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SOCIAL WELFARE OUTCOMES OF MICRO-CREDIT IN MALAWI

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SOCIAL WELFARE OUTCOMES OF MICROFINANCE IN MALAWI

Susana Lastarria-Cornhiel and Yasuharu Shimamura

Microfinance institutions, and particularly micro-credit, have attracted much attention from development practitioners and scholars because of the potential that micro-credit and savings have for reducing poverty and increasing household welfare. By providing capital to limited-asset and low-income households for investing in self-employment activities such as agriculture or micro-enterprises, household income is increased. This should result in decreased poverty through increased expenditures on household needs and increased consumption for children as well as adults (Morduch 1999). Since studies have shown that female income is more likely to be invested in household welfare items such as food and schooling (Thomas 1990; Haddad et al. 1997), the practice of most microfinance programs to target women should have positive results on household welfare. And there has been much anecdotal evidence to support these assumptions. More systematic studies are beginning to show, however, that outcomes with regard to household welfare are mixed.¹

This purpose of this study is to contribute to the knowledge on the impact of microfinance programs on the social welfare of households in Malawi. Access to credit is said to contribute to increased welfare of rural households and its members in several ways. Credit provides capital for production inputs thus increasing production and possibly productivity and household income. This is particularly important for agricultural production where the production cycle is long. In addition, Diagne and Zeller (2001) point out that having access to credit, that is, knowing that credit is available whether one actually borrows or not, may motivate an individual to make potentially risky investments. And finally, if a risky venture fails or the household experiences an economic shock, access to credit can contribute to smoothing household consumption after the shock.

Development practitioners and scholars have often decried the absence of financial services for households with low levels of income, assets, and property. They have remarked on the difficulties and reluctance on the part of commercial banks to provide savings accounts and extend credit to these households. The reasons include: (1) lack of property and assets that can be used as collateral, making loans too risky; (2) lack of information regarding the credit-worthiness of potential borrowers, also contributing to risk; and (3) the high transaction costs of administering numerous but small savings accounts and loans.

¹ Morduch (1999) pointed out that while microfinance participation should increase household income and consumption, the impact on other household welfare indicators such as education, fertility, and leisure are not clear.

Microfinance programs have attempted to overcome these difficulties by forming groups of potential savers and borrowers. These groups are supposed to bring together persons who know and trust each other, thus overcoming the information problem. They require their members to deposit savings and serve as lending vehicle for the group, lowering transaction costs and collecting cash collateral. And finally, the group is held responsible for repayment of the loans (joint liability), resolving in part the issue of lack of material collateral. Assumptions have been made that because microfinance programs have been successful at reaching low-income and low-asset households, they have been able to positively impact on the social welfare of these households.² Studies are beginning to show that the evidence is mixed: credit programs do not always improve household welfare. This study attempts to contribute to that literature.

Following the success of microfinance programs in south Asia, particularly in Bangladesh, donor agencies and NGOs organized microfinance programs in selected areas in Malawi in the 1980s. In the early 1990s, a rural finance program to offer savings and credit services with national coverage was established by the Malawi government. Using this program as an example of a broad-based and relatively stable credit program, we will attempt to determine whether micro-credit has positively influenced household welfare and facilitated gender empowerment.

The first section of this paper will provide basic social and economic information on Malawi and describe the financial institutions operating in the country. The second section will outline the specific research questions we explore and our methodology. The results of the data analysis are presented in the third section and the last section provides a discussion of these results.

1. SOCIO-ECONOMIC BACKGROUND

Malawi, a southern African country landlocked between Mozambique, Zambia, and Tanzania, is one of the most densely populated countries in Africa (105 persons per square kilometer). It is an agricultural country with approximately 83 percent of its population living in rural areas, mostly in the central and southern regions of the country. Agriculture is the main economic activity and accounted for between 35 and 40 percent of the Gross Domestic Product (GDP) between 2001 and 2005, and 90 percent of its export earnings (mostly tobacco, but also tea, cotton, and sugar). The service sector accounts for 46 percent of GDP and industry only 19 percent.

Malawi has many different ethnic groups but the majority of the population belongs to the Chewa group and speak Chichewa (English is the other official language); other ethnic groups include the Nyanja, Tumbuka, and Yao. Both patrilineal and matrilineal kinship systems are found in Malawi, with the northern region being primarily patrilineal and the central and southern regions matrilineal. Religious affiliations are in the majority either Christian (approximately 80 percent) or Muslim (13 percent); the practice of these religions are mingled with traditional indigenous beliefs.

² In fact, studies have shown that many micro-credit programs are not reaching the very poor, targeting mainly those households at the upper margins of poverty and even households above the poverty line (Copestake et al. 2005).

1.1 POVERTY LEVELS

Malawi is one of the poorest countries in Africa and has experienced chronic food insecurity for at least several decades. In 2005, 52 percent of the population was below the poverty line of US\$0.44 per day.³ The 2006 Human Development Index ranks Malawi at 166 out of 177 countries. Per capita Gross National Income (GNI, Atlas method) for 2005 was US\$160, compared to US\$745 for sub-Saharan Africa, and US\$580 for low-income countries. Other, and more relevant, indicators of poverty are its low life expectancy at birth (40 years), high infant mortality (110 per 1,000 live births), and child malnutrition (22 percent of children under age 5). HIV-AIDS has lowered life expectancy for both women and men: in 1990, life expectancy for men was 44 and for women 47 years; by 2004, life expectancy for both women and men had fallen to 40 years. On the other hand, literacy for the population 15 years old and over is relatively high: 64 percent compared to an average of 62 percent for low-income countries.⁴ This high level is most likely a result of free primary education since 1994. Looking at 1990-91 expenditure levels (as a proxy for income), the Gini coefficient (0.62) shows that Malawi has one of the highest inequality levels compared to many African countries (World Bank 1996).

While poverty characterizes the majority of Malawi's rural households, there are regional differences. A number of indicators reveal that poverty is deeper and more extensive in the southern and central regions and less severe in the northern region.⁵ For example, the 1992 child mortality rate in the north was 92.3 (per 1,000 live births) compared to 100.1 for the southern and 151.0 for the central regions. In education, gross enrollment rates⁶ in the first four years of primary school in 1990-91 was 139 in the northern, 103 in the central, and 98 in the southern regions. Nationally, girls had lower gross enrollment rates than boys; this tendency persisted in the 1994-95 school years when school fees for primary school were eliminated. Looking at poverty levels, the southern region contains a higher percentage of households below the poverty line than the central and northern regions.

1.2 AGRICULTURAL SECTOR

The great majority of the population lives and works (over 80%) in rural areas and depends on agriculture for its livelihood. This agricultural sector is a classic dual economy: a majority of smallholders engaging in subsistence agriculture on less than 1 hectare of land, and a commercial estate sector producing cash crops for export (Sahn and Arulpragasam 1991; Peters 1996, 2006). Production conditions are not favorable for the majority of smallholders. Geography and climate provide one rainfall season per year with frequent droughts and floods. Major droughts in the 1990s and more recently in the 2002-03 and 2004-05 agricultural cycles, together with floods in the southern region in 2005, has dramatically affected the smallholders' ability to provide sufficient food for

³ Based on the 2005 Integrated Household Survey. The poverty line was based on daily consumption requirements per person in rural and urban areas across regions.

⁴ These data are for the most recent year between 1999 and 2005 (World Bank devdata).

⁵ Refer to World Bank (1996) for more details on these indicators.

⁶ All children enrolled in Standards I to IV as percentage of 6-9 years old population.

itself and the country. Physical infrastructure is poor: less than 2 percent of arable land is irrigated and the road system is inadequate with regard to quality and extent. Only 18.5 percent of the roads is paved (5,833 kilometers). Finally, world commodity prices for Malawi's main export crop (tobacco) has been declining for several years. The trade balance has been consistently negative since 2000, and real GDP per capita fell 36.7 percent between 2001 and 2005. For all these reasons and others, the economy of Malawi is quite weak and susceptible and the smallholder sector is particularly vulnerable.

Subsistence agriculture is the main economic activity for the majority of Malawi's rural households. Very few cultivate cash crops and only 7.9 percent sell a significant portion of their crops (Burritt 2006). Maize is the principal food crop across all regions⁷, but a large proportion of rural households are unable to provide a year-round supply of maize. Wage labor and remittances provide cash income and supplement subsistence production. Crop production provides rural households an average 73 percent of their income and women carry out between 63 to 70 percent of all agricultural work (Diagne and Zeller 2001). For a number of reasons including limited access to land, low productivity, and poor infrastructure, rural household income from agricultural production is low, contributing to high poverty rates.

Access to arable land⁸ for smallholders is severely limited in Malawi compared to most other sub-Saharan African countries. As stated earlier, population density, particularly in the southern and central regions, is relatively high compared to rest of sub-Saharan Africa. In addition, however, land distribution is highly skewed. Transfer of lands from African communities to mostly British settlers in the southern Shire highlands for cash crop production (tobacco, tea, cotton, and coffee for British industries) began in the late 19th century, initially as treaties with local chiefs. At the turn of the century, the colonial government began granting land as freehold properties with title and later on began granting long-term leaseholds to British and Europeans (Mkandwire and Phiri 1987).

Post-independence policies continued to favor export agricultural production on large estates by granting leaseholds for estate production, providing subsidized credit, establishing favorable prices for export crops while keeping food prices low, and prohibiting smallholders from producing export crops, neglecting smallholder production (Sahn and Arulpragasam 1991). Since the mid-1960s, an increasing number of 99-year leaseholds have been granted by the state to European and later Malawian landholders and corporations in the central and northern regions (Mkandwire and Phiri 1987). Both freehold and leasehold estates have been carved out of customary land, reducing the amount of land available for the majority of Malawi rural residents (Mkandwire and Phiri 1987; Place 1995).

Large estates that grow export crops (currently, mostly burley tobacco and tea) work the land with tenants who either provide labor or sharecrop. While the estates established

⁷ Other primary food crops in the regions are beans, groundnuts, rice, cassava, millet, sorghum, and some vegetables and chilies.

⁸ Estimates of arable land vary between 25 and 34 percent of total land.

up through the 1970s were mainly large-scale enterprises belonging to corporations, businessmen, and civil servants, since the 1980s smallholder families are establishing small estates by registering their family customary land. The great majority of these registered smallholder estates are located in the central region.⁹ These later estates are much smaller in size: less than 30 hectares compared to earlier estates of 200-300 hectares (Mkandawire, Jaffee, and Bertoli 1990). In addition, the smaller estates do not have the technology and administrative structure of the larger ones, working the land with family and casual wage labor. These smaller estates grow both export cash crops (mostly burley tobacco) and food crops for family consumption.

Since independence, the amount of freehold land has declined, becoming public or leasehold land. The state also increased public land holdings by creating forest reserves and game parks. As a result of expansion of land under leasehold and public tenure forms, the amount of land available for smallholders under customary tenure fell dramatically between 1964 and 1988: from 8,183 to 7,066 thousand hectares. At the same time, leasehold holdings increased from 72 to 689 thousand hectares (Mkandawire, Jaffee, and Bertoli 1990). The estate sector has grown to occupy 12 percent arable land and receives marketing and price support from government (Place 2005). Thus, while customary landholdings occupied by smallholders still represents 88 percent of arable land in Malawi, estates owners control a disproportionate amount of the country's arable land, capital, and government services.

One result of estate formation and public land expansion and population growth is that land distribution is currently one of the most highly skewed in sub-Saharan Africa: the majority of rural residents are smallholders under customary tenure with an average of less than 1 hectare of arable land per household. The 1992-93 National Sample Survey of Agriculture showed that 41 percent of smallholder households cultivated less than 0.5 hectares (the average being 0.28 hectares), and 31 percent between 0.5 and 1.0 hectare (World Bank 1996). Since productivity on smallholder land continues to be low, the reduction of available land contributes to low food security and poverty. The limited opportunities for off-farm employment do little to relieve poverty.

Improving agricultural production and productivity of Malawi's smallholder sector could contribute to increasing the income of the majority of its population and, hopefully, reduce poverty. Given the small amounts of arable land available to smallholders,¹⁰ other sources of income are also needed; off-farm income sources, either through employment or small enterprises, can reduce poverty. Providing financial services to households is thought to encourage and enable rural residents to produce both food and export crops and establish non-farm micro-enterprises and thereby increase household income and household welfare. Since the overwhelming majority of smallholders have limited assets, micro-credit is one means to provide them with capital.

⁹ These registrations are most likely the result of the implementation of the Registered Land Act and Customary Land Development Act in that area under the Lilongwe Land Development Programme. There appears to be little registration of land by smallholders in the other regions (Sahn and Arulpragasam 1991).

¹⁰ And the unlikelihood that estate land will be redistributed to smallholders.

1.3 RURAL FINANCIAL SERVICES IN MALAWI

Financial services in Malawi have been historically targeted to estates producing cash crops since before independence. Government policy after independence continued support of estate production and issued directives to finance the development of tobacco estates. Marketing board surpluses were channeled as subsidized loans through banks to the estate sector (Kydd and Christiansen 1982). By 1980, over 50 percent of commercial bank credit went to estates, mostly for burley tobacco production (Mkandawire and Phiri 1987). Smallholders producing for local markets had little access to formal credit and were limited to informal lenders. A credit revolving fund established by the National Rural Development Programme in the early 1980s was reported to favor better-off farmers, rather than smallholders. Beginning in 1987, the Ministry of Agriculture offered agricultural production credit for hybrid maize to small farmers through the Smallholder Agricultural Credit Administration (SACA). Because of severe droughts and credit defaults in the early 1990s, SACA eventually collapsed.

In spite of financial liberalization policies¹¹ in the recent past, including increased participation of the private sector in banking, savings and lending services for the great majority of rural residents have not increased, and may have even decreased (Burrirt 2006).¹² Few financial services in Malawi are licensed to accept savings, thus this service is very limited. The only formal savings institution broadly available to rural residents is the Malawi Savings Bank and the Malawi Rural Finance Company. Financial services provided by credit cooperatives, such as SACCO and MUSCCO, services both rural and urban areas. Credit cooperative loans are used for agricultural production and non-farm micro-enterprises (Diagne and Zeller 2001).

Microfinance programs were introduced in the late 1980s, one of the earliest being the Malawi Mudzi Fund supported by IFAD and based on the Grameen model (Hulme 1991; Chirwa 1998). The Mudzi Fund began in two pilot areas, targeting low-income households and forming loan groups of five persons. It was the Mudzi Fund that introduced the mechanism of giving its field loan officers with motorcycles because of the long distances they had to travel to service their area and the lack of public transportation. At least at the beginning, the majority of loans were utilized for trading or simple food processing (such as grinding maize flour), not for agricultural production or small-scale manufacturing. Initially, loan periods were 50 weeks and the 15 percent interest rate was very low compared to commercial bank rates. In 1992, the interest rate was raised to 18.5 percent and the loan period decreased to 25 weeks. They remained at this level until the program was assumed by the Malawi Rural Finance Company. Because of lower repayment rates by men, the Mudzi Fund developed a preference for women borrowers over time. By 1993, all lending was to women (Chirwa 1998).

¹¹ Other liberalization policies from the mid-1980s to the mid-1990s included dismantling state marketing structures, subsidized state credit, fertilizer subsidies, market-determined prices for agricultural inputs and produce (except maize), and permitting smallholders to grow export burley tobacco.

¹² Burrirt 2006 is one of the more recent works that reviews Malawi's policy environment with regard to financial services.

Other microfinance providers operated by NGOs and donor agencies in the last 15 years, such as Pride Malawi and FINCA, have attempted to service smallholder farmers, but they are dependent on commercial banks for payment services. Since commercial banks have reduced their presence in rural areas, this constrains most microfinance providers. The only microfinance provider with national coverage is the Malawi Rural Finance Company. While this microfinance institution accepts savings deposits, about 70 percent of these are really forced savings to collateralize loans (Burritt 2006).

MALAWI RURAL FINANCE COMPANY

The Malawi Rural Finance Company (MRFC) was established in 1993 by the Government of Malawi with financial and technical assistance from the World Bank and began operations in 1994.¹³ MRFC assumed the bankrupt SACA agricultural loan program that collapsed in 1994¹⁴ and the Mudzi Fund. MRFC received two credit lines: a US\$25 million line from The World Bank under The Rural Financial Services Project; and a US\$12 million line from IFAD under the Mudzi Financial Services Project. The principal objective of the Company is to provide financial services, specifically savings and credit, for rural areas.¹⁵ MRFC is charged with the responsibility to run its operations strictly on a commercial basis so as to attract private investment.

MRFC currently receives no subsidies, no credit guarantees, nor grants from Government and runs its operations with the objective of making profit. It, therefore, only takes “those credit risks that are commercially acceptable and are backed by acceptable collateral” (MRFC 2005: 6). MRFC charges competitive market-determined interest rates on its loans.

MRFC has the most extensive network of banking offices in Malawi. In 2006, there were 122 Field Offices throughout the country, through which it lends and accepts deposits from customers. These field offices are generally located in Agricultural Extension facilities. Field offices are supervised by 7 Branch Offices located in major cities and towns and 27 Satellite Offices. MRFC field staff members are equipped with motorbikes to enable them to take the banking services to the villages. Most banking transactions are done at the village so that the customers do not have to travel to the branch office.

MRFC provides both individual and group credit to rural-area residents, and it is the group micro-credit program that seeks to reach low-income and asset-poor households. Two types of group credit are available: seasonal (for agricultural production) and business (for micro-enterprises). The groups (called clubs in Malawi) are usually formed by agricultural extension agents, NGO staff, and missions.

¹³ The information in this section on the MRFC is based on interviews with Field Officers, meetings with MRFC officials in Lilongwe, and the MRFC 2004 Annual Report.

¹⁴ SACA, run by the Ministry of Agriculture, had provided subsidized agricultural production loans, mostly for hybrid maize, to smallholders since 1987.

¹⁵ MRFC is not a licensed bank—while it can collect savings deposits, it cannot onlend savings to the public (Burritt 2006).

Credit groups are mixed, consisting of both women and men.¹⁶ According the 2004 MRFC Annual Report, the percentage of women borrowers (for both individual and group loans) since 1999 was 40.7 percent.¹⁷ After a group is formed, they are screened by MRFC field officers to make sure they are a viable group. The screening attempts to determine that the group is homogeneous, that persons in the group know each other, that they are 18 years of age or older, and that they have not previously defaulted on a loan. All approved groups have to attend a four-week training program¹⁸ provided by agricultural extension agents and MRFC staff. Field officers visit the credit groups periodically several times monthly to collect loan payments (for micro-enterprise loans) and savings deposits and to sort out problems borrowers are experiencing. These meetings take place in different places, such as a church, school, or under a tree, depending on available structures in the village.

