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THE INCOME UNIT AND THE ANATOMY OF INCOME DISTRIBUTION

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ABSTRACT

This paper focuses on a neglected aspect of the treatment of the income unit in the construction of size distributions of income. If the size distribution is to be an indicator of the distribution of economic welfare, and if the economic welfare of each individual in society is to count equally, then conventional distributions are inconsistent with individualistic social welfare functions. We estimate size distributions with each person's welfare weighted equally, and contrast these results with those weighting income units equally. The choice of weights is shown to affect the size of the trend in income inequality.

Size distributions of incomes for any time period are constructed by assigning incomes to income units and then arraying the units by size of income. Measures of income inequality based on such constructions are then taken to be rough indicators of inequality in economic welfare. Economists are well aware that such measures are imperfect. Severe data limitations make the income concept, the income unit, and the income accounting period used in constructing size distributions of income far from ideal, and the welfare interpretation of income inequality measures in consequently subject (see, e.g., Morgan, 1962). Economists have put much hard work into refining the income concept used in size distributions (e.g., Browning, 1976; Moon and Smolensky, 1977; and Taussig, 1973); and they have also recently attempted to deal with the problem of moving from a size distribution of annual incomes to one of multiyear or even lifetime incomes (e.g., Benus and Morgan, 1975; Lillard, 1977; and Paglin, 1975). All these studies have given us valuable insights into the "anatomy of income distribution", but none has dealt adequately with an equally important topic, the treatment of the income unit.

The income unit in conventional size distributions of income is usually taken to be either the Census family--all individuals living in the same household who are related by blood, marriage or adoption--the unrelated individual, living either alone or in a household with other (unrelated) individuals or families, or both families and unrelated individuals together. Distributions based on other income units, e.g., the individual income recipient, the household, or the spending unit, have been constructed. But the Census family and/or unrelated individual unit predominates, and the Census Current Population Survey (CPS) time series is the only reasonably consistent source of

information on changes in income inequality over time (see Danziger and Taussig, 1977). The CPS income unit has been subject to much penetrating criticism. Kuznets (1974) and Danziger and Plotnick (1977) have shown that instability in the demographic composition of units has imparted an upward bias to the trend in measured inequality since World War II. The problem for welfare interpretations of changes in inequality measures is that living arrangements are an economic good and are endogenous to the trend in the level of economic welfare over time. In the United States at least, people appear to have taken part of their improvement in economic welfare in the form of independent living arrangements. This historical trend includes both the long-established movement from the extended to the nuclear family unit and more recently the splitting of the nuclear family unit itself. Size distributions that treat the income units as exogenous obscure these changes.

The Appropriate Weighting of Income Units in the Size Distribution of Income

This paper focuses on a neglected aspect of the treatment of the income unit in the construction of size distributions of income. Conventional size distributions violate the requirements for individualistic social welfare functions because they implicitly weight the welfare of an individual inversely to the size of the unit in which he or she lives. That is, the weight given to each income (welfare) in the measurement of income inequality is the same for all units, independent of their size, and the welfare of an unrelated individual is, therefore, given equal weight to that of a family including, say, ten persons. From the obverse point of view, the welfare of a person in the larger

unit is weighted at one-tenth that of the unrelated individual. Our own (nonrandom) sample of economists has not yet uncovered a defender of this implicit social welfare function. Rather, they opt for an individualistic social welfare function in which every person's welfare has equal weight.

The dimensions of the problem are suggested by some simple empirical relationships. According to our estimates from CPS microdata for 1976, the mean unit size for all income units, including both Census families and unrelated individuals, was 2.73. For the lowest and highest deciles of the size distribution of income, ranked by unit income, mean unit sizes were 1.54 and 3.71, respectively. In other words, by this ranking, the top decile of the distribution included more than twice as many persons as the bottom decile. Mean unit sizes for intermediate deciles increased monotonically, almost linearly, between these two extreme values. If, however, we follow the practice employed by Kuznets (1950) in his pioneering study and rank all units by their per capita incomes, the resulting size distribution of Census units has an estimated mean unit size of 3.43 in the lowest, and 1.71 in the highest, deciles. The distribution of per capita income thus includes twice as many persons in the bottom decile as in the top decile. Both distributions, then, compare the income shares of deciles of units with widely varying numbers of persons per decile.

