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GENDER AND POVERTY: NEW EVIDENCE FROM 10 DEVELOPING COUNTRIES

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ABSTRACT

This paper presents new evidence on the association between gender and poverty based on an empirical analysis of 11 data sets from 10 developing countries. The paper computes income- and expenditure-based poverty measures and investigates their sensitivity to the use of per capita and per adult equivalent units. It also tests for differences in poverty incidence between individuals in male- and female-headed households using stochastic dominance analysis.

Stochastic dominance analysis reveals that differences between male- and female-headed households among the very poor are not sufficiently large that one can conclude that one is unambiguously worse- or better-off, except for a few exceptions. When we use the method of endogenous bounds, persons in female-headed households in rural Ghana and Bangladesh are consistently worse-off, using two stochastic dominance criteria.

These results suggest that, among the very poor, persons in male- and female-headed households may not differ significantly. The consistent and significant exceptions, rural Ghana and Bangladesh, suggest that cultural and institutional factors may be responsible for higher poverty among women in these countries. Our results point to the need to analyze determinants of household income and consumption using multivariate methods, and to give greater attention to the processes underlying female headship.

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GENDER AND POVERTY: NEW EVIDENCE FROM 10 DEVELOPING COUNTRIES*

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1. INTRODUCTION

The assumption that women are disproportionately represented among the poor has been used to justify targeting of poverty-alleviation policies and projects to women (Buvinic and Gupta, forthcoming). Yet robust evidence supporting this assumption is scarce. Much of the literature on gender and poverty is impressionistic and anecdotal, due in large part to the failure of many surveys to disaggregate and present information by gender (McGuire and Popkin 1990). Moreover, the existing literature generally fails to distinguish between poverty measures disaggregated by the gender of the household head, and poverty experienced by *individuals* in poor families, whether headed by men or by women.

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This paper presents new evidence on the association between gender and poverty, based on an empirical analysis of 11 data sets from 10 developing countries (seven from Sub-Saharan Africa, three from Asia, and one from Latin America). The paper computes income- and expenditure-based poverty measures and investigates their sensitivity to the use of per capita and per adult equivalent units. It also tests for differences in poverty incidence between individuals in male- and female-headed households, using stochastic dominance analysis, a more robust way of ranking distributions.[1] Section 2 highlights some of the outstanding issues related to the analysis of poverty and gender. Section 3 discusses the poverty measures and the theory of stochastic dominance. Section 4 describes the data and presents empirical results. Section 5 presents conclusions and discusses their relevance for policy and research.

2. POVERTY AND GENDER: MEASUREMENT AND CONCEPTUAL ISSUES

The empirical literature on gender and poverty in developing countries is plagued by a lack of consensus. An early study by Visaria concludes that women do not seem to be heavily overrepresented among the poor, based on the percentage of females in households, ranked by deciles (Visaria 1980a, 1980b). However, according to a recent review by Buvinic and Gupta (forthcoming), out of 61 studies that examined the relationship between headship and poverty, 62 percent found that woman-headed households are overrepresented among the poor, using a variety of poverty indicators—not an overwhelming majority. Yet, a review by Lipton and Ravallion (1995) argues that females are not generally overrepresented in

[1] Dominance conditions are more robust than comparisons based on means and variances of distributions. On the use of dominance conditions in ranking distributions in terms of measures of poverty, see Atkinson (1987) and Foster and Shorrocks (1988). A good exposition is given by Ravallion (1992). We used the stochastic dominance software in Howes (1994a).

consumption-poor households; nor are female-headed households more likely to be poor.[2]

The confusion stems from the attempt to use poverty differences across households, stratified according to the gender of the household head, to proxy the conditions of individuals within households. In addition, methodological issues complicate the measurement of poverty in male- and female-headed households, as is discussed below.

THE DEFINITION OF INCOME

The use of cash income as the sole measure of household income tends to underestimate the welfare of subsistence households. If subsistence production is positively associated with households with a large proportion of female adults, and if subsistence production is underestimated, these households may well be falsely associated with poverty.[3] A common solution uses total expenditure (imputing a value to the consumption of home-produced goods and services as well as those received as wages, gifts, and loans) rather than measured income as the welfare measure, since total expenditure is considered a reasonable approximation of "permanent income."[4]

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[2] Lipton and Ravallion (1995) go on to say, however, that "even if it were true that consumption-poverty incidence is on average no greater amongst women, they are severe victims of poverty in other respects" (p. 33).

[3] However, the bias could also occur in the opposite direction. For example, landless rural households in South Asia have a slightly higher proportion of women and children than landholding households. Moreover, the rural female poor are more likely to be wage earners and are less likely to depend on subsistence production than the rural female nonpoor (Bardhan 1993).

[4] Carloni (1994, personal communication) points out that total expenditures may underestimate the income of rich households, since household surveys tend to understate savings and investments. On the other hand, poor households' total income may be overestimated by using total expenditures, since they might be financing their expenditures through transfers and loans. If people base their expenditures on expected lifetime earnings rather than on current income, however, expenditure is a better measure of permanent income.

Income or expenditure measures also neglect differences in men's and women's time use. Reviews of formal time allocation studies confirm that, on average, women in developing countries put in more hours per day in nonleisure activities than do men (Juster and Stafford 1991). Not only are women actively engaged in agriculture and wage-generating activities, but a substantial amount of a woman's day is devoted to home production activities such as fetching water and fuelwood, preparing meals, and child care. In addition, low-income women have longer working days than higher-income women, often to the detriment of their own health and nutritional status.[5] In many rural areas, domestic activities account for the largest proportion of women's time in any given day.[6] Compared to a measure that incorporates leisure (through detailed time allocation data) into the definition of welfare, expenditure measures may therefore understate poverty for households reliant heavily on female labor.[7] Due to the scarcity of detailed time allocation data, however, most studies (including this one) on gender and poverty rely on standard income or total expenditure measures that ignore potential gender-differentiation in leisure time.

