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Summary. — This paper examines the effect of household access to microcredit upon work by seven to eleven year old children in rural Malawi. Given that microcredit organizations foster household enterprises wherein much child labor is engaged, this paper aims to discover whether access to microcredit might increase work by children. It is found that, in the season of peak labor demand, household access to microcredit, measured as self-assessed credit limits at microcredit organizations, raises the probability of child work in households with average landholdings and retail sales enterprises.

Key Words — Child labor, microcredit, Africa, Malawi

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I. INTRODUCTION

This study examines the effect of household access to microcredit upon children's propensity to work in rural Malawi and so conjoins the two topical subjects of microcredit and child labor. Given the growing role of microcredit in development financing and the increased disbursement of official aid via microcredit programs, an assessment of the effects of microcredit access upon child labor will be a useful contribution to research in the sustainability of development financing.

The International Labor Organization (ILO) considers child labor to be 'simply the single most important source of child exploitation and child abuse in the world today' (ILO, 1998 A). As Binder and Scrogin (1999) put it, there are at least four reasons for the objectionability of child labor. First, child labor reduces children's current welfare. This is an especially pressing reason given children's vulnerability to exploitation. Second, by plausibly reducing children's schooling, child labor may also lower children's future welfare ¹. Third, reductions in children's schooling may slow the pace of national economic growth. Fourth, as argued by Basu and Van (1998), child labor may, by competing with adult labor, reduce adult wages, thereby increasing household dependence upon children's earnings, making for a vicious cycle of continued child labor.

The International Labor Organization estimates there were about 211 million 5 –14 year old economically active children worldwide in 2000, of whom 186.3 million were child laborers, and 120 million worked full-time (ILO, 2002). An economically active child, by the ILO, is one who works at least 1 hour a week. All 5 – 11 year old economically active children are considered child laborers. On the other hand, an economically active 12-14 year old is considered a child laborer only if she performs at least 14 hours of non-hazardous work per week, or at least 1 hour of hazardous work per week. The ILO considers work to be activity producing a marketable output. This includes work for pay as well unpaid work in a household farm or non-farm enterprise but excludes children's domestic chores, performed mainly by girls, such as the fetching of firewood and water, cooking, cleaning, and childcare. In light of this, the ILO may be considered underestimating the magnitude of child work.

By ILO estimates, Africa, with about 41 per cent of 5 to 14 year old children engaged in economic activity, has the highest incidence of child work in the developing world (ILO, 1998 B). Children's labor force participation rates are highest in Sub-Saharan Africa (ILO, 1998 B). As regards Malawi in Southern Africa, the ILO estimates that 35.2 per cent of 10 to 14 year old Malawian children were working in 1995 (ILO, 1996 A). A Malawi demographic and health study (DHS) found that 27 per cent of 5 to 14 year old children (42 per cent of 10 to 14 year olds) were working in 2000 (Malawi National Statistical Office, 2001). By 2004, the proportion of working 5 to 14 year old children had risen to 37 per cent (Malawi National Statistical Office, 2006). Even though Malawian law prohibits the employment of persons less than 14 years of age, significant child labor may be found on tobacco and tea farms, subsistence farms, and in domestic service.

In any case, labor laws may not be depended upon to stamp out child work, consisting in the main of unpaid toil in household enterprises (ILO, 1996 B) usually beyond the ambit of legislation. It is now believed this type of work is not innocuous. For example, while the ILO acknowledges the need for distinction between "normal family obligations and work which gives rise to exploitation and abuse", it warns that "an emphasis on traditional practices over the potential hazards of work for children can result in ignoring the extent of the child labor problem" and that "what happens within the family context" may well fall within the purview of labor laws in the future (ILO, 1998 B). Similarly, Nieuwenhuys (1994) writes, "the assumption that children's work, in the context of the peasant family, is morally neutral is preposterous." Detailed anthropological study in Kerala, India, leads Nieuwenhuys (1994) to conclude that work within the household is not any the less demanding or less important for families than market work, and there can be no presumption that poor parents are able to protect their children from excessive drudgery and exploitation. The predominance of unpaid household work among children's economic activities, apprehension that it too may be detrimental to children, and the difficulties of bringing household production within the purview of labor laws, have led to consideration of alternate means of combating child labor. For instance, the ILO holds that 'the single most effective way to stem the flow of school-age children into abusive

forms of employment is to extend and improve schooling so that it will attract and retain them' (ILO, 1998 A). Another such measure gaining currency is improvement in poor households' access to credit.

While there has been considerable theoretical research upon the relation between access to credit and child labor, by, for example, Ranjan (1999) and Baland and Robinson (2000), empirical research has been rarer. This study aims to contribute to the slim body of empirical evidence of a relation between access to credit and child labour in developing countries. Further, whereas theoretical models commonly predict a negative relation between credit and child labor, this study follows Wydick (1999) in arguing that credit, especially microcredit, may in fact increase child work in household enterprises. After all, credit would enable the use of more capital equipment and other inputs in household enterprises and so raise the productivity of family child labor therein. In other words, as shall be elaborated in section II, credit may increase the demand for family child labor in household enterprises. Indeed, empirical analyses of data from rural Malawi reveal that household access to microcredit raises children's propensity to work during the season of peak labor demand. However, it is found that access to microcredit is significantly related merely to children's household domestic work. This suggests only adults are busied in credit-stimulated household enterprises whereas children merely replace them in the shouldering of domestic chores. In order to discover whether credit-stimulated work by children is detrimental to them, this study also examines the relation between household access to microcredit and children's school attendance. Even though no statistically significant relation between the two is uncovered, the study cautions it may not be concluded that children are unscathed.

The remainder of the paper is organized as follows. Section II discusses the theoretical foundations of a relation between access to credit and child labor, emphasizes it is possible that common theoretical predictions are reversed once it is realized that household work is the predominant form of child work, and reviews the empirical literature. Section III describes the data from rural Malawi and discusses empirical issues in the measurement of access to credit. Section IV

presents an econometric model of the relation between work by children and household access to microcredit, and the empirical findings. Section V summarizes these findings and briefly concludes.

