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Household Access to Microcredit and Children's Food Security in Rural Malawi

A Gender Perspective

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Abstract

Using data from the 1995 Malawi Financial Markets and Food Security Survey, this study seeks to discover if women's relative control over household resources or intra-household bargaining power in rural Malawi, gauged by their access to microcredit, plays a role in children's food security, measured by anthropometric nutritional Z-scores. Access to microcredit is assessed in a novel way as self-reported credit limits at microcredit organizations. Since credit limits, that is, the maximum sums that might be borrowed, hinge upon supply-side factors such as the availability of credit programmes and the financial resources of lenders, it is plausible they are more exogenous than demand driven loan uptake or participation in microcredit organizations, the common ways of gauging access to microcredit. It is indicated that whereas the access to microcredit of adult female household members improves 0- to 6-year old girls', though not boys', long-term nutrition as measured by height-for-age, the access to microcredit of males has no such salutary effect on either genders' nutritional status. This may be interpreted as evidence of a positive relation between women's relative control over household resources and young girls' food security. That women's access to microcredit improves young girls' long-term nutrition may be explained in part by the subsidiary finding that it raises household expenditure on food.

Keywords: microcredit, gender, food security, Malawi

JEL classification: J08, J21, I20, J16

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1 Introduction

There are, broadly, two competing models of intra-household allocation: the Unitary Model and the Collective Model. The Unitary Model, attributed to Becker (1965, 1981), assumes that household resources are distributed among its members according to a single set of household preferences, that is, the household is a monolithic unit. The Collective Model, on the other hand, commonly views intra-household distribution as the outcome of Nash Bargaining between members with dissimilar preferences, so that allocations to a member (and her constituency) are dependent on her bargaining power. Since it is plausible mothers are more solicitous of children than fathers, that is, their preferences are more weighted toward beneficent children's outcomes, greater women's bargaining power or control over household resources may yield children tangible advantages if intra-household distribution proceeded according to the Collective Model. Indeed, this implication of the Collective Model has been the common means of testing between these competing models of the household. There is now a fair body of empirical evidence that intra-household allocation is the outcome of bargaining between household members. For example, Thomas (1990) finds that child survival probabilities in Brazil are much more improved by increases in mothers' than fathers' unearned income, mothers' unearned income being taken to measure their relative control over household resources. Hoddinott and Haddad (1995) find that an increase in the share of household income earned by women in Côte d'Ivoire raises the proportion of the household budget expended on food and reduces the budget shares of alcohol and cigarettes. Handa (1996) uncovers evidence from Jamaica that the presence in a household of a female decision-maker generally increases the share of the household budget allocated to child and family goods. Lundberg et al. (1997), in an examination of a late 1970s policy change in the UK that transferred a substantial child allowance to wives, find that this resulted in greater expenditures on women's and children's clothing relative to men's clothing. Levin et al. (1999), in a study of urban households in Ghana, find that women allocate a larger share of their income towards meeting their children's and their own basic needs despite earning less than men. Thomas et al. (2002) learn that child health in Java is influenced by the relative asset positions of parents at the time of their marriage, pre-marital assets being taken to measure intra-household bargaining power. This paper attempts to emulate the few studies that measure women's intra-household bargaining power by their access to microcredit. In the parlance of the Collective Model, a woman's intra-household bargaining power is positively related to her reservation or threshold utility, that is, to her options outside marriage. It is plausible that women's access to microcredit, that is, credit to finance microenterprises or small businesses, raises their intra-household bargaining power by boosting their earning potential and, hence, options outside marriage. For example, Pitt and Khandker (1998), in an examination of microcredit programmes in rural Bangladesh, determine that household consumption expenditure increased by 18 taka for every 100 taka borrowed by women, as opposed to an increase of only 11 taka for every 100 taka borrowed by men. Further, Pitt et al. (2003) find that whereas women's access to microcredit in rural Bangladesh significantly improves children's health outcomes, men's access to credit has no such statistically discernible effect. This study too attempts to link women's intra-household bargaining power as measured by their access to microcredit, to children's health outcomes, specifically, their nutritional status. The finding, for instance, that children's nutritional status, a measure of their food security, is better improved by women's access than by men's access to microcredit shall suggest intra-

household allocation proceeds according to the Collective Model rather than the Unitary Model.