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[5] Competing responsibilities and demands on women's time might also constrain them to accept lower paid part-time jobs or employment such as "piece work" that allows for flexible hours. See Buvinic and Gupta (forthcoming).

[6] For example, a gender-disaggregated analysis of Ghanaian data shows that in terms of time burdens, women are consistently worse-off than men. Reported female time loads are 15-25 percent higher than those of males. Moreover, the main source of the discrepancy is the much heavier commitment of women to household work. Only one-third of this discrepancy is compensated by a reduction in female time spent in employment outside the home, as women work about 27 hours to men's 31 hours for single jobholders, and 42 compared to 47 hours for multiple jobholders. See Haddad 1991.

[7] For example, female-headed households may have a greater demand for processed foods and market-provided services to save on time and services such as child care. Male-headed households do not have to pay for these good and services, since they can rely on their spouses to do households tasks, such as cooking and child rearing, without having to financially compensate them (Carloni 1994, personal communication). If female-headed households are too poor to pay for these goods and services, they would have to sacrifice their own leisure or rely more on other household members for domestic chores.

THE USE OF ADULT EQUIVALENTS

Adult equivalent scales are often used to compare groups of individuals with different demographic characteristics. For instance, compared to male-headed households, female-headed households may contain a higher proportion of children. Per capita measures, which are based on household size, would then overstate poverty in households with many children.[8]

Poverty comparisons may be sensitive to the use of per capita or adult equivalent units. For example, in an analysis of female headship and poverty in Jamaica (Louat, van der Gaag, and Grosh 1994), when per capita total expenditure is used as a measure of welfare, 9 percent of people living in male-headed households are found to be below the 10th percentile poverty line, compared with 11 percent in female-headed households, a small, but statistically significant, difference. When adult equivalents are used to adjust total expenditure, however, no difference is significant for the 10 percentile poverty line.

Both per capita and per adult equivalent measures have their shortcomings. While per capita indicators fail to capture different dependency ratios across household types, adult equivalent scales may further mask dependency burdens by assigning a weight less than one to females and children, on the assumption that their consumption needs are less than those of adult men (Ravallion 1992). Such scales are usually based on individuals' actual consumption as measured from household surveys,[9] which could reflect the outcome of intrahousehold bargaining or lack of information about consumption requirements rather than actual biological needs.

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[8] It is possible that there are economies of scale in household consumption, and that larger households are not necessarily poorer. Lanjouw and Ravallion (1995), for example, estimate the size elasticity of the welfare indicator at which there is no difference between large and small households, using data from Pakistan. They find that the critical value is within the range of actual elasticity estimates.

[9] For the construction of adult equivalence scales, as applied to survey data from Sri Lanka and Indonesia, see Deaton and Muellbauer (1986).

Moreover, the use of the same adult-equivalent scales for all countries neglects the cross-country variation in the costs of raising children (for instance, in some countries, parents may need to pay more for their children's education, while in some cultures, parents may have to spend for dowries or bridewealth). Adult equivalent scales may also distort poverty assessments if higher dependency burdens increase women's and children's work efforts to achieve a certain level of consumption. Such increased work effort, or reduction in leisure time, could increase households' current and future poverty if welfare has both income/expenditure and time components (Buvinic and Gupta, forthcoming). Lastly, adult equivalent scales do not consider the time costs of raising children, which are likely to be higher for women than men. Considering time costs not only raises the consumption cost of a child, but also increases it disproportionately for women (Apps and Rees 1995).

HOUSEHOLD COMPOSITION

Household composition affects the link between female headship and poverty. Female-headed households, particularly those with young children, account for a larger share among the poor than their share in the population. A study using Ghanaian data calculated poverty indices for individuals in male- and female-headed households and for individuals in households containing more, equal, or less adult males than adult females (Haddad 1991). While the poverty share of each gender-disaggregated group was close to their representation in the sample, the largest discrepancies occurred in households with more adult females than males. While these households accounted for 39 percent of the sample, their share of overall poverty was approximately 46 percent. This result was robust to the poverty index used and the poverty line selected.

A study of approximately 20,000 households from three metropolitan regions in Brazil also finds that female-headed households are disproportionately overrepresented in low per capita income groups (Barros, Fox, and Mendonca 1992).

Female-headed households comprise 17 to 22 percent of households, but account for 27 to 41 percent of all households in the lowest per capita income quintile. Within this group, 20 to 35 percent of the households are female-headed with minors and 11 to 21 percent of the households are female-headed with minors and no other adults. These numbers are striking compared to these groups' representation in the population, at around 9 and 3 percent, respectively.[10]

THE HETEROGENEITY OF FEMALE HEADSHIP DEFINITIONS

Noncomparable definitions in different countries, the ambiguity inherent in self-reporting, and the nonneutrality of the term "head of household" also complicate the identification of female-headed households. For example, a study based on household survey data from 1980 and 1990 from Latin America found that, in most countries, female-headed households are overrepresented in the lowest per capita income group, although this percentage has declined over time (Batista 1994). In all of the 13 countries, female heads of households are, on average, older and less educated. However, among the region's highest income countries, female-headed households are also overrepresented in the top per capita income groups.

Some of this ambiguity can be traced to the concept of headship as an artifact of census reporting. In most cases, what surveys identify as female-headed households are households where no husband or adult male is present. This method tends to misclassify households where both spouses or partners are present but the wife's responsibility, authority, and economic contribution are greater (Batista 1994). Other potential sources of biases in reporting headship may be prevalent in developing countries where extended families comprise households and where social and cultural norms automatically consider the oldest male household member as the household

[10] One caveat, however, is the use of per capita measures for these comparisons. For example, female-headed households with minors in the lower per capita income group may simply contain more minors than otherwise similar households in the higher per capita income category.

head (Handa 1993). Finally, the census-derived headship label bestows a false veneer of homogeneity upon male- and female-headed households (Rosenhouse 1989).

