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Gender, Poverty and Intra-Household Distribution of Resources

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Gender, Poverty and Intra-household Distribution of Resources*

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Abstract. Numerous authors have pointed out the importance of taking into consideration the intra-household distribution of resources in the analysis of poverty. Most empirical studies of poverty, however, assume an equal sharing of resources between all household members. There is a growing body of research indicating this assumption is not realistic. Nevertheless, only limited attention has been directed towards addressing how one incorporates sharing assumptions into poverty measurement. This paper proposes a method that allows one to evaluate how the unequal sharing of resources between male and female adults and between adults and children affects the incidence and intensity of poverty. The method is consistent with Sen's axiomatic approach to poverty measurement and is based upon an aggregate poverty index that is additively decomposable with population share weights. Data from two countries participating in the *Luxembourg Income Study*—Italy and the United States—are used to illustrate the importance of paying attention to the intra-household distribution when one is examining the relationship between gender and poverty.

Gender, Poverty and Intra-household Distribution of Resources

Introduction

Most empirical studies of poverty assume an equal sharing of resources between all household (or family) members. Household members are assumed to "pool" their individual resources (e.g. earnings, government transfers, unearned income, etc.). These pooled resources are then redistributed equally amongst household members based on need. A household is defined as being poor if its "average" level of resources (however defined and measured) falls below the level chosen to represent the poverty standard. In turn, an individual is poor if he or she is a member of a poor household. As Glendinning and Millar (1988:5) put it, most empirical studies of poverty explicitly or implicitly assume that the: "[L]evels of consumption and living standards of all household members are also broadly similar: i.e. poverty and plenty are both equally shared and that poverty is only experienced by those individuals living in poor households."

Numerous authors have pointed out the potential importance of taking into consideration the intra-household distribution of resources in the measurement of poverty (see for example, Jenkins, 1991). Many writers believe that significant inequality exists within the household, with resources not being shared equally between men, women and children (see for example, Glendinning and Millar, 1988; Millar and Glendinning, 1989; Pahl, 1983, 1989; Vogler, 1989; Young, 1952). Furthermore, it is often argued that

women are not receiving their "fair share" of available household resources. If this is true, then some women residing in "non-poor households" may in fact be "poor". Likewise, some men residing in "poor households" may not be "poor". If the unequal sharing of resources is occurring, then conventional methods of poverty measurement will lead to an *under-estimate* of female poverty and an *over-estimate* of male poverty (and perhaps child poverty).

The purpose of this paper is to examine how the unequal sharing of resources between male and female adults and between adults and children affects the incidence and intensity of poverty. Unfortunately, little reliable data describing the pattern of sharing within households are available. Therefore, the approach that we follow is based on simple numeric simulation. Nationally-representative data from Italy and the United States are used in these simulations. Assumptions concerning the size and direction of transfers between different household members are made. Based on these assumptions, male and female poverty rates and shares are calculated. These estimates are then compared to estimates based on the equal sharing of resources.

The paper proceeds as follows. In the first section, a framework that can be used incorporate information about the intra-household distribution of resources in the measurement of poverty is described. In this section, the procedures used to identify poor households and individuals are outlined. In Section 2, the specific poverty measures calculated are described. An index that is additively decomposable with population share rates, and is consistent with Sen's influential axiomatic approach to

poverty measurement, is used. With this index it is possible to decompose the total amount of poverty into male and female shares. In the third section, micro-data from two countries participating in the *Luxembourg Income Study*—Italy and the United States—are used to examine how aggregate estimates of poverty vary depending on assumptions relating to the sharing of resources within the household. The estimates based on unequal sharing are presented in the fourth section. Conclusions and suggestions for future research follow in Section 5. The estimates illustrate the importance of paying attention to the intra-household distribution of when one is examining the relationship between gender and poverty.

I. Theoretical Framework: Identifying the Poor

If we define economic well-being as the ratio of economic resources to need, then an individual is "poor" if the resources available to them do not meet their needs at some minimum level. Most empirical studies of poverty, employ *disposable equivalent household income* as the empirical counterpart to economic well-being. The household's economic resources are assumed to be determined by it's total disposable income, which is equal to the gross weekly income of all household members minus income taxes and other mandatory deductions.

It is clear that there are economies of scale in consumption relating to household size. Likewise, there are differences in consumption patterns between children and adults. Disposable

income should be adjusted to reflect these differences. This adjustment is usually carried out by assuming that the household's needs are a function of the number and ages of its members. Equivalence scales are then used to adjust disposable income.