II. ACCESS TO CREDIT AND CHILD LABOR

While child labor is widely held to stem from poverty, Ranjan (1999) and Baland and Robinson (2000) take the nuanced view that it isn't poverty *per se* but rather poverty combined with lack of access to credit that causes (excessive) child labor. These authors assume parents are altruistic, deriving satisfaction from their children's future consumption. Parents may augment their children's future consumption in two ways, namely, by schooling them so as to raise their future earnings, or by bequeathing them an inheritance. The cost to parents of leaving a bequest is, naturally, reduction in their own consumable resources. Similarly, by schooling their children as opposed to working them, parents forego children's earnings from labor. Parents choose an optimal combination of schooling and bequest by, for example, trading-off a quantity of bequest for more schooling. Poverty poses the particular difficulty that poor parents may not have resources to bequeath their children and so there is no question of trading-off a sum of bequest for more schooling, that is, unless it were possible for bequests to take negative values. Therefore, poverty-stricken parents unable to engineer negative bequests, that is, resource transfers back in time from adult children to parents, may be constrained to educate their children less than they would like. Since child labor is the converse of children's schooling in this model, poverty may, thus, cause child labor to be greater than in an interior solution. Access to credit may alleviate this difficulty by enabling negative bequests. Were children to be relied upon to honor their parents' debts, parents might simply borrow at present to leave their children the negative bequest of debt. Thus, if it were possible for impoverished parents to borrow, work by their children might not be excessive.

Alternatively, parents whose initial endowment is low relative to their children's future earnings may wish to transfer resources from the future to the present. With option to borrow, parents would accomplish this inter-temporal resource transfer by availing of loans upon the strength

of their children's future earnings. This is, of course, predicated upon children's willingness to take on their parents' debts, that is, upon children's altruistic feelings for their parents or 'reverse altruism'. On the other hand, without access to credit, parents may be compelled to effectuate an inter-temporal resource transfer by the means of putting their children to work as opposed to schooling them, increasing parents' current consumption at the expense of children's future earnings. Hence, an increase in household access to credit may decrease child labor.

However, this ignores household economic and domestic work wherein the bulk of child workers is engaged. Wydick (1999) makes the rare observation that improved access to credit may increase children's household economic work. By making the purchase of market inputs like capital equipment possible, credit may raise children's labor productivity in household enterprises. Given that the poor in many developing countries now often obtain credit in the form of microenterprise loans, that is, loans for the purposes of production rather than consumption, improved access to credit may, thus, increase child work, particularly when hired labor is scarce or when the potential for moral hazard by hired labor is high making hired and household labor poor substitutes in household enterprises (Wydick, 1999).

Even though a relation between access to credit and child labor is amply supported in theory, it has seldom been empirically verified. Dehejia and Gatti (2005) find evidence of a significantly negative cross-country association between child labor and access to credit as measured by the ratio of private credit issued by banks to GDP. Beegle, Dehejia, and Gatti (2006) find that transitory income shocks in the Kagera region of Tanzania lead to increased work by children but that household access to credit, measured by the value of household collateralizable assets, mitigates the increase. Wydick (1999), investigating the effect of microenterprise lending upon child labor in western Guatemala, finds that increased access to credit generally reduces the likelihood of a child being withdrawn from school for the purposes of work in a household enterprise. However, the author discovers that this positive effect of access to credit upon children's schooling is dampened when the nature of the household enterprise raises the potential for moral hazard by hired labor or

when credit enables the labor productivity enhancing physical capitalization of the enterprise.

Ersado (2005) finds that credit access, measured by the presence in the community of a commercial bank, is likely to improve school enrollment rates while decreasing child labor in rural Nepal and Zimbabwe. Ersado (2005) discovers, however, that proximity to a commercial bank in rural Peru actually increases the probability of children working as against attending school. The author conjectures credit in rural Peru fosters household enterprises employing child labor. Hence, that credit may increase child work already finds a modicum of empirical support.

III. THE DATA

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. These households did not constitute a random sample. Since it was necessary to include sufficient numbers of microcredit program participants in the survey, stratified random sampling was employed to ensure that half of the final sample of 404 households consisted of current microcredit program 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 data are rich in household and community descriptors. Further, discontinuous time allocation ² data for seven to eleven year old children were elicited. Children were assumed to allocate time between educational, leisure, and work activities. Since child work, by girls in particular, would be underestimated if household domestic chores were excluded, it is taken to consist of the fetching of firewood/dung/straw, helping in field/with animals, working at somebody else's for wage/meal, the fetching of drinking water, and other domestic housework. Of these, the fetching of firewood/dung/straw, the fetching of drinking water, and other domestic housework may be

considered children's household domestic work. It may be noted that actual time spent in an activity was unreported: it is merely known if a child undertook the activity. It is notable, however, that Nankhuni's and Findies's (2004) analysis of 1997 – 1998 Malawi Integrated Household Survey data indicates 6 to 14 year old Malawian children spend an average of as many as 18.3 hours per week in household domestic work. The authors find that the most common form of children's domestic work is the provision of childcare to younger household members. This is followed by the fetching of water, cooking, and the gathering of firewood.

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 Malawian farming season begins in November. February to April is the period of peak harvest during which the demand for child labor is particularly high. Indeed, the proportions of children engaging in some type of work in the first, second, and third rounds of the Survey were, respectively, 51.7 per cent, 45.3 per cent, and 35.9 per cent. Data from each round of the Survey were analyzed separately. The key variables pertaining to household credit access were found to be statistically significant only in the analyses of data from the first round. This suggests the effect of household access to credit upon child work is pronounced only in periods of peak labor demand. Consequently, this study only reports the results of the analyses of data from the first round (February-April) of the Survey.

Access to credit, in studies relating it to economic outcomes, has usually been measured in two ways: dichotomous membership in credit programs, and actual loan uptake. Both these measures may be unsuitable for estimating the *true* causal effect of credit access (David and Meyer, 1980). First, since credit program participation and loan uptake are voluntary, the measures are potentially endogenous. For example, parents who avail of loans may be less likely to have their children work, but it cannot be concluded that loans reduce child work since parents more eager to educate their children 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 don't fully exercise their option to borrow. Even so, that option may well influence their economic behavior. For example, households with unexercised option to borrow might, as a result, feel sufficiently secure to embark upon a household enterprise employing child labor. Third, membership in a credit program often confers benefits unrelated to credit access such as literacy classes and business training. These secondary effects of credit program participation may confound the true causal effect of access to credit. Finally, mere membership in a credit program may not guarantee ready access to credit. Indeed, many group-based credit programs stipulate that only half of a group's members may receive credit at any time. Even credit programs repudiating this rule rarely provide their members with assured access to credit.