One approach is to define the "working head" as the household member most heavily engaged in income-generating activities (Rosenhouse 1989). A similar approach is that of "cash head," which focusses on individual contributions to household cash income (Lloyd and Brandon 1991). Indeed, results differ when the "working head" or the self-reported definition is used. For example, Handa compares male- and female-headed households, based on self-reported status as well as the degree of participation in market work in Jamaica (Handa 1993). Based on per adult equivalent expenditure figures, self-reported female-headed households achieve a consumption level that is 88 percent of their male counterparts, but "working" female-headed households attain a consumption level that is 97 percent of their male counterparts' consumption level. This suggests that a female working head is more likely to be the main decisionmaker and source of financial support for her household in Jamaica.

A less data-intensive approach disaggregates self-declared female-headship into de facto and de jure female-headed households. De facto female-headed households are those where the self-declared male head is absent for a large proportion of the time (usually at least half or 50 percent). Labor migration studies suggest that this type of female-headed household is becoming increasingly common in Africa (Buvinic and Youssef 1978; Buvinic, Lycette, and McGreevey 1983). In these households, husbands or other male relatives may still play a role in basic decisionmaking and make contributions to household incomes. De jure female-headed households are those in which a woman is considered the legal and customary head of household. De jure households are usually headed by widows, who are often the grandmothers of the children in the household, by unmarried women, or by those who are divorced or separated.

Again, the incidence of poverty among female-headed households is sensitive to the definition of headship. For example, Kennedy and Haddad (1994), using household survey data from Kenya, found that de facto female-headed households are significantly poorer than other types of households, but de jure female-headed households are only slightly poorer than male-headed households. Another study in Ecuador by DeGraff and Bilsborrow (1992) found that female-headed households, as a whole, have per capita household income 10 percent lower than male-headed households. However, when female-headed households are disaggregated by marital status, divorced and widowed groups have a higher per capita income than male-headed households.

The above discussion provides evidence that women are overrepresented in poor households, although the overrepresentation is not striking. Moreover, the issue is plagued by methodological difficulties. In our empirical analysis, we apply more robust techniques for comparing income- or expenditure-based distributions in addition to standard measures of poverty.

3. POVERTY MEASURES AND STOCHASTIC DOMINANCE

POVERTY MEASURES

The Foster, Greer, and Thorbecke (1984) P_α class of poverty measures is useful for its ability to capture a range of value judgments on the incidence and depth of poverty. If real per capita household expenditures, y_i, are ranked as follows,

$$y_1 \leq y_2 \leq \ldots \leq y_q \leq z \leq y_{q+1} \leq \ldots \leq y_n,$$

where z is the poverty line, n is the total population, and q is the number of poor, then P_α is given by

$$p_\alpha = 1/n \sum_{x=\Theta}^{\cdot} [(z-y_x)/z]^\alpha ; \qquad \alpha \geq 0.$$

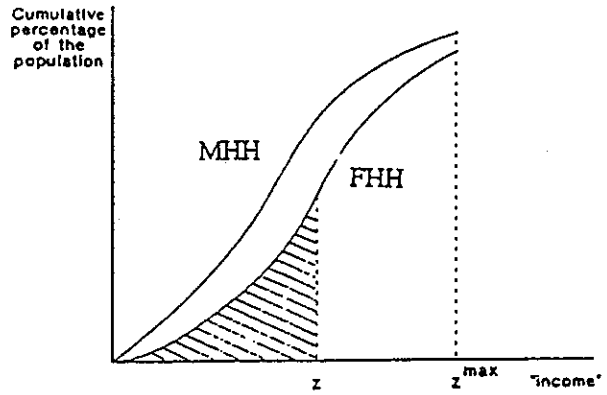
The parameter α reflects the policymaker's degree of aversion to inequality among the poor. If α= 0 is chosen, no concern is exhibited about the depth of poverty, and P_η corresponds to the fraction of individuals falling below the poverty line (the Headcount Index). If α = 1, P_Θ corresponds to the average shortfall from the poverty line (Poverty Gap Index). Values of α greater than 1 in P_α calculations give more weight to the average income shortfalls of the poorest of the poor. Thus, the P_θ measure is an index of the severity of poverty, whereby the poverty gaps of the poor are weighted by those poverty gaps in assessing aggregate poverty. Another key aspect of the P_α measure is its additive decomposability into different mutually exclusive and exhaustive subgroups such as male- and female-headed households. Hypotheses tests on the P_α measures can be used to test differences in poverty between groups (Kakwani 1993).

The robustness of poverty comparisons using summary measures can be compromised by errors in living standards data, unknown differences between households at similar consumption levels, and uncertainty and arbitrariness about both the poverty line and the precise poverty measure (Ravallion 1992). Application of the theory of stochastic dominance to poverty analysis permits a more robust comparison by ranking distributions, which would not have been possible simply from the comparison of the mean and variance of the distributions (Hadar and Russell 1969). It also allows poverty comparisons to be made without prior specification of a poverty line.

