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POVERTY ORDERINGS WHEN WELFARE COMPARISONS ARE UNCERTAIN

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Poverty Orderings when Welfare Comparisons are Uncertain

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Abstract

In applied welfare economics, equivalence scales for household composition and size corrections, and appropriate price deflators are minimum requirements to perform interhousehold comparisons of welfare, measured via household income or consumption information. In practice, the information available is insufficient and only approximate price or household composition corrections are available. Poverty comparisons between groups or over time are then problematic. In this paper, Atkinson's standard results on first order stochastic (welfare) dominance are extended to allow for pairwise comparisons of poverty of groups with different needs or facing different prices, when there is uncertainty on the true cost-of-living deflators and equivalence scales. The approach is illustrated using household surveys from Ethiopia and Burkina Faso.

JEL classification codes: I32
Key words: poverty orderings, welfare dominance, equivalence scales, price deflators

1 Introduction

Stochastic dominance theory applied to poverty comparisons allows statements on poverty across di¤erent groups to be made without reference to a particular poverty line and for a broad class of aggregate poverty measures (Atkinson [1987] and Foster and Shorrocks [1988a, 1988b]). The distributions of welfare for particular groups provide all the information necessary for this purpose, provided that the welfare for one group can be meaningfully compared to the welfare of the other groups. Atkinson [1987] has shown that for all poverty measures that can be de…ned in terms of a poverty gap (such as the FGT-measures, Foster et al. [1984]), that …rst order dominance exists for a broad class of poverty measures satisfying general conditions, if the cumulative distribution of welfare for one group never intersects the other group's cumulative distribution for an interval of poverty lines from 0 to Z^+. Second order dominance can similarly be de…ned if the poverty de…cit curves never intersect. An important problem in practice is that the conclusions about di¤erences in poverty between groups are sensitive to the approach taken to compare welfare (Deaton [1997]). For example, conclusions about poverty in the U.S. in the 1980s are apparently sensitive to the choice of the equivalence scale and to the price index to adjust poverty thresholds (Slesnick [1993]). A series of articles by Coulter et al. [1992], Banks and Johnson [1994] and Jenkins et al. [1994] debated the use of speci…c equivalence scales on statements about poverty and inequality in the U.K. For developing countries, Lanjouw and Ravallion [1995], demonstrated the sensitivity of poverty results in Pakistan to assumptions about the existence of economies of scale to household size. Ravallion and Bidani [1994] showed the sensitivity to di¤erent assumptions about rural-urban price di¤erentials for poverty statements in Indonesia. Sensitivity to alternative regional or intertemporal price de‡ators in developing countries is discussed in Grootaert and Kanbur [1996] for Côte d'Ivoire and in Dercon and Krishnan [2000] for Ethiopia.

The poverty dominance results as in Atkinson [1987] are derived conditional on some prior choice of scaling factors or corrections to make the welfare measures comparable in real terms. Dominance is de…ned relative to a common interval of poverty lines $[0; Z^+]$. In this paper, I expand the poverty dominance results in Atkinson [1987] to the case in which the appropriate corrections for prices or household characteristics needed for welfare comparisons are not known with certainty. I allow statements about poverty di¤erences for ranges of poverty lines and for ranges of the corrections needed for welfare comparisons, in the form of equivalence scales and cost-of-living indexes.

Atkinson and Bourguignon [1987] provided a discussion on how di¤erences in needs could be considered in the context of dominance results in income distributions. Jenkins and Lambert [1997a, 1997b] provided a methodology in which dominance results could be discussed even if there are di¤erences in the poverty line relativity over time or across groups. As they discuss, this is equivalent to not requiring an a priori choice of scaling factors to make the income distributions comparable. Their results are applicable to a broader set of poverty measures than considered in Atkinson [1987], (but they do not apply

to the head count index). They present a graphical approach in which di¤erent dimensions of poverty are presented in one graph. In this paper, I remain closer to the approach of Atkinson [1987]. I show that for a broad class of measures, his results can be directly extended. I also provide a simple graphical tool that allows to see the ranges of corrections for welfare comparisons that are needed to obtain unambiguous dominance of poverty between di¤erent groups or in di¤erent times and circumstances.