These results reflect the pattern of relative mean incomes by unit size shown in Table 1. (The relative mean income of any group in the population is $u = u_i/u_j$, where u_i is the group's own mean and u_j is the reference group mean. In Table 1, u_j is the mean income of units of size 1). Table 1 shows the sensitivity of the mean income of Census units of varying

Table 1

Relative Mean Incomes of Census Units by Size of Unit, 1976[a]

	Definition of Income		
Unit Size	Mean CPS Unit Income (1)	Mean Per Capita Income (2)	Mean Standardized Income[b] (3)
1	1.00	1.00	1.00
2	1.97	.96	1.54
3	2.33	.78	1.50
4	2.62	.65	1.31
5	2.73	.55	1.16
6	2.79	.46	1.05
7	2.75	.39	.83
8+	2.46	.28	.76

Source: Estimated by authors from computer tapes of microdata from March 1977 CPS.

[a]Census unit here includes families and unrelated individuals.

[b]CPS income standardized by equivalence scales implicit in Social Security Administration poverty lines for units of various size and composition.

size under three alternative definitions of income. For example, single-person units have the lowest relative mean CPS unit income (column 1), the highest relative mean per capita income (column 2), and a below average relative mean standardized income (column 3). Column 1 uses the income of the unit unadjusted for the size of the unit; use of this income concept as a measure of a unit's welfare implies that variation in the size of the unit through marriage, birth, death or otherwise does not effect the welfare of the unit, ceteris paribus. Column 2 takes the income concept to be the unit's income divided by the number of persons in the unit presumably sharing the income; use of this income concept as a measure of a unit's welfare implies, for example, that marriage or birth diminishes the welfare of the persons orginally in the unit, ceteris paribus. The income concept in column 3 is, by construction, intermediate between columns 1 and 2 in its welfare interpretation.

What Table 1 does not resolve is how to measure income inequality; it merely presents the data using three income concepts. In fact, economists who have attempted to deal with the weighting of units problem empirically have tended to confuse the weighting issue with that of refinement of the income concept. Discussion has centered upon the choice of one of the three income concepts. For example, Kuznets (1950) and, more recently, Browning (1976) have opted for measuring income on a per capita basis; they then ranked the original income units on the basis of their per capita incomes. Other authors, including Morgan and Smith (1969), have opted for deflating the unit's income by a set of equivalence scales to obtain an income-to-needs welfare measure and then ranking units on the basis of this income-to-needs ratio. This same approach is implicit, of course, in the official Social Security (Orshansky) poverty lines. On the other hand, Lebergott (1976, pp. 33-43) has argued cogently against a per capita or needs-adjusted income measure as an indicator of a unit's economic welfare.

What none of these authors makes explicit, however, is that the choice of a definition of income is independent of the method chosen for weighting individual welfares. Indeed, they all have proceeded as if the only issue were the choice of the income concept, since they have all weighted the units equally. But to measure inequality, one must choose both an income concept and a recipient unit. To our knowledge, only Atkinson and Harrison (1978) and Kuznets (1976) have recognized and dealt correctly with the weighting problem in empirical work on inequality measures. In this paper, we estimate size distributions under the three alternative definitions of income shown in Table 1, with each person's welfare weighted equally, and contrast these results with those weighting the income of each unit equally. The balance of the paper reports the empirical consequences of measuring inequality with the equal-person weights implicit in an indivisualistic social welfare function.

Empirical Results

Table 2 reports estimates of summary statistics of inequality for six income distributions for the years 1967 and 1976. The summary statistics are the Gini coefficient and the ratio of the mean incomes of the top and bottom deciles ($\bar{y}_{10}/\bar{y}_1$).[1] Let y_i be the Census money income of the ith Census unit and n_i be the number of persons included in the unit. Also let n_i^* be the number of equivalent adults in the unit based on the equivalence scales implicit in the official U.S. poverty lines. Then we can define three income concepts for each unit in the population as either y_i, y_i/n_i or y/n_i^*.[2] These incomes can be assigned either to the whole unit and counted once in the distribution denoted by "m", or to each person in the unit and thus counted n times, denoted by "n". Thus we have a total of six distributions to compare: three Census-

Table 2

Inequality Measures Under Alternative Treatments of the Income Unit, 1967 and 1976