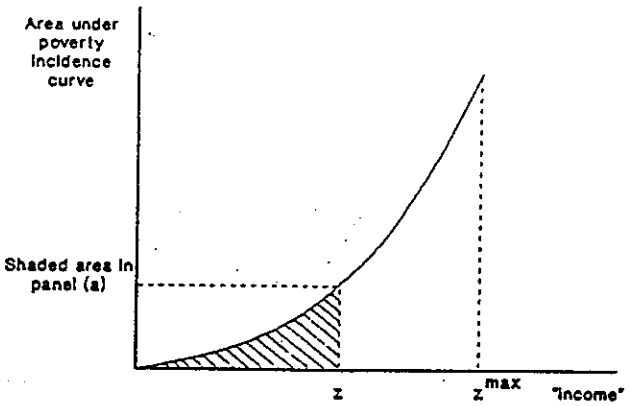
STOCHASTIC DOMINANCE ANALYSIS

Suppose that we have two distributions of per capita household expenditure, one for male-headed (MHH) and the other for female-headed households (FHH). Suppose further that we can draw a curve called the poverty incidence curve, showing on the vertical axis the proportion of the population consuming less than the per capita household expenditure amount on the horizontal axis (Figure 1a). This cumulative distribution function is called the poverty incidence curve. The area under this curve is the poverty deficit curve, and each point on the vertical axis corresponds to the value of the poverty gap P_Θ times the poverty line z (Figure 1b). If one again calculates the area under the poverty deficit curve, each point on the new curve—the poverty severity curve—is directly proportional to P_θ (Figure 1c). Suppose that we do not know the precise value of the poverty line, but are sure that it does not exceed $z_{\Upsilon''\Upsilon'}$. (We can interpret $z_{\Upsilon''\Upsilon'}$ as the upper bound on the set of reasonable poverty lines.) Even if we do not know the precise poverty measure, but know that it is a monotonic transformation of an additive measure, it can be shown that poverty is less among MHH if the poverty incidence curve for MHH is somewhere below and nowhere above that of FHH, up to $z_{\Upsilon''\Upsilon'}$. This is the *First Order Stochastic Dominance Condition* (FSD). (Alternatively, the distribution MHH dominates FHH.)

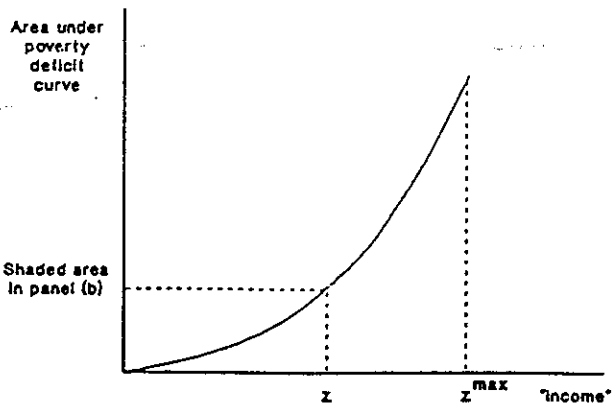
Figure 1—The three poverty curves



(a) Poverty incidence curves for two distrbutions MHH and FHH



(b) Poverty deficit curve for distribution FHH



(c) Poverty severity curve for distribution FHH

Adapted from Ravallion (1990).

If we then examine additive measures that reflect the depth of poverty such as P_Θ and P_θ (excluding P_η), we can use a *Second Order Stochastic Dominance Condition* (SSD). One distribution dominates the other if the former's poverty deficit curve is somewhere below and nowhere above the deficit curve of the latter. In our context, MHH dominates FHH in the sense of SSD if the poverty deficit curve of male-headed households fulfills the above criterion.

Second order dominance is equivalent to Lorenz dominance, since the family of Lorenz curves is a dual for the deficit curve depending on the analysis undertaken.[11] Following Atkinson (1970), for the analysis of equality SSD, the ordinary Lorenz curve can be substituted for the equality deficit curve. A variable (say, per capita household expenditure of MHH) then dominates another (per capita household expenditure of FHH) in the sense of Lorenz SSD if its Lorenz curve is somewhere above and nowhere below the Lorenz curve of the other variable. That is, the Lorenz curve of the dominant distribution is closer to the line of equality than the other. This enables us to analyze not only the relative poverty of persons in male- and female-headed households, but also the relative inequality (and heterogeneity) within each category.

RESTRICTED DOMINANCE AND ENDOGENOUS BOUNDS

Howes has argued that the stochastic dominance criteria suffer from a reliance on "extreme" dominance, i.e., mean dominance, minimum dominance, maximum dominance, and any combination of the three.[12] This is problematic because, in the analysis of survey data, conclusions will be based on a very small number of

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[11] This exposition follows Howes (1994b) closely.

[12] This draws extensively from Howes (1994b). One distribution has mean dominance over another if its mean y is no lower. It has minimum dominance if it has no lower minimum, and maximum dominance if it has no lower maximum, if y is income or if it has no higher maximum and y is mean normalized income.

observations in the tails of the distributions. The requirement of each form of extreme dominance also embodies an extreme normative judgment.[13]

The concept of restricted dominance, in which dominance is analyzed within upper or lower limits (or bounds), has therefore been suggested. Specifying an upper bound implies that we are not concerned with changes beyond a certain income level or percentage of the population; for example, redistributions among the very rich will not affect poverty comparisons. Similarly, specifying a lower bound is equivalent to specifying the lower limit to the range of minimum poverty lines. Below this bound, transfers within the group of the poorest no longer have an effect on the ranking.

Another method uses bounds that emerge "endogenously" from inspection of the data (Howes 1994b). This pragmatic approach specifies the minimum length (the difference between the upper and lower bounds) as the combined length in terms of the proportions of the combined sample to control for the probability of mistakenly inferring dominance within the bounds. If this length is below a suggested minimum (50 percent of the sample, according to simulations), the sample curves differ only insignificantly and dominance cannot be inferred.

In our empirical analysis, we apply stochastic dominance techniques to evaluate the income (or expenditure) measure of individuals in male-headed and female-headed households. Since we are interested in the very poor (the bottom third of the population), we specify a 33-percentile poverty line as the upper bound, but also use the method of endogenous bounds, in which the bounds are set using sample information. In using a 33-percentile poverty line, we are therefore in the domain of *relative* poverty comparisons across countries.

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[13] There is little support for the position of "distributional indifference" implied by mean dominance, and none for the requirement of maximum dominance. The association of minimum dominance with the work of Rawls is also flawed. For details, see Howes (1994b, 11).