Under the assumption of the equal sharing of resources, a household is "poor" if it's equivalent disposable income, y_i, is below the "poverty line", y^*. Unfortunately, there are no well defined rules for selecting the "correct" poverty line. In this paper, the so-called "households below average income" (HBAI) approach is used. With this approach, the poverty line is set at a fraction, ρ, of the mean level of income, $\bar{y}$. This is: $y^* = \rho \cdot \bar{y}$. Therefore, a household is poor if its income is below this level. An individual is poor, if he or she is a member of a poor household.[1] That is:

$$\text{If } y^* - y_i > 0 \text{ then } P_i = 1, \qquad [1]$$

where P_i is an indicator variable that takes the value of 1 if an individual is poor and 0 if not. Therefore, under the equal sharing of resources the poverty rate or percentage, $\bar{P}$, is simply:

$$\bar{P} = (1/n)\sum_{i=1}^{n} P_i, \qquad [2]$$

where n is the number of individuals in the population.

As mentioned above, if unequal sharing of resources is

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1. For a detailed discussion of the advantages associated with the HBAI approach see Atkinson (1987).

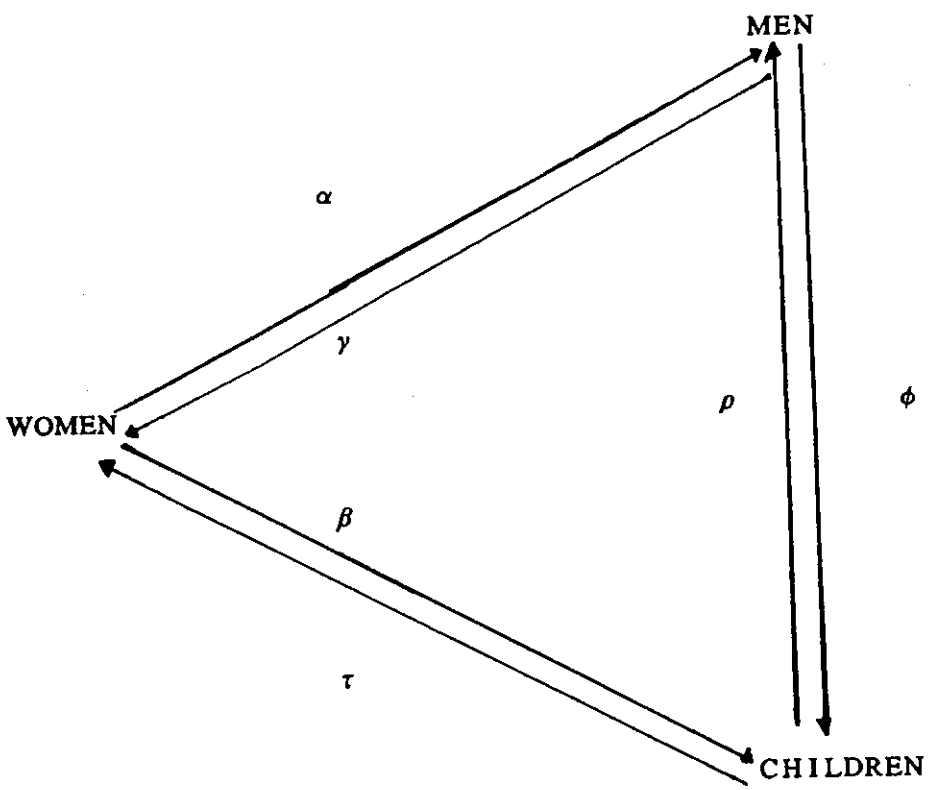
occurring within households, then $\bar{P}$ will not be an accurate estimator of the incidence of poverty in the population. One way to conceptualise inequality within the household is in terms of transfers of resources between different "types" of household members. A useful starting point is to think in terms of three main groups of individuals: (1) *adult men*; (2) *adult women*; and (3) *children*.

Since there are three groups of individuals, there are six possible directions in which transfers may flow. These are shown in Figure 1. The parameters α and β represent transfers from adult women to adult men and children respectively. The parameters γ and ϕ are transfers from adult men to adult women and children. Finally, τ and ρ are the parameters representing the transfers from children to adult women and from children to adult men. The parameters represent how much an individual gains or loses due to inequality within the household relative to what they are entitled to if there is equal sharing of resources.

