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Poverty and the Economic Transition

How Do Changes in Economies of Scale Affect Poverty Rates for Different Households?

Has the economic transition in Eastern Europe and the countries of the former Soviet Union been harder on pensioner households or on households containing children? Do per capita measures of welfare give a misleading picture?

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Summary findings

Much attention has been paid to the relative vulnerability of two well-defined household groups during the transition. Some observers argue that old-age pensioner households have been relatively protected because of a less steep decline in real pensions compared with wages in most transition economies. By contrast, households with young children are believed to have experienced a substantial decline in living standards under reform and show strikingly higher rates of measured poverty than pensioner households.

But others argue that the elderly have suffered more than the young during the transition. Can these conflicting viewpoints about the relative poverty of old and young households be arbitrated?

Lanjouw, Milanovic, and Paternostro show that strong (though implicit) assumptions underpin certain poverty comparisons. Notably, using a per capita measure of individual welfare assumes that there are no economies of scale in household consumption, in the sense that the per capita cost of reaching a specific level of welfare does not fall as household size increases. Relaxing that assumption could affect comparisons, showing higher poverty rates among the elderly because their households tend to be smaller than the households containing children.

Even the nature of the transition has implications for economies of scale. The relative cost of housing and other goods and services with at least some public-good characteristics has risen rapidly. These relative price shifts hit small households particularly hard, because a greater share of their expenditures goes to public and quasi-public goods.

But transition economies have also experienced big increases in the relative prices of goods and services consumed largely by children, such as kindergarten and other education services. These increases affect younger households more.

Since there is no accepted way to establish the true extent of economies of scale in a given country, the question can't be answered exactly. But clearly a small departure from a per capita measure may be enough in some cases to overturn the conventional relative ranking of poverty headcounts: poverty among the elderly may then turn out to be worse than among children.

This paper — a product of Poverty and Human Resources, Development Research Group — is part of a larger effort in the group to study changes in welfare and inequality during the transition. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Patricia Sader, room MC3-632, telephone 202-473-3902, fax 202-522-1153, Internet address psader@worldbank.org. Branko Milanovic may be contacted at bmilanovic@worldbank.org. November 1998. (35 pages)

Poverty and Economic Transition: How Do Changes in Economies of Scale Affect Poverty Rates of Different Households?

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I. Introduction

The distributional impact of the economic transition in Eastern Europe and the countries of the former Soviet Union has, not surprisingly, been a topic of major concern to observers of the reform process. Building on the valuable groundwork provided by Atkinson and Micklewright (1992), there has been a considerable amount of research into the question of how poverty has evolved over time in the transition economies, who have been the winners and losers from this process, and what policies are needed to protect the vulnerable.[2]

Within this broad research agenda, there has been a considerable amount of attention paid to the relative vulnerability of two well-defined household groups in the transition economies. Some observers have argued that old age pensioner households have been protected during the transition process, at least in relative if not in absolute terms. In contrast, living standards of households with young children are believed to have fallen substantially over the reform period. This argument has drawn on two types of evidence: the seemingly moderate rate of decline in the real value of pensions in most transition countries (Milanovic, 1998; Cornia, 1995); and the strikingly higher rates of measured poverty among households with young children compared to households which comprise the elderly (Milanovic, 1998, pp. 101-104).

Empirical evidence on the relative incidence of poverty among households of differing household structures, such as that displayed in Table 1 for a subset of seven transition economies, seemingly provides strong support to this view. In this table the focus is on the poverty rates of different household types. Overall poverty, in each country, is fixed at 20% of the national population (i.e. the poor are, by construction, assumed to be the lowest quintile of the population). It can be seen that the elderly or households comprising only the elderly are

[2] For recent reviews, see Milanovic, 1998, Braithwaite and Klugman, 1998, Falkingham, Klugman, Marnie, and Micklewright, 1996.

consistently less poor than the population as a whole.[3] In fact, for Hungary, Poland, Kyrgyzstan, Estonia and Kazakhstan, the incidence of poverty among elderly households is half or less than in the population as a whole. For example, in Poland, the poverty rate among the elderly households is 3 percent, in Hungary and Kazakhstan 9 percent etc. Similarly, the poverty rates among the elderly are in all countries lower than the poverty rates among children (10 vs. 31 in Poland; 13 vs. 29 in Hungary etc.)

Table 1. Poverty Estimates

(average poverty rate = 20 percent; based on per capita expenditures)

	BULGARIA	RUSSIA	HUNGARY	KYRGYZSTAN	POLAND	ESTONIA	KAZAKHSTAN
Average % Poor	20%	20%	20%	20%	20%	20%	20%
Household characteristics							
Elderly household	18%	17%	09%	09%	03%	10%	09%
Female headed household	16%	19%	13%	15%	09%	16%	18%
Low dependency ratio	18%	18%	19%	18%	17%	15%	16%
High dependency ratio	24%	25%	25%	21%	24%	19%	24%
Low child ratio	16%	15%	11%	17%	09%	11%	14%
High child ratio	24%	24%	28%	21%	28%	21%	25%
Household with No Child	15%	15%	11%	09%	07%	10%	12%
Household with One Child	16%	18%	20%	14%	15%	16%	14%
Household with Two Children	27%	24%	26%	18%	26%	22%	19%
Household with Three+ Children	59%	47%	56%	25%	49%	34%	40%
Individual characteristics							
Children	25%	25%	29%	43%	31%	28%	25%
Elderly	20%	18%	13%	29%	10%	16%	16%
Average Household Size							
Among the poor	3.57	3.09	3.60	6.07	4.68	2.91	4.49
Among the non-poor	2.79	2.67	2.63	4.70	2.89	2.33	3.44

Source: Authors' calculations.

In contrast, when one turns to households with more than the country's average number of children (the "high child ratio" category in the 6th row of Table 1), the incidence of poverty is consistently higher than in the population as a whole. In fact, once one focusses on

[3] Following convention in the region, the elderly are women aged 55 and above and men aged 59 and higher. We shall occasionally refer to households comprising only the elderly as "pensioner" households, although this is clearly a less than air-tight association.

households with three or more children, the relative poverty rates are two or more times higher than average for five out of the seven countries. The picture seems unambiguous: "...the idea that the old have suffered most from market reforms in Eastern Europe.....is wrong. ...the demands of pensioners are taking the food out of the mouths of working people's children" (*Economist*, 16 December, 1995).

However, the view that it is the elderly who have suffered most during the transition does have its proponents as well. An assortment of arguments have been presented, some less rigorously formulated than others. First of all, although officially pensions may not have declined as rapidly in real terms as have wages and welfare payments, at least in some countries actual payments from the government to pensioners have fallen far behind schedule. Second, the notion that pensioners are relatively well-off sits uneasily with oft-rehearsed anecdotes in many East European and FSU countries. These commentators often point to many impoverished pensioners as well as persisting support of the elderly for the Communist Party as evidence of widespread disaffection with the reform process.

The debate as to which types of household groups are relatively poor, and which are relatively well-off, can have important policy implications. All countries undergoing economic transition face tight budget constraints. Given a highly underdeveloped tax base, governments face far more demands for budgetary resources than they are able to satisfy. This means that need to shift expenditures from low-priority purposes (such as social transfers to those who are relatively well-off) towards high priority areas (that is, to help the poorest).

Is there any possibility of arbitrating between the conflicting viewpoints as to the poverty of the young versus the old? This paper suggests that seemingly arcane details of poverty measurement can help account for the divergence between the statistical evidence and the more popular, intuitive judgments. The paper illustrates that strong, albeit implicit, assumptions underpin the poverty comparisons reported in Table 1. Notably, the utilization of a per capita measure of individual welfare underlying these comparisons is premised on the assumption that there exist no economies of size in household consumption, in the sense that

the per capita cost of reaching a specific welfare level does not fall as household size increases. Similarly, a per capita measure does not allow for differences in needs arising from differences in family composition. If these assumptions are relaxed, this could affect comparisons of poverty between large and small households, and in turn could affect rankings of different household groups: households comprising the elderly are relatively small, while households with many children tend to be relatively large.[4]

Are there likely to be economies of size in household consumption? It is difficult to answer this question convincingly as there exists no obvious way in which to measure such economies of size (Pollak and Wales, 1979, Deaton, 1997, Deaton and Paxson, forthcoming, Lanjouw and Ravallion, 1995).[5] The existence of economies of size in consumption is linked to the extent to which there are public goods included among the household's consumption basket.[6] This is difficult to establish precisely with existing data sources. However, research in the developing country context has illustrated that while it may remain difficult to fully establish the extent of economies of size in consumption, it seems far less realistic to assume zero economies of size than to allow for some (Drèze and Srinivasan, 1995, Lanjouw and Ravallion, 1995). Poverty measurement undertaken for Western European countries standardly assumes quite extensive economies of size in household consumption (Gottschalk and Smeeding, 1997, Triest, 1998). This high degree of size economies is in part prompted by the evidence from the subjective approach to setting poverty lines (the so-called "Leiden School" approach-- see for example, Hagenaars, 1987, Hagenaars and van Praag, 1985), suggesting

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[4] A recent study by Drèze and Srinivasan (1995) examined a similar set of issues in the context of India. There, anthropological, demographic and sociological evidence points strongly to widows being a highly vulnerable group in Indian society. But poverty rates based on per-capita consumption measures calculated from household surveys, indicate that widow-headed households are among the least poor in Indian society. By relaxing slightly the assumption of no economies of size, Drèze and Srinivasan (1995) overturned these poverty comparisons dramatically, bringing the consumption-based evidence much more into line with evidence from other sources. Deaton and Paxson (1997) have also investigated the sensitivity of poverty comparisons in a set of six developing countries (including one, Ukraine, among the transition economies). They note that particularly in the two richest countries of their sample (Ukraine and Taiwan), poverty rankings between the elderly and children were most sensitive to alternative assumptions regarding economies of size in consumption.