4. EMPIRICAL ANALYSIS

DATA

We use household survey data from Sub-Saharan Africa (Botswana, the Côte d'Ivoire, Ethiopia, Ghana (urban and rural), Madagascar, Rwanda), Asia (Bangladesh, Indonesia, Nepal), and Central America (Honduras) for our empirical analysis. Most of the surveys were conducted by the International Food Policy Research Institute (IFPRI) and its collaborators (such as the International Center for Research on Women) to investigate patterns and determinants of food security, with the exception of the Ghana and Côte d'Ivoire data sets, which were gathered as part of the Living Standards Measurement Study of the World Bank. The Ghana and Cote d'Ivoire data sets are nationally representative, while the IFPRI data are from rural surveys that were not designed to be nationally representative. Some surveys focused on a specific region (e.g., the Rwanda data set), while others aimed for representativeness across agroclimatic settings, ethnic groups, and infrastructure and market access. Clusters were chosen purposively, then households within clusters were randomly selected. Most of the IFPRI data sets also consist of more than one round of data collection to capture seasonal variation. In this study, we use cross-round averages for comparability with other one-round data sets.

Table 1 presents summary characteristics of the data; sampling procedures are described more fully in the Appendix. The incidence of female headship in our samples should not be taken as representative of the country as a whole, since the data sets (aside from the Ghana and Côte d'Ivoire data) are not nationally representative. Moreover, our preliminary results do not use standard errors that have been corrected for sampling design, i.e., stratification, clustering, and household size. Since most of the samples are subnational (and purposively

Table 1 Summary characteristics of data sets

Country	Year of Survey	Number of Survey Rounds	Number of Male-Headed Households[a]	Number of Female-Headed Households	Percent of Households That Are Female-Headed
Africa					
Botswana[b]	1993	1	121	168	58.1
Côte d'Ivoire[c]	1986-87	1	1,470	129	8.1
Ethiopia[b]	1989-90	1	205	22	9.7
Ghana (rural)[b]	1987-1988	1	1,310	526	28.6
Ghana (urban)[b]	1987-1988	1	803	351	30.4
Madagascar[b]	1992	3	170	19	10.1
Rwanda[c]	1985-1986	3	168	21	11.1
Asia					
South Asia					
Bangladesh[c]	1992-1993	3	683	61	8.2
Nepal[c]	1991-1992	4	246	18	6.8
Southeast Asia					
Indonesia[c]	1988-89	12	221	20	8.3
Central America					
Honduras[b]	1988-1989	1	313	32	9.3

[a] Households for which income and expenditure information are complete.

[b] Income.

[c] Expenditure.

[d] Food consumption, crop, and livestock transactions data were collected on a fortnightly basis, while data on all other transactions were collected on a monthly basis.

selected), there is a need to define the domain (the population corresponding to the sample) carefully. These issues will be addressed in future work.

POVERTY INDICES BY SELF-REPORTED HEADSHIP STATUS

Table 2 presents the poverty indices (head count, poverty gap, and P_θ indices) calculated for individuals in male- and female-headed households, according to self-reported headship. A 33-percentile poverty line was defined over the distribution of individuals in male- and female-headed households combined. Since we do not have information on individual incomes, and expenditures cannot be assigned to specific individuals, household income per capita (or per adult equivalent) was assumed to be the same for all household members. This therefore abstracts from issues of intrahousehold distribution and individual control of incomes (Alderman et al. 1995).

For the per capita expenditure (income) measure, a greater proportion (P_η) of individuals in female-headed households lie below the 33-percentile poverty line in 7 out of 11 data sets, and the poverty gap (P_1) is likewise larger for persons in female-headed households in 7 out of 11 data sets. The exceptions are in Côte d'Ivoire, Rwanda, and Nepal, where the poverty measures are lower for female-headed households. Poverty measures are significantly (10 percent or less level of significance) larger for persons in female-headed households in five data sets for the headcount index (P_η) and in four data sets for the poverty gap index (P_θ). The lower poverty measures for FHH in Côte d'Ivoire are consistent with the disproportionate location of female-headed households in Abidjan and other urban areas, which are considerably richer than rural areas.[14] The P_2 measure, which gives a larger weight to poorer families, is also larger for female-headed households in 8 out of 11 data sets. However, these differences are significant in

[14] Kakwani (1993) citing Glewwe (1987).

Table 2 Poverty indices by gender of household head, based on alternative income measures[a] (percentages)

	Total Expenditure (Income) per Capita						Total Expenditure (Income) per Adult Equivalent					
	P_0		P_1		P_2		P_0		P_1		P_2	
	Male-Headed	Female-Headed	Male-Headed	Female-Headed	Male-Headed	Female-Headed	Male-Headed	Female-Headed	Male-Headed	Female-Headed	Male-Headed	Female-Headed
Africa												
Botswana	30.2	35.3***	11.6	10.0*	6.2	4.5***	34.3	31.6	12.3	9.5***	6.6	4.0***
Côte d'Ivoire	33.4	26.1***	9.0	7.9**	3.4	3.6	32.9	37.1	8.3	11.4***	3.0	5.3***
Ethiopia	32.8	38.1	14.9	18.9	9.3	12.6	33.1	35.1	16.0	18.1	9.9	13.1
Ghana (rural)	31.6	37.5***	13.1	15.9***	7.0	8.9***	31.8	37.0***	12.7	15.1***	6.8	8.2***
Ghana (urban)	30.6	38.8***	14.4	18.6***	9.4	11.6***	31.2	37.1***	14.6	17.5***	9.6	10.9**
Madagascar	30.6	48.1***	10.2	18.4***	4.7	8.3**	32.7	44.3***	10.2	14.2	4.6	7.1
Rwanda	33.6	23.6***	6.7	1.8**	2.0	0.3***	33.2	25.8	7.3	5.4	2.3	1.4***
Asia												
Bangladesh	27.0	68.2***	6.4	21.7***	2.2	9.0***	28.6	62.4***	6.2	21.7***	2.1	9.0***
Indonesia	12.7	16.7	3.1	4.1	1.0	1.4	16.9	21.4	3.2	4.5	1.0	1.1
Nepal	33.0	32.9	9.9	8.6	4.1	2.6**	32.2	43.8**	9.4	14.1***	3.9	5.5
Central America												
Honduras	33.5	30.4	16.9	18.0	11.5	13.1	33.0	32.6	16.2	17.4	11.0	12.0

[a] Based on a 33-percentile poverty line for the combined distribution of individuals in male- and female-headed households.