I focus on pairwise comparisons between (homogenous) groups of similar within-group characteristics. The purpose is to be able to make unambiguous statements about di¤erences in poverty, say, between periods in time or between large versus small families. Some recent contributions, building on Atkinson and Bourguignon [1987], take a di¤erent route, by focusing on the consequences of uncertainty about the correct within-group comparability of welfare outcomes when comparing di¤erent (heterogenous) group distributions. For example, Bradbury [1997] presents a method that permits general statements about di¤erences in poverty over time which is true for a range of equivalence scales used to construct the distribution in each period. Fleurbaey et al. [2001] consider in general the problem of comparing distributions for heterogenous populations and provide a precise dominance criterion with bounded equivalence scales.

The structure of the paper is as follows. The next sections extends Atkinson's [1987] results. In section 3, the approach is graphically illustrated using data from Ethiopia and Burkina Faso. Section 4 concludes.

2 Theory

Suppose we have two groups of households, denoted by subscripts 0 and 1, and with similar within-group characteristics (so that a distribution of welfare can be considered). Suppose we are interested in knowing whether poverty is higher in the distribution of welfare outcomes for group 0, $u_1^0; u_2^0; :::; u_H^0$ compared to the distribution of welfare outcomes of the other group, $u_1^1; u_2^1; :::; u_J^1$. Standard poverty dominance results could be obtained provided u^0 and u^1 can be directly compared. The standard method is to use 'true' cost-of-living indexes and equivalence scales. If we assume that di¤erences in tastes between these groups can be explained by di¤erences in characteristics, we may de…ne a common utility function for all households in either group s (s = 0;1) and make this a speci…c function of household characteristics a_h^s:

$$u_h^s = v(q_h; a_h^s) = \tilde{A}(x_h^s; ¼^s; a_h^s) \quad (1)$$

with a cost function $c(u_h^s; ¼^s; a_h^s)$, in which x_h^s are nominal expenditures, q_h is a bundle of commodities, $¼^s$ are prices faced by group s, v() is the direct utility function and $\tilde{A}()$ is indirect utility. Common functions v(), c(), and $\tilde{A}()$ ensure that households with the same characteristics, the same total expenditures and facing the same prices are regarded as equally well o¤. To make this operational we consider a money metric welfare measure de…ned by the expenditure needed

to reach a particular welfare level at some reference prices and for a household with reference characteristics. Let these reference prices and characteristics be those of the households in group 0, so that welfare of a member of group 1 can be de…ned as:

$$u_h^1 = c(\tilde{A}(x_h^1; ¼^1; a_h^1); ¼^0; a_h^0) \tag{2}$$

Note that u_h^0 equals x_h^0. In general, we can also write (2) as:

$$\begin{aligned} u_h^1 &= x_h^1 . \frac{c(\tilde{A}(x_h^1; ¼^1; a_h^1); ¼^0; a_h^0)}{c(\tilde{A}(x_h^1; ¼^1; a_h^1); ¼^0; a_h^1)} . \frac{c(\tilde{A}(x_h^1; ¼^1; a_h^1); ¼^0; a_h^1)}{c(\tilde{A}(x_h^1; ¼^1; a_h^1); ¼^1; a_h^1)} \\ &= \frac{x_h^1}{m_h^1 : ¦_h^1} \end{aligned} \tag{3}$$

where m_h^1 is the value of the speci…c equivalence scale (a scalar) for comparing households with characteristics a^0 and a^1, and $¦_h^1$ is the true cost-of-living index, for comparing prices faced by group 1 and 0 (Deaton and Muellbauer [1980]). I will denote the product of the equivalence scale and the cost-of-living index as e_h^1, the scaling factor needed to transform nominal welfare measures for group 1 into real welfare measures, comparable to welfares for group 0, i.e. $e_h^1 = m_h^1 : ¦_h^1$. In this way, we can derive general results about comparing di¤erent groups, irrespective of whether groups are de…ned by the same households in di¤erent periods, households in di¤erent geographical areas or households with di¤erent household characteristics. Note that $e_h^0 = 1$. Finally, since we have assumed that all di¤erences between groups can be captured by di¤erences in prices and characteristics, e_h^1 is constant across the group. Nevertheless, the exact value of the scaling factor e_h^1 is rarely known, making welfare comparisons di¢cult and at times rather arbitrary. In what follows, we assume that welfare comparisons between groups are possible, but that we do not exactly know how to make them.