[5] In particular, the use of food share method has been severely criticized (Deaton 1997, p. 251).

[6] Drèze and Srinivasan (1995) indicate the share of public goods in total consumption can be interpreted as an upper-bound of the degree of economies of size in household consumption (see also Deaton and Paxson, forthcoming).

that the self-assessed cost of avoiding poverty for a household of, say, four is much less than four times the cost for a household of one. A recent analysis implementing the subjective approach to welfare measurement in Russia finds that self-assessed individual welfare is quite insensitive to changes in household size, suggesting a very high degree of economies of size (Ravallion and Lokshin, 1998).[7]

Given our inability to precisely observe the degree of economies of size in consumption for a household, the question then boils down to how sensitive conclusions regarding the relative poverty of the elderly to that of the young, are to the *presence* of economies of size. If one has to make highly unrealistic allowances for economies of size before there are any re-rankings between these two population sub-groups, then statistical results based on the per-capita assumption can probably be accepted. If however, only mild deviations from the zero economies of size assumption result in sharp re-rankings, then there is clearly reason for caution in interpreting results such as in Table 1.

The very nature of the process of economic transition also has implications for our thinking about adjustments for economies of size in consumption. First, this process is typically associated with large shifts in relative prices. In particular, a common feature in many transition countries has been the rapid rise in the relative cost of housing and other goods and services which embody at least some public-good characteristics. These relative price shifts hit small households particularly hard, because they spend a greater share of total expenditures on public goods. However, second, there is also a counterveiling process. Transition economies have typically also experienced fairly large increases in the relative price of goods and services which are consumed primarily by children (for example, kindergartens and other education services). These price rises penalize households with young children (typically larger households). An important objective of this paper is to show how these two relative price effects enter into an assessment of economies of size of consumption. On balance we conclude that, as the transition process proceeds, the default assumption that

[7] Implementation of the subjective approach in two developing countries (Nepal and Jamaica) has also found

economies of size are absent or negligible needs to be revisited. The objective of this paper is to provide a theoretical framework, and some empirical evidence, within which to conduct the discussion.

The remainder of this paper adds analytical support to the arguments in the preceding paragraphs. In the next section we provide a framework for thinking about economies of size in household consumption. We illustrate the conceptual distinction between (i) economies of *size* and (ii) differences in the cost of meeting a given welfare level among family members of different ages or gender which require adjustments using *equivalence scale*. We call the two together, *economies of scale*. We then present in Section II a general framework for assessing the impact of relative price changes on economies of scale, and look, in particular, how relative price changes during the transition might have affected economies of size and equivalence scales. In Section III we test empirically the sensitivity of conclusions for the seven countries represented in Table 1. We illustrate that the relative poverty of elderly households vis-à-vis households with young children hinges quite critically on what "true" economies of scale are. We point out that not only do elderly households appear increasingly at risk with higher levels of scale-economies, but that the risk for households with other characteristics, such as female-headed households, is also quite sensitive. Female-headed households appear more poor with greater economies of scale because of the negative correlation between this household type and average household size (female-headed households are typically small). We argue that a more robust household classification would be one which does not discriminate between elderly and the young but rather focuses on the number of dependents (both young and old) vis-à-vis working age adults. We show that households with high dependency ratios are always significantly more likely to be poor than average across a range of assumed scale-economies. Section IV offers concluding comments.

II. Economies of Size and Equivalence Scales in Consumption: A Framework of Analysis

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strong evidence of economies of size in the developing country context (Pradhan and Ravallion, 1997).

Although the concepts of economies of size and equivalence scales are often used interchangeably, they possess a quite distinct nature. As we have mentioned above, economies of size imply that there is a decreasing per capita cost for reaching a given welfare level as household size increases. For a given household size, the relevance of such economies depend on the share in total household's expenditure on public goods, like housing or durables, within the household (see Deaton and Paxson, forthcoming, Drèze and Srinivasan, 1995, Lanjouw and Ravallion, 1995). On the other hand, equivalence scales account for the heterogeneous consumption *needs* that different household members have. For example children might have lower nutritional requirements and thus lower food costs than adults.

It is clear that a change in relative prices affects both household economies of size, and equivalence scales. We shall consider them in turn in light of the relative price changes taking place in Eastern European and FSU transition economies.

II. 1. Economies of size

We investigate the demand for private and public goods using a very simple version of the Barten model (see Deaton and Muellbauer, 1980, and Deaton and Paxson, forthcoming).[8] Utility of a family member in a household which consumes both private goods (say, food) and a quasi-public good (say, housing) can be written (see following Drèze and Srinivasan, 1995, p. 27),

$$(1) \qquad y^* = \frac{Y}{n^\theta} = \rho\frac{Y}{n} + \frac{U[(1-\rho)Y/p_h]}{n^\beta}$$

[8] While this model is very helpful for our purposes in providing a relatively transparent framework within which to consider the issues we are interested in, recent analysis by Deaton and Paxson indicates that this model does not receive clear empirical support (Deaton and Paxson, forthcoming).

where y*="true" income or consumption (welfare) per household member at the optimum, Y=total income or consumption, n= number of household members, ρ=share of all expenditures spent on food, β=reverse of the economy of size in the consumption of housing, p_h = unit price of housing and U(.)=utility (shared equally among all members) from consumption of housing. Note that if housing were a *pure* public good, β would be equal to 0, and the entire "utility" from the public good would be consumed by each household member. Finally, the parameter θ expresses the (reverse of) the overall economies of size[9]. θ reflects both the composition of consumption (between the public and private goods), and the economies of size in the consumption of housing (β). While β is ultimately a technological parameter, θ is an overall *calculated* elasticity.[10]

If we introduce quantity of housing consumed (q_h), and let the unit price of private goods serve as the numeraire ($p_f=1$), the expression (1) can be written

$$(2) \qquad y^* = \frac{Y - p_h q_h}{n} + \frac{U[q_h]}{n^\beta}$$

During the transition, a typical change in prices involves an increase in the relative price of quasi-public goods like housing, residential electricity and heating. Their new price is $p_{h_1} > p_{h_0}$ (expressed in terms of the private good numeraire) For example, in Poland, between 1989 and 1993, the nominal rent increased 39 times, heating and hot water costs increased 230 times, household electricity 116 times, while the nominal price of food rose 18 times.[11] In Hungary, over the 1990-96 period price of electricity, gas and other utilities increased almost 7 times, and price of food 3.5 times.[12]

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[9] θ is defined as the negative of the elasticity of y^* with respect to n.

[10] An almost pure public good may be television, although there too congestion may arise.

[11] Polish Central Statistical Office, *Statistical Yearbook 1994*, pp. 190-1.

[12] Hungarian Central Statistical Office, *Statistical Yearbook 1996*, p. 315.

Assume, for simplicity, that the household continues to consume the same amount of housing (q_h). The increase in rent may be insufficient to make the household undertake an expensive and risky transfer to a smaller house or apartment--particularly so because the housing market, despite privatization, has remained very thin; also, in Russia, for example, there are still *de facto* constraints on migration.[13] As for utilities and heating costs, in all countries of the former Soviet Union, they are not metered but assessed according to the number of people or surface of the apartment.[14] All the conclusions below remain the same so long as the share of spending on housing increases, that is, so long as its uncompensated price elasticity is less than 1, which is not a strong assumption.

If consumption of the quasi-public good does not adjust, and income stays the same, household will have to reduce consumption of the private good. The utility becomes

$$(3) \qquad y_1^* = \frac{Y - p_{h1} q_h}{n} + \frac{U[q_h]}{n^\beta}$$

where $y_1^* < y^*$ since $p_{h1} > p_h$.