Seasonal loans are available from October to September—the agricultural season—to smallholder farmers who generally have customary rights to community land. All seasonal loans are in kind: mainly seeds and fertilizer to grow hybrid maize, tobacco, soybean, and other cash crops. When credit is approved, the individual borrower receives a voucher that can be used to buy the inputs from any supplier registered with the MRFC. Loans are repaid after harvest. Currently, there are two group-based micro-credit programs for seasonal loans¹⁹:

1. Smallholder club: for landholders (normally without title) with less than one hectare of land. Until 2004, only social collateral was required; now each borrower must deposit at least 15 percent of the loan amount in a savings account and it cannot be withdrawn until the loan is fully paid back.
2. Agricultural Productivity Investment Programme (APIP) loans: the funds for this micro- credit program originally came from the Ministry of Agriculture and the European Union. Borrowers receive vouchers for one bag of hybrid maize seed and one bag of fertilizer. Besides the social collateral, borrowers also deposit a 15 percent cash collateral. The Mudzi Fund²⁰ and Food Security Program²¹,

¹⁶ The Malawi Mudzi Fund micro-credit program initially had separate male and female groups; after several years, all their groups were women only.

¹⁷ Broken down by year, the percentages are: 38% for 1999–00, 40% for 2000–01, 40% for 2001–02, 45% for 2002–03, and 40% for 2003–04 (MRFC 2005: 41).

¹⁸ Training sessions used to be eight weeks long.

¹⁹ Besides these micro-credit programs, MRFC provides individual loans to owners of large and medium-sized estates (more than 30 hectares) with freehold rights to land. The collateral requirements are a land title and 15 percent cash collateral deposit (until recently, cash collateral was 20 percent). According to MRFC officials, it is these loans that generate profits for MRFC.

²⁰ As of mid-2006, Malawi Mudzi Fund loans were available only in Blantyre area in the south and Salima area in the central region. Initially, only social collateral was required. Now, only first time borrowers do not need to deposit cash collateral. Second-year borrowers are required to deposit 7.5 percent cash collateral and third-year borrowers, 15 percent cash collateral.

²¹ The Food Security Program has now been completely phased out. It was targeted for landholders with less than 0.4 hectares of land or with assets equal to 5 bags of maize. They received an input package to plant 0.25 hectare in maize, 0.1 hectare in tobacco, and 0.15 hectare in other crops, usually legumes.

which were targeted to low-income and low-asset households, have been phased out and absorbed under the APIP program.

A two-tier interest rate structure is used for seasonal loans. Repeat borrowers who have paid their loans on time are charged a rate 2 points below that of first-time borrowers.

Business loans are available from July to June—the financial fiscal year. These loans are in cash, not in-kind. There are two group business credit programs.

1. Micro-business: these are available in both rural and urban areas (used to be Mudzi Fund loans). A 20 percent cash deposit, in addition to social collateral, is required; no assets are required as collateral. Normally, there are 10-15 persons per group. Loan amounts for repeat borrowers are increased by 50 percent each time to a maximum of 50,000 MK (approximately US\$357 as of July 2006) per person.
2. Group-based business credit: groups are normally 5-9 persons. Asset collateral (household appliances and goods, or landed property with or without title) is required in addition to a 20 percent cash deposit and social collateral. The village chief provides guarantee of ownership. First loan maximum is 50,000 MK; subsequent loans can be increased by 50 percent up to a maximum of 450,000 MK per person (approximately US\$3,214 as of July 2006).

Interest rates on Business Loans are a function of perceived risks inherent in a proposal and the level of collateral offered.

2. STUDY OBJECTIVES AND METHODOLOGY

This section outlines the research questions that drove the study, the methodology adopted for exploring these research questions, and the sampling strategy.

2.1 STUDY QUESTIONS

The general objective of this study is to assess the effects of rural credit on household welfare. The specific welfare issues that we focused on are the household's consumption and expenditure levels, vulnerability to economic shock, children's education and health, and women's empowerment.

HOUSEHOLD WELFARE

Microfinance institutions, and particularly micro-credit, have attracted much attention from development practitioners because of the potential that micro-credit and savings have for reducing poverty and increasing household welfare. By providing capital to limited-asset and low-income households for investing in agriculture or micro-enterprises, household income is increased. This should result in increased expenditures on household needs and increased consumption for household members, including children. Since studies have shown that female income is more likely to be invested in household welfare items such as food and schooling, the practice of most microfinance

programs to target women²² should raise the probability of increased household welfare. We explore the relation between micro-credit and household welfare by looking at household consumption and expenditure levels (including expenditures on education and health), school attendance, and child immunization.

VULNERABILITY

Shocks with economic effects, such as crop failure, sickness, or death, are devastating for chronically poor communities and households. Micro-credit for agriculture or micro-enterprise development can reduce poverty and vulnerability by providing sources of income and/or savings to smooth over the effects of economic shocks. The research question we explore is whether households with access to credit have less recourse to “bad” coping mechanisms, such as food consumption reduction and pulling children out of school, in response to shock.

GENDER EMPOWERMENT

One of the justifications of targeting women for micro-credit programs is that access to financial services facilitates women’s participation in income-generating activities, increasing their power of agency, their ability to exercise choice. The literature has shown that women who bring income into the household have greater bargaining power over household decisions such as allocation of resources. Related to the issue of empowerment and women’s increased decision-making power, is the propensity for women to allocate more income and resources towards child welfare (Ackerly 1995; Thomas 1990).

Empowerment is a process of change—from disempowerment to exercising choice. And as such, it is difficult to measure because of differing social contexts (Dessy and Ewoudou 2006) as well as personal and societal conjunctural events (Kabeer 1994, 1999).²³ Kabeer (1999) describes the three dimensions of empowerment as control over resources, agency, and outcomes. The process begins with a woman’s control over some resources or assets such as land, livestock, education, or skills. She uses these resources to define a goal and act upon it—agency. These decisions and actions may or may not be in opposition to household and community norms and practices. For example, she may obtain credit in order to engage in an income-generating activity and hopefully increase her assets and well-being, as well as those of her household. Whether those actions result in outcomes that increase her welfare or that change the balance of intra-household power is the final element in the empowerment process.

Efforts to capture gender empowerment effects generally attempt to capture intra-household power by looking at decision-making practices within the household or by using proxies such as women’s participation in income-generating activities which

²² The principal reason MFIs target women as borrowers is women’s high repayment rate compared to men’s.

²³ For example, a number of studies have shown that women who obtain micro-credit remain limited in the type of income-generating activity they participate in, generally low-productivity and low-capital enterprises (Kabeer 2001, Lairap-Fonderson 2002).

improves a woman's fall-back position vis-à-vis male heads of household (Basu 2006; Anderson and Eswaran 2005).

Another difficulty of measuring the effect of micro-credit on gender empowerment, particularly without time-series data, is that women who apply for credit may already have an elevated level of empowerment and decision-making power relative to her peers (Mahmud 2003). In our attempt to capture the process of empowerment directly, we use several proxies that indicate levels of empowerment: participation in income-generating activities, decision-making, and participation in community organizations.

2.2 STUDY DESIGN AND DATA COLLECTION

The ideal methodology for testing our hypotheses would be with panel survey data that was initially conducted at the time the microfinance program was initiated and again more recently. In addition, the survey sample should ideally include two types of communities: one where formal credit has been available and another where it has not. In this case, we do not have a baseline survey; therefore we undertook a quasi-experimental survey design and the analysis is limited to cross-sectional comparison of program and non-program communities.

DATA COLLECTION METHODS

The data was collected at the household level by interviewing both spouses. Some modules were applied to both husband and wife together (or just the household head, if single-headed household): information on household members, education and schooling, health and anthropometry, economic shocks, and expenditures. Other modules were applied to each spouse separately: household and individual income sources, household wealth and assets, use of financial services (of that individual only), membership in community organizations (of that individual only), intra-household decision-making, and asset transfers related to marriage. Some of the data was recall information such as economic shocks and coping strategies in the last three years and credit history for last three years.

To supplement the household survey data, community-level questionnaires were conducted in both program and non-program sites. In addition, two types of focus group discussions were carried out with women in the three regions: on group credit and on gender empowerment.

SAMPLING STRATEGY

Malawi has three regions that are geographically, demographically, and culturally different; all three regions were included in our sample. The northern region is less densely populated, has less infrastructure such as roads, and contains ethnic groups based on patrilineal kinship. Central Malawi, where the capital, Lilongwe, is located, is more densely populated and while culturally diverse is mainly matrilineal. And the southern region, with some of the best agricultural land in Malawi, is very densely populated, has two major cities (Blantyre and Zomba), and is populated by matrilineal ethnic groups. Since the study is focused on rural areas, we avoided cities and towns when selecting sample sites.

Since use of credit is extremely low in Malawi and widely scattered, we purposefully selected program sample rural sites in each region with high MRFC borrower levels²⁴ to ensure a high proportion of households with borrowers. Nearby villages without access to formal credit (i.e., non-program villages) were also purposefully selected as control areas.²⁵ Sample households within program and non-program villages were randomly selected. We sampled 150 household in each of the northern and southern regions, and 200 in the central region because of the higher level of loan activity in the central region.²⁶ Because areas were purposefully selected, the sample is not representative of Malawi nationally.

Some household characteristics are presented in Table 1. While there are some differences between regions, there are no significant differences between program and non-program households within a region.²⁷ Household size in the north is considerably larger than in the central and southern regions. Another major regional difference is the distribution of female-headed households. The sample contained a large percentage of single-headed households, mostly headed by women (more than 30% of sample), and most of these female-headed households are located in the central (43%) and southern (29%) regions.²⁸ On the other hand, dependency ratios are similar across regions.

²⁴ MRFC is the biggest and most extensive provider of micro-credit in rural Malawi.

²⁵ In order to evaluate the impacts of program participation, the ideal instrument is the random assignment of the program. In reality, however, program allocation and participation are non-random. In other words, program villages might be purposively selected by the finance company or field offices to ensure that lending is sufficiently profitable. And within program villages participants may be systematically different from non-participants (e.g., wealthier households). When microfinance institutions target the poorest of the poor, the opposite scenario is highly possible. The issue of non-random program allocation is known as “placement bias” (Pitt and Khandker 1998). To address this problem, we carefully chose the non-program villages from areas in the same socio-economic conditions. The rest of this section describes the similarities between program and non-program villages, while presenting some variations across districts, to confirm that there is no difference in underlying characteristics that might influence the social welfare outcomes we examine. The non-program villages in our sample were reported to be candidates for next inclusion in the program by the company, although field officers and village leaders had not yet officially begun the process. In addition, we compared the program and non-program villages using community surveys. The community surveys also suggest little variation between program and non-program villages in terms of main economic activities (farming and small-scale trade), ethnicity (Tumbuka in northern region; Ngoni, Yao, and Chewa in central region; and Yao, Chewa, and Lomwe in the southern region), culture (marriage and inheritance practices), and access to infrastructure and services such as roads (type of roads and distance to paved road), markets (distance to the nearest market), schools (primary and secondary schools), medical services (hospital, health center, dispensary, etc.), financial institutions (MRFC, cooperatives, NGOs), and welfare and support programs. To address the selection problem within the program villages, we utilize econometric methodologies based on the quasi-experimental survey design, which is discussed in more detail in Section 3.

²⁶ Tables A1 and A2 in Annex A provide information on the sampled areas such as village and district location, and list the number of sample households in program and non-program sample districts and Extension Program Areas (EPA).

²⁷ The t-tests on each characteristic within regions found no significant differences. For the entire sample, however, the proportion of female-headed households in non-program communities was significantly higher than in program villages. Household size and dependency ratio were not significantly different. In the parametric analysis presented in the next section, we include a control for female-headed households.

²⁸ Table A3 in Annex A provides more information on type of household.

Table 1: Household Characteristics by Region

Region	Program	Non-Program	Total
<i>North</i>	(n=75)	(n=75)	(n=150)
Household size	5.74	5.48	5.60
Dependency ratio	1.30	1.24	1.27
% with female head	12.3	17.0	14.8
<i>Central</i>	(n=99)	(n=99)	(n=198)
Household size	4.76	4.44	4.57
Dependency ratio	1.22	1.24	1.24
% with female head	36.4	47.7	43.0
<i>South</i>	(n=75)	(n=75)	(n=150)
Household size	4.62	4.92	4.76
Dependency ratio	1.07	1.29	1.18
% with female head	19.2	39.0	28.7
<i>Total</i>	(n=249)	(n=249)	(n=498)
Household size	4.85	4.83	4.84
Dependency ratio	1.16	1.26	1.21
% with female head	23.3	38.7	31.3

Note: Weighted means are reported. Dependency ratio is defined as the ratio of the number of dependents (children under the age of 15 and adults above 65 years old) to that of working age adults. In 19 households the ratio cannot be calculated because there is no working adult.

Characteristics of household heads and spouses in the sample are very similar between program and non-program communities within each region, although there are differences between regions (Table A4 in Annex A gives data on age and education broken down by region). Heads and spouses in the northern region are more educated than in central and southern regions. As already noted, the percentage of female-headed households in the north is approximately half of those in central and southern regions.

Looking at borrowing behavior in our sample shows expected differences between program and non-program communities (Table 2). As expected, there is a high number of MRFC borrowers in the program areas and a low number in non-program areas.²⁹ In addition, many households in our sample in both program and non-program areas borrowed from relatives and friends, very few from traders and shops. Not only does MRFC provide another source of credit in the program areas, the average amount borrowed per household over the last three years (32,359 Malawi Kwacha) is, on average, about 8 times the amount borrowed from relatives and friends (3,945 MK) and more than

²⁹ There were very few borrowers from other formal sources other than MRFC.

18 times what they borrow from traders and shops (1,767 MK) (see Table A5 in Annex A).

Table 2: Credit Sources for Borrowing over Last 3 Years

Region & Credit Source	Program		Non-Program	
	Borrower	Non-Borrower	Borrower	Non-Borrower
<i>North</i>				
MRFC	33	41	4	71
Relatives/Friends	35	39	29	46
Traders/Shops	4	70	2	73
<i>Central</i>				
MRFC	26	73	2	96
Relatives/Friends	39	60	41	57
Traders/Shops	6	93	5	93
<i>South</i>				
MRFC	48	27	5	70
Relatives/Friends	24	51	35	40
Traders/Shops	8	67	14	61
<i>Total</i>				
MRFC	107	141	11	237
Relatives/Friends	98	150	105	143
Traders/Shops	18	230	21	227

Note: 50 households obtained loans from both MRFC and relatives/friends, and 9 households borrowed from both MRFC and traders/shops; 7 households borrowed from all three credit sources.

Because we targeted districts and EPAs with relatively high numbers of borrowers, the number of borrowers in our program sample areas is very high compared to national coverage: almost 43 percent of households in program villages had obtained at least one loan from MRFC during the last three years (see Table A6 in Annex A).

A disappointing characteristic of our sample is the low number of women borrowers.³⁰ Out of 126 MRFC borrowers, only 34 are women (27%), fairly evenly distributed among the three regions (Table 3). Fourteen (41%) of these women borrowers are from single-headed households, all located in the central and southern regions (Table A7 in Annex A). Women borrowers are younger and less educated than male borrowers. They obtain smaller loans, and a higher percentage of their loans (18%) are for micro-enterprise, not agriculture, compared to men borrowers (only 4%). The fact

³⁰ According the 2004 MRFC Annual Report, the percentage of women borrowers (for both individual and group loans) since 1999 was 40.7 percent (MRFC 2005).

that the majority of loans in rural areas are for cash crop production, particularly export tobacco, may explain why a small percentage of women borrowers were represented in the sample. Peters (1996) has pointed out that the production of burley tobacco has a very high labor demand and is therefore difficult for farmers without access to family male labor and little cash income such as female-headed households and women farmers.

Table 3: Characteristics of MRFC Clients by Gender

	Male	Female
Total number of clients	92	34
(agricultural production loan)	(89)	(28)
Age	46.7	44.6
Highest education (grade) completed	4.95	4.04
Loan amount (MK*)	34,853	20,211

* At time of survey, 1USD = 140MK

3. DATA ANALYSIS

In this section, we outline our estimation methodology for testing the hypotheses and report the results obtained for the three hypotheses.

3.1 DATA ANALYSIS METHODOLOGY

The estimation methodology we utilize, based on our quasi-experimental sampling design, includes (1) propensity score matching and (2) a dummy endogenous variable model. Since, in our analysis, the most serious concern is non-random program participation or non-random assignment of the program by the company, we need to address potential selection biases to consistently estimate the causal effect of the program participation. Historically, the program has targeted the poor, thus poorer households were more likely to be in the program. More recently, however, the company may be purposively choosing wealthier households under the recent pressure of privatization and the fear of high default rates.³¹ In the former case, the OLS estimator leads us to underestimate the causal effect of the MRFC credit program, whereas the latter tends to inflate the effect because of the pre-existent difference in the household welfare. In order to address these problems, we utilize both non-parametric and parametric approaches.

(1) Propensity Score Matching (PSM)

Propensity Score Matching is called selection on observables. The critical assumption that Rosenbaum and Rubin (1983) introduced for this methodology is ignorability of treatment given the conditioning variables X

$$Y_1, Y_0 \perp D \mid X \quad (1)$$

³¹ This conjecture is based on interviews with MRFC Field Officers.

where Y_1, Y_0 are the realization of the outcome when $D = 1$ (participation) and $D = 0$ (non-participation) respectively. Thus, (1) indicates that the outcome is independent from the participation given the covariate X . They also assume

$$0 < p(X) < 1 \quad (2)$$

where $p(X)$ is the probability of the participation, which is called the propensity score. Under these assumptions, they show

$$Y_1, Y_0 \perp D \mid p(X), \quad (3)$$

which indicates the outcome is independent from the participation given the propensity score, and the effect of program participation is non-parametrically identified.³²

To apply PSM to our dataset, we first estimate the following participation equation by the Probit model with samples only in the program villages.

$$D_i = 1[X_i\beta_V + u_{vi} \geq 0]. \quad (4)$$

$1[\cdot]$ is the indicator function that takes one when household i 's utility exceeds zero and the household i participates in the program, β_V is a vector of parameters to be estimated, and u_{vi} is an error term. Since we are also interested in the probabilities of participation among the households in the non-program villages if the program was available there, we predict such probabilities by applying the estimate $\hat{\beta}_V$ obtained from the above Probit estimation to the households in the non-program villages. After that, with the radius matching method a consistent estimator is non-parametrically constructed. Note that, to calculate the PSM estimator, we exclude eligible non-participants (ENPs), i.e., non-participants in the program villages because it is known that including ENPs into the matching sample tends to result in a biased estimator (Heckman, Ichimura and Todd 1997; 1998). For the same reason, we exclude the participants in non-program villages as well. We utilize the PSM methodology whenever it is applicable.

