equipped bank on wheels to service the rural areas. Introduced in late 2007, the bank rapidly expanded access to formal services, particularly savings, in three of the largest districts of central Malawi: Lilongwe, Mchinji and Dedza. This paper takes advantage of the expanded access to formal savings provided by the OIBM mobile bank and is based on quantitative panel data from 2,006 randomly selected households in three rural districts of Central Malawi, collected in two periods: the first during February and March of 2008, the second during the same period of 2010.

A cluster randomized matched-pair encouragement design that randomly assigned information on formal financial services at the community level is used to examine the impacts on the poorest of the poor of expanded access to financial services. Specifically,

- What happens to traditional forms of social safety nets and informal insurance as villagers begin to use formal savings?
- How are *non*-users in a village community affected when other community members begin using formal savings?
- How is the ability of the most vulnerable households to cope with food insecurity and illness affected by the expanded use of formal savings?

## Study Findings

The introduction of formal savings in rural Malawi has a substantial positive immediate-term effect on inter-household wealth flows during the pre-harvest “hungry season”.<sup>1</sup>

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<sup>1</sup> Most areas of Malawi have a single growing season, and most farming households receive the majority of their annual income during one single period of the year – the harvest period, which in Central Malawi usually lasts from late April into June. Household resources are often stretched to their thinnest during the months leading up to the harvest, making this the most likely period for people to go for extended periods without sufficient food, particularly in the poorest households.

## Effect on Receipts of Cash Gifts

In treatment communities, where savings-use was experimentally boosted, the proportion of those receiving cash-gifts from other households during the hungry season is nearly 50% higher than in control communities (a 10 percentage-point difference). When restricting to the most vulnerable, whose extreme poverty makes them essentially ineligible to access formal finance, the proportion of households receiving cash gifts is 180% higher in treated communities than in the control communities (an 18 percentage-point difference).

Using the treatment as a source of exogenous variation, instrumental variables estimates indicate that, for every one percentage-point increase in the proportion of local households using formal savings, the worst-off households in the community experience about a three percentage-point increase in the probability of receiving a cash gift.

## Effect on Access to Informal Loans

In addition, over the first two years of expanded savings access (from 2008 to 2010), the most vulnerable households in treated communities experience an increase in the probability of receiving loans from friends and relatives, while the most vulnerable in control communities experience a slight reduction. The proportion of highly vulnerable households receiving loans from friends and relatives increases by 16 to 22 percentage points in treated villages, relative to comparable households in control areas, the effect stronger in more remote villages. This effect is very similar in scale to the increase observed for cash gifts (18 percentage points).

## Welfare Impacts on the Poorest Non-Users

The increases in assistance-receipts are linked with significant welfare impacts. The worst-off households in treatment communities, relative to comparable households in control communities, experienced improvements in at least three key welfare indicators over the two-year period – food security severity, food security prevalence, and health status:

- Likelihood of exiting the worst food-security category to enter one of the three less severe categories over the two-year period increases by 12 to 16 percentage points;
- The worst-off also experience a 1.3 to 1.4 reduction in a continuous food-insecurity score, representing a 10-12% improvement over baseline values for this food-security indicator;
- The worst-off households experienced a reduction of 12 to 17 percentage points in the likelihood of reporting any members of the household as recently unwell..

The study shows that the immediate-term indirect impacts of microfinance on the worst off in central Malawi can be large. While the spillover effects in this case are strong and positive, care should be taken when generalizing to other contexts, where negative effects could occur.

## I. Introduction

For microfinance programs and policy interventions in developing economies, spillover impacts on those not directly affected by the program may be just as important as direct effects, even over the immediate term.

The indirect impact of expanded formal savings services on inter-household transfers and informal insurance among the poor has been conceptually explored in a handful of studies (Ligon, Thomas, and Worrall, 2000; Foster and Rosenzweig 2000). Most studies suggest an increase in local formal savings-use is likely to lead to a reduction of inter-household wealth flows as households increasingly exit informal support networks. This notion is supported by a series of correlative studies which observe that a stronger presence of formal capital markets in villages is often accompanied by weaker informal insurance institutions and safety nets (e.g. Townsend 1995a, 1995b).

The impact of formal savings on a household's decision of whether to provide financial assistance to another household, however, can depend on whether assistance receipts are part of informal contracts of mutual assistance (as is often assumed), or instead considered as charitable gifts to a family member or friend in need. For assistance which falls into the latter category, economic theory predicts that the increased return on savings that may result from the introduction of formal accounts can have either a positive or negative effect on the decision to provide assistance to another. In the face of the ambiguous predictions of theory, there remains little rigorous causal evidence on what will happen to the safety nets of the worst-off as wealthier members of village communities start using formal savings and alter their assistance-practices.

This paper, using data from Malawi, examines the spillover effects of formal savings from users onto non-users. In doing so, it shows that formal financial services can strongly interact with pre-existing informal safety nets for the poorest households and affect their welfare outcomes. The short-term impacts found on non-users indicate microfinance can have much broader effects than suggested by studies which focus exclusively on service-users themselves.

The analysis of indirect effects takes advantage of rapidly expanded access to formal savings in poor, rural areas of the country. In 2007, the Bill & Melinda Gates Foundation provided funding to Opportunity International Bank in Malawi (OIBM) for a fully-equipped bank on wheels to service more remote areas. Introduced in late 2007, the bank rapidly expanded access to formal financial services, particularly savings, in three of the largest districts of central Malawi: Lilongwe, Mchinji and Dedza.

Identifying causal effects of expanded local access to financial services on the poorest of the poor relies on a cluster matched-pair encouragement design that randomly assigned information on formal financial services at the community level. The IRIS Center at the University of Maryland, in collaboration with OIBM, designed an intensive information campaign to disseminate information about OIBM to increase use of its savings services. Between April 2008 and December 2010, Field-Based Promotional Assistants (FBPAs)



visited villages, made contact with potential clients, and disseminated information about the products and services offered by the mobile bank. The information campaign was conducted in one randomly selected enumeration area from each of 56 pairs, so that 56 randomly selected enumeration areas had the campaign while the households in 56 matched enumeration areas did not. This paper uses data from a panel of 2,006 households gathered by the IRIS Center in treatment and control areas. The data were collected in two periods: the first during February and March of 2008, the second during the same period of 2010.

Specifically, the paper addresses the following:

- What happens to traditional forms of social safety nets and informal insurance as villagers begin to use formal savings?
- How are *non*-users in a village community affected when other community members begin using formal savings?
- How is the ability of the most vulnerable households to cope with food insecurity and illness affected by the expanded use of formal savings?

The findings of the study should help OIBM better understand its overall net effects on those communities it serves, raising awareness of its impact not only on clients but also on non-clients, through its effects on local social safety nets. More broadly, the findings here provide valuable lessons for rural microfinance throughout the developing world, as they demonstrate the sensitivity of traditional safety nets to the introduction of formal financial services.

## II. The Study Methodology

It was not logistically feasible to directly randomize access to OIBM's service. In addition, randomizing access might lead to perceptions of discrimination at the individual or community level and changes in inter-household interactions unrelated to use of financial services. This would confound interpretation of impacts. Instead, drawing from focus group discussions on how people obtain trustworthy information from sources outside the village, an information campaign was designed by the IRIS center in collaboration with OIBM to serve as a source of exogenous variation in service-use.

The campaign was administered in 56 enumeration areas (clusters of 3-4 villages), randomly selected from 56 matched pairs. Its backbone consisted of periodic visits to villages located in these enumeration areas from a paid Field-Based Promotional Assistant (FBPA) via foot and bicycle. The FBPA brought informational materials on the bank's services, talked with community members, and left posters and other promotional materials in each village assigned to them. These villages are referred to throughout the paper as treatment villages. Villages located in the set of 56 similar enumeration areas (the remaining halves of each pair) did not receive the intensive information. These are referred to throughout as control villages (refer to Nagarajan and Adelman, 2010, and Nagarajan, 2011 for more information on the information campaign).

The terms “treated” and “control” in this paper refer to the intensity of exposure to information that encouraged adoption of formal savings. The “treatment” is actually a randomly assigned intention-to-treat at the community-level, which serves as an instrument for increased local prevalence of formal savings, the true change whose effects are being studied. “Treated” refers to a village-cluster that was exposed to the savings encouragement. Instrumental-variables regressions are used to estimate the effect of the ultimate object of study – a one-unit increase in local prevalence of formal savings-use.

OIBM is a savings-led institution, and the first service available to new clients is a savings account. Access to formal credit through the mobile van operated by OIBM was not available to most communities. The information intervention thus served essentially as an encouragement to open a formal savings account with OIBM.<sup>2</sup>

## The Survey

A panel survey of randomly sampled households was conducted among the residents of rural communities in three districts in Central Malawi – Mchinji, Dedza and rural Lilongwe where the OIBM mobile bank has operated since August 2007.

The surveys were conducted in two rounds: 2008 for baseline and 2010 for end line. The data were gathered during the months of January to March in both rounds. The baseline data were gathered from 2,459 randomly selected households prior to the intensive information campaign in the three study districts. A follow-up survey was conducted from January to March of 2010, immediately after the information campaign ended in December 2009. The end line survey was able to locate and interview 2,006 of the same households that were included in 2008 survey.

Survey respondents satisfied the major criteria often used by MFIs to identify eligible clients: adults engaged in some income earning activity and those that have lived in the village for at least a year.<sup>3</sup> Most microfinance institutions (MFIs) in Malawi only include adults above 18 years of age that are engaged in some economic activity, and also require proof of residency of over a year and Malawian citizenship.

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<sup>2</sup> Access to formal credit from the mobile bank is expanded quite slowly in the areas it serves. It is done on a village-by-village basis, and involves significant resources – several visits to a village by a bank officer, meetings with prospective borrowers and village leaders, risk assessments, etc. The banking officers explain that this process, which takes 1-2 months, targets areas closest to the bank’s stop, and those with the greatest economic activity.