The question we want to ask next is, how would this affect the household's overall economies of size, θ. Solving (1) explicitly for θ, we find

$$(4) \qquad \theta = \frac{\beta \ln n - \ln[\rho n^{\beta-1} + 1 - \rho]}{\ln n} = \beta - \frac{\ln[\rho n^{\beta-1} + 1 - \rho]}{\ln n}$$

θ is a function of β, n and ρ. Note that in the case of a pure public good, when $\beta = 0$, relation (4) reduces to

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[13] Although the *propiska* (residential permit) was deemed anti-Constitutional at least twice by the Russian Supreme Court it is still effectively used in Moscow.

[14] Moreover, under the *ceteris paribus* conditions, demand for a good will be less elastic the smaller its relative share in total expenditures. Since expenditures on housing were typically very small in socialist

$$\theta = \frac{-\ln[1-\rho+(\rho/n)]}{\ln n}$$

as derived by Lanjouw and Ravallion (1995, p. 1428).

Note also that when the share of all expenditures spent on private goods is large (as it was before the transition), and ρ tends to 1, θ tends toward 1 as well, indicating that the overall economies of size are negligible:

$$\theta = \frac{\beta \ln n - (\beta-1)\ln n}{\ln n} = \frac{\ln n}{\ln n} = 1$$

If we assume housing as the only quasi-public good then ρ is by definition:

(5) $$\rho = \frac{Y - p_h q_h}{Y} = 1 - \frac{p_h q_h}{Y}.$$

The change in ρ, due to the change in price of housing, is

(6) $$\frac{d\rho}{dp_h} = \frac{-q_h}{Y}.$$

Now, differentiating θ (from 4) with respect to ρ, we obtain,

(7) $$\frac{d\theta}{d\rho} = \frac{-1}{\ln n}\left(\frac{n^{\beta-1}-1}{\rho n^{\beta-1}+1-\rho}\right)$$

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economies (seldom representing more than 5 percent of total expenditures, and often as small as 2 percent) a very great increase in relative price is needed to elicit a reduction in demand.

Since we know that ρ has changed as given by (6), we can simply replace it in (7), and obtain (8). Equation (8) shows the change in the economies of size, θ, produced by the increase in the relative price of a good that "generates" these economies of size (housing). [15]

$$(8) \qquad d\theta = \frac{1}{\ln n}\left(\frac{n^{\beta-1}-1}{\rho n^{\beta-1}+1-\rho}\right)\frac{q_h}{Y}dp_h$$

Clearly, for $dp_h > 0$ and $\beta < 1$, we must have $d\theta < 0$. Thus. if there are some economies of size in the consumption of housing,and price of housing goes up, θ must go down.

Taking the actual values of ρ's before the transition for different household sizes in Poland (from the *1989 Household budget survey*), and noting that in 1993 (the year for which we have the Polish household survey data that we use for in the empirical calculations in Section III below), the increase in the relative price of housing compared to food was 455 percent,[16] and assuming a $\beta = 0.3$, it can be easily calculated that θ will decrease by between 0.15 and 0.2 (see Table 2).

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[15] Assuming as before that the consumption of housing stays the same.

[16] Calculated from the Polish Central Statistical office: *Statistical Yearbook 1994*, pp. 190-191. As mentioned above, food prices between 1989 and 1993 increased by 18 times, while the rent went up by 39 times, and central heating and electricity by respectively 230 and 116 times. Using the 1989 shares of rent, heating and electricity in total expenditures, the average increase in housing costs was 100 times. Thus the price of housing expressed in the food numeraire rose some 455 percent (100/18).

Table 2. Empirical change in the economies of scale for different household sizes, Poland 1989-93.

	n=2	n=3	n=3.52	n=4	n=5
pre-transition θ	0.959	0.962	0.958	0.959	0.955
and ρ	[0.954]	[0.963]	[0.962]	[0.964]	[0.964]
post-transition θ	0.809	0.788	0.779	0.772	0.759
and ρ	[0.772]	[0.789]	[0.767]	[0.772]	[0.750]
Change in θ	-0.150	-0.174	-0.179	-0.187	-0.196

Note: Calculations based on the following assumptions: $\beta=0.3$; increase in relative price of housing=455%. Workers' households only. The average household size is 3.52. Source: Polish Central Statistical Office: *Household Budget Surveys* 1989, Table 9. ρ=share of non-housing expenditures in total expenditures. θ calculated from (4).

Equation (8) has the virtue of showing simply and explicitly that the change in θ will be negatively related to the price of the quasi-public good and household size, and positively related to β. As economies of size become more important, the position of large households (compared to small) improves. Similarly, countries with large increases in the price of quasi-public goods and a large average household size will experience significant gains in economies of size (i.e. large decrease in θ).

II.2. Adding equivalence scales

In the previous sub-section, we looked at the impact of higher public good prices on households of different sizes while implicitly assuming that the composition of households (adults vs. children) is either the same or did not matter. Now we introduce the assumption that households, even if they have the same size, may still vary in their "needs" if their composition is different, in particular because the needs of children may be less than the needs of adults.

Rewriting (1), with income (or consumption) per equivalent adult:

$$(9) \qquad y^* = \frac{Y}{n^\theta} = \frac{\rho Y}{(A + bC)} + \frac{(1-\rho)Y}{(A + b_h C)^\beta}$$

where A=number of adults, C=number of children, b=equivalence scale for children in consumption of food ($b \leq 1$), and b_h= equivalence scale for children in consumption of a quasi-public good (housing) with b_h generally assumed to be less than or equal to one (although, in principle, b_h could also take a value greater than one). In general, $b \neq b_h$ since we have no grounds to suppose that equivalence scales in consumption of a private and of a quasi-public are the same. For simplicity of the presentation we shall assume that children "need" the same amount of quasi-public good as adults, and thus $b_h = 1$.[17] The lower "cost" of children is thus confined to private goods. (9) then becomes

$$(10) \qquad \frac{Y}{n^\theta} = \frac{\rho Y}{(A + bC)} + \frac{(1-\rho)Y}{n^\beta}$$

It is generally held that the main reason why the expenditures needed for a child to achieve the same level of welfare as an adult are lower are children's lower nutritional and clothing needs. To that extent that children and adult food and clothing are fundamentally the same goods, b can be regarded as a "technological" parameter stating that, for example, a child can be adequately nourished with half-a-hamburger while an adult needs an entire hamburger. Then the coefficient itself would be unaffected by the change in prices of food or clothing. However, there are also specific children goods that were included in our previous two-good model under the rubric of all non-housing expenditures (ρY). They are toys, diapers, school supplies, kindergartens, and not the least, education-related expenses. Thus, b can be seen to be a function of a "technological" parameter ν, and relative price (expressed in non-housing goods) of children goods (p_c). We can write

(11) $b = f(\upsilon, p_c)$

It is the children goods (e.g. kindergarten and education in particular[18]) that were heavily subsidized under socialism, and whose relative price has increased in all transition countries. Thus, the relative cost of a child compared to an adult, b, has risen even if the "technological" parameter ν is fixed by definition.

The question we ask now is, how will an increase in b affect the value of θ? Using (10), we solve for θ, as we have done in the previous section (see equation 4). This yields equation (4a)

$$\theta = \frac{\ln(A + bC) + \beta \ln n - \ln[\rho n^{\beta} + (1-\rho)(A + bC)]}{\ln n} =$$

(4a)

$$= \frac{\ln(A + bC)}{\ln n} + \beta - \frac{\ln[\rho n^{\beta} + (1-\rho)(A + bC)]}{\ln n}$$

θ in equation (4a) is, in principle, a function of four variables, ρ, n, β, and b. n and β are assumed to be parameters; ρ and b do change during the transition. Therefore, the total differential of θ will be

(12) $$d\theta = \frac{\delta\theta}{\delta\rho} d\rho + \frac{\delta\theta}{\delta b} db.$$

Differentiation of (4a) with respect to b and ρ gives

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[17] Relaxing this assumption strengthens our conclusions regarding the sensitivity of our overall economies of scale parameter, θ, to changes in relative prices. Our qualitative conclusions are unaffected.

[18] *International comparison project* (see Ahmad, 1998) shows education costs in PPP terms to be much lower in Eastern Europe than in the West, and even to be below the level predicted from Eastern European countries' GDPs.

$$(13) \qquad \frac{\delta\theta}{\delta b} \quad \frac{C}{\ln n}\left[\frac{1}{A+bC} - \frac{1-\rho}{\rho n^{\beta}+(1-\rho)(A+bC)}\right]$$

$$(7a) \qquad \frac{d\theta}{d\rho} = \frac{-(n^{\beta}-A-bC)}{\ln n\left(\rho n^{\beta}+(1-\rho)(A+bC)\right)}$$

We also know that ρ has changed because of greater spending on housing. The increased cost of children goods will lead to a reallocation of spending *amongst* private goods (as between children and non-children goods) but would not affect ρ which remains as given in (6). [19]

We also know from (11) that

$$(14) \qquad db = \frac{\delta b}{\delta p_c} dp_c$$

Substituting (6), (7a), (13), and (14) into (12), yields the final expression for the change in θ due to *both* an increase in the price of the quasi-public good (housing) and cost of children.

