

# Access to Credit and Women's Work Decisions: An Empirical Study in Rural Malawi

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*Abstract. The objectives of this study are to answer the following: (i) does access to credit for women change their status within the household with effects for their work choices (on-farm work vs. off-farm self-employment), (ii) does the impact of access to credit on work choices differ by the headship status of the household, and (iii) does this effect differ by source of credit (formal credit vs. informal credit)? Access to credit is defined as a variable that positively affects women's status and decision-making powers within the household by increasing their level of economic activity and giving them independent access to resources. This study differentiates between access to credit and participation in a credit program. A non-participating household that has access can still benefit as it can take on activities that are risky but yield a high return. The on-farm and off-farm participation decisions of married men and women and female heads are estimated through discrete models using data from rural Malawi. The estimation procedure accounts for endogeneity of access to credit to the participation decisions.*

**Keywords:** Women's status; credit; on-farm work; off-farm work, jural credit, informal credit; Malawi.

## 1. Introduction and Objectives

The 'empowering' effect of access to credit for women has been widely debated in recent literature with both positive and negative verdicts (Pitt and Khandker 1996, Hashemi *et al.* 1996, Ackerly 1995). Kabeer (2001) reviews the different studies and notes that the conflicting conclusions are a function of the method, approach and focus of the

evaluation. Kabeer argues that the studies that find a negative effect of credit on women stress gender conflict in the household, while overlooking the relevance of cooperation. Autonomy in decision-making is seen as a sign of 'empowerment', while 'jointness' in decision-making is a disguise for male dominance (Montgomery *et al.* 1996, as noted in Kabeer 2001). On the other hand, studies that find a positive effect of credit tend to take into account 'jointness' in decision-making as a sign of increased involvement on part of the woman in the household. To overcome such shortcomings, Kabeer conducted a participatory evaluation of a credit program in Bangladesh where the loanees evaluated themselves. The participatory approach was supplemented by a quantitative survey of the households to provide basic descriptive statistics. The study finds that access to credit has the potential to enhance women's status by '*increasing their sense of self-worth, of bringing something of value to their households*' (Kabeer 2001: 71). Furthermore, the author finds that ability to contribute to household income can arise even within the accepted cultural norms of gender division of labor.

This research further explores the relationship between access to credit and women's status in the household by investigating the impact of credit on labor participation decisions in certain areas of rural Malawi. Specifically, the questions addressed in this study are: Does access to credit affect an individual's work choices within the household? How does this effect differ by gender? How does this effect differ by source of credit (formal credit vs. informal credit)? Are the choices made by women living in male-headed households different from the choices made by women living in female-headed households, i.e., do women who are spouses make different choices than those who are themselves heads?

Women in rural Malawi, as in other developing countries, allocate their labor between the following activities: (i) self-employment on own farm; (ii) off-farm self-employment; (iii) off-farm wage employment; and (iv) household activities. This paper examines the effect of access to credit on participation in off-farm self-employment work and own farm work for men (head) and women (spouses) in male-headed households and for women (heads) in female-headed households.<sup>1</sup>

Availability of credit for an individual has several implications for women's status and household welfare. Following the idea suggested by Hashemi *et al.* (1996), this study views access to credit as a variable that positively affects women's status within the household by increasing their contributions to family income and household welfare. The interaction between credit and status can be conceptualized in several ways. First, access

to credit by itself increases women's status because it implies independent access to resources. Second, if the credit is used to finance an off-farm activity, it is likely that women will have greater control over the income generated from the enterprise. The additional income she provides to the household is also likely to enhance her status. In the event that credit is used mainly for consumption smoothing, once again, women's status is likely to be enhanced, as it is an important contribution to household welfare. Finally, credit can give women access to essential agricultural inputs (fertilizers, seeds) and improved technology to increase farm productivity. This is crucial because many women lack cash or credit to buy inputs and can plant only unfertilized local maize or local hybrid maize as a subsistence crop instead of planting hybrid maize as a cash crop (Gladwin 1992). However, Malawi is a land-scarce country and increasing subsistence production may not be the best alternative to ensuring food security for the family. In many parts of Africa, farming for food gives women a social and gender identity. African rural women pride themselves on their farming ability and being able to grow food for the household. For them, '*A good woman is a good food farmer*' (Gladwin *et al.* 2001: 198). Thus, it seems reasonable to conclude that being able to provide adequate food for the household is important for her status in the household.

## 2. Policy Relevance

Research on the effects of credit programs is of interest as credit is being used as a policy instrument to enhance household welfare and women, in particular, are being targeted (for example, the Grameen Bank, Malawi Mudzi Fund). Recent literature in economics suggests that women's independent access to resources affects their bargaining power and access to resources within the household (Quisumbing and de la Briere 2000, Quisumbing and Maluccio 2000, Doss 1996, Strauss and Beegle 1996). Research also suggests that men and women spend their income differently, with women more likely to invest in household welfare (Doss 1996, Hoddinott and Haddad 1995). Therefore, women's control over resources has implication for household welfare.

For African households, participation in off-farm activities (wage or self-employment) is an important diversification strategy that serves several goals: to maintain food security in situations of low farm productivity and income shocks; to provide cash to finance household and farm expenditures in the event of credit market failure; and to reduce income risk by *ex ante* diversification (Reardon 1997). Recent research in Ghana suggests that

women's income diversification strategies, more than men's, may be motivated to cope with income shortfalls in the household (Abdulai and Delgado 1999). However, in achieving this goal the constraints faced by women farmers with regard to access to land, capital or credit, technology, and training services, are generally greater than those faced by male farmers (Gladwin 1991).

Most of Malawi's rural population is not self-sufficient in food (Peters 1992, 1995). Off-farm work is an important source of income supplement for poor households in rural Malawi. Casual labor, small crafts and beer brewing are the major sources of income, although casual labor (*ganyu*) consisting mainly of agricultural wage labor has the highest contribution (Peters 1993, World Bank 1996). *Ganyu* is one form of distress labor that finance-constrained households undertake to meet their consumption needs and purchase inputs. However, it is an unreliable source of employment especially during poor agricultural seasons when the need for cash income is the highest. *Ganyu* also creates labor shortages on the farms of the households that undertake it, with serious consequences for their food security (Alwang and Siegel 1999). The study concludes that a multi-pronged strategy is needed to address the various constraints that smallholders face, of which a lack of credit is one. Gladwin *et al.* (2001) notes that the problem of food security is linked to low household incomes and poverty and not only inadequate food production. Increasing subsistence production without application of fertilizer will still lead to food insecurity. Instead of focusing on increasing food production alone, Gladwin's study suggests ways to improve returns to women's resources and make their livelihoods sustainable by diversifying into cash cropping, income-generating activities and wage labor.

Women are not a homogenous category and they respond differently to new opportunities (Kabeer 2001). It is important for policy purposes to recognize this diversity in order to maximize the effect of interventions. Our study focuses on women in male-headed households and women in female-headed households separately, to better understand the effect of credit on women. Female-headed households are in general poorer and more vulnerable to income shocks than male-headed households. This is also true for Malawi. Approximately 25 percent of households in Malawi are female headed, but form 27 percent of all poor households and are also over-represented in the rural areas (National Economic Council 2000).

## 2. Data

The household data set from Malawi used in this research was made available from the International Food Policy Research Institute (IFPRI), based in Washington D.C. The data are from a household rural finance survey of 404 households in 45 villages spread over five districts in Malawi (see Figure 1 for the location of the survey sites in Malawi). The survey was conducted by IFPRI in collaboration with the Bunda College of Agriculture, University of Malawi. The primary purpose of the survey was to 'study the determinants of access to and participation in existing formal and informal credit and saving programs, and their effects on agricultural productivity, income generation and food security' (Simtowe and Diagne 1998: 1).

The households in the Malawi sample were interviewed in a three-round household survey with a recall period of up to two years for some data. Round 1 of the survey took place in February-April 1995, round 2 in July-August 1995, and round 3 in November-December 1995. The survey was conducted at three levels: the household level, community level and credit group level. The household-level survey, comprised of seven modules, was administered in all three rounds. The seven modules are (i) demographics, (ii) crop and livestock incomes, (iii) asset ownership and transactions, (iv) food and non-food expenditure, (v) credit and savings, (vi) non-farm income and time allocation, and (vii) anthropometric measures.

The community-level and group-level questionnaires were administered in the second and third rounds, respectively. The community-level questionnaire provides information on the socio-economic characteristics of the forty-five surveyed villages and surrounding communities (e.g., types of infrastructure available, health, education and sanitation facilities, existence of market, among other variables). The group-level questionnaire collected information on the structure, rules and performance for each of the credit groups operating in the surveyed areas. In addition, demographic information was collected for each member of the credit group.

## 4. Sampling Framework

Participation in credit programs is not a very common phenomenon in Malawi. Diagne and Zeller (2001) found that, of the 4,699 households enumerated in the forty-five villages, only twelve percent were

current members of a credit program. The authors suggest this figure is an overestimate of the likelihood of program participation in Malawi because it represents the membership in the villages hosting the programs studied. A more accurate estimate of program participation is likely to be between one and three percent. Membership in programs is not evenly distributed across the country. Hence, the sample is stratified along the program membership status variable, with random selection within each stratum as opposed to straight random sampling. Fifty percent of the sample is comprised of households who are members of the credit programs, with the remaining sample comprised of non-participating households. The non-participants are further equally divided between those who never received credit from an organization and defaulters, who are no longer eligible for loans. The four programs considered in the study are the Malawi Rural Finance Company (MRFC), Malawi Mudzi Fund (MMF), Malawi Union of Savings and Credit Cooperatives (MUSCCO), and the Promotion of Micro-Enterprises for Rural Women (PMERW).