<sup>3</sup> All randomly sampled households automatically met the criteria of having at least one adult engaged in production activities. Resampling due to encounters with residents living in the village under a year was extremely rare.

| <b>Table 1: Selected Baseline Characteristics of Sampled Households in the Panel Sample</b> |                      |                        |              |      |
|---|----------------------|------------------------|--------------|------|
|   | <b>Control Areas</b> | <b>Treatment Areas</b> | <b>Total</b> |      |
| <b>Total households</b>   | <b>995</b>           | <b>1,011</b>           | <b>2,006</b> |      |
| By Gender of household head   |                      |                        |              |      |
|   | Female               | 158                    | 139          | 297  |
|   | Male                 | 837                    | 872          | 1709 |
| By distance from mobile bank stop   |                      |                        |              |      |
|   | Less than 5 km       | 203                    | 195          | 398  |
|   | 5 – 7 km             | 173                    | 217          | 390  |
|   | 7 – 12 km            | 504                    | 451          | 955  |
|   | More than 12 km      | 118                    | 145          | 263  |
| Note: See Sharma and Nagarajan, 2011 for more details                                       |                      |                        |              |      |

## Survey Instrument

The survey instrument used to gather data for the study was a 30-page structured questionnaire with eleven sections including household demographics, economic activities, poverty status, food security status, physical assets, income, use of financial services, shocks experienced by households, mechanisms used to cope with the shocks, and social capital. The instrument was pretested in the field prior to conducting the survey. It was also translated into Chichewa, the local language.

The food security status of the households is examined using food security indices that provide an estimate of household welfare based on food consumption in a month prior to the survey. This data provides an indicator of household welfare during the time of greatest financial stress of the year for many households, when access to and use of financial services can be critical. Our food security measures are a modified version of the USAID Food Insecurity Access Scale (HFIAS) for Measurement of Food Access (Coates, Swindale, and Bilinsky, 2007). The HFIAS provides several types of food security indicators, which we have modified to fit the Malawi context, based on a set of questions about the frequency of food insecurity “domains” in the previous month. Responses to these questions were used to group households according to the Household Food Insecurity Access Prevalence (HFIAP) constructions. The HFIAP categorizes households into four categories: food secure, mildly food insecure, moderately food insecure, and severely food insecure. Moderately and severely food insecure households have problems with adequate food intake (or serious lack of access to quality food). Mildly food insecure households usually have enough food, but may have poor food quality at times.

While the baseline questionnaire includes data on a broad range of financial services and transactions, detailed questions on inter-household transfers were not added to the questionnaire until the endline survey. The end line questionnaire included a section which collected information on wealth flows into the household from members of other households,

or out of the household to members of other households. Three types of wealth flows were considered – cash gifts, in-kind gifts, and help paying fees to third parties on behalf of someone else – such as helping to pay school fees or medical fees. (Questions gathering information on loans were present in both waves of the survey.) Data was gathered for transfers valued at 50 kwacha (about \$.30) or more, received over a 90-day recall period preceding the interview. The section included questions on information such as the number of recent transfers received (or given), amounts for recent transfers, relative wealth status of the giver (or recipient), and time-traveled to request assistance.<sup>4</sup>

## Defining the Vulnerable

Households are classified by level of vulnerability to hunger and low welfare outcomes using baseline (2008) variables on food-security status, assets, education, distance from major roadways and trading centers, and gender of household head. The primary indicator is the household's 2008 food-security status. The survey included a slightly modified version of the USAID Household Food Insecurity Access Scale for Measurement of Food Access (Coates, Swindale, and Bilinsky, 2007). Food insecurity scores are generated by examining the frequency with which each of 7 possible food-insecurity conditions occurred in the 30 days preceding the interview. Recall that, as the survey was conducted during the pre-harvest “hungry” season, these scores reflect conditions during the most intense period of vulnerability to low food-intake.

The Household Food Insecurity Access Prevalence (HFIAP) score, largely reflecting caloric intake, groups households into 4 categories – food secure, mildly food insecure, moderately food insecure, and severely food insecure. Mildly food insecure households usually have enough food, but may have poor food quality at times. Moderately and severely food insecure households have problems with adequate food intake (or serious lack of access to quality food). The baseline HFIAP score helps identify vulnerable households.

This measure by itself, however, is too broad to identify those households of highest vulnerability – nearly 40% of the sample falls into the highest food-insufficiency category (HFIAP=4). In addition, random variability in consumption introduces noise into this as a measure of vulnerability since some households may simply have had a bad year during the baseline and were not as vulnerable on average as this simple measure would predict. To sharpen the indicator of high vulnerability, the following are therefore added: distance from the mobile bank stop (a proxy for distance from major roads), possessing a cell-phone (a proxy for wealth-level), literacy, and whether the household head is female. Literacy is defined as whether the household has any members that can read. Table 2 shows the definition for each classification, and indicates the number of households in the final panel in each category. Categories A-D are mutually exclusive; after category D, the following categories are successive subsets of each other.

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<sup>4</sup> Interviewers were intensively trained on the difference between assistance that is a “gift” and that which is a loan, the latter carrying with it an expectation of repayment of some type of wealth in the future. In addition, the module added to the 2010 survey with questions on gifts came after a section in which detailed information was already gathered on loans.

The pivotal group for the analyses which follow is formed by the households in category G. These households comprise a group which is *de facto* ineligible to use formal savings, as the fixed costs of opening a savings account, combined with the minimum balance requirements, are too high relative to their cash income and savings potential.<sup>5</sup> These households also represent those who are most susceptible to very low welfare outcomes and among the most sensitive to changes in local safety nets.

| <b>Vulnerability Category</b>  | <b>Definition</b>   | <b>HHs Control</b> | <b>HHs Treated</b> |
|--|---|--------------------|--------------------|
| Category A   | 2008 HFIAP = 1<br>Household classified as “food-secure” in 2008.  | 77                 | 80                 |
| Category B   | 2008 HFIAP = 2<br>Classified as “mildly food-insecure” in 2008.   | 61                 | 55                 |
| Category C   | 2008 HFIAP = 3<br>Classified as “moderately food-insecure” in 2008.   | 417                | 413                |
| Category D   | 2008 HFIAP = 4<br>Classified as “severely food-insecure” in 2008.   | 443                | 463                |
| Category E   | 2008 HFIAP = 4, 3+km<br>Classified as “severely food-insecure” in 2008, located 3 or more kilometers from the bus-bank stop.  | 429                | 434                |
| Category F   | 2008 HFIAP = 4, 3+km, no cell phone<br>Classified as “severely food-insecure” in 2008, located 3 or more kilometers from the bus-bank stop, does not have cell-phone  | 415                | 427                |
| Category G   | 2008 HFIAP = 4, 3+km, no cell phone, illiterate<br>Classified as “severely food-insecure” in 2008, located 3 or more kilometers from the bus-bank stop, does not have cell-phone, and either:<br><i>(i) no HH member is literate in Chichewa; or (ii) household head is female.</i> | 141                | 131                |
| Note: A, B, C, and D are mutually exclusive. But E is a subset of D, F is a subset of E, and G is a subset of F. |   |                    |                    |

<sup>5</sup> For further discussion of the barriers to formal savings-use by the very poor, see Flory (2011).

### III. Treatment Effects on Local Formal Services Use

#### **Result 1: Adoption of formal savings accounts increases with treatment**

Table 3 shows the effect of the treatment to encourage savings on changes in household financial service-use. The results are obtained from a simple OLS regression of the decision to adopt (or quit) formal savings (or credit) on a dummy indicating assignment of the community to the information intervention, with fixed effects at the cluster-pair level, and standard errors clustered at the village-cluster level.<sup>6</sup>

The coefficient estimates for the treatment dummy in columns 1 and 2 shows that the encouragement increased the percentage of households that adopted formal savings by about 3.1 percentage-points overall, and by 3.7 percentage points among clusters three or more kilometers from the bank's stop. Both effects are highly significant. This represents a boost of 33% and 43%, respectively, to adoption rates, over control villages.

The estimated coefficients on the treatment dummy for columns 3 and 4 show that the treatment had no effect on whether households stopped using formal savings, while the estimates in columns 5 through 8 indicate no effect of the treatment on changes in use of formal credit.<sup>7</sup>

#### **Result 2: Increases in the total proportion of households using formal savings services is higher in treatment areas farther from the capital city**

Table 4 reports results on the treatment's effect from a different perspective – its impact on changes in the overall proportion of households in the community using formal services.

Columns 1 and 2 indicate the treatment's impact on the overall change in the proportion of households in a village cluster with formal savings when combining all three districts is not significantly different from zero. However, columns 3 and 4 show that when restricting to the 76% of the sample living in districts further from the capital, the treatment effect is significant, resulting in a 2.8 percentage-point increase overall, and a 3.2 percentage-point increase when restricting to the more remote village clusters. This represents a boost in prevalence of formal saving by 23% and 31%, respectively, over the control villages.

The coefficient estimates reported in columns 5-8 show that the treatment had no effect on the overall proportion of households using formal credit.<sup>8</sup>

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<sup>6</sup>The fixed effects account for the possibility that pairs experience the van-bank's expansion of formal services access differently. For example, villages in pairs closer to the bank-stop may be more responsive to access expansion than those in pairs further away, regardless of whether they are encouraged or non-encouraged.

<sup>7</sup> For a more in-depth treatment of this analysis and the accompanying regressions, see Flory (2011)

<sup>8</sup> See Flory (2011) for a more detailed discussion.

### Result 3: Treatment did not induce adoption of formal savings among the highly vulnerable population

As stated earlier, we hypothesize that the most vulnerable households are essentially ineligible to take advantage of increased formal savings access due to high fixed costs, low cash incomes, and restricted ability to save. We test this hypothesis by examining whether the information campaign encouraged the vulnerable households to open savings accounts.

