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Who Should be Interviewed in Surveys of Household Income?

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ABSTRACT

This study tests the null hypothesis that it is sufficient to interview only the household head to obtain accurate information on household income. The results show that using a husband's estimate of his wife's income does not produce statistically reliable results for poverty analysis. Estimates of the wife's income separately provided by the husband and wife agree in only 6 percent of the studied households. This indicates that although limiting interviews to one person can reduce the time and expense of household surveys, this appears to be detrimental to accuracy, and may lead to incorrect conclusions on the determinants of poverty.

Keywords: Africa, gender, household dynamics, household surveys, Malawi, poverty

1. INTRODUCTION

In recent years, large household surveys, such as the World Bank's Living Standards Measurement Study (LSMS), have adopted the practice of interviewing multiple adult household members for information on their time use, incomes, and expenditures (Grosh & Glewwe 2001). This trend represents an experience-based commonsense approach to data collection. In the case of household income, for example, a householder may be unaware of the full range of income-generating activities undertaken by the wife and other adult members of the household, resulting in an underreporting of the total household income. Even if a householder is aware of the income sources of other family members, incomplete pooling of information within the household could mean that he may be unable to provide an accurate account of their incomes. On the other hand, if information sharing is complete across household members, the household head will be able to provide an accurate account of his household's total income, and it would be superfluous to interview multiple household members.

The shift in the LSMS surveys toward interviewing multiple household members reflects a larger trend in the study of household economies. In the past, this field was heavily influenced by unitary household models. Today, however, most efforts to understand household economies in both the economic and qualitative social sciences seek to understand the different preference orderings of various household members, and how these different preferences are negotiated through cooperative and non-cooperative bargaining (Carr 2005; Folbre 1984; Haddad & Hoddinott 1994; Haddad & Kanbur 1990; Udry 1996). To our knowledge, however, no previous empirical study has built on these larger conceptual trends to test their methodological implications.

The current study uses data from rural Malawi to test the null hypothesis that it is sufficient to interview only the household head to obtain accurate information on total household income. As in farm households elsewhere in Africa, Malawian farm households are characterized by distinct gender roles in livelihood activities, incomplete pooling of resources, and conflict among household members over the distribution of resources (Carr 2008a; Cloud 1986; Fafchamps & Quisumbing 2002; Fapohunda 1988; Fisher, Warner, & Masters 2000; Guyer 1986; Jones 1986; Whitehead 1990). In the households sampled for the present study, only agricultural income was widely reported as being pooled. Incomes from other activities, such as operating small businesses or working as wage laborers, were generally viewed as belonging to the person who earned the income, and contributions to the household were voluntary. The presence of multiple, gender-based economic spheres may make it difficult for a single household member to be aware of the household's total economy. Furthermore, differences among household members regarding the preferred distribution of resources would suggest that members would have strategic reasons to withhold information on personal income generation. As such, it may not be possible to obtain complete information on household income in rural Africa by interviewing only the household head.

Here, we use data from a 2008 farm household survey conducted in southern Malawi, and construct two measures of total household income for households with spousal couples: *CombinedInc* combines income information from the male household head and his wife, while *HusbandInc* uses only the income data collected from the male household head. Several empirical analyses are conducted to determine whether interviewing only the husband provides accurate results for certain types of research questions. First, we calculate the percentage difference between the two measures of household income. Next, we use regression analysis to examine the determinants of differences between the two income measures. We then calculate the poverty headcount and the poverty gap indexes using both *CombinedInc* and *HusbandInc*, and assess the degree to which measures of poverty are influenced by how the income data are collected. Finally, we investigate whether the factors associated with the incidence and depth of poverty vary according to how the household income data are gathered. The results of this study provide insights into the appropriate design of household surveys in developing countries. Specifically, our findings indicate that efforts to understand household income and poverty require survey tools that are designed with at least a preliminary understanding of the income-generating activities and livelihood roles of the different members of the studied households.

2. STUDY CONTEXT AND DATA

Survey Sites and Data Collection

The data for the present study come from a household survey conducted in four Southern Malawian villages between January and December of 2008. Two of the authors of the present study were involved in the design and data collection. Southern Malawi has the highest poverty incidence (64.4 percent in 2004) and population density (146 people km² in 1998) in the country (National Statistical Office, <http://www.nso.malawi.net>). The surveyed villages represent a spectrum of market accesses and household livelihoods. A simple random sample of 50 households was selected for interviews in each village, giving an initial sample size of 200 households.¹ The survey defined a “household” as a group of people, usually family members, who live in the same dwelling compound, eat food prepared from the same cooking pot, and pool their labor (i.e., no payment is made for labor exchange). A male-female enumerator team was based in each of the four villages, and each team spent six months interviewing residents of the sample households. The collected household information included incomes, expenditures, demographics, wealth holdings, food security, agricultural production, forest use, risk attitudes, risk-coping strategies, and perceptions of climate variability.