## 5. Access to Credit

The access to credit variable is defined following the methodology outlined in Diagne and Zeller (2001). Their approach differentiates between *access to credit* and *participation in a credit program* or *in the informal credit market*. A household has access to credit from a particular source if it can borrow from that source. A household participates if it borrows from that source of credit. Thus, a household can have access but choose not to borrow, i.e., does not participate in the credit market. A non-participating household that has access can still benefit as it can take on risky but high-yielding activities (Eswaran and Kotwal 1990, McKee 1989) and also do away with precautionary savings with negative returns (Deaton 1991).

Most previous studies estimate the marginal effects of either the amount of credit borrowed or membership in a program as measures of impact of access to credit. Using the amount of credit received assumes that: first, all households in the program were credit constrained when they received credit; second, the program was the only source of credit; and finally, they had no resources to self-finance even a part of their investment (Feder *et al.* 1990, as noted in Diagne and Zeller 2001). In addition, the authors note two other reasons where the use of the amount borrowed is not appropriate: (i) households may have access to credit, but decided not to borrow because it was not an optimal strategy for them, and (ii) households may receive large

amounts of credit with negligible marginal impact. In both situations outlined above, using the amount borrowed does not fully capture the positive effects that access alone can provide in terms of shields and flexible borrowing choices.

Program impacts as measured through the membership status variable are also not a good measure of the impact of access to formal credit for two reasons. First, most credit programs are not focused on credit alone. They provide educational services like literacy training, family planning, training for income-generating activities and so on. Hence, in the use of program impacts, we will not be able to separate out the effects due to credit received and the effects due to the educational services provided (Pitt and Khandker 1996). Second, access to credit is not necessarily automatic for members of a credit program. Diagne and Zeller (2001) find that many group-based credit programs lend only to a certain proportion of the group at any point in time. Also, most credit programs are dependent on donor funds that introduce an element of uncertainty with regard to availability of cash for lending.

The extent of access is determined by the maximum amount the person can borrow from that source. This is referred to as the person's credit limit or credit line from that source. In the IFPRI data set, access to credit is measured separately for all adult household members, i.e., for those over 17 years of age. In each round, information was collected from each adult household member on the maximum amount they could borrow during the recall period by the sector of the credit market (formal or informal source of credit). This question was asked of all respondents: those who were involved in a loan transaction as a borrower, those who were not involved in any loan transaction, and those whose loan request had been rejected. Thus, the data set provides information on the formal and informal credit limit of each adult member for all three rounds. In this research we define access to credit for both formal and informal credit separately. An individual is said to have access to formal credit or to informal credit if he/she enjoys a strictly positive credit limit for formal credit or for informal credit, respectively.

## 6. Empirical Specification

As discussed previously, a stratified sample selection procedure was followed due to low participation in credit programs in Malawi. Since the stratifying variable is endogenous, this is a choice-based sampling procedure. To correct for the corresponding bias from choice-based

sampling, we use a two-step estimation method following Diagne and Zeller (2001). The probability choices for the household, corrected for choice-based sampling, are estimated in the first step. The work participation equations are then estimated in the second step, using the corrected probability choices from the first step as weights. This procedure corrects for the bias in the estimation process caused by the choice-based sampling approach.

A three-alternative multinomial logit model is used for the estimation of the corrected probability choices of the household. The three alternatives are specified as: (i) never participated in a credit program ( $j = 0$ ); (ii) current member of a credit program ( $j = 1$ ); and (iii) joined a credit program and then dropped out of the program, i.e., past member ( $j = 2$ ).<sup>2</sup> Due to the restriction of mutual exclusivity, each household can belong to only one of the three alternatives.

The multinomial logit model is an extension of the binary logit model. In this model the individual specific characteristics are the primary determinants of the choice. The probability choices for household  $i$  are specified as:

$$\text{Probability}(y_i = j) = \frac{e^{\beta_j x_i}}{\sum_{k=0}^2 e^{\beta_k x_i}}, \quad [1]$$

where  $j = 0, 1, 2$ . For the purpose of identification, we impose the normalization  $\beta_0 = 0$ , and rewrite the probabilities as:

$$\text{Probability}(y_i = 0) = \frac{1}{1 + \sum_{k=1}^2 e^{\beta_k x_i}}, \quad [2]$$

$$\text{Probability}(y_i = j) = \frac{e^{\beta_j x_i}}{1 + \sum_{k=1}^2 e^{\beta_k x_i}},$$

where  $j = 1, 2$ .

The model is estimated as full information maximum likelihood (FIML) using the Manski and Lennan (1977) weighted-exogenous-sample maximum likelihood (WESML) estimator to correct for choice-based sampling (Greene 2000). The WESML estimator requires that the true population proportions be known. If  $p_0$ ,  $p_1$ , and  $p_2$  are the sample



proportions and  $\omega_0$ ,  $\omega_1$ , and  $\omega_2$  are the true population proportions corresponding to the three alternatives, then the estimator is obtained by maximizing the weighted log-likelihood

$$\log L = \sum_{i=1}^n w_i \log F(q_i, \beta x_i) \quad [3]$$

where

$$w_i = y_{i0} (\omega_0 / p_0) + y_{i1} (\omega_1 / p_1) + y_{i2} (\omega_2 / p_2) \quad [4]$$

If access to credit is an exogenous variable then we could estimate the participation decisions (work as off-farm self-employed or not; work on own farm or not) using a univariate probit model, with access to credit as an independent variable. However, there are several reasons why access to credit may be potentially endogenous to the participation decisions of individuals within the household. The first explanation is related to the idea that credit program participation may be endogenous, which makes it likely that access to formal credit is also endogenous. Pitt and Khandker (1996) argue that program participation is endogenous due to the non-random placement of credit programs, and common village-specific, household-specific and individual-specific unobservable characteristics. It is very rarely that credit programs are allocated randomly and in fact, it is often the case that programs are placed in poorer areas or in areas where the people have themselves requested a program (Pitt and Khandker 1996). In addition, the unobserved attributes at the village, household and individual level are likely to affect both credit demand and the outcomes of interest. Examples of such attributes at the village level are prices, availability of infrastructure, agro-climatic conditions; at the household level these include household environment, specific traditions and customs; and at the individual level are health endowments and entrepreneurial ability. Apart from influencing the demand for credit and the outcome of interest, the unobserved attributes also influence the supply of credit (Khandker and Faruqee 2001). This point is particularly relevant for access to informal credit. Informal lenders are comprised mainly of relatives, friends, neighbors, traders or landlords. They are likely to be well acquainted with the characteristics of the borrower or the borrowing household that can affect repayment of the loan, thus influencing their lending decision.

The potential endogeneity of access to credit to the outcome of interest implies that the univariate probit cannot be implemented as such

without correcting for endogeneity. The endogeneity correction leads us towards the bivariate probit model where the participation decision and the access to credit equations are jointly estimated (Greene 1998, Ribar 1994). The bivariate probit model is estimated using maximum likelihood techniques. We correct for endogeneity of men's (women's) access to credit in the men's (women's) participation equations.

The theoretical basis for the empirical model is the utility maximization framework (Lass *et al.* 1989). We impose a constraint for the total time available to the individual, whereby time is allocated between the competing activities of off-farm self-employment, working on own farm and household leisure.

$$T^i = L^i + F^i + M^i \quad [5]$$

where  $i = 1, \dots, n$  and

$F^i$  = time allocated to farm work

$M^i$  = time allocated to market work (defined as off-farm self-employment in this instance)

$L^i$  = time allocated to leisure

$T^i$  = total time available

If the potential returns from off-farm self-employment ( $W_i^m$ ) are greater than the shadow value of farm work ( $W_i^f$ ), the individual will participate in the off-farm self-employment activity. Let  $I_i^*$  be the unobserved indicator that represents the difference between returns from off-farm work ( $W_i^m$ ) and farm work ( $W_i^f$ ), conditional on personal, household and locational characteristics, as well as access to credit ( $C_i$ ). It is specified as

$$I_i^* = \beta C_i + \beta x_i + \varepsilon_i, \quad i = 1, \dots, n \quad [6]$$

where  $x_i$  is a vector of exogenous determinants and  $\varepsilon_i$  represents unobserved variation.

The participation decision rule that determines the observed value for off-farm self-employment work,  $M^i$  is

$$M^i = \begin{cases} > 0 & \text{if } I_i^* = \beta C_i + \beta x_i + \varepsilon_i > 0 \\ = 0 & \text{if } I_i^* = \beta C_i + \beta x_i + \varepsilon_i \leq 0 \end{cases} \quad [7]$$

While  $I_i^*$  is not observed, the binary indicator ( $I^i$ ) that denotes the participation decision is observed

$$I^i = \begin{cases} 1 \text{ (participates)} & \text{if } I_i^* > 0 \\ 0 \text{ (does not participate)} & \text{otherwise} \end{cases}$$

The specification for participation in own farm work is similarly defined: the individual works on own farm when the shadow value of own farm work exceeds the returns to off-farm activity.