The remainder of the paper is organized as follows. Section 2 discusses empirical concerns pertaining to the measurement of access to microcredit, and describes the utilized data and empirical methodology. Sections 3 and 4 present the study's empirical findings and conclusions, respectively.

2 Empirical concerns, data, and empirical methodology

Access to credit, in studies relating it to economic outcomes, has usually been measured in two ways: dichotomous membership in credit programmes, and actual loan uptake. Both these measures may be unsuitable for estimating the *true* causal effect of access to credit (David and Meyer 1980). First, since credit programme participation and loan uptake are voluntary, the measures are potentially endogenous. For example, parents who avail of loans may have better nourished children, but it cannot be concluded that loans advance child nutrition since parents more heedful of their children's health may be likelier to seek out helpful loans. Second, loan uptake would measure access to credit accurately only if credit limits were universally binding, that is, if everyone's loan uptake were equivalent to her credit limit. In reality, individuals often do not fully exercise their option to borrow. Even so, that option may influence their economic behaviour. For example, households with unexercised option to borrow might, as a result, feel sufficiently secure to expend more of their current resources upon children's nutrition. Third, membership in a credit programme often confers benefits unrelated to credit access such as literacy classes. These secondary effects of credit programme participation may bias estimates of the true causal effect of access to credit. Finally, mere membership in a credit programme may not guarantee ready access to credit since many group-based credit programmes stipulate that only a portion of a group's members may receive credit at any time. Hence, Diagne (1998) and Diagne and Zeller (2001) argue that the credit limit, that is, the maximum amount that may be borrowed, is a better measure of credit access. The authors reason that unlike credit programme participation or loan uptake, which are related to demand for credit, the credit limit, reflecting mainly supply-side factors such as the availability of credit programmes and the financial resources of lenders, is a truer measure of an exogenous credit constraint.

Data for this study are drawn from the Malawi Financial Markets and Food Security Survey conducted jointly in 1995 by the International Food Policy Research Institute (IFPRI) and the Department of Rural Development (DRD) of the Bunda College of Agriculture of the University of Malawi. A total of 404 rural households in 45 villages of 5 Malawian districts were surveyed. The yearlong survey consisted of three rounds. The first round was conducted from February to April, the second between July and September, and the third in November and December. The surveyed households did not constitute a random sample. Since it was necessary to include sufficient numbers of microcredit programme participants in the Survey, stratified random sampling was employed to ensure that half of the final sample of 404 households consisted of current microcredit programme participants with past participants and non-participants making up approximately equal portions of the remainder. The non-randomness of the sample calls for the inclusion of sampling weights in estimation.

The Survey is unusual in having queried respondents over 17 years of age about the maximum amount they might conceivably borrow at any one time. Thus, access to credit may be measured as self-assessed credit limits. This study measures female household members' access to microcredit as the sum of their credit limits at microcredit organizations, and, similarly, male members' access to such credit as the sum of their credit limits. Since 75 per cent of the households surveyed had adult members who were either current microcredit programme participants or past participants, that is, who were familiar with microcredit organizations and their lending rules, it is likely the reported sums are credible.