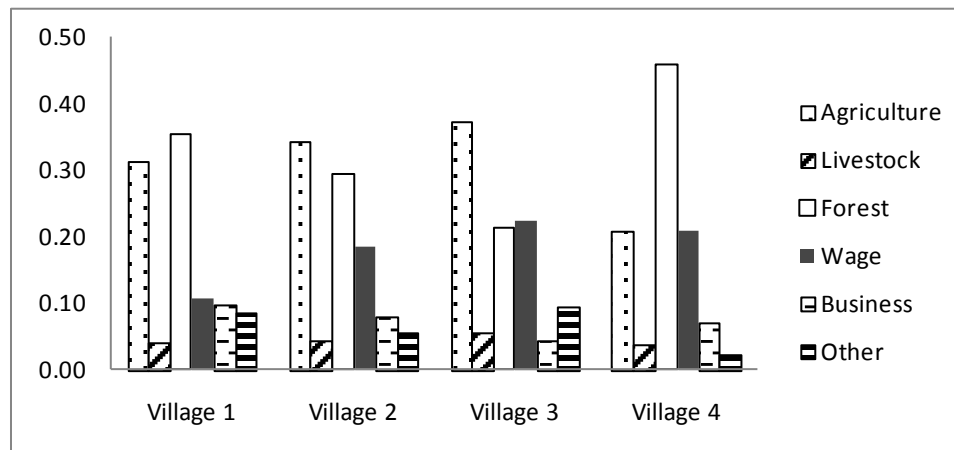
Before turning to a description of the specific data used in the empirical analyses of the present study, we will first discuss the household structures, livelihoods, and decision-making paradigms in the study area. We focus on sampled households having a spousal couple ($n = 130$) since the two income measures, *CombinedInc* and *HusbandInc*, must be calculated using these households. The average numbers of members, working-age members (13-59 years of age), and elderly (60 years and older) in these households were 5.38, 2.83, and 0.28, respectively.² These households generally had two principal earners.

The livelihoods in the study villages were based around five key categories: agriculture, livestock husbandry, collection of forest products, wage labor, and self-employment (i.e., business). Households also received transfer incomes in the form of remittances and gifts from relatives or friends, pensions, and aid from the government and non-government organizations (NGOs). The mix of livelihood activities varied among the studied villages (Figure 1). Agriculture accounted for about a third of the total household incomes in all villages, except in Village 4. The high income share from forests in Villages 1 and 2 was largely due to their proximities to the Forestry Department, which offered family members potential employment as forest extension officers, forest guards, mountain guides, and porters. The high forest income share seen in Village 4 primarily represented income from charcoal sales. Charcoal marketing occurred mainly in villages close to a sizable town where there was charcoal demand; this was the case for Village 4. Wage employment was an important income source, particularly in Villages 2, 3, and 4. In Village 2, wage work was varied and included employment of family members as school teachers, watchmen, road construction workers, etc. In Village 3, most of the wage work comprised contract agricultural labor, which typically offered low wages but had the benefit of high availability during the agricultural season. In Village 4, many household members worked at neighboring tea estates. These between-village differences in the livelihood activity profiles are likely to have influenced the ability of male household heads to account for the incomes of every earner (typically himself and his wife) in the household.

¹ During the survey year, the sample size decreased from 200 to 182 households because: households moved away permanently (11); enumerators were unable to interview respondents (4); respondents refused to continue participation because they felt that the time required for participation outweighed the survey's benefits (2); and the female householder passed away (1).

² We classify working-age members as those aged 13-59 years based on the advice of local collaborators. Although Malawi is party to several international conventions against child labor, the official minimum working age in the country is 14 years.

Figure 1. Income shares, by activity and village



In the study area, as in much of rural Africa, the incomes earned by different household members are not uniformly pooled into a single household income. Agricultural incomes are combined into a single pool of “family money.” Individuals may contribute part of their earnings from other activities to this pool, while the remainder of the income belongs to the person who earned it and can be spent on whatever the earner chooses. The men and women in the study sample had different consumption patterns: The men tended to purchase items (e.g., batteries, beer, clothes, mobile phones and units, and tobacco products) or spend their money on girlfriends outside the household. The women, on the other hand, spent their personal earnings mainly on household needs instead of personal needs or desires. Snuff and hair products were the only female-reported purchases that were clearly intended for use solely by the purchaser. This purchasing pattern reflects the unspoken role of women in the study area, which is that they are to support the household before making any personal purchases. These gender-specific patterns of expenditure are mirrored in other parts of Africa (e.g., Carr 2008a).