This framework can be used to incorporate information about intra-household inequality into the measurement of poverty. More formally, let y_i be the level of income that individual i is entitled to based on the equal sharing of resources assumption (i.e. equivalent income). Let $y_i^a(w)$ be the adjusted level of income received by adult women after transfers to and from adult men and children have been made. We may write this amount in terms of the transfer parameters defined above. That is:

$$y_i^a(w) = (1 - \alpha - \beta + \gamma + \tau) \cdot y_i \qquad [3a]$$

Figure 1
Intra-household Resource Flows



Parameters

		From:		To:
1.	α:	Women	→	Men
2.	β:	Women	→	Children
3.	γ:	Men	→	Women
4.	ϕ:	Men	→	Children
5.	τ:	Children	→	Women
6.	ρ:	Children	→	Men

or

$$y_i^a(w) = \sigma(w) \cdot y_i, \qquad [3b]$$

where $\sigma(w)$ is the "net transfer parameter" for adult women.[2] Clearly if women are receiving (for whatever reasons) less than they are entitled to under the equal sharing of resources assumption, then $\sigma(w) < 1$. It follows that woman are poor if their *adjusted* income falls below the poverty line. That is:

$$\text{If } y^* - y_i^a(w) > 0 \text{ then } P_i^a(w) = 1, \qquad [3c]$$

where y^* is the poverty line and $P_i^a(w)$ is an indicator variable equal to 1 if she is "individually poor" and 0 if she is not. It is important to note that if $\sigma(w) < 1$ *and* $y_i > y^*$ women may in fact be "poor" but do not reside in "poor households". Therefore, the poverty rate for women is:

$$\bar{P}_w = (1/n_w) \sum_{i=1}^{n_w} P_i^a(w), \qquad [3d]$$

where n_w is the number of adult women in the population.

A similar resource quantity can be defined for adult men. Let $y_i^a(m)$ be the adjusted level of income of adult men in the

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2. These transfer parameters are subject to the following constraints: (1) If $X = \alpha, \beta, \gamma, \phi, \tau$ and ρ then $0 \leq X < 1$ and (2) $0 \leq (\alpha + \beta) < 1$; $0 \leq (\gamma + \phi) < 1$ and $0 \leq (\tau + \rho) < 1$. These constraints imply that all transfers are positive and all individuals must keep some of their resources for personal consumption.

household after transfers to and from adult women and children. In terms of the transfer parameters defined above, we may write this amount of income as:

$$y_i^a(m) = (1 - \gamma - \phi + \alpha + \rho)\cdot y_i \qquad [4a]$$

or

$$y_i^a(m) = \sigma(m)\cdot y_i, \qquad [4b]$$

where $\sigma(m)$ is the net transfer parameter for adult men. If $(m) > 1$ then adult men are receiving more resources than they are entitled to under the equal sharing of resources assumption. It follows that adult men are poor if their adjusted income falls below the poverty line. That is:

$$\text{If } y^* - y_i^a(m) > 0 \text{ then } P_i^a(m) = 1. \qquad [4c]$$

Again it is important to note that if $\sigma(w) > 1$ *and* $y_i < y^*$ adult men may in fact be residing in "poor households" but are not "individually poor". The male poverty rate is:

$$\bar{P}_m = (1/n_m) \sum_{i=1}^{n_m} P_i^a(m), \qquad [4d]$$

where n_m is the number of adult men in the population.

Finally, the adjusted income for children after transfers to and from adult men and women may be written:

$$y_i^a(c) = (1 - \tau - \rho + \beta + \phi) \cdot y_i \qquad [5a]$$

or

$$y_i^a(c) = \sigma(c) \cdot y_i, \qquad [5b]$$

with the poverty condition:

$$\text{If } y^* - y_i^a(c) > 0 \text{ then } P_i^a(c) = 1. \qquad [5c]$$

With the adjusted child poverty rate being:

$$\bar{P}_c = (1/n_c) \sum_{i=1}^{n_c} P_i^a(c), \qquad [5d]$$

where n_c is the number of children in the population.

The problem with this approach, of course, is that data describing the magnitudes of these transfer parameters are rare (see Jenkins, 1991). In the absence of accurate data, an alternative approach is to select a series of "average" values for these parameters and then calculate male, female and child poverty rates based on these selected values—a form of simple numeric simulation. By comparing these "adjusted" poverty rates to the rates obtained under the assumption of equal sharing of resources, one can examine how sensitive conventional estimates of poverty are to changes in sharing patterns. This approach, albeit imperfect, does provide a quantification of how much of a difference the existence of inequality within the household makes.