Oddly, however, reported available credit at Round 1 often far exceeds that at Rounds 2 and 3. For example, in 35 per cent of households, the combined maximum amount that may be borrowed at any one time by the adult female members is larger at Round 1 than at Round 2. Indeed, in full 27 per cent of households, this sum is as high as 6,000 Malawi Kwacha (MK) at Round 1 but zero at Round 2. It is plausible the reported sums are credit limits less current borrowing. Hence, an individual who has drawn upon a portion of her credit limit between Rounds 1 and 2 of the Survey may report having access to a smaller sum of credit at Round 2 than at Round 1. It may be incorrect to interpret this as reduction in her bargaining power since the act of borrowing to finance a microenterprise is in fact a demonstration of her bargaining power, an exhibition of her options outside marriage. In other words, her bargaining power may be better measured by her credit limit, akin to the limit on a credit card, than by the remaining credit available to her. It may be noted in this context that the elicited amounts at Round 1 pertain to the previous three years, whereas those reported at Rounds 2 and 3 relate merely to the brief periods between the rounds. Recall that the first round of the Survey was conducted from February to April of 1995, the second between July and September, and the third in November and December. Loans may be fully repaid in three years, that is, the period is long enough to accommodate an entire loan cycle, so that the maximum credit available to a respondent at any one time in the previous three years may well equal her credit limit. On the other hand, it is likelier there shall be outstanding loans throughout the few months between the rounds, that is, the periods may be briefer than a loan cycle, and so it is plausible the maximum credit available to a survey participant at any one time during these months is less than her credit limit. Thus, her credit limit at Round 1 is taken to be the reported maximum amount she might have borrowed at any one time in the preceding three years. However, her credit limit at Round 2 is taken to be the greater of the sums reported at Round 1 and at Round 2. Similarly, her credit limit at Round 3 is considered to be the largest of the sums reported at Round 1, at Round 2, and at Round 3.

The Malawi Financial Markets and Food Security Survey gathered the heights and weights of 0 to 6 year old children. The former are converted into height-for-age anthropometric nutritional Z-scores, a measure of 'stunting' or long-term nutrition, and weight-for-height Z-scores, a measure of 'wasting' or short-term nutrition, by the methodology prescribed by the World Health Organization (WHO 1983). These Z-scores constitute the principal dependent variables of the study's regression analysis, the regressors of primary interest being the combined credit limits at microcredit organizations of, separately, adult female household members and adult male members.

Assuming adult microcredit limits have dissimilar effects upon girls and boys, the regression equations may be specified as:

(1) $haz_i = \alpha_1 . creditfemale_i \times girl_i + \alpha_2 . creditfemale_i \times boy_i + \alpha_3 . creditmale_i \times girl_i + \alpha_4 . creditfemale_i \times boy_i + X_i' \alpha_5 + e_{1i}$

and

(2) $haz_i = \beta_1 . creditfemale_i \times girl_i + \beta_2 . creditfemale_i \times boy_i + \beta_3 . creditmale_i \times girl_i + \beta_4 . creditfemale_i \times boy_i + X_i' \beta_5 + e_{2i}$

where haz_i and whz_i denote, respectively, child i's height for-age and weight-for-height anthropometric Z-scores, $creditmale_i$ is the combined credit limit of her household's adult male members, $creditfemale_i$ is the combined credit limit of her household's adult female members, X_i is a vector of other plausible correlates of children's anthropometric nutritional status, and e_{1i} and e_{2i}, the error terms, signify unobserved random influences. The finding that *creditfemale* has a more pronounced positive effect upon children's anthropometric nutritional Z-scores than *creditmale* will suggest children's food security in rural Malawi is improved by gains in women's bargaining power as predicted by the Collective Model of intra-household allocation.

The study pursues the complementary strategy of comparing the effects of *creditmale* and *creditfemale* upon household expenditure patterns. The finding, for instance, that *creditfemale* has a greater positive effect upon household expenditures on food than *creditmale* will suggest children's food security is improved by gains in women's relative control over household resources. However, since food is not consumed by children alone, the study also compares the effects of *creditmale* and *creditfemale* upon household expenditures on goods plausibly consumed only by adults, such as tobacco, adult clothing and footwear, and items of adults' personal grooming like cosmetics. *Ceteris paribus*, decreases in household expenditures upon goods consumed exclusively by adults ought to improve children's food security. The finding that an increase in *creditfemale* causes a more pronounced reduction in household expenditures upon such 'adult goods' than an increase in *creditmale* will suggest children's food security is improved by gains in women's bargaining power. The pertinent regression equations are of the form:

(3) $expgood_{kj} = \lambda_{1k}.creditmale_j + \lambda_{2k}.creditfemale_j + Z_j' \lambda_{3k} + u_{kj}$

where $expgood_{kj}$ denotes household j's expenditures upon the good k, Z_j signifies other plausible correlates of the household's expenditures upon the good, and u_{kj} represents unobserved random influences. The particular goods considered are food and the plausible adult goods of tobacco, goods and services for adults' personal grooming such as cosmetics, and adult clothing and footwear.

Equations (1) and (2) are estimated upon a sample of 820 0- to 6-year old children pooled from all three rounds of the Survey. This sample of children shall be referred to as the 'Child Anthropometrics Sample'. On the other hand, equations of the form (3) are estimated upon a pooled sample of 541 households to which these children belong. This sample of households shall be referred to as the 'Household Expenditures Sample'.

3 Empirical findings

Table 1 presents the (unweighted) sample mean values of all the variables employed in equations (1) and (2). The mean height-for-age Z-score of these 839 children is -2.33. Since a Z-score between -2 and -3 indicates moderate malnutrition, it seems there is widespread long-term malnutrition among 0 to 6 year old children in rural Malawi. 45.7 per cent of these children are female. The children's average age is about 3 years and 4 months. The average child is one of some seven household members, of whom approximately two are in the age group 0- to 6-years. It is likely parental literacy is an important determinant of childhood nutrition and health, but since, as argued by Basu and Foster (1998), individual literacy may confer positive externalities within a household, children may also benefit from the literacy of household members other than their parents. Hence, literacy is measured by the proportion of 12 or older household members literate in the Chichewa language. The average child is from a household in which about 28 per cent of 12 or older members are literate. 20.1 per cent of these children reside in female-headed households. It is likely children's nutrition depends upon household income and wealth. However, since it is plausible intra-household allocations of consumption and allocations of leisure (the converse of work for adult members) are simultaneous, income from work, or earned income, may be an endogenous regressor in equations (1) and (2). Thus, only household unearned income consisting of gifts and remittances is included as an explanatory variable.

Table 1: Sample means: child anthropometrics sample
(n = 820)

Variable	Sample mean	SD
Dependent variables		
Height-for-age Z-score (*haz*) – measures stunting	-2.331	2.435
Weight-for-height Z-score (*whz*) – measures wasting	0.770	3.238
Child attributes		
Child is female	0.457	0.498
Child's age in months	39.560	19.271
Household attributes		
Number of members	6.754	2.433
Number of 0–6 year old members	2.082	0.941
Number of 7–11 year old members	1.088	0.867
Proportion of literate 12 and older members	0.281	0.299
Household head's age in years	41.839	12.827
Household head is female	0.201	0.401
Total household unearned income, in hundreds of Malawi Kwacha (MK), in past 15 months	0.417	0.995
Household wealth, in thousands of MK (land, other assets besides livestock, and food stocks)	6.837	22.719
Key variables		
Access to microcredit, in hundreds of MK, of adult female household members × child is female	2.241	6.072
Access to microcredit, in hundreds of MK, of adult female household members × child is male	2.383	6.013
Access to microcredit, in hundreds of MK, of adult male household members × child is female	2.365	12.137
Access to microcredit, in hundreds of MK, of adult male household members × child is male	3.950	18.061

Table 2: Sample means: household expenditure sample
(n = 541)