(2) Dummy Endogenous Variable Model (Treatment Regression)

The central idea of the dummy endogenous variable model, which we call treatment regression in this paper, is to control for unobservable effects relating to the underlying selection mechanism. The model consists of two equations; participation equation (5) and outcome equation (6).

$$D_i = 1[X_i\beta_V + Z_i\gamma_V + u_{vi} \geq 0] \quad (5)$$

$$Y_i = X_i\beta_Y + D_i \cdot \Delta + u_{Yi} \quad (6).$$

The parameter of interest is Δ , which is the effect of the program participation, and vectors of the parameters β_V and β_Y are also estimated. Z is an additional exogenous variable, which should not be included in X (exclusion restriction), and γ_V is also a parameter to be estimated. In this study, Z is a dummy variable that takes 1 if the

³² See also Wooldridge (2002).

household is in a non-program village and 0 otherwise.³³ The key issue here is that D is likely to be endogenous because program participation seems to be non-random. To treat this problem, we assume that the error terms u_V and u_Y have a bivariate normal distribution. Then, we can have the following expression with an i.i.d. error term ε .

$$Y_i = X_i\beta_Y + D_i \cdot \Delta + \hat{\lambda}_i\eta + \varepsilon_i \quad (7)$$

$$\text{where } \hat{\lambda}_i = \begin{cases} \frac{\phi(X_i\hat{\beta}_V + Z_i\hat{\gamma}_V)}{\Phi(X_i\hat{\beta}_V + Z_i\hat{\gamma}_V)} & \text{if } D_i = 1 \\ \frac{-\phi(X_i\hat{\beta}_V + Z_i\hat{\gamma}_V)}{1 - \Phi(X_i\hat{\beta}_V + Z_i\hat{\gamma}_V)} & \text{if } D_i = 0, \end{cases}$$

which is called the inverse mills ratio. $\hat{\beta}_V$ and $\hat{\gamma}_V$ can be obtained by estimating the participation equation (5) by the Probit model, and correspondingly the inverse mills ratio also can be estimated. The inclusion of the inverse mills ratio controls for the selection in the outcome equation (7). Therefore, with the inverse mills ratio we can consistently estimate the equation (7) by OLS and correctly identify the causal effect of the program participation³⁴. Even if the dependent variable is either censored or truncated, we can utilize this methodology as suggested in Wooldridge (2002).

Table 4 lists the summary statistics for the explanatory variables utilized in the regression models.

³³ Even in the non-program villages, there are several MRFC clients. They participate in the program by joining a group in the program villages. A simple test shows that the coefficients on X are not statistically significantly different between the both areas, and thus we assume that the non-program village dummy Z only affects the level difference in the probability of the program participation. We furthermore assume that, because of our sampling design, the non-program village dummy does not appear in the outcome equation, which is our main source of the identification. See more discussion in Section 2.

³⁴ A major criticism against this methodology is that the distributional assumption seems to be too restrictive. To respond to the criticism, we relaxed the assumption and used more flexible functional forms such as quadratic and cubic functions of the estimated propensity score as a control function (Heckman and Navarro-Lozano 2004) in order to check the robustness of our findings. In addition, a switching regression regime (i.e., different parametric assumption on program participants and non-participants) was adopted to conduct the robustness test.

Table 4: Summary Statistics of Explanatory Variables

	Mean	s.d.	Minimum	Maximum
<i>MRFC participation</i>				
MRFC Client (=1)	0.238	(0.426)	0	1
Female MRFC Client (=1)	0.069	(0.253)	0	1
<i>Head characteristics</i>				
Female headed household (=1)	0.296	(0.457)	0	1
Age	44.8	(15.9)	20	92
Age sq.	2263	(1590)	400	8464
<i>Male head (n=349)</i>				
Age	43.5	(15.1)	20	89
Age sq.	2121	(1465)	400	7921
Highest education (grade) completed	515	(3.62)	0	14
<i>Female head/spouse (n=475)</i>				
Age	40.2	(15.5)	16	92
Age sq.	1854	(1458)	256	8464
Highest education (grade) completed	3.45	(3.29)	0	12
<i>Household characteristics</i>				
log (Household size)	1.471	(0.486)	0	2.398
Ratio of dependents (15- and 65+) to household size	0.492	(0.230)	0	1
log (land size in acre 3 years ago)	1.217	(0.619)	-0.693	4.370

Note: n = 496

3.2 DATA ANALYSIS RESULTS

The outcomes we attempt to determine are whether access to micro-finance services for rural households increases household welfare and reduce vulnerability to economic shock. In order to construct a propensity score and control for selection, we first determined the observable characteristics of those individuals and their households who are most likely to participate in the credit program (Table 5, Column A and B). Age of household head is positive and significant (at 0.01 level) indicating that households with older heads are more likely to participate in the credit program.³⁵ Being a female-headed household has a negative and also highly significant coefficient (at 0.01 level), indicating that women who head households (and are single) are less likely to participate in the credit program.

Household size is positive but not significant and ratio of dependents is negative and not significant. Size of landholdings (log) is positive (except for female-headed households, Column D) but not significant. Since most of the micro-credit in our sample

³⁵ Age squared, however, is negative and significant indicating that after a certain age (for our sample, 55), participation declines.

is for agricultural production, the positive coefficient is expected. Not surprisingly, not living in a program area has a significant (at 0.01 level) negative coefficient for participation.

Table 5: Determinants of MRFC Program Participation (Probit Model)

Household and Individual Characteristics	Program Area Households	All Households	Two spouse household	Female headed household
	(A)	(B)	(C)	(D)
Head				
Female headed household (=1)	-1.123** (0.442)	-0.747** (0.362)		
Age of household head	0.109** (0.045)	0.081** (0.037)	0.197** (0.078)	0.183 (0.130)
Age sq. ^(a)	-1.016** (0.459)	-0.736** (0.374)	-1.664** (0.741)	-2.071 (1.404)
Highest education (grade) completed	-0.013 (0.038)	-0.028 (0.032)	-0.036 (0.038)	0.097 (0.077)
Spouse				
Age of spouse			-0.140 (0.086)	
Age sq. ^(a)			1.291 (0.943)	
Highest education (grade) completed	0.043 (0.041)	0.023 (0.034)	-0.012 (0.047)	
Household characteristics				
log (Household size)	0.246 (0.253)	0.372* (0.210)	0.459 (0.291)	-0.012 (0.556)
Ratio of dependents (15- and 65+) to household size	-0.894* (0.479)	-0.630 (0.394)	-0.537 (0.514)	-1.567 (1.167)
log (land size in acres 3 years ago)	0.173 (0.166)	0.163 (0.150)	0.204 (0.192)	-0.400 (0.494)
Non-Program (=1)		-1.723*** (0.184)	-1.809*** (0.224)	-2.275*** (0.680)
Region Dummies	Yes	Yes	Yes	Yes
Sample Size	248	496	282	147

Note: Raw coefficients are reported and standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

In the following sections we will examine the effect of participation in the MRFC micro-credit program on several measures of household welfare: household consumption, expenditures, and income; education (expenditures and school attendance); health (expenditures and child immunization); vulnerability to shock; and gender empowerment.

HOUSEHOLD CONSUMPTION, EXPENDITURES, AND INCOME

First, we will examine the effect of credit participation on expenditure and consumption at the household level.³⁶ Tables 6 and 7 give the results of these estimations for total expenditures and total consumption (includes non-purchased food).³⁷ Respondents (both head of household and spouse together) were asked to recall how much food was consumed in the past week (both own-produced and purchased), how much was spent on non-food consumer items over the past month, and on durables and services over the past year.

MRFC participation increases total monthly consumption by 22.6 percent (Table 6, column C), but this increase is significant only at the 0.10 level. The PSM estimate shows a similar result and is significant at the 0.01 level. An explanatory variable that has a larger positive and significant (at 0.01 level) effect is land size: an increase in land size increases total consumption by 31 percent. Household size also has a positive and significant effect (at 0.01 level), but that is to be expected since larger households, other things being equal, consume more. Spouse's education is also positive and significant (0.10 level). Education of household head and ratio of dependents to household size are both negative, but not significant. Another interesting result is that female-headed households have a negative, but not significant, effect on total consumption, perhaps indicating that they are smaller and/or poorer households.

MRFC participation increases food consumption (includes both purchased and own-produced food) by 12.5 percent; this positive effect, however, is not significant. As with total consumption, land size (as well as household size) is positive and significant for food consumption (Table A9 in Annex A).

³⁶ Table A8 in Annex A lists the program and non-program means for different categories of consumption, expenditures, and income.

³⁷ We use the log of consumption and expenditures so that we can capture the non-linear relationship between consumption (or expenditures) and explanatory variables.

Table 6: Impact of MRFC Participation on Log (Total Consumption)

	PSM (A)	OLS (B)	Treatment Regression (C)
<i>MRFC participation</i>			
MRFC client (=1)	0.215*** (0.081)	0.125* (0.069)	0.226* (0.129)
<i>Head and Spouse</i>			
Female headed household (=1)		-0.110 (0.121)	-0.090 (0.122)
Age of household head		0.010 (0.012)	0.009 (0.012)
Age sq. ^(a)		-0.122 (0.115)	-0.109 (0.114)
Highest education (grade) completed by head spouse		-0.005 (0.012)	-0.005 (0.012)
Highest education (grade) completed by female spouse		0.022* (0.012)	0.022* (0.011)
<i>Household characteristics</i>			
log (Household size)		0.321*** (0.071)	0.314*** (0.070)
Ratio of dependents (15- and 65+) to household size		-0.082 (0.138)	-0.076 (0.136)
log (land size in acres)		0.313*** (0.051)	0.308*** (0.051)
<i>Selection control</i>			
Inverse Mills ratio			-0.070 (0.090)
Region Dummies		Yes	Yes
Sample Size	344	496	496

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

If we look at total monthly expenditures (excludes own-produced food, a significant proportion of food consumed), MRFC participation has a positive (an increase of almost 20 percent) but not significant effect (Table 7, column C).³⁸ On the other hand, the PSM results in a 25 percent increase, significant at the 0.01 level. Some of the other explanatory variables are significant: household size and land size are positive and

³⁸ The Malawi Kwacha increase is 1,327 (mean of monthly expenditure 6669MK * 0.199), about US\$9.48.

significant (both at 0.01 level). This last variable increases total expenditures by 26 percent. Again, being a female-headed household has a negative (but not significant) effect, decreasing expenditures by 25 percent. Education of both household head and spouse are positive, but not significant.

Table 7: Impact of MRFC Participation on log (Total Expenditure)

	PSM (A)	OLS (B)	Treatment Regression (C)
<i>MRFC participation</i>			
MRFC client (=1)	0.252*** (0.094)	0.162* (0.086)	0.199 (0.161)
<i>Head and Spouse</i>			
Female headed household (=1)		-0.254* (0.151)	-0.247 (0.152)
Age of household head		0.021 (0.014)	0.020 (0.014)
Age sq. ^(a)		-0.240 (0.143)	-0.236 (0.143)
Highest education (grade) completed by head spouse		0.002 (0.015)	0.002 (0.015)
Highest education (grade) completed by female spouse		0.023 (0.014)	0.023 (0.014)
<i>Household characteristics</i>			
log (Household size)		0.334*** (0.088)	0.332*** (0.087)
Ratio of dependents (15- and 65+) to household size		0.042 (0.172)	0.044 (0.170)
log (land size in acres)		0.262*** (0.064)	0.259*** (0.063)
<i>Selection control</i>			
Inverse Mills ratio			-0.022 (0.112)
Region Dummies		Yes	Yes
Sample Size	344	496	496

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

Breaking down expenditures into food and non-food (Tables A10 and A11 in Annex A), it is clear that effect of MRFC participation on expenditures is accounted for by consumer goods and services (such as health and education) rather than food. Non-food

expenditures increase by 43.5 percent and this increase is significant at 0.01 level; expenditures on food also increase (by 12 percent) but is not significant. Other significant and positive effects on non-food expenditures are household size and land size (at 0.01 level) and female spouse's education (at 0.05 level). Again, female headed households have negative effect, significant at 0.10 level.

Thus, it appears that while participation in the MRFC credit program increases food consumption and expenditures, the more important effect is on non-food goods and services. After a brief look at household income, we will explore more closely two of these non-food expenditures: education and health.

Our survey instrument did not collect detailed income data: we preferred to use expenditure data as a proxy for income. We did, however, ask respondents to recall annual cash income at the household level from different income sources: crops (food and cash crops), livestock, wage work, non-farm enterprises, and remittances. Regression analysis results on the effect of MRFC participation on household income (Table 8) is consistent with those we obtained for expenditures. A simulation shows the coefficient 2.280 indicates that MRFC credit increased total monthly household income by 1,545 Malawi Kwacha, a significant increase (at 0.05 level); the increase in monthly expenditures is 1,654MK. Again, we find that female-headed households have significantly less income (at 0.05 level), and that income increases significantly with size of landholding (at 0.01 level). Tables A12 and A13 in Annex A break down household income by source.

Table 8: Impact of MRFC Participation on Monthly Income (in 1000 Malawi Kwacha*)

	PSM (A)	Tobit	
		without selection control (B)	with selection control (C)
<i>MRFC participation</i>			
MRFC client (=1)	0.508 (0.381)	-0.484 (0.607)	2.280** (1.147)
<i>Household head/spouse</i>			
Female headed household (=1)		-2.842*** (1.077)	-2.280** (1.085)
Age of household head		0.055 (0.104)	0.011 (0.104)
Age sq.(a)		-0.731 (1.043)	-0.349 (1.041)
Highest education (grade) completed by male spouse		0.108 (0.106)	0.115 (0.105)
Highest education (grade) completed by female spouse		0.166 (0.103)	0.166 (0.102)
<i>Household Characteristics</i>			
log (Household size)		0.683 (0.636)	0.478 (0.634)
Ratio of dependents (15- and 65+) to household size		-0.310 (1.239)	-0.138 (1.230)
log (land size in acres 3 years ago)		2.047*** (0.466)	1.874*** (0.465)
<i>Selection control</i>			
Inverse Mills ratio			-2.175*** (0.769)
Region Dummies		Yes	Yes
Sample Size	344	496	496

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

**1US\$ = 140MK.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

EDUCATION EXPENDITURES AND SCHOOL ATTENDANCE

Education in Malawi has been free for primary schools (grades 1 through 8) since 1994. School attendance soared at that time (World Bank 1996) and has remained relatively high. Nevertheless, households still have expenses such as uniforms, shoes, and books. For low income households, these expenses are not insignificant. Secondary school is not free; in addition, they are often located far from students' own villages, incurring other expenses such as transportation, food, and lodging. One can expect, therefore, that much fewer children attend secondary school.

Participation in the MRFC credit program significantly (at 0.05 level) increases monthly expenditures on education by 77.9 MK per student (the MRFC client coefficient is 0.156 in Table A14 in Annex A). Other variables that have significant positive influence on education expenditures are: age of household head, education of female spouse, and land size.

If we break down education expenditures by gender of children (Table 9), we find that the coefficients on the MRFC client dummy variable are 0.221 for girls and 0.091 for boys. Using simulations, MRFC participation increases monthly education expenditures on girls by 93.5 MK per student (significant at 0.05) and on boys by 44.8 MK per student (not significant).³⁹

Other positive explanatory variables for boy children (column B) are: age of household head and land size (at 0.01 level), and education of head (at 0.05 level). The other household characteristics such as size (log) and dependant/household size ratio have opposite signs but are not significant. For girls (column D), again age of household head is positive and significant (at 0.05 level), and education of spouse (rather than head) is positive and significant (at 0.05 level). Education of head is negative, but not significant. Among household characteristics, land size is positive, but less so for girls than for boys, and significant at 0.10 level. Neither household size nor dependent/household size ratio are significant.

³⁹ In US\$: \$0.67 for girls and \$0.32 for boys.

Table 9: Impact of MRFC Participation on Educational Expenditures among Individuals Aged 6 to 24 by Gender (in 1000 Malawi Kwacha*)

	Boys		Girls	
	Tobit (A)	Tobit with selection control (B)	Tobit (D)	Tobit with selection control (E)
<i>MRFC participation</i>				
MRFC client (=1)	0.058 (0.040)	0.091 (0.074)	-0.011 (0.060)	0.221** (0.108)
<i>Child characteristics</i>				
Age dummies	Yes	Yes	Yes	Yes
<i>Head and Spouse</i>				
Female headed household (=1)	0.097 (0.077)	0.104 (0.078)	0.069 (0.103)	0.122 (0.104)
Age of household head	0.024*** (0.009)	0.024*** (0.009)	0.035*** (0.013)	0.032** (0.013)
Age sq.(a)	-0.220*** (0.084)	-0.218** (0.084)	-0.306** (0.126)	-0.281** (0.125)
Highest education (grade) completed by male spouse	0.015** (0.008)	0.016** (0.008)	-0.006 (0.011)	-0.005 (0.011)
Highest education (grade) completed by female spouse	0.006 (0.008)	0.006 (0.008)	0.025** (0.011)	0.024** (0.010)
<i>Household characteristics</i>				
log (Household size)	-0.049 (0.061)	-0.055 (0.062)	0.131 (0.082)	0.090 (0.083)
Ratio of dependents (15- and 65+) to household size	0.092 (0.125)	0.096 (0.125)	-0.077 (0.166)	-0.020 (0.165)
log (land size in acres 3 years ago)	0.111*** (0.033)	0.108*** (0.033)	0.105** (0.049)	0.088* (0.049)
<i>Selection control</i>				
Inverse Mills ratio		-0.027 (0.050)		-0.182** (0.071)
Region Dummies	Yes	Yes	Yes	Yes
Sample Size	546	546	590	590

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

*1US\$ = 140MK.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

Having looked at expenditures on education, let's now look at school attendance. Children in Malawi, especially in rural areas, tend to start their schooling at a later age and to repeat grade levels. For this reason, older children may be still attending primary school. In our sample, over half of the 6-year old children were attending school, but by age 7, the great majority was in school (Table A15 in Annex A). Attendance seems to peak at age 12, and then declines steadily as children become older. Because secondary school is not free, children that complete primary often do not go on to secondary school (World Bank 1996).

Table A16 (in Annex A) shows the effect of participation in the credit program on individual children's school attendance, both primary-age and secondary-age. MRFC participation has a negative effect (7 percentage points decrease in attendance) but not significant for younger children (ages 6 to 14). The coefficient for female-headed households is negative and significant (at 0.10 level), and the coefficient on land size is also negative, but not significant.

For older children (ages 15 to 18), participation has a positive effect (14 percentage points increase in attendance) but is not significant.⁴⁰ A positive and significant (at 0.05 level) influence is ratio of dependents to household size. A negative influence is female-headed households (significant at 0.01). The girl dummy variable is negative and significant (at 0.10 level), meaning that, overall, fewer girls in this age category attend school than boys.

If we break down our sample of school children by gender to explore the effect on boy and girl children separately, the differences between age groups become more evident. Tables 10-12 show the results of MRFC participation on three age groups broken down by gender: primary-age, secondary-age, and young adults. For primary age children (Table 10), the negative effect we detected seems to be borne mainly by girls—their attendance rate decreases by almost 12 percentage points (significant at 0.10), compared to almost 3 percentage points for boys (not significant). Households headed by women have negative coefficients for both boys and girls, but are not significant. Age and education of head, as well as spouse's education are positive but not significant. The household characteristic variables tend to be negative but none are significant.