(15) +/- - + + +

$$d\theta = \left[(A+bC-n^{\beta})\left(\frac{1}{Y}[-qhdph]\right) + \frac{\rho n^{\beta} C}{(A+bC)}\frac{\delta b}{\delta pc}dpc\right]\left[\frac{1}{[\rho n^{\beta}+(1-\rho)(A+bC)]\ln n}\right]$$

[19] Notice that what happens to ρ is determined uniquely by what happens to the share of spending on housing. Also, the increase in spending in both children goods and housing does not violate the budget constraint as it is compensated by the decrease in spending in the private non-children goods which we treat as a residual.

The signs of the terms on the RHS are shown directly above. The first sign is ambiguous because there may be a combination of low b and high β that renders it negative. However, the entire equation critically depends on its sign because only if it is positive can $d\theta$ be less than 0. To be quite sure of what would be the overall direction of change in θ, one would need empirical estimates of the various underlying parameters. However, equation (15) is useful because it shows that the introduction of higher costs of children dampens the reduction in the overall economies of scale parameter (the term $\frac{\rho n^{\beta} C}{(A+bC)} \frac{\delta b}{\delta pc} dpc$).

II. 3. Implications of the analysis.

We have seen in Section II.1 that the increase in the relative price of a quasi-public good like housing will lead to an increase in the overall economies of size (reduction of θ), and that, everything else being the same, the position of larger households will improve relative to smaller households. The intuitive logic is quite straightforward: as more money is spent on goods that have some public character in them, economies of size become more important, and larger households benefit from it more than small households.

In Section II.2, when we have allowed for the fact that households do not differ only by size, but by composition as well, we have seen that our earlier conclusion about the reduction in θ is weakened because higher cost of children will push θ up. The intuition behind such an effect is apparent if one remembers that larger households are typically more "children-intensive" households. Then, an increase in the cost of children will affect them more than smaller households.

Thus, two contradictory movements can be detected during the transition. While the first movement in relative prices (*viz.* increased cost of housing) helps, in relative terms,

large families, [20] the second movement (increased cost of children) does the opposite. However, while the second change will provide some offsetting effect, it is unlikely to reverse the decrease in θ.

This can be also shown as in Figure 1. Line AA shows by how much income decreases due to a higher cost of the quasi-public good (downward distance from the 0 line--where the 0 line indicates the initial income). The line is upward sloping because the income loss is less for larger households. Let there then be a correlation between the household size and the number of children, and let the cost of children increase. The line AB shows by how much income is further reduced as cost of children rises: the line AB diverges more and more from AA as household size increases.[21]

Whether, on balance, the relative position of large or small households will improve will depend on: (1) how in reality the two lines look which, in turn, will depend on all the variables discussed before, e.g. increase in price of housing and children goods, actual elasticity of demand for housing, "children intensity" as n increases, etc.[22], and (2) the distribution of households by size. If they are dispersed as in Figure 1 (see the squares), and we plot a regression (shown as a thick line), large households will be shown to be have, on average, gained relative to small.

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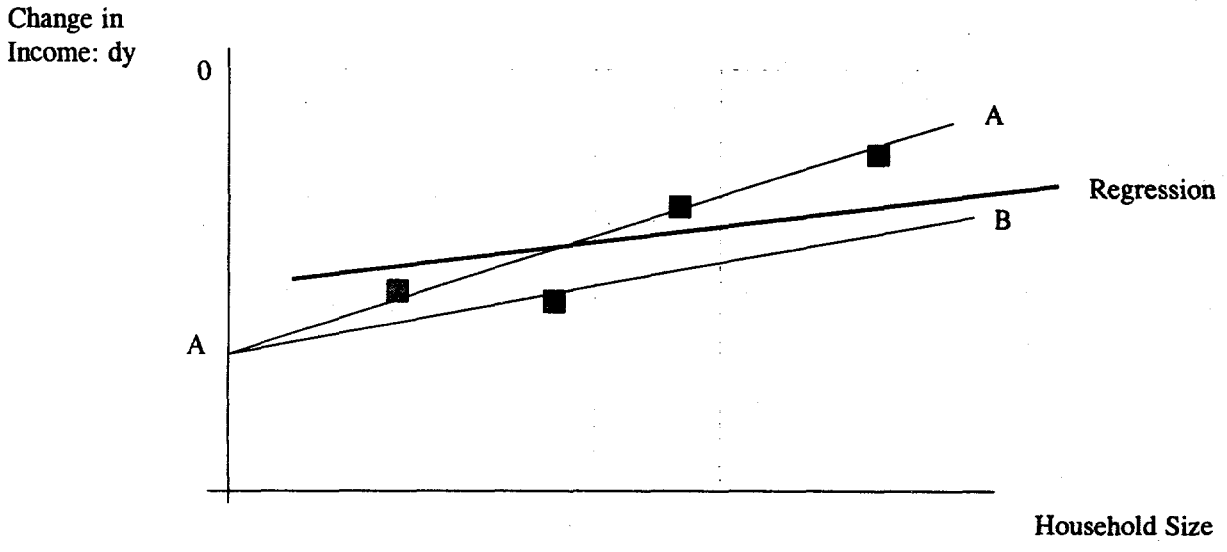
[20] Note that we are throughout speaking of *relative* position of different households. Clearly if prices increase and nominal income is the same, real welfare will be reduced. But the point is to investigate whose real welfare will be reduced by more.

[21] Obviously, households that have no children, will not be affected by the rising cost of children; hence their income would stay at AA.

[22] For example, the effect of a higher cost of children may be so small that the line AB only marginally diverges from AA, or it can be so strong that the slope of AB becomes negative; a similar thing will occur if the number of children increases very fast with household size.

Figure 1



Different countries display different constellations of relative prices of quasi-public goods (like housing), and cost of children. We can attempt to classify them with respect to what it implies for the overall economies of size (see Table 3).[23] Consider, first, a country with heavily subsidized quasi-public goods like housing, and a high cost of children. In such a country, ρ would be high, so much that the second term in equation (10) would tend to zero; the high cost of children will drive b close to 1, and in consequence, $\theta \approx 1$. In such a country, the use of per capita measures will make a lot of sense (see South-Western corner in Table 3). The opposite holds for a country where housing is relatively expensive (so that ρ is relatively low), while children goods and education are subsidized (so b is low). There, θ will be small. Indeed, this situation (market rents and free education) is common in Western Europe and might explain why both the empirically estimated subjective and even more so the political θ's as revealed in the official poverty lines are low (the British poverty line incorporates a value of $\theta=0.3$, see Trent 1998). The formerly socialist countries lay between these two extremes since a low cost of housing pulls θ up, while the low cost of children pulls it down. The same is true for the countries (e.g. United States) where both education and children goods, on the one hand, and public goods (housing and utilities), on the other,

[23] We disregard possible differences in the average household size and family composition between the countries.

are at market rates. As the East European countries move toward a relative price structure similar to that existing in Western Europe, we can expect the parameter θ to decrease. This is indeed what motivates our empirical analysis in Section III. To put the issue starkly--even if a rather high θ could have been justified before the transition, we must now work with a lower θ.

Table 3. Classification of countries' overall economies of scale according to different relative prices.

	Cheap housing and utilities	**"Expensive" housing and utilities**
Subsidized education and children goods (low cost of children)	medium level of θ [*Former Socialist Economies*]	low θ [*Western Europe*]
Education and children goods at market rates (high cost of children)	θ close to 1 per capita measures acceptable	medium level of θ [*United States*]

III. Poverty of the Elderly Vis-a-vis the Young

In this section we turn to an empirical assessment of the robustness of conclusions to alternative assumptions about the degree to which there exist scale economies in consumption in the transition countries. A convenient manner in which to assess this sensitivity is to reconstruct demographic profiles of poverty with alternative specifications of the value of θ. Recall from the previous section that θ captures the combined, net, effect on welfare of economies of size and of equivalence scales (together comprising what we term *economies of scale*). We are not in a position where we can fully separate out these two effects because this would require that we distinguish within total consumption between expenditures on private goods and on public goods, and in addition, that we distinguish within private goods between children goods and other private goods.[24] When $\theta = 1$ we assume no economies of scale in

[24] In their study, Deaton and Paxson (1997) separate between economies of size and equivalence scales when they undertake sensitivity analysis. However, their approach requires implicitly assuming that economies of

consumption and a per capita measure of consumption is an appropriate indicator of individual welfare. As θ falls below 1 there are increasing economies of scale, and with $\theta = 0$ the best measure of *individual* welfare is total *household* consumption. In poverty studies carried out in Western Europe and the United States, it is common to assume a value of θ as low as 0.5 (Gottshalk and Smeeding, 1997, see also Triest, 1998). These values imply that if we observe significant changes in our demographic profiles at values of θ above 0.6, we should not regard these values as wholly unrealistic. [20]

The data we analyze belong to the *HEIDE (Household Income and Expenditure Data for Transition Economies)* data set described in Braithwaite, Grootaert and Milanovic (1998). We have household level data for seven countries in Eastern Europe and the former Soviet Union. Considerable effort has been expended to ensure that the data are as comparable as possible, although it should be acknowledged that this may not have been achieved completely. In all cases the indicator of welfare is consumption rather than income. The definitions of consumption are defined in a similar manner, but do vary somewhat across countries in terms of their degree of comprehensiveness. As we will be comparing poverty profiles across countries rather than actual consumption levels, the fact that the consumption definitions do not match perfectly is of less concern. There would only be cause for concern if the different definitions led to strongly varying profiles of poverty.[21]

Tables A.1-A.7 in the appendix to this paper provide calculations of the relative incidence of poverty for various household types and across a range of values of θ between 1

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size are technologically determined only, and are not also a function of relative prices between public and private goods. Similarly, their equivalence scale adjustments do not permit different adjustments for food consumption, children-good consumption and quasi public-good consumption. Hence, while their approach does break down the overall economies of scale effect into its two sub-components, these two, in turn, are taken to be aggregate effects over their own respective sub-components. Given our inability to quantify any of these sub-compenent effects, we emply a single parameter θ to represent the overall, net, adjustment.