* Differences significant at $\alpha = .10$.
** Differences significant at $\alpha = .05$.
*** Differences significant at $\alpha = .01$.

only four data sets (urban and rural Ghana, Madagascar, and Bangladesh). In contrast, the depth of poverty is higher for male-headed households in Botswana, Rwanda, and Nepal.

Using per adult equivalent income measures, a larger proportion of individuals in female-headed households are poor in 8 out of 11 data sets. Differences between male- and female-headed households are statistically significant in five data sets for P_η. Based on the poverty gap index, individuals in female-headed households are worse-off in nine data sets; these differences are significant in five data sets. With respect to the depth of poverty, persons in female-headed households have larger shortfalls from the poverty line in nine data sets; these are significant in four. Poverty is more severe for individuals in male-headed households in Botswana and Rwanda.

STOCHASTIC DOMINANCE RESULTS

Table 3 presents the application of first- and second-order stochastic dominance criteria to the per capita expenditure (or income) curves of individuals in male- and female-headed households. For sample dominance and statistical dominance, we specify an upper bound of 0.33, but also use the method of endogenous bounds so that upper and lower bounds are determined using sample information. Table 4 presents similar results using per adult equivalent measures.

The most striking result in both Tables 3 and 4 is that, within the restricted range of the bottom third, it is difficult to observe dominance of either MHH or FHH. For FSD, using per capita measures and statistical dominance, FHH dominates in one case (Rwanda). For 10 out of 11 data sets, in the bottom third of the combined samples, neither MHH nor FHH is dominant. Using adult equivalent measures (Table 4), MHH dominates FHH in two data sets (Côte d'Ivoire and Bangladesh); neither MHH nor FHH dominates for the 10 other data sets. This implies that, for the bottom third, the poverty incidence curves of

Table 3 Poverty comparisons using stochastic dominance analysis, per capita expenditure (income), by self-reported gender of household head[a]

Country	First-Order Stochastic Dominance[b] Sample Dominance[c]	Sample Dominance[d]	Statistical Dominance with Endogenous Bounds[e]	Length	Minimum	Maximum
Africa						
Botswana	x	x	mhh	0.29	322	474
Côte d'Ivoire	x	x	fhh	0.27	130,000	200,000
Ethiopia	x	x	mhh	0.18	119	220
Ghana (rural)	x	x	MHH	0.88	9,506	200,000
Ghana (urban)	x	x	mhh	0.42	8,655	31,000
Madagascar	x	x	mhh	0.29	39,000	90,000
Rwanda	FHH	FHH	fhh	0.39	3,974	8,734
Asia						
Bangladesh	x	x	MHH	0.97	49	867
Indonesia	x	x	fhh	0.08	12,000	14,000
Nepal	x	x	mhh	0.03	7,161	8,219
Central America						
Honduras	x	x	d	0.09	36	48
	Second-Order Stochastic Dominance (Deficit Curve)[f]					
Africa						
Botswana	x	x	fhh	0.30	107	327
Côte d'Ivoire	x	x	FHH	0.72	17,000	36,000
Ethiopia	x	x	MHH	0.55	62	1,025
Ghana (rural)						
Ghana (urban)	x	x	MHH	0.91	4,935	460,000
Madagascar	MHH	x	MHH	0.75	15,000	240,000
Rwanda	FHH	FHH	FHH	0.99	3,974	37,000
Asia						
Bangladesh	x	x	MHH	0.98	6.0	1,963
Indonesia	x	x	fhh	0.00	4,350	4,350
Nepal	FHH	x	fhh	0.28	863	2,467
Central America						
Honduras	x	x	fhh	0.02	0	1

[a] Both sample dominance and statistical dominance are evaluated between minus infinity and the 33rd percentile of individuals in both male-headed and female-headed households.

[b] Uppercase MHH (or FHH) indicates that MHH dominates FHH (FHH dominates MHH). For FSD, one variable dominates another if its distribution function is somewhere below and nowhere above the distribution of the other variable in the relevant range. X means that neither MHH nor FHH dominates.

[c] For restricted sample dominance, we are looking at whether one sample dominates another over the range of values from minus infinity to the 30th percentile.

(continued)

Table 3 (continued)

[d] For restricted statistical dominance, we are looking at whether we can infer that one distribution dominates another over the range of values from minus infinity to the 30th percentile. Dominance between the two populations is inferred if there is sample dominance and if the t-ratio between the two curves in the relevant range is greater in absolute value than the critical value 1.65 ($\alpha = 0.05$).

[e] For statistical dominance with endogenous bounds, we are looking for whether one variable dominates another within bounds that emerge from the analysis rather than being given exogenously. The length variable shows the longest range of statistically significant dominance (t-ratio greater in absolute value than the critical value 1.65) between plus and minus infinity, and gives the proportion of the two samples combined that are found between the minimum and maximum. If a capital MHH or FHH is used, then this length of statistically significant dominance is greater than the minimum length criterion used, .5. If a small mhh or fhh is used, this length is less than the minimum length criterion. If an X is used, Length, Minimum, and Maximum will all be missing, indicating that three is no range of statistically significant dominance. The minimum and maximum are both given in terms of the analyses variables, while the length gives the proportion of the two samples combined that are found between the minimum and maximum.

[f] Uppercase MHH (or FHH) indicates that MHH dominates FHH (FHH dominates MHH). For SSD, one variable dominates another if its deficit curve is somewhere below and nowhere above the deficit curve of the other variable in the relevant range. X means that neither MHH nor FHH dominates.