Our results, based on the sample of 272 households classified as highly vulnerable (group G), shows that the information treatment did not induce formal savings use among this group (see Appendix 1). In addition, a separate set of regressions which uses the sample of the non-vulnerable households (all those not in category G) shows higher magnitudes and significance of the treatment's effect on the change in percentage of households using formal savings than when looking at the entire sample overall (see Appendix 2).

| VARIABLES     | Formal Savings                      |                         |                                     |                         | Formal Credit                       |                         |                                     |                         |
|---------------|-------------------------------------|-------------------------|-------------------------------------|-------------------------|-------------------------------------|-------------------------|-------------------------------------|-------------------------|
|               | Start Formal Savings                |                         | Stop Formal Savings                 |                         | Start Formal Credit                 |                         | Stop Formal Credit                  |                         |
|               | (1)<br>All<br>Distances<br>Has Svgs | (2)<br>3+km<br>Has Svgs | (3)<br>All<br>Distances<br>Has Svgs | (4)<br>3+km<br>Has Svgs | (5)<br>All<br>Distances<br>Has Loan | (6)<br>3+km<br>Has Loan | (7)<br>All<br>Distances<br>Has Loan | (8)<br>3+km<br>Has Loan |
| Treatment     | 0.0306**<br>(0.0288)                | 0.0371**<br>(0.0129)    | 0.0441<br>(0.490)                   | 0.0298<br>(0.655)       | -0.00708<br>(0.416)                 | -0.00693<br>(0.430)     | 0.00782<br>(0.948)                  | -0.0752<br>(0.619)      |
| FSAV in 2008  | N                                   | N                       | Y                                   | Y                       |                                     |                         |                                     |                         |
| FCRED in 2008 |                                     |                         |                                     |                         | N                                   | N                       | Y                                   | Y                       |
| Observations  | 1,784                               | 1,593                   | 217                                 | 169                     | 1,860                               | 1,651                   | 120                                 | 93                      |
| R-squared     | 0.064                               | 0.066                   | 0.270                               | 0.308                   | 0.038                               | 0.035                   | 0.396                               | 0.419                   |

Note: Cluster-Robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All regressions include cluster-pair fixed effects. Columns 1 & 2 restrict the sample to households without formal savings in 2008, columns 3 & 4 restrict to those with formal savings. Columns 5 & 6 restrict to households without current formal loans in 2008, columns 7 & 8 to those with formal loans.

| VARIABLES    | Change in Proportion of Households with Formal Savings |                                |  |                             | Change in Proportion of Households with Formal Credit |                                 |  |                                 |
|--------------|--|--------------------------------|--|-----------------------------|---|---------------------------------|--|---------------------------------|
|              | All Districts  |                                | Excluding Lilongwe                     |                             | All Districts   |                                 | Excluding Lilongwe                         |                                 |
|              | (1)<br>All<br>Distances<br>Chg in<br>FSAV              | (2)<br>3+ km<br>Chg in<br>FSAV | (3)<br>All<br>Distances<br>Chg in FSAV | (4)<br>3+ km<br>Chg in FSAV | (5)<br>All<br>Distances<br>Chg in<br>FCRED            | (6)<br>3+ km<br>Chg in<br>FCRED | (7)<br>All<br>Distances<br>Chg in<br>FCRED | (8)<br>3+ km<br>Chg in<br>FCRED |
| Treatment    | 0.0143<br>(0.291)                                      | 0.0185<br>(0.211)              | 0.0283*<br>(0.0695)                    | 0.0323*<br>(0.0522)         | -0.00250<br>(0.820)                                   | -0.00414<br>(0.689)             | 0.00357<br>(0.793)                         | -0.000404<br>(0.974)            |
| Observations | 2,001  | 1,762                          | 1,523                                  | 1,334                       | 1,978   | 1,877                           | 1,506                                      | 1,439                           |
| R-squared    | 0.036  | 0.034                          | 0.038                                  | 0.038                       | 0.041   | 0.050                           | 0.044                                      | 0.054                           |

Cluster-Robust p-value in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All regressions include cluster-pair fixed effects.

**Result 4: Treatment does not affect the savings balance in formal accounts, conditional on having an account.**

The survey collected data on the current balance of accounts at the time of the interview. The overall average balance of formal accounts is MK 11,432 in the endline. The dispersion is high, though, with the median reported value at MK 2,000.<sup>9</sup> Compared to the typical costs of opening an account (which are on the order of MK 1,500), the median balance seems low. This is likely attributable to the fact that the interview took place during the pre-harvest hungry season, when household resources are running low, and account-holders may need to draw down accounts. It also suggests that, for at least some formal-savers, the accounts may be serving more as a within-year wealth storage and management device than as a long-term wealth accumulation vehicle.

Looking across the information-treated and control communities, the mean and median are slightly higher in the control communities. This is actually what we would expect if the wealthiest households are the most likely to have formal accounts absent encouragement, and if the treatment is most effective among individuals that are just a little less wealthy. In control communities, the mean account balance is MK 12,486, and the median is MK 2,500; while in the treated communities the mean is MK 10,692 and the median is MK 2,000. However, the differences are not statistically significant, either through a two-sided t-test, or a Mann-Whitney U-test.

<sup>9</sup> These figures are lower than the balances reported for formal accounts reported in the baseline, for which the average was MK 16,290 and the median MK 4,000. This may be a sign that households of lower wealth strata are starting to use formal savings as a result of the formal services expansion through the mobile bank.



## IV. Assistance Receipts: Differences across Treated and Control Communities

The analysis focuses on the effects of local formal savings rates on *receipts* of assistance, particularly by the most vulnerable households. This is due mainly to the study's focus on empirically testing for the presence of *indirect* effects, and the indirect effects on the worst-off households in particular.

The data used to test for the effects of exogenously increased formal savings-use contain information on transfers received during the pre-harvest hungry season, the time of year when household resources are most restricted, and requests for emergency assistance are arguably the highest. This is the period during which transfers received are likely to have the highest positive marginal impacts.

While the baseline includes data on a broad range of financial services and transactions, detailed questions on inter-household transfers were not added to the questionnaire until the endline survey. Therefore, we begin discussion of the impacts of formal savings adoption on inter-household transfers with a cross-sectional analysis of the endline data. Since the information treatment was randomly assigned, it is valid to interpret relationships between the treatment and household outcomes as causal. However, the full panel does contain limited information for both years on certain wealth transfers that are similar to the gifts-information captured only in the endline. Later analysis thus uses a difference-in-differences estimation of these related types of transfers to explore panel results which also serve as a robustness check for the results presented in this section.

**Result 1: Receipt of cash gifts during the hungry season is significantly more prevalent in the treated villages than in the control villages: Both in the likelihood of (i) ever receiving a cash gift; and (ii) receiving multiple cash gifts is higher in treated areas.**

We gathered data on cash gifts of 50 kwacha (about \$.30) or more, received over a 90-day recall period preceding the interview. The vast majority of these gifts are from within the local community, as about 80% of the reported round-trip travel times are below 30 minutes (implying one-way trips of a maximum 5-15 minutes)<sup>10</sup>. As the standard mode of transport in these areas is usually walking, sometimes cycling, most of these transfers are clearly between households within the same village, or at furthest from neighboring villages.

Table 5 shows simple comparisons of the percentage of households receiving cash gifts in the control and treated clusters – overall and by household vulnerability type.<sup>11</sup> Before analyzing separately by vulnerability level, we already see a large difference in receipts of cash gifts

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<sup>10</sup> The question was asked so as to include time spent at the location of where they were requesting or receiving the gift. That is, it is a total time-cost figure, inclusive of time spent communicating with anyone providing assistance.

<sup>11</sup> Statistical significance for the figures in this table are based on a two-sided t-test.

from other households across treated and control areas. While 20.8% of all households in the control areas received one or more cash gifts in the last 90 days, 30.6% of those in the treated areas did. (Significant at the 0.01 level). This represents a difference of almost 50%. In addition, while 7.4% of all households in the control areas received more than one cash gift, 12.0% of all those in the treated areas received multiple cash gifts – a difference of 62%. This difference is also highly significant ( $p < .001$ ).

| <b>HH Type<br/>(Based on 2008 Characteristics)</b> | <b>Control Clusters<br/>(#HHs)</b> | <b>Treated Clusters<br/>(#HHs)</b> | <b>Difference</b>          |
|--|------------------------------------|------------------------------------|----------------------------|
| <b>All HHs</b>                                     | 20.8%<br>(995)                     | 30.6%<br>(997)                     | 9.8% ***<br>( $p=0.000$ )  |
| <b>A<br/>(Food-Secure)</b>                         | 28.6%<br>(77)                      | 32.9%<br>(79)                      | 4.3%<br>( $p=0.560$ )      |
| <b>B<br/>(Mildly Food-Insecure)</b>                | 27.9%<br>(61)                      | 36.4%<br>(55)                      | 8.5%<br>( $p=0.331$ )      |
| <b>AB<br/>(Secure &amp; Mildly Insecure)</b>       | 28.2%<br>(138)                     | 34.3%<br>(134)                     | 6.1%<br>( $p=0.282$ )      |
| <b>C<br/>(Moderately Insecure)</b>                 | 22.6%<br>(416)                     | 33.0%<br>(406)                     | 10.4%***<br>( $p=0.0008$ ) |
| <b>D<br/>(Severely Insecure)</b>                   | 16.8%<br>(441)                     | 27.4%<br>(457)                     | 10.6% ***<br>( $p=.0001$ ) |
| <b>E<br/>(D + No Cell)</b>                         | 16.2%<br>(427)                     | 27.1%<br>(428)                     | 10.9% ***<br>( $p=.0001$ ) |
| <b>F<br/>(E + 3 or more km)</b>                    | 16.0%<br>(413)                     | 27.5%<br>(412)                     | 11.5% ***<br>( $p=.0001$ ) |
| <b>G<br/>(F + Non-literate or Female-head)</b>     | 9.9%<br>(141)                      | 27.7%<br>(130)                     | 17.8% ***<br>( $p=.0001$ ) |

Note: Reported p-values are based on two-sided t-tests. The number of households in each category above is slightly smaller than the actual number of sampled households in each category reported in Table 2, as there are a few randomly missing responses for the cash gift receipt question.