Hence, Diagne (1998) and Diagne and Zeller (2001) argue that the credit limit, that is, the maximum amount that may be borrowed as self-reported by survey participants, is a better measure of credit access. The authors reason that unlike credit program 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 programs and the financial resources of lenders, is a truer measure of an exogenous credit constraint. Therefore, the Malawi Financial Markets and Food Security Survey having queried respondents over 17 years of age about the maximum amount they might conceivably have borrowed, this study measures a household's access to microcredit by summing the self-assessed credit limits of its members at microcredit organizations. Given that 75 per cent of the households surveyed had adult members who were either current microcredit program participants or past participants, that is, who were familiar with microcredit organizations and their lending rules, it is likely these self-assessed credit limits are credible. We don't discount the possibility, however, of exaggerated credit limits since access to microcredit may be a source of pride. It is also acceded that this novel measure of access to credit is not indisputably exogenous. For instance, an individual's credit limit may reflect her credit-worthiness, and an individual willing to have her children contribute to the success of her economic enterprise, that is, an individual demonstrably committed

to her enterprise, might be considered more credit-worthy by lending institutions. It is merely suggested that a credit limit, the maximum amount that may be borrowed, being externally imposed, is less likely to be endogenous than actual loan uptake or dichotomous credit program participation.

Some institutional details of microcredit programs in Malawi follow. The nation has four main credit and savings programs: the Malawi Rural Finance Company (MRFC), Promotion of Micro-Enterprises for Rural Women (PMERW), the Malawi Mudzi Fund (MMF), and the Malawi Union of Savings and Credit Cooperatives (MUSCCO). The first three are group-lending programs, whereas MUSCCO is an individual membership based union organization. MRFC and MUSCCO provide seasonal agricultural credit, mainly to tobacco and maize farmers. PMERW and MMF, operating in but a few districts, specialize in off-farm credit, though a portion of MMF's loan portfolio supports agricultural operations. In addition, there are numerous small credit programs run by NGOs and foreign government organizations. Interest rates charged by these programs are fairly high. For instance, MRFC charged an annual interest rate of 40 per cent in 1994-95 (Diagne and Zeller, 2001). This was partly owing to Malawi's high rates of inflation at the time.

IV. ECONOMETRIC MODEL AND EMPIRICAL FINDINGS

Improvement in access to credit is taken to relax the working capital constraints of household production. Indeed, working capital toward household production may increase even if no borrowing occurs. For example, given uncertainty, a household with greater access to credit may, with loans to fall back upon, be likelier to use precautionary savings to purchase inputs. In other words, the mere option to borrow may raise a household's working capital.

Wydick (1999) suggests two effects of an increase in working capital on a household's employment of its children: the 'family-labor -substitution effect' and the 'household-enterprise-capitalization effect'. Additional working capital would permit the replacement of family labor in household enterprises by hired labor. Further, since additional working capital may boost the profitability of household enterprises, family labor in such enterprises may also be reduced via an

income effect as family workers consume more leisure. Thus, the ‘family-labor-substitution effect’ makes for a negative relation between resources allocated to household production and child labor employed therein. However, the effect would be diminished if hired labor were either a poor substitute for family labor or in short supply. For example, Wydick (1999) contends that households may find hired labor an inadequate substitute for family labor in retail sales enterprises given opportunities for petty theft. The ‘household-enterprise-capitalization effect’, on the other hand, pertains to the increase in the marginal productivity of child labor in household enterprises because of the increase in purchased inputs that additional working capital enables. This makes for a positive relation between working capital and child labor in household enterprises. Thus, the net effect of household access to credit upon child labor depends upon the relative magnitudes of the mutually opposed ‘family-labor -substitution effect’ and ‘household-enterprise-capitalization effect’.

The above motivates an econometric model of child labor that may be specified simply as

$$H^* = X'\beta + u, \quad (1)$$

where H^* denotes a child’s optimal work hours, X indicates a vector of correlates that includes a measure of household access to credit and interactions that capture the ‘family-labor-substitution effect’ and ‘household-enterprise-capitalization effect’, and u , the error term, represents unobserved random influences. Given that work by children in the Malawi Financial Markets and Food Security Survey is measurable only as a dichotomous variable, H^* may be considered the latent variable underlying a binary H such that $H = 1$ if $H^* > 0$, $H = 0$ otherwise. Assuming the error term, u , is normally distributed, (1) may be estimated by probit ML.

Estimates of the coefficients of the twin equations

$$H_1^* = X'\beta_1 + u_1 \quad (2)$$

and

$$H_2^* = X'\beta_2 + u_2, \quad (3)$$

where H_1^* and H_2^* denote optimal hours in household domestic work and household economic work ³, respectively, would reveal whether access to microcredit influences these two types of child

work differently. After all, there is evidence child work is not homogeneous. For example, Hazarika and Bedi (2003) find that while children's extra-household (outside the home) work is positively related to schooling costs in rural Pakistan, children's intra-household work, the dominant form of child work, is insensitive to changes in the costs of schooling. Similarly, Amin, Quayes, and Rives (2006) find that children's market work in Bangladesh often exerts a different effect upon their schooling than their domestic work. Since H_1^* and H_2^* are observed but dichotomously, (2) and (3) may be jointly estimated by bivariate probit ML, assuming the errors u_1 and u_2 are bivariate-normally distributed.