Income Measurement

The utilized measures of household income, which is the key variable in the present study, were designed to provide accurate data. First, income information was collected quarterly, to reduce the recall period and capture seasonal variation. Second, interviews were conducted with multiple household members. Where possible all active adult household members were interviewed; however, this was rarely feasible. In practice, all of the interviews in single-headed households included the household head, and those in spousal-couple households included both the head and his wife. The respondents were asked to report the income for their household as a whole, as well as the incomes from agriculture, livestock, forest activities, wage work, self-enterprise, and transfers. Third, single-gender interviews were conducted; a uniform questionnaire was utilized for this phase because field observations suggested that the respondents might withhold income information in the presence of their spouses. In some cases, males and females were interviewed in single-sex groups; in other cases, respondents were interviewed individually. The gender of the interviewer was matched to that of the respondent(s). These collection methods not only insured high quality data, they also provided us with the opportunity to test the null hypothesis that it is sufficient to interview only the household head to obtain accurate information on total household income.

The two measures of total household income, *CombinedInc* and *HusbandInc*, are calculated for a subsample of 99 households that included a spousal couple and offered full interview data for both the husband and wife. The total for both variables is the sum of the cash earnings and subsistence incomes from all sources (agriculture, livestock, forest activities, self-employment, wage work, and transfers) for all household members. “Subsistence income” represents non-marketed agricultural production and

collected forest products (e.g., firewood, forest foods, thatching grass) that were consumed at home. Only the husband's income questionnaire is used to construct *HusbandInc*, while the questionnaires completed by both the male householder and his wife are used to compile *CombinedInc*. The income questionnaire included items on who engaged in and/or controlled the earnings from each income-generating activity. For *CombinedInc*, we assume that the person engaged in a given activity (for subsistence incomes) or who controlled the earnings (of cash incomes) provided the most accurate information. For example, if the wife controlled the cash earnings from firewood sales, her response is used to calculate *CombinedInc*. Because household members typically work together with members of the same sex, it is assumed that the wife (husband) provided the most accurate response for all female (male) household members engaged in a given activity. Thus, if a teenage son was reported to earn income from wage employment, the husband's response is used to calculate *CombinedInc*. There were two major livelihood activities in the study area for which the husband and wife were joint participants: subsistence agricultural production and charcoal marketing. In calculating *CombinedInc*, we use the wife's response to estimate the production of subsistence agricultural goods, because the women generally store, process, and prepare home-consumed agricultural goods. We use the husband's response to estimate charcoal earnings, because men are typically responsible for charcoal sales in the study area. Charcoal burning is primarily a male activity, even though women assist by bringing water for the kiln.

The present study uses only income data recorded in June of 2008 (covering the months of March, April, and May). The use of second-quarter data, as opposed to data from all four quarters or for another individual quarter, provides the largest available sample size. Due to high geographic mobility among household members, there were few households for which both husband and wife reported their incomes for multiple quarters of 2008. The data from the first quarterly income survey were problematic, because enumerators in Village 4 mistakenly revised the questionnaires to make the responses of husbands and wives correspond. A drawback of using only the second-quarter data is that it may not represent the situation for the entire year. The second quarter includes the harvest times of the main agricultural crops (including the staple crop, maize), and the bulk of income earned in the second quarter was from agriculture. Agricultural income is largely pooled in the study area, whereas incomes from other sources tend not to be pooled. Husbands should therefore have better knowledge of the household's agricultural income compared to incomes from other sources. As a result, the male household head's knowledge of the household's income should be greater in the second quarter than in other quarters.

3. EMPIRICAL ANALYSIS

What is the Degree of Difference between *CombinedInc* and *HusbandInc*?

We find perfect agreement between *CombinedInc* and *HusbandInc* (i.e., correspondence between husbands' and wives' responses) in only 6 percent of the sample households (Table 1). As the income interviews were conducted concurrently but separately, this finding suggests that there was prior income information sharing between husband and wife in only a small proportion of households. In 28 percent of households, the husband overestimated his wife's earnings by an average of 17 percent, leading to an overestimation of the total household income. In 66 percent of households, the husband underestimated his wife's income by an average of 47 percent. Overall, *CombinedInc* exceeds *HusbandInc* by an average of 26 percent ($p < 0.05$). The implication of these findings is that, at least for the Malawian study sites, interviewing both the husband and the wife appears to be necessary to obtain accurate estimates of total household income.

