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Stellenbosch Economic Working Papers: 13/08

KEYWORDS: CHILD POVERTY MEASUREMENT, ADULT EQUIVALENCE SCALES, SOCIAL GRANTS FOR CHILDREN
JEL: D31, I32

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A WORKING PAPER OF THE DEPARTMENT OF ECONOMICS AND THE
BUREAU FOR ECONOMIC RESEARCH AT THE UNIVERSITY OF STELLENBOSCH

How invariant is South African child poverty to the choice of equivalence scale or poverty measure?

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ABSTRACT

This paper offers evidence on the sensitivity of child poverty in South Africa to changes in the Adult Equivalence Scale (AES) and updates the child poverty profile based on the Income and Expenditure Survey 2005/06. Setting the poverty line at the 40th percentile of households calculated with different AESs the scope and composition of child poverty are found to be relatively insensitive to the scale used. The rankings of children of different ages, girls versus boys, racial groupings and children living in rural versus urban areas are unaffected by choice of AES, although some provincial rankings on the poverty headcount measure *are.* The proportions of children and households 'correctly' identified as poor for the full range of scales is extremely high. These findings support the argument of Woolard & Leibbrandt (2006) that it may be appropriate for profiling poverty in South Africa to use a poverty line based on a *per capita* welfare measure. For the construction of the child poverty profile, per capita income is used as the welfare indicator with the poverty line set at the 40th percentile of household. The profile suggests that poverty amongst children is more extensive than amongst the population or adults even after the massive injection of transfers into households with poor children through the child support grant. The child poverty headcount, depth and severity are all highest amongst children age 0-4 and lowest amongst those aged 15-17, who are not yet beneficiaries of the grants. They are also highest amongst African and Coloured children. Large variations across provinces remain. The analysis underlines the importance of prioritising *children* in the fight against poverty, particularly in their earliest years.

Keywords: Child poverty measurement, Adult equivalence scales, Social grants for children

JEL codes: D31, I32

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Introduction

Understanding the extent and characteristics of child poverty in South Africa and how these have been changing over time is vital for addressing it. Just over 18 million of South Africa's total population of around 47 million are children (age 0-17 years) (IES 2005). Child poverty is extensive and concentrated amongst the African and Coloured population (Streak & Coetzee 2004; Barnes *et al.* 2007). This paper adds to the evidence base on this issue. It has two objectives: first, to provide evidence on the sensitivity of the dimensions and characteristics of child poverty to alternative Adult Equivalence Scales (AESs); second, to present an updated and more comprehensive child poverty profile, based on an analysis of the Income and Expenditure Survey 2005/06 (hereafter IES2005) undertaken by Statistics South Africa between September 2005 and August 2006. Whilst IES2005 has been used to provide an updated profile of poverty in South Africa (Armstrong *et al.* 2008), it has not yet been used to profile child poverty.

The AES is a tool developed to deal with differences in household size and composition in welfare measurement. It provides an index converting nominal incomes of heterogeneous households into comparable measures of well-being (Bellù and Liberati, 2005). It does so by adjusting for assumptions about economies of scale and the differential needs and costs deriving from household composition. Individuals are then ranked using the per adult equivalent money metric welfare measure (in this paper, income). Based on Hunter, Kennedy & Biddle (2004: 413), $I_E = \frac{I_H}{AE_i}$ *where* I_E is equivalent income, I_H raw household income and AE the equivalence scale used. They point out that the scale can be set equal to one, i.e. no distinction can be drawn between households based on size or composition, whereas on the other extreme the scale can be set equal to the number of persons in the household, i.e. raw household income would be converted into per

capita income. Equivalence scales typically result in measures of equivalent income that lie between raw household income and per capita income.

Although most existing evidence finds that poverty profiles at the aggregate level are not highly sensitive to the AES used, there is virtually no evidence on the sensitivity of the *child poverty* profile to the AES. The South African government has recently released a proposal for a *per capita* poverty line (National Treasury & Statistics South Africa 2007; Woolard & Leibbrandt 2006). However, should the choice of AES affect ranking of poor children and provincial child poverty rates and shares, the use of the per capita method may lead to misguided targeting. This contribution is therefore particularly relevant at this time in South Africa.