Income Measure and Recipient Unit		1967		1976		1967-76 % change	
		$\bar{y}_{10}/\bar{y}_1$[c]	Gini	$\bar{y}_{10}/\bar{y}_1$	Gini	$\bar{y}_{10}/\bar{y}_1$	Gini
Census Unit[a] Income							
Census Unit	(y [m])[d]	26.7	.3992	23.1	.4061	-7.42	+1.7 3
Persons	(y [n])	16.9	.3536	17.4	.3658	+3.38	+3.45
Per Capita Income							
Census Unit	(y/n [m])	18.1	.4122	19.4	.4027	+12.9	-2.30
Persons	(y/n [n])	15.7	.3963	17.4	.3906	+9.23	-1.44
Standardized Income[b]							
Census Unit	(y/n^* [m])	19.4	.3850	17.1	.3786	-8.43	-1.66
Persons	(y/n^* [n])	14.8	.3623	14.5	.3592	-4.93	-0.86

[a] Census units include families and unrelated individuals.

[b] $y = yi/(\frac{\text{pov line for this family}}{\text{pov line for family of four}})$

[c] $\bar{y}_{10}/\bar{y}_1$ = Mean income of the 10th decile/Mean income of the first decile.

[d] Between 1967 and 1976 the number of census units grew from 63 to 78 million, or by 24 percent; the number of persons grew from 196 to 212 milion, or by 8.5 percent.

unit-based distributions = y (m), y/n (m), and y/n^* (m); and three corresponding person-based distributions = y (n), y/n (n), and y/n^* (n). Each pair of distributions, e.g., y (m) and y (n), has an identical measure of a unit's income (economic welfare) but differs in the weight given to that level of income in constructing the size distribution.

The results reported in Table 2 clearly show that measurement of income inequality is sensitive to the treatment of the income unit. First, in any one year, the degree of income inequality depends critically both on how the income concept is refined according to the size of the income unit and on the weighting of the incomes of different units. In both 1967 and 1976, for example, a comparison of the summary statistics for the y (m) and y (n) distributions shows that weighting the conventional Census money income measure by persons instead of by Census units substantially reduces measured inequality. For example, the standard 1976 Gini of CPS unit income is .4061 when weighted by the Census unit, but .3658 when weighted by persons. The Lorenz curve for y (n) lies completely inside the Lorenz curve for y (m), and the Gini coefficient value for both years is about 10 percent lower. Similar pairwise comparisons of the size distributions based on the y/n and y/n^* income measures conform to this pattern. A comparison of the $\bar{y}_{10}/\bar{y}_1$ statistics for these distributions confirms this finding. Weighting incomes by the number of persons, rather than by the number of units, reduces measured income inequality.

Similar comparisons of the y (n), y/n (n) and y/n^* (n) distributions in any one year reveal the sensitivity of measured income inequality to alternative income concepts, given weighting by persons.

The summary statistics for these distributions show a somewhat ambiguous ranking of inequality, varying with the choice of year for the comparison and the summary measure of inequality. The Lorenz curves in some of these comparisons intersect, so that the degree of inequality across distributions cannot be assessed without specifying an explicit inequality aversion function. For example, in 1976, the per capita income distribution, y/n (n), is much more unequal than the unadjusted Census unit money income distribution, y (n), if the criterion is the value of the Gini coefficient: .3906 to .3658. The per capita distribution is more equal, however, by a comparison of the income share of the bottom decile: .0160 to .0144; or of the bottom quintile: .0511 to .0480. On the other hand, the top decile share of the per capita distribution is .288, as compared to .245 for the share of the top decile of the y (n) distribution. The ratios of the mean incomes of the top to the bottom deciles of the two distributions are both 17.4. In summary, it makes a difference how income is adjusted for family size in measuring income inequality when the weighting of units is held constant, and a comparison of Gini coefficient values does not provide unambiguous rankings.