Table 1. Summary statistics for *CombinedInc* and *HusbandInc*

Variable	Mean or Proportion	95% Conf. Interval
Percent households in which <i>CombinedInc</i> = <i>HusbandInc</i>	6.06	[1.28 to 10.84]
Percent households in which <i>CombinedInc</i> > <i>HusbandInc</i>	65.66	[56.14 to 75.18]
Percent households in which <i>CombinedInc</i> < <i>HusbandInc</i>	28.28	[19.25 to 37.31]
All households: Percent difference between <i>CombinedInc</i> and <i>HusbandInc</i> (base income is <i>HusbandInc</i>)	26.31	[10.60 to 42.02]

To some extent, the observed differences between *CombinedInc* and *HusbandInc* probably reflect errors in reporting and recording. For example, a husband may strategically underreport his and his wife's incomes in anticipation of development assistance at the end of the survey. Issues of honor and pride may cause a husband to inflate his income relative to his wife's so he appears to be the main breadwinner. There might also be differences in the ability of the husband and wife to accurately recall income information over the prior three months. Furthermore, a husband's estimate of his wife's income could be inflated due to "telescoping," which is a form of reporting bias in which the respondent includes events that occurred prior to the recall period (Deaton & Grosh 2000). As for the possibility of a recording bias, the discrepancies could reflect recording errors by enumerator and/or data-entry mistakes. However, the magnitude of the differences between *CombinedInc* and *HusbandInc* suggests that these differences are probably not due solely to reporting and recording errors.

What Factors Explain the Observed Differences between *CombinedInc* and *HusbandInc*?

We use a regression model to examine the factors associated with the differences between *CombinedInc* and *HusbandInc*, as follows:

$$D_i = \alpha_0 + \alpha_1 A_i + \alpha_2 Eh_i + \alpha_3 Ew_i + \alpha_4 Hd_i + \alpha_5 Ha_i + \alpha_6 I_i + \alpha_7 Y_i + \delta V_i + \varepsilon_i \quad (1)$$

where D is the percent difference between *CombinedInc* and *HusbandInc*, calculated as $[(CombinedInc - HusbandInc)/HusbandInc] \times 100$. Various household-level explanatory variables are included in the model. A is the age difference between the household head and his wife. Eh and Ew indicate whether the husband or wife, respectively, had at least a primary education. Hd and Ha are the number of household members classified as dependents (children aged 12 and under and elderly aged 60 and over) or as working-age members (individuals aged 13-59 years), respectively. I is a binary variable representing

whether the household's main dwelling unit had a corrugated iron roof; this is an important local indicator of wealth. Y is the number of years the household head had resided in the current village of residence; this is intended to proxy for the degree of community integration. Vector V denotes three dummy variables for the village of residence, with Village 4 acting as the comparison village. Descriptive statistics for these explanatory variables are provided in Table 2.

Table 2. Descriptive statistics for explanatory variables

Variable	Mean or Proportion	Standard Deviation
Age of household head (years)	44.59	16.76
Difference between the ages of the household head and his wife (years)	6.29	7.31
Head had at least primary education (0/1)	0.37	
Wife had at least primary education (0/1)	0.13	
Number of years head had resided in village at survey	25.31	19.21
Head's ethnicity corresponded to a main ethnic group in the village (0/1)	0.76	
Number of dependents	2.57	1.56
Number of working-age members	2.95	1.41
Dependency ratio	0.45	0.21
Main dwelling unit had a corrugated iron roof (0/1)	0.42	
Farm size per person (acres)	0.41	0.52
Household received a fertilizer coupon (0/1)	0.84	

The results of the regression model show that five of the variables are significant at the 95 percent probability level (Table 3). Note that a positive coefficient indicates that a husband underestimated the total income of his household. The education variables suggest that a husband was less likely to underestimate the total household income if he had at least a primary education (Table 3), probably because education is associated with improved numeracy. In contrast, the difference between *CombinedInc* and *HusbandInc* is more likely to be large if the wife had at least a primary education, suggesting that men are less aware of the incomes of educated wives. This conforms to our prior expectations, as education increases a woman's probability of employment in the wage-labor market (Glick & Sahn 1997; Vijverberg 1993), and in the study area wage earnings tended to be pooled only when the wage earner chose to do so.