II. Summarising Poverty

The above discussion focused on the "incidence" dimension of poverty. However, poverty is multi-dimensional and these dimensions should be incorporated into summary indices of poverty. Sen (1986) described three properties that a good summary index of poverty should possess. The first is the index must be sensitive to the relative number of poor, capturing the *incidence of poverty*. The second is that the index must be sensitive to the average level of income of poor, indicating their *average deprivation*. The third is the index must be sensitive to the distribution of income among the poor, indicating their degree of *relative deprivation*.

Unfortunately most measures of poverty that incorporate Sen's axiomatic requirements (including Sen's own measure) are not decomposable (see Hagenaars, 1987). For our purposes this is problematic since we want to decompose the "total" amount of poverty into male and female "shares". These shares provide information about the gender composition of poverty.

The measure used here, which is decomposable, is due to Foster, Greer and Thorbecke (1984) (hereafter referred to as the FGT measure). This measure, $P(\alpha)$, may be defined:

$$P(\alpha) = (1/n) \sum_{i=1}^{q} \left[\frac{(y^* - y_i)}{y^*} \right]^{\alpha} . \qquad [6]$$

where: y^* is the poverty line; y_i is the household income of

individual i; q is the number of poor individuals in the population ($y_i < y^*$); and n is the total number of individuals in the population. α is a parameter which takes on a value greater than or equal to zero ($\alpha \geq 0$). As α gets larger, the measure becomes more sensitive to the income circumstances of the "poorest poor".

If $\alpha=0$ then $P(0)=H=q/n$. This is the "head-count ratio", which is simply the proportion of population who have income below the poverty line (i.e. the incidence of poverty). If $\alpha=1$ then $P(1)=H \cdot I$ where $I=(y^* - \bar{y}_p)/y^*$. $\bar{y}_p$ is the average income of the poor. This is a re-normalisation of the "income-gap ratio", which captures the average income shortfall of the poor. If $\alpha=2$ then $P(2)=H[I^2+(1-I)^2 C_q^2]$, where C_q is the coefficient of variation of income among the poor. Since C_q is a commonly used measure of income inequality, its inclusion in the measure captures the relative deprivation of the poor.

A useful feature of the FGT measure is that it is additively decomposable with population share weights. More specifically, with respect to male and female poverty:

$$P(\alpha) = (n_w/n) \cdot P(\alpha)_w + (n_m/n) \cdot P(\alpha)_m \ , \qquad [7]$$

where the subscripts "m" and "w" denote male and female respectively. The ratios n_w/n and n_m/n are the population shares of adult females and males ($n_w/n + n_m/n = 1$). $P(\alpha)_w$ and $P(\alpha)_m$ are the FGT poverty measures calculated separately for females and males. If we think of $P(\alpha)$ aa being the total amount of poverty in the population, then the female and male shares of this total are:

$$S(\alpha)_w = (n_w/n)\cdot P(\alpha)_w/P(\alpha) \ , \qquad [8]$$

and

$$S(\alpha)_m = (n_m/n)\cdot P(\alpha)_m/P(\alpha) \ . \qquad [9]$$

It follows from Eqs. [8] and [9], if poverty is "equally shared" between women and men, each groups poverty share would equal their population share. That is:

$$S(\alpha)_w=(n_w/n) \qquad [10]$$

and

$$S(\alpha)_m= (n_m/n) \qquad [11]$$

If on the other hand, $S(\alpha)_w > (n_w/n)$ then poverty is not "equally shared" between men and women, with women being "over-represented" in the ranks of the poor. A convenient way of summarising how "over-represented" women are in poverty is simply how much their poverty share exceeds their population share. For example, the ratio of the female poverty share to the female population share.

For reasons discussed above, if there is the unequal sharing of resources then male and female poverty rates and shares will change. All the above quantities can be easily calculated by substituting into the equations the adjusted poverty rates. By comparing the poverty rates and shares that incorporate information about the unequal sharing of resources, one can see what difference inequality within the household makes.

III. Data

In this section, FGT poverty rates shares are calculated for two countries—Italy and the United States—in order to examine how estimates of poverty vary depending on different assumption about the sharing of resources in the household. These data-sets form part of *Luxembourg Income Study.*[3] The source of the Italian data is the *Bank of Italy Income Survey*. This survey was carried out in 1986 and has an unweighted sample size of 8,022 households. The source of the American data is the *March Current Population Survey*. This survey was carried out in 1985 and has an unweighted sample size of 11,614 households. All estimates presented below are weighted in order to reflect population totals.

Total disposable income is used to represent the household's level of resources. This is adjusted using "equivalence scales" in order to take into consideration the different needs of different household members. The scales used are the weights recommended by the OECD in its work on social indicators. That is, the first adult in the household has a weight of 1.0; each other adult has a weight of 0.7; and each child has a weight of 0.5.