[Table 1 approximately here]

Table 1 presents the sample means of all utilized variables. Of the 261 seven to eleven year old children examined, 51.7 per cent worked in the two days preceding their interview, work, as stated, being taken to consist of the fetching of firewood/dung/straw, helping in field/with animals, working at somebody else's for wage/meal, the fetching of drinking water, and other domestic housework. 42.9 per cent of children undertook domestic work, taken, as stated, to consist of the fetching of firewood/dung/straw, the fetching of drinking water, and other domestic housework. 11.1 per cent undertook economic work, that is, work other than domestic chores. No child in the sample worked at somebody else's for pay, that is, engaged in market or extra-household economic work, and so work other than domestic chores consists entirely of household economic work. These figures indicate that 2.3 ($42.9 + 11.1 - 51.7$) per cent of children undertook both household domestic and economic work. By these statistics, 74.7 per cent of the sampled children attended school during the past school year. Average age in the sample is near 9 years. Girls constituted about 48 per cent of the sample. Sample mean household access to microcredit stood at 972.9 Malawi Kwacha ⁴.

Table 2 presents probit estimates of (1). As discussed, the non-random nature of sampling in the Malawi Financial Markets and Food Security Survey necessitates the inclusion of sampling

weights in estimation. Further, standard errors are adjusted for the number of children per household since it is likely that such clustering vitiates the independence of error terms across children. It appears girls are significantly more likely to work than boys in rural Malawi. The probability of child work declines significantly in household size. It is plausible that household size measures the combined availability of family labor, and is, therefore, negatively related to the probability of an individual child being called upon to work. The probability of work increases significantly in the number of younger children. This is not surprising given that children must often assist in the rearing of younger siblings, and that the quanta of domestic chores even other than childcare increases in the number of young children. Controlling for measures of household wage labor income and wealth, children appear significantly less likely to work in female-headed households. This is consistent with the increasingly popular view that intra-household resource allocation results from bargaining between parents, and that, given the nature of maternal solicitude, there is a positive relation between female empowerment and children's well-being (for example, Hoddinott and Haddad, 1995, and Pitt and Khandker, 1998). The probability of child work declines significantly in household wage labor income, in household landholding, and in the number of retail sales enterprises. These are plausibly in the nature of wealth effects.

[Table 2 approximately here]

Three village attributes, namely, the presence of a primary and a secondary school, and the proportion of village households with relatively large landholdings, are included as regressors. The former two variables seek to measure local access to schooling. Note that secondary schools in Malawi are of three types: conventional government schools, Distance Education Centers (DECs), now called Community Day Secondary Schools (CDSSs), and private schools. Conventional government schools in 1995 were all highly subsidized boarding schools, selection into which was determined by a national entrance examination. Thus, the presence in a village of a secondary school

would not measure local access to secondary education if the school were a conventional government school ⁵. In that event, the variable would instead capture aspects of local economic development such as the quality of communications links. The third village attribute included as a regressor, the proportion of village households with relatively large landholdings, attempts to measure the local availability of labor for hire, since the supply of labor to market plausibly decreases in household landholding. Hence, it is expected that the greater the proportion of village households with relatively large landholdings, the smaller the local supply of labor for hire, with consequences for the employment of family child labor in household production. However, none of these variables is a significant correlate of children's propensity to work.

The share of acreage under major crops devoted to tobacco is included as a regressor given that tobacco cultivation is highly labor intensive and that it is widely believed children are particularly adept at plucking tobacco leaf. The variable, however, is found to be statistically insignificant.

The interaction 'Household access to microcredit \times Area owned land in acres' endeavors to identify the 'household-enterprise-capitalization effect', that is, rise in child work in household enterprises following increases in children's labor productivity therein brought about by credit-enabled increases in the enterprises' working capital. Farming is the primary occupation of 66 per cent of household heads in the Malawi Financial Markets and Food Security Survey (Diagne and Zeller, 2001), which suggests farming is the commonest household enterprise in rural Malawi. It is plausible that the increase in labor productivity upon family farms from a credit-enabled increase in purchased inputs would be more pronounced the greater the input of land. Hence, the interaction of household access to microcredit and household landholding is expected to be positively correlated with children's propensity to work ⁶. In sum, by the 'household-enterprise-capitalization effect', microcredit raises children's labor productivity in household enterprises and so increases child work. When the household enterprise is the family farm, it is reasonable that this rise in children's labor productivity and, hence, work, would be more pronounced the larger the farm. It is plausible,

therefore, that child work increases in the explanatory variable ‘Household access to microcredit \times Area owned land in acres’.

The interaction ‘Household access to microcredit \times Number of retail sales enterprises’ may, similarly, relate to the ‘household-enterprise-capitalization effect’, though it may also bear upon the ‘family-labor-substitution effect’. While working capital facilitates the substitution of hired for family labor in household enterprises, substitution would be held back if hired and family labor were imperfect substitutes as, for example, in retail sales enterprises given their susceptibility to pilferage by employees. Substitution would also be obstructed by a shortage of labor for hire, as perhaps in villages in which a high proportion of households own relatively large tracts of land. Hence, the interaction ‘Household access to microcredit \times Proportion of village households owning +5 acres of land’ is also taken to pertain to the ‘family-labor-substitution effect’. Since the negative ‘family-labor-substitution effect’ of household credit access upon child work would be dampened by imperfect substitution between hired and family labor and by a shortage of labor for hire, these two interactions are expected to be non-negatively correlated with children’s propensity to work. In sum, whereas credit would ordinarily enable the substitution of hired for family labor in household enterprises, that is, reduce child work, this substitution may be hampered if the enterprises were best run by trusted household members or if labor for hire were in short supply. Therefore, whereas microcredit may exert a negative effect upon child work by the ‘family-labor-substitution effect’, it is plausible the regressors ‘Household access to microcredit \times Number of retail sales enterprises’ and ‘Household access to microcredit \times Proportion of village households owning +5 acres of land’ shall exert opposite, that is, non-negative, effects.