Table 3. Regression results for percent difference between CombinedInc and HusbandInc

Variable	Coefficient	P-value
Constant	-0.99	0.953
Difference in age between household head and his wife (years)	0.78	0.524
Husband had at least primary education (0/1)	-31.32	0.015
Wife had at least primary education (0/1)	24.40	0.053
Number of dependents	2.60	0.343
Number of working-age members	9.31	0.026
Main dwelling unit had a corrugated iron roof (0/1)	-22.34	0.345
Number of years head had resided in village	-0.69	0.131
Village 1 residence (0/1)	38.26	0.035
Village 2 residence (0/1)	29.26	0.015
Village 3 residence (0/1)	41.82	0.307
Number of observations	99	
R-squared	0.12	

The head of household was more likely to underestimate his total household income in households with more working-age members (Table 3). This result is predictable, because as more members earn subsistence or cash incomes, it is harder for a household head to account for total household income. This is an even greater problem in household economies where part or all of the individual incomes are contributed to the household on a voluntary basis, as is the case in the study area.

Heads of households in Village 1 or 2 were more likely to underestimate their wives' incomes than their counterparts in Village 4. Field observations indicate two possible explanations for this. First, the primary remunerative activities in Village 4 were charcoal burning/marketing and wage employment at neighboring tea estates. Charcoal production was a joint activity of husbands and wives, and both men and women worked on the tea estates, where salaries are commonly known. Thus, it was probably easier for the husbands to account for their total household incomes in Village 4 than in Villages 1 and 2, where spousal incomes arose from a variety of gender-specific activities. Second, Villages 1 and 2 were located closer to the main hiking trails leading up Mulanje Mountain and to the Likhubula Forestry Office, where prospective hikers registered. Many of the men worked intermittently as mountain porters/guides or woodcraft marketers, and spent considerable amounts of time away from home. Thus, householders in those villages might have been less aware of their wife's non-agricultural livelihood activities.

Do Measurements of Income Poverty Depend on How the Income Data are Gathered? ³

We use *CombinedInc* and *HusbandInc* to calculate poverty indexes. Poverty measurement requires at least four decisions: 1) which welfare indicator to use (e.g., income, consumption); 2) how to make the chosen welfare indicator comparable across households of varying size and demographic composition (i.e., what equivalence scale to use); 3) how to discriminate between the poor and non-poor (i.e., relative vs. absolute poverty concepts); and 4) which aggregate poverty index to use (e.g., poverty headcount or poverty gap index) (Dercon 2005). Here, we use annual income per capita in purchasing power parity (PPP) US\$ as the welfare indicator.³ We convert the quarterly income data to annual figures, thereby

³ The authors recognize that there are many definitions of poverty, and that the very concept of poverty is problematic (see,

allowing comparison with an annualized absolute poverty line (discussed below). To annualize, we divide each household's second-quarter income by the proportion of total annual income represented by this quarter: For the sample households, 42 percent of annual income was earned in the second quarter on average. The annualized figures are then converted to PPP US\$, using the International Comparison Program's (ICP) 2005 PPP estimate for Malawi. Finally, the annual PPP US\$ figures are divided by the household size.⁴ We use an absolute poverty concept to discriminate between the poor and non-poor; the utilized absolute poverty line is the World Bank's US\$2 per person per day. Finally, poverty is summarized using the poverty headcount and the poverty gap index. The poverty headcount is the proportion of individuals that have income below the poverty line. The poverty gap index is the average income shortfall separating the poor from the poverty line, and provides a measure of the depth of poverty. The poverty headcount and poverty gap index are special cases of the Foster, Greer, and Thorbecke (1984) class of poverty measures, and are calculated using the following equation:

$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^q \left(\frac{z_i - c_i}{z_i} \right)^{\alpha} \quad (2)$$

where P is a summary measure of poverty, α is a non-negative parameter, n is the sample size, i indexes individuals or households, $q \leq n$ is the number of poor in the sample, z is the poverty line, and c is the welfare level ordered from poor to rich. When α is zero, the calculated poverty measure is the poverty headcount. When α is one, the calculated poverty measure is the poverty gap index.⁵

The average annual per capita income, poverty headcount, and poverty gap calculated using *CombinedInc* and *HusbandInc* (Table 4) closely agree with previous estimates. The most recent estimate of Malawi's income per capita (that for 2007) is 750 PPP US\$ per capita (World Bank 2009). Recent estimates from the second Malawi Integrated Household Survey (2004/05) for the southern Malawi poverty headcount and poverty gap are 0.64 and 0.24, respectively (National Statistical Office). The mean values of the aggregate poverty measures calculated using *CombinedInc* and *HusbandInc* are not significantly different, suggesting that, at least for the purpose of measuring average poverty levels at the study sites, it may not matter whether only the husband or both husband and wife are interviewed. However, the lack of a significant difference in the mean values does not necessarily reflect a lack of difference in the distributions of poverty incidence and depth. To get at the potential hidden underlying patterns, we employ a regression analysis.

for example, Carr 2008b). Our goal in this article is to pick one measurable means of thinking about poverty for the purposes of testing a particular methodology, not to make absolute claims about how poverty might be best defined.