[20] Note that the value of θ implicit in subjective poverty lines for developed countries has been observed to be as low as 0.12. See Buhmann et al. 1988.

[21] Lanjouw and Lanjouw (1997) illustrate with reference to Ecuador that while poverty levels can vary sharply with the definition of consumption, poverty profiles tend to be much less sensitive.

and 0, respectively in Estonia, Russia, Hungary, Kyrgyzstan, Poland, Bulgaria, and Kazakhstan. For each country, and for each value of θ, the overall, national, incidence of poverty in the population is set at 20%. Taking this approach allows us to compare the incidence of poverty for a given household type at a given value of θ to the overall poverty rate. We are then able to observe how this relative poverty rate changes as θ is allowed to fall from 1 to 0. For example, in Table A.1 we can observe that with a per-capita measure of consumption ($\theta = 1$), the incidence of poverty in Estonia for households comprising solely of the elderly (row 1 in Table A.1) is 10% while it is 20% for the population as a whole. At this value of θ, the incidence of poverty for the population residing in households which have a larger than average number of children ("high child ratio") is 21%, and for the population residing in households with three or more children the incidence of poverty is 34%. In the final column of Table A.1 we can see that these three household groups represent 17%, 53% and 9% of all households, respectively. When we allow θ to fall from 1 to, say, 0.7 we can see that poverty among elderly households is now 23%, for "high child ratio" households it is 20%, and for households with three or more children it is down to 25%. As θ declines further the poverty rates among these three groups continues to change. By the time $\theta=0.5$ poverty among elderly households is 39%, while among high child ratio households and households with three or more children it is below average (19%, respectively). From Table A.1 we can also see that when $\theta = 1$ in Estonia the incidence of poverty among all children is 28% while it is 16% among all of the elderly (those living in households by themselves as well those living in households with younger members). Even by the time $\theta = 0.7$, these poverty rates have switched over to 21% for children and 22% for the elderly.

Figure 2 and figure 3 summarize the information in Tables A.1-A.7 for four key household groups: households comprising only elderly; "high child ratio" households (defined as households with more than the average number of children); female-headed households; and households which have a higher than average dependency ratio (where dependents are assumed to include any family member not of an adult working age). We will confine our main

remarks to the patterns observed in these figures, rather than Tables A.1-A.7. The broad patterns observed in these figures carry through in the Tables.

Figure 2.Country Estimates.

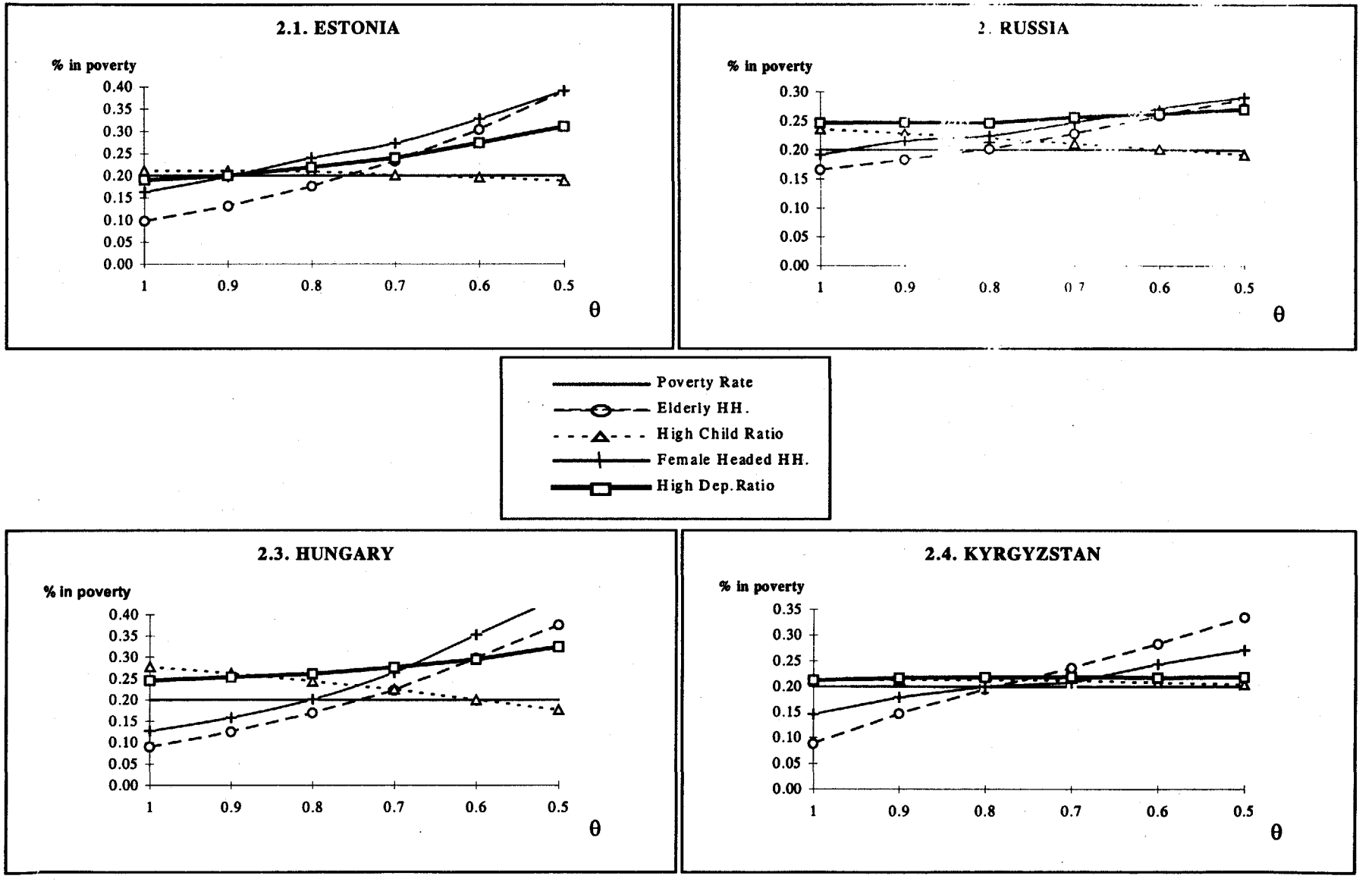
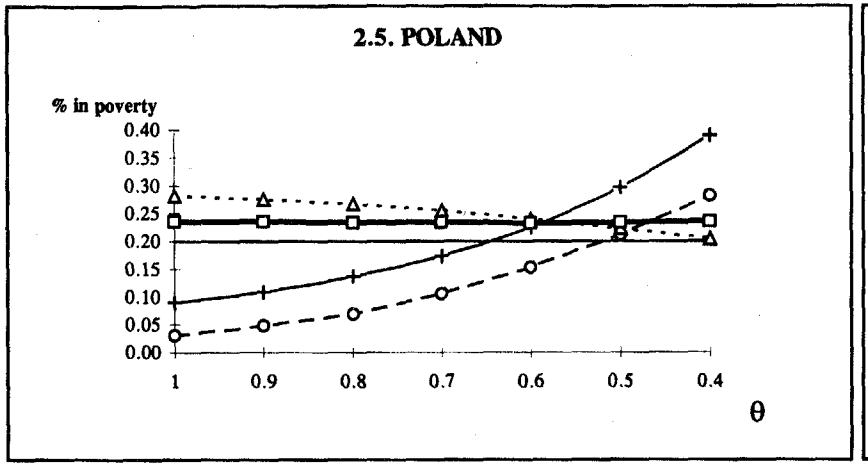
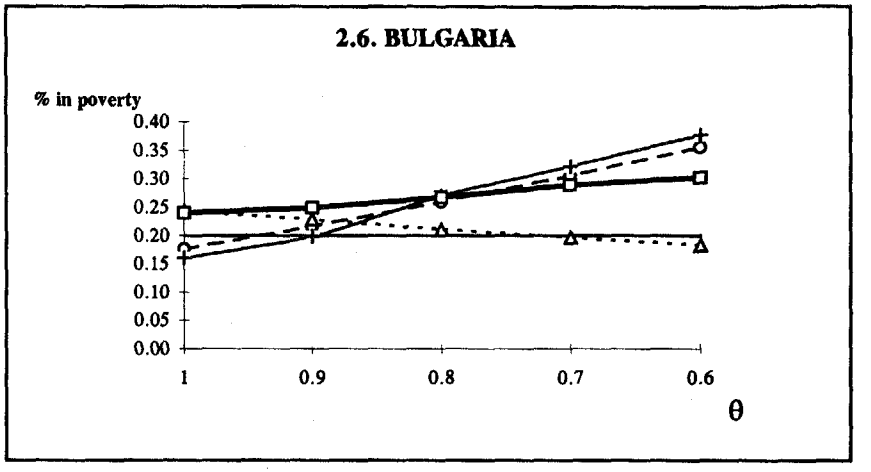
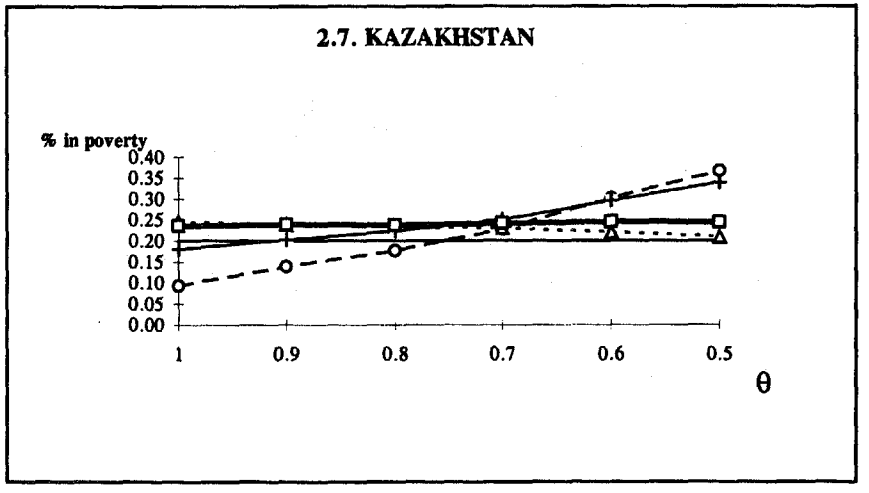
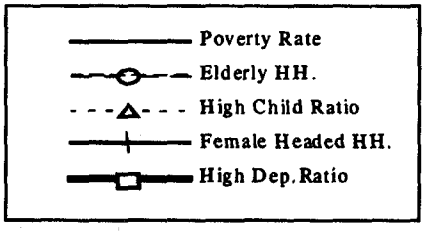