⁴⁰ School attendance rates for the whole sample are lower for older children, and lower for older girl children compared to older boy children (Table A15 in Annex A).

**Table 10: Impact of MRFC Participation on School Attendance
among Children Aged 6 to 14**

	Boys		Girls	
	OLS (A)	Treatment Regression (B)	OLS (C)	Treatment Regression (D)
MRFC participation				
MRFC client (=1)	0.051 (0.035)	-0.030 (0.064)	-0.063* (0.036)	-0.116* (0.067)
Child characteristics				
Age dummies	Yes	Yes	Yes	Yes
Head and Spouse				
Female headed household (=1)	-0.077 (0.064)	-0.093 (0.065)	-0.062 (0.059)	-0.075 (0.061)
Age of household head	0.011 (0.007)	0.012 (0.007)	0.000 (0.008)	0.000 (0.008)
Age sq. ^(a)	-0.095 (0.072)	-0.102 (0.072)	0.003 (0.078)	-0.002 (0.079)
Highest education (grade) completed by male spouse	0.003 (0.006)	0.002 (0.006)	0.008 (0.007)	0.007 (0.007)
Highest education (grade) completed by female spouse	0.008 (0.006)	0.009 (0.006)	0.011 (0.006)	0.011 (0.007)
Household characteristics				
log (Household size)	-0.069 (0.051)	-0.054 (0.052)	-0.024 (0.050)	-0.016 (0.051)
Ratio of dependents (15- and 65+) to household size	0.120 (0.116)	0.108 (0.116)	-0.142 (0.103)	-0.157 (0.104)
log (land size in acres 3 years ago)	0.006 (0.026)	0.013 (0.026)	-0.056* (0.032)	-0.052 (0.032)
Selection control				
Inverse Mills ratio		0.063 (0.042)		0.041 (0.043)
Region Dummies	Yes	Yes	Yes	Yes
Sample Size	345	345	363	363

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.
(a) Coefficients and standard errors are reported in the order of 10⁻³

For secondary-age children (Table 11, columns B and D), the effect is positive but insignificant, and greater for adolescent boys: 16 percentage points compared to 9 percentage points for adolescent girls. The only significant variables for this age group occur among girls: female-headed households have a negative effect (significant at 0.10 level), and spouse's education which is positive at 0.10 level. Education of household head is positive for boys and negative for girls, but insignificant. Of the household characteristics, household size is negative while dependents/household size ratio and land size are positive—none are significant.

Table 11: Impact of MRFC participation on School Attendance among Adolescents aged 15 to 18

	Boys		Girls	
	OLS (A)	Treatment Regression (B)	OLS (C)	Treatment Regression (D)
MRFC participation				
MRFC client (=1)	0.137* (0.080)	0.159 (0.157)	0.033 (0.090)	0.088 (0.170)
Child characteristics				
Age dummies	Yes	Yes	Yes	Yes
Head and Spouse				
Female headed household (=1)	-0.282* (0.167)	-0.277 (0.171)	-0.358** (0.175)	-0.349* (0.178)
Age of household head	-0.005 (0.023)	-0.005 (0.023)	0.028 (0.017)	0.026 (0.017)
Age sq. ^(a)	0.018 (0.204)	0.018 (0.205)	-0.190 (0.169)	-0.178 (0.172)
Highest education (grade) completed by male spouse	0.015 (0.016)	0.015 (0.016)	-0.028 (0.020)	-0.030 (0.020)
Highest education (grade) completed by female spouse	0.006 (0.017)	0.005 (0.017)	0.034** (0.017)	0.032* (0.017)
Household characteristics				
log (Household size)	-0.010 (0.142)	-0.011 (0.143)	-0.087 (0.147)	-0.088 (0.148)
Ratio of dependents (15- and 65+) to household size	0.332 (0.258)	0.325 (0.263)	0.373 (0.265)	0.373 (0.266)
log (land size in acres 3 years ago)	0.031 (0.077)	0.033 (0.078)	0.016 (0.076)	0.012 (0.077)
Selection control				
Inverse Mills ratio		-0.019 (0.119)		-0.047 (0.125)
Region Dummies	Yes	Yes	Yes	Yes
Sample Size	115	115	100	100

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.
(a) Coefficients and standard errors are reported in the order of 10^{-3}

Among young adults (Table 12), MRFC participation increases young women's attendance significantly (at 0.01) by 39.5 percentage points (Column D), whereas it decreases young men's participation by 13.4 percentage points (but not significant). For young women the only other significant variable (at 0.01) is the household head's education, but its influence is negative. Interestingly, both land size and female-headed households have a negative influence on young women's school attendance and a positive influence on young men's, although neither are significant.

**Table 12: Impact of MRFC participation on School Attendance
among Young Adults aged 19 to 24**

	Male		Female	
	OLS (A)	Treatment Regression (B)	OLS (C)	Treatment Regression (D)
MRFC participation				
MRFC client (=1)	0.029 (0.102)	-0.134 (0.194)	0.094 (0.074)	0.395*** (0.137)
Child characteristics				
Age dummies	Yes	Yes	Yes	Yes
Head and Spouse				
Female headed household (=1)	0.148 (0.238)	0.139 (0.238)	-0.199 (0.160)	-0.165 (0.156)
Age of household head	0.030 (0.024)	0.032 (0.024)	0.021 (0.014)	0.018 (0.014)
Age sq. ^(a)	-0.240 (0.241)	-0.262 (0.242)	-0.153 (0.145)	-0.125 (0.142)
Highest education (grade) completed by male spouse	-0.003 (0.022)	-0.003 (0.022)	-0.030** (0.012)	-0.036*** (0.012)
Highest education (grade) completed by female spouse	-0.023 (0.025)	-0.020 (0.025)	0.017 (0.013)	0.019 (0.012)
Household characteristics				
log (Household size)	0.039 (0.174)	0.091 (0.182)	0.086 (0.099)	0.012 (0.101)
Ratio of dependents (15- and 65+) to household size	-0.167 (0.318)	-0.218 (0.323)	0.029 (0.196)	0.020 (0.191)
log (land size in acres 3 years ago)	0.018 (0.102)	0.020 (0.102)	-0.027 (0.048)	-0.040 (0.047)
Selection control				
Inverse Mills ratio		0.137 (0.139)		-0.241** (0.093)
Region Dummies	Yes	Yes	Yes	Yes
Sample Size	86	86	127	127

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

HEALTH EXPENDITURES AND CHILD IMMUNIZATION

Another indicator of household welfare is health. We attempt to determine how participation in the MRFC program affects the health of household members by looking at expenditures for health services and child immunization. An important indicator of household welfare is children's health, particularly preventative measures such as child immunization. We consider here two immunizations: BCG and measles vaccinations among children 12 years of age and under.

Since 1998, Malawi has undertaken a concerted effort to eliminate measles among its children. A nationwide immunization campaign in that year targeting 4.7 million children from 9 months to 14 years succeeded in reaching over 90 percent of the target population. As a result, Malawi enjoyed 4-5 years of near zero measles deaths. Since 1998, Malawi has been periodically conducting major measles immunization campaigns about every four years to clear measles reservoirs that build up over the years. It is reported that many mothers are reluctant to take their infants to health centers for the routine vaccinations.

Tables 13 and 14 show that, with the exception of the BCG vaccination for boys, children in households that have obtained MRFC credit are less likely to have received either of the two vaccinations. None of these coefficients, however, are significant. They do, however, become significant, particularly for boys, when the borrower is a woman. This may be a result, again, of women's increased involvement in cash crop production such that mothers do not have the time to take their children to be vaccinated and of son's involvement in their mother's cash crop production.

Other variables that influence, positively and significantly, child immunization are education of head and spouse and size of landholding. Higher levels of education among female spouses resulted in increased measles vaccination among all children, particularly boys (both at 0.05 level). Larger land sizes also resulted in higher rates of measles vaccination for all children, particularly boys (both at 0.01 level). On the other hand, higher education levels among male spouses resulted in increased BCG vaccinations for all children (at 0.01 level), particularly girls (at 0.05 level).

Table 13: Probability of Receiving a Measles Vaccination among Children Aged 12 and Below [Linear probability model with selection control]

	All		Boys		Girls	
	(A)	(B)	(C)	(D)	(E)	(F)
<i>MRFC participation</i>						
MRFC client (=1)	-0.064 (0.044)	-0.041 (0.045)	-0.076 (0.061)	-0.056 (0.062)	-0.045 (0.065)	-0.022 (0.066)
Female client (=1)		-0.126*** (0.046)		-0.122* (0.063)		-0.108 (0.067)
<i>Individual characteristics</i>						
Girl (=1)	-0.006 (0.020)	-0.004 (0.019)				
Age Dummies	Yes	Yes	Yes	Yes	Yes	Yes
<i>Head and Spouse</i>						
Female headed household (=1)	0.010 (0.028)	0.018 (0.028)	-0.039 (0.040)	-0.025 (0.041)	0.034 (0.039)	0.037 (0.039)
Age of household head	0.008 (0.005)	0.008 (0.005)	0.010 (0.007)	0.010 (0.007)	0.004 (0.008)	0.003 (0.008)
Age sq. ^(a)	-0.095 (0.051)	-0.094 (0.051)	-0.123 (0.066)	-0.124 (0.065)	-0.038 (0.081)	-0.032 (0.081)
Highest education (grade) completed by male spouse	0.002 (0.004)	0.002 (0.004)	-0.010 (0.006)	-0.009 (0.006)	0.010* (0.006)	0.010* (0.006)
Highest education (grade) completed by female spouse	0.010** (0.004)	0.011*** (0.004)	0.013** (0.006)	0.014*** (0.006)	0.010 (0.006)	0.010* (0.006)
<i>Household characteristics</i>						
log (Household size)	-0.004 (0.037)	-0.009 (0.036)	-0.039 (0.051)	-0.043 (0.051)	0.039 (0.053)	0.035 (0.053)
Ratio of dependents (15- and 65+) to household size	-0.014 (0.074)	-0.009 (0.074)	0.155 (0.107)	0.145 (0.107)	-0.157 (0.106)	-0.144 (0.106)
log (land size in acres 3 years ago)	0.051*** (0.018)	0.052*** (0.018)	0.082*** (0.025)	0.083*** (0.025)	0.019 (0.027)	0.019 (0.027)
<i>Selection control</i>						
Inverse Mills ratio	0.029 (0.029)	0.036 (0.029)	0.046 (0.040)	0.055 (0.040)	0.008 (0.041)	0.013 (0.042)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	996	996	476	476	520	520

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

**Table 14: Probability of Receiving BCG Vaccination among Children Aged 12 and Below
[Linear probability model with selection control]**

	All		Boys		Girls	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	-0.004 (0.035)	0.009 (0.036)	0.041 (0.053)	0.055 (0.053)	-0.049 (0.049)	-0.036 (0.050)
Female client (=1)		-0.071* (0.036)		-0.089* (0.054)		-0.061 (0.050)
Individual characteristics						
Girl (=1)	0.014 (0.016)	0.015 (0.016)				
Age Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Head and Spouse						
Female headed household (=1)	0.001 (0.022)	0.006 (0.022)	-0.003 (0.035)	0.007 (0.035)	-0.002 (0.029)	-0.001 (0.029)
Age of household head	0.002 (0.004)	0.002 (0.004)	-0.001 (0.006)	0.001 (0.006)	0.002 (0.006)	0.002 (0.006)
Age sq. ^(a)	-0.035 (0.040)	-0.034 (0.040)	-0.021 (0.056)	-0.021 (0.056)	-0.016 (0.060)	-0.013 (0.060)
Highest education (grade) completed by male spouse	0.009*** (0.003)	0.009*** (0.003)	0.007 (0.005)	0.008 (0.005)	0.011** (0.004)	0.011** (0.004)
Highest education (grade) completed by female spouse	0.001 (0.003)	0.001 (0.003)	-0.001 (0.005)	-0.001 (0.005)	0.002 (0.005)	0.002 (0.005)
Household characteristics						
log (Household size)	0.012 (0.029)	0.009 (0.029)	0.020 (0.044)	0.017 (0.044)	0.004 (0.039)	0.002 (0.039)
Ratio of dependents (15- and 65+) to household size	-0.050 (0.059)	-0.047 (0.059)	-0.098 (0.092)	-0.106 (0.092)	-0.015 (0.079)	-0.008 (0.079)
log (land size in acres 3 years ago)	0.006 (0.014)	0.007 (0.014)	0.021 (0.021)	0.022 (0.021)	-0.010 (0.020)	-0.010 (0.020)
Selection control						
Inverse Mills ratio	0.012 (0.023)	0.016 (0.023)	-0.012 (0.034)	-0.006 (0.034)	0.032 (0.031)	0.035 (0.031)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	996	996	476	476	520	520

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

When considering health expenditures, the incidence of illness needs to be taken into account. Looking at the probability of illness, Table 15 shows that, fortunately or unfortunately, participation in the program does not affect illness among individuals in the sample. If we consider individual characteristics, men are 5.7 percent less likely to be ill (significant at 0.01 level).

If we breakdown the household members by gender, we find that young men and women (compared to children and older adults) are less likely to become ill (significant at 0.01 level). In fact, the “peak” age of good health is approximately 27 years. Also, the incidence of illness among males is significantly lower in female-headed households (at 0.05 level) and higher when the female head or female spouse is more educated (at 0.10 level). The latter may indicate that more educated women are more aware of illness among household members, particularly children. What is not clear, is why males and not females.

Household characteristics that affect the incidence of illness are household size and size of landholding. Household size is negative, indicating that males and females in larger households are less likely to experience illness (significant at 0.01 and 0.05 levels). This finding is a curious one, but may indicate that smaller households have a higher proportion of older adults who are more likely to become ill, even though the ratio of dependents is also controlled. The landholding variable indicates that more land results in less illness for females and males, although this decrease is significant (at 0.05 level) only for males. More land may increase a household’s ability to provide food security for its members, decreasing their susceptibility to illness.

Table 15: Probability of Illness (Linear Model)

	All		Male		Female	
	OLS (A)	OLS with selection (B)	OLS (C)	OLS with selection (D)	OLS (E)	OLS with selection (F)
MRFC participation						
MRFC client (=1)	0.028 (0.018)	-0.001 (0.034)	0.035 (0.024)	0.036 (0.045)	0.017 (0.028)	-0.043 (0.051)
Individual characteristics						
Male (=1)	-0.057*** (0.016)	-0.057*** (0.016)				
Age	-0.007*** -0.001	-0.007*** (0.001)	-0.007*** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)
Age sq. ^(a)	0.125*** (0.021)	0.125*** (0.021)	0.133*** (0.030)	0.133*** (0.030)	0.116*** (0.029)	0.115*** (0.029)
Head and Spouse						
Female headed household (=1)	-0.042 (0.034)	-0.048 (0.034)	-0.111** (0.050)	-0.111** (0.051)	0.006 (0.047)	-0.006 (0.048)
Age of household head	0.002 (0.004)	0.002 (0.004)	0.001 (0.005)	0.001 (0.005)	0.003 (0.005)	0.004 (0.005)
Age sq. ^(a)	-0.032 (0.036)	-0.036 (0.036)	-0.017 (0.049)	-0.017 (0.049)	-0.052 (0.052)	-0.060 (0.052)
Highest education (grade) completed by male spouse	-0.001 (0.003)	-0.001 (0.003)	0.001 (0.005)	0.001 (0.005)	-0.004 (0.005)	-0.004 (0.005)
Highest education (grade) completed by female spouse	0.004 (0.003)	0.004 (0.003)	0.008* (0.005)	0.008* (0.005)	0.001 (0.005)	0.001 (0.005)
Household characteristics						
log (Household size)	-0.094*** (0.024)	-0.092*** (0.024)	-0.076** (0.033)	-0.076** (0.033)	-0.116*** (0.034)	-0.110*** (0.034)
Ratio of dependents (15- and 65+) to household size	-0.021 (0.044)	-0.023 (0.044)	0.040 (0.062)	0.040 (0.062)	-0.071 (0.062)	-0.078 (0.062)
log (land size in acres 3 years ago)	-0.035** (0.014)	-0.033** (0.015)	-0.048** (0.020)	-0.049** (0.020)	-0.025 (0.021)	-0.022 (0.021)
Selection control						
Inverse Mills ratio		0.023 (0.023)		-0.001 (0.031)		0.046 (0.033)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	2399	2399	1117	1117	1282	1282

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

Having established that participation in the micro-credit program does not affect the incidence of illness, let us consider expenditures on health services for those household members who reported illness in the previous four weeks. While participation increases expenditures for ill persons (Table 16), the increase is significant only for female household members (at 0.10 level); the MRFC client coefficient (2.843) implies an increase of 1,036 MK per person (7.40US\$). The only other significant explanatory variable for females is the ratio of dependents (positive and significant at 0.10 level). We are not clear as to the meaning of this result.

For health expenditure on males, significant explanatory variables are: age and age squared (negative at 0.05 and 0.10 levels), days of work missed (positive at 0.01 level), and female-headed households (negative at 0.10 level). These would seem to indicate that expenditures for sick young adult males and for men in female-headed households are lower than for all sick males. The positive coefficient for days of work missed may indicate that as illness increases in severity such that that they cannot work, they are more likely to receive health services.

**Table 16: Health Expenditure among Those Who Reported Illness
(in 1000 Malawi Kwacha*) (Tobit Model)**

	All		Male		Female	
	Tobit without/with selection		Tobit without/with selection		Tobit without/with selection	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	0.301 (0.477)	1.122 (0.963)	-0.284 (0.190)	-0.110 (0.401)	1.192 (0.804)	2.843* (1.624)
Individual characteristics						
Female (=1)	0.373 (0.424)	0.378 (0.424)				
Age	0.022	0.022	-0.031**	-0.030**	0.059	0.056
Age sq. ^(a)	-0.033 (0.491)	(0.033) (0.492)	(0.014) (0.224)	(0.015) (0.225)	(0.054) (0.808)	(0.054) (0.811)
Days of work activities missed due to illness	-0.216 (0.022)	-0.231 (0.022)	0.427* (0.011)	0.420* (0.011)	-0.823 (0.033)	-0.819 (0.033)
Head and Spouse						
Female headed household (=1)	-1.260 (0.810)	-1.031 (0.841)	-0.962** (0.473)	-0.941* (0.476)	-1.041 (1.170)	-0.562 (1.236)
Age & Age sq. of household head	-0.023 (0.103)	-0.030 (0.103)	0.030 (0.048)	0.026 (0.048)	-0.099 (0.162)	-0.104 (0.162)
Age sq. ^(a)	0.262 (1.059)	0.303 (1.061)	-0.230 (0.507)	-0.194 (0.514)	0.942 (1.647)	0.951 (1.652)
Highest education (grade) completed by male spouse	-0.050 (0.087)	-0.052 (0.087)	0.040 (0.039)	0.043 (0.039)	-0.094 (0.136)	-0.108 (0.137)
Highest education (grade) completed by female spouse	0.131 (0.092)	0.133 (0.092)	-0.007 (0.041)	-0.009 (0.041)	0.181 (0.144)	0.192 (0.145)
Household characteristics						
log (Household size)	-0.119 (0.565)	-0.169 (0.568)	0.376 (0.238)	0.365 (0.239)	-0.942 (0.925)	-1.078 (0.934)
Ratio of dependents (15- and 65+) to household size	1.098 (1.056)	1.273 (1.071)	-0.427 (0.493)	-0.429 (0.493)	2.364 (1.621)	2.816* (1.668)
log (land size in acres 3 years ago)	0.030 (0.401)	0.012 (0.401)	-0.175 (0.160)	-0.181 (0.161)	0.380 (0.662)	0.347 (0.661)
Selection control						
Inverse Mills ratio		-0.626 (0.637)		-0.147 (0.299)		-1.186 (1.007)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size ^(a)	429	429	165	165	264	264

Note: Standard errors in parentheses; + significant at 10%; * significant at 5%; ** significant at 1%

*1US\$ = 140MK

(a) Coefficients and standard errors are shown in the order of 10⁻³

(b) Sample for this analysis is restricted to those who had an illness over the past 4 weeks.