**Result 2: The difference in prevalence of cash-gift receipts between treated and control areas increases as vulnerability increases. The difference is negligible among the best-off households, but highly significant among the worst-off households. This is true for both receiving any gift, and receiving multiple gifts.**

The figures in Table 5 also show that the relationship between the treatment and incidence of cash-gift receipts depends heavily on household vulnerability level. When we restrict our

focus to the least vulnerable groups, for example, the difference between treated and control areas in cash gift receipts attenuates substantially. Among those households that were either food-secure (category A) or just mildly food insecure (category B) in 2008, the percentage of households receiving at least one cash gift is not significantly higher in the treated villages than in the control villages ( $p=.282$ ).

The difference between treated and control areas grows consistently higher as we move towards indicators of increasing vulnerability. The amount by which the percentage of households receiving gifts is higher in treated than control areas is only 4.3% among the category A households (not significant), and 8.5% among category B (not significant). The difference grows to 10.4% among category C households, 10.6% among category D, 10.9% among category E, 11.5% among category F, and 17.8% among Category G – all of which are highly significant (at the .01 level or higher).

Looking at the *percentage* changes in the proportion of households receiving gifts in moving from control to treated (rather than just the change in the proportions), the pattern of increases is even more striking. Gift receipts in treated areas are only 14% more common among the A-category, and 33% more common among the B-category (neither significant). The percentage difference grows to 48% among the C-category, 62% among the D-category, 69% E-category, 71% among the F-category, and 180% among the G-category.

***Box. Does the entrance of formal savings change sharing behaviors among villagers?***

Natsalira Anana, a widow and care-taker of four children in a treated village in Dedza district, says that people in her village help each other more than they did 2 years ago (before the expanded access to formal savings). For example, when she asks for help, she is now given more opportunities to engage in some casual farm-labor, in exchange for cash assistance.

Michael Chimutu, head of one of the better-off households in Nkanganya, another treated village, recently began using formal savings. Since then, he says, he has been giving more cash help to friends and relatives. He attributes this to the small tea-shop he began since opening the account. “Now that I’m doing business, money is often around the corner. So, when people ask me, I know I can give.”

Mr. Chimutu comments that, in general, people in the community seem to help each other more than two years ago, before the expansion of savings access. “Nowadays,” he explains, “there are more activities that are money-oriented, so there are more people who help others.”

### **Impact on the De Facto Ineligibles**

We now focus on the highest vulnerability category (group G), which consists of households that were highly food insecure in 2008 according to the HFIAP scale, live in communities more than 3 kilometers from the bank-stop, and do not possess a mobile phone. In addition, they either have no literate household members, or are female-headed.

Restricting attention to the highest vulnerability group simplifies the interpretation of any causal effects as deriving from *indirect* effects of local formal savings usage, rather than direct effects from own-use of formal savings. As discussed above, it is assumed that the minimum balance and fixed costs of opening a formal savings account are too high to be

affordable by the poorest households.<sup>12</sup> This group is therefore assumed to not have access to formal savings, making them a *de facto* “ineligible” group.<sup>13</sup>

Very few group G households use formal savings. Only 8 households (3.2%) of this group had formal accounts in 2010, 6 of which (2.4% of the entire group) started using formal savings between 2008 and 2010. Any effects on group G households of local formal savings adoption rates therefore cannot be caused by direct effects of having an account, but are instead attributable to indirect effects of others in the community having accounts.

Table 6 reports marginal effects from a set of Probit regressions to help clarify the findings reported in Table 5. These regressions account for intra-cluster correlation within communities, analyze how the effect changes with distance from the bank-stop, and examine whether the results are sensitive to excluding Lilongwe district. The dependent variable is a 0-1 indicator for whether a household received a cash gift. Results are reported for the entire sample, and then restricting to just the highly vulnerable category. Errors are clustered at the village-cluster level.<sup>14</sup>

The main conclusions are unaltered by accounting for intra-cluster correlation, and are the same as those based on the simpler tests presented in Table 5. Among all vulnerability categories, the information treatment increases the percentage of households in the cluster receiving a cash gift by about 10 percentage points, while it increases the percentage of highly vulnerable households receiving a cash gift by about 18 percentage points. Both estimates remain highly significant. In addition, we find evidence that the effect is slightly stronger in more remote communities (where the treatment has a stronger effect on savings adoption). Finally, note that the results are nearly identical when the sample is restricted to Dedza and Mchinji districts.

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<sup>12</sup> Even in cases where a formal account may be technically within the range of affordability for a very poor household, the fixed costs associated with opening the account should be high enough to cause total returns to drop below traditional alternatives for low deposit amounts.

<sup>13</sup> The classification of this group as ineligible lies in the spirit of Angelucci et. al. (2009), who analyze the indirect impact of Mexico’s welfare program, Progresa, on households not eligible to participate in the program.

<sup>14</sup> Pair-level fixed effects are not included here, as this is a Probit. Appendix 3 shows their absence here is inconsequential. The table in Appendix 3 reports results from a set of linear regressions for which the conclusions are almost identical to those of the Probit estimations. The results of the linear estimations are unaltered by the inclusion or omission of pair fixed effects. See Appendix 3 for further discussion.

| VARIABLES    | All Household Types                    |                            |  |                            | Vuln HHs (G)                           |                            |  |                            |
|--------------|--|----------------------------|--|----------------------------|--|----------------------------|--|----------------------------|
|              | All Districts                          |                            | Excluding Lilongwe                     |                            | All Districts                          |                            | Excluding Lilongwe                     |                            |
|              | (1)<br>All<br>Distances<br>Rcv Csh Gft | (2)<br>3+km<br>Rcv Csh Gft | (3)<br>All<br>Distances<br>Rcv Csh Gft | (4)<br>3+km<br>Rcv Csh Gft | (5)<br>All<br>Distances<br>Rcv Csh Gft | (6)<br>3+km<br>Rcv Csh Gft | (7)<br>All<br>Distances<br>Rcv Csh Gft | (8)<br>3+km<br>Rcv Csh Gft |
| Treatment    | 0.0979***<br>(5.57e-06)                | 0.110***<br>(5.68e-07)     | 0.0885***<br>(0.000450)                | 0.0961***<br>(0.000201)    | 0.178***<br>(6.44e-05)                 | 0.180***<br>(0.000171)     | 0.166***<br>(0.00112)                  | 0.169***<br>(0.00247)      |
| No. Clusters | 112                                    | 96                         | 85                                     | 72                         | 99                                     | 91                         | 76                                     | 69                         |
| Observations | 1,992                                  | 1,754                      | 1,519                                  | 1,330                      | 271                                    | 250                        | 205                                    | 187                        |

Note: Cluster-robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0. The results above are for a set of Probit regressions, with estimated marginal effects reported. All regressions use errors clustered at the village-cluster level.

**Result 3: In contrast to the strong association between the treatment and the quantity of highly vulnerable households receiving gifts, tests on the size of gifts (amounts) show no significant differences across treated and control clusters.**

The data include amounts for the most recent gift received over the last 90 days. Across all households receiving gifts, the overall average amount reported is 620 kwacha (about \$4). However, amounts vary substantially by vulnerability category. The average gift amount is 1,250 kwacha among A-category households, 890 kwacha among B-category households, 540 kwacha among category C, 520 among category D, and 290 kwacha among category G.

Results for a linear regression on the amount of cash received, including pair-level fixed effects and standard errors clustered at the village cluster level are reported in Table 7 below. These results also show that, conditional on receiving a cash gift, amounts are no higher in the treated villages than in the control areas. When restricting the sample to those households that report receiving a cash gift and regress the amount of the gift on the treatment dummy, the dummy is not significant.

The results suggest the key decision of a benefactor household is not *how much* to give in a cash gift to a supplicant, but instead *whether* to give a cash gift at all. This may indicate that the gifts serve a similar purpose – for example, small amounts of emergency consumption-support. At the very least, there appear to exist commonly accepted gift amounts, which may vary by wealth of recipient.

**Table 7: Linear Regression of Amount of Cash-Gift Received (Conditional on Receiving a Cash Gift)**

| VARIABLES    | All Household Types                  |                             |                                      |                             | Vuln HHs (G)                         |                             |                                 |                             |
|--------------|--------------------------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|-----------------------------|---------------------------------|-----------------------------|
|              | All Districts                        |                             | Excluding Lilongwe                   |                             | All Districts                        |                             | Excluding Lilongwe              |                             |
|              | (1)<br>All Distances<br>Amt Csh Rcvd | (2)<br>3+km<br>Amt Csh Rcvd | (3)<br>All Distances<br>Amt Csh Rcvd | (4)<br>3+km<br>Amt Csh Rcvd | (5)<br>All Distances<br>Amt Csh Rcvd | (6)<br>3+km<br>Amt Csh Rcvd | (7)<br>All Dist<br>Amt Csh Rcvd | (8)<br>3+km<br>Amt Csh Rcvd |
| Treatment    | -173.8<br>(0.188)                    | -118.8<br>(0.361)           | -177.4<br>(0.297)                    | -100.0<br>(0.542)           | 113.0<br>(0.214)                     | 113.0<br>(0.201)            | 130<br>(0.208)                  | 130<br>(0.198)              |
| Constant     | 1,486***<br>(3.31e-07)               | 1,449***<br>(2.89e-06)      | 1,488***<br>(1.06e-06)               | 1,437***<br>(1.25e-05)      | 108.0<br>(0.195)                     | 108.0<br>(0.182)            | 96.67<br>(0.245)                | 96.67<br>(0.234)            |
| Observations | 512                                  | 435                         | 384                                  | 324                         | 50                                   | 47                          | 40                              | 38                          |
| R-squared    | 0.172                                | 0.194                       | 0.166                                | 0.192                       | 0.969                                | 0.968                       | 0.977                           | 0.977                       |

Note: Cluster-robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All regressions include cluster-pair fixed effects, errors clustered at the village-cluster level.