Variable	Sample mean	SD
Dependent variables		
Expenditure on food in past 3 days	31.788	29.337
Expenditure on tobacco in past 4 weeks	2.271	14.939
Expenditure on items of adults' personal grooming since October. 1994 or last round of survey	9.672	23.961
Expenditures on adult clothing and footwear since October 1994 or last round of survey	57.416	169.302
Household attributes		
Number of members	6.433	2.319
Number of 0–6 year old members	1.804	0.868
Number of 7–11 year old members	1.057	0.860
Proportion of literate 12 and older members	0.285	0.308
Household head's age in years	41.919	12.621
Household head is female	0.229	0.421
Total household unearned income, in hundreds of Malawi Kwacha (MK), in past 15 months	0.430	1.053
Household wealth, in thousands of MK (land, other assets besides livestock, and food stocks)	7.443	27.122
Key variables		
Access to microcredit, in hundreds of MK, of adult female household members	4.819	8.363
Access to microcredit, in hundreds of MK, of adult male household members	5.872	20.998

Table 2 presents the (unweighted) sample mean values of the variables employed in equation (3). Average household expenditure on food during the past three days is about 31.8 MK. Average spending on tobacco during the previous four weeks is about 2.3 MK. Average household spending on items of adults' grooming is about 9.7 MK and that on adult clothing and footwear is approximately 57.4 MK. The average combined credit limit of adult female household members is about 482 MK whereas the average access to microcredit of adult male household members is approximately 587 MK.

Table 3 presents weighted OLS estimates of the coefficients of (1) and (2), the weights being household sampling weights adjusted for the pooling of data from the three survey rounds. For example, if a particular child is observed in all three rounds and so is thrice included in the pooled Child Anthropometrics Sample, the sampling weight she is associated with is taken to be her household's sampling weight divided by 3. Children's height-for-age Z-scores, measuring their long-term nutrition, are significantly higher in female-headed households. This is consistent with Handa's (1996) finding that the presence in a Jamaican household of a female decision-maker generally increases the share of the household budget allocated to child and family goods. It is noteworthy that whereas the access to microcredit of adult female household members significantly improves girls', though not boys', long-term nutrition, the access to microcredit of adult male members has no such beneficial effect on either girls' or boys' nutritional status. That a plausible rise in women's intra-household bargaining power improves the nutrition of a section of children may be considered evidence of intra-household allocation proceeding according to the Collective Model rather than the Unitary Model. The additional finding that children in female-headed households enjoy superior long-term nutrition bolsters this conclusion.

In contrast, there is no evidence that children's short-term nutrition as measured by their weight-for-height Z-scores is correlated with women's access to microcredit.

Table 3: Determinants of 0-5 year old children's anthropometric nutritional status

	haz stunting	*whz* wasting
Variable	Coefficients	
Constant	-2.036**	0.140
	(-2.53)	(0.15)
Child is female	-0.542	-0.446
	(-1.30)	(-0.87)
Child's age	0.014	-0.009
	(1.56)	(-1.32)
Number of members	-0.082	0.259
	(-0.66)	(1.18)
Number of 0 – 6 year old members	-0.175	-0.222
	(-0.98)	(-1.49)
Number of 7 – 11 year old members	-0.067	-0.290
	(-0.21)	(-0.72)
Proportion of literate 12 and older members	0.953	-0.160
	(1.64)	(-0.25)
Household head's age	0.002	0.004
	(0.14)	(0.32)
Household head is female	0.810**	0.292
	(2.07)	(0.48)
Total household unearned income	-0.046	-0.001
	(-0.30)	(-0.01)
Household wealth	0.037	0.0003
	(1.27)	(0.05)
Key variables		
Access to microcredit of adult female household members × Child is Female	0.072***	-0.020
	(3.16)	(-0.99)
Access to microcredit of adult female household members × Child is Male	-0.050	-0.054
	(-1.53)	(-1.41)
Access to microcredit of adult male household members × Child is Female	-0.009	-0.001
	(-1.01)	(-0.08)
Access to microcredit of adult male household members × Child is Male	0.007	-0.003
	(1.28)	(-0.60)
R^2	0.093	0.027

Notes: The numbers in parentheses are t-ratios. The superscripts *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Weighted OLS estimates.