HOUSEHOLD VULNERABILITY

Co-variant and idiosyncratic shocks with economic effects can be devastating for chronically poor communities and households. Micro-credit can reduce poverty and vulnerability by providing income and/or savings to smooth over the effects of economic shocks. The hypothesis we explore is whether households with access to credit have less recourse to “bad” coping mechanisms, such as reducing food consumption and pulling children out of school, in response to shock. Data collected included occurrence and types of economic shocks in the last three years, coping strategies utilized by households in response to each shock, and effects on household welfare.

The most common types of shock reported were death, injury, or illness of adult member and reduced agricultural returns due to crop failure, crop destruction, or sharp drop of crop prices. Most households reacted to these shocks by reducing food consumption, looking for wage work, using savings, selling off livestock, or obtaining help from family and friends. In this section, we look at the effects of crop failure on food consumption and the effect of health-related shocks (death or serious illness of an adult in the household) on education expenditures and school attendance.

Food security has been a serious problem for Malawi smallholders because of droughts, floods, and the small size of landholdings, among other factors. Regression analysis on the effect of participation in the MRFC program on food consumption and expenditures in the case of crop failure (Table 17) shows that, not surprisingly, crop failure significantly reduced food consumption by 42 percent (at 0.01 level) and food expenditures by almost 78 percent (at 0.01 level). Even though most MRFC credit is for cash crops such as tobacco, not for food crops, it is still hoped that credit would smooth consumption patterns in the face of crop failure. The coefficients on the interaction term (MRFC*crop failure) for food consumption and expenditures are positive, although not statistically significant, suggesting that the MRFC credit program might work as a buffer for the shock. As with the earlier analyses of total consumption and expenditures, the significant coefficients on household size and land size, both positive, show that larger households and households with larger landholdings purchase and consume more food.

Table 17: Crop Failure and Log of Food Consumption and Expenditure

	Log (Food Consumption)		Log (Food Expenditure)	
	OLS	Treatment Regression	OLS	Treatment Regression
	(A)	(B)	(C)	(D)
<i>MRFC participation</i>				
MRFC client in 2005-2006 (=1)	-0.025 (0.090)	0.142 (0.191)	-0.110 (0.130)	0.065 (0.277)
Crop failure in 2006 (=1)	-0.428*** (0.139)	-0.423*** (0.139)	-0.781*** (0.200)	-0.776*** (0.201)
MRFC * Crop failure (=1)	0.371 (0.327)	0.333 (0.329)	0.151 (0.472)	0.111 (0.476)
<i>Head and Spouse</i>				
Female headed household (=1)	-0.113 (0.126)	-0.082 (0.130)	-0.329* (0.182)	-0.297 (0.188)
Age of household head	0.010 (0.012)	0.008 (0.012)	0.021 (0.017)	0.019 (0.018)
Age sq. ^(a)	-0.111 -0.119	-0.094 -0.121	-0.234 -0.173	-0.215 -0.175
Highest education (grade) completed by male spouse	-0.005 (0.012)	-0.006 (0.012)	0.008 (0.018)	0.006 (0.018)
Highest education (grade) completed by female spouse	0.016 (0.012)	0.017 (0.012)	0.017 (0.017)	0.018 (0.017)
<i>Household characteristics</i>				
log (Household size)	0.274*** (0.073)	0.271*** (0.073)	0.241** (0.106)	0.238** (0.106)
Ratio of dependents (15- and 65+) to household size	-0.052 (0.143)	-0.049 (0.143)	0.129 (0.207)	0.132 (0.207)
log (land size in acres 3 years ago)	0.307*** (0.053)	0.303*** (0.053)	0.231*** (0.077)	0.228*** (0.077)
<i>Selection control</i>				
Inverse Mills ratio		-0.118 (0.118)		-0.123 (0.171)
Region Dummies	Yes	Yes	Yes	Yes
Sample Size	496	496	496	496

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

We also considered the effect of economic shock on child education. Table 18 (Column C) shows that a health shock in 2005 reduced education expenditures (not significantly) for the 2005-2006 school year; the interaction term (MRFC*Shock) shows that MRFC participation may offset the shock's negative effect, although the interaction term is also not significant. More important factors are spouse's education and land size which are positive and significant (at 0.01).

Table 18: Health Shocks and Educational Expenditure among Individuals Aged 6 to 24 (in 1000 Malawi Kwacha*)

	OLS (A)	Tobit (B)	Tobit with selection control (C)
MRFC participation			
MRFC client in 2005 (=1)	0.012 (0.037)	0.017 (0.047)	0.161* (0.092)
Shock in 2005/06 (=1)	-0.023 (0.028)	-0.035 (0.037)	-0.036 (0.036)
MRFC * Shock (=1)	0.131 (0.084)	0.145 (0.107)	0.171 (0.108)
Individual characteristics			
Female (=1)	0.012 (0.023)	0.012 (0.031)	0.010 (0.030)
Age dummies	Yes	Yes	Yes
Head and Spouse			
Female headed household (=1)	0.079 (0.050)	0.071 (0.065)	0.098 (0.066)
Age of household head	0.019*** (0.006)	0.033*** (0.008)	0.032*** (0.008)
Age sq. ^(a)	-0.178*** (0.055)	-0.297*** (0.074)	-0.285*** (0.074)
Highest education (grade) completed by head	0.003 (0.005)	0.006 (0.007)	0.005 (0.007)
Highest education (grade) completed by spouse	0.013** (0.005)	0.017*** (0.007)	0.017*** (0.007)
Household characteristics			
log (Household size)	0.034 (0.040)	0.039 (0.052)	0.031 (0.052)
Ratio of dependents (15- and 65+) to household size	0.007 (0.079)	0.033 (0.104)	0.044 (0.104)
log (land size in acres 3 years ago)	0.071*** (0.022)	0.112*** (0.029)	0.108*** (0.029)
Selection control			
Inverse Mills ratio			-0.105* (0.058)
Region Dummies	Yes	Yes	Yes
Sample Size	1136	1136	1136

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

*1US\$ = 140MK

(a) Coefficients and standard errors are reported in the order of 10⁻³

If we look at school attendance rates (Table 19), a health-related shock again has a negative effect across both age groups, and is significant (at 0.10 level) for older students. Yet, the coefficient on the interaction term suggests that the MRFC program participation significantly (at 0.10 level) offsets the adverse effect of the shock for these older students. Another positive effect is spouse's education (significant at 0.05). Negative and significant are household head's education (at 0.10) and being a female-headed household (at 0.05). Again the girl dummy variable is negative and significant, indicating that, overall, fewer older girls attend school than older boys.

For younger children, the interaction term actually has a negative coefficient, which suggests that the MRFC program did not mitigate the adverse effect and instead may amplify the negative effect. This is most likely due to the stronger negative effect of MRFC participation on school enrollment for younger children in general. Being a female-headed households is negative but not significant, and spouse's education is positive and significant (at 0.10). The girl dummy variable for younger children, in contrast to the older children, is positive, but not significant.

Table 19: Health Shocks and School Attendance

	Children aged 6 to 14		Young adults aged 15 to 24	
	OLS (A)	Treatment Regression (B)	OLS (C)	Treatment Regression (D)
MRFC participation				
MRFC client in 2005 (=1)	0.014 (0.033)	-0.067 (0.062)	0.046 (0.057)	0.114 (0.105)
Shock in 2005/06 (=1)	-0.011 (0.024)	-0.011 (0.024)	-0.081* (0.046)	-0.080* (0.046)
MRFC * Shock (=1)	-0.045 (0.082)	-0.060 (0.082)	0.181 (0.118)	0.199* (0.120)
Individual characteristics				
Female (=1)	-0.001 (0.021)	0.001 (0.021)	-0.090** (0.037)	-0.091** (0.037)
Age dummies	Yes	Yes	Yes	Yes
Head and Spouse				
Female headed household (=1)	-0.056 (0.043)	-0.071 (0.044)	-0.240*** (0.088)	-0.225** (0.090)
Age of household head	0.004 (0.005)	0.005 (0.005)	0.029*** (0.008)	0.028*** (0.008)
Age sq. ^(a)	-0.036 (0.053)	-0.043 (0.053)	-0.229*** (0.083)	-0.220*** (0.084)
Highest education (grade) completed by head spouse	0.004 (0.005)	0.005 (0.005)	-0.012 (0.008)	-0.014* (0.008)
Highest education (grade) completed by female spouse	0.008* (0.005)	0.008* (0.005)	0.017** (0.008)	0.017** (0.008)
Household characteristics				
log (Household size)	-0.036 (0.035)	-0.032 (0.035)	0.065 (0.066)	0.061 (0.066)
Ratio of dependents (15- and 65+) to household size	-0.025 (0.076)	-0.034 (0.076)	0.079 (0.121)	0.083 (0.121)
log (land size in acres 3 years ago)	-0.024 (0.020)	-0.022 (0.020)	0.023 (0.033)	0.021 (0.034)
Selection control				
Inverse Mills ratio		0.059 (0.039)		-0.053 (0.068)
Region Dummies	Yes	Yes	Yes	Yes
Sample Size	708	708	428	428

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

GENDER EMPOWERMENT

The low number of women borrowers in the sample makes it difficult to determine empowerment effects from program participation. In fact, the low number of women borrowers may be an indication that there are structural and normative obstacles to women's participation. Nevertheless, we examine three different elements of gender empowerment: women's engagement in income-generating activities, women's decision-making power, and women's participation in community organizations.

When we look at income-generating activities, we find that both men and women in households that obtain MRFC credit engage in farming activities at a significantly higher rate and significantly decrease their wage work (Tables A17-A19 in Annex A). In general, women increased their rate of participation in farming activities more than men, and the rate of increase for female heads (73 percent) is considerably higher than for male heads (29 percent) and female spouses (32 percent). Nevertheless, when women in two-headed households are the MRFC client, the credit program has a larger impact on male heads (significant at 0.10 level) than female spouses in crop production (Tables A17 A18, Column B). This may be due to the fact that a higher percentage of women's loans (than men's loans) are for micro-enterprises rather than crop farming. It is, however, very difficult to have correct statistical inference with the small number of women borrowers.

Female spouses also significantly increase their involvement in raising small animals (at 0.05 level) and significantly decreased participation in wage work (at 0.10 and 0.01 levels respectively). The decrease in wage-work participation for female heads (in single-headed households), on the other hand, was not significant. These findings seem to indicate, not surprisingly, that households that obtain micro-credit participate more in agricultural activities, particularly crop production, and less in wage work. Women's involvement in crop production generally increases more than men's.

If we consider the number of hours that heads and spouses invest in agricultural activities, we find, not surprisingly, that micro-credit significantly increases the number of hours worked on cash crops by both men and women, whether the work was on their own land or on their spouses' land (Tables 20 and 21). Another explanatory variable contributing to male heads' working hours on cash crops is size of landholding which is positive and significant for spouse's land (at 0.05 level). For male heads, the significance of the age variables in the spouse's land column (negative and significant at 0.05 level) may indicate that older husbands work less on wife's land and perhaps more on their own land. This speculation would be congruent with land access practices among some ethnic groups in central and southern Malawi where couples initially live in the wife's community and her family gives the husband access right to agricultural land for cultivation. Later in the marriage, husbands sometimes return to their own community and claim rights to agricultural land from their own family (Ngwira 2002).

With regard to food crops (mainly maize), households that obtained micro-credit did not significantly modify the number of hours worked on them (Tables A20 and A21 in Annex A). The only other explanatory variables that significantly affected (at 0.01 level) total food crop hours is ratio of dependents (for male heads, Table A20) which was understandably negative and size of landholding (positive and significant at 0.10 level).

Table 20: Impact of MRFC Participation on Cash Crop Working Hours among Male heads (Tobit model with selection control)

	Total hours worked		Hours worked on own land		Hours worked on spouse's land	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	1,211.46*** (253.08)	1,212.01*** (253.82)	869.31*** (296.86)	882.07*** (297.37)	1,481.94** (665.02)	1,433.89** (663.09)
Female client (=1)		-7.355 (259.50)		-206.86 (309.90)		454.99 (588.41)
Male head						
Age	-34.01 (47.13)	-34.12 (47.31)	-47.66 (54.62)	-50.64 (54.65)	66.46 (146.10)	78.68 (147.20)
Age sq.	0.156 (0.449)	0.158 (0.452)	0.234 (0.522)	0.267 (0.522)	-0.459 (1.416)	-0.629 (1.445)
Highest education (grade) completed	19.98 (24.44)	19.98 (24.44)	21.69 (29.12)	21.91 (29.11)	-0.229 (58.45)	-0.095 (58.05)
Female spouse						
Age	47.80 (53.20)	47.89 (53.30)	88.44 (63.19)	90.01 (63.05)	-86.04** (147.10)	-100.10** (148.30)
Age sq.	-0.442 (0.58)	-0.443 (0.58)	-0.867 (0.70)	-0.879 (0.69)	0.653* (1.627)	0.847* (1.655)
Highest education (grade) completed	-30.99 (29.150)	-30.94 (29.200)	-33.74 (34.99)	-32.47 (35.02)	31.63 (70.64)	25.10 (70.54)
Household Characteristics						
log (Household size)	65.13 (195.91)	65.60 (196.61)	-45.95 (234.41)	-34.32 (234.46)	344.39 (487.54)	298.85 (488.73)
Ratio of dependent (15- and 65+) to household size	-387.02 (353.13)	-387.02 (353.13)	-449.43 (427.47)	-441.47 (426.63)	173.94 (901.72)	195.13 (897.29)
log (land size in acres 3 years ago)	135.85 (119.76)	135.82 (119.76)	117.81 (138.71)	118.70 (138.53)	722.13** (354.41)	744.51** (355.99)
Selection control						
Inverse Mills ratio	-164.31 (168.39)	-163.69 (169.80)	-48.27 (202.10)	-28.94 (204.12)	-259.97 (416.49)	-287.18 (414.99)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size ^(a)	282	282	282	282	282	282

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Sample for this analysis is restricted to two-spouse households from which we could obtain responses from both spouses. There are 330 two-spouse households in our sample, but only 282 of those households had questionnaires with responses from both spouses.

Table 21: Impact of MRFC Participation on Cash Crop Working Hours among Female Spouses (Tobit model with selection control)

	Total hours worked		Hours worked on own land		Hours worked on spouse's land	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	1,101.75*** (267.67)	1,117.65*** (267.89)	955.54** (382.07)	938.92** (382.95)	989.61** (448.43)	1,020.53** (447.88)
Female client (=1)		-254.90 (277.20)		232.61 (371.03)		-824.54 (510.16)
Male head						
Age	19.65 (53.37)	13.94 (53.25)	36.25 (76.99)	42.26 (78.10)	32.35 (88.29)	15.29 (86.92)
Age sq.	-0.492 (0.532)	-0.423 (0.530)	-0.495 (0.779)	-0.569 (0.796)	-0.680 (0.886)	-0.485 (0.866)
Highest education (grade) completed	0.177 (26.69)	0.248 (26.63)	30.77 (38.44)	30.90 (38.47)	-31.72 (44.24)	-31.52 (44.11)
Female spouse						
Age	22.79 (58.69)	27.35 (58.54)	10.97 (82.84)	6.13 (83.59)	10.60 (98.73)	22.80 (97.18)
Age sq.	-0.025 (0.664)	-0.078 (0.660)	-0.130 (0.949)	-0.071 (0.962)	0.195 (1.128)	0.060 (1.102)
Highest education (grade) completed	-37.49 (31.42)	-35.73 (31.39)	-60.09 (45.75)	-63.010 (46.07)	2.38 (51.89)	4.74 (51.75)
Household Characteristics						
log (Household size)	95.13 (207.45)	110.29 (207.46)	-155.33 (296.10)	-172.23 (298.14)	173.72 (350.18)	224.88 (349.23)
Ratio of dependent (15- and 65+) to household size	-246.50 (375.86)	-242.74 (374.64)	487.29 (545.33)	488.54 (546.67)	-749.50 (643.94)	-735.37 (641.95)
log (land size in acres 3 years ago)	118.05 (128.03)	116.30 (127.74)	202.31 (175.87)	203.26 (175.90)	93.37 (217.06)	85.20 (215.51)
Selection control						
Inverse Mills ratio	-124.11 (178.10)	-102.59 (179.33)	13.84 (252.08)	-5.30 (253.84)	-204.88 (309.27)	-134.57 (311.96)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size ^(a)	282	282	282	282	282	282

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Sample for this analysis is restricted to two-spouse households from which we could obtain responses from both spouses. There are 330 two-spouse households in our sample, but only 282 of those households had questionnaires with responses from both spouses.

What does this analysis on types of income-generating activities and hours worked on cash crops tell us about gender empowerment? Does it increase women's ability to make decisions within the household?

We collected information on household decision-making on a wide set of decisions regarding food, clothing, household durables, and animal purchases, children's education, children's spouse choice, land transactions, crop cultivation, and family planning. With the exception of who children will marry, respondents indicated that household decisions are mostly decided jointly between head and spouse (Table A22 in Annex A). Wives (in two-spouse households) responded joint decision rates of between 64 and 76 percent, male head decision rates of between 10 and 30 percent, and female spouse decision rates of between 1 and 9 percent (with the exception of 19.5 percent for jewelry purchase). Those decisions that directly and personally impact on women (birth control, purchase of women's clothing, shoes, and jewelry) fell on the high end (8.5 to 19.5 percent). The one decision that does not directly affect women and had a relatively high rate among women is how much to spend on food: women made that decision in close to 8 percent of the households (compared to 24 percent by the male head and 67 percent by joint decision).