**Table 8: Reduced-Form Effect of Treatment on Percentage of Vulnerable Receiving In-Kind Gift or Help with Fees, Linear Regression**

| VARIABLES    | In-Kind Gifts                        |                             |                                      |                             | Help Paying Fees                     |                             |                                      |                             |
|--------------|--------------------------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|-----------------------------|--------------------------------------|-----------------------------|
|              | All Districts                        |                             | Excluding Lilongwe                   |                             | All Districts                        |                             | Excluding Lilongwe                   |                             |
|              | (1)<br>All Distances<br>Receive Gift | (2)<br>3+km<br>Receive Gift | (3)<br>All Distances<br>Receive Gift | (4)<br>3+km<br>Receive Gift | (5)<br>All Distances<br>Receive Help | (6)<br>3+km<br>Receive Help | (7)<br>All Distances<br>Receive Help | (8)<br>3+km<br>Receive Help |
| Mktg Dummy   | 0.0891<br>(0.103)                    | 0.0891<br>(0.100)           | 0.0599<br>(0.325)                    | 0.0599<br>(0.320)           | 0.0449<br>(0.206)                    | 0.0449<br>(0.202)           | 0.0105<br>(0.742)                    | 0.0105<br>(0.740)           |
| Constant     | -0.0594<br>(0.220)                   | -0.0594<br>(0.216)          | -0.0399<br>(0.385)                   | -0.0399<br>(0.380)          | -0.0299<br>(0.295)                   | -0.0299<br>(0.291)          | -0.00699<br>(0.746)                  | -0.00699<br>(0.744)         |
| Observations | 271                                  | 250                         | 205                                  | 187                         | 271                                  | 250                         | 205                                  | 187                         |
| R-squared    | 0.247                                | 0.227                       | 0.266                                | 0.237                       | 0.300                                | 0.299                       | 0.327                                | 0.329                       |

Note: Cluster-robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All regressions include cluster-pair fixed effects, errors clustered at the village-cluster level.

**Result 4: Increased cash assistance does not appear to be driven by a reduction in other forms of assistance or by a substitution of cash-assistance in place of other types of help.**

The data also include information on receipts of in-kind gifts, as well as occurrences of someone outside the household making payment to a third party on behalf of a household member. The latter might include, for example, paying for a household member's medical fees, maize-grinding fees, school fees, etc. Just as for the cash-gift variable, the question is limited to a recall period of 90 days, and only includes values that are greater than or equal to 50 kwacha (approx. \$0.30).

Table 8 reports results from linear regressions analogous to those reported for cash gifts. They show that the estimated effects of the treatment on the proportion of highly vulnerable receiving in-kind gifts or help paying fees are generally not significant, but the signs are positive.

This finding yields two important insights. On the one hand, it appears that *direct monetary transfers to households* are more sensitive to changes introduced by formal savings than non-monetary wealth transfers and monetary payments to a third party. More importantly, the fact that neither of these other two types of assistance decrease (and, if anything, appear to increase) suggests that the cash-gifts result is not simply caused by a substitution. It is not the case, for example, that vulnerable households are now receiving cash gifts in lieu of in-kind gifts, such as food. This is important, as it suggests the change in transfer behaviors induced by the boost in formal savings may improve welfares of the highly vulnerable, an issue taken up in greater detail in Section VII.

## V. Quantifying the Indirect Effects of Formal Savings on Assistance to the Most Vulnerable

The findings above show that the information intervention boosted local formal savings-use among the less vulnerable and significantly increased the proportion of the highly vulnerable receiving cash gifts from other households.

In order to quantify the effects of increased penetration of formal savings on transfer receipts by the vulnerable, a two-stage least squares regression is used. The percentage of highly vulnerable receiving cash gifts is regressed on the percentage of households in the community using formal savings, instrumenting for the latter with the randomly assigned information intervention.<sup>15</sup> The unit of observation in these regressions is the village-cluster, and the variables are therefore cluster-level aggregates. The dependent variable is the proportion of the given village cluster's category-G households that receive a cash gift. The chief regressor of interest is the proportion of households (among *all* households in the cluster) that report having one or more formal savings accounts, which is simply the cluster mean of the 0-1 variable indicating whether a household has a formal savings account. As this variable is likely to be endogenous, the instrument is used as a source of exogenous variation for causal inference.<sup>16</sup> The first stage is a simple linear estimation that regresses the percentage of households in the village cluster with formal savings on the dummy for treatment. The regression includes pair-level fixed effects, and uses heteroskedasticity-robust standard errors. The second stage is a simple cross-sectional Linear-IV, which regresses the percentage of category-G households that receive a cash gift on the predicted percentage of households in the cluster with formal savings. This regression includes pair-level fixed effects and Huber-White sandwich errors to account for heteroskedasticity.

Table 9 reports results from an instrumental variable (IV) estimation at both distance thresholds, with and without Lilongwe district.<sup>17</sup> Instrumenting for local formal savings prevalence to remove the endogeneity suggests that an unit increase in the percentage of households in the cluster using formal savings leads to a 2.4 point increase in the percentage of vulnerable households that receive a cash gift. When restricting to Dedza and Mchinji

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<sup>15</sup> Since the analysis is restricted to category-G households, any clusters that do not have category-G households are forcibly dropped. This results in dropping 13 village clusters, or 11% of the sample. Regressions of the instrument's effect on local formal savings and loans prevalence when these 13 clusters are excluded show that dropping them has little to no effect on the estimated effects of the information intervention. The intervention's estimated impact on local percentage of formal savers in the endline is still significant at the .01 to .05 level, depending on the subsample and specification. In addition, as before, the information intervention has no measurable effect on prevalence of formal credit. (For more detailed discussion of these results, see Flory, 2011.)

<sup>16</sup> Endogeneity of local formal savings-use has several possible sources. For example, integration into the modern economy may weaken norms for assisting other households (e.g. dilute traditional safety nets and informal aid networks), and may also simultaneously increase the probability of having formal savings. Communities whose residents are more integrated into modern life may therefore have higher formal savings usage rates, and lower gifts among non-users, but not due to an effect of formal savings on assistance.

<sup>17</sup> The variables have been scaled up so that they are in terms of percentage points (i.e. they are multiplied by 100).



districts, the magnitude of the effect grows to 3.2 percentage points. The effect is highly significant in all four subsamples.

Tables 9 and 10 show results for the same regressions, but instead where the response variables are (i) percentage of vulnerable households that received help paying fees or expenses to a third party; and (ii) percentage of vulnerable households that received an in-kind gift. The results for help paying fees tend to mirror those for cash gifts, though the effects are not nearly as strong, and not significant in all subsamples. The results for receipt of in-kind gifts are more mixed, the effect having a positive sign in some cases and negative in others, but never significant in any of the subsamples. That is, there is essentially no effect on receipt of in-kind gifts by the vulnerable group. This may suggest the effect is stronger for *monetary* wealth transfers than non-monetary transfers.

Regardless, these instrumental-variables estimates of the indirect treatment effect of local formal savings rates on transfer receipts by the highly vulnerable confirm the result articulated in “Result 4” above. That is, the indirect effect on transfer receipts appears strongest for *direct monetary transfers to households*, and that the effect on receipts of in-kind gifts and help paying fees to a third party are either positive or not significantly different from zero. This suggests the influx of transfer receipts by the highly vulnerable is not driven by a substitution away from other types of transfers.

| <b>Table 9: Effect of Increase in Pctg of HHs Using Formal Savings on Pctg of Vulnerable HHs in Cluster Receiving a CASH GIFT</b> |                            |                                    |                            |                                    |                            |                            |                            |                            |
|---|----------------------------|------------------------------------|----------------------------|------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| VARIABLES   | All Districts              |                                    |                            |                                    | Excluding Lilongwe         |                            |                            |                            |
|   | OLS                        |                                    | IV                         |                                    | OLS                        |                            | IV                         |                            |
|   | (1)                        | (2)                                | (3)                        | (4)                                | (5)                        | (6)                        | (7)                        | (8)                        |
|   | Pctg Vuln Rcv<br>Cash Gift | Pctg Vuln Rcv<br>3+km<br>Cash Gift | Pctg Vuln Rcv<br>Cash Gift | Pctg Vuln Rcv<br>3+km<br>Cash Gift | Pctg Vuln Rcv<br>Cash Gift | Pctg Vuln Rcv<br>Cash Gift | Pctg Vuln Rcv<br>Cash Gift | Pctg Vuln Rcv<br>Cash Gift |
| Pctg HHs w FSAV   | 0.547<br>(0.112)           | 0.547*<br>(0.0978)                 | 2.382**<br>(0.0111)        | 2.382**<br>(0.0111)                | 0.927<br>(0.125)           | 0.927<br>(0.108)           | 3.191**<br>(0.0109)        | 3.191**<br>(0.0109)        |
| Constant  | -4.101<br>(0.428)          | -4.101<br>(0.408)                  | -17.87<br>(0.217)          | -17.87<br>(0.217)                  | -6.954<br>(0.434)          | -6.954<br>(0.412)          | -23.93<br>(0.216)          | -23.93<br>(0.216)          |
| Observations  | 99                         | 91                                 | 99                         | 91                                 | 76                         | 69                         | 76                         | 69                         |
| R-squared   | 0.540                      | 0.526                              | 0.272                      | 0.250                              | 0.572                      | 0.555                      | 0.310                      | 0.282                      |

Note: Robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Unit of observation is the village cluster. All regressions include cluster-pair fixed effects, and heteroskedasticity-robust errors.