This paper uses the money-metric approach to child poverty and is concerned therefore only with what Chambers (1998) labels 'poverty proper', though the authors acknowledge that there is much to be gained from supplementing monetary metric measures of poverty with direct measures to reflect non-economic aspects of poverty (Noble *et al.* 2006; Stuart *et al.* 2003; Sumner, 2004). How poverty is conceptualized, defined and measured affects the design and effectiveness of strategy to address it (Stuart *et al.* 2003; Minujin *et al.* 2007). Traditionally, poverty has been conceptualized and defined as resource deprivation, measured using money metrics. More recently, there has been a greater shift towards a broader multidimensional approach which sees poverty as resource deprivation plus various forms of non-economic deprivation (Stuart 2003; Sumner 2004). But money-metric measurement remains useful, because it tells a large part of the child poverty story.

A second limitation of the paper is the common yet problematic assumption that resources are allocated in the household in line with costs and needs as reflected in the AES (Deaton 1997). There is now much research on inequality within the household, but this issue also lies outside the scope of this paper.

The paper is structured as follows. Section 2 lays out the key methodological issues in measuring child poverty, paying particular attention to the need for and role of the AES. Section 3 describes the evidence base in South Africa to which this paper adds. Section 4 is on the data and method used, and Section 5 presents the findings. The conclusion summarises key findings and their implications for the per capita poverty line proposal.

Methodological issues in measuring child poverty

The key methodological issues in measuring poverty can be described in three steps: (i) Identification of a monetary welfare indicator for ranking households or individuals. When the aim is to measure *child* poverty, an indicator for ranking individuals is required (Corak 2005; White & Masset 2002). (ii) Definition of a poverty line to separate the poor from the non-poor; and (iii) Selection of aggregate poverty measures for constructing a poverty profile. The three steps, each of which is contentious (Corak 2005; Woolard & Leibbrandt 2001), are described below.

Identifying a welfare indicator

Most empirical work on the distribution of material welfare uses expenditure or income data from household surveys (Deaton 1997; Woolard & Leibbrandt). Income is often under-reported and may be seasonal or volatile (e.g. in agriculture and the informal sector). Expenditure is more stable over time, but underreporting is also common and expenditure data are costly and difficult to collect. Use of expenditure as the welfare indicator thus also commonly leads to under-estimation of welfare (Deaton 1997). On balance, the literature

suggests it is best to use expenditure data (defined in consumption terms) to measure welfare in developing countries. In this paper, however, for reasons to be discussed later, the emphasis will be on *income* data.

Once the welfare indicator has been selected, a method must be chosen for disaggregating household into individual welfare (see for example Deaton 1997; Ravallion 1992; Sen 1987), but "the passage from household data to individual welfare … remains a perennial difficulty" (Deaton & Paxson, 1997:1). This is because, in addition to the black box of intra-household resource allocation, differences in household size and composition must be dealt with. As indicated in the introduction, the AES has been developed as a tool to deal with these two issues, allowing conversion of household welfare for households of heterogeneous size and composition into welfare measures for the individual members of the household (Bellù & Liberati, 2005). To do this, the AES makes assumptions about economies of scale and household composition. Individuals are then ranked using the per adult equivalent money metric welfare measure.

The household size issue that the AES addresses is that larger households require additional income / expenditure than smaller households to achieve the same level of welfare, but this is not a linear relationship as is implicitly assumed when using per capita measures. Instead, larger households benefit from economies of scale with respect to consumption of some goods. For example, the costs of electricity will not be three times as high for a household with three members than for a single person (OECD, 2008). The extent to which economies of scale actually exist within households depends on the level of household 'public (non-rival) goods' in the consumption basket (Woolard, 2001). Whilst a growing body of evidence from the subjective approach to setting poverty lines suggests a very high level of economies of scale, there is no best practice method for determining the precise value of this parameter in the AES (Woolard, 2001). Lanjouw *et al (*1998)

is an excellent source on the construction of AES with particular reference to economies of scale. The general approach is to use a scale of the form introduced by Culter & Katz (1992):

$$AE = (A + \alpha K)^{\beta}$$

where:

- AE refers to adult equivalents
- A represents the number of adults
- K is the number of children
- α adjusts for age equivalences
- β adjusts for economies of scale

Lanjouw *et al.* (1998) point out that if household consumption is largely on food, as is the case for the poor in developing countries, there should be few economies of scale, thus β should be close to 1. As households and countries grow wealthier, the share spent on food declines and the share of household 'public goods' increase. Hence, economies of scale increase, with the implication that β will fall (Braithwaite, 2008).