The estimates in Table 2 also illustrate the point that the trend in measured inequality depends on both the choice of income concept and the method of weighting the income unit. We might conclude that income inequality increased between 1967 and 1976 if we limited ourselves to a comparison of Gini coefficient values for the unadjusted income (y) distributions, weighted either by Census units, y (m), or by persons, y (n). However, during the same period income inequality decreased, by a similar Gini coefficient comparison of the per capita income (y/n) or standardized

income (y/n^*) distributions. Given the income measure, the effect of weighting by persons was to approximately double the rise or halve the fall in measured inequality during the period. Again, the Gini coefficient comparison is somewhat misleading by itself, because the 1967 and 1976 Lorenz curves for the same distributions intersect in some cases. For example, the share of the bottom decile of the y/n (n) distribution fell sharply during the period from .0183 to .0160, even as the Gini coefficient value fell from .3963 to .3906, indicating a movement to less inequality. These complex changes in inequality over the period reflect rapid demographic change, as illustrated in Table 3. Changes in family size and composition were remarkable for so brief a time span. Mean Census unit size fell from 3.10 in 1967 to 2.73 in 1976, as the proportion of persons living in one- or two-person Census units rose by about 25 percent, from 24.1 to 30.5 percent. During such a period, it would be surprising if the trend in measured income inequality did not depend critically on the treatment of the income unit.

The Incidence of Relative Poverty and Affluence

Perhaps the most interesting results from this study pertain to the reranking of various groups of persons in the U.S. population under alternative treatments of the income unit. For many purposes, it may not matter who is at the top or bottom of the distribution. The social welfare function might weight every person's welfare equally and anonymously and only the spread between top and bottom would matter. In some instances, however, we do care who is where in the distribution; e.g., whether the bottom decile is 100 percent black or the top decile 100 percent white. (In 1976,

Table 3

Composition of U.S. Population by Census Unit Size, 1967 and 1976

Unit Size[a]	1967		1976	
	Units	Persons	Units	Persons
1	20.9%	6.7%	27.5%	10.1%
2	26.8	17.4	27.5	20.4
3	16.3	16.0	16.0	17.7
4	15.0	19.4	14.7	21.5
5	9.9	15.9	7.9	14.5
6	5.6	10.9	3.6	7.8
7	2.8	6.3	1.6	4.0
8+	2.6	7.5	1.3	4.0
All Units	100.0	100.0	100.0	100.0

[a]Mean unit size for 1967 is 3.10; for 1976, 2.73.

22.7 percent of the bottom decile of the conventional Census y (m) size distribution of income was nonwhite; 72.8 percent of the bottom decile of this distribution consisted of one-person Census units.) We also may be interested in investigating how the relative incomes of some groups change over time. For these purposes, we can look at the incidence of relative poverty or affluence, defined for this study as the percentage of a given group that falls in the bottom or top decile under alternative treatments of the income unit.[3]

Table 4 gives estimates of the incidence of relative poverty and affluence for one-person and for six-person or more Census units based on our six alternative income size distributions. Who is relatively poor or affluent depends on the choice of both the income concept and the weighting of the incomes. According to the CPS income, equal-person-weighted size distribution for 1976, y (n), 41.2 percent of one-person Census units were relatively poor while only 1.0 percent were relatively affluent. According to the equal-person-weighted per capita y/n (n) size distribution for the same year, however, only 7.6 percent of the one-person units were relatively poor while 23.8 percent were relatively affluent. By construction, the results for the y/n^* (n) distribution are intermediate between those for the y (n) and y/n (n) distributions. The results for very large Census units show exactly the obverse pattern. The incidences of relative poverty and affluence for Census units with six or more persons are low and high respectively according to the y (n) size distribution; the reverse holds true according to the y/n (n) distribution. Finally, the trend in the incidence of relative poverty by size of Census unit in the 1967-76 period also

Table 4

Incidence of Relative Poverty and Affluence by Size of Census Unit, 1967 and 1976.

Income Measure and Recipient Unit	1967				1976			
	Relative Poverty[a]		Relative Affluence[b]		Relative Poverty		Relative Affluence	
	Unit Size 1	Unit Size 6 or More	Unit Size 1	Unit Size 6 or More	Unit Size 1	Unit Size 6 or More	Unit Size 1	Unit Size 6 or More
Census Unit Income								
Census Unit (y [m])	33.7%	2.1%	1.4%	14.6%	26.4%	2.6%	1.4%	20.2%
Persons (y [n])	50.2	5.3	1.2	11.3	41.2	4.4	1.0	15.8
Per Capita Income								
Census Unit (y/n [m])	12.8	22.6	19.0	0.8	9.0	26.1	17.5	0.3
Persons (y/n [n])	11.2	21.1	26.1	1.2	7.6	22.9	23.8	0.8
Standardized Income*								
Census Unit (y/n^* [m])	25.2	10.4	6.2	2.0	18.3	12.6	6.1	2.7
Persons (y/n^* [n])	30.6	14.3	7.2	2.6	20.9	14.6	6.7	2.9

[a]Percentage of group in first decile.