| <b>Table 10: Effect of Increase in Pctg of HHs With Formal Savings on Pctg of Vulnerable HHs Receiving HELP PAYING FEES</b> |                              |                              |                              |                              |                              |                              |                              |                              |
|---|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| VARIABLES   | All Districts                |                              |                              |                              | Excluding Lilongwe           |                              |                              |                              |
|   | OLS                          |                              | IV                           |                              | OLS                          |                              | IV                           |                              |
|   | (1)                          | (2)                          | (3)                          | (4)                          | (5)                          | (6)                          | (7)                          | (8)                          |
|   | Pctg Vuln Rcv<br>Help w Fees | Pctg Vuln Rcv<br>Help w Fees | Pctg Vuln Rcv<br>Help w Fees | Pctg Vuln Rcv<br>Help w Fees | Pctg Vuln Rcv<br>Help w Fees | Pctg Vuln Rcv<br>Help w Fees | Pctg Vuln Rcv<br>Help w Fees | Pctg Vuln Rcv<br>Help w Fees |
| Pctg HHs w FSAV   | 0.514<br>(0.164)             | 0.514<br>(0.147)             | 1.011*<br>(0.0558)           | 1.011*<br>(0.0558)           | 0.392<br>(0.276)             | 0.392<br>(0.253)             | 0.713<br>(0.264)             | 0.713<br>(0.264)             |
| Constant  | -3.857<br>(0.444)            | -3.857<br>(0.425)            | -7.582<br>(0.255)            | -7.582<br>(0.255)            | -2.940<br>(0.485)            | -2.940<br>(0.463)            | -5.351<br>(0.381)            | -5.351<br>(0.381)            |
| Observations  | 99                           | 91                           | 99                           | 91                           | 76                           | 69                           | 76                           | 69                           |
| R-squared   | 0.623                        | 0.615                        | 0.589                        | 0.579                        | 0.647                        | 0.636                        | 0.636                        | 0.625                        |

Note: Robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Unit of observation is the village cluster. All regressions include cluster-pair fixed effects, and heteroskedasticity-robust errors.

| Table 11: Effect of Increase in Pctg of HHs With Formal Savings on Pctg of Vulnerable HHs Receiving An IN-KIND Gift |                           |                           |                           |                           |                           |                           |                           |                           |
|---|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|   | All Districts             |                           |                           |                           | Excluding Lilongwe        |                           |                           |                           |
|   | OLS                       |                           | IV                        |                           | OLS                       |                           | IV                        |                           |
| VARIABLES   | (1)                       | (2)                       | (3)                       | (4)                       | (5)                       | (6)                       | (7)                       | (8)                       |
|   | Pctg Vuln Rcv In-Kind Gft | Pctg Vuln Rcv In-Kind Gft | Pctg Vuln Rcv In-Kind Gft | Pctg Vuln Rcv In-Kind Gft | Pctg Vuln Rcv In-Kind Gft | Pctg Vuln Rcv In-Kind Gft | Pctg Vuln Rcv In-Kind Gft | Pctg Vuln Rcv In-Kind Gft |
| Pctg HHs w FSAV   | 0.451<br>(0.338)          | 0.451<br>(0.318)          | 0.314<br>(0.674)          | 0.314<br>(0.674)          | 1.006<br>(0.273)          | 1.006<br>(0.250)          | -0.398<br>(0.709)         | -0.398<br>(0.709)         |
| Constant  | -3.383<br>(0.508)         | -3.383<br>(0.490)         | -2.358<br>(0.687)         | -2.358<br>(0.687)         | -7.547<br>(0.484)         | -7.547<br>(0.462)         | 2.986<br>(0.718)          | 2.986<br>(0.718)          |
| Observations  | 99                        | 91                        | 99                        | 91                        | 76                        | 69                        | 76                        | 69                        |
| R-squared   | 0.660                     | 0.612                     | 0.659                     | 0.611                     | 0.706                     | 0.655                     | 0.632                     | 0.568                     |

Note: Robust p-values in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Unit of observation is the village cluster. All regressions include cluster-pair fixed effects, and heteroskedasticity-robust errors.

## VI. Changes in Informal Loans to the Most Vulnerable

**Result 5: The instrument for local rates of formal savings adoption is associated with a substantial increase in the two-year change in the proportion of highly vulnerable households receiving cash-loans from friends or relatives. However, it does not affect the proportion of non-vulnerable households receiving such loans.**

In addition to the information on receipts of cash gifts in 2010, the survey data also contain information on receipts of informal *loans*. These are cash loans received from friends or relatives anytime in the past two years. Unlike that for cash gifts, the data on loans was collected in both years, enabling a panel analysis.

Among the control villages, the percentage of highly vulnerable households reporting informal loans over the previous 2 years was the same in 2008 as it was in 2010, 42.6%. Among treated villages, however, there was nearly a ten point increase in the percentage of highly vulnerable receiving informal loans, from 39.7% in 2008 to 49.2% in 2010. When restricting to clusters 3 km out, this trend grows stronger. In control communities, there was a slight reduction in the proportion of highly vulnerable who received loans from friends and relatives, from 45.0% in 2008 to 43.4% in 2010. In treated areas, there was a twelve point increase, from 38.5% to 50.4%.

Analyzing the changes, adding controls, and controlling for intra-cluster correlation sharpens the picture. Table 12 reports results from a set of simple first-differenced regressions of informal loan receipt on a dummy for the treatment, with clustered standard errors. The regressions are run at the household-level and include cluster-pair fixed effects.<sup>18</sup> The dependent variable is the change in whether a given vulnerable household received an informal loan over the two years preceding the interview date, taking values of  $\{-1,0,1\}$ . The coefficient on treatment represents the effect of the information intervention on the change in percentage of vulnerable households that received an informal loan. Columns 1-4 report results when the sample is restricted to the highly vulnerable, with column 1 including all category-G households, column 2 restricting to those communities more than 3 km away, and columns 3 and 4 showing results from the same regressions but which exclude Lilongwe.

The effect of the treatment is highly significant across all four samples, increasing the change in percentage of vulnerable households that received an informal loan by an estimated 15.8 to

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<sup>18</sup> Omitting fixed effects does not alter the main results. (See Flory, 2011 for a more detailed analysis.) The location-specific fixed effects are added to account for interactions of sample-wide changes over the two years with local variables, as well as changes which vary across communities. As an example of the former case, even when an adverse shock is experienced by all communities in the sample (e.g. a region-wide drought), villages with strong urban linkages are likely to have more households which can easily mitigate the effects (for example, through access to non-agricultural income sources). More households in such a community would be in a position to offer loans to less fortunate households than in a community with weaker links to modern economies. For the latter case, any region-specific or spatially covariate shocks which occur over the two-year period (positive or negative) may affect the ability of neighboring households to provide assistance differently in one area than another. Including spatial fixed effects accounts for both possibilities.

22.4 percentage points over the comparable control villages. As in the case for cash gifts, the effect grows stronger as remoteness of communities increases and the power of the instrument in exogenously boosting formal savings rates grows. Grouping the treated and control communities, the overall two-year change in percentage of highly vulnerable receiving informal loans at the 3 km threshold is an increase of 4.8 percentage-points.<sup>19</sup> The estimated effect is therefore quite large also in relative terms.

Columns 5-8 report results from analogous regressions, but instead using the total sample of all households. Here, while the sign for the coefficient estimate for the information intervention is always positive, the magnitudes are much smaller, and never significant across any of the specifications. The reduced-form impact of the information intervention on the two-year change in proportion of households receiving a loan from friends or relatives is therefore limited to the highly vulnerable group.<sup>20</sup>

| Variables      | Among Highly Vulnerable Households |                        |                                |                        | Among All Households           |                       |                                |                        |
|----------------|------------------------------------|------------------------|--------------------------------|------------------------|--------------------------------|-----------------------|--------------------------------|------------------------|
|                | All Districts                      |                        | Excluding Lilongwe             |                        | All Districts                  |                       | Excluding Lilongwe             |                        |
|                | (1)<br>All Distances<br>Δ Loan     | (2)<br>3+km<br>Δ Loan  | (3)<br>All Distances<br>Δ Loan | (4)<br>3+ km<br>Δ Loan | (5)<br>All Distances<br>Δ Loan | (6)<br>3+km<br>Δ Loan | (7)<br>All Distances<br>Δ Loan | (8)<br>3+ km<br>Δ Loan |
| Treatment      | 0.158**<br>(0.0291)                | 0.158**<br>(0.0281)    | 0.222***<br>(0.00965)          | 0.224***<br>(0.00845)  | 0.0372<br>(0.220)              | 0.0478<br>(0.143)     | 0.0547<br>(0.161)              | 0.0611<br>(0.149)      |
| Change in Date | -0.00912**<br>(0.0268)             | -0.00913**<br>(0.0325) | -0.00628<br>(0.253)            | -0.00689<br>(0.209)    | -0.00194<br>(0.219)            | -0.000550<br>(0.789)  | 0.00298<br>(0.212)             | 0.00363<br>(0.133)     |
| Obsv.          | 271                                | 250                    | 205                            | 187                    | 1,988                          | 1,750                 | 1,516                          | 1,328                  |

Note: Cluster-Robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All regressions include cluster-pair fixed effects. Columns 1 & 2 restrict sample to households.

<sup>19</sup> There was a drop of 1.6 percentage points in the information-control clusters, and an increase of 11.6 percentage points in the information-treated.

<sup>20</sup> When the above regressions are run on the sample restricted to the non-vulnerable (i.e. all household except for category G), the highest significance for the estimated coefficient of the information intervention is p=0.385. Results not shown.

## VII. Welfare Changes among the Highly Vulnerable in Treated Villages

Upon observing the substantial impact of exogenously boosted local savings rates on transfer receipts by the worst-off, the natural follow-up question is whether this actually improves their welfare. As Townsend (1994) points out, studying informal insurance institutions one at a time may lead one to overlook other important smoothing options, and whether substitution or general equilibrium effects cause improvements in one to be accompanied by weakening in another. Examining final consumption outcomes, however, enables assessment of the impact on all available institutions jointly. The true test in whether the influx of cash assistance enhances well-being among the worst-off lies in whether their consumption and welfare outcomes have actually improved.

### **Result 1: Highly vulnerable households in treated villages were more likely to exit the worst food-security status over the two-year period.**

About 40% of the highly vulnerable in treated clusters rose from the “severely insecure” HFIAP category to one of the three other categories (“moderately insecure”, “mildly insecure”, “secure”) in the two-year interval between interviews, while only 29% of the highly vulnerable in control clusters did. (This difference is significant at the .05-level with a two-sided t-test). Table 13, columns 1-4, report results from a first-differenced regression that examines this relationship more closely. The dependent variable is a dummy which takes a value of one if the household is no longer in the “severely insecure” category in 2010.<sup>21</sup> The coefficient on the treatment dummy thus represents the reduced-form effect of the information intervention on the proportion of highly vulnerable households that exit the severely-insecure category. Change of date is included as an additional control since being interviewed later in the pre-harvest “lean” season may affect food-security.<sup>22</sup> Errors are clustered, and pair fixed effects are included.