The second problem the AES addresses is with respect to household composition. Children[2] have smaller food needs (and hence costs) than adults. This derives from the fact that younger children eat less food and that food is a large share of household expenditure. There can be no universal, scientifically determined true value for α. The true costs vary from country to country and are probably different for children of different ages. If household consumption is largely on food, as is often the case in poor countries, the cost of a child

[2] The definition of a *child* varies. The South African Constitution defines a child as an individual younger than 18 years. This definition is used here unless otherwise stated.

will be rather less than an adult. As income rises and the food expenditure share declines, α will approach one (Braithwaite, 2008). Deaton & Zaidi (2000) and Paxson & Deaton (1997) are two useful sources on the determination of AESs with particular reference to the value of α, the child cost parameter.

A common procedure used to set α is comparison of the energy requirements for different groups. But children and adults consume both food and non-food items, and there is no reason to expect non-food costs to follow the same ratio. An alternative and older procedure is the Engel method. Engel observed that amongst households of similar size and composition, the budget share devoted to food declined as total consumption increased. He also observed that for households with the same total expenditure, the larger the household, the larger also the budget share devoted to food. This led to the hypothesis that households with the same budget share have the same level of welfare, regardless of the demographic make-up of the household (Woolard 2002). This finding forms the basis of the statistical method used in the Engel approach, where values of α and β are calculated from household survey data on the assumption that a household's needs can be deduced from the food share in its budget.

A wide range of AESs exists, which includes normative scales devised by experts, scales estimated from consumer demand models and scales based on subjective welfare measurement (Woolard, 2001:77).[3] Table 1 presents AESs commonly used at the international level. The rationale for the choice of scale is often left rather vague.

[3] For more on the range of AESs and their determination see Deaton & Muellbauer, (1986) and Deaton (1997).

Table 1: Commonly used Adult Equivalence Scales

OECD original	This scale assigns a value of 1 to the first household member, of 0.7 to each additional adult and of 0.5 to each child.
OECD-modified	This scale assigns a value of 1 to the first household member, of 0.5 to each additional adult and of 0.3 to each child.
Square root scale	This scale approximates the number of equivalent adults as the square root of household size (to address economies of scale). The different needs of adults versus children are not distinguished.
Double parameter class of scales proposed by Cutler & Katz (1992)	This determines the adult equivalents using the equation $AE = (A + \alpha K)^{\beta}$ where AE = Adult equivalents A = Number of adults K = Number of children α is a constant reflecting the resource cost of a child relative to an adult; it is typically set at less than 1 β = the overall economies of scale in a household, typically set at less than 1

Source: Braithwaite, 2008; Corak, 2005; OECD 2008; Paxson & Deaton, 1997

The simplest scale for converting household welfare to individual welfare, and the one most commonly used, is the per capita method. This sets the number of adult equivalents equal to the number of household members, i.e. it assumes that the needs of a child cost as much to meet as those of an adult, and that there are no economies of scale (implying that household needs rise in proportion to the number of members, i.e. that there are no household 'public goods' that generate economies of scale). In the Cutler-Katz AES, this amounts to setting β and α equal to one.

Commenting on the AES literature, Deaton & Paxson (1997:) remark that: "much of the long-standing literature on the measurement of equivalence scales from data on household expenditure … is a morass of dubious identification and internal contradiction". In the end, the choice of scale and decision about the value of the parameters for economies of scale and the child cost relative to that of an adult tend to be based less on theory and empirical evidence than on convention and assumption (Corak, 2005:11) This underlines the importance of testing sensitivity to changes in the AES. At the international level, there have been many studies investigating sensitivity of poverty to the AES. Whilst some researchers have found that the choice of scale can make quite a difference to both the level and pattern of poverty and child poverty (see White & Masset 2002 for the case of Vietnam), others have found that results are only marginally affected (Buchmann *et al* 1988; Coulter *et al* 1992; Jenkins & Cowell 1994; Burkhauser 1996). The few South African studies are reviewed in section 3.