⁴ A per capita adjustment is standard in the poverty literature and has the merit of simplicity. However, it has drawbacks; for example, it ignores economies of scale in consumption and does not account for differences in household composition. Economies of scale in consumption imply that household needs do not grow proportionally to household size, reflecting that some household goods (e.g., housing, water taps) are non-rival and can be consumed jointly by several people. The sharing of non-rival goods within a household means that the cost per person to achieve a given living standard is lower when individuals live together than apart. Furthermore, the per capita adjustment does not account for the fact that a household's demographic composition influences its needs, because individuals with different attributes differ in their requirements (Slesnick 2001).

⁵ When α exceeds one, the summary poverty measure has the desirable property of sensitivity to income inequality among the poor, but this comes at a cost in terms of ease of interpretation. As a result, such measures are rarely used in practice (Dercon 2005).

Table 4. Summary statistics for CombinedInc and HusbandInc

Variable	<i>CombinedInc</i>	<i>HusbandInc</i>
Annualized household income per capita (in PPP US\$)	734 [622 to 847]	703 [578 to 829]
Poverty headcount	0.65 [0.55 to 0.74]	0.66 [0.56 to 0.75]
Poverty gap	0.27 [0.22 to 0.32]	0.33 [0.27 to 0.39]

Note: Bracketed terms are 95 percent confidence intervals.

Do the Correlates of Income Poverty Depend on How the Income Data are Gathered?

To determine whether it is sufficient to interview only the household head when examining why some households are poor and others are not, we estimate probit and tobit regression models of household poverty, which take the form:

$$P_i = \beta_0 + \beta_1 Ah_i + \beta_2 T_i + \beta_3 Eh_i + \beta_4 Ew_i + \beta_5 R_i + \beta_6 F_i + \beta_7 C_i + \delta V_i + \varepsilon \quad (3)$$

where P is either a measure of poverty incidence or poverty depth for household i . Poverty incidence is a binary variable indicating whether the household had an income below the World Bank's US\$2 per-person-per-day poverty line, and is estimated with a probit regression. Poverty depth is estimated with a tobit regression; it is continuous for those with an income less than or equal to the poverty line and equals zero for those with an income above the poverty threshold. Ah is the age of the household head. T indicates whether the household head's ethnicity fell within one of the main ethnic groups in his village. Eh and Ew indicate whether the husband or wife, respectively, had at least a primary education. R is the dependency ratio, calculated as the number of children and elderly divided by household size. F is the size of the household's farm. C indicates whether the household received a fertilizer coupon from the Malawian government. Vector V denotes the village of residence (Village 4 is the comparison village).

The empirical model captures the main determinants of human impoverishment that have been highlighted by poverty researchers (e.g., Rank, Yoon, & Hirschl 2003; Schiller 1995). One common view is that specific attributes of poor people, such as low levels of education or a large number of dependents, are responsible for their poverty. In this view, poverty is viewed as a consequence of individual decisions related to education, employment, and household structure, and these decisions impact economic well being. Other researchers argue that poverty is mainly the result of restricted educational, economic, and political opportunities, which may be related to the individual's place of residence, or may originate from discrimination on the basis of age, gender, ethnicity, or class. According to this restricted-opportunity viewpoint, poverty is caused by forces beyond the control of individuals and families. In the present study, these two explanations of poverty are considered to be complementary, as reflected in equation (3).

Tables 5 and 6 present our regression results for poverty incidence and poverty depth for the two income measures; they reveal marginal effects and p -values. The regression results for poverty incidence based on *CombinedInc* and *HusbandInc* show that the marginal effects have the same sign regardless of the income measure in all cases except Ew (Table 5). The significant regression results based on *CombinedInc* indicate that only farm size per person and residence in Village 1 have a significant effect on poverty incidence. In contrast, regression results based on *HusbandInc* show that the risk of being poor in rural Malawi increases over the householder's life cycle, is lower for households having a relatively large farm size per person, is lower for households that received a fertilizer coupon, and is higher for residents of larger villages (Villages 1 and 2). The regression results based on *CombinedInc* show that poverty depth is negatively correlated with education of the wife, farm size per capita, receipt of a fertilizer coupon, and residence in Village 4 (Table 6). In contrast, the results based on *HusbandInc* indicate that poverty depth is significantly influenced by the householder's age and education, farm size per person, receipt of a fertilizer coupon, and location of residence.