Using these de…nitions, we can make statements about poverty di¤erences between di¤erent groups. Let us de…ne poverty lines Z, which are applicable to households when welfare is compared in 'real' terms, i.e. after corrections for cost-of-living or equivalence scales. Dropping subscripts, let us de…ne ' real' expenditure y as $\frac{x}{e}$. Also, let F[y] de…ne the cumulative distribution, and for simplicity, F[0] = 0 and F[A] = 1, in which A is the highest y for the group. Let f[y] be the corresponding density function. Following Atkinson [1987], let us consider the class of additive separable poverty measures P such that there is a monotonic transformation G[P] which can be written as an integral over the function p[y; Z] over the full range of the distribution of welfare for each group. G is decreasing in the poverty index P, so that poverty is expressed negatively. I assume that p is non-decreasing in y, i.e. $p^0[y; Z] = p_y \geq 0$. Also, assume that p[y; Z] = 0 for $y \geq Z$. Consequently, p[y; Z] is non-positive. Finally, p[y; Z] is non-increasing in Z, i.e. $p_Z \leq 0$, so that a higher poverty line implies higher

poverty. G[P] is de…ned in general as:

$$G[P] = \int_0^A p[y;Z]:f[y]dy = \int_0^Z p[y;Z]:f[y]dy \qquad (4)$$

A large number of poverty measures satisfy these properties, including the head count, the poverty gap and higher order FGT-measures, the Watts A large number of poverty measures satisfy these properties, including the head count, the poverty gap and higher order FGY-measures, the Watts measure and the second measure by Clark et al. (1981). For all these measures, poverty is only dependent on the poverty line through the ratio of the money metric welfare measure and the poverty line. Consequently, for all e,

$$p[y;Z] = p[\frac{x}{e};Z] = p[x;e:Z] \qquad (5)$$

This means that using (3), for a particular e, G can be de…ned as:

$$G[P;e] = \int_0^Z p[\frac{x}{e};Z]:f[\frac{x}{e}]d\frac{x}{e} \qquad (6)$$
$$= \int_0^{Z:e} p[x;Z:e]:f[x]dx$$

Finally, let us de…ne F^1 and f^1, respectively $F^0$and f^0, be the distribution and density over y^1 and y^0. Let $y^1 = \frac{x^1}{e^1}$ and $y^0 = x^0$, Then poverty is no higher in group 1 compared to 0, if,

$$4G = \int_0^Z p[y^1;Z]:f^1[y]:dy \; ¡ \int_0^Z p[y^0;Z]:f^0[y]:dy \qquad (7)$$

Part of the proof is similar to Atkinson [1987, p.757]. First, let us consider whether for $e^1 = e^{1+}$ this is valid. Since $p[Z;Z] = 0$ and $F[0] = 0$, and

integrating (4) by parts, G[P] can be written as

Suppose now that there exists a strictly positive equivalence scale $e^{1+} > 0$, for which, for a particular level of the poverty line Z^+, the following condition is valid:

$$F^1[Z^+] ¡ F^0[Z^+] \cdot 0 \qquad (8)$$

i.e. the head count is no higher for group 1 than for group 0 at that poverty line.