By the probit estimates in table 2, access to microcredit significantly reduces the probability of child work in households without owned land or retail sales enterprises. However, when combined with the sample means in table 1, the estimates indicate that a 100 MK (about \$6.7) increase in access to microcredit *raises* the probability of child work in households with sample mean values of ‘area owned land in acres’ and ‘number of retail sales enterprises’, in that $-0.079 +$

$0.015 \times 5.520 + 0.043 \times 0.371 = 0.02 > 0$. This translates to a rise in the probability of child work, calculated at the sample mean values of the regressors, of 0.7 percentage points ⁷, a notable finding given that 100 per cent and 31 per cent of the sampled children resided in, respectively, households owning land and operating retail sales enterprises. The positive coefficients of the interactions ‘Household access to microcredit \times Area owned land in acres’ and ‘Household access to microcredit \times Number of retail sales enterprises’ together with the statistical significance of these variables are interpretable as evidence of the ‘household-enterprise-capitalization effect’. That the coefficient of the interaction ‘Household access to microcredit \times Number of retail sales enterprises’ is non-negative perhaps also points to imperfect substitution between hired and family labor that obstructs the ‘family-labor-substitution effect’. Since hired labor may not replace family labor when it is in short supply, it is not surprising that the interaction ‘Household access to microcredit \times Proportion of village households owning +5 acres of land’ is non-negatively related to the probability of child work. The finding that child work may increase in household access to credit is broadly consistent with Wydick’s (1999) discovery that the negative effect of credit upon child work may be dampened by the ‘household-enterprise-capitalization effect’ and an obstructed ‘family-labor-substitution effect’.

[Table 3 approximately here]

Table 3 presents estimates of (1) re-specified to elucidate some gender dimensions of the effects of household access to credit upon child work. It is found that while household access to microcredit reduces the probability of work by boys in households without land or retail sales enterprises, it does not have a statistically discernible effect on the probability of work by such girls. The ‘household-enterprise-capitalization effect’ as measured by the coefficient of the interactions ‘Household access to microcredit \times Area owned land in acres’ appears significantly smaller for girls than for boys. The interaction ‘Household access to microcredit \times Number of retail sales enterprises’

has a positive and significant effect on boys' propensity of work but a negative, though insignificant, effect on girls' propensity to work.

Table 4 presents bivariate probit estimates of (2) and (3). Girls are significantly more likely than boys to be put to domestic work. The probability of child domestic work decreases in household size and increases in the number of younger siblings. Children appear less likely to perform domestic chores in households headed by women. Further, the older the household head, the lower the probability of child domestic work. The probability of child domestic work decreases significantly in household wage labor income, in household landholding, and in the value of household assets other than land, livestock, and food stocks. On the other hand, girls are significantly less likely than boys to undertake household economic work. The probability of child household economic work decreases in the value of household landholding. It increases in the share of acreage under major crops devoted to tobacco, as well as in the number of household retail sales enterprises. The probability of such work increases in the proportion of village households with relatively large landholdings. This stands to reason if the availability of labor for hire is negatively related to the proportion of village households with relatively large landholdings. Lastly, children in villages with a primary school and a secondary school are significantly less likely to engage in household economic work.

[Table 4 approximately here]

It is notable that household access to microcredit significantly raises the probability of child domestic work in households either owning land or operating retail sales enterprises. That, on the other hand, access to microcredit or its interactions aren't statistically significant correlates of children's economic work suggests children must relieve adults of domestic chores as the latter are busied in credit-stimulated household enterprises.

Table 5 presents bivariate probit estimates of (2) and (3) re-specified to elucidate some gender dimensions of the effect of household access to microcredit upon the probabilities of child household domestic work and child work in a household enterprise. It appears access to microcredit raises both boys' and girls' propensities to engage in domestic work in households owning land. Access to credit raises the probability of domestic work by boys in households operating a retail sales enterprise. Credit access reduces the probability of household domestic work by boys in villages in which a large proportion of households owns 5 or more acres of land, that is, in villages with possibly insufficient labor for hire. Perhaps boys are instead deployed in household enterprise, but this is belied by the finding that access to microcredit and its interactions have no statistically discernible effect upon boys' household economic work. Credit access appears to reduce the probability of girls in households without owned land or retail sales enterprises engaging in such work. Finally, access to microcredit also seems to raise the probability of girls' household economic work in villages with perhaps insufficient labor for hire.

[Table 5 approximately here]

Might the conjecture that child work in households either owning land or operating retail sales enterprises is affected by microcredit only to the extent that children must relieve adults of domestic chores as the latter are busied in credit-stimulated household enterprises, be directly tested? This is attempted as follows. First, the examined seven to eleven year old children are matched to their households' members over 17 years of age. This yields a sample of 410 adults. Their involvement in farm or non-farm enterprises is then related to household access to microcredit via a regression equation similar to (1). The ensuing probit estimates are presented in table 6. By the estimated coefficients of the key variables, the rise in probability of adult participation in economic work from a 100 MK (about \$6.7) increase in household access to microcredit, calculated at the sample mean values of the regressors, is 0.7 percentage points. It is notable that, by the estimates in

table 2, a 100 MK increase in household access to microcredit raises the probability of child work by 0.7 percentage points as well. Hence, it appears adults are indeed drawn into household economic work following improved access to microcredit, and that children are consequently called upon to take on more household domestic work.

[Table 6 approximately here]

While it is learnt that children's participation in work and their households' access to microcredit are positively related in rural Malawi in the season of peak harvest, it is as yet unclear whether the rise in children's work from their households' greater access to microcredit is detrimental to them. Hence, this study finally examines the effect of microcredit upon a critical dimension of children's future well-being, namely, their current school attendance. School attendance, like work, is reported but dichotomously in the Malawi Financial Markets and Food Security Survey, and so a child's optimal hours in school, S^* , must be treated as a latent variable underlying its binary counterpart, taken to be an indicator of whether she attended school in the past school year. Hence, assuming that ν , the error term, is normally distributed, the equation

$$S^* = X'\gamma + \nu, \quad (4)$$

where the regressors X are the same as in (1) – (3), is estimated by probit ML. Table 7 presents the resulting estimates. Briefly, household access to microcredit and its interactions are found to be statistically insignificant correlates of children's propensity to attend to school. This suggests trade-off between children's work and schooling is marginal, since, in contrast, by the estimates in table 2, household access to microcredit and two of its three interactions are statistically significant correlates of children's propensity to work. Perhaps, as argued by Ravallion and Wodon (2000), trade-off between children's work and schooling is greatly tempered by children's leisure absorbing the effect of the one upon the other, that is, by more work leading to less leisure rather than to less schooling. Unfortunately, this may not be directly verified since the available time allocation data are

discontinuous. But if it were true, children may be viewed as adversely affected in having less leisure. Furthermore, dichotomous school attendance is an imperfect measure of children's human capital accumulation at school. Even though household access to microcredit doesn't reduce children's school attendance, it is plausible their increased work, leading to fatigue as well as less time for study outside of school hours, reduces their learning at school. In sum, even though microcredit appears to increase child work without reducing their school attendance, it may not be concluded that children are unscathed. Future empirical analyses of better suited data may supply more conclusive evidence in this regard.