Thus, surveying only the head of the household versus the head and his spouse could lead to disparate conclusions regarding the causes of poverty and thus could result in different policy prescriptions. For example, if *CombinedInc* is assumed to give the most accurate income measure, appropriate anti-poverty interventions would focus on female education opportunities, land redistribution, distribution of fertilizer coupons, and infrastructure development in remote rural villages. However, a study using *HusbandInc* to measure income would not prescribe female education, and would instead focus on education opportunities for males and target households headed by older individuals. Although the lack of a difference in average poverty levels based on *CombinedInc* and *HusbandInc* suggests that, at least for the study sites, it is sufficient to interview only the household head for total income data (Table 4), the disparate results for poverty incidence and poverty depth (Tables 5 and 6) suggest it is necessary to interview multiple adult household members in order to understand why some households are poor and others are not.

Table 5. Probit regression results for poverty incidence: CombinedInc and HusbandInc

Variable	<i>CombinedInc</i>	<i>HusbandInc</i>
Age of the household head (years)	0.005 (0.125)	0.010 (0.004)
Household head's ethnicity corresponded to a main ethnic group in the village (0/1)	-0.159 (0.178)	-0.115 (0.307)
Husband had at least primary education (0/1)	-0.066 (0.585)	-0.158 (0.175)
Wife had at least a primary education (0/1)	-0.307 (0.117)	0.104 (0.455)
Dependency ratio	0.320 (0.216)	0.174 (0.514)
Farm size per person (acres)	-0.338 (0.006)	-0.238 (0.004)
Household received a fertilizer coupon (0/1)	-0.210 (0.064)	-0.196 (0.053)
Village 1 residence (0/1)	0.286 (0.005)	0.299 (0.001)
Village 2 residence (0/1)	0.175 (0.142)	0.250 (0.022)
Village 3 residence (0/1)	0.172 (0.186)	0.172 (0.165)
Number of observations	99	99
Pseudo <i>R</i> -squared	0.22	0.24

Note: Results shown in the table are marginal effects and *p*-values.

Table 6. Tobit regression results for poverty depth: CombinedInc and HusbandInc

Variable	<i>CombinedInc</i>	<i>HusbandInc</i>
Age of the household head (years)	0.004 (0.077)	0.006 (0.009)
Household head's ethnicity corresponded to a main ethnic group in the village (0/1)	-0.133 (0.097)	-0.104 (0.142)
Husband had at least primary education (0/1)	-0.062 (0.452)	-0.174 (0.038)
Wife had at least a primary education (0/1)	-0.372 (0.039)	-0.009 (0.945)
Dependency ratio	0.213 (0.260)	0.070 (0.660)
Farm size per person (acres)	-0.342 (0.001)	-0.292 (0.000)
Household received a fertilizer coupon (0/1)	-0.165 (0.017)	-0.127 (0.053)
Village 1 residence (0/1)	0.196 (0.012)	0.216 (0.003)
Village 2 residence (0/1)	0.200 (0.026)	0.224 (0.009)
Village 3 residence (0/1)	0.186 (0.051)	0.132 (0.150)
Number of observations	99	99
Pseudo <i>R</i> -squared	0.38	0.33

Note: Results shown in the table are marginal effects and *p*-values.

4. DISCUSSION AND CONCLUSIONS

The present study examines whether a researcher can draw valid conclusions about total household income when interviews are limited to the household head. Limiting interviews to a single adult has the advantage of reducing the time and expense of household surveys. For households in rural Malawi, however, using a husband's estimates of his wife's income does not produce statistically defensible results for certain assessments of household economic well being. Husband-only interviews appear to be valid for calculating aggregate poverty measures, such as poverty headcounts and poverty gap indexes. However, analyses of the determinants of poverty are sensitive to whether or not the household income estimate incorporates the wife's estimate of her own income. Furthermore, husbands tend to underestimate their wife's incomes, and accurately estimate their total incomes in only a small percentage of households.

Readers will need to individually gauge the extent to which our findings generalize to other settings, based on the detailed description of the survey area provided in section 2. Our sense, however, is that many of the study's findings are indeed quite general. For example, we find that the husband is less aware of the household's economy when he works away from home at least part of the time, when household livelihoods are more complex (i.e., involve more earners), and when the household is more sophisticated (e.g., has educated female members or is located in a larger town). These factors probably have similar effects in other regions of the world. Situations in which a husband alone would provide accurate information about total household income might include, for example, if he is the sole breadwinner or if his wife's income is readily observable. Those characteristics more closely match the unitary household model found in some parts of South Asia, in which within-household bargaining is subtler. However, in relatively complex household situations having multiple individual incomes with different visibilities, interviews with multiple income earners are advisable.