Following the definition of access to credit let  $C_i^*$  represent the individual's credit limit that is a function of individual, household and other socio-economic characteristics. It is specified as

$$C_i^* = \alpha z_i + \eta_i \quad [8]$$

where  $z_i$  is a vector of exogenous determinants and  $\eta_i$  represents unobserved variation. Access to credit is a dichotomous variable, such that

$$C_i = \begin{cases} 1 \text{ (has access)} & \text{if } C_i^* \geq 0 \\ 0 \text{ (does not have access)} & \text{otherwise} \end{cases}$$

Following the bivariate probit specification, we assume that

$$\begin{aligned} E[\varepsilon_i] &= E[\eta_i] = 0 \\ \text{Var}[\varepsilon_i] &= \text{Var}[\eta_i] = 1 \\ \text{Cov}[\varepsilon_i, \eta_i] &= \rho \end{aligned} \quad [9]$$

We impose exclusion restrictions on the vector  $X_i$  to identify the effect of the credit variable on the participation decision. The variables that are excluded should be theoretically and statistically related to access to

credit, but not to the participation variable (Ribar 1994). The variables are discussed in the results section.

## **7. Results**

### **7.1 Descriptive Statistics**

Before discussing the results from the estimations, we present selected descriptive statistics from the data.<sup>3</sup> The analysis presented here is from round 1 of the data set. In this paper, the data set is partitioned into two sub-samples: (i) male-headed households where head and spouse are present (251 households), and (ii) female-headed households (91 households).<sup>4</sup> Approximately 85 percent of the female heads are widowed, divorced or separated.

Table 1 presents the means of some of the variables of interest.<sup>5</sup> Women, who are spouses, are on average six years younger than their husbands, while female heads are on average six years older than the male ones. Although the household size is similar in both the male and female-headed households, the dependency ratio is higher for the latter category, reflecting the absence of the spouse.<sup>6</sup> As expected, female-headed households are poorer than male-headed households when we compare the value of assets and agricultural land owned by the household. However, female heads personally own more assets (value of total assets, land owned) than women in male-headed households.

The participation rate in off-farm self-employment for female heads is comparable to those of the male heads and higher than for women in male households (Table 2). This is indicative of the greater reliance that these households place on off-farm work as a livelihood strategy and is consistent with evidence from other studies. Using the IFPRI data set, Diagne and Zeller (2001) find that off-farm income generating activities provide 30 percent more income than the average crop income for rural Malawi households.<sup>7</sup> Female-headed households are more reliant than male-headed households on off-farm income (35 percent as opposed to 27 percent of total household income, respectively). In addition to farm work, women face considerable demands on their time, as they are responsible for collecting fuel wood and drinking water for the household (Table 2.1), apart from the childcare, cooking, cleaning and other domestic tasks (Tellegen 1997: 123).

Table 1  
MEANS OF SELECTED VARIABLES

	Male-headed households			Female-headed households		
	Men		Women	Men		Women
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
<b>Whole sample</b>						
Age	39.7	13.7	33.8	12.8	45.5	16.2
Primary education	0.7	0.5	0.5	0.5	0.6	0.5
Total household size	4.5	2.1	4.5	2.1	4.3	2.4
Dependency ratio	0.4	0.2	0.4	0.2	0.5	0.2
Total value of assets (individual)	4,037	3,657	1,639	3,344	3437	4,217
Value of livestock (individual)	443	1,460	355	2,050	464	2,236
Agricultural area owned in acres (individual)	2.4	2.2	1.1	2.0	2.2	1.5
Non-agricultural area owned in acres (individual)	0.5	0.8	0.2	0.5	0.7	1.1
Total value of asset (household)	5,680	5,517			3601	4,356
Value of livestock (household)	798	2,510			467	2,235
Agricultural area owned in acres (household)	3.5	2.4			2.3	1.6
Non-agricultural area owned in acres (household)	0.7	0.9			0.7	1.1
<b>Number of observations</b>		251			91	

\* Significant at 5% or better; tested for the difference in means between women (spouse) in male-headed household and female heads. All asset values are in Malawi Kwacha (MK): 15 MK = 1 US \$ at the time of survey. Total asset value includes value of livestock a: Calculated as household members aged less than 15 and over 64 divided by total household size.

**Table 2**  
**PARTICIPATION IN OFF-FARM SELF-EMPLOYMENT AND FARM WORK**

	Male-headed households			Female-headed households	
	Men	Women	N	Women	N
<b>Whole sample</b>					
Farm work (own farm)	64.6	42.1	251	42.6	91
Off-farm self-employment	42.3	28.0		41.0	
<b>District level</b>					
<i>Dowa</i>					
Farm work	86.5	36.5	45		
Off-farm self-employment	58.5	37.7			
<i>Dedza</i>					
Farm work	71.8	53.3	75		
Off-farm self-employment	37.4	27.7			
<i>Mungochi</i>					
Farm work	36.4	27.1	55		
Off-farm self-employment	42.5	26.2			
<i>Nkhotakota</i>					
Farm work	62.2	50.4	39		
Off-farm self-employment	40.4	20.5			
<i>Rumphi</i>					
Farm work	89.8	59.7	37		
Off-farm self-employment	9.1	7.3			

**Table 2.1**  
**PARTICIPATION IN VARIOUS HOME ACTIVITIES**

	Male-headed households			Female-headed households	
	Men	Women	N	Women	N
Collecting fuel	6.0	15.1	251	13.2	91
Fetching drinking water	1.1	62.9		63.1	
Sick	6.6	9.6		5.8	
Sleeping/resting/eating/relaxing	94.5	94.2		97.2	
Other domestic	20.1	81.9		63.7	

Examining the type of off-farm self-employment activities shows a limited range of activities, with two activities (three for men) accounting for more than 60 percent of enterprises operated. Beer brewing is the most prevalent activity and is exclusively undertaken by women (Table 3). Tellegen (1997) notes several reasons why this activity is predominant among women. Beer brewing is a low-skilled and low-investment activity for which inputs are easily acquired. The process involves collection of water and firewood, the grinding of maize and cooking – all of which are perceived as ‘female activities’. An additional advantage for women is that beer brewing can be combined with other domestic activities since it can be processed and sold within the compound. Finally, beer serves a social function and enjoys a high demand. It is served at weddings, funerals or work parties organized to pay laborers. Other studies in Sub-Saharan Africa find that female-operated enterprises require less investment, have low returns and are operated for only part of the year (Tellegen 1997, Simler 1994). About 30 percent of the male heads participate in weaving, a traditional male activity. Produce selling accounts for more than 20 percent of off-farm participation among all individuals. It highlights the reliance of the off-farm activity on the farm sector in the rural areas.<sup>8</sup>

Table 3 summarizes the extent of involvement of individuals (heads and spouses) in the off-farm enterprise, differentiated by the ownership of the enterprise. Women in male households, who own an off-farm enterprise, are highly involved in the operation of the enterprise, either by themselves or jointly with their husbands. The head shows a greater involvement as compared to the spouse, in the operation of the enterprises irrespective of the ownership status. In the data set, those individuals who worked on an off-farm self-employment activity were asked, ‘*Has the business changed your status in the family?*’<sup>9</sup> Individuals who felt their status had improved were asked to explain the reason for this increase. Among those who responded, 97 percent of the men and 82 percent of the women felt their status within the household had improved as a result of their self-employment activity. All responses (see Tables 3.1 and 3.2 for most commonly occurring responses) convey the idea of being able to provide essential consumption items for the family, and thus, increase the standard of living for the household. There is no difference by gender or by headship in the reasons provided. For women, providing an additional source of income to enhance household welfare seems the most important contributor to their increased status.

**Table 3**  
**CHARACTERISTICS OF OFF-FARM SELF-EMPLOYMENT ENTERPRISES**

	Male-headed households			Female-headed households	
	%		N	%	
	Men	Women		Women	N
<b>Type of Business</b>					
Grocery	41	25	114a	47	50
Bakery	--	84	73b	14	
Carpentry	83	--		--	
Beer brewing	--	317		465	
Poultry	--	28			
Produce selling	221	298		262	
Weaving	291	--		62	
Pottery	--	54		--	
Fishing	224	105		89	
Other	140	90		61	
<b>Member who runs the business</b>					
Self	716	708	105a	852	43
Spouse	246	227	70b		
Husband and wife together	35	61			
Wife and dependants	--	04			
Non-members of the household	03	--			
<b>Member who does most of the work</b>					
Self	854	748	105a	977	43
Spouse	105	244	70b		
Husband and wife together	32	06			
Wife and dependants	--	02			
Non-members of the household	095	--			
<b>Has the business changed your status in the family</b>					
Yes	972	822	84a 45b	824	34

*Note:* A small percent operated more than one enterprise. It is included in the calculation of type of business. A: men; b: women



**Table 3.1**  
**COMMON RESPONSES FROM MEN TO THE QUESTION OF WHY BUSINESS HAS INCREASED YOUR STATUS IN THE FAMILY**

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Able to buy food for the family  
 Now there is no shortage of food and non-food items for my family  
 Able to buy small items like sugar, paraffin and soap  
 There is no need to borrow from someone else for non-food expenditure  
 There has been a rise in living standards  
 Generates incomes for consumption and farming activities

---

**Table 3.2**  
**COMMON RESPONSES FROM WOMEN (SPOUSES AND HEADS TO THE QUESTION OF WHY BUSINESS HAS INCREASED YOUR STATUS IN THE FAMILY**

---

There is no food shortage in the house after the business started  
 The Money from the business has helped to buy maize, salt, relish and soap  
 Able to help my husband in supporting my family  
 Health of the family has improved  
 There has been a rise in living standards  
 Generate income for consumption and farming activities

---

Although we use access to credit as opposed to amount received in our analysis, we present some features of the loans received by the households. We differentiate between sources of credit as formal and informal because they serve different needs, and it is interesting and useful for policy purposes to assess the impact of each sector (Diagne and Zeller 2001). The formal sector in Malawi comprises of government and non-governmental supported credit programs, commercial banks and other formal institutions. The informal sector is a function of kinship ties and is composed of friends, relatives, neighbors and professional moneylenders. The credit market in Malawi is not very active, particularly when compared to other Asian and African countries (for details see Diagne and Zeller 2001). A little more than 50 percent of our sub-samples have access to any source of credit, with access to formal credit at less than 10 percent (Table 4). Studies have shown that asset ownership is an important determinant of access to credit (Diagne 1999), and hence, it is not surprising that female heads have low access to credit as compared to male heads.