[Table 7 approximately here]

V. CONCLUSION

This study seeks to estimate the causal effect of household access to microcredit, measured in a novel manner as self-assessed credit limits at microcredit organizations, upon children's propensity to work in rural Malawi. This measure of access to credit, it has been argued, is a truer, more exogenous, measure than actual loan uptake or dichotomous credit program participation. Whereas both consumption and microenterprise loans bring about consumable resource transfers from the future to the present and so reduce parents' incentives to effectuate such transfers via putting their children to work, consumption loans achieve this directly whereas microenterprise loans realize this but indirectly, by promoting family enterprises. Given that such enterprises routinely employ household members, including children, this study aims to discover whether access to microcredit might increase rather than decrease child work.

It is found that, in the season of peak labor demand, children's propensity to work in rural Malawi, computed at sample mean values of household land ownership and number of retail sales enterprises, increases in household access to microcredit. It is suggested this is due to children

having to take up more domestic work as adults are busied in household economic work following improved access to microcredit. Further, microcredit-stimulated work by children does not appear to reduce their school attendance, suggesting more child work leads to less leisure rather than to less schooling. As argued, this does not imply microcredit has no adverse effects upon children. After all, less leisure, and work-induced fatigue together with less time for study outside of school hours, both of which would impede learning at school, may be considered adverse effects upon children of microcredit-stimulated work.

This study hopes to bring this possibility of detrimental effects of microcredit upon children to the notice of policy makers. Such effects might be minimized if microcredit organizations instituted lending rules sensitive to children's well-being, such as loans conditional upon household children attending school while contributing no labor to the funded enterprises. While microenterprise loans are deservedly acknowledged to have improved the lives of large numbers of the world's poor, this paper's findings indicate that they may cause children to be drawn into deleterious credit-stimulated work.

TABLE 1
UNWEIGHTED DESCRIPTIVE STATISTICS
SAMPLE OF 7 – 11 YEAR OLD RURAL MALAWIAN CHILDREN

Variable	Mean	S.D.
Dependent Variables		
Worked in 2 days preceding interview	0.517	0.501
Undertook household domestic work in 2 days preceding interview	0.429	0.496
Undertook household economic work in 2 days preceding interview	0.111	0.315
Attended school in past school year	0.747	0.435
Child Attributes		
Female	0.479	0.501
Age in years	8.816	1.453
Household Attributes		
Number of members	6.824	2.309
Number of 0-6 year-old members	1.307	1.142
Number of 7-11 year-old members	1.783	0.857
Household head's age in years	45.393	11.753
Female household head	0.285	0.452
Total wage labor income of +17 year-old members, in hundreds of Malawi Kwacha (MK), since October 1994	1.726	6.688
Area owned land in acres	5.520	7.730
Value, in thousands of MK, of owned land	5.852	25.270
Value, in thousands of MK, of assets other than land, livestock, and food stocks	4.181	12.163
Share of acreage under major crops devoted to tobacco	0.049	0.141
Number of retail sales enterprises	0.371	0.614
Village Attributes		
Proportion of village households owning +5 acres of land	0.061	0.084
Primary school present	0.461	0.499
Secondary school present	0.049	0.216
Key Variables		
Household access to microcredit in hundreds of MK	9.729	20.055
Household access to microcredit × Male	4.236	9.921
Household access to microcredit × Female	5.551	18.940
Household access to microcredit × Area owned land in acres	99.603	661.460
Household access to microcredit × Area owned land × Male	29.973	152.147
Household access to microcredit × Area owned land × Female	71.565	654.673
Household access to microcredit × Number of retail sales enterprises	5.336	19.528
Household access to microcredit × Number of retail sales enterprises × Male	2.767	16.326
Household access to microcredit × Number of retail sales enterprises × Female	2.538	11.513
Household access to microcredit × Proportion of village households owning +5 acres of land	0.998	5.035
Household access to microcredit × Proportion of village households owning +5 acres of land × Male	0.405	2.120
Household access to microcredit × Proportion of village households owning +5 acres of land × Female	0.614	4.682
n =		261

TABLE 2
ACCESS TO CREDIT AND CHILD WORK (ALL)
PROBIT ESTIMATES

Variable	Coefficient	T-ratio	Marginal Effect
Constant	1.489	1.49	
Child Attributes			
Female	0.928***	3.65	0.323
Age in years	0.242	1.63	0.089
Household Attributes			
Number of members	-0.479***	-3.37	-0.177
Number of 0-6 year-old members	0.563***	2.74	0.209
Number of 7-11 year-old members	0.248	0.99	0.092
Household head's age in years	-0.015	-1.18	-0.006
Female household head	-0.952***	-2.67	-0.344
Total wage labor income of +17 year-old members, in hundreds of Malawi Kwacha (MK), since October 1994	-0.033***	-2.86	-0.012
Area owned land in acres	-0.118***	-2.63	-0.044
Value, in thousands of MK, of owned land	-0.066	-1.41	-0.024
Value, in thousands of MK, of assets other than land, livestock, and food stocks	-0.021	-0.61	-0.008
Share of acreage under major crops devoted to tobacco	1.924	1.61	0.713
Number of retail sales enterprises	-0.572**	-2.54	-0.212
Village Attributes			
Proportion of village households owning +5 acres of land	-3.655	-1.21	-1.353
Primary school present	0.220	0.83	0.081
Secondary school present	-0.175	-0.36	-0.066
Key Variables			
Household access to microcredit in hundreds of MK	-0.079***	-2.59	-0.029
Household access to microcredit \times Area owned land in acres	0.015***	3.70	0.006
Household access to microcredit \times Number of retail sales enterprises	0.043***	2.88	0.016
Household access to microcredit \times Proportion of village households owning +5 acres of land	0.308	1.25	0.114
n =		261	
Log-likelihood		-127.879	
Wald chi-sq(20)		61.40	

Note: *, **, and *** denote, respectively, significance at the 10%, 5%, and 1% levels