Columns 1 and 2 show the results across the full sample, then restricted to pairs three or more kilometers from the bank-stop. Columns 3 and 4 show results for analogous regressions, excluding Lilongwe. The effect is large and significant in all specifications. The estimated effect of the information intervention on the proportion of vulnerable households exiting the severely food-insecure category ranges from 11.8 to 16.3 percentage points. This represents an increase of 39% - 55% over the proportion of highly vulnerable exiting the severely insecure status in the control clusters.

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<sup>21</sup> Recall that all highly vulnerable households, by definition, were in the “severely food insecure” category in 2008.

<sup>22</sup> Results are robust to omitting the change-of-date variable.

**Box. The pivotal role of outside assistance to households in extreme poverty**

Nunkaleko Chakoya, an elderly woman who cares for her two teenage grandchildren ever since their mother died and their father left the village lives in Nanthambwe, a control community. Her brother was helping to watch after her welfare, but he died in the middle of the previous year. She receives little in the way of pure gifts or loans from other households. “My relatives are also poor,” she comments. “If I ask them for help, they say they are facing the same problems. So I sleep with an empty stomach for two or three days. If I find food, that’s when I eat.”

But she says that when she runs out of food, she can ask her better-off neighbors in her own and neighboring villages for opportunities to do some *ganyu*, casual farm-labor in their fields, in exchange for a basin or two of maize. Recalling a time she asked to do some *ganyu* for a neighbor during the previous rainy season, she says “They told me to come back the next day, so my grandchildren and I went to bed without eating that night. The next day, after we did the work, we had a good night.”

Recently, neighbors have been giving less food for the same amount of work done, though she doesn’t know why. Following the death of her brother, she has had to work more to provide for herself and her grandchildren, which is difficult as she is often ill. Asked of something good that has happened to her in the last year, she recalls being happy to have survived a recent illness. “I was sick for three days. By God’s grace, I survived. I don’t even have a bicycle to go to the hospital. When I woke up, that was a good point of my life.”

Coping with shocks is difficult. “I wish I could prepare for bad things, but I don’t have the money to prepare.” Earlier in the year, one of the grand-children contracted cerebral malaria and needed urgent medical treatment. Had a relative not loaned her a bicycle so the other grand-child could bicycle him to the hospital, he probably would not have survived.

For people living on the margins like Ms. Chakoya, help from friends and relatives can make a huge difference. Among those with little means, whose well-being is highly responsive to external support, changes in local assistance practices and behaviors may have large impacts. While more assistance might lead to large welfare gains, reductions in help might be disastrous for some.

**Result 2: The highly vulnerable in treated villages had greater improvements in food-security scores over the two-year period.**

Columns 5-8 of Table 13 report results suggesting higher local formal savings adoption also caused improvements in the more continuous food-security indicator, HFIAS, among the highly vulnerable. These results are from a regression of the change in each vulnerable household’s HFIAS score on the dummy for the information intervention and change in the interview date, with location fixed-effects and errors clustered at the village-cluster level. The coefficient for the treatment dummy represents the average effect of living in a treated community on a highly vulnerable household’s change in HFIAS score. Recall that the HFIAS indicator runs from 0 to 21, with higher numbers indicating worse food-security.

As columns 5-8 show, the impact is significant across all four samples. Those living in a community exposed to the treatment had an estimated reduction in their HFIAS score of 1.25 to 1.40 points. As the average baseline HFIAS score among the highly vulnerable group in 2008 was 12.0 overall, this represents a 10-12% improvement in food-security as measured by this scale.

**Result 3: The highly vulnerable in treated villages are much less likely to experience a decline in short-term health indicators.**

It is also possible that increased cash assistance might lead to improvements in health outcomes. Health effects might be directly related to food-security outcomes. Alternatively, cash assistance may also help cover medical-related expenditures. Qualitative interviews in these areas reveal that one of the top three reasons a one might provide cash assistance to another household is to help people access medical services – for example, by paying the bike-taxi fee to get to travel to clinics difficult to access on foot.<sup>23</sup> This may therefore make it easier for struggling households to seek treatment for ailments such as Malaria, quite common and often severe in rural Malawi.

One simple measure of health outcomes the data contain is whether any household member was injured or sick over the last 14 days preceding the interview. In control communities, the percentage of highly vulnerable households reporting at least one household member unwell increased by 19.9 percentage points. In treated clusters, the percentage increased only 6.1 percentage-points. The difference, which amounts to a 13.8 percentage-point improvement over comparable households in the control villages, is significant with a two-sided t-test ( $p=.029$ ).

Once again, a simple first-differenced regression examines the effect more closely, controlling for location fixed-effects and any possible changes in interview date, as well as adjusting for intra-cluster correlation. The results are reported in Table 14. The effect is significant in all four subsamples. The information intervention is associated with a reduction in the proportion of highly vulnerable households reporting an unwell member, ranging from 11.6 to 17.4 percentage points. Note that, once again, the scale of the effect is quite similar to that of the increase in percentage of highly vulnerable households that received cash gifts and that received informal loans.

| VARIABLES    | Exit Severely Food-Insecure |                       |                           |                     | Change in HFIAS Food-Insecurity Score |                        |                           |                        |
|--------------|-----------------------------|-----------------------|---------------------------|---------------------|---------------------------------------|------------------------|---------------------------|------------------------|
|              | All Districts               |                       | Mchinji & Dedza Districts |                     | All Districts                         |                        | Mchinji & Dedza Districts |                        |
|              | All Distances               | 3+ km                 | All Distances             | 3+ km               | All Distances                         | 3+ km                  | All Distances             | 3+ km                  |
|              | (1)                         | (2)                   | (3)                       | (4)                 | (5)                                   | (6)                    | (7)                       | (8)                    |
|              | Exit Severe                 | Exit Severe           | Exit Severe               | Exit Severe         | $\Delta$ HFIAS                        | $\Delta$ HFIAS         | $\Delta$ HFIAS            | $\Delta$ HFIAS         |
| Treatment    | 0.162***<br>(0.00272)       | 0.163***<br>(0.00241) | 0.118*<br>(0.0780)        | 0.120*<br>(0.0720)  | -1.251**<br>(0.0147)                  | -1.252**<br>(0.0143)   | -1.393**<br>(0.0308)      | -1.402**<br>(0.0285)   |
| Change Date  | -0.00351<br>(0.332)         | -0.00389<br>(0.301)   | -0.00249<br>(0.704)       | -0.00290<br>(0.655) | 0.0468<br>(0.138)                     | 0.0473<br>(0.151)      | 0.0801*<br>(0.0552)       | 0.0827**<br>(0.0477)   |
| Constant     | -0.138*<br>(0.0642)         | -0.142*<br>(0.0582)   | -0.100<br>(0.274)         | -0.105<br>(0.250)   | 7.240***<br>(1.12e-05)                | 7.245***<br>(1.08e-05) | 7.623***<br>(1.67e-05)    | 7.651***<br>(1.53e-05) |
| Observations | 272                         | 251                   | 206                       | 188                 | 269                                   | 248                    | 203                       | 185                    |
| R-squared    | 0.291                       | 0.279                 | 0.276                     | 0.264               | 0.219                                 | 0.212                  | 0.221                     | 0.211                  |

Note: Unit of observation is the household. Regressions include cluster-pair fixed effects. Cluster-robust pval in parentheses  
 \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

<sup>23</sup> The other two top reasons are to buy food, or to pay for funeral expenses.



**Table 14: Change in the Proportion of Vulnerable Households Reporting a Member Unwell**

| VARIABLES    | All Districts       |                       | Mchinji & Dedza Districts |                      |
|--------------|---------------------|-----------------------|---------------------------|----------------------|
|              | All Distances       | 3+ km                 | All Distances             | 3+ km                |
|              | (1)                 | (2)                   | (3)                       | (4)                  |
| Treatment    | -0.120*<br>(0.0727) | -0.116*<br>(0.0775)   | -0.174**<br>(0.0470)      | -0.174**<br>(0.0456) |
| Change Date  | -0.00502<br>(0.175) | -0.00618*<br>(0.0938) | -0.00958<br>(0.171)       | -0.00965<br>(0.167)  |
| Constant     | 0.370<br>(0.117)    | 0.357<br>(0.126)      | 0.366<br>(0.178)          | 0.365<br>(0.176)     |
| Observations | 272                 | 251                   | 206                       | 188                  |
| R-squared    | 0.278               | 0.280                 | 0.291                     | 0.294                |

Note: Unit of observation is the household. Regressions include cluster-pair fixed effects. Cluster-robust Pval in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## VIII. Conclusion

Households in the developing world face frequent, often severe, adverse income and consumption shocks. To help cope with hard times, communities with low access to formal financial markets typically have a broad array of informal financial tools and safety-nets based on inter-household assistance. These can be used to help smooth consumption and prevent poor outcomes. It is unclear *a priori* how these pre-existing systems will be affected by the spread of market-based financial services.

This amplifies the uncertainty over the impacts that financial deepening will have in poor rural areas of developing economies. Not only is it necessary to understand the effects of introducing new financial services on service-users themselves, but high interdependence among households in villages means that effects may propagate beyond new service-adopters. Large-scale expansion of formal savings is likely to interact with indigenous institutions which have evolved to fulfill important economic roles. This may result in unanticipated consequences for non-users.

The findings of this paper show that the increased use of formal savings that followed OIBM's rapid expansion of savings-access led to large impacts on inter-household transfers, with particularly strong effects on assistance receipts and welfare outcomes by the worst-off non-using population. Using a community-level information treatment as a source of exogenous variation, instrumental-variables regressions show that a one percentage-point increase in the local proportion of formal-savers leads to an estimated 2.4 to 3.2 percentage-point increase in the proportion of highly vulnerable households that received one or more cash-gifts during the peak period of hunger for the year. In addition, in treated communities – where savings adoption rates were 33% to 40% higher than control communities – the proportion of highly vulnerable households that received a loan from a friend or relative increased by an estimated 15.8 to 22.4 percentage points over the two-year period, relative to control villages.