**Table 4**  
**ACCESS TO CREDIT**

	Male-headed households			Female-headed households	
	Men	Women	N	Women	N
<b>Whole sample</b>					
Formal or informal or both	55.3	51.6	251	50.7	91
Formal	7.6	8.2		3.5	
Informal	53.5	49.4		49.5	
<b>District level</b>					
<i>Dowa</i>					
Formal or informal or both	65.4	69.1	45		
Formal	11.0	15.7			
Informal	61.8	69.1			
<i>Dedza</i>					
Formal or informal or both	59.2	60.6	75		
Formal	10.2	3.0			
Informal	58.1	59.7			
<i>Mangochi</i>					
Formal or informal or both	41.1	22.1	55		
Formal	2.6	6.2			
Informal	39.8	18.5			
<i>Nkhosakota</i>					
Formal or informal or both	65.0	61.4	39		
Formal	7.6	14.5			
Informal	61.4	50.1			
<i>Rumphi</i>					
Formal or informal or both	55.1	78.5	37		
Formal	3.0	19.8			
Informal	53.7	70.2			

For individuals who received credit from the informal sector, there is a greater reliance on personal networks (relatives and friends) than on professional moneylenders. This is consistent with the findings of Diagne and Zeller (2001). Examining the patterns of loan use provides us an insight into the needs of the households (Table 5). Formal credit to household heads is mainly used for agricultural inputs. This is not surprising as the formal agricultural programs (those that lend only for agricultural purposes) provide in-kind credit (seeds, fertilizers and pesticides). By providing loans only for agricultural purposes, these programs are biased against women (spouses) in areas where the land distribution in the household is unequal within the household (Simtowe and Diagne 1998). Loans given to women in male-

headed households are mainly used for off-farm income generation activities. Again, this reflects the ideology of the formal institutions (Malawi Mudzi Fund and Promotion of Microenterprises for Income Generation) that were established to promote off-farm income generating activities among women. On the other hand, informal loans are used to maintain food security in the household and for consumption-smoothing expenditures. This is particularly striking for female heads of households who use more than 60 percent of their loans for food and non-food primary needs, and medical expenditures. The corresponding figure for male heads is 24 percent, while for their spouses it is 29 percent. Irrespective of the headship status or gender, about 25 percent or more of the informal loans are used for agricultural inputs and off-farm income generation. These patterns suggest several features of the financial sector in Malawi: first, formal programs are not reaching all households in the rural areas and second, the amount of credit provided is not sufficient for their agricultural or off-farm requirements.<sup>10</sup> Diagne and Zeller (2001) find that over two-thirds of the total input value for agricultural production in Malawi was financed from the smallholder's own resources. Informal credit by meeting the basic consumption requirements (such as food, medical expenditures and funerals) of the poor households is performing an important role in rural Malawi (Chipeta and Mkandawire 1992).

**Table 5**  
**USE OF CREDIT RECEIVED**

	Male-headed households			Female-headed households	
	%		N	%	
	Men	Women		Women	N
<b>Formal credit</b>					
Food	6.0	8.5	91a	6.3	26
Agricultural equipment/livestock	0.2	0.8	44b	--	
Agricultural inputs	81.2	35.2		64.1	
Purchase inputs for non-ag.					
Income generation	1.5	50.1		28.2	
Non-food primary needs	4.5	1.5		--	
Consumption items	0.9	3.2		0.7	
Doctor/medicine/health	0.2	0.7		--	
Education	1.8	--		--	
Other	1.6	0.0		0.7	
<b>Informal credit</b>					
Food	21.4	19.5	98a	47.2	53

(Continued)

(Continuation - Table 5)

	Male-headed households			Female-headed households	
	%		N	%	
	Men	Women		Women	N
Agricultural equipment/livestock	0.8	--	35b	--	
Agricultural inputs	24.3	7.3		2.3	
Purchase inputs for non-ag.					
Income generation	12.1	16.7		28.7	
Non-food primary needs	--	--		11.6	
Consumption items	35.4	47.0		4.1	
Doctor/medicine/health	3.1	9.3		5.7	
Education	2.0	--		0.1	
Other	0.8	0.3		0.4	

## 7.2 Econometric Analysis

Table 6 presents the means and the standard deviations of the variables used in the bivariate probit models. The area average variables are used in the model as identifying variables that should be theoretically and statistically related to access to credit, but unrelated to the participation decision.<sup>11</sup> The correction for endogeneity of the credit variable resulted in problems of model convergence in some cases, and the models had to be adjusted accordingly.<sup>12</sup> Due to the limited number of observations, we could not estimate the effect of access to credit by source of credit (i.e., formal vs. informal) for the female-headed households, although an overall access equation can be estimated. Participation in off-farm self-employment activity (dichotomous variable) was defined from the self-employment module of the data set. Participation in farm work (dichotomous variable) was defined from the time allocation module of the data set. In our discussion of results, the marginal effects are reported (Greene 1998).

Table 6  
MEANS AND STANDARD DEVIATIONS OF VARIABLES USED IN THE BIVARIATE PROBIT MODELS

Variable Definitions	Male-headed households			Female-headed households		
	Men			Women		
	Mean	Standard Deviation	Standard Deviation	Mean	Standard Deviation	Standard Deviation
Age (AGE)	397	137	128	455	162	162
Ever attended primary school						
Dummy variable (PRIMEDU)	07	05	05	06	05	05
Off-farm self-employed participation						
Dummy variable (SELFEMP)	04	05	04	04	05	05
Farm work participation dummy variable (FARM)	06	05	05	05	05	05
Access to credit dummy variable (ACCESS)	06	05	05	00	02	02
Access to formal credit dummy variable (FACCESS)	01	06	03	05	05	05
Access to informal credit dummy variable (IACCESS)	05	05	05	43	24	24
Total household size (TOTHH)	45	21	21			
Dependent population in the household (DEPPOP)	20	16	16	25	19	19
Number of children between 0 and 5 year of age (CHDNUM5)	07	08	08	08	10	10
(Total value of household assets - value of plot owned by the household) / 1000 (HHASET)	32	47	47	15	27	27
Past member of credit program (PASTH)	02	04	04	01	03	03
Never member of credit program (NEVERH)	06	05	05	08	04	04
Current member of credit program (CURRENTH)	01	03	03	01	03	03

(Continued)

(Continuation - Table 6)

Variable Definitions	Male-headed households			Female-headed households		
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
<b>Area Variables</b>						
Distance in kilometers from head's Parent's village (PHVKM)	200	713	121		355	
Percent of area adults with second Occupation (OCZAAP)	04	01	04		02	
Percent of area heads migrating from Another village (MIGRAP)	02	02	03		02	
Percent of area male-headed households (MALEHAP)	07	01	06		01	
Village has a market place dummy Variable (VMAKTPLC)	04	05	05		05	
Area average 1 value of all assets (TASSETA)	63237	47302	73703		60270	
<b>Location variables</b>						
DOWA	02	04	02		04	
RUMPHI	00	02	00		02	
NKHOTA	01	02	01		03	
DEDZA	04	05	03		05	
MANGOCHI (Reference)	03	05	04		05	
Number of Observations	251		91			

Note: All the variables related to men end with M (AGEM) and the variables related to women end with W (AGEW). All asset values are in Malawi Kwacha (MK): 15 MK = 1 US \$ at the time of survey.

a. Proportion and averages are taken across the cluster of villages (between 1 to 5) that comprise an area. Area averages are computed excluding the corresponding values for households 1 (Diagne and Zeller 2001).

### 7.3 Identifying Variables

We briefly discuss the identifying variables used in the bivariate models.<sup>13</sup> Membership status of the household (past, present or current member) in a credit program is one of the most important determinants of access to formal credit. We expect that being a current member of a program raise the likelihood of having access to formal credit for the individual.<sup>14</sup> Area average value of all assets is expected to increase access to formal credit as assets can be used for collateral.<sup>15</sup> The percent of male-headed households in the area is expected to increase access to formal credit for heads and decrease it for spouses, as most agricultural formal credit is targeted towards household heads.