Selecting a poverty line

There is no one true concept of absolute poverty and thus no one true absolute poverty line (Stewart *et al.* 2003). There is an element of subjectivity in the setting of the line. Commonly used approaches for setting the absolute poverty line(s) are: (i) The food calorific approach, which involves basing the line on a costing of the level of calories required per day; 2 100 calories per day is often used (Sumner 2004:7). (ii) The cost of basic needs approach, which adds a costing of other basic goods to the line based on minimum food needs (this is the approach on which South Africa's current poverty line proposal is based) (iii) Using lines set by

government for targeting programmes, such as income support (Stewart *et al.* 2003)[4]. The $1 and $2 dollar a day lines are commonly used for international comparisons.

A relative poverty line defines the poor in relation to a reference group, most commonly the income or expenditure position of others in society. Commonly used examples are the bottom 40% or 20% of households in the income or expenditure distribution; and 40%, 50% or 60% of the mean or median income or expenditure (Corak 2006; Stuart *et al.* 2003; Barnes *et al.* 2007). When used for comparative purposes (e.g. comparing poverty over time or across countries), it can thus also be regarded as a measure of *inequality* rather than of *poverty*. In this paper, the poverty line is set at a cut-off which places the poorest 40% of all households in poverty, once households have been ranked using the alternative measures.

When the aim is to measure changes in poverty over time, the issue of where to set the poverty line may be less important than maintaining its stability over time. If, on the other hand, the poverty line is used to profile poverty at a point it time, as it is here, where the line is set and how this affects the poverty profile becomes important. Moreover, there is then a need to check robustness of findings on rankings of different groups and geographical areas to alternative poverty lines. A method commonly used for this purpose is testing for stochastic poverty dominance, using the cumulative density function (CDF). This will be discussed in more detail later.

Poverty measures

[4] An example of this method in the South African context is Budlender's (2006) recent use of the poverty line cut off used to target the Child Support Grant income support programme (See Budlender in Monson *et al.* 2006).

Once the poverty line has been set, the Foster-Greer-Thorbecke (FGB) poverty measures can be derived from the following equation (see Foster *et al.* 1984):

$$P_\alpha = {}^1/n \sum ({}^{z - y_i}/ z)^\alpha \quad \big| \quad (y_i \leq z)$$

Where:

- P_α = the measure of poverty
- q = the number of poor households
- n = the total number of households
- z = the poverty line
- y_i = the income of the i-th household

P_0, the headcount index measure, sets $\alpha = 0$ and shows the headcount poverty rate, the proportion of the population (or child population) below the poverty line. P_1, or the poverty gap index measure, sets $\alpha = 1$. It is a measure of the depth of poverty, based on the sum of the poverty gaps, i.e. the distance the poor lies below the poverty line. P_2, the squared poverty gap index, sets $\alpha = 2$. This measure of severity of poverty gives a higher weight to individuals who are deeper in poverty, i.e. further below the poverty line.

Existing evidence base

Determination of AES

There has been very little research to determine an appropriate AES for South Africa. Woolard & Leibbrandt (2006) review the limited literature. They point out that researchers have tended to follow the lead of May *et al.* (1995) and use the Culter & Katz (1992) AES form with $\alpha = 0.5$ and $\beta = 0.9$. These are values that were used as *examples* by Angus Deaton in a lecture on poverty measurement in the early 1990s.

One source of "implied" AES is in the methodology of the Household Subsistence Level (HSL) that has long been used in South Africa. The HSL represents an attempt to cost basic needs. Some costs (such as rent and transport) are taken to be the same for all households, while others (such as food and clothing) are treated as varying with size and demographic composition of the household. The implicit value of α emerges as 0.75 and of β as 0.86 from the HSL (Woolard & Leibbrandt, 2006).

Lancaster, Ray and Venezuela (1997) estimate AESs for eight countries, including South Africa, using the 1993 Project for Statistics on Living Standards and Development (PSLSD) data. They use Engel's procedure as well as models based on the demographically extended rank two and rank three "complete" demand systems. But their analysis includes only households containing different numbers of children but exactly two adults. This makes the sample unrepresentative of the demographic composition of South African households (Woolard & Leibbrandt 2006); only 37% of households in the PSLSD fell into this category. The scale allows for three different age groups of children and further is separately calculated by gender. The scales derived from this study suggest child costs that are quite a bit lower than Woolard's.