Our analysis focuses on poverty amongst adults only. An adult is defined as an individual age 18 and above. Unfortunately, the LIS data-sets are not detailed enough to examine how the unequal sharing of resources affects child poverty. Therefore, we

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3. The LIS database is housed at the *Centre for Poverty, Population and Policy Studies*, Walferdange, Luxembourg and may be conveniently accessed through the BITNET electronic mail service. Further details can be found in Smeeding et al (1990: 172-181).

concentrate on how the unequal sharing of poverty affects the distribution of among adult men and women.

The poverty estimates presented in this paper are all based on a poverty line set at 50 per cent of the mean level of equivalent income in each of the two countries. Therefore, the poverty line is a *relative* poverty threshold, not an *absolute* threshold, since no adjustment is made for differences in the price level between the Italy and the United States. In fact, this is the poverty line used in the European Community's *First and Second European Poverty Programmes* (see Commission of the European Communities, 1991).

Inequality within the household is generated by the following process:

$$y_i^a(w) = (1 - \eta) \cdot y_i, \qquad [12a]$$

$$y_i^a(m) = (1 + 0.25\eta) \cdot y_i, \qquad [12b]$$

$$y_i^a(c) = (1 + 0.75\eta) \cdot y_i, \qquad [12c]$$

where η ranges from 0 to 0.5. As can be seen from these conditions, in our simulations adult women "lose" and adult men and children "gain" because of inequality within the household. It is further assumed that 25 per cent of the total amount that adult women transfer is transferred to adult men, while 75 per cent is transferred to children. The amount that women transfer varies from 0 to 50 per cent of the income they are entitled to under

equal sharing of resources. As η gets larger, women transfer a progressively larger share of their resources to adult men and children in the household.

IV. Estimates

Table 1 reports the estimates of the three values of the FGT poverty index (i.e. α=0,1 and 2) calculated under the assumption of an equal sharing of resources.[4] The estimates suggest that *relative poverty* is higher in the United States compared to Italy. All three poverty measures are higher in the United States. The P(0) index, or head-count ratio,indicates that about 17.5% of adults in the United States are poor while the rate in Italy is 17.0%. The poverty difference between these two countries is larger than suggested by the head-count ratio when the other two FGT poverty indices are considered. The P(1) rate in the United States is 7.1% and the rate in Italy is 4.5%—a difference of almost 50%. Likewise, the P(2) rate in the United States is 3.8, which is twice the Italian rate of 1.9. These estimates indicate that when more information about the income circumstances of the poor is incorporated into the measurement of poverty, the poverty gap between Italy and the United States widens.

The estimates shown in Table 1 indicate that under the assumption of equal sharing of resources, the gender distribution of poverty is very different in the United States and Italy. Italy