Table 4 Poverty comparisons using stochastic dominance analysis, per adult equivalent expenditure (income), by self-reported gender of household head[a]

Country	First-Order Stochastic Dominance[b]					
	Sample Dominance[c]	Sample Dominance[d]		Statistical Dominance with Endogenous Bounds[e]		
				Length	Minimum	Maximum
Africa						
Botswana	x	x	fhh	0.14	119	395
Côte d'Ivoire	MHH	x	mhh	0.20	210,000	280,000
Ethiopia	x	x	mhh	0.15	91	146
Ghana (rural)	x	x	MHH	0.56	42,000	170,000
Ghana (urban)	x	x	mhh	0.26	18,000	38,000
Madagascar	x	x	mhh	0.38	42,000	86,000
Rwanda	x	x	fhh	0.08	7,134	9,494
Asia						
Bangladesh	MHH	MHH	MHH	0.97	82	1,260
Indonesia	x	x	mhh	0.17	15,000	18,000
Nepal	x	x	mhh	0.15	2,785	4,288
Central America						
Honduras	x	x	fhh	0.05	368	533
	Second-Order Stochastic Dominance (Deficit Curve)[f]					
Africa						
Botswana	x	x	FHH	0.61	144	862
Côte d'Ivoire	MHH	MHH	MHH	0.87	54,000	730,000
Ethiopia	x	x	mhh	0.46	118	1,401
Ghana (rural)	x	x	MHH	0.99	4,256	660,000
Ghana (urban)	x	x	MHH	0.60	11,000	65,000
Madagascar	MHH	x	MHH	0.57	42,000	380,000
Rwanda	FHH	x	fhh	0.24	7,134	12,000
Asia						
Bangladesh	MHH	MHH	MHH	0.99	87	2,955
Indonesia	x	x	mhh	0.29	14,000	22,000
Nepal	x	x	MHH	0.66	3,526	16,000
Central America						
Honduras	x	x	fhh	0.03	842	930

Note: See notes of Table 3.

MHH and FHH are not sufficiently different for any one distribution to exhibit dominance. When the method of endogenous bounds is used, the length exceeds the minimum length required to obtain the critical value of the t-statistic (1.65) only for two data sets (rural Ghana and Bangladesh) using both per capita and adult equivalent measures.

For SSD, using the deficit curve and an upper bound of 0.33, three out of 11 data sets exhibit sample dominance using per capita measures (Madagascar, Rwanda, and Nepal) while four exhibit dominance using adult equivalent measures (Côte d'Ivoire, Madagascar, Bangladesh, and Rwanda). MHH dominates in most cases, with the exception of Rwanda and Nepal, for per capita measures. However, these differences are statistically significant only for FHH in Rwanda, using per capita measures, and for MHH in rural Ghana and Bangladesh, using per adult equivalent measures. For the majority of the data sets, the deficit curves of male- and female-headed households are again not sufficiently different to infer stochastic dominance. When bounds are determined endogenously, MHH dominates in five data sets using per capita measures and in six using adult equivalent measures. FHH dominates in Côte d'Ivoire and Rwanda, using per capita measures, and in Botswana, using adult equivalent measures.

To summarize, when we restrict the analysis to the bottom third of each sample, and examine statistical dominance using per capita income or expenditure measures, MHH consistently dominates in terms of SSD for Madagascar. FHH dominates for both FSD and SSD for Rwanda. When adult equivalent units are used, Bangladesh MHH dominate for FSD and SSD, and Côte d'Ivoire for SSD. That is, among the very poor, there is evidence that male-headed households are better-off in Madagascar when per capita units are used to deflate income or expenditure, and in Bangladesh when adult equivalent units are used. Female-headed households among the very poor appear to do better in Rwanda (using per capita measures). When bounds are set endogenously, for both the incidence and deficit curves, MHH dominates in

Bangladesh and rural Ghana. In other words, poverty among female-headed households seems to be consistently higher in these two areas when the information from the entire sample is used. These results are consistent with tests of significant differences between the poverty measures of male- and female-headed households.

5. CONCLUSIONS

SUMMARY OF RESULTS

Similar to previous studies on gender and poverty, our results show weak evidence that female-headed households are overrepresented among the poor. While individuals in female-headed households are worse-off in terms of a number of poverty measures, these differences are statistically significant in about a third-to-half of the data sets, depending on the poverty measure used.

Stochastic dominance analysis reveals that differences between male- and female-headed households among the very poor are not sufficiently large that one can conclude that one is unambiguously worse- or better-off, except for a few exceptions. When we use the method of endogenous bounds, persons in female-headed households in rural Ghana and Bangladesh are consistently worse-off using two stochastic dominance criteria. These results suggest that, among the very poor, persons in male- and female-headed households may not differ significantly. The consistent and significant exceptions, rural Ghana and Bangladesh, suggest that cultural and institutional factors may be responsible for higher poverty among women in these countries. Moreover, the general lack of dominance suggests the need for multivariate analysis. Part of the problem is that both groups, male- and female-headed households, are very diverse and univariate dominance does not control for other determinants of household income or consumption.

Given that such comparisons do not control for other determinants of income, the results should not be taken to argue that policy interventions should not be

targeted by gender. Even if there are no strong poverty differences between men and women, in many countries, women have lower levels of education, assets, and social indicators than do men. It is therefore quite remarkable that poverty differences are not large, *despite* the massive discrimination against women in terms of access to and control of resources.

OUTSTANDING ISSUES

Why do significant differences not emerge in all of the data sets? Part of the reason may be methodological. Since we did not have information on household expenditures for all data sets, we used income data where expenditure data were not available. If both types of households had the same expenditure propensities, comparisons across male- and female-headed households in the same country would be valid. However, a growing body of evidence suggests that male and female expenditure patterns may not be the same (Thomas and Chen 1994). Moreover, most of the data sets used in this study are not nationally representative, and it is possible that sampling variation may have contributed to larger standard errors, reducing the significance of the differences. Nevertheless, such tests of statistical significance should be a regular feature of tables comparing males and females, such as those in the *World Development Report*, the UN's *World's Women*, and the *Human Development Report*.