Woolard (2002) derives an AES for African households using the 1995 IES and Engel method. She finds the cost of a child to be high – almost the same as an adult. This result is typical in estimations using the Engel method (Deaton & Muellbauer 1986; Woolard & Leibbrandt, 2006) which has been criticised for over-

estimating child costs (see for example Deaton & Muellbauer, 2006). Woolard (2002) finds quite small scale economies (estimate of $\beta = 0.85$). After considering the argument that the Engel method over-estimates child costs, and informed by the HSL, she chooses an AES that sets $\alpha = 0.75$ and $\beta = 0.85$ for her subsequent measurement of poverty.

Sensitivity to AES

Two studies (Deaton & Paxson, 1997; Woolard, 2002[5]) report empirical findings on sensitivity of the poverty profile to the AES in South Africa.

Deaton & Paxson (1997) examine sensitivity of the poverty headcount for people in different age groups in a range of developing countries, one of which is South Africa, to changes in the value of the child cost and economies of scale parameters in and Cutler & Kutz-type AES. They use per adult equivalent expenditure as the welfare measure, based on the 1993 PSLSD. The age groups considered are: children (two groups, age 0-6 and age 7-15); the elderly (defined according to pension eligibility criteria as 60 and over for women and 65 and over for men); and a residual group of non-elderly adults, loosely referred to as adults. They consider nine pairs of values for α and β with each taking the three values 1, 0.75 and 0.5. The poverty line is set at R105 per adult equivalent per month, a figure chosen to correspond with US 1$ a day. They find that: (i) Regardless of AES, adults have the lowest fraction of the poor, followed by the elderly, then older and only then younger children. (ii) Lower poverty rates among adults are robust to assumptions about child costs and economies of scale, as is the finding that younger children are always more likely to be poor than older children. (iii) Fewer children are counted as poor the greater are economies of scales and the smaller the cost

[5] Woolard & Leibbrandt (2006) also report this, but based on Woolard's (2002) analysis of the IES 1995.

of a child. (iv) The relative ranking of the elderly and children depends on the values of these two parameters. With a very high value for economies of scale and low costs of a child the elderly are the poorest group, but that switches with low economies of scale and high child costs. This finding is important, because it suggests the choice of AES may affect priorities for targeting and budget allocation.

Woolard (2002) investigates sensitivity of the poverty profile to a variety of values of α and β: $\alpha = 0.5$, 0.75 and 1, and $\beta = 0.6$, 0.75 and 0.9, also using the Cutler and Katz (1992) form AES. She uses the 1995 IES, adult equivalent consumption as the welfare measure and sets the poverty line cut off at the 40^{th} percentile. The findings are encouraging, for "they show that the poverty profile changes very little even when quite large adjustments are made to the parameters" (Woolard 2002:85). When one considers specific age categories, the impact of the parameters is more noticeable … nevertheless the changes are not dramatic, with the percentage of poor children varying from 45.5% to 48.6%...The incidence of poverty among the elderly varies slightly more, with between 36.1% to 41.3% of the elderly being defined as poor (Woolard, 2002:85).Like Deaton & Paxson (1997), Woolard finds that fewer children are poor the lower are child costs and the larger are economies of scale, but also, and critically, that the relative ranking of poverty among the elderly and children is not affected by AES. Finally, she finds that "the choice of equivalence scale makes a small difference to the identification of poor households" (Woolard 2002:87). As she points out, this is less important than sensitivity of the composition of the poverty profile, because government is more likely to use large scale surveys to identify *vulnerable groups* than for targeting *specific households*.

The only study on sensitivity of the child poverty profile to the AES is Dieden & Gustafsson (2003). This is limited in that only the effect of changing the economies of scale parameter was investigated (the child cost

parameter was kept fixed at 1). The authors illustrate, like Deaton & Paxson (1997) and Woolard (2002),that allowing for economies of scale reduces the child poverty headcount.

To sum up, there is some evidence on sensitivity of South Africa's poverty profile to the AES, and these have informed the National Treasury proposal for one or more *per capita* poverty lines to be used. There is hardly any evidence on sensitivity of the scale of child poverty and none on how the composition of child poverty is affected by the AES.