These changes in assistance receipts are linked to strong welfare impacts, with sharp effects in at least three indicators. Highly vulnerable households in treated villages are 11.8 to 16.3 percent more likely than comparable households in control villages to exit the worst food-security category in the HFIAP scale (“severely insecure”) to enter one of the three less severe categories. They also experience a 1.3 to 1.4 point reduction in the continuous food-insecurity score, HFIAS, relative to the highly vulnerable in control villages. This represents a 10-12% improvement in food-security over baseline values. In addition, highly vulnerable households in treated villages were 12 to 17.4 percent less likely than those in control villages to report any members of the household as recently unwell.

These findings provide some important lessons for OIBM and other microfinance institutions operating in rural Malawi. First and foremost, introducing formal financial services to rural Malawi can have substantial immediate-term impacts on the *non service-using* population living in these communities. This means that knowing the true effects of expanding services into new areas requires accounting for its effects on non OIBM-clients. It may even be

possible in some cases that the spillover impacts on non-clients are greater than the effects on the clients themselves. Failing to account for the short-term effects on non-clients can lead to a severe under-appreciation of impacts of service-expansion.

Second, the intensity of impacts of OIBM services on non-clients can significantly vary by household vulnerability level. This analysis shows that, in the case of formal savings, the poorest and most vulnerable are the most sensitive to changes in inter-household wealth flows which can follow on the introduction of savings services. This is of critical importance if one of the objectives of the organization is to positively affect the lives of the poorest of the poor. While this study shows the poorest do not appear eligible to take advantage of easier access to formal savings, they are nevertheless the *most* strongly affected by spillover effects of formal savings on inter-household assistance receipts.

Third, the welfare consequences of these changes in inter-household assistance behavior are far from trivial. The highly vulnerable in the treated communities show strong responses in at least three key indicators of food-security and health outcomes.

One of the most noteworthy findings of this study is the large magnitude of these spillover effects on transfer receipts, particularly among the worst-off households, and the substantial impacts this appears to have on welfare outcomes. The positive indirect effects experienced in the treated villages of Central Malawi are certainly encouraging. However, the lesson here should perhaps be one of caution. As discussed in Flory (2011), economic theory predicts the introduction of formal savings an ambiguous result, making it *possible* for the introduction of formal savings to have a stimulating effect on inter-household wealth flows. It is not clear, however, that introducing formal savings will always have a positive effect. Differing local customs and cultural norms may cause strong negative effects in other contexts. This is important to consider even within Malawi, due to its high degree of ethnic diversity and variety of local customs.

The relevance of the findings from this study of course extends well beyond OIBM and Malawi. There is scant evidence on the effects of formal financial services on pre-existing informal safety nets in villages, and the impact of financial deepening on those who may be too poor to make use of expanded service-access. It is our hope that the findings on the experience of households in Central Malawi will contribute to the discussion of impacts of financial services and help inform development policy and microfinance initiatives in other contexts of the developing world.

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## Appendix

| <b>Table 15: Treatment Effects on Local Proportion of Highly Vulnerable HHs with Formal Savings and Formal Credit</b> |  |                             |                                     |                             |   |                              |                                      |                              |
|---|--|-----------------------------|-------------------------------------|-----------------------------|---|------------------------------|--------------------------------------|------------------------------|
| VARIABLES   | Change in Proportion of Households with Formal Savings |                             |                                     |                             | Change in Proportion of Households with Formal Credit |                              |                                      |                              |
|   | All Districts  |                             | Excluding Lilongwe                  |                             | All Districts   |                              | Excluding Lilongwe                   |                              |
|   | (1)<br>All Distances<br>Chg in FSAV                    | (2)<br>3+ km<br>Chg in FSAV | (3)<br>All Distances<br>Chg in FSAV | (4)<br>3+ km<br>Chg in FSAV | (5)<br>All Distances<br>Chg in FCRED                  | (6)<br>3+ km<br>Chg in FCRED | (7)<br>All Distances<br>Chg in FCRED | (8)<br>3+ km<br>Chg in FCRED |
| Treatment   | -0.00834<br>(0.684)                                    | -0.00834<br>(0.682)         | -0.0195<br>(0.395)                  | -0.0195<br>(0.390)          | -0.00309<br>(0.893)                                   | -0.00309<br>(0.893)          | -0.00845<br>(0.767)                  | -0.00845<br>(0.767)          |
| Observations  | 270  | 249                         | 204                                 | 186                         | 269   | 269                          | 203                                  | 203                          |
| R-squared   | 0.178  | 0.162                       | 0.084                               | 0.084                       | 0.332   | 0.332                        | 0.301                                | 0.301                        |

Note: Sample restricted to the households in the highly vulnerable category. Cluster-Robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All regressions include cluster-pair fixed effects.

| <b>Table 16: Treatment Effects on Local Proportion of Non-Vulnerable HHs with Formal Savings and Formal Credit</b> |  |                             |                                     |                             |   |                              |                                      |                              |
|--|--|-----------------------------|-------------------------------------|-----------------------------|---|------------------------------|--------------------------------------|------------------------------|
| VARIABLES  | Change in Proportion of Households with Formal Savings |                             |                                     |                             | Change in Proportion of Households with Formal Credit |                              |                                      |                              |
|  | All Districts  |                             | Excluding Lilongwe                  |                             | All Districts   |                              | Excluding Lilongwe                   |                              |
|  | (1)<br>All Distances<br>Chg in FSAV                    | (2)<br>3+ km<br>Chg in FSAV | (3)<br>All Distances<br>Chg in FSAV | (4)<br>3+ km<br>Chg in FSAV | (5)<br>All Distances<br>Chg in FCRED                  | (6)<br>3+ km<br>Chg in FCRED | (7)<br>All Distances<br>Chg in FCRED | (8)<br>3+ km<br>Chg in FCRED |
| Treatment  | 0.0151<br>(0.324)                                      | 0.0219<br>(0.187)           | 0.0334*<br>(0.0584)                 | 0.0401**<br>(0.0322)        | -0.00179<br>(0.885)                                   | -0.00385<br>(0.741)          | 0.00300<br>(0.843)                   | -0.00176<br>(0.897)          |
| Observations   | 1,731  | 1,513                       | 1,319                               | 1,148                       | 1,709   | 1,608                        | 1,303                                | 1,236                        |
| R-squared  | 0.039  | 0.038                       | 0.042                               | 0.042                       | 0.036   | 0.046                        | 0.036                                | 0.048                        |

Note: Sample restricted to the households in the non-vulnerable category. Cluster-Robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All regressions include cluster-pair fixed effects.

| VARIABLES    | All Household Types                 |                            |                                     |                            | Vuln HHs (G)                        |                            |                                |                            |
|--------------|-------------------------------------|----------------------------|-------------------------------------|----------------------------|-------------------------------------|----------------------------|--------------------------------|----------------------------|
|              | All Districts                       |                            | Excluding Lilongwe                  |                            | All Districts                       |                            | Excluding Lilongwe             |                            |
|              | (1)<br>All Distances<br>Rcv Csh Gft | (2)<br>3+km<br>Rcv Csh Gft | (3)<br>All Distances<br>Rcv Csh Gft | (4)<br>3+km<br>Rcv Csh Gft | (5)<br>All Distances<br>Rcv Csh Gft | (6)<br>3+km<br>Rcv Csh Gft | (7)<br>All Dist<br>Rcv Csh Gft | (8)<br>3+km<br>Rcv Csh Gft |
| Treatment    | 0.0989***<br>(1.17e-08)             | 0.111***<br>(4.82e-09)     | 0.0953***<br>(2.31e-06)             | 0.0983***<br>(1.23e-05)    | 0.159***<br>(0.000371)              | 0.159***<br>(0.000346)     | 0.153***<br>(0.00314)          | 0.153***<br>(0.00295)      |
| Constant     | 0.0409<br>(0.397)                   | 0.0315<br>(0.539)          | 0.0438<br>(0.367)                   | 0.0413<br>(0.407)          | -0.106*<br>(0.0989)                 | -0.106*<br>(0.0963)        | -0.102<br>(0.117)              | -0.102<br>(0.114)          |
| No. Clusters | 112                                 | 96                         | 85                                  | 72                         | 99                                  | 91                         | 76                             | 69                         |
| Observations | 1,992                               | 1,754                      | 1,519                               | 1,330                      | 271                                 | 250                        | 205                            | 187                        |
| R-squared    | 0.046                               | 0.043                      | 0.047                               | 0.038                      | 0.225                               | 0.230                      | 0.220                          | 0.221                      |

Note: Cluster-robust pval in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All regressions include cluster-pair fixed effects, and errors clustered at the village-cluster level.

The results reported in Table 17 are drawn from a set of linear regressions which help clarify the findings reported in Table 5, by adding cluster-pair fixed effects, clustering errors at the community-level, and verifying that the result is robust to excluding Lilongwe district. The dependent variable is a 0-1 indicator for whether a household received a cash gift. Results are reported for the entire sample, and then restricting to just the highly vulnerable category. The conclusions are roughly the same as those based on the simpler t-tests reported in Table 5. Among all vulnerability categories, the treatment of information campaign increases the percentage of households in the cluster receiving a cash gift by about 10 percentage points, while it increases the percentage of highly vulnerable households receiving a cash gift by about 15 or 16 percentage points, all of which are highly significant. Note that the results are nearly identical when the sample is restricted to Dedza and Mchinji districts.

The inclusion or omission of pair-level fixed effects does not alter the basic results of the linear regression. When fixed effects are omitted, estimated magnitudes of effects are almost identical, and they remain significant well beyond the .01-level within all subsamples, whether using all households together or just the highly vulnerable. For example, across all households regardless of type, the estimated magnitudes are slightly lower when fixed effects are omitted, but just barely. The largest difference in estimated magnitude is .006 (an estimated coefficient of .089 versus .095). Across just the highly vulnerable households, the largest difference in magnitude is .02 (an estimated coefficient of .178 versus .159).