Proposition 1 For all measures satisfying conditions (4), (5), (6) and (8), where p is continuous and non-decreasing in y and the cross- derivative p_{yz} is

non-positive, a necessary and sufficient condition for there to be for all $Z \in [0; Z^+]$ and for all $e^1 \in]0; e^{1+}]$ a reduction, or no increase in poverty on moving from the distribution F^0 to F^1 is that:

$$\Delta F[Z] = F^1[Z] - F^0[Z] \leq 0 \tag{9}$$

Proof. Part of the proof is similar to Atkinson [1987, p.757]. First, let us consider whether for $e^1 = e^{1+}$ this is valid. Since $p[Z; Z] = 0$ and $F[0] = 0$, and integrating (4) by parts, $G[P]$ can be written as

$$G[P] = -\int_0^Z p_y . F[y] . dy \tag{10}$$

Consequently, (7) can be written as:

$$\Delta G[P] = \int_0^Z p_y . \Delta F[y] . dy \tag{11}$$

Since p_y is non-negative, ΔG is non-negative for all $Z \in [0; Z^+]$ if ΔF is non-positive. To see whether this is valid not just for e^{1+}, but for all $e^1 \in]0; e^{1+}]$. Using (6), we can rewrite (7) as

$$\begin{aligned} G[P; e^1] - G[P; 1] &= \int_0^Z p[\frac{x}{e^1}; Z] . f^1[\frac{x}{e^1}] d\frac{x}{e^1} - \int_0^Z p[x; Z] . f^0[x] . dx \\ &= \int_0^{Z.e^1} p[x; Z.e^1] . f^1[x] dx - \int_0^Z p[x; Z] . f^0[x] . dx \end{aligned} \tag{12}$$

Now, consider any positive $e^{1\alpha} \leq e^{1+}$. We know that (12) is non-negative for $e^1 = e^{1+}$. Therefore if we can show that $\Delta G[P; e^{1\alpha}] - \Delta G[P; e^{1+}] \geq 0$, the sufficiency of the proposition is proven.

$$\begin{aligned} G[P; e^{1\alpha}] - G[P; e^{1+}] &= \int_0^{Z.e^{1\alpha}} p[x; Z.e^{1\alpha}] . f^1[x] dx - \int_0^{Z.e^{1+}} p[x; Z.e^{1+}] . f^1[x] dx \\ &= \int_0^{Z.e^{1\alpha}} (p[x; Z.e^{1\alpha}] - p[x; Z.e^{1+}]) . f^1[x] dx \\ &\quad - \int_{Z.e^{1\alpha}}^{Z.e^{1+}} p[x; Z.e^{1+}] . f^1[x] dx \end{aligned} \tag{13}$$

The second term is non-negative, since $p[x; Z{:}e^{1+}] \cdot 0$. The …rst term is non-negative as well, since $p_Z \cdot 0$ and $e^{1¤} \cdot e^{1+}$. Since this is valid for any possible value of $e^{1¤} \cdot e^{1+}$, the su¢ciency of the proposition is proven. The example in Atkinson [1987, p.757] illustrates the necessity of the proposition. If over a particular interval the cumulative distributions F^1 and F^0 cross, then …rst order dominance cannot be established. ■

The proposition de…nes an extended …rst order poverty dominance condition when there is no exact information about the appropriate equivalence scale or cost-of-living di¤erences. The result states that poverty is no higher for group 1 compared to the reference group for an interval of poverty lines and of equivalence scales if the poverty incidence curve for group 1, de…ned over x^1 with a poverty line equal to $Z{:}e^1$ (or, equivalently, the poverty incidence curve de…ned over $\frac{x^1}{e^1}$ with a poverty line Z), is never above the poverty incidence curve for group 0 (de…ned over x^0 with a poverty line Z).

Welfare dominance is not only de…ned relative to a particular level of the poverty line, Z^+, but also relative to e^{1+}. Note that e^{1+} will depend on Z^+. In fact, it is possible to de…ne, for each $Z \; 2 \; [0; Z^+]$, the largest range $]0; e^{1++}]$ for which …rst order dominance applies, by:

$$e^{1++} = \min\{e^{1+} j \; 4 \; F[Z] = 0; 8Z \; 2 \; [0; Z^+]\} \qquad (14)$$

i.e. it is the lowest scaling factor among those which result in the di¤erence in head count index to be zero for each Z in the interval from zero up to Z^+. To see this, if (11) is valid, then (8) as well as proposition 1 is valid for all $Z \; 2 \; [0; Z^+]$ and for all $e^1 \; 2]0; e^{1++}]$. However, if a value $e^{1+} > e^{1++}$ were to be used as the highest value of the interval, then there will be at least one value of Z for which condition (9) is not valid, since this would make $F^1(Z) > F^0(Z)$.