Studies on scale and characteristics of child poverty

Most measurement research on poverty in South Africa since the transition to democracy in 1994 has focused on the population in general (Kanbur & Bhorat 2005; Klasen 1997; Leibbrandt *et al.* 2005; May *et al.* 1995; Meth & Dias 2004; Simkins, 2004; Woolard 2002; Woolard & Leibbrandt 2002; Van der Berg & Louw 2004; Van der Berg *et al.* 2007). However, a handful of researchers have concentrated on child poverty (NIEP, 1996; Haarmann, 1999; Woolard 2002 in Streak 2002a &2002b; Dieden & Gustafsson, 2003; Woolard in Streak 2004; Budlender 2006 in Monson *et al.* 2006; Barnes *et al.* 2007). The trend towards using multi-dimensional poverty measurement is reflected in the South African literature, although the money-metric approach still dominates. A particular child specific contribution to note is the recent development of a South African Index of Multiple Deprivation for Children (see Barnes *et al. 2007*) that uses data from Census 2001 and the multi-dimensional model of child poverty proposed by Noble *et al.* (2006).

Table 2 presents the eight published measurement studies on child poverty. It shows the data and measurement method used and each study's findings for the poverty headcount measure at national level. It

reports only on the method and findings for money-metric measurement even though some of the studies include non-monetary measures. The poverty headcount findings vary substantially across studies depending on the welfare measure and data used and where the poverty line is set.

Table 2: Measurement studies on child poverty in South Africa 1994-2008

Study	Data used	Welfare indicator and AES	Poverty line and headcount (P_0)
1. National Institute of Economic Policy (NIEP) 1996	1993 Project for Statistics on Living Standards and Development (PSLSD)	**Welfare indicator**: Adult equivalent income **Scale**: Study says simple World Bank informed scale – old OECD?	**Line**: 40% of adult equivalent income. **Headcount**: 60% for children age 0-4.
2. Haarrmann, D. 1999	1993 PSLSD	**Welfare indicator: Adult equivalent expenditure** **AES: AE = (A + 1K)$^{0.9}$**	**Line**: Less than 40% of per adult equivalent expenditure **Headcount**: 69%
3. Woolard 2002 cited in Streak 2002a	Data sets used: 1999 OHS	**Welfare indicator**: Per adult equivalent income AES: AE = (A + 0.6 K) $^{0.9}$.	**Lines**: Less than 40% of per adult equivalent income **Headcounts**: 59.2% for children age 0-17 and 59.3% fir children age 0-6.
4. Woolard, 2002 cited in Streak 2002b	Two data sets used (i) 1995 OHS (ii) 1999 OHS	Welfare indicator: Per capita income	**Lines**: (i) R200 per capita per month in 1999 rand; (ii) R400 per capita per month in 1999 rand. **Headcounts**: 1995 data: 38.9% with lower poverty line and 64.7% with higher line. 1999 data 58.1% with lower line and 75.8 % with higher line.
5. Dieden & Gustafsson 2003	1995 OHS and linked IES	**Welfare indicator**: Per capita income	**Lines:** (i) $1 a day. (ii) 50% of median. **Headcounts**: (i) Using 1$ a day 28.4 % of children age 0-14; (ii) Using

			50% of median 49.2% of children age 0-14.
6. Woolard 2004 reported in Streak & Coetzee (eds) 2004	2000 IES	**Welfare indicator**: Per capita income	**Lines**: (i) R215 per capita per month in 2000 rand and (ii) R430 per capita per month in 2000 rand. **Headcounts**: (i) Low line, 54.3 % of children age 0-17; (ii) Higher line 74.8 % of children age 0-17.
7. Budlender, 2006 reported in Monson et al 2006	2005 GHS	**Welfare indicators:** (i) Household expenditure; (ii) Household income	**Line**: Household income or expenditure less than R1200 per month. **Headcounts**: Expenditure measure 66% of children age 0-17; (ii) Income measure 60% of children age 0-17 poor.
8. Barnes *et al*. 2007	2001 Census.	**Welfare indicator:** Adult equivalent income. **AES**: OECD original	**Line**: Less than 40% of mean annual adult equivalent income. **Headcount**: 82%.