Regression analysis on the effect of MRFC participation on decision-making showed that it significantly (at 0.01 level) affected women-alone decisions only on one item: decision on food consumption by wives decreased by 19 percent (Table 22).⁴¹ When the MRFC borrower is a woman, the effect is positive but not significant. It appears that the shift in decision-making on food consumption favors joint-decisions (13.5 percent) and male-head decisions (7.8 percent), even though these positive coefficients are not significant.

The other explanatory variables seem to tell an interesting story. Male head's education has a significantly positive influence (at 0.05 level) on joint decision-making and a negative influence on male head-only decision-making. This would support the argument that higher education for men contributes to shifting decision-making from male-only to joint decisions. The regional dummies have a similar effect: both central and southern regions have positive and significant (at 0.05 level) effects on joint decisions, and negative and significant (at 0.05 and 0.10 respectively) on male-head decisions. Since central and southern regions are predominantly matrilineal areas and the northern region is patrilineal, these results may indicate that matrilineal gender norms contribute to joint decision-making as opposed to male-head decision-making. On the other hand, size of landholding has a negative and significant (at 0.05 level) coefficient for joint decision making and an almost equal but positive coefficient for male-head-only decision. This seems to indicate that bigger landholdings increase male head's decision-making authority (on food consumption) at the expense of joint-decisions.

Further examination of the relationship between decision-making and gendered control of land may shed some light on the effect of micro-credit on women's decision-making power.

⁴¹ Table A23 in Annex A provides regression analysis results on the effect of MRFC participation on all the decision-making opportunities included in the questionnaire.

**Table 22: Impact of MRFC Participation on Decision-Making on Food Consumption
[Linear probability model with selection control]**

	Female spouse decision		Joint decision		Male spouse decision	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	-0.036 (0.038)	-0.190*** (0.066)	0.093 (0.064)	0.135 (0.111)	-0.040 (0.060)	0.078 (0.104)
Female client (=1)	0.125* (0.074)	0.096 (0.074)	-0.189 (0.122)	-0.181 (0.123)	0.081 (0.114)	0.103 (0.115)
Male head						
Age	0.007 (0.012)	0.009 (0.012)	0.006 (0.020)	0.005 (0.020)	-0.014 (0.019)	-0.016 (0.019)
Age sq. ^(a)	-0.003 (0.116)	-0.023 (0.115)	-0.138 (0.192)	-0.132 (0.193)	0.142 (0.180)	0.158 (0.180)
Highest education (grade) completed	-0.003 (0.006)	-0.002 (0.006)	0.023** (0.011)	0.023** (0.011)	-0.021** (0.010)	-0.022** (0.010)
Female spouse						
Age	-0.010 (0.014)	-0.008 (0.014)	-0.008 (0.023)	-0.008 (0.023)	0.024 (0.022)	0.023 (0.022)
Age sq. ^(a)	0.042 (0.151)	0.030 (0.149)	0.225 (0.249)	0.229 (0.250)	-0.342 (0.234)	-0.332 (0.233)
Highest education (grade) completed	-0.002 (0.008)	-0.002 (0.008)	-0.008 (0.013)	-0.008 (0.013)	0.009 (0.012)	0.009 (0.012)
Household Characteristics						
log (Household size)	0.001 (0.052)	0.007 (0.051)	0.000 (0.086)	-0.001 (0.086)	-0.051 (0.081)	-0.055 (0.080)
Ratio of dependent (15- and 65+) to household size	-0.105 (0.090)	-0.140 (0.090)	-0.046 (0.150)	-0.037 (0.151)	0.196 (0.140)	0.222 (0.141)
log (land size in acres 3 years ago)	-0.010 (0.032)	0.003 (0.032)	-0.114** (0.054)	-0.117** (0.054)	0.127** (0.050)	0.118** (0.051)
Selection control						
Inverse Mills ratio		0.128*** (0.045)		-0.034 (0.076)		-0.098 (0.071)
Region Dummies						
Central (=1)	-0.022 (0.054)	-0.019 (0.053)	0.190** (0.089)	0.189** (0.090)	-0.164* (0.084)	-0.167** (0.084)
South (=1)	-0.071 (0.056)	-0.032 (0.057)	0.199** (0.092)	0.189** (0.095)	-0.123 (0.086)	-0.153* (0.089)
Sample Size (b)	282	282	282	282	282	282

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

(b) Sample for this analysis is restricted to two-spouse households from which we could obtain responses from both spouses. There are 330 two-spouse households in our sample, but only 282 of those households had questionnaires with responses from both spouses.

Within the community, we hypothesize that women borrowers are more active members of local organizations, and are more likely to hold leadership positions because of heightened public identity and increased recognition of their credit-worthiness. The three most common community organizations are farmer, church, and community development organizations. We compared current level of participation in these three organizations with their level of participation three years ago.⁴² We found that while participation in the MRFC program does not influence male heads' level of participation in these organizations (Table A24 in Annex A), it does significantly increase (at 0.01 level) women's level of participation in farmer associations, if the woman was the MRFC client (Table 23). Other explanatory variables that are significant for women are age of head and age of spouse (at 0.05 level): older female spouses are more likely to join farmer associations and increase their participation and leadership in the organization. On the other hand, a household's involvement in the MRFC program decreased women's involvement in both the church and development committees. This is not surprising since most of the MRFC credit is for production of agricultural cash crops, a labor-intensive enterprise that would absorb adult time.

⁴² Level of participation in the organizations was defined as: non-member, normal member, active member, and leadership position.

Table 23: Female Spouses' Promotion in Community Organization*

	Farmers' Association		Church		Development Committee	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	0.009 (0.042)	-0.002 (0.042)	-0.237* (0.124)	-0.234* (0.125)	-0.175** (0.084)	-0.174** (0.084)
Female client (=1)		0.143*** (0.046)		-0.034 (0.138)		-0.010 (0.093)
Male head						
Age	0.014* (0.008)	0.016** (0.008)	0.024 (0.023)	0.023 (0.023)	-0.007 (0.015)	-0.007 (0.015)
Age sq. ^(a)	-0.136 (0.073)	-0.155 (0.072)	-0.185 (0.215)	-0.181 (0.216)	0.022 (0.145)	0.023 (0.146)
Highest education (grade) completed	0.002 (0.004)	0.002 (0.004)	-0.005 (0.012)	-0.005 (0.012)	0.013 (0.008)	0.013 (0.008)
Female spouse						
Age	-0.016* (0.009)	-0.018** (0.009)	-0.039 (0.026)	-0.038 (0.026)	0.028 (0.017)	0.028 (0.017)
Age sq. ^(a)	0.192 (0.095)	0.209 (0.094)	0.403 (0.279)	0.399 (0.280)	-0.255 (0.188)	-0.257 (0.189)
Highest education (grade) completed	0.000 (0.005)	-0.001 (0.005)	0.005 (0.014)	0.005 (0.014)	-0.005 (0.010)	-0.005 (0.010)
Household Characteristics						
log (Household size)	-0.006 (0.033)	-0.014 (0.032)	0.061 (0.096)	0.063 (0.097)	-0.070 (0.065)	-0.069 (0.065)
Ratio of dependent (15- and 65+) to household size	0.077 (0.058)	0.076 (0.057)	-0.054 (0.169)	-0.054 (0.169)	-0.079 (0.114)	-0.079 (0.114)
log (land size in acres 3 years ago)	-0.004 (0.021)	-0.003 (0.020)	-0.016 (0.061)	-0.016 (0.061)	0.017 (0.041)	0.017 (0.041)
Selection control						
Inverse Mills ratio	-0.014 (0.029)	-0.027 (0.029)	0.061 (0.084)	0.064 (0.085)	0.086 (0.057)	0.087 (0.058)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size ^(b)	282	282	282	282	282	282

Note: Standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

* Dependent variable is defined as a change in the position of the respondent in the organization. Position is classified into four categories: 1-leadership, 2-active member, 3-ordinary member, and 4-other position or non-member.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

(b) Sample for this analysis is restricted to two-spouse households from which we could obtain responses from both spouses. There are 330 two-spouse households in our sample, but only 282 of those households had questionnaires with responses from both spouses.

Level of involvement in community organizations by female-heads, in contrast to women in two-spouse households, is not influenced by participation in the MRFC program (Table 24). The coefficient for MRFC participation is negative for farmer association (and church organizations), but not significant. This may reflect high demands for their time and/or lower status for women who head households and who are mostly single. Focus group discussions indicated that single mothers are not held in high esteem in the community.

Table 24: Female Heads' Promotion in Community Organization*

	Farmers' Association (A)	Church (B)	Development Committee (C)	School Committee (D)
MRFC participation				
MRFC female client (=1)	-0.063 (0.210)	-0.154 (0.339)	0.233 (0.215)	-0.203 (0.169)
Female head				
Age	0.003 (0.010)	0.030* (0.015)	0.003 (0.010)	0.007 (0.008)
Age sq. ^(a)	-0.024 (0.090)	-0.256* (0.146)	-0.038 (0.092)	-0.056 (0.073)
Highest education (grade) completed	0.013 (0.009)	0.056*** (0.015)	0.009 (0.010)	0.019** (0.008)
Household Characteristics				
log (Household size)	0.010 (0.056)	0.062 (0.090)	0.017 (0.057)	0.014 (0.045)
Ratio of dependent (15- and 65+) to household size	0.013 (0.113)	0.313* (0.182)	0.132 (0.116)	-0.066 (0.091)
log (land size in acres 3 years ago)	0.005 (0.044)	-0.062 (0.071)	0.048 (0.045)	-0.022 (0.036)
Selection control				
Inverse Mills ratio	0.180 (0.130)	0.038 (0.209)	0.035 (0.133)	0.081 (0.105)
Region Dummies	Yes	Yes	Yes	Yes
Sample Size	147	147	147	147

Note: Standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

* Dependent variable is defined as a change in the position of the male head in the organization. The position is classified into four categories: 1-leadership, 2-active member, 3-ordinary member, and 4-other position or non-member.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

4. DISCUSSION AND CONCLUSIONS

As a number of scholars and practitioners have pointed out, the power or ability of microfinance services to reduce poverty and improve household welfare may be overstated. Poverty reduction as well as intra-household welfare levels, are closely tied to many factors, including economic structures (e.g., markets, infrastructure, etc.) and social institutions (exclusionary structures and relations such as class and gender), factors beyond the world of microfinance.

Serious questions have also been posed regarding the supposed gender empowerment outcomes of providing microfinance services to women. It was generally accepted that by channeling micro-credit through women, their greater income-generating capacity would give them greater decision-making authority in the household. This accepted wisdom has been challenged from various viewpoints. In Malawi, the problem is more basic: it seems to be that women, particularly female heads, are participating in the micro-credit program at low levels. This may be related to the fact that approximately 75 percent of MRFC credit is for agricultural production⁴³, mostly for export tobacco, a crop that is labor intensive and more difficult for women to undertake if they do not have access to land and/or command the sufficient labor force. Thus, we saw that households headed by older male heads, who have access to family labor, are most likely to participate in the micro-credit program. The conclusions from this study regarding household welfare are mixed.

CONSUMPTION AND EXPENDITURES

We examined a number of household welfare indicators: consumption, expenditures, education and health. Participation in the credit program increases household consumption, expenditures, and income. The increase in expenditures is mostly for non-food goods and services. We also found, however, that size of household landholding and female spouse's education increase consumption levels at higher rates than micro-credit. Not surprisingly, female-headed households have significantly lower consumption and expenditure levels.

The 2005-2006 agricultural cycle in Malawi was a good one in the sense that there was sufficient and timely rainfalls. Success in terms of consumption, expenditure, and income, therefore, is in good measure due to the good harvest in 2006. We are not certain what the results for consumption, expenditure, and income would be in a bad agricultural year. In addition, the future of export tobacco production is uncertain because of volatile world prices. Thus, more efforts to encourage production of other crops are required to make the positive outcomes we find in this study sustainable in the long term.

EDUCATION

The effect of credit-program participation on children's schooling varies by age and gender. In general, the overall pattern for schooling is that boys at all ages are more

⁴³ MRFC's annual report for 2004 shows that 75 percent of its loan portfolio is for seasonal loans and 25 percent for business loans (MRFC 2005: 43).

likely to go to school than girls, and that as children get older (13 years and older), they steadily drop out of school. A small percentage attends secondary school which, unlike primary school, is not free. Participation in the credit program seems to both support and counteract these tendencies. On the one hand, it decreases school attendance by younger children, particularly girl children. On the other hand, it increases school attendance by older children who are more likely to be in secondary school. This is confirmed by expenditures on schooling: credit program participants spend more on education, particularly among older girl students.

There are several tentative explanations for these results. The negative effect of MRFC participation on younger children, particularly girls, may indicate that they are needed for household chores when the adults are involved in tobacco production, a labor-intensive crop (MRFC loans are given mainly for tobacco production). On the other hand, parents may be reluctant to pull out the few older children still attending school and in whom they have already invested many years of education. In addition, the gendered results seem to indicate that MRFC allows households to reverse some of the bias in girl attendance rates, particularly at older ages.

HEALTH

The results on immunization also suggest that younger children, and particularly girls, are adversely affected by the micro-credit program. Children in those households that participate in the MRFC program are less likely to have received measles and BCG vaccinations, although these results are not significant. When the MRFC client is a woman, the negative effect is significant. This may be a result, again, of women's increased involvement in cash crop production such that mothers do not have the time to take their children to be vaccinated and of son's involvement in their mother's cash crop production. This may suggest that child immunization campaigns take women's work obligations into consideration in order to reach more children. Variables that have positive and highly significant effects on child immunization are parents' education and landholding size.

When we looked at health expenditures, we found that participation in the micro-credit program increases expenditures on health services for both males and females that experienced illness, but this increase is significant for females. For ill males, the variable that increased their health expenditures is days of work missed, perhaps indicating that as illness increases in severity such that they cannot work, they are more likely to receive health services.

VULNERABILITY

With regard to household vulnerability to economic shocks, we looked at whether micro-credit ameliorates two negative coping strategies often utilized by households: reducing food consumption and pulling children out of school. We found that crop failure significantly reduced food consumption and expenditures. Micro-credit brought up food consumption and expenditures, but the positive effect was not significant. Size of landholding and household size, on the other hand, had positive and significant effects on both food consumption and expenditures.

Health-related shocks (death or serious illness of household adult) have negative effects on both school attendance and education expenditures. Participation in the credit program significantly offsets the negative effect of the shock on school attendance for older children, but not for younger children. In fact, in the face of shock, MRFC participation appears to amplify the negative effect on schooling among younger children. The results also seem to confirm the tendency, among MRFC participants, to withdraw younger children from school.

GENDER EMPOWERMENT

The low number of women borrowers in the sample makes it difficult to determine empowerment effects from program participation. In fact, the low number of women borrowers may be an indication that there are structural and normative obstacles to women's participation. Nevertheless, we examine three different elements of gender empowerment: women's engagement in income-generating activities, women's decision-making power, and women's participation in community organizations.

In households that participate in the MRFC micro-credit program, both men and women are more likely to engage in agricultural production and, particularly for men, less likely to engage in wage work. Involvement in crop production and small animal production in these households is higher for women than for men. Focusing on number of hours worked on cash crop production, again both men and women had significantly higher and comparable numbers of hours dedicated to cash cropping. These two results would indicate that micro-credit increases women's participation in income-generating activities, an element that can potentially increase women's empowerment within the household.

Analysis on the effect of MRFC participation on decision-making showed that it significantly affected women-alone decisions only on one item: the decision on food consumption. Wives lost decision-making power on this household issue, while the rate of decision-making by the male head and the couple increased. When the MRFC borrower is the wife, the effect is positive but not significant. The significance of other explanatory variables (land size and region) suggests that the relationship between decision-making and gendered control of land may shed some light on the effect of micro-credit on women's decision-making power.

We examined women's participation in community organizations by determining their level of participation over the last three years. While participation in the MRFC program did not influence male heads' level of participation, it did significantly increase wives' level of participation in farmer associations, if they were MRFC borrowers. Wives' participation in other community organizations (church and development committees), on the other hand, decreased significantly suggesting lack of time to participate in other community activities. Female heads that obtained micro-credit, in contrast to wives, experienced lower, but not significant, levels of participation in farmer associations, church organizations, and school committees. This may reflect high demands for their time and/or lower status for women who head households and who are mostly single.

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Table A1: Sampled Villages in the Three Regions

Region	District	EPA	Village Name	Type	No. of Sampled Household
North	Rumphi	Mhuju	Kamuvwikamo	Program	15
			Ganje	Program	20
			Kanjululu	Non-Program	35
	Mzimba	Zombwe	Nthuwuluke	Non-Program	17
			Mukonyo Tembo	Non-Program	23
			Sumphi	Program	19
			Gwanjawire	Program	21
Central	Ntcheu	Nsipe	Mzewe (Gwendeza)	Program	20
			Phikani	Program	10
			Chimkuluchina	Program	19
			Mpulula	Non-Program	31
			Chagwamomwe	Non-Program	10
			Malaswa	Non-Program	8
	Dedza	Mayani	Chikandwe	Program	20
			Mpombe	Program	20
			Mtemwende	Program	10
			Chechingo	Non-Program	16
			Lipululu	Non-Program	14
			M'Chipera	Non-Program	20
South	Blantyre	Lirangwe	Mkumba	Program	25
			Kayesa	Non-Program	26
			Kavalo	Non-Program	24
	Chiradzul	Mombezi	Nkhongozo	Program	15
			Mphepo	Program	20
			Ngalawesa	Program	15
			Msulupi	Non-Program	25

Table A2: Sampled Households

<i>Region</i>		Program	Non-Program	All
District	EPA			
<i>North</i>				
Rumphi	Mhuj	35	35	70
Mzimba	Zombwe	40	40	80
<i>Central</i>				
Ntcheu	Nsipe	49	49	98
Dedza	Mayani	50	50	100
<i>South</i>				
Blantyre	Lirangwe	25	50	75
Chiradzul	Mombezi	50	25	75
<i>Total</i>		249	249	498

Table A3: Type of Households by Region

<i>Region</i>	District	EPA	Two spouse household	Single headed household	
				Male head	Female head
<i>North</i>					
Rumphi	Mhuj		65 (92.9)	2 (2.9)	3 (4.3)
Mzimba	Zombwe		62 (77.5)	2 (2.5)	16 (20.0)
<i>Central</i>					
Ntcheu	Nsipe		49 (50.0)	6 (6.1)	43 (43.9)
Dedza	Mayani		54 (54.0)	4 (4.0)	42 (42.0)
<i>South</i>					
Blantyre	Lirangwe		38 (50.7)	6 (8.0)	31 (41.3)
Chiradzul	Mombezi		62 (82.7)	1 (1.3)	12 (16.0)
<i>Total</i>			330 (66.3)	21 (4.2)	147 (29.5)

Table A4: Characteristics of Heads and Spouses

Region	Head			Spouse		
	Program	Non-Program	Total	Program	Non-Program	Total
<i>North</i>						
Number of observations	75	75	150	65	62	127
% of female	12.0	13.3	12.7	100	100	100
Age	44.4	44.0	44.2	36.6	34.5	35.6
Education (highest grade)	6.5	6.3	6.4	4.9	4.8	4.8
<i>Central</i>						
Number of observations	99	99	198	59	44	103
% of female	38.4	47.5	42.9	100	100	100
Age	44.8	43.4	44.1	35.7	34.5	35.1
Education (highest grade)	3.7	3.8	3.8	2.7	4.4	3.4
<i>South</i>						
Number of observations	75	75	150	56	44	100
% of female	22.7	34.7	28.7	100	100	100
Age	49.0	44.1	46.5	42.3	36.4	39.7
Education (highest grade)	4.8	4.2	4.5	2.9	3.5	3.2
<i>Total</i>						
Number of observations	249	249	498	180	150	330
% of female	25.7	33.3	29.5	100	100	100
Age	46.0	43.8	44.9	38.1	35.0	36.7
Education (highest grade)	4.6	4.3	4.5	3.2	4.2	3.6

Note: There are 4 polygamous households and 334 spouses are included in the sample. To make this table, the information about the eldest spouse is used when there are two spouses in the household.