Figure 2.Country Estimates (cont.)



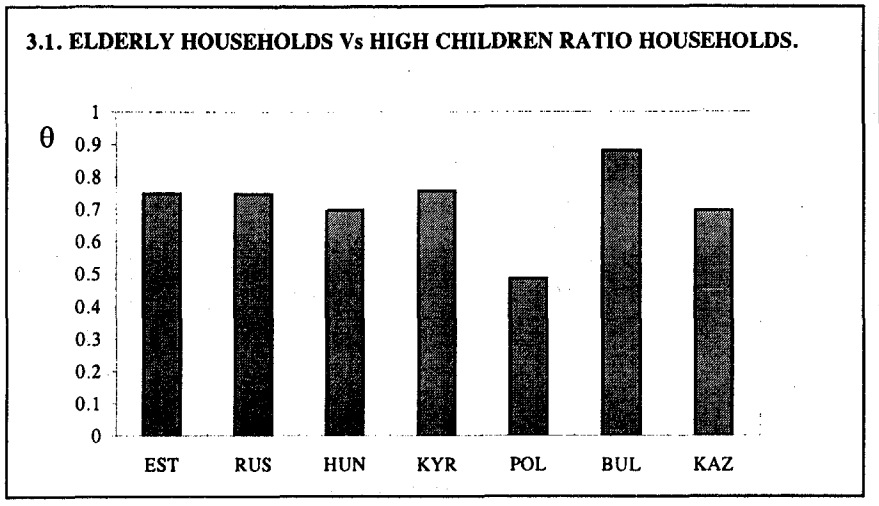


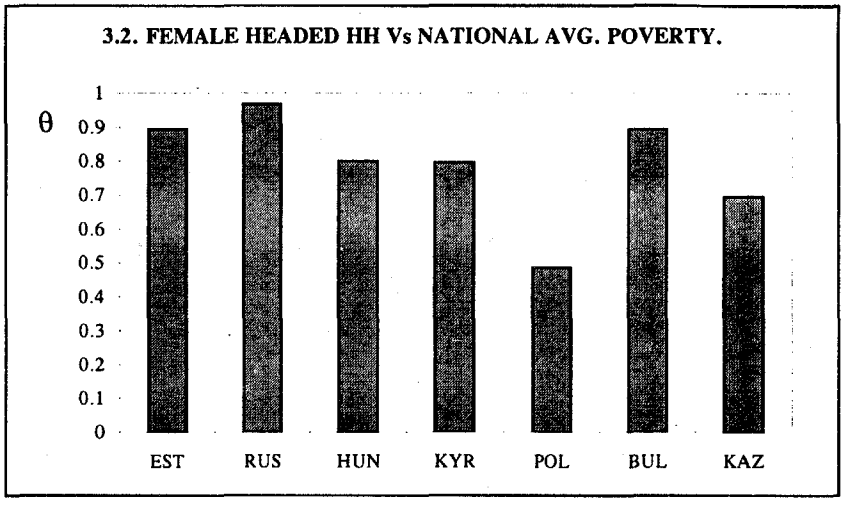


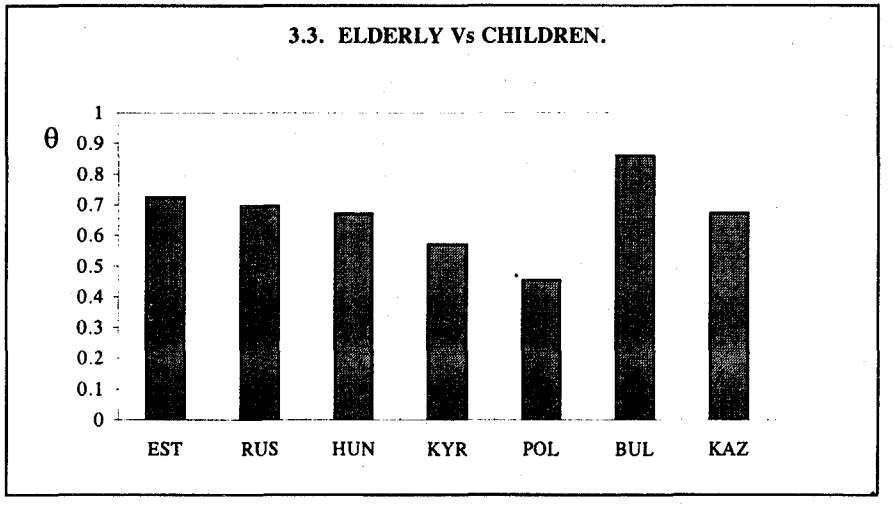


Note: Authors' calculations. Scales differ across tables.

Figure 3. Values of θ for which re-ranking occurs between selected pairs.







Elderly Households versus High Child Ratio Households

Figure 2 and figure 3 illustrate the sensitivity of poverty rankings between elderly households and households with more than the average number of children to alternative values of θ. As was already observed in Table A.1 the incidence of poverty among elderly households rises sharply in Estonia as θ falls from 1 towards 0. By the time $\theta = 0.75$ the elderly are more likely to be poor than the average population. It is also at this value of θ that the elderly are observed to have a higher incidence of poverty than high child ratio households. In Estonia, the incidence of poverty among high child ratio households declines with lower values of θ, but quite slowly.

In Poland re-ranking between these two household groups does not occur until a value of θ of around 0.5. Here the poverty of the elderly is particularly low when $\theta = 1$, and very high for high child ratio households. The poverty rates for these two groups clear converge as θ falls, but have to cover a lot of ground before they meet. For the remaining five countries re-ranking between these two household groups occurs at $\theta = 0.7$ or higher. In all countries the relative poverty of the elderly households tends to rise more rapidly than the incidence of poverty declines among households with a high child ratio.