3 Empirical Applications

The fact that we are working with nominal distributions of welfare and that we allow both the poverty lines and the scaling factors to vary, implies that simple two-dimensional graphs of poverty dominance, showing the poverty incidence curve (i.e. the cumulative income distribution) or the poverty de…cit curve with multiples of the poverty line on the axis, as in Ravallion [1994], are not possible. They not only gave a clear visual representation of whether poverty was higher over an interval, but also allowed the extent to which this was true to be clearly seen. However, since the focus of this paper is mainly on whether poverty dominance results are sensitive to changes in the scaling factors, it is possible to construct graphs of the interval of scaling factors for which a poverty dominance result related to di¤erent groups applies. In particular, I will focus on (14), which will give the highest value of the scaling factor for which poverty in a group will not be higher than in a reference group. For example, we will be able to give the values of a price index or of equivalence scales for which the poverty ordering between groups is not reversed. I will give three

examples: equivalence scales for valuing children relative to adults, urban-rural price differences and intertemporal price changes. The welfare measure used is total household consumption. The data used are the 1995 Priority Survey in Burkina Faso, collected by the INSD, Burkina Faso, covering 8628 households (for details, see INSD [1996], Bigman et al. [2000]) and the Rural Household Survey from the Economics Department of Addis Ababa University, a panel data survey started in 1994, covering 1477 rural households in 15 villages across the country (for details, see Dercon and Krishnan [2000a, 2000b]).

3.1 Urban-rural price differences in Burkina Faso

The Priority Survey for Burkina Faso did not collect good information about price differences across the country. Nevertheless, to construct a national poverty profile, this is important information. One possible solution is to use nominal consumption data, but then differences in needs from differences in the cost-of-living are not accounted for. An alternative solution would be to construct different poverty lines for different areas, for example via transforming the consumption data into calorie intake data. Ravallion and Bidani [1994] illustrated using urban-rural differences in Indonesia that such an approach may bias the poverty results towards those areas with more expensive tastes. Indeed, they found that one such approach resulted in unlikely higher urban poverty estimates than in rural areas in Indonesia. Here, I use proposition 1 and (14) to derive the bounds of the rural-urban cost-of-living differences which would still make the urban areas less poor than the rural areas. I abstract from other scaling problems by using nominal household consumption divided by the number of adult equivalent units in the household, where the equivalence scales are simple nutritional scales (see Bigman et al. [2000]).

Figure 1 gives the results, plotting the percentage differences in the cost-of-living which would make poverty incidence the same in urban versus rural areas (i.e. which would make the cumulative distribution of 'real' consumption equal across urban and rural areas). Note that the curve is increasing in poverty levels. For low 'real' poverty lines, i.e. those giving low levels of poverty, urban-rural cost-of-living differences that were to make urban areas poorer are smaller than for higher levels of the real poverty line. For example, suppose we think that urban-rural cost-of-living differences are somewhere between 130 and 140 percent, then first order stochastic dominance would not be present, since at lower poverty lines urban poverty would be relatively higher, while at higher poverty lines, rural poverty would be higher. However, in Burkina Faso it is unlikely that the cost-of-living is indeed more than double in urban areas. The graph shows that at any reasonable estimate or guess of the difference in urban-rural prices, poverty will be higher in rural areas, even though the differences in the standard-of-living of the poorest households in urban and rural areas appear to be smaller than for the relatively better off.