[b]Percentage of group in tenth decile.

depends on the choice of income measure and the weighting of the incomes For example, according to the y (m) distribution in Table 4, the incidence of relative poverty among very large Census units increased from 2.1 to 2.6 percent between 1967 and 1976; according to the y (n) distribution, however, it decreased from 5.3 to 4.4 percent during the same period. In contrast, the incidence of relative poverty for one-person units fell sharply between 1967 and 1976 according to any of the six income distributions constructed for this study.[4]

The sensitivity of the incidence of relative poverty and affluence can of course be investigated for the population classified by a multitude of characteristics other than size of the Census units. For example, in 1976, according to the y (m) income size distribution, nonwhite relative poverty was 18.6 percent and, as noted above, 22.7 percent of the bottom decile consisted of nonwhite Census units. According to the y/n (n) distribution for the same year, however, nonwhite relative poverty was 27.5 percent, and the bottom decile of persons was 36.8 percent nonwhite, reflecting the larger average size of nonwhite units.

Perhaps the most interesting breakdown of the population is by age, where the question is whether units headed by the aged (age 65 and over) are relatively poor or affluent when compared to the nonaged population. Units headed by the aged had lower unit incomes in 1976 but their units contained many fewer persons. The mean Census unit income for the aged was only $8,452, while the mean income per unit was $14, 087 for the whole population; the mean unit size of aged units was only 1.61, as compared with 2.73 for the whole population. Thus, the mean per capita incomes of the aged and

the nonaged in 1976 were remarkably close. These patterns of income and unit size by age group are reflected in the incidence of relative poverty and affluence among the aged under alternative treatments of the income measure and income unit. The incidence of relative poverty for the aged was 24.6 percent in 1976, according to the y (n) distribution, but only 11.3 percent, according to the y/n^* (n), and 5.9 percent, according to the y/n (n) distributions. Also, the incidence of relative affluence for the aged in the same year was 4.1, 7.7 and 8.1 percent, according to the y (n), y/n^* (n), and y/n (n) distributions, respectively. All of these distributions produce one robust finding about the income status of the aged: relative poverty among the aged declined sharply between 1967 and 1976. On the basis of these numbers, it is difficult to resist the conclusion that the sharp increases in social security retirement benefits and the advent of the Supplementary Security Income program for the aged in 1974 were successful in achieving their goals of improving the economic status of the aged.

Table 5 shows estimates of relative poverty by units and by persons for units headed by white and nonwhite females. Relative poverty was disproportionately high for both groups in both years according to any of the six size distributions. For these groups, both the adjustment of the income concept for size of unit and the weighting of incomes are important in affecting relative poverty. In 1976, relative poverty, according to the conventional y (m) income size distribution, was 23.5 percent for white female-headed units and 31.4 percent for nonwhite female-headed units. According to the person-weighted y (n) distribution, however, relative poverty for the two groups was 31.3 percent for whites and 38.0 percent

Table 5

Incidence of Relative Poverty Among Female-Headed Census Units, 1967 and 1976

Income Measure and Recipient Unit	1967		1976	
	White Female-Headed Units	Nonwhite Female-Headed Units	White Female-Headed Units	Nonwhite Female-Headed Units
Census Unit Income				
Census Unit (y [m])	28.8%	33.0%	23.5%	31.4%
Persons (y [n])	34.3	38.0	31.3	38.0
Per Capita Income				
Census Unit (y/n [m])	16.7	39.4	14.5	39.7
Persons (y/n [n])	17.9	49.6	18.1	48.3
Standardized Income				
Census Unit (y/n_* [m])	23.8	39.1	18.8	39.0
Persons (y/n_* [n])	26.7	49.7	23.0	47.8