Sample: child anthropometrics sample, n = 820

Dependent variables: height-for-age (*haz*) and weight-for-height (*whz*) Z-scores

Table 4 presents estimates of the coefficients of (3). Expenditure on food significantly increases in household size, but, controlling for the total number of household members, decreases in the numbers of resident 0 to 6 year old children, presumably because young children require less food. Wealthier households spend more upon food, as do female-headed households, whereas the opposite seems true of households headed by older individuals. It is noteworthy that household expenditure on food significantly increases in women's access to microcredit. It is plausible this contributes to the positive relation between women's access to microcredit and young girls' long-term nutrition reported in Table 3. Note, though, that women's access to microcredit does not appear to influence household expenditures upon the adult goods of tobacco, items of adults' personal grooming, or adult clothing and footwear.

Table 4: Determinants of household expenditures on select goods and services

	foodexp	*tobexp*	*groomexp*	*clothexp*
Variable	Coefficients			
Constant	17.105**	7.335	9.957***	116.376**
	(2.32)	(0.92)	(3.24)	(2.35)
Household attributes				
Number of members	8.017***	-1.010	0.755	5.108
	(6.08)	(-0.84)	(0.98)	(1.11)
Number of 0–6 year old members	-10.062**	-0.832	-0.177	-2.693
	(-1.19)	(-1.17)	(-0.13)	(-0.31)
Number of 7–11 year old members	-2.498	3.617	-3.695**	-3.859
	(-0.88)	(0.90)	(-2.21)	(-0.26)
Proportion of literate 12 and older members	0.139	1.827	-2.009	-63.518**
	(0.03)	(0.49)	(-0.63)	(-2.24)
Household head's age	-0.500***	0.001	-0.147*	-1.756***
	(-3.05)	(0.01)	(-1.79)	(-2.72)
Household head is female	8.215*	-5.467	4.342*	-21.525
	(1.94)	(-1.39)	(1.73)	(-1.47)
Total household unearned income	-0.608	-0.532	0.366	-5.086
	(-0.53)	(-0.94)	(0.38)	(-0.75)
Household wealth	0.171*	0.477	0.410***	0.019
	(1.94)	(1.32)	(3.23)	(0.08)
Key variables				
Access to microcredit of adult female household members	0.411*	-0.276	0.369*	2.030
	(1.86)	(-1.57)	(1.95)	(1.01)
Access to microcredit of adult male household members	-0.033	-0.041	-0.002	0.011
	(-0.44)	(-0.97)	(-0.05)	(0.03)
R^2	0.331	0.205	0.204	0.064

Note: The numbers in parentheses are t-ratios. The superscripts *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Weighted OLS estimates.

Sample: household expenditures sample, n = 541.

Dependent variables: expenditures on food (*foodexp*), tobacco (*tobexp)*, items of adults' personal grooming (*groomexp*), and adult clothing and footwear (*clothexp*).

4 Conclusion

This study seeks to discover if women's relative control over household resources in rural Malawi, gauged by their access to microcredit, influences children's food security, measured by anthropometric nutritional Z-scores. The finding that women's access to microcredit improves children's nutrition shall suggest intra-household allocation proceeds according to the Collective Model rather than the Unitary Model.

Access to microcredit is measured in a novel way as self-reported credit limits at microcredit organizations. Since credit limits, that is, the maximum sums that might be borrowed, hinge upon supply-side factors such as the availability of credit programmes and the financial resources of lenders, it is plausible they are more exogenous than demand driven loan uptake or participation in microcredit organizations, the common ways of gauging access to microcredit.

It is found that whereas young girls', though not boys', long-term nutrition and the access to microcredit of adult female household members are positively correlated, male members' access to microcredit has no beneficial effect upon either girls' or boys'

nutritional status. This suggests there is a positive relation between women's relative control over household resources and 0–6 year old female children's food security. That women's intra-household bargaining power, as measured by their access to microcredit, improves the long-term nutrition of a section of children suggests that intra-household allocation in rural Malawi proceeds according to the Collective Model. The uncovered positive relation between women's access to microcredit and young girls' long-term nutrition may be explained in part by the finding that the former raises household expenditure on food.

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