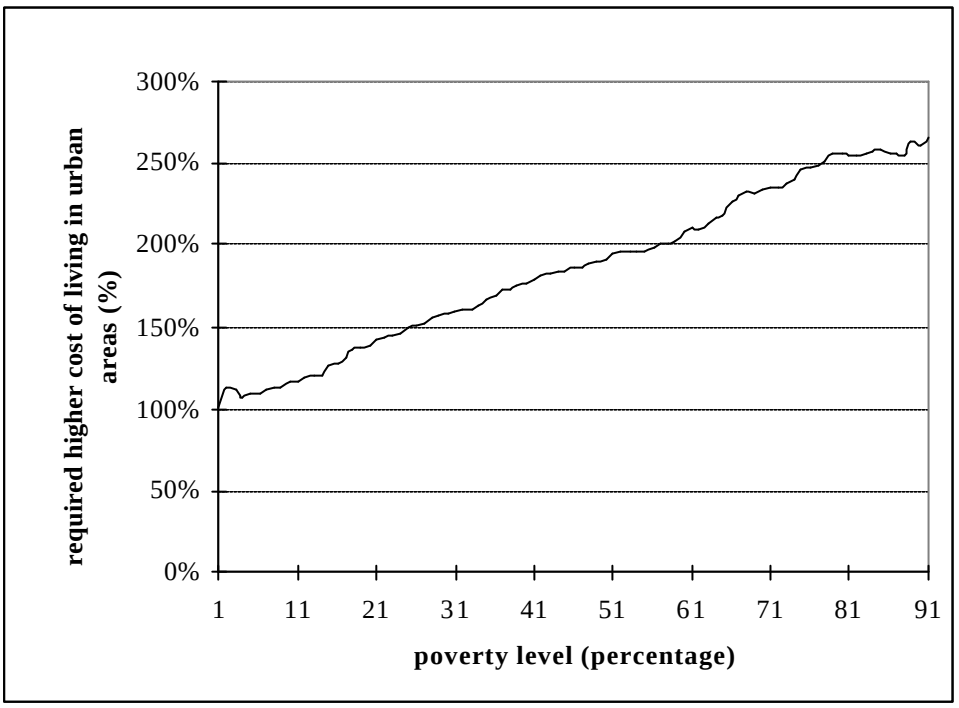

Figure 1: Cost of living differences in urban relative to rural areas for equal poverty in Burkina Faso (1995)

3.2 Equivalence scales for children in Ethiopia

Comparisons of welfare between households require some means of correcting for household size and composition. Finding the appropriate corrections in practice is, however, not self-evident. Estimations using behavioural models of expenditure patterns are time- and data-intensive and su¤er from methodological problems [Deaton (1997)]. Nutritional scales, often used for simplicity on developing country data sets, only focus on calorie-intake. No estimates speci…cally for Ethiopia exist; still, for poverty comparisons, this information is vital.

To illustrate the sensitivity to the equivalence scales used, I will take households consisting of two adults as the base group. Each adult (above 15 years of age) will be considered as one. I will provide results for the number of equivalent adults for each additional child under 15 years of age. Since the full data set is relatively small (1477 households), more subtle age sensitive equivalence scales are not feasible, while only households of two adults with up to three children will be considered[1]. Figure 2 gives for each level of poverty (i.e. for a particular 'real' poverty line) the values of the equivalence scale for one child that were to result in poverty to be equal for the reference household and for the particular household with children. If the 'true' equivalence scale were larger than this number, households with the speci…c number of children would be poorer at this poverty line. Poverty dominance results could be read from the graph by looking at the lowest equivalence scale across the interval of 'real' poverty lines.

The graph shows that the poverty results are very sensitive to the particular 'real' poverty line used: for example, for households with one child, the poverty equalising equivalence scale is close to zero at low levels of poverty but close to one at higher levels. This means that statements about households with two adults and one child being poorer or not than those without children are not robust. Once more children have entered the household, the pattern becomes clearer. The equivalence scales needed for equal poverty are between 0 and just under 0.5. If children's needs in expenditure terms are above 0.5 of an adult, then households with two or three children are poorer for a large range of 'real' poverty lines than those without children. When looking at the estimates in the literature, estimated values for younger children are usually quite close to this …gure: for example Deaton [1997, p.253] reports estimates which are equivalent to 0.48 to 0.60 for India and 0.56 to 0.76 for Pakistan for di¤erent age groups. Especially when using relatively low poverty lines (i.e. for the poorest households) it appears that households in rural Ethiopia with two or three children are systematically worse o¤.