However, perhaps the focus on headship as *the* stratifying variable for the study of gender and poverty is misplaced. The gender of the household head may be a useful first-order disaggregation in some cases, and not in others. This disaggregation still masks the details of household composition and the actual allocation of resources within the household. Moreover, the heterogeneity among female-headed households contributes to these methodological difficulties. Indeed, the clearest picture that emerges from our review and analysis is that poverty is a multifaceted problem that is far too complex to be attributed solely to gender. Income-based measures relate to

only one aspect of poverty. Differences in nutrition, health, and time allocation may reveal more about gender disparities in well-being. Some social indicators, notably adult and infant mortality rates, may differ more widely across males and females. Future studies of gender and poverty would do well to analyze these variables in addition to traditional income-based measures.

A focus on headship per se may be a misleading angle for analyzing gender and poverty. We may perhaps obtain better insights into gender and poverty if we were to analyze the processes that determine female headship. Models of family behavior suggest that family formation and marital dissolution depend upon individual, family, and external characteristics.[15] Female headship, rather than being an exogenous category, is, in fact, endogenous: it depends upon the characteristics of the marriage market, as well as the processes that lead to marital dissolution. In cooperative bargaining models of marriage,[16] whether or not an individual remains in a union depends on his or her utility outside that union. This "reservation utility" or "threat point" is a function of individual characteristics, especially nonlabor income and education, and social or institutional factors that affect the attractiveness of being married.[17] Although there is a growing literature on the effect of policies on family formation, especially in the context of welfare systems in industrialized countries,[18] similar empirical analyses for developing countries are rare.[19] For disaggregation by gender to be meaningful for policy, and to serve as a better indicator for targeting programs, we need to understand more fully the "black box" of the household and its interactions with the economic, social, and even the political environment.

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[15] Buvinic and Gupta refer to this in passing when they note that "women with economic means" may choose such family structures, but the authors do not pay sufficient attention to the endogeneity of female headship.

[16] See, for example, McElroy and Horney (1981) and McElroy (1990).

[17] These are the "extra-environmental parameters" (eeps) in McElroy's model.

[18] See, for example, Schultz (1993).

[19] One example is Handa (1995).

APPENDIX

Characteristics and Sample Design of the Data Sets

Country	Year(s) of Collection	Number of Survey Rounds	Sample Size	Sample Design
			(households)	
Botswana	1993	1	349	The survey work covered eight villages identified based on their degree of participation in road work and representation of villages in the vicinity of the road work. All resident road participants were included and an equal number of nonparticipants were randomly selected from four strata of non-participants (female-headed households with no assets, female-headed households with assets, male-headed with assets, and male-headed without assets).
Côte d'Ivoire	1986-87	1	1,600	The survey was undertaken in 1,600 households, in a random sample designed to be nationally representative.
Ethiopia	1989-90	1	550	Surveys were conducted in seven rural sites that suffered hardships (not caused by military disruption of production) between 1984-1989. Site selection was based on diversity of agro-ecological settings and ethnic groups and clear indication of recent food crisis at a local level. Survey locations were chosen to lie in territory administered by that government and in areas unlikely to become militarily insecure during the survey operation. The seven sites capture some of the diversity of the famine experiences in the survey regions: three sites were in the highlands, and four in the lowlands. Of the lowlands sites, one is a semi-nomadic pastoral community, while the other six are all settled farming communities.
Ghana	1987-88	1	3,200	This is a nationally representative survey of 3,200 households across approximately 200 enumeration areas stratified by urban/rural and by ecological zones.

(continued)

Country	Year(s) of Collection	Number of Survey Rounds	Sample Size (households)	Sample Design
Madagascar	1992	3	189	The survey was administered in four regions covering the major agroecological conditions in Madagascar except for those in eastern coastal and rain forest regions. Ten villages were drawn from a subsample of villages with formal community-based savings and credit associations, using stratified random sampling based on population size and region-specific distance of the village to the nearest national road. All survey households were drawn randomly from the population within each of the ten villages.
Rwanda	1985-86	3	189	The survey was undertaken in a high altitude zone of the Zaire-Nile Divide in northwest Rwanda. The survey site is landlocked, very densely populated, and has a low degree of urbanization.
Bangladesh	1992-93	3	553	The survey was conducted only in fully- and well-operating rural rationing locations. Based on random sampling, 553 households were chosen during the first round. The sample size was increased to 737 households in the second and third survey rounds in order to include households from the higher income groups. The survey was conducted in eight villages, two in each of the four divisions of the country. Four of the survey villages are located in distressed areas and the other four in nondistressed areas. Two distressed villages and two nondistressed villages are located in infrastructurally developed areas. The other four villages are from relatively poor infrastructure locations.
Indonesia	1988-89	12	320	Two provinces were selected to represent different cropping systems most commonly found in the areas susceptible to highly seasonal climates: a relatively developed province and a comparatively underdeveloped province. In each province, a regency and district were selected that were representative of the predominant cropping system. At the district level, two villages were selected such that one village was more remote than the other, both geographically and in terms of access to markets and employment.

(continued)

Country	Year(s) of Collection	Number of Survey Rounds	Sample Size (households)	Sample Design
Nepal	1991-1992	4	256	The study compares two groups of randomly selected farm households depending on their adoption of new technologies for crop production. The study was undertaken in three communities representing different agroclimatic and environment zones and having different ethnic compositions.
Honduras	1988-89	1	712	The study was carried out in six municipalities of Choluteca, the southern part of region IV of Honduras. The survey was based on a stratified cluster sampling procedure; each cluster had about 30 households. Stratification was based on ecological characteristics (soil quality, water availability, and climate). Population consists of areas under the Honduran-German Cooperation Food for Work (COHAAT) Program. The sample size was based on the prevalence of child malnutrition in the study area as indicated in the national nutrition survey of the Ministry of Public Health.

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