TABLE 3
ACCESS TO CREDIT AND CHILD WORK (ALL): A GENDER PERSPECTIVE
PROBIT ESTIMATES

Variable	Coefficient	T-ratio	Marginal Effect
Constant	1.754*	1.77	
Child Attributes			
Female	0.886***	2.92	0.316
Age in years	0.256*	1.67	0.097
Household Attributes			
Number of members	-0.482***	-3.20	-0.182
Number of 0-6 year-old members	0.588***	2.69	0.222
Number of 7-11 year-old members	0.249	0.97	0.094
Household head's age in years	-0.019	-1.42	-0.007
Female household head	-1.120***	-2.86	-0.406
Total wage labor income of +17 year-old members, in hundreds of Malawi Kwacha (MK), since October 1994	-0.037***	-3.08	-0.014
Area owned land in acres	-0.127***	-2.76	-0.048
Value, in thousands of MK, of owned land	-0.089*	-1.89	-0.034
Value, in thousands of MK, of assets other than land, livestock, and food stocks	-0.051	-0.96	-0.019
Share of acreage under major crops devoted to tobacco	2.136*	1.82	0.806
Number of retail sales enterprises	-0.454*	-1.85	-0.171
Village Attributes			
Proportion of village households owning +5 acres of land	-3.874	-1.18	-1.462
Primary school present	0.227	0.81	0.086
Secondary school present	-0.213	-0.41	-0.083
Key Variables			
Household access to microcredit in hundreds of MK × Male	-0.154***	-2.76	-0.058
Household access to microcredit × Female	-0.033	-0.82	-0.013
Household access to microcredit × Area owned land in acres × Male	0.022***	4.21	0.008
Household access to microcredit × Area owned land × Female	0.011***	2.76	0.004
Household access to microcredit × Number of retail sales enterprises × Male	0.080***	3.64	0.030
Household access to microcredit × Number of retail sales enterprises × Female	-0.049	-1.39	-0.018
Household access to microcredit × Proportion of village households owning +5 acres of land × Male	0.238	0.78	0.090
Household access to microcredit × Proportion of village households owning +5 acres of land × Female	0.400	1.28	0.151
n =		261	
Log-likelihood		-123.030	
Wald chi-sq(24)		65.22	

Note: *, **, and *** denote, respectively, significance at the 10%, 5%, and 1% levels

TABLE 4
ACCESS TO CREDIT AND CHILDREN'S HOUSEHOLD DOMESTIC AND ECONOMIC WORK
BIVARIATE PROBIT ESTIMATES

Variable	Coefficient	T-ratio	Coefficient	T-ratio
	Household Domestic Work		Household Economic Work	
Constant	0.989	0.92	-0.564	-0.40
Child Attributes				
Female	1.158***	4.26	-0.716*	-1.91
Age in years	0.249	1.63	0.012	0.08
Household Attributes				
Number of members	-0.312***	-2.77	-0.177	-1.18
Number of 0-6 year-old members	0.418**	2.25	0.165	0.79
Number of 7-11 year-old members	0.232	1.03	-0.261	-0.79
Household head's age in years	-0.037***	-3.20	0.017	1.08
Female household head	-1.115***	-3.46	0.387	1.21
Total wage labor income of +17 year-old members, in hundreds of Malawi Kwacha (MK), since October 1994	-0.035**	-2.24	-0.009	-0.88
Area owned land in acres	-0.091**	-2.10	0.004	0.09
Value, in thousands of MK, of owned land	-0.006	-0.012	-0.182*	1.88
Value, in thousands of MK, of assets other than land, livestock, and food stocks	-0.094*	-1.67	0.027	1.26
Share of acreage under major crops devoted to tobacco	1.419	1.37	1.665*	1.66
Number of retail sales enterprises	-0.665	-2.47	0.657**	2.04
Village Attributes				
Proportion of village households owning +5 acres of land	-1.915	-0.71	4.273*	1.80
Primary school present	0.395	1.59	-0.619**	-2.08
Secondary school present	-0.003	-0.005	-5.779***	-12.91
Key Variables				
Household access to microcredit in hundreds of MK	-0.036	-1.10	-0.017	-0.56
Household access to microcredit × Area owned land in acres	0.007**	2.41	0.0002	0.06
Household access to microcredit × Number of retail sales enterprises	0.044**	2.38	-0.020	-0.57
Household access to microcredit × Proportion of village households owning +5 acres of land	-0.207	-1.14	0.058	0.39
n =			261	
Rho			-0.673 (s.e. = 0.125)	
Log-likelihood			-149.442	
Wald chi-sq(40)			1760.72	

Note: *, **, and *** denote, respectively, significance at the 10%, 5%, and 1% levels

TABLE 5
ACCESS TO CREDIT AND CHILDREN'S HOUSEHOLD DOMESTIC AND ECONOMIC WORK:
A GENDER PERSPECTIVE
BIVARIATE PROBIT ESTIMATES

Variable	Coefficient	T-ratio	Coefficient	T-ratio
	Household Domestic Work		Household Economic Work	
Constant	1.136	1.07	-0.187	-0.15
Child Attributes				
Female	1.191***	3.58	-0.647	-1.48
Age in years	0.268*	1.70	0.057	0.38
Household Attributes				
Number of members	-0.313***	-2.60	-0.204	-1.34
Number of 0-6 year-old members	0.440**	2.24	0.182	0.86
Number of 7-11 year-old members	0.254	1.08	-0.260	-0.79
Household head's age in years	-0.040***	-3.37	0.017	1.08
Female household head	-1.252***	-3.50	0.136	0.40
Total wage labor income of +17 year-old members, in hundreds of Malawi Kwacha (MK), since October 1994	-0.039**	-2.32	-0.012	-1.06
Area owned land in acres	-0.103**	-2.20	-0.049	-0.84
Value, in thousands of MK, of owned land	-0.036	-0.76	-0.225**	-2.00
Value, in thousands of MK, of assets other than land, livestock, and food stocks	-0.136**	-2.14	0.040	1.06
Share of acreage under major crops devoted to tobacco	1.881	1.54	2.409**	2.01
Number of retail sales enterprises	-0.527*	-1.79	0.599**	2.04
Village Attributes				
Proportion of village households owning +5 acres of land	-2.130	-0.73	0.870	0.30
Primary school present	0.422	1.62	-0.891***	2.57
Secondary school present	-0.071	-0.12	-5.788***	-11.79
Key Variables				
Household access to microcredit in hundreds of MK × Male	-0.071	-1.50	-0.099	-1.28
Household access to microcredit × Female	-0.018	-0.54	-0.100*	-1.91
Household access to microcredit × Area owned land in acres × Male	0.012***	2.69	0.011	1.54
Household access to microcredit × Area owned land × Female	0.010**	2.28	-0.008	-1.61
Household access to microcredit × Number of retail sales enterprises × Male	0.074***	3.02	-0.013	-0.25
Household access to microcredit × Number of retail sales enterprises × Female	-0.047	-1.43	-0.009	-0.18
Household access to microcredit × Proportion of village households owning +5 acres of land × Male	-0.435*	-1.72	0.362	1.36
Household access to microcredit × Proportion of village households owning +5 acres of land × Female	0.031	0.14	0.718**	1.96
n =			261	
Rho			-0.722 (s.e. = 0.113)	
Log-likelihood			-142.62	
Wald chi-sq(48)			2617.70	