3.3 Rural in‡ation rates in Ethiopia

A sub-sample of the Rural Household Survey in 1994 consists of households in 6 villages which were visited in a rural survey conducted by IFPRI in 1989. The survey data were collected using virtually the same survey instruments so

[1] Households in Ethiopia are relatively nuclear. The most frequent household in the sample consists of two adults and two children.

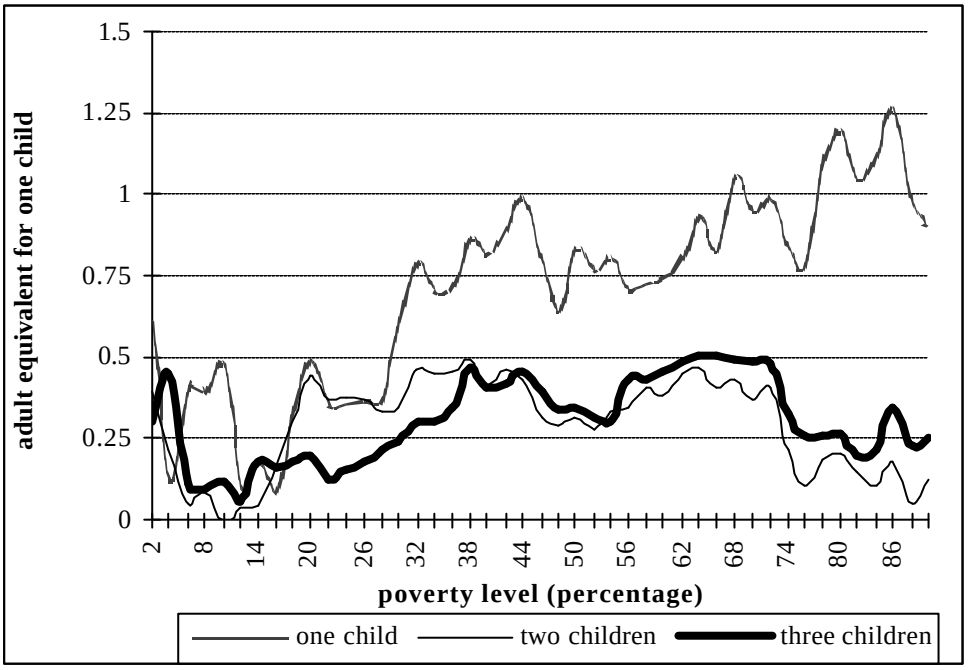

Figure 2: Adult equivalent units per child for equal poverty in comparison with households with two adults only - Ethiopia 1994