for nonwhites. The difference between the white and nonwhite groups is much larger, however, when we move to the per capita (y/n), and standardized (y/n^*) adjusted income measures. For example, according to the y/n^* (n) distribution, relative poverty in 1976 for the nonwhite group was 47.8 percent, more than double the 23.0 percent for the white group. The differences in these numbers illustrate the importance of weighting income measures by number of persons when unit sizes differ between groups roughly equal in unit incomes. Finally, note that the incidence of relative poverty clearly declined for white, but not for nonwhite, female-headed units, between 1967 and 1976, after weighting unit incomes by persons. According to the conventional y (m) distribution, relative poverty for both the white and nonwhite groups declined; from 28.8 percent in 1967 to 23.5 percent in 1976 for whites and from 33.0 percent in 1967 to 31.4 percent in 1976 for nonwhites. According to the person-weighted y (n) distribution, however, only the white group experienced a decline in relative poverty; from 34.3 percent in 1967 to 31.3 percent in 1976. Relative poverty for the nonwhite group remained constant over the 1967-1976 period at 38.0 percent.

Summary and Conclusions

If the size distribution of income is to be an indicator of the distribution of economic welfare, and if the economic welfare of each individual in society is to count equally, then conventional size distributions are inconsistent with social welfare functions. The units in such distributions are families or groupings of persons that range in size from an unrelated

individual to 10 or more persons. Distributions that weight the incomes of all units once weight the welfare of persons in n-person units as just 1/nth the welfare of persons living by themselves. To be consistent with individualistic social welfare functions, equal weight must be given to each person's income.

The choice of an appropriate measure of income for units that differ in size and composition is a separate, although related issue. We experimented with three income measures in this study: total unit income, y; per capita income, y/n; and a standardized income y/n^*. Others who have adjusted measures of inequality for differences in unit size have also made these income concept adjustments, but have neglected the choice of adjustments for weighting units of varying size. Thus, while we do not advocate any income concept as optimal, we do suggest that persons are the optimal choice for weights.[5]

Our estimates show that weighting unit incomes by persons rather than by units reduces measured inequality. The effects of adjusting the income concept for the size of the unit are less clear because the Lorenz curves of these distributions intersect. The direction of the trend in inequality over the 1967-76 period depends on the income concept, while the choice of weights affects the size of this trend. Also important are the empirical implications for the ranking of specific groups in the population (e.g., the aged, nonwhites, or female household heads), in the size distribution.

Notes

[1]Some of the Lorenz curves of our distributions intersect and, in such cases, we will also report on the shapes of both Lorenz curves. For an analysis of the issues involved, see Atkinson (1970). Note that $(\bar{y}_{10}/\bar{y}_1)$ is also the ratio of the share of the top decile to the share of the bottom decile. Our results differ slightly from published Census data because we use reported incomes for all units. The reported income for those with $50,000 or more is thus $50,000. The Census Bureau uses an estimated income for these top units, so, in most cases, the published Ginis will be higher than those reported here. For example, in 1967, the published Gini is .400 while ours is .399.

[2]We deflate each y_i by the unit's poverty index, n_i^* to obtain an estimate of y_i/n_i^*. For example, based on the weighted average poverty lines for nonfarm, nonaged units, and setting n^* for a one-person unit at 1.0, a four-person unit will have an n^* of 1.97. Thus, the y/n^* measure divides the income of a family of four by 1.97, and is intermediate between the y and y/n measures which divide by 1.0 and 4.0 respectively. The poverty lines are given in U.S. Bureau of the Census (1977), Table 15.

[3]The results reported in the text on the incidence of relative poverty and affluence pertain only to the extremes of the various size distributions. We have also estimated, but have not reported here, qualitatively similar results pertaining to the bottom and top halves of the same distributions.

[4]This reflects the facts that about one-third of all one-person units consist of aged individuals and that rapid social security increases over the period improved the economic position of the aged.

[5]There are two other unresolved measurement issues closely related to the topic of our study. First, we have followed the conventional assumption that a unit's income is pooled equally within the unit but not at all within or across households. Real-world pooling of incomes is much more complex and needs careful investigation. Second, the underlying income measure in our study is the conventional Census money income definition. Its deficiencies as even a rough measure of economic welfare are well known and can be corrected, at least to some extent. The treatment of the income unit and the income concept involve some overlapping problems; e.g., how to rank the relative economic welfare of two units with the same money income when one unit is a single person and the other is a married couple in which one spouse works at home rather than in the market for pay. To construct satisfactory income size distributions, such income measure and income unit problems must be dealt with jointly.

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