Overall, the results of the present study demonstrate that research design should include an understanding of the income-generating activities of the household economies under investigation, as well as the livelihood roles played by different household members.. This information should allow a preliminary assessment of the likelihood that a single member of the household would be aware of all incomes and be able to provide an accurate estimate of the total household income.

REFERENCES

- Carr, E.R. 2005. Development and the household: Missing the point? *Geojournal* 62(1): 71–83.
- _____. 2008a. Men's crops and women's crops: The importance of gender to the understanding of agricultural and development outcomes in Ghana's Central Region. *World Development* 36(5): 900–915.
- _____. 2008b. Rethinking poverty alleviation: A “poverties” approach. *Development in Practice* 18(6): 726–734.
- Cloud, K. 1986. Sex roles in food production and distribution systems in the Sahel. In *Women farmers in Africa* (pp. 19–49), ed. L.E. Creevey. New York: Syracuse University Press.
- Deaton, A., and M. Grosh. 2000. Consumption. In *Designing household survey questionnaires for developing countries: Lessons learned from 15 years of the Living Standards Measurement Study* (pp. 91–133), ed. M. Grosh and P. Glewwe. Washington, D.C.: The World Bank.
- Dercon, S. 2005. Poverty measurement. In *The Elgar companion to development studies* (pp. 457–464), ed. D.A. Clark. Cheltenham, UK: Edward Elgar.
- Fafchamps, M., and A. R. Quisumbing. 2002. Control and ownership of assets within rural Ethiopian households. *Journal of Development Studies* 38(6), 47–82.
- Fapohunda, E. R. 1988. The nonpooling household. In *A home divided: Women and income in the Third World*, eds. D. Dwyer and J. Bruce. Stanford, CA: Stanford University Press.
- Fisher, M. G., R. L. Warner, and W. A. Masters. 2000. Gender and agricultural change: Crop-livestock integration in Senegal. *Society and Natural Resources* 13: 203–222.
- Folbre, N. 1984. Household production in the Philippines: A non-neoclassical approach. *Economic Development and Culture Change* 32: 312–327.
- Foster, J., J. Greer, and E. Thorbecke. 1984. A class of decomposable poverty measures. *Econometrica* 52: 761–765.
- Glick, P., and D. E. Sahn. 1997. Gender and educational impacts on employment and earnings in West Africa: Evidence from Guinea. *Economic Development and Cultural Change* 45: 793–823.
- Grosh, M., and P. Glewwe. 2000. Introduction. In *Designing household survey questionnaires for developing countries: Lessons learned from 15 years of the Living Standards Measurement Study* (pp. 5–20), eds. M. Grosh, and P. Glewwe. Washington, D.C.: The World Bank.
- Guyer, J. I. 1986. Intra-household processes and farming systems research: Perspectives from anthropology. In *Understanding Africa's Rural Households and Farming Systems* (pp. 92–104), ed. J.L. Mook. Boulder, CO: Westview Press.
- Haddad, L., and R. Kanbur. 1990. How serious is the neglect of intra-household inequality? *The Economic Journal* 100: 866–881.
- Haddad, L. and J. Hoddinott. 1994. Women's income and boy-girl anthropometric status in the Côte d'Ivoire. *World Development* 22(4): 543–553.
- Jones, C. 1986. Intra-household bargaining in response to the introduction of new crops: A case study from North Cameroon. In *Understanding Africa's rural households and farming systems* (pp. 105–123), ed., J.L. Mook. Boulder, CO: Westview Press.
- National Economic Council. 2000. *Profile of poverty in Malawi: Poverty analysis of the Malawi Integrated Household Survey, 1997-98*. Unpublished manuscript, November.
- Rank, M. R., H. Yoon, H., and T. A. Hirschl. 2003. American poverty as a structural failing: Evidence and arguments. *Journal of Sociology and Social Welfare* 30(4): 3–29.
- Schiller, B. R. 1995. *The economics of poverty and discrimination*. Englewood Cliffs, NJ: Prentice-Hall.
- Slesnick, D. T. 2001. *Consumption and social welfare*. Cambridge, UK: Cambridge University Press.

- Udry, C. 1996. Gender, agricultural production, and the theory of the household. *Journal of Political Economy* 104(5): 1010–1046.
- Vijverberg, W. 1993. Educational investments and returns for women and men in Cote d'Ivoire. *Journal of Human Resources* 28: 933–74.
- Whitehead, A. 1990. Rural women and food production systems in Sub-Saharan Africa. In *The political economy of hunger* (pp. 425–473), eds., J. Dreze and A. Sen. Oxford, UK: Clarendon Press.
- World Bank. 2009. *Reshaping economic geography, World Development Report*. Washington, D.C.: The World Bank.

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