The distance in kilometers to the home of the head's parents is used as an indicator of social capital (Zeller *et al.* 1997). It is hypothesized that individuals living closer to their parents will have more informal networks (friends and relatives) to draw upon for informal credit.<sup>16</sup> Percent of heads migrating from another village is also considered an indicator of social capital, with a higher percent likely to decrease access to informal credit. The percent of adults with a second occupation is likely to increase access to informal credit. Friends, relatives, neighbors and shopkeepers are all potential lenders for an individual and we expect that having a second occupation will increase their lending capacity. Having a marketplace in the village gives scope for greater interaction with shopkeepers and traders, and hence, a better opportunity to exploit informal networks as a source of credit.

### 7.4 Participation in off-farm self-employment

Access to credit increases the probability of participating in off-farm self-employment for both categories of women, i.e., for head and spouse. Tables 7 – 7.2 present the results of the probit models differentiated by headship status and by source of credit. Although overall access is positive and significant for spouses, it is informal credit that increases the probability of off-farm work. This is a surprising result – we expected the access to formal credit to be significantly positive as the formal institutions that target women are supposed to lend only for off-farm self-employment. The life-cycle hypothesis is supported in the models with age showing a positive effect and age squared a negative effect (Tables 7 and 7.2), a result consistent with Simler 1994. The effect of some formal education (attending primary school) is positive for women in male-headed households, but is significantly different from zero only in the model with informal access to credit. The model for

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female heads shows similar results for the credit variable: access to credit increases the probability of off-farm self-employment participation. Although not significant, the effect of some formal schooling reduces the participation of female heads in off-farm work.<sup>17</sup> Most of the location variables in both models are significant and negative implying that probability of off-farm participation is higher for women in the Mangochi (reference) district in Southern Malawi. This is consistent with the USAID (1999) report that finds that off-farm activity has a greater contribution to total income in the south than in the north or central regions of Malawi. The southern region is more densely populated, which is likely to put pressure on the limited agricultural land available and force people to seek employment opportunities outside the farm sector.

**Table 7**  
**PARTICIPATION IN OFF-EMPLOYMENT AND ACCESS TO CREDIT (WOMEN)**

Variables	Women in male-headed households		Female-headed households	
	Marginal Effects	Standard Errors	Marginal Effects	Standard Errors
<b>Off-farm participation</b>				
CONSTANT	-1.5499*	0.4944	-0.4024	0.8231
AGEW	0.0782	0.0269	0.0457	0.0434
AGESQW	-0.0008*	0.0003	-0.0006	0.0005
AGEM	-0.0078	0.0079	--	--
ACCESSW	0.8608*	0.2831	1.0785*	0.5690
ACCESSM	0.0244	0.0856	--	--
PRIMEDUW	0.1232	0.0831	-0.4578	0.3087
PRIMEDUM	-0.0274	0.1099	--	--
CHDNUM5	-0.0999	0.0746	0.0063	0.1636
DEPPOP	0.0482	0.0358	--	--
TOTHH	--	--	0.0492	0.0674
HHASET	-0.0014	0.0108	0.0057	0.0304
DOWA	-0.3308*	0.1337	-0.6402*	0.3885
RUMPHI	-0.3543*	0.1559	-0.7890*	0.3291
NKHOTA	-0.1821	0.1451	-0.9545*	0.5393
DEDZA	-0.5166*	0.1329	-0.9692*	0.3454
<b>Access to credit</b>				
PASTH	0.047	0.0750	0.2887	0.2881

(Continued)



(Continuation - Table 7)

Variables	Women in male-headed households		Female-headed households	
	Marginal Effects	Standard Errors	Marginal Effects	Standard Errors
CURRENTH	0.2196*	0.0995	0.2018	0.2030
MALEHAP	-0.3327	0.2050	--	--
PHVKM	-0.0001	0.0002	--	--
MIGRAP	--	--	-0.3200	0.3092
Rho	-0.8952*	0.1537	-0.8791*	0.32014

\* Significant at 5% or better

Mangochi is omitted district; Never member of credit program (NEVERH) is omitted membership status of the household.

**Table 7.1**  
**PARTICIPATION IN OFF-FARM SELF-EMPLOYMENT AND ACCESS TO FORMAL CREDIT (WOMEN)**

Variables	Women in male-headed households	
	Marginal Effects	Standard Errors
<b>Off-farm participation</b>		
CONSTANT	-1.0047	0.9831
AGEW	0.0351	0.0429
AGESQW	-0.0004	0.0005
AGEM	-0.0033	0.0055
FACCESSW	0.3964	0.3680
FACCESSM	-0.0473	0.0739
PRIMEDUW	0.0603	0.0882
CHDNUMS	-0.0410	0.0510
DEPPOP	0.0246	0.0306
HHASET	-0.0001	0.0062
DOWA	-0.0744	0.1218
RUMPHI	-0.1837	0.2283
NKHOTA	-0.1062	0.1457
DEDZA	-0.4954	0.2415
<b>Access to credit</b>		
PASTH	0.0188	0.0690
CURRENTH	0.2495	0.1622
(TASSETVA)/1000	0.0073	0.0060
Rho	-0.8182*	0.2073

\* Significant at 5% or better

Mangochi is omitted district; Never member of credit program (NEVERH) is omitted membership status of the household.

**Table 7.2**  
**PARTICIPATION IN OFF-FARM SELF-EMPLOYMENT AND ACCESS**  
**TO INFORMAL CREDIT (WOMEN)**

Variables	Women in male-headed households	
	Marginal Effects	Standard Errors
<b>Off-farm participation</b>		
CONSTANT	-1.7098*	0.3598
AGEW	0.0704	0.0209
AGESQW	-0.0007*	0.0002
AGEM	-0.0057	0.0060
IACCESSW	0.6712*	0.1631
IACCESSM	0.0189	0.0628
PRIMEDUW	0.1407*	0.0644
PRIMEDUM	0.0266	0.0779
CHDNUM5	-0.0589	0.0502
DEPPOP	0.0397	0.0250
HHASET	0.0008	0.0083
DOWA	-0.2780*	0.1075
RUMPHI	-0.2894*	0.1210
NKHOTA	-0.0276	0.0985
DEDZA	-0.3615	0.1119
<b>Access to informal credit</b>		
OC2AAP	0.3025*	0.1707
PHVKM	-0.0002	0.0002
Rho	-0.9518*	0.0540

Results from the men's models (Tables 8 – 8.2), show that access to credit reduces their participation in off-farm self-employed activities. The effect of access is negative by source of credit, though it is significantly different from zero only for overall access. This could mean that men are more likely to be engaged in farming, leaving them little time for off-farm work. Since formal credit for men is mainly in-kind agricultural inputs, the informal credit could be used for financing other farm equipments. The effect of primary schooling is positive but not significantly different from zero. However, men whose wives have some formal schooling are less likely to work off-farm. Except for the Rumphu dummy variable (Northern Malawi), the location variables are not significant. The sign on the Rumphu dummy is significant and negative, implying, as with the women's model, that the probability of off-farm participation is higher in the Mangochi district.<sup>18</sup>

**Table 8**  
**PARTICIPATION IN OFF-FARM SELF-EMPLOYMENT AND**  
**ACCESS TO CREDIT (MEN)**

Variables	Men	
	Marginal Effects	Standard Errors
<b>Off-farm participation</b>		
CONSTANT	0.6069	0.4950
AGEM	-0.0198	0.0249
AGESQW	0.0001	0.0003
ACCESSW	-0.0427	0.0866
ACCESSM	-0.6162*	0.2948
PRIMEDUW	-0.1455*	0.0811
PRIMEDUM	0.1582	0.0990
CHDNUM5	-0.0256	0.0578
DEPPOP	0.0600*	0.0342
HHASET	0.0123	0.0079
DOWA	0.1027	0.1213
RUMPHI	-0.6280*	0.2034
NKHOTA	-0.0034	0.1243
DEDZA	-0.0221	0.1048
<b>Access to credit</b>		
PASTH	-0.0491	0.0675
CURRENTH	-0.1427*	0.0838
PHVKM	0.0007*	0.0004
Rho	0.8182*	0.2131

\* Significant at 5% or better

Mangochi is omitted district; never member of credit program (NEVERH) is omitted membership status of the household.

**Table 8.1**  
**PARTICIPATION IN OFF-FARM SELF-EMPLOYMENT AND**  
**ACCESS TO FORMAL CREDIT (MEN)**

Variables	Men	
	Marginal Effects	Standard Errors
<b>Off-farm participation</b>		
CONSTANT	0.1979	0.4082
AGEM	-0.0164	0.0184
AGESQW	0.0001	0.0002
FACCESSW	-0.0696	0.0772
FACCESSM	-0.0762	0.1910
PRIMEDUW	-0.0768	0.0821
PRIMEDUM	0.1001	0.1033
CHDNUM5	-0.0127	0.0419
DEPPOP	0.0351	0.0378
HHASET	0.0101	0.0085
DOWA	0.0776	0.0989
RUMPHI	-0.4789	0.3788
NKHOTA	0.0053	0.0776
DEDZA	-0.0288	0.0715
<b>Access to credit</b>		
PASTH	0.0014	0.0252
CURRENTH	0.0669	0.1706
(TASSETVA)/1000	-0.0056	0.0151
Rho	-0.1206	0.4013

\* Significant at 5% or better

Mangochi is omitted district; never member of credit program (NEVERH) is omitted membership status of the household.