Table A5: Total Amount Borrowed over Last 3 Years (in Malawi Kwacha)

<i>Total amount</i>	No.	Mean	s.d.
MRFC	118	32,359	34,001
Relatives/Friends	203	3,945	8,595
Traders/Shops	39	1,767	2,473

Table A6: MRFC Credit User

<i>Region</i>		Program		Non-Program	
District	EPA	Borrower	Non-Borrower	Borrower	Non-Borrower
North					
Rumphi	Mhuju	20 (57.1)	15 (42.9)	2 (5.7)	33 (94.3)
Mzimba	Zombwe	13 (33.3)	26 (66.7)	2 (5.0)	38 (95.0)
Central					
Ntcheu	Nsipe	18 (36.7)	31 (63.3)	1 (2.0)	48 (98.0)
Dedza	Mayani	8 (16.0)	42 (84.0)	1 (2.0)	48 (98.0)
South					
Blantyre	Lirangwe	11 (44.0)	14 (56.0)	4 (8.0)	46 (92.0)
Chiradzul	Mombezi	37 (74.0)	13 (26.0)	1 (4.0)	24 (96.0)
Total		107 (43.1)	141 (56.9)	11 (4.4)	237 (95.6)

Table A7: MRFC Clients by Household Type and Gender

<i>Region</i>	Program		Non-Program	
	Male	Female	Male	Female
<i>North</i>				
Two Spouses	27	8	4	2
Single	0	0	0	0
<i>Central</i>				
Two Spouses	19	2	1	1
Single	0	6	0	0
<i>South</i>				
Two Spouses	38	5	2	2
Single	1	7	0	1
<i>All</i>				
Two Spouses	84	15	7	5
Single	1	13	0	1
Total	85	28	7	6

**Table A8: Household Consumption, Expenditures, and Income
in Malawi Kwacha (1US\$ = 140MK)**

	No. of obs.	Program		Non-Program	
		Borrower	Non-Borrower	Borrower	Non-Borrower
		- mean -	- mean -	- mean -	- mean -
<i>Total consumption (last month)</i>		10,654	10,762	11,598	8,145
<i>Total expenditure (last month)</i>		6,481	6,342	8,386	5,589
Food Expenditure	496	3,513	3,776	5,148	3,396
Non-food Expenditure	496	2,121	2,042	2,517	1,690
Education	350	424	329	290	165
Health	157	423	195	432	338
<i>Income (last month)</i>	359	6,385	7,257	5,014	4,906
Crop faming	192	4,830	4,654	3,864	3,051
Raising livestock	35	628	267	559	355
Raising small animals	54	90	298	0	81
Business or trade	113	451	1,718	455	933
Wage work	92	258	232	136	453
Remittances	22	94	70	0	27
Pensions	5	25	18	0	6
<i>Annual income</i>	462	27,539	36,913	21,496	18,936
Crop faming	360	18,947	18,474	14,628	9,251
Raising livestock	73	1,998	711	1,673	1,390
Raising small animals	75	213	696	0	234
Business or trade	134	3,875	14,233	5,000	6,282
Wage work	137	1,049	1,423	195	1,412
Remittances	36	1,137	1,173	0	259
Pensions	6	297	204	0	105
<i>Aid/Grant (last year)</i>	205	1,512	789	3,532	2,510
Food aid	182	1,260	612	2,895	2,357
Starter pack	23	78	106	182	89
Cash grant	9	39	0	455	55

Note: No. of observations refers to the number of households that are involved in each income generating activity. The means are the average among all the households regardless of the involvement.

Table A9: Impact of MRFC Participation on log (Food Consumption)

	PSM (A)	OLS (B)	Treatment Regression (C)
MRFC participation			
MRFC client (=1)	0.142* (0.082)	0.068 (0.072)	0.134 (0.134)
Head and Spouse			
Female headed household (=1)		-0.100 (0.127)	-0.087 (0.127)
Age of household head		0.008 (0.012)	0.007 (0.012)
Age sq. ^(a)		-0.084 (0.120)	-0.075 (0.119)
Highest education (grade) completed by head spouse		-0.005 (0.012)	-0.005 (0.012)
Highest education (grade) completed by female spouse		0.016 (0.012)	0.016 (0.012)
Household characteristics			
log (Household size)		0.269*** (0.074)	0.264*** (0.073)
Ratio of dependents (15- and 65+) to household size		-0.054 (0.144)	-0.049 (0.142)
log (land size in acres 3 years ago)		0.303*** (0.053)	0.299*** (0.053)
Selection control			
Inverse Mills ratio			-0.022 (0.112)
Region Dummies		Yes	Yes
Sample Size	344	496	496

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

Table A10: Impact of MRFC participation on log (Food Expenditure)

	PSM (A)	OLS (B)	Treatment Regression (C)
MRFC participation			
MRFC client (=1)	0.141 (0.109)	0.077 (0.105)	0.074 (0.196)
Head and Spouse			
Female headed household (=1)		-0.299 (0.185)	-0.300 (0.185)
Age of household head		0.016 (0.018)	0.016 (0.017)
Age sq. ^(a)		-0.184 (0.175)	-0.184 (0.174)
Highest education (grade) completed by head spouse		0.006 (0.018)	0.006 (0.018)
Highest education (grade) completed by female spouse		0.019 (0.018)	0.019 (0.017)
Household characteristics			
log (Household size)		0.228** (0.107)	0.228** (0.107)
Ratio of dependents (15- and 65+) to household size		0.122 (0.210)	0.122 (0.207)
log (land size in acres 3 years ago)		0.232*** (0.078)	0.232*** (0.077)
Selection control			
Inverse Mills ratio			-0.022 (0.112)
Region Dummies		Yes	Yes
Sample Size	344	496	496

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

(a) Coefficients and standard errors are reported in the order of 10^{-3}

Table A11: Impact of MRFC Participation on log (Expenditures on Non-Food Goods and Services)

	PSM (A)	OLS (B)	Treatment Regression (C)
<i>MRFC participation</i>			
MRFC client (=1)	0.446*** (0.107)	0.301*** (0.087)	0.435*** (0.164)
<i>Head and Spouse</i>			
Female headed household (=1)		-0.313** (0.154)	-0.287* (0.155)
Age of household head		0.026* (0.015)	0.024 (0.015)
Age sq. ^(a)		-0.310** (0.146)	-0.293** (0.145)
Highest education (grade) completed by head spouse		-0.004 (0.015)	-0.003 (0.015)
Highest education (grade) completed by female spouse		0.037** (0.015)	0.037** (0.015)
<i>Household characteristics</i>			
log (Household size)		0.506*** (0.090)	0.496*** (0.089)
Ratio of dependents (15- and 65+) to household size		-0.004 (0.175)	0.004 (0.173)
log (land size in acres 3 years ago)		0.308*** (0.065)	0.300*** (0.065)
<i>Selection control</i>			
Inverse Mills ratio			-0.022 (0.112)
Region Dummies		Yes	Yes
Sample Size	344	496	496

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

Table A12: Impact of MRFC participation on Agricultural Monthly Income in Malawi Kwacha (1000MK) [Tobit model with selection control]

	Crop farming		Raising large livestock		Raising small animal	
	Tobit	Tobit with selection	Tobit	Tobit with selection	Tobit	Tobit with selection
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	0.615 (0.399)	2.878*** (0.758)	0.343 (0.306)	-0.623 (0.569)	-0.061 (0.114)	0.323 (0.219)
Household head/spouse						
Female headed household (=1)	-1.614** (0.728)	-1.153 (0.729)	-0.456 (0.599)	-0.657 (0.616)	0.212 (0.220)	0.295 (0.223)
Age of household head	0.041 (0.070)	0.004 (0.070)	0.018 (0.060)	0.033 (0.061)	-0.027 (0.022)	-0.034 (0.022)
Age sq. ^(a)	-0.458 (0.702)	-0.135 (0.698)	-0.058 (0.588)	-0.194 (0.595)	0.175 (0.230)	0.239 (0.229)
Highest education (grade) completed by male spouse	-0.001 (0.070)	0.007 (0.070)	-0.013 (0.057)	-0.016 (0.057)	0.003 (0.019)	0.004 (0.019)
Highest education (grade) completed by female spouse	0.087 (0.070)	0.085 (0.070)	0.049 (0.056)	0.054 (0.056)	-0.010 (0.020)	-0.012 (0.020)
Household Characteristics						
log (Household size)	1.150*** (0.430)	0.961** (0.428)	1.235*** (0.405)	1.326*** (0.414)	0.313** (0.148)	0.266* (0.147)
Ratio of dependents (15- and 65+) to household size	-0.474 (0.835)	-0.306 (0.825)	-0.591 (0.723)	-0.651 (0.731)	-0.225 (0.273)	-0.172 (0.271)
log (land size in acres 3 years ago)	1.105*** (0.314)	0.959*** (0.311)	0.407 (0.251)	0.484* (0.256)	0.020 (0.087)	0.003 (0.085)
Selection control						
Inverse Mills ratio		-1.769*** (0.504)		0.769** (0.388)		-0.310** (0.152)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	496	496	496	496	496	496

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

(a) Coefficients and standard errors are reported in the order of 10^{-3}

Table A13: Impact of MRFC participation on Non-Farm Monthly Income in Malawi Kwacha (1000MK) [Tobit model with selection control]

	Business or Trade		Wage work		Remittance	
	Tobit	Tobit with selection	Tobit	Tobit with selection	Tobit	Tobit with selection
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	-0.812 (1.234)	-2.192 (2.369)	-0.432*** (0.152)	-0.625** (0.279)	0.580 (0.455)	1.318 (0.975)
Household head/spouse						
Female headed household (=1)	-2.195 (2.116)	-2.476 (2.162)	-0.662** (0.269)	-0.701** (0.274)	-0.190 (0.782)	-0.044 (0.792)
Age of household head	0.371 (0.254)	0.395 (0.257)	0.005 (0.026)	0.008 (0.026)	0.068 (0.071)	0.055 (0.072)
Age sq. ^(a)	-5.243** (2.712)	-5.457** (2.739)	-0.190 (0.265)	-0.213 (0.266)	-0.303 (0.673)	-0.189 (0.681)
Highest education (grade) completed by male spouse	0.248 (0.223)	0.251 (0.224)	0.017 (0.025)	0.015 (0.025)	0.225** (0.100)	0.226** (0.100)
Highest education (grade) completed by female spouse	0.375* (0.211)	0.376* (0.212)	-0.031 (0.025)	-0.030 (0.025)	-0.026 (0.081)	-0.022 (0.080)
Household Characteristics						
log (Household size)	-1.038 (1.401)	-0.931 (1.415)	-0.202 (0.158)	-0.187 (0.160)	-0.701* (0.412)	-0.730* (0.411)
Ratio of dependents (15- and 65+) to household size	0.027 (2.875)	-0.084 (2.893)	0.038 (0.311)	0.028 (0.311)	0.487 (0.803)	0.533 (0.799)
log (land size in acres 3 years ago)	3.026*** (0.961)	3.135*** (0.980)	0.015 (0.111)	0.027 (0.113)	0.249 (0.348)	0.198 (0.346)
Selection control						
Inverse Mills ratio		1.096 (1.604)		0.155 (0.186)		-0.573 (0.662)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	496	496	496	496	496	496

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

(a) Coefficients and standard errors are reported in the order of 10⁻³

Table A14: Impact of MRFC Participation on Educational Expenditure among Individuals Aged 6 to 24 (in 1000 Malawi Kwacha*)

	OLS (A)	Tobit (B)	Tobit with selection control (C)
<i>MRFC participation</i>			
MRFC client (=1)	0.014 (0.027)	0.025 (0.036)	0.156** (0.065)
<i>Individual characteristics</i>			
Female (=1)	0.009 (0.023)	0.008 (0.031)	0.006 (0.030)
Age dummies	Yes	Yes	Yes
<i>Household characteristics</i>			
Female headed household (=1)	0.081 (0.050)	0.074 (0.065)	0.101 (0.065)
Age of household head	0.019*** (0.006)	0.033*** (0.008)	0.031*** (0.008)
Age sq.(a)	-0.175*** (0.055)	-0.294*** (0.074)	-0.281*** (0.073)
Highest education (grade) completed by male spouse	0.002 (0.005)	0.005 (0.007)	0.006 (0.007)
Highest education (grade) completed by female spouse	0.012** (0.005)	0.016** (0.007)	0.015** (0.007)
<i>Household characteristics</i>			
log (Household size)	0.035 (0.039)	0.039 (0.051)	0.016 (0.052)
Ratio of dependents (15- and 65+) to household size	0.010 (0.079)	0.039 (0.104)	0.062 (0.104)
log (land size in acres 3 years ago)	0.072*** (0.022)	0.114*** (0.029)	0.103*** (0.029)
<i>Selection control</i>			
Inverse Mills ratio			-0.104** (0.044)
Region Dummies	Yes	Yes	Yes
Sample Size	1136	1136	1136

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

(a) Coefficients and standard errors are reported in the order of 10^{-3}

Table A15: School Attendance Ratio

	No. of obs.	Program		Non-Program	
		Borrower	Non-Borrower	Borrower	Non-Borrower
		- mean -	- mean -	- mean -	- mean -
<i>All aged 6 - 24</i>	1,136	0.81	0.72	0.78	0.74
Age 6 -14	708	0.91	0.88	0.95	0.93
Age 15-18	215	0.88	0.69	0.40	0.71
Age 19-24	213	0.35	0.12	0.50	0.23
<i>Males aged 6 - 24</i>	546	0.87	0.76	0.83	0.79
Age 6 -14	345	0.95	0.86	1.00	0.91
Age 15-18	115	0.93	0.73	n.a.	0.78
Age 19-24	86	0.41	0.13	0.67	0.39
<i>Females aged 6 - 24</i>	590	0.74	0.70	0.71	0.70
Age 6 -14	363	0.86	0.89	0.88	0.94
Age 15-18	100	0.81	0.65	0.67	0.62
Age 19-24	127	0.29	0.11	0.33	0.11

Table A16: Impact of MRFC Participation on School Attendance

	Children aged 6 to 14		Adolescents aged 15 to 18		Young adults aged 19 to 24	
	OLS (A)	Treatment Regression (B)	OLS (D)	Treatment Regression (E)	OLS (D)	Treatment Regression (E)
MRFC participation						
MRFC client (=1)	-0.005 (0.025)	-0.071 (0.046)	0.088 (0.059)	0.142 (0.112)	0.044 (0.059)	0.122 (0.114)
Individual characteristics						
Female (=1)	0.001 (0.021)	0.001 (0.021)	-0.094* (0.054)	-0.095* (0.055)	-0.096* (0.052)	-0.099* (0.052)
Age dummies	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics						
Female headed household (=1)	-0.062 (0.043)	-0.076* (0.043)	-0.353*** (0.118)	-0.343*** (0.119)	-0.091 (0.131)	-0.086 (0.132)
Age of household head	0.005 (0.005)	0.006 (0.005)	0.026** (0.012)	0.025** (0.013)	0.025** (0.012)	0.024** (0.012)
Age sq. ^(a)	-0.041 (0.052)	-0.048 (0.052)	-0.217* (0.118)	-0.209* (0.119)	-0.182 (0.123)	-0.177 (0.123)
Highest education (grade) completed by male spouse	0.005 (0.005)	0.004 (0.005)	-0.001 (0.012)	-0.002 (0.012)	-0.025** (0.011)	-0.026** (0.011)
Highest education (grade) completed by female spouse	0.009* (0.005)	0.009** (0.005)	0.018 (0.012)	0.017 (0.012)	0.012 (0.011)	0.012 (0.011)
Household characteristics						
log (Household size)	-0.040 (0.035)	-0.029 (0.035)	-0.047 (0.099)	-0.050 (0.099)	0.093 (0.089)	0.071 (0.093)
Ratio of dependents (15- and 65+) to household size	-0.023 (0.075)	-0.038 (0.076)	0.411** (0.177)	0.403** (0.178)	-0.084 (0.167)	-0.073 (0.168)
log (land size in acres 3 years ago)	-0.024 (0.020)	-0.018 (0.020)	0.066 (0.052)	0.063 (0.052)	-0.036 (0.045)	-0.038 (0.045)
Selection control						
Inverse Mills ratio		0.051* (0.029)		-0.046 (0.082)		-0.063 (0.079)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	708	708	215	215	213	213

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%
(a) Coefficients and standard errors are reported in the order of 10⁻³

Table A17: Impact of MRFC participation on Income Generating Activities among Male heads (Linear model)

	Crop farming		Raising small animals		Wage work	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	0.292*** (0.081)	0.293*** (0.082)	0.171* (0.102)	0.163 (0.103)	-0.360*** (0.111)	-0.355*** (0.112)
Female client (=1)		-0.009 (0.091)		0.099 (0.114)		-0.063 (0.124)
Male head						
Age	-0.017 (0.015)	-0.017 (0.015)	-0.002 (0.019)	-0.001 (0.019)	0.011 (0.020)	0.011 (0.021)
Age sq. ^(a)	0.118 (0.141)	0.119 (0.142)	-0.019 (0.177)	-0.032 (0.178)	-0.104 (0.193)	-0.096 (0.194)
Highest education (grade) completed	-0.001 (0.008)	-0.001 (0.008)	-0.002 (0.010)	-0.002 (0.010)	-0.008 (0.011)	-0.008 (0.011)
Female spouse						
Age	0.013 (0.017)	0.013 (0.017)	-0.007 (0.021)	-0.008 (0.021)	-0.020 (0.023)	-0.019 (0.023)
Age sq. ^(a)	-0.104 (0.183)	-0.105 (0.184)	0.073 (0.230)	0.085 (0.230)	0.160 (0.250)	0.152 (0.251)
Highest education (grade) completed	-0.010 (0.009)	-0.010 (0.009)	-0.003 (0.012)	-0.003 (0.012)	0.005 (0.013)	0.006 (0.013)
Household Characteristics						
log (Household size)	-0.027 (0.063)	-0.027 (0.063)	0.006 (0.079)	0.001 (0.079)	0.046 (0.086)	0.050 (0.087)
Ratio of dependent (15- and 65+) to household size	0.135 (0.111)	0.135 (0.111)	0.112 (0.139)	0.112 (0.139)	-0.250 (0.152)	-0.250 (0.152)
log (land size in acres 3 years ago)	0.043 (0.040)	0.043 (0.040)	0.018 (0.050)	0.018 (0.050)	0.001 (0.054)	0.001 (0.054)
Selection control						
Inverse Mills ratio	-0.129** (0.055)	-0.128** (0.056)	-0.093 (0.069)	-0.102 (0.070)	0.170** (0.076)	0.175** (0.077)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size ^(b)	282	282	282	282	282	282

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

(b) Sample for this analysis is restricted to two-spouse households from which we could obtain responses from both spouses.