Note: *, **, and *** denote, respectively, significance at the 10%, 5%, and 1% levels

TABLE 6
ACCESS TO CREDIT AND ADULT HOUSEHOLD ECONOMIC WORK
PROBIT ESTIMATES

Variable	Coefficient	T-ratio	Marginal Effect
Constant	-0.830	-1.00	
Adult Attributes			
Female	-0.276	-1.06	-0.109
Age in years	0.053***	3.54	0.021
Household Attributes			
Number of members	0.118	0.88	0.047
Number of 0-6 year-old members	0.029	0.16	0.011
Number of 7-11 year-old members	-0.144	-0.58	-0.057
Household head's age in years	-0.027	-1.37	-0.011
Female household head	0.151	0.47	0.060
Total wage labor income of +17 year-old members, in hundreds of Malawi Kwacha (MK), since October 1994	-0.056*	-1.90	-0.022
Area owned land in acres	-0.029	-0.68	-0.011
Value, in thousands of MK, of owned land	-0.033	-1.13	-0.013
Value, in thousands of MK, of assets other than land, livestock, and food stocks	-0.013	-0.49	-0.005
Share of acreage under major crops devoted to tobacco	1.868**	1.97	0.744
Number of retail sales enterprises	0.857***	2.82	0.341
Village Attributes			
Proportion of village households owning +5 acres of land	3.90*	1.81	1.552
Primary school present	-0.548**	-2.02	-0.216
Secondary school present	-0.168	-0.23	-0.067
Key Variables			
Household access to microcredit in hundreds of MK	0.051**	2.29	0.020
Household access to microcredit × Area owned land in acres	0.002	0.91	0.001
Household access to microcredit × Number of retail sales enterprises	-0.074***	-2.68	-0.029
Household access to microcredit × Proportion of village households owning +5 acres of land	-0.274**	-2.50	-0.109
n =		410	
Log-likelihood		-207.087	
Wald chi-sq (20)		69.70	

Note: *, **, and *** denote, respectively, significance at the 10%, 5%, and 1% levels

TABLE 7
DETERMINANTS OF CHILDREN'S SCHOOL ATTENDANCE
Dependent Variable = Attended school in the past school year; Probit Estimates

Variable	Coefficient	T-ratio
Constant	-3.203***	-2.87
Child Attributes		
Female	-0.309	-1.15
Age in years	0.261***	3.18
Household Attributes		
No. of members	-0.165	-1.10
No. of 0-6 year-old members	0.221	0.99
No. of 7-11 year-old members	0.509*	1.81
Household head's age in years	0.029*	1.77
Female household head	-0.102	-0.28
Total wage labour income of +17 year-old members, in hundreds of Malawi Kwacha (MK), since October 1994	-0.027*	-1.81
Area owned land in acres	-0.022	-0.50
Value, in thousands of MK, of owned land	0.067	1.32
Value, in thousands of MK, of assets other than land, livestock, and food stocks	-0.017	-0.61
Share of acreage under major crops devoted to tobacco	-0.022	-0.02
No. of retail sales enterprises	-0.650	-1.64
Village Attributes		
Proportion of village households owning +5 acres of land	3.350	1.32
Primary school present	0.350	0.93
Secondary school present	1.488**	2.40
Key Variables		
Household access to microcredit in hundreds of MK	0.001	0.04
Household access to microcredit x Area owned land in acres	0.003	1.07
Household access to microcredit x No. of retail sales enterprises	0.048	1.21
Household access to microcredit x Proportion of village households owning +5 acres of land	-0.170	-1.19
n =		261
Log-likelihood		-127.162
Wald chi-sq(20)		115.34

Note: *, **, and *** denote, respectively, significance at the 10%, 5%, and 1% levels

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NOTES

¹ The empirical evidence with regard to the effect of child work upon schooling is, however, ambiguous. For example, Psacharopoulos (1997) uses data from Bolivia and Venezuela to show that children who work are more likely to fail at school and that child work reduces educational attainment by almost two years. In contrast, Patrinos and Psacharopoulos (1997) find that child labour is not detrimental to schooling in Peru.

² It is merely known if certain activities were undertaken at certain times of the day.

³ No child in the study undertook market economic work.

⁴ The exchange rate was US \$1 for MK 15 in 1995.

⁵ The study's sample of 261 children is drawn from 36 villages of which only one has a secondary school. This uncommonness of secondary schools suggests the Survey elicited information only of conventional government schools.

⁶ Wydick (1999), on the other hand, attempts to capture the 'household-enterprise-capitalization effect' rather directly by including, as a determinant of work by children, an indicator of whether borrowed monies were used to purchase capital equipment. However, given enterprises make labor and capital input decisions simultaneously, it is likely the indicator variable is endogenous.

⁷ $\phi(X'\beta) \times (-0.079 + 0.015 \times 5.520 + 0.043 \times 0.371)$, where $\phi(X'\beta)$ is the standard normal density calculated at the product of the matrix of the sample mean values of all regressors and the matrix of the estimated probit coefficients.