**Table 8.2**  
**PARTICIPATION IN OFF-FARM SELF-EMPLOYMENT AND ACCESS TO**  
**INFORMAL CREDIT (MEN)**

Variables	Men	
	Marginal Effects	Standard Errors
<b>Off-farm participation</b>		
CONSTANT	0.7770	0.4860
AGEM	-0.0336	0.0231
AGESQW	0.0003	0.0002
FACCESSW	-0.0317	0.0808
FACCESSM	-0.5423	0.3953
PRIMEDUW	-0.1502*	0.0801
PRIMEDUM	0.1245	0.0937
CHDNUM5	-0.0211	0.0572
DEPPOP	0.0522	0.0336
HHASET	0.0107	0.0079
DOWA	0.1118	0.1190
RUMPHI	-0.5893*	0.2658
NKHOTA	0.0040	0.1277
DEDZA	0.0091	0.1175
<b>Access to informal credit</b>		
OC2AAP	0.1636	0.1701
PHVKM	0.0005	0.0004
Rho	0.8020*	0.30721514

\* Significant at 5 % or better  
Mangochi is omitted district.

### 7.5 Participation in own-farm work

*Overall access to credit increases the probability of working on their own farms for women in male households (Table 9). Access to formal credit, which did not influence women's participation in off-farm work, positively affects their own-farm work participation (Table 9.1). This could be a reflection of the farm-off-farm linkages in the kind of activities undertaken by the women (see Table 3). For example, beer brewing, the most prevalent activity for women requires maize cultivated by the brewers (women) themselves on small tracts of land (Tellegen 1997). Produce selling, another activity in which many women participate, is also dependent on the farm for its inputs. Contrary to expectations, the effect of credit is not significant for female heads. As heads, we expected them to have access to*

agricultural inputs through the formal credit programs, which in turn would increase their farm activity. A possible explanation is that there may be an effect on the time allocated to farm work as opposed to 'participate or not.'

**Table 9**  
**PARTICIPATION IN FARM WORK AND ACCESS TO CREDIT (WOMEN)**

Variables	Women in male-headed households		Female-headed households	
	Marginal Effects	Standard Errors	Marginal Effects	Standard Errors
<b>Off-farm participation</b>				
CONSTANT	-1.4296*	0.3902	0.2650	0.8092
AGEW	0.0607*	0.0239	-0.0490*	0.0278
AGESQW	-0.0007	0.0003	0.0005	0.0003
AGEM	-0.0066	0.0061	--	--
ACCESSW	0.5029*	0.2389	0.4215	0.5955
ACCESSM	0.0184	0.0681	--	--
PRIMEDUM	0.1051	0.0798	--	--
PRIMEDUW	-0.1026	0.0704	0.1547	0.1927
CHDNUMS	0.0239	0.0521	-0.1116	0.1158
DEPPOP	-0.0348	0.0278	0.0280	0.0526
HHASET	-0.0064	0.0068	-0.0070	0.0252
DOWA	0.0998	0.1068	0.4343*	0.2541
NKHOTA	0.2249*	0.1000	0.5062*	0.2358
DEDZA	0.3895*	0.1010	0.4274*	0.1675
RUMPHI	0.4278*	0.1262	0.3912*	0.1923
<b>Access to credit</b>				
PASTII	-0.0195	0.0436	0.0146	0.2135
CURRENTH	0.1034	0.0694	0.0072	0.1036
MALEHAP	-0.0611	0.0973	--	--
PHVKM	0.0000	0.0001	--	--
OC2AAP	0.1584	0.1282	--	--
MIGRAP	--	--	-0.0245	0.3503
Rho	-0.6930*	0.2943	-0.0789	1.1423

\* Significant at 5% or better

Mangochi is omitted district; Never member of credit program (NEVERH) is omitted membership status of the household.

**Table 9.1**  
**PARTICIPATION IN FARM WORK AND ACCESS TO FORMAL CREDIT (WOMEN)**

Variables	Women in male-headed households	
	Marginal Effects	Standard Errors
<b>Off-farm participation</b>		
CONSTANT	-1.2895*	0.3702
AGEW	0.0563	0.0255
AGESQW	-0.0006*	0.0003
AGEM	-0.0066	0.0058
FACCESSW	0.2331*	0.1240
FACCESSM	0.0924	0.0972
PRIMEDUW	0.1085	0.0773
PRIMEDUM	-0.1067	0.0671
CHDNUMS	0.0169	0.0482
DEPPOP	-0.0345	0.0256
HHASET	-0.0061	0.0064
DOWA	0.0806	0.1061
NKHOTA	0.1542	0.1037
DEDZA	0.3420*	0.0967
RUMPHI	0.3796*	0.1186
<b>Access to formal credit</b>		
PASTH	-0.0218	0.0559
CURRENTH	0.1787*	0.0983
(TASSETVA)/1000	0.0061*	0.0036
Rho	-0.4139	0.2597

\* Significant at 5% or better

Mangochi is omitted district; never member of credit program (NEVERFI) is omitted membership status of the household.

Once again, age shows an inverted U pattern for women in male households. However, for female heads, the age variable has a negative linear term and a positive quadratic term. This implies that as the female heads get older, the probability of participating in farm work decreases at an increasing rate. A possible explanation for this relationship is that as women get older, they can substitute their labor inputs in farming with the household labor of other members. This frees up the women's labor for employment in other, more remunerative activities or for the enjoyment of leisure. The location variables, except the Dowa district dummy for women in male households, are all significant and positive, implying decreased participation in farm work in the Mangochi district. This complements the results from the models

discussed earlier, which shows a higher probability of off-farm participation in Mangochi.

**Table 9. 2**  
**PARTICIPATION IN FARM WORK AND ACCESS TO INFORMAL CREDIT**  
**(WOMEN)**

Variables	Women in male-headed households	
	Marginal Effects	Standard Errors
<b>Off-farm participation</b>		
CONSTANT	-1.0132	0.7180
AGEW	0.0665*	0.0307
AGESQW	-0.0007*	0.0003
AGEM	-0.0073	0.0061
IACCESSW	-0.3301	0.4979
IACCESSM	-0.0397	0.0638
PRIMEDUW	0.1097	0.0805
PRIMEDUM	-0.0805	0.0761
CHDNUM5	0.0218	0.0496
DEPPOP	-0.0310	0.0277
HHASET	-0.0044	0.0075
DOWA	0.1429	0.1290
NKHOTA	0.1571	0.1466
DEDZA	0.3707*	0.1047
RUMPHI	0.3898*	0.1403
<b>Access to informal credit</b>		
MIGRAP	-0.0759	0.1312
OC2AAP	-0.1350	0.1885
VMAKTPLC	0.0951	0.1303
PHVKM	-0.0001	0.0001
Rho	0.6442	0.7075

\* Significant at 5% or better Mangochi is omitted district.

Access to credit increases men's participation in farm work and predictably, it is the effect of access to formal credit that is significant (Tables 10 – 10.2). Similar to their off-farm participation model, if their wives have attended primary schooling they are less likely to work on their own farm. All the location variables show the same effects as the women's farm work model.



**Table 10**  
**PARTICIPATION IN FARM WORK AND ACCESS TO CREDIT (MEN)**

Variables	Men	
	Marginal Effects	Standard Errors
<b>Farm work participation</b>		
CONSTANT	-0.2642	0.2152
AGEM	0.0084	0.0069
AGEW	-0.0083	0.0085
ACCESSW	-0.0377	0.0878
ACCESSM	0.7375*	0.3244
PRIMEDUW	-0.1750*	0.0858
PRIMEDUM	-0.0397	0.0901
DEPPOP	-0.0241	0.0264
HHASET	-0.0137	0.0264
DOWA	0.3213*	0.0095
NKHOTA	0.3418*	0.1497
DEDZA	0.3354*	0.1117
RUMPHI	0.5425*	0.1526
<b>Access to credit</b>		
PASTH	0.0579	0.0901
CURRENTH	0.1892*	0.1046
PHVKM	-0.0007*	0.0004
VMATPLC	-0.1742	0.1081
Rho	-0.9038	0.1551

\* Significant at 5% or better. Mangochi is omitted district; Never member of credit program (NEVERH) is omitted membership status of the household.

**Table 10.1**  
**PARTICIPATION IN FARM WORK AND ACCESS TO FORMAL CREDIT (MEN)**

Variables	Men	
	Marginal Effects	Standard Errors
<b>Farm work participation</b>		
CONSTANT	0.1437	0.4580
AGEM	-0.0192	0.0214
AGESQM	0.0002	0.0002
FACCESSW	-0.0056	0.0743
FACCESSM	0.2307*	0.0978
PRIMEDUW	-0.1635	0.1097
PRIMEDUM	-0.0354	0.0692
DEPPOP	-0.0040	0.0202
HHASET	-0.0100	0.0109
DOWA	0.3486	0.2245
NKHOTA	0.3161*	0.1823
DEDZA	0.3801	0.2331
RUMPHI	0.5515*	0.3184
<b>Access to credit</b>		
PASTH	-0.0051	0.1122
CURRENTH	0.3195*	0.0817
MALEHAP	-0.0182	0.1177
(TASSETVA)/1000	-0.0267*	0.0075
Rho	-0.5043	0.3081

\* Significant at 5% or better Mangochi is omitted district; Never member of credit program (NEVERH) is omitted membership status of the household.