***Source**: Compiled from sources listed in column 1*

Characteristics of child poverty identified by existing studies are: (i) Concentration of child poverty amongst the African and to a slightly lesser extent the Coloured population (Dieden & Gustafsson 2003; NIEP 1996; Budlender in Monson *et al.* 1996). (ii) Higher child poverty rates in rural than in urban areas (Dieden & Gustafsson 2003; NIEP 1996) (iii) Higher child poverty in households without wage income (Budlender in Monson *et al.* 2006; Dieden & Gustafsson 2003). (iv) A high correlation between child poverty and low level of education of the household head (Dieden & Gustafsson 2003); (v) Over-representation of households headed by women in the poor child population (Dieden & Gustafsson 2003). (vi) Large variation across the

nine provinces, with particularly high incidence of child poverty in KwaZulu-Natal, Eastern Cape and Limpopo (Woolard 2002 in Streak 2002a&b; Dieden & Gustafson 2003; Woolard 2003 in Streak 2004; Budlender 2006 in Monson *et al.* 2006).

These characteristics associated with child poverty need to be understood in the context of the socio-economic legacy left by apartheid. Under this strategy economic and social policies discriminated against Africans, coloureds and Indians. Human capital development was concentrated amongst the white population and the system of migrant labour fractured household structures among Africans (Republic of South Africa, 1996). By the time of the transition, these policies as well as two decades of declining per capita income and structural unemployment left extremely high income inequality.

Gaps in the existing measurement research on child poverty in South Africa include the absence of money measurement of the depth and severity of poverty, and limited consideration of age and gender differences. These are gaps this paper begins to fill. Others, not addressed in this contribution, area dearth of research on how child poverty has changed over time[6] and limited measurement of correlation between money-metric and other measures of child poverty (Dawes *et al*. 2007; Barnes *et al.* 2007).

Whilst there has been little careful *measurement* work on multi-dimensional child poverty, qualitative research (see for example Berry *et al* 2003; Ewing 2004) has revealed that children suffering material deprivation commonly experience deprivation across a range of other domains, including health, education

[6] The only evidence in this regard is that from Woolard's comparison of the child poverty headcount in the 1995 and 1999 OHS (see Streak 2002b). She found, as indicated in Table 2 above, that child poverty increased between 1995 and 1999. However, Streak and Woolard caution that this finding should be read with caution because of the concern about extensive underreporting of income in the 1999 OHS.

and psycho-social. Moreover, poor children commonly also experience greater difficulty in accessing health, education and basic services, and a poorer quality of such services.

Data and method

IES 2005 and profile of children in South Africa

IES 2005, undertaken by Statistics South Africa between September 2005 and August 2006, gathered data on the income sources and expenditure patterns of a nationally representative sample of 21 144 households (Armstrong *et al* 2008). This type of survey is usually conducted every five years. Because of problems of comparability, it is not advisable to compare the IES surveys of 1995, 2000 and 2005 (Yu 2008; Van der Berg *et al.* 2008). However, as a crude indication of the trend, measured child poverty when calculated using the IESs[7] had declined by about 5 percentage points between 2000 and 2005, both when using the poverty line suggested by StatsSA of R3 860 per capita in 2000 Rand terms, or the line separating the poorest 40 per cent of households based on per capita income from the rest, i.e. R4 560 in 2000 terms or R6 542 in 2007 terms.[8] The StatsSA poverty line gives a headcount child poverty rate that is about 6 percentage points lower than the one reported here. But because of the comparability issues, there remains a gap in our knowledge of the trend in child poverty, although a consensus is emerging that aggregate poverty has been on the decline after 2000, and that the expansion of the grant system, including the child support grants, has contributed to this in a major way (Van der Berg, 2007).[9]

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[7] And considering differences in dealing with imputed rent between the surveys.

[8] In 2007, the exchange rate of the Rand fluctuated around an average value of R7.05 to the US dollar.

[9] One non-money metric indicator available from the General Household Survey, the proportion of households who reported that children have gone hungry in the past year, has shown a consistent decline every year since measurement began in 2002, and this proportion has now dropped from 31% in 2002 to 16% in 2006. (Van der Berg *et al*, 2007: 25)

The rest of the analysis is confined to investigating child poverty in 2005 only. Because it is not possible to use a consistent poverty line across different adult equivalence scales, the methodology used will determine a poverty line for each scale such that it separates the poorest 40% of households using that particular scale from the rest of the population. In the final part of the paper (Section 5), where the analysis turns to a profile of child poverty, the poverty line used places the poorest 40% of households in per capita income terms below the poverty line.

Table 3 presents a profile of children in South Africa generated by the IES 2005.

Table 3: Profile of children in South Africa generated by IES 2005