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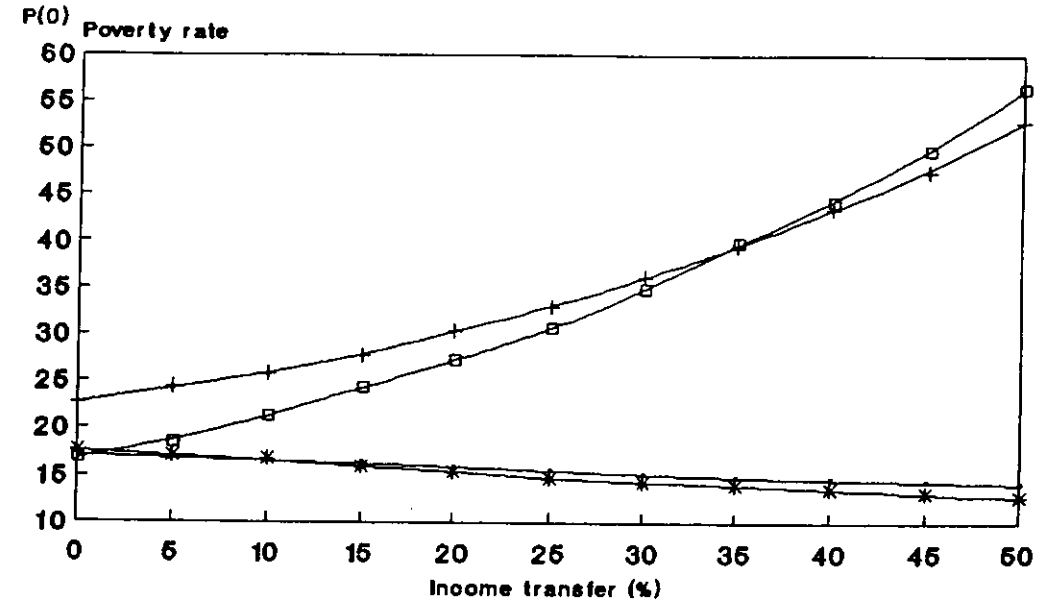
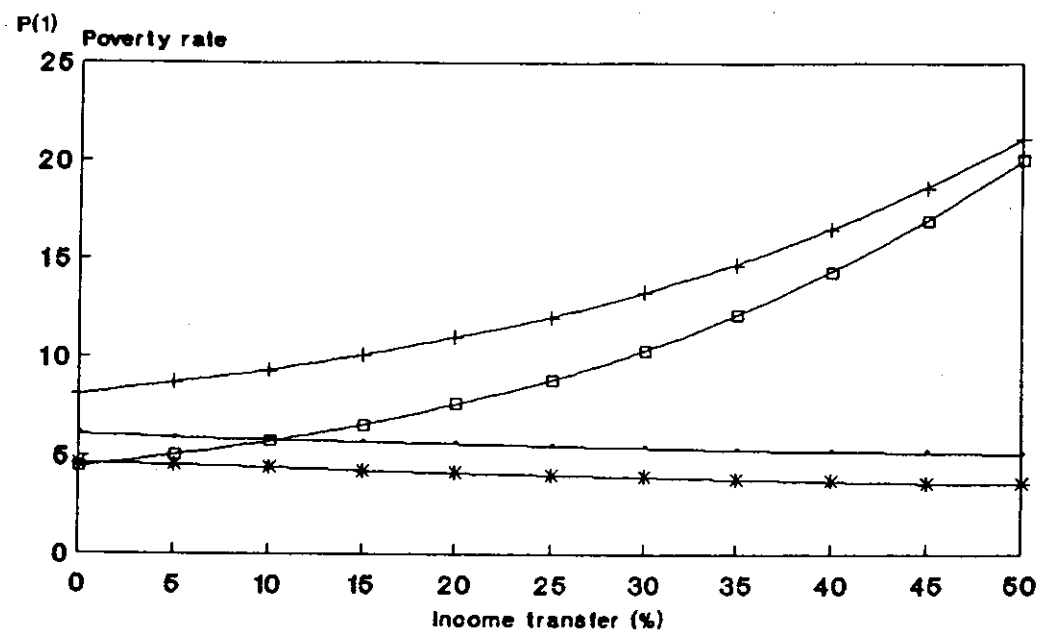
4. All the poverty estimates have been multiplied by a factor of 100 and all poverty shares are expressed as percentages.

Table 1
Male-Female Poverty Rates
(Equal Sharing Assumption)

Measure:		*P(0)*			*P(1)*			*P(2)*		
Country	Year	Male	Female	Both	Male	Female	Both	Male	Female	Both
Italy	1986	17.5	16.8	17.1	4.6	4.4	4.5	2.0	1.9	1.9
U.S.A.	1985	17.0	22.6	20.0	6.1	8.1	7.1	3.3	4.3	3.8