**Table 10.2**  
**PARTICIPATION IN FARM WORK AND ACCESS TO INFORMAL CREDIT**  
**(MEN)**

Variables	Men	
	Marginal Effects	Standard Errors
<b>Farm work participation</b>		
CONSTANT	-0.1989	0.2066
AGEM	0.0080	0.0067
AGEW	-0.0065	0.0079
IACCESSW	0.0602	0.0811
IACCESSM	0.4969	0.5894
PRIMEDUW	-0.1853*	0.0895
PRIMEDUM	-0.0117	0.0874
DEPPPOP	-0.0104	0.0227
HHASET	-0.0147	0.0097
DOWA	0.3506	0.2948
NKHOTA	0.3569*	0.1478
DEDZA	0.4014	0.2608
RUMPHI	0.5611*	0.3278
<b>Access to informal credit</b>		
MIGRAP	-0.1068	0.1593
VMAKTPLC	-0.1337	0.1762
Rho	-0.7314	0.6029

\* Significant at 5% or better Mangochi is omitted district.

## 8. Concluding Remarks

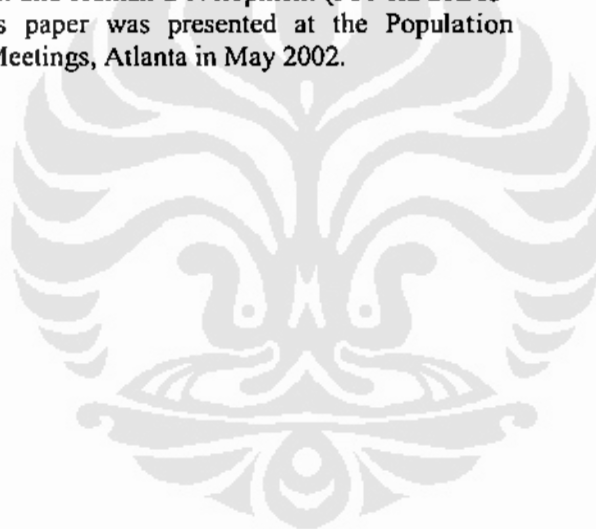
Using household data from Malawi, we have examined the effect of access to credit on men and women's work decisions. We expected that access to credit would increase women's participation in own farm work and in off-farm self-employment activities. Our econometric results show that *access to credit increases participation in farm and off-farm self-employment for women in male households and in off-farm self-employment for female heads*. This is important because literature suggests that women's status within the household is enhanced when they have independent access to resources and when they are able to make a contribution to the household income and welfare by increasing their *levels* of economic activity if not their *range* of economic activity. Our descriptive analysis substantiates this link between women's status and the level of economic activity undertaken by them. Our results show that even though women are still engaged in

traditional 'women activities', they experience an enhanced sense of self-worth and status when they are able to contribute to household income. Due to data limitations we have not been able to explore the farm activity of women in greater detail (what kind of work women do, whether they work on their own farms or their husband's farms). However, it is likely that being able to provide food for the family is an important gender role for African women, the successful fulfillment of which is likely to increase her status (Gladwin *et al.* 2001). This shows that access to credit, by increasing the opportunities available to women, raises their status within the household.

The analysis presented here is restricted to round 1 of the survey, and hence, is limited to a cross-section approach. It is likely that the use of panel data (combining data from rounds 2 and 3) may yield additional insights regarding the impact of credit on the labor allocation decisions of men and women in rural Malawi.

## 9. Acknowledgement

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## Notes

1. Participation in off-farm wage employment was not modeled because very few women in the sample participate in the activity. Furthermore, the data do not provide information on hours worked on household tasks, which makes it impossible to estimate labor allocation to household activities. The concept of participation as a dichotomous variable is not a useful measure of involvement in household activities. Understandably, it will be very high and is close to 100 percent for the women in our sample.

2. The results of the multinomial model are presented in the Appendix (Tables A1 and A2).

3. All descriptive statistics are weighted using household sampling weights provided in the data set.

4. A small number of households (10) were female-headed with a male spouse present in the household. This is presumably due to the matrilineal system prevailing in certain parts of the country. However, our focus group interviews with women from matrilineal systems showed they regarded their husband as the main decision-maker in the household and, hence, these observations were retained in the head and spouse sub-sample.

5. We statistically test for the difference in means in Tables 1 and Tables A2 – A4. Tables A2 – A4 present the means of the variables by work status and access to credit.

6. Dependency ratio is defined as population aged less than 15 and over 64 divided by total household size.

7. Their definition of non-farm activity is slightly different from our off-farm self-employment activity, in that it also includes wage / contract labor.

8. Buckley (1996) in an analysis of the Malawi Mudzi Fund, points out that limited range of activities suggest a limited resource base and a lack of income generating activities in Malawi and argues for the need to diversify this base.

9. It would have been useful to know the reasons if the respondent felt their status had not improved as a result of owning the enterprise. Unfortunately, this information was not collected in the data set.

10. Based on personal interviews we conducted in Malawi, it seems the reasons apply to different sets of households. The extremely poor households complained being ignored by the credit programs, while the not so poor complained that the credit provided was not sufficient, particularly for off-farm income generating activities.

11. The area average variables were available to us in the data set. To reduce simultaneity bias, each average is computed excluding the corresponding value for the household (Diagne and Zeller 2001).

12. It is likely that the convergence problems were also compounded by the small sample size.

13. The exclusion restrictions on  $X_i$  were tested using the likelihood ratio test. Only variables satisfying the restrictions are discussed here.

14. Initially, we used membership status of the individual to predict access to credit. But it did not satisfy the exclusion restriction and had to be substituted with the household membership status.

15. The composition of assets is usually considered more important for access to credit rather than the value of total assets *per se* (Diagne and Zeller 2001).

16. Zeller *et al.* (1997) uses this variable as an indicator of social capital for formal credit programs. The author hypothesizes that friends and relatives will help individuals to get accepted into a group and retain membership.

17. Simler (1994) suggests that increased levels of formal education will reduce participation in relatively low paying off-farm self-employment to more remunerative good wage-employment. We tried to capture this effect by using a professional training dummy variable. The variable was either insignificant or the model did not converge.

18. It is interesting to find that the probability of off-farm self-employment in the Mangochi district as compared to other districts is strong only in the women's model. This could reflect the influence of the matrilineal system prevalent in the southern region of Malawi, which helps women take better advantage of their opportunities. We hope to investigate this further.

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## Appendix

**Table A1**  
**MEANS AND STANDARD DEVIATIONS OF VARIABLES USED IN THE**  
**MULTINOMIAL LOGIT MODEL**

Variable Definitions	Mean	Standard Deviation
Age of household head (AGEH)	415	154
Male headed household dummy variable (MALEHEAD)	07	05
Primary training received by head dummy variable (PTRAINH)	19	03
Dependency ratio (DEPRATIO)	04	02
Total adult population in the household (ADTPOP)	23	11
Total land owned by household (AREASIZH)	40	34
(Total value of livestock owned by household)/1000(LSTOCKH)	21	97
(Total value of assets owned by household)/1000(ASSETALL)	79	199
<b>Location variables</b>		
DEDZA	03	05
DOWA	02	04
NKHOTA	01	03
RUMPHI	01	02
MANGOCHI (Reference)		
Number of observations	403	

All asset values are in Malawi Kwacha (MK); 15 MK = 1 US \$ at the time of survey.

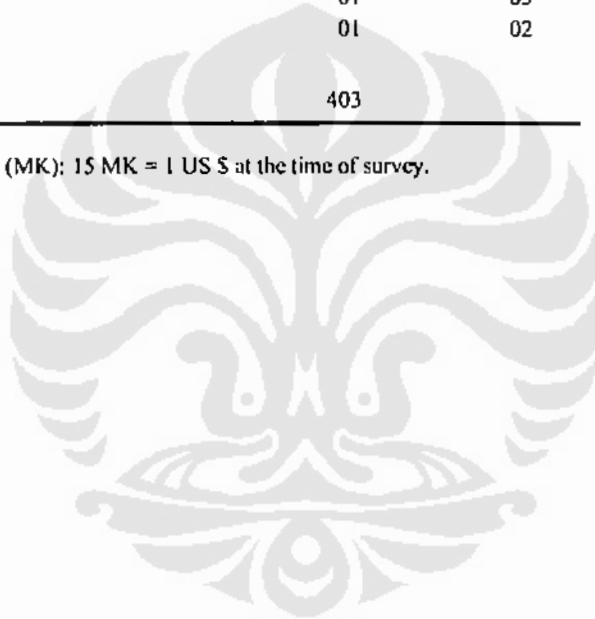


Table A2  
 RESULTS OF THE MULTINOMIAL LOGIT MODEL FOR PREDICTING PROBABILITY CHOICES FOR THE HOUSEHOLD  
 CORRECTED FOR CHOICE-BASED SAMPLING (WEIGHTED-EXOGENOUS-SAMPLE MAXIMUM LIKELIHOOD ESTIMATES)