Table A18: Impact of MRFC participation on Income Generating Activities among Female Spouses (Linear model)

	Crop farming		Raising small animals		Wage work	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	0.302*** (0.094)	0.318*** (0.094)	0.224** (0.106)	0.227** (0.106)	-0.158* (0.091)	-0.163* (0.091)
Female client (=1)		-0.204* (0.104)		-0.042 (0.118)		0.063 (0.101)
Male head						
Age	-0.021 (0.017)	-0.023 (0.017)	-0.001 (0.019)	-0.001 (0.020)	0.014 (0.017)	0.015 (0.017)
Age sq. ^(a)	0.213 (0.163)	0.239 (0.163)	-0.054 (0.183)	-0.048 (0.184)	-0.141 (0.157)	-0.149 (0.158)
Highest education (grade) completed	0.005 (0.009)	0.005 (0.009)	0.011 (0.010)	0.011 (0.010)	-0.010 (0.009)	-0.010 (0.009)
Female spouse						
Age	0.016 (0.020)	0.018 (0.019)	-0.001 (0.022)	0.001 (0.022)	-0.010 (0.019)	-0.010 (0.019)
Age sq. ^(a)	-0.213 (0.212)	-0.237 (0.211)	0.035 (0.238)	0.030 (0.239)	0.082 (0.204)	0.089 (0.205)
Highest education (grade) completed	-0.014 (0.011)	-0.013 (0.011)	0.004 (0.012)	0.004 (0.012)	0.009 (0.010)	0.009 (0.010)
Household Characteristics						
log (Household size)	-0.041 (0.073)	-0.030 (0.073)	-0.019 (0.082)	-0.017 (0.082)	-0.035 (0.070)	-0.038 (0.071)
Ratio of dependent (15- and 65+) to household size	0.133 (0.128)	0.134 (0.128)	0.069 (0.144)	0.069 (0.145)	-0.028 (0.124)	-0.028 (0.124)
log (land size in acres 3 years ago)	0.073 (0.046)	0.072 (0.046)	-0.025 (0.052)	-0.025 (0.052)	0.019 (0.044)	0.019 (0.044)
Selection control						
Inverse Mills ratio	-0.116* (0.064)	-0.098 (0.064)	-0.091 (0.072)	-0.087 (0.073)	0.134** (0.062)	0.128** (0.062)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size ^(b)	282	282	282	282	282	282

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

(a) Coefficients and standard errors are reported in the order of 10^{-3}

(b) Sample for this analysis is restricted to two-spouse households from which we could obtain responses from both spouses.

Table A19: Impact of MRFC participation on Income Generating Activities among Single Female Heads (Linear model)

	Crop farming	Raising large animals	Raising small animals	Business or trade	Wage work	Remittances
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC female client (=1)	0.734** (0.313)	-0.080 (0.198)	-0.150 (0.262)	0.124 (0.262)	-0.190 (0.272)	0.283 (0.194)
Female head						
Age	-0.003 (0.014)	0.006 (0.009)	-0.005 (0.012)	0.002 (0.012)	-0.001 (0.012)	-0.007 (0.009)
Age sq. ^(a)	0.030 (0.135)	-0.044 (0.085)	-0.005 (0.113)	-0.014 (0.113)	-0.026 (0.117)	0.081 (0.084)
Highest education (grade) completed	-0.010 (0.014)	-0.003 (0.009)	-0.022* (0.012)	0.025** (0.012)	-0.016 (0.012)	-0.009 (0.009)
Household Characteristics						
log (Household size)	0.007 (0.083)	0.054 (0.053)	0.025 (0.069)	0.066 (0.069)	-0.061 (0.072)	0.061 (0.052)
Ratio of dependent (15- and 65+) to household size	-0.043 (0.169)	0.180* (0.107)	0.190 (0.141)	-0.225 (0.141)	0.037 (0.146)	-0.137 (0.105)
log (land size in acres 3 years ago)	0.077 (0.066)	-0.007 (0.041)	0.021 (0.055)	-0.041 (0.055)	0.072 (0.057)	-0.013 (0.041)
Selection control						
Inverse Mills ratio	-0.304 (0.193)	0.279** (0.122)	0.052 (0.161)	-0.078 (0.161)	0.055 (0.168)	-0.083 (0.120)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size	147	147	147	147	147	147

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

(a) Coefficients and standard errors are reported in the order of 10^{-3}

Table A20: Impact of MRFC Participation on Working Hours for Food Crop among Male Heads (Tobit model with selection control)

	Total hours worked		Hours worked on own land		Hours worked on spouse's land	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	112.55 (82.05)	106.85 (82.19)	77.60 (106.15)	74.23 (106.36)	103.38 (195.65)	101.26 (196.37)
Female client (=1)		80.74 (91.08)		54.21 (117.12)		28.45 (230.55)
Male head						
Age	-1.781 (15.10)	-0.896 (15.11)	-10.14 (19.24)	-9.597 (19.27)	69.51 (44.40)	70.10 (44.68)
Age sq.	-0.001 (0.143)	-0.012 (0.143)	0.036 (0.182)	0.029 (0.182)	-0.594 (0.445)	-0.602 (0.450)
Highest education (grade) completed	-7.894 (7.926)	-7.989 (7.917)	-3.994 (10.20)	-4.092 (10.19)	-15.28 (18.22)	-15.25 (18.22)
Female spouse						
Age	-6.691 (17.05)	-7.592 (17.06)	16.850 (21.98)	16.320 (22.01)	-89.14** (45.04)	-89.85** (45.43)
Age sq.	0.121 (0.19)	0.131 (0.19)	-0.077 (0.24)	-0.071 (0.24)	0.856* (0.515)	0.866* (0.522)
Highest education (grade) completed	13.54 (9.332)	13.09 (9.333)	7.410 (12.11)	7.134 (12.12)	27.93 (21.58)	27.69 (21.65)
Household Characteristics						
log (Household size)	107.89* (63.24)	103.68 (63.33)	-65.09 (81.14)	-67.77 (81.32)	374.14** (159.85)	372.55** (160.33)
Ratio of dependent (15- and 65+) to household size	-341.79*** (111.41)	-342.00*** (111.25)	-259.74* (142.63)	-260.75* (142.56)	-186.84 (277.83)	-185.91 (277.85)
log (land size in acres 3 years ago)	69.58* (39.91)	69.94* (39.85)	75.21 (50.85)	75.32 (50.82)	104.92 (108.50)	105.72 (108.67)
Selection control						
Inverse Mills ratio	-68.38 (55.92)	-75.79 (56.49)	-40.40 (72.38)	-45.94 (73.34)	-87.55 (135.07)	-89.37 (135.86)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size ^(a)	282	282	282	282	282	282

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Sample for this analysis is restricted to two-spouse households from which we could obtain responses from both spouses.

Table A21: Impact of MRFC participation on Working Hours for Food Crop among Female Spouses (Tobit model with selection control)

	Total hours worked		Hours worked on own land		Hours worked on spouse's land	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	-23.94 (84.97)	-23.15 (85.26)	-48.85 (116.15)	-64.09 (116.45)	-33.17 (179.23)	-18.87 (178.91)
Female client (=1)		-10.77 (94.65)		173.30 (127.02)		-253.30 (208.76)
Male head						
Age	-8.200 (15.67)	-8.317 (15.70)	18.37 (21.90)	20.39 (21.94)	-35.62 (32.96)	-38.30 (32.88)
Age sq.	0.060 (0.148)	0.062 (0.149)	-0.144 (0.211)	-0.170 (0.212)	0.288 (0.309)	0.323 (0.309)
Highest education (grade) completed	-11.75 (8.236)	-11.75 (8.236)	-5.37 (11.59)	-5.27 (11.57)	-7.066 (16.52)	-6.546 (16.48)
Female spouse						
Age	12.32 (17.71)	12.44 (17.73)	-18.38 (24.49)	-20.53 (24.54)	50.38 (38.28)	52.35 (38.08)
Age sq.	-0.098 (0.19)	-0.099 (0.19)	0.186 (0.27)	0.211 (0.27)	-0.524 (0.417)	-0.548 (0.415)
Highest education (grade) completed	13.03 (9.687)	13.09 (9.702)	10.07 (13.58)	8.583 (13.59)	10.40 (19.54)	11.02 (19.49)
Household Characteristics						
log (Household size)	47.74 (65.69)	48.30 (65.87)	-0.650 (89.27)	-9.050 (89.36)	108.58 (141.34)	124.18 (141.48)
Ratio of dependent (15- and 65+) to household size	-159.56 (115.73)	-159.55 (115.73)	14.05 (158.99)	14.16 (158.68)	-400.54 (256.88)	-401.85 (256.44)
log (land size in acres 3 years ago)	57.83 (41.51)	57.80 (41.51)	53.45 (56.57)	53.43 (56.40)	73.74 (86.00)	74.16 (85.64)
Selection control						
Inverse Mills ratio	13.45 (57.61)	14.41 (58.22)	30.15 (78.40)	15.77 (78.88)	26.55 (124.24)	50.19 (125.55)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size ^(a)	282	282	282	282	282	282

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

(a) Sample for this analysis is restricted to two-spouse households from which we could obtain responses from both spouses.

Table A22: Decision-Making as Reported by Female Spouses

	Female spouse decision	Joint decision	Male spouse decision
	(A)	(B)	(C)
<i>Decision on:</i>	- % -	- % -	- % -
The amount spent on food eaten at home	7.80	67.02	24.11
Large purchases such as appliances or furniture	2.84	69.15	26.60
Purchase of clothing & shoes for children	4.61	72.34	20.92
If a sick child should go to the health post/doctor/hospital	4.61	72.70	20.21
When to send your sons to primary school	2.48	72.34	23.76
When to send your daughters to primary school	2.84	73.40	22.34
Whether your sons should go to secondary school	2.84	72.34	22.34
Whether your daughters should go to secondary school	3.19	71.28	22.70
Who children will marry?	3.90	17.73	10.64
Whether to acquire more land (buy, rent in, borrow, etc.)	1.42	69.86	28.72
If the HH needs to sell land, who decides what plot to sell	2.13	69.86	28.01
What crops to cultivate on your land	2.13	72.34	25.53
What crops to cultivate on household land	1.77	73.40	24.82
How much of the harvest from your land to sell	1.77	71.28	26.95
How much of the harvest from household land to sell	1.77	71.63	26.60
Purchasing large livestock (cows, bulls, oxen, horses, mules, etc.)	1.06	68.79	29.43
To sell large livestock animals	1.06	68.09	30.50
Purchasing small animals (pigs, goats, chickens, ducks, etc.)	1.42	71.99	26.24
Purchase of clothing & shoes for you]	8.51	71.63	19.86
Purchase of jewelry	19.50	63.83	13.48
Family Planning, including birth control	9.22	76.60	9.57

**Table 23: Impact of MRFC participation on Female's decision making power
[Linear probability model with selection control]**

	Female spouse decision		Joint decision		Male spouse decision	
	MRFC client	Female client	MRFC client	Female client	MRFC client	Female client
	(A)	(B)	©	(D)	(E)	(F)
<i>Decision on</i>						
The amount spent on food eaten at home	-0.190*** (0.066)	0.096 (0.074)	0.135 (0.111)	-0.181 (0.123)	0.078 (0.104)	0.103 (0.115)
Large purchases such as appliances or furniture	-0.013 (0.041)	0.024 (0.046)	0.063 (0.111)	-0.123 (0.123)	-0.018 (0.108)	0.110 (0.120)
Purchase of clothing & shoes for children	-0.047 (0.053)	0.072 (0.058)	0.119 (0.109)	-0.037 (0.121)	-0.001 (0.101)	-0.085 (0.112)
If a sick child should go to the health post/doctor/hospital	-0.052 (0.052)	0.039 (0.058)	0.102 (0.109)	-0.069 (0.121)	0.022 (0.100)	0.040 (0.110)
When to send your sons to primary school	-0.021 (0.040)	0.054 (0.044)	0.032 (0.108)	-0.002 (0.120)	0.026 (0.103)	-0.055 (0.114)
When to send your daughters to primary school	-0.041 (0.042)	0.053 (0.047)	0.049 (0.107)	-0.037 (0.118)	0.029 (0.101)	-0.018 (0.112)
Whether your sons should go to secondary school	-0.028 (0.042)	0.053 (0.047)	0.095 (0.110)	-0.031 (0.122)	-0.015 (0.102)	-0.004 (0.113)
Whether your daughters should go to secondary school	-0.048 (0.045)	0.052 (0.050)	-0.012 (0.111)	-0.032 (0.123)	0.086 (0.102)	0.006 (0.113)
Who children will marry?	0.043 (0.049)	0.018 (0.054)	-0.096 (0.096)	0.279*** (0.106)	0.022 (0.075)	-0.080 (0.083)
Whether to acquire more land (buy, rent in, borrow, etc.)	-0.036 (0.030)	-0.002 (0.033)	-0.049 (0.109)	-0.077 (0.121)	0.085 (0.107)	0.079 (0.118)
If the HH needs to sell land, who decides what plot to sell	-0.077** (0.037)	-0.002 (0.041)	-0.018 (0.109)	-0.068 (0.121)	0.095 (0.106)	0.070 (0.118)
What crops to cultivate on your land	-0.049 (0.036)	-0.018 (0.040)	-0.091 (0.106)	-0.098 (0.117)	0.140 (0.104)	0.116 (0.115)
What crops to cultivate on household land	-0.024 (0.034)	-0.015 (0.038)	-0.114 (0.106)	-0.125 (0.117)	0.138 (0.103)	0.140 (0.114)
How much of the harvest from your land to sell	-0.031 (0.034)	-0.016 (0.038)	-0.087 (0.108)	-0.081 (0.119)	0.118 (0.105)	0.098 (0.117)
How much of the harvest from household land to sell	-0.031 (0.034)	-0.016 (0.038)	-0.111 (0.109)	-0.083 (0.120)	0.142 (0.106)	0.100 (0.117)
Purchasing large livestock (cows, Bulls, oxen, horses, mules, etc.)	-0.042 (0.026)	0.002 (0.029)	-0.042 (0.110)	-0.115 (0.122)	0.122 (0.108)	0.057 (0.120)

	Female spouse decision		Joint decision		Male spouse decision	
	MRFC client	Female client	MRFC client	Female client	MRFC client	Female client
	(A)	(B)	©	(D)	(E)	(F)
To sell large livestock animals	-0.042 (0.026)	0.002 (0.029)	-0.026 (0.110)	-0.107 (0.121)	0.096 (0.108)	0.049 (0.119)
Purchasing small animals (pigs, goats, chickens, ducks, etc.)	-0.049 (0.030)	0.001 (0.034)	-0.035 (0.107)	-0.196* (0.118)	0.112 (0.104)	0.139 (0.115)
Purchase of clothing & shoes for you [for wife, when asking husband]	-0.031 (0.068)	0.002 (0.075)	-0.122 (0.107)	-0.033 (0.119)	0.152 (0.097)	0.030 (0.107)
Purchase of jewelry	-0.141 (0.095)	0.135 (0.105)	0.024 (0.112)	-0.080 (0.124)	0.013 (0.087)	0.040 (0.096)
Family Planning, including birth control	-0.089 (0.072)	0.067 (0.080)	-0.006 (0.103)	-0.121 (0.114)	-0.008 (0.074)	0.001 (0.082)
Sample Size	282		282		282	

Note: Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table A24: Male Heads' Promotion in Community Organization

	Farmers' Association		Church		Development Committee	
	(A)	(B)	(C)	(D)	(E)	(F)
MRFC participation						
MRFC client (=1)	0.115 (0.095)	0.122 (0.095)	0.056 (0.093)	0.066 (0.093)	-0.150 (0.117)	-0.137 (0.118)
Female client (=1)		-0.087 (0.105)		-0.122 (0.103)		-0.163 (0.130)
Male head						
Age	0.025 (0.017)	0.024 (0.017)	0.010 (0.017)	0.009 (0.017)	-0.001 (0.022)	-0.003 (0.022)
Age sq. ^(a)	-0.128 (0.164)	-0.117 (0.165)	-0.061 (0.161)	-0.046 (0.161)	0.045 (0.203)	0.067 (0.204)
Highest education (grade) completed	0.002 (0.009)	0.002 (0.009)	0.006 (0.009)	0.006 (0.009)	-0.011 (0.011)	-0.011 (0.011)
Female spouse						
Age	-0.038* (0.020)	-0.037* (0.020)	0.001 (0.019)	0.002 (0.019)	0.002 (0.024)	0.003 (0.024)
Age sq. ^(a)	0.308 (0.213)	0.298 (0.214)	-0.023 (0.209)	-0.037 (0.209)	-0.054 (0.264)	-0.073 (0.264)
Highest education (grade) completed	0.014 (0.011)	0.015 (0.011)	-0.001 (0.011)	-0.001 (0.011)	-0.012 (0.013)	-0.011 (0.013)
Household Characteristics						
log (Household size)	0.080 (0.073)	0.085 (0.074)	-0.201*** (0.072)	-0.194*** (0.072)	0.024 (0.091)	0.033 (0.091)
Ratio of dependent (15- and 65+) to household size	-0.153 (0.129)	-0.153 (0.129)	-0.053 (0.127)	-0.053 (0.127)	0.170 (0.160)	0.171 (0.160)
log (land size in acres 3 years ago)	-0.061 (0.046)	-0.061 (0.046)	0.051 (0.045)	0.051 (0.045)	0.050 (0.057)	0.049 (0.057)
Selection control						
Inverse Mills ratio	0.001 (0.064)	0.008 (0.065)	-0.011 (0.063)	0.001 (0.064)	0.086 (0.080)	0.101 (0.081)
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample Size ^(b)	282	282	282	282	282	282

Note: Standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Dependent variable is defined as a change in the position of the male head in the organization. The position is classified into four categories: 1- leadership, 2-active member, 3-ordinary member, and 4-other position or non-member.

(a) Coefficients and standard errors are reported in the order of 10^{-3}

(b) Sample for this analysis is restricted to two-spouse households from which we could obtain responses from both spouses.