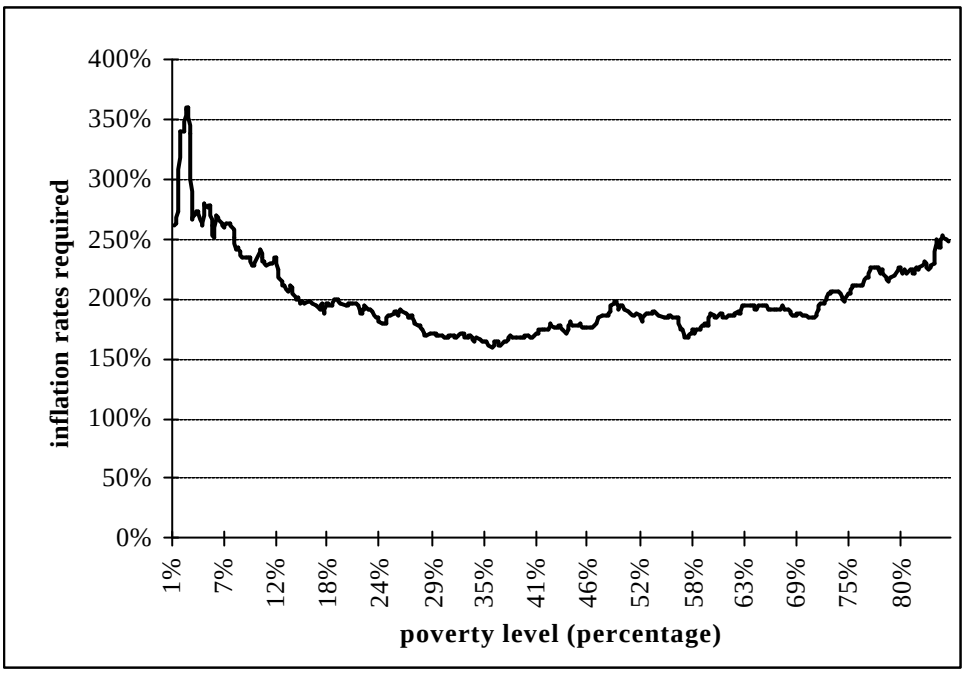

Figure 3: In‡ation rates for equal poverty in Ethiopia 1989-95

that the comparability is very high. However, while in 1994 an extensive price survey was conducted, this was not done in 1989. An important problem to compare welfare over time is therefore uncertainty about the price changes in this period. One of the problems is that in‡ation soared brie‡y during the early 1990s, during the last few months of the civil war, so that there is de…nitely a need to …nd a good correction for cost-of-living di¤erences over time. The issue is not helped by the apparently contradictory …ndings using alternative data sources. For example, the o¢cial (national, but based on urban Ethiopia) Consumer Price Index suggests an increase by 75 percent between 1989 and 1994, the Food Consumer Price Index rose by more, by 85 percent. A price index using the average basket of food items consumed by the poorer half of the sample and using prices from regional rural consumer price collection by the Central Statistical Authority (CSA) suggests a price increase in the same period by 98 percent on average across the survey areas. The price data collected in the survey villages in 1994 compared to the prices of the CSA for 1989 were 121 percent higher. The latter estimate is obviously questionable, since di¤erent sources were combined. Still, it shows too large a range of estimates of rural price in‡ation to just pick one of them to calculate ' real' consumption for poverty comparisons, as would be done in standard poverty dominance analysis.

Using the approach described in this paper, we can calculate the range of in‡ation …gures which would have kept poverty at a particular level in both periods. Figure 3 gives these results. If actual in‡ation would have been higher than the points on the curve, then poverty would have increased between 1989 and 1994. As can be seen, the lowest …gure of the entire range shown is above 150 percent. Consequently, as long as in‡ation is estimated to be below 150 percent, we can con…dently conclude that poverty was in these villages in 1994 below poverty in 1989. Since all available estimates are well below this …gure, extended …rst order dominance therefore applies for a wide range of poverty measures.

4 Conclusions

In this paper, we discussed poverty dominance results in the context of uncertainty about the exact scaling factors for interhousehold comparisons, such as equivalence scales and cost-of-living di¤erences. We extended Atkinson's [1987] …rst and second order poverty dominance results for intervals of the scaling factors. The results were used to develop a graphical representation of the dominance result. For each level of the poverty line for the reference group, the scaling factor that will equalize poverty between the groups can be determined. The minimum of the set of poverty equalizing scaling factors up to a particular poverty level will give the highest scaling factor for lower or equal poverty for the group relative to the base group.

The approach was graphically illustrated using data from Burkina Faso and Ethiopia. It was found that urban poverty in Burkina Faso is clearly below poverty in rural areas for any poverty line, since only if the cost of living is at least double in urban areas than in rural areas would poverty in urban areas be lower. For Ethiopia, it was found that if equivalence scales for a child relative to an adult are above 0.5, then the most common larger households, those with two adults and two or three children, are systematically poorer than households with only two adults, for any poverty line. Finally, using a sub-sample of the Ethiopian rural household survey, it was found that poverty in 1995 was below poverty in 1989 for all poverty lines, at least if in‡ation has not been above 150 percent. Since despite being quite contradictory, all available estimates give lower in‡ation rates than this …gure, …rst order extended poverty dominance is established.

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