Figure 2
Male-Female Poverty Rates





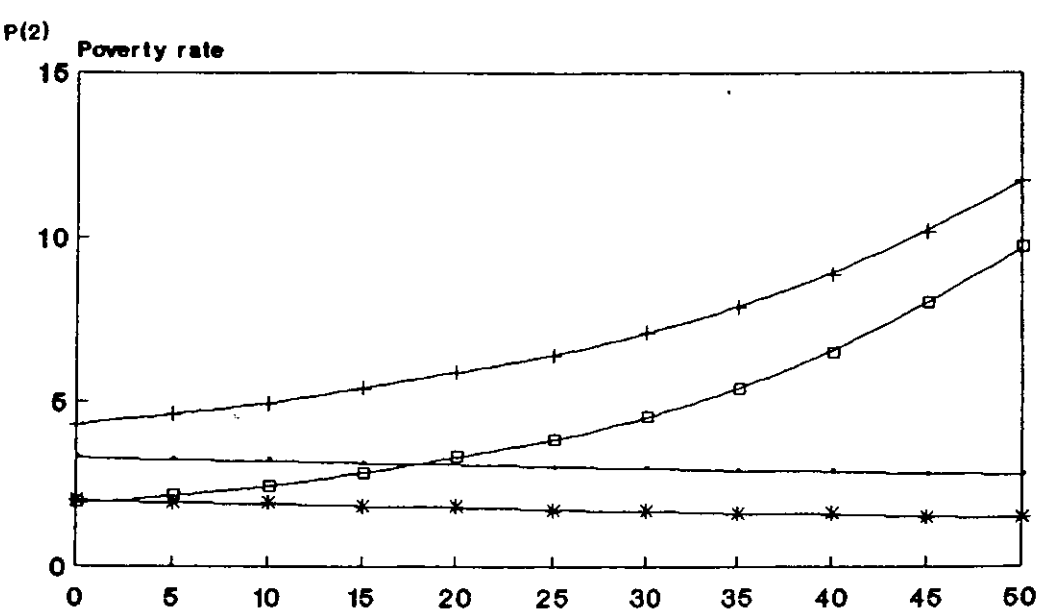
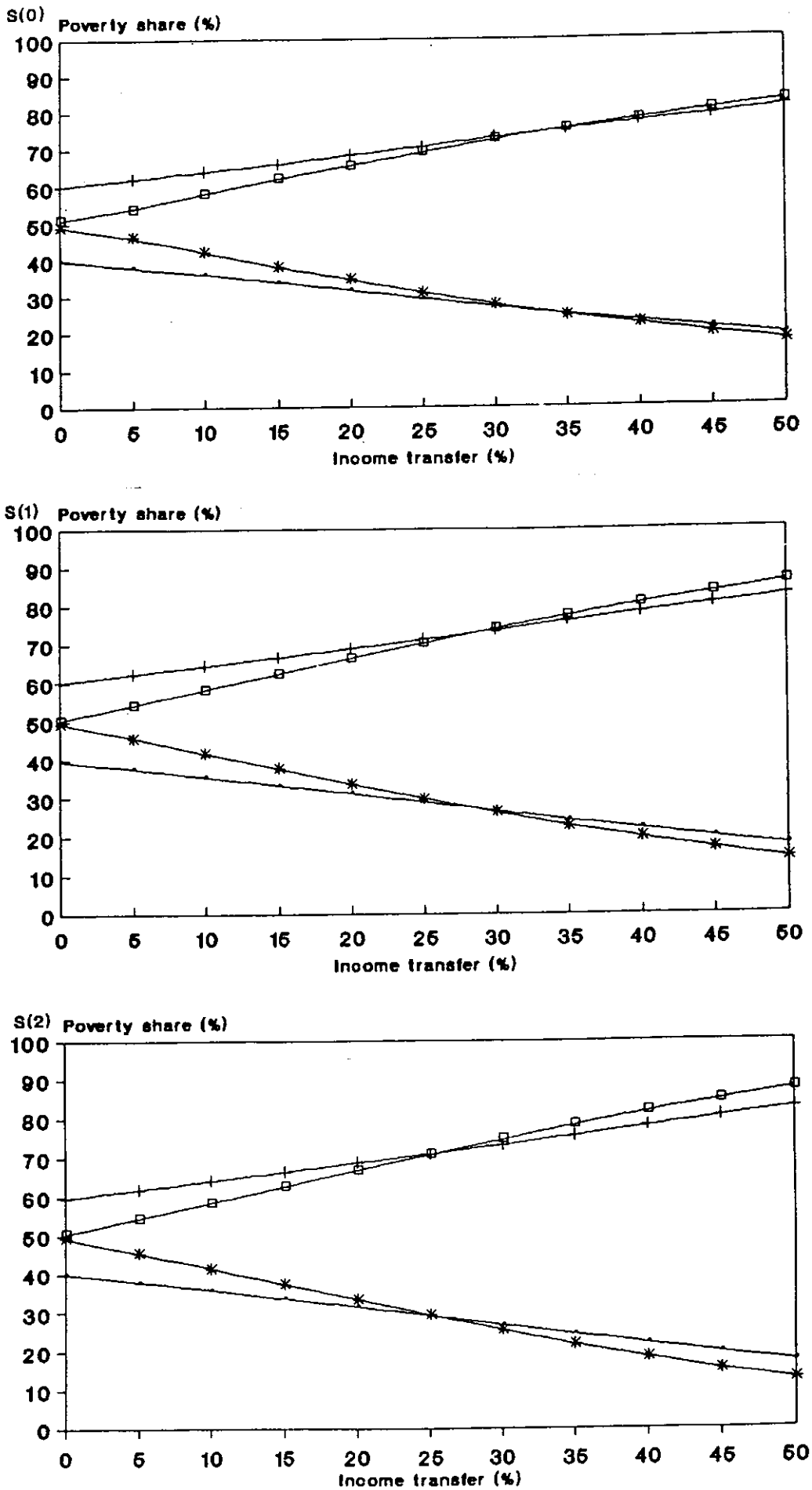


Figure 3
Male-Female Poverty Shares



has a very equal gender distribution of poverty. However, in the United States, the gender distribution of poverty is very unequal, with women being significantly over-represented amongst the poor.