Female-Headed Households

Female-headedness is a household characteristic which tends to be closely correlated with low overall household size. This implies that we would expect to see that incidence of poverty among this type of household to rise fairly rapidly as θ declines from 1 toward 0. Indeed, this is what can be observed for the seven countries examined in figure 2 and figure 3. An interesting pattern is that this group appears to be on average more poor than the elderly at all levels of θ, which implies that a re-ranking between this group and the high child ratio group tends to occur earlier than observed between elderly households and high child ratio

households. It is of course important to recognize that there may well be considerable overlap between female-headed households and elderly households (to the extent that many female-headed households comprise widowed pensioners living by themselves.) The key finding here is that whereas female-headed households in transition economies nowhere look particularly vulnerable when a per capita measure of consumption is employed as the welfare level, this conclusion is rapidly overturned once some economies of scale are allowed for. The point at which female households look more poor than the population average is often only slightly below the $\theta = 1$ value (figure 3.2). It is also clear that if substantial economies of scale are assumed (e.g. $\theta = 0.5$) then the population residing in female headed households is generally much poorer than the population on average. At $\theta = 0.5$ the incidence of poverty among such households ranges from about 27% in Russia to about 43% in Bulgaria (holding the respective average incidence of population in these counties at 20%).

To further illustrate our findings, we show in figure 3.3 the values of theta for which re-ranking occurs for elderly versus children in the population as a whole. The 'switch points' are substantially identical to those of elderly households versus high children ratio households, the only exception being Kyrgyzstan for which the critical value of θ drops from .75 to .57.

High Dependency Ratios

Scrutiny of figure 2 also reveals another relatively robust finding: the incidence of poverty among the population residing in households with high dependency ratios tends to be above average over all values of θ. In these figures a household is defined as having a high dependency ratio, if the proportion of dependents (either children or elderly) relative to the total household size is greater than the mean proportion for that country. This finding suggests that as conclusions regarding the poverty of the elderly compared to the young do not seem to be very robust, it might be more meaningful to consider dependents as a group rather than to try to distinguish between sub-groups of these. However, it should be kept in mind that, while the incidence of poverty is robust across different values of θ, the composition of those who

are poor (that is, are they large households, or small households consisting mostly of the elderly) will continue to vary.

IV. Conclusions

Since the onset of economic transition all Eastern European and FSU countries have been under intense pressure to rationalize their public expenditures in order to meet tight budget constraints. The pursuit of a more efficient allocation of relatively scarce resources has led to a global reconsideration of public expenditure priorities. In this context, the discussion of the relative poverty among the children and the elderly has been of particular relevance because it influenced spending decisions. Many empirical studies of transition economies show that that poverty among children is more pronounced than among the elderly (see, for example, Andorka and Speder, 1994, table 2; Vecernik and others, 1994, tables IV/3a and IV/3b; World Bank, 1996, p.18; World Bank, 1995, figure B, page iii).

We have shown in this paper that these findings are often based on various implicit assumptions. In particular, one important assumption underpinning the conventional application of a per capita measure of income or consumption, is that there exist no economies of size in consumption. One purpose of this paper has been to open the discussion of this point, by noting that in the transition economy context where there have been large shifts in relative prices, often raising the relative cost of goods and services which embody at least some public good characteristics, economies of size have become more important.

There exists, however, no accepted way to establish or estimate the true extent of economies of size in a given country. This makes it difficult to determine what kind of departure from a per-capita measure of welfare is required. While we are unable to offer an

answer to this question, we have shown that only a small departure from a per capita measure may often (but not always) be sufficient to overturn the conventional ranking of poverty headcounts between elderly households and those with young children.

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A.1. Appendix.

TABLE 1. ESTONIA.

	θ=1.0	θ=0.9	θ=0.8	θ=0.7	θ=0.6	θ=0.5	θ=0.4	θ=0.3	θ=0.2	θ=0.1	θ=0.0	
Household Characteristics												**populat.**
% in poverty												**shares**
Elderly household	0.10	0.13	0.18	0.23	0.30	0.39	0.47	0.53	0.61	0.65	0.69	0.17
Female headed household	0.16	0.20	0.24	0.27	0.33	0.39	0.44	0.48	0.54	0.57	0.61	0.22
low dependency ratio	0.15	0.16	0.16	0.17	0.18	0.18	0.18	0.19	0.20	0.21	0.22	0.67
high dependency ratio	0.19	0.20	0.22	0.24	0.27	0.31	0.35	0.38	0.41	0.42	0.44	0.33
low child ratio	0.11	0.13	0.15	0.19	0.22	0.26	0.30	0.34	0.39	0.42	0.45	0.47
high child ratio	0.21	0.21	0.21	0.20	0.20	0.19	0.18	0.17	0.17	0.16	0.16	0.53
Household with/No Child	0.10	0.12	0.15	0.18	0.22	0.26	0.31	0.34	0.39	0.42	0.45	0.47
Household with One Child	0.16	0.17	0.18	0.18	0.18	0.18	0.17	0.17	0.18	0.18	0.20	0.25
Household with Two Child.	0.22	0.22	0.21	0.21	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.19
Household with Three+ Child.	0.34	0.31	0.29	0.25	0.22	0.19	0.18	0.16	0.13	0.12	0.09	0.09
Average % Poor	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
Average household size												
Poor	2.91	2.71	2.51	2.29	2.13	1.97	1.86	1.78	1.69	1.65	1.62	
Non-Poor	2.33	2.35	2.39	2.44	2.49	2.57	2.64	2.72	2.84	2.92	2.98	
% in Poverty												
children	0.28	0.26	0.24	0.21	0.19	0.17	0.16	0.14	0.13	0.12	0.12	
elderly	0.16	0.18	0.20	0.22	0.25	0.28	0.31	0.33	0.35	0.36	0.37	

TABLE 2. RUSSIA.

	θ=1.0	θ=0.9	θ=0.8	θ=0.7	θ=0.6	θ=0.5	θ=0.4	θ=0.3	θ=0.2	θ=0.1	θ=0.0	
Household Characteristics												**populat.**
% in poverty												**shares**
Elderly household	0.17	0.18	0.20	0.23	0.26	0.29	0.31	0.34	0.37	0.40	0.43	0.14
Female headed household	0.19	0.22	0.22	0.25	0.27	0.29	0.31	0.33	0.35	0.38	0.41	0.14
low dependency ratio	0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.16	0.16	0.16	0.16	0.72
high dependency ratio	0.25	0.25	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.31	0.31	0.28
low child ratio	0.15	0.16	0.17	0.18	0.20	0.21	0.22	0.23	0.25	0.26	0.27	0.42
high child ratio	0.24	0.23	0.22	0.21	0.20	0.19	0.19	0.18	0.17	0.16	0.15	0.58
Household with/No Child	0.15	0.16	0.17	0.18	0.20	0.21	0.22	0.23	0.25	0.26	0.27	0.42
Household with One Child	0.18	0.18	0.18	0.18	0.17	0.17	0.16	0.16	0.15	0.15	0.14	0.28
Household with Two Child.	0.24	0.23	0.23	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.23
Household with Three+ Child.	0.47	0.44	0.39	0.37	0.33	0.30	0.28	0.27	0.25	0.22	0.19	0.07
Average % Poor	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
Average household size												
Poor	3.09	2.96	2.86	2.73	2.60	2.47	2.38	2.27	2.19	2.10	2.02	
Non-Poor	2.67	2.70	2.72	2.76	2.79	2.83	2.86	2.90	2.94	2.98	3.02	
% in Poverty												
children	0.25	0.24	0.23	0.22	0.21	0.20	0.20	0.19	0.18	0.17	0.16	
elderly	0.18	0.19	0.21	0.22	0.24	0.26	0.28	0.30	0.31	0.33	0.35	

TABLE 3. HUNGARY.

	θ=1.0	θ=0.9	θ=0.8	θ=0.7	θ=0.6	θ=0.5	θ=0.4	θ=0.3	θ=0.2	θ=0.1	θ=0.0	
Household Characteristics												**populat.**
%in poverty												**shares**
Elderly household	0.09	0.13	0.17	0.22	0.30	0.37	0.43	0.49	0.54	0.57	0.60	0.15
Female headed household	0.13	0.16	0.20	0.26	0.35	0.44	0.51	0.56	0.61	0.65	0.67	0.10
low dependency ratio	0.19	0.18	0.18	0.17	0.16	0.15	0.14	0.13	0.13	0.12	0.11	0.73
high dependency ratio	0.25	0.25	0.26	0.28	0.29	0.32	0.33	0.35	0.35	0.37	0.37	0.27
low child ratio	0.11	0.13	0.14	0.17	0.19	0.22	0.25	0.27	0.29	0.30	0.32	0.44
high child ratio	0.28	0.26	0.24	0.22	0.20	0.18	0.15	0.13	0.11	0.10	0.08	0.56
Household with/No Child	0.11	0.13	0.14	0.16	0.19	0.22	0.24	0.27	0.29	0.30	0.32	0.44
Household with One Child	0.20	0.19	0.19	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.24
Household with Two Child.	0.26	0.25	0.22	0.20	0.18	0.16	0.13	0.11	0.10	0.07	0.06	0.25
Household with Three+ Child.	0.56	0.53	0.49	0.45	0.39	0.33	0.23	0.19	0.12	0.09	0.07	0.08
Average % Poor	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
Average household size												
Poor	3.60	3.36	3.09	2.80	2.52	2.28	2.09	1.95	1.83	1.74	1.68	
Non-Poor	2.63	2.66	2.71	2.77	2.85	2.93	3.02	3.09	3.16	3.22	3.27	
% in Poverty												
children	0.29	0.28	0.27	0.25	0.22	0.20	0.17	0.15	0.13	0.11	0.09	
elderly	0.13	0.16	0.19	0.23	0.27	0.33	0.37	0.41	0.44	0.47	0.49	

TABLE 4. KYRGYZSTAN.