Variables	Never member		Current Member		Past Member	
	Marginal Effects	Standar Errors	Marginal Effects	Standar Errors	Marginal Effects	Standar Errors
CONSTANT	1.4377*	0.2450	-0.9367*	0.2402	-0.5010*	0.1335
AGEH	-0.0421*	0.0094	0.0348*	0.0095	0.0073	0.0057
AGESQ	0.0004*	0.0001	-0.0003*	0.0001	-0.0001	0.0001
MALEHEAD	-0.0360	0.0436	-0.0107	0.0441	0.0468	0.0288
PTRAINH	0.1763*	0.0629	-0.1369*	0.0586	-0.0394	0.0321
DEPRATIO	-0.5487*	0.0905	0.4082*	0.0931	0.1405*	0.0553
ADTPOP	-0.1008*	0.0194	0.0888*	0.0176	0.0119	0.0104
AREASIZH	-0.0168*	0.0074	0.0147*	0.0070	0.0020	0.0029
LSTOCKH	-0.0262*	0.0064	-0.0230*	0.0060	-0.0032*	0.0012
ASSETALL	-0.0165	0.0043	0.0122*	0.0034	0.0036	0.0010
DEDZA	-0.0785	0.0612	-0.1548*	0.0588	0.2333*	0.0380
DOWA	-0.0165	0.0749	-0.1887*	0.0712	0.2052*	0.0444
NKHOTA	-0.1748*	0.0721	0.0081	0.0650	0.1667*	0.0447
RUMPHI	0.0449	0.0712	-0.1551*	0.0649	0.1002*	0.0469
Log likelihood function		-658.1707				
Restricted log likelihood		-796.2620				
Likelihood Ratio Statistic		276.1826				
Likelihood Ratio Index		0.17				
Number of observations		4.03				

Table A3  
MEANS OF SELECTED VARIABLES BY OFF-FARM WORK STATUS

	Male-headed households			Female-headed households		
	Men	Women	Standard Deviation	Men	Women	Standard Deviation
<b>Off-farm self-employed</b>						
Age	39.1	39.3*	15.4	39.3*	39.3*	8.8
Primary education	0.7	0.6	0.5	0.6	0.6	0.4
Total household size	4.3	5.3*	2.3	5.3*	4.2	2.1
Dependency ratio	0.4	0.5*	0.2	0.5*	0.5	0.2
Total value of assets (individual)	3,704	2,284*	3,338	2,284*	3,963	3,252
Value of livestock (individual)	261*	58	963	58	138	647
Agricultural area owned in acres (individual)	2.6	1.7*	2.5	1.7*	2.5	1.4
Non-agricultural area owned in acres (individual)	0.5	0.3*	0.9	0.3*	1.0*	1.2
Total value of assets (household)	6,018	6,299	7,462	6,299	4,172	3,441
Value of livestock (household)	1,070	499	3,725	499	145	648
Agricultural area owned in acres (household)	4.0*	3.9	3.0	3.9	2.6*	1.5
Non-agricultural area owned in acres (household)	0.6*	0.9*	0.9	0.9*	1.0*	1.2
Number of observations	80	115		115	56	
<b>Not off-farm self-employed</b>						
Age	40.1	31.7	12.9	31.7	47.0	18.8
Primary education	0.7	0.5	0.4	0.5	0.7	0.6
Total household size	4.7	4.2	2.0	4.2	4.4	2.9
Dependency ratio	0.4	0.3	0.2	0.3	0.5	0.3

(Continued)

(Continuation - Table A3)

	Male-headed households			Female-headed households		
	Men	Women	Standard Deviation	Men	Women	Standard Deviation
Total value of assets (individual)	4,281	1,388	3,791	3,071	4,081	5,420
Value of livestock (individual)	577	470	0,634	690	2,763	3,511
Agricultural area owned in acres (individual)	2.3	0.9	2.0	2.0	2.3	1.6
Non-agricultural area owned in acres (individual)	0.6	0.1	0.7	0.4	0.5	0.5
Total value of assets (household)	5,432	5,440	4,331	3,203	3,542	5,512
Value livestock (household)	599	914	1,655	690	3,283	3,511
Agricultural area owned in acres (household)	3.2	3.4	2.1	2.1	2.8	1.6
Non-agricultural area owned in acres (household)	0.8	0.6	0.9	0.4	0.9	0.5
Number of observations	171	136		35		

Work off-farm. All asset values are in Malawi Kwacha (MK): 15 MK = 1 US \$. Total asset value includes value of livestock.



Table A4  
MEANS OF SELECTED VARIABLES BY OWN FARM WORK STATUS

	Male-headed households			Female-headed households		
	Men		Women	Men		Women
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
<b>Work on-farm (own farm)</b>						
Age	39.9	14.0	36.8*	10.5	46.8	15.5
Primary education	0.6*	0.5	0.5	0.4	0.7	0.5
Total household size	4.3*	2.1	5.0*	1.8	4.5	2.3
Dependency ratio	0.4*	0.2	0.4*	0.2	0.5	0.2
Total value of assets (individual)	3,686*	3,515	2,525*	4,044	3,614	4,612
Value of livestock (individual)	405	1,416	800*	2,714	904*	3,204
Agricultural area owned in acres (individual)	2.7*	2.2	1.8*	2.3	2.2	1.4
Non-agricultural area owned in acres (individual)	0.5	0.8	0.2	0.5	0.9*	1.4
Total value of livestock (household)	5,388	6,081	6,660*	6,141	3,804	4,690
Value of livestock (household)	938	2,922	1,355*	2,912	9,04*	3,204
Agricultural area owned in acres (household)	3.8*	2.6	4.4*	2.5	2.3	1.4
Non-agricultural area owned in acres (household)	0.6*	0.8	0.6	0.7	0.9*	1.4
Number of observations	159		136		41	
<b>Do not work on-farm (own farm)</b>						
Age	39.3	13.3	31.7	14.6	44.6	16.8
Primary education	0.8	0.4	0.5	0.6	0.6	0.5
Total household size	4.9	2.1	4.2	2.4	4.2	2.6

(Continued)

(Continuation - Table A4)

	Male-headed households			Female-headed households		
	Men	Women	Standard Deviation	Men	Women	Standard Deviation
Dependency ratio	0.4	0.4	0.2	0.4	0.5	0.3
Total value of assets (individual)	4,679	995	3,831	3,306	1,979	3,906
Value of livestock (individual)	512	32	1,540	137	425	702
Agricultural area owned in acres (individual)	1.9	0.6	2.0	2.2	1.3	1.6
Non-agricultural area owned in acres (individual)	0.6	0.2	0.8	0.5	0.5	0.6
Total value of livestock (household)	6,213	4,969	4,357	3,450	4,533	4,103
Value of livestock (household)	542	394	1,545	142	1,813	703
Agricultural area owned in acres (household)	2.9	2.9	2.0	2.3	2.0	1.7
Non-agricultural area owned in acres (household)	0.8	0.8	0.9	0.5	0.5	0.6
Number of observations	92	115		50		

• Significant at 5% or better: tested for the difference in means between those who work on farm and those who do includes value of livestock.

Table A5  
MEANS OF SELECTED VARIABLES BY ACCESS TO CREDIT

	Male-headed households			Female-headed households		
	Men		Women	Men		Women
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
<b>Access to credit</b>						
Age	41.2*	12.0	34.7	11.5	45.6	
Primary education	0.7	0.4	0.6*	0.4	0.6	
Total household size	4.5	2.0	4.7	2.0	3.8*	
Dependency ratio	0.4	0.2	0.4	0.2	0.6	
Total value of assets (individual)	4,275	3,582	2,030*	3,764	3,932	
Value of livestock (individual)	606*	1,632	672*	2,521	8,43*	
Agricultural area owned in acres (individual)	2.7*	2.1	1.4*	2.1	2.3	
Non-agricultural area owned in acres (individual)	0.5	0.8	0.1	0.4	0.8	
Total value of livestock (household)	6,220*	5,976	5,717	5,947	4,136	
Value of livestock (household)	1,231*	3,055	1,208*	2,886	843*	
Agricultural area owned in acres (household)	4.0	2.4	4.0*	2.5	2.4	
Non-agricultural area owned in acres (household)	0.6	0.8	0.7	0.9	0.8	
Number of observations	148		162		61	
<b>No access to credit</b>						
Age	37.8	15.7	32.9	14.8	45.4	
Primary education	0.7	0.5	0.4	0.6	0.6	
Total household size	4.5	2.4	4.4	2.4	4.9	

(Continued)



(Continuation - Table A5)

	Male-headed households			Female-headed households		
	Men			Women		
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Dependency ratio	0.4	0.2	0.4	0.2	0.5	0.5
Total value of assets (individual)	3,743	3,757	1,221	2,322	2,929	2,929
Value of livestock (individual)	241	1,143	1.7	8.9	7.4	7.4
Agricultural area owned in acres (individual)	2.1	2.2	0.8	1.8	2.1	2.1
Non-agricultural area owned in acres (individual)	0.5	0.8	0.2	0.7	0.5	0.5
Total value of livestock (household)	5,011	4,716	5,640	4,664	3,051	3,051
Value of livestock (household)	262	1,195	362	1,470	80	80
Agricultural area owned in acres (household)	2.9	2.3	3.1	2.2	2.1	2.1
Non-agricultural area owned in acres (household)	0.8	1.0	0.7	0.9	0.5	0.5
Number of observations	103		89		30	30