Turning first to the estimates for Italy, the FGT poverty indices calculated separately for men and women are very similar in magnitude. In fact, the P(0) and P(1) rates are slightly higher for *men* compared to women, and the P(2) rates are equal. However, the situation is very different in the United States. The three poverty rates are all significantly higher for women compared to men. This suggests that both the incidence and intensity of poverty is higher for women compared to men in the United States.

Table 2 shows male-female population and poverty shares. The estimates for Italy suggest that women are *slightly* "under-represented" amongst the poor, while the estimates for the United States suggest that women are *severely* "over-represented" amongst the poor. In Italy, the three poverty shares corresponding to the three poverty measures P(0), P(1) and P(2) are 50.9%, 50.4% and 50.6%, respectively. These shares are all lower than the female population share of 51.9%. The opposite is observed for the United States. The poverty shares of 60.1%, 60.3% and 59.8% are all much higher than the female population share of 53.2%.

How does the gender distribution of poverty change when inequality is introduced within the household? The results of the simple simulations performed are summarised in Figures 2 and 3. Figure 2 shows the poverty rates for men and women. Figure 3 shows the associated male and female poverty shares.

As a general remark, the poverty estimates for both Italy and

Table 2
Female Poverty Shares
(Equal Sharing Assumption)

Country	Year	PopShare(%)	Poverty Share(%)		
			$S(0)_f$	$S(1)_f$	$S(2)_f$
Italy	1986	51.9	50.9	50.4	50.6
U.S.A.	1985	53.2	60.1	60.3	59.8

the United States change considerably after the data are adjusted in order to reflect the unequal sharing of resources between men, women and children. The estimates of the head-count ratio, P(0), indicate that if adult women in the United States transfer 25% of their income to adult men and children, the proportion who are poor increases from 22.6% (i.e. equal sharing) to 32.9%, while the male poverty rate decreases from 17.0% to 15.5%. If women transfer 50%, the proportion who are poor is 52.8%, compared to 15.5% of adult men. Likewise, if Italian women transfer 25% of their income, their poverty rate increases from 16.8% to 30.5%, while the male rate decreases from 17.5 to 14.7%. If the amount transferred is 50%, the female rate is 56.2% and the male rate is 12.7%. Similar magnitudes of relative change are observed for the other two poverty rates, P(1) and P(2) (see Figure 2).

The gender distribution of poverty changes dramatically because of these transfers (see Figure 3). The poverty shares based on the P(0) index, suggest that if American women transfer 50% of their income, their poverty share increases from 60.1% to 81.0%. If Italian women transfer 50%, their poverty share increases from 50.9% to 82.6%. Again, a similar pattern of relative change is observed for the poverty shares based on the other two poverty measures.

It is interesting to note that as the amount of income transferred from women to men and children increases, the gender distribution of poverty becomes very similar in the two countries. This is a surprising finding since under the assumption of equal sharing of resources, the gender distribution of poverty in the

two countries is quite different.

V. Conclusions

Our analysis indicates that if there is significant intra-household inequality, as some writers have suggested, then conventional methods of poverty measurement based on the equal sharing of resources is likely to lead to a serious under-estimate of the incidence and intensity of female poverty. Our simple simulations, using data from Italy and the United States, indicate that female poverty rates increase dramatically if resources are being transferred from women to other household members. It it hoped, at the very least, that this paper has illustrated the potential importance of paying attention to the intra-household distribution of resources when examining the relationship between gender and poverty.

In closing, it is worth reminding the reader of the obvious weakness with the approach we have followed. It is assumed that all women are behaving in the same way in the sense that the same proportion of their income is being transferred to other household members. The problem with this approach, of course, is that in reality this "sharing behaviour" is likely to be more heterogeneous. However, as was already mentioned, reliable data describing the structure of intra-household inequality are rare. Furthermore, we are not optimistic that data of this type will soon be available, given that it is very difficult (and expensive) to collect. As an alternative, we are attempting to model sharing

patterns by applying game theoretical models of household behaviour (see for example, McElroy, 1990). The data requirements of this approach are more modest and we believe it to be a tractable way of furthering the understanding of this important issue.

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