	θ=1.0	θ=0.9	θ=0.8	θ=0.7	θ=0.6	θ=0.5	θ=0.4	θ=0.3	θ=0.2	θ=0.1	θ=0.0	
Household Characteristics												**populat.**
%in poverty												**shares**
Elderly household	0.09	0.15	0.19	0.24	0.28	0.33	0.39	0.45	0.50	0.53	0.57	0.03
Female headed household	0.15	0.18	0.20	0.21	0.24	0.27	0.30	0.32	0.36	0.39	0.41	0.05
low dependency ratio	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.17	0.38
high dependency ratio	0.21	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.23	0.22	0.22	0.62
low child ratio	0.17	0.17	0.17	0.17	0.18	0.19	0.20	0.21	0.21	0.22	0.22	0.32
high child ratio	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.19	0.19	0.19	0.19	0.68
Household with/No Child	0.09	0.11	0.13	0.15	0.18	0.21	0.23	0.27	0.30	0.33	0.34	0.13
Household with One Child	0.14	0.14	0.14	0.14	0.16	0.17	0.17	0.18	0.17	0.19	0.20	0.15
Household with Two Child.	0.18	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.19
Household with Three+ Child.	0.25	0.25	0.24	0.24	0.22	0.21	0.20	0.19	0.18	0.17	0.17	0.53
Average % Poor	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
Average household size												
Poor	6.07	5.69	5.47	5.27	4.92	4.64	4.39	4.16	3.96	3.78	3.68	
Non-Poor	4.70	4.77	4.81	4.85	4.93	5.00	5.08	5.16	5.25	5.33	5.38	
% in Poverty												
children	0.43	0.43	0.42	0.42	0.41	0.40	0.39	0.38	0.37	0.36	0.35	
elderly	0.29	0.33	0.35	0.37	0.40	0.43	0.47	0.51	0.55	0.57	0.59	

TABLE 5. POLAND.

	θ=1.0	θ=0.9	θ=0.8	θ=0.7	θ=0.6	θ=0.5	θ=0.4	θ=0.3	θ=0.2	θ=0.1	θ=0.0	
Household Characteristics												**populat.**
%in poverty												**shares**
Elderly household	0.03	0.05	0.07	0.11	0.15	0.21	0.28	0.36	0.42	0.49	0.54	0.12
Female headed household	0.09	0.11	0.14	0.17	0.22	0.30	0.39	0.47	0.54	0.60	0.65	0.08
low dependency ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.43
high dependency ratio	0.24	0.24	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.25	0.25	0.57
low child ratio	0.09	0.10	0.11	0.13	0.15	0.18	0.21	0.25	0.28	0.31	0.33	0.39
high child ratio	0.28	0.28	0.27	0.26	0.24	0.22	0.20	0.19	0.17	0.15	0.14	0.61
Household with/No Child	0.07	0.08	0.10	0.12	0.15	0.18	0.22	0.25	0.29	0.32	0.35	0.37
Household with One Child	0.15	0.16	0.16	0.16	0.17	0.16	0.16	0.16	0.16	0.16	0.15	0.23
Household with Two Child.	0.26	0.26	0.25	0.24	0.23	0.22	0.21	0.19	0.17	0.15	0.14	0.24
Household with Three+ Child.	0.49	0.46	0.43	0.39	0.35	0.30	0.25	0.21	0.17	0.14	0.10	0.17
Average % Poor	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
Average household size												
Poor	4.68	4.45	4.18	3.83	3.46	3.09	2.75	2.49	2.30	2.16	2.05	
Non-Poor	2.89	2.92	2.95	2.99	3.05	3.14	3.24	3.35	3.46	3.56	3.64	
% in Poverty												
children	0.31	0.30	0.29	0.27	0.25	0.23	0.21	0.18	0.17	0.15	0.13	
elderly	0.10	0.11	0.12	0.14	0.17	0.20	0.24	0.28	0.31	0.35	0.37	

TABLE 6. BULGARIA.

	θ=1.0	θ=0.9	θ=0.8	θ=0.7	θ=0.6	θ=0.5	θ=0.4	θ=0.3	θ=0.2	θ=0.1	θ=0.0	
Household Characteristics												**populat.**
%in poverty												**shares**
Elderly household	0.18	0.22	0.26	0.31	0.36	0.40	0.45	0.48	0.52	0.56	0.60	0.17
Female headed household	0.16	0.20	0.27	0.32	0.38	0.44	0.50	0.52	0.55	0.59	0.63	0.07
low dependency ratio	0.18	0.18	0.17	0.16	0.15	0.15	0.14	0.13	0.13	0.12	0.12	0.70
high dependency ratio	0.24	0.25	0.27	0.29	0.30	0.32	0.35	0.35	0.36	0.38	0.39	0.30
low child ratio	0.16	0.17	0.19	0.20	0.22	0.23	0.25	0.26	0.28	0.29	0.31	0.50
high child ratio	0.24	0.23	0.21	0.20	0.18	0.17	0.15	0.14	0.12	0.11	0.09	0.50
Household with/No Child	0.15	0.17	0.19	0.20	0.22	0.23	0.25	0.26	0.28	0.30	0.31	0.50
Household with One Child	0.16	0.15	0.15	0.14	0.13	0.12	0.10	0.10	0.09	0.08	0.07	0.24
Household with Two Child.	0.27	0.25	0.23	0.21	0.19	0.18	0.17	0.15	0.12	0.12	0.09	0.22
Household with Three+ Child.	0.59	0.56	0.53	0.49	0.46	0.41	0.37	0.31	0.26	0.20	0.20	0.04
Average % Poor	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
Average household size												
Poor	3.57	3.30	3.02	2.78	2.54	2.36	2.21	2.09	1.99	1.87	1.80	
Non-Poor	2.79	2.83	2.89	2.95	3.02	3.10	3.17	3.23	3.30	3.38	3.45	
% in Poverty												
children	0.25	0.24	0.22	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.10	
elderly	0.20	0.22	0.25	0.27	0.30	0.32	0.35	0.37	0.39	0.41	0.43	

TABLE 7. KAZAKHSTAN.

	θ=1.0	θ=0.9	θ=0.8	θ=0.7	θ=0.6	θ=0.5	θ=0.4	θ=0.3	θ=0.2	θ=0.1	θ=0.0	
Household Characteristics												**populat.**
%in poverty												**shares**
Elderly household	0.09	0.14	0.18	0.23	0.30	0.37	0.42	0.49	0.52	0.56	0.62	0.05
Female headed household	0.18	0.20	0.22	0.25	0.30	0.34	0.37	0.40	0.44	0.47	0.51	0.09
low dependency ratio	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.15	0.15	0.15	0.47
high dependency ratio	0.24	0.24	0.24	0.24	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.53
low child ratio	0.14	0.15	0.15	0.16	0.17	0.19	0.19	0.20	0.21	0.22	0.23	0.42
high child ratio	0.25	0.24	0.23	0.23	0.22	0.21	0.20	0.20	0.19	0.18	0.18	0.58
Household with/No Child	0.12	0.13	0.15	0.16	0.19	0.22	0.25	0.27	0.29	0.32	0.34	0.24
Household with One Child	0.14	0.15	0.14	0.15	0.15	0.16	0.16	0.15	0.15	0.16	0.15	0.28
Household with Two Child.	0.19	0.18	0.18	0.18	0.16	0.15	0.14	0.14	0.14	0.14	0.13	0.28
Household with Three+ Child.	0.40	0.38	0.36	0.34	0.32	0.29	0.28	0.27	0.23	0.21	0.19	0.20
Average % Poor	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
Average household size												
Poor	4.49	4.26	4.06	3.81	3.56	3.32	3.13	3.02	2.86	2.73	2.62	
Non-Poor	3.44	3.47	3.51	3.56	3.62	3.69	3.75	3.79	3.86	3.92	3.98	
% in Poverty												
children	0.25	0.24	0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.17	
elderly	0.16	0.18	0.20	0.22	0.25	0.28	0.31	0.33	0.35	0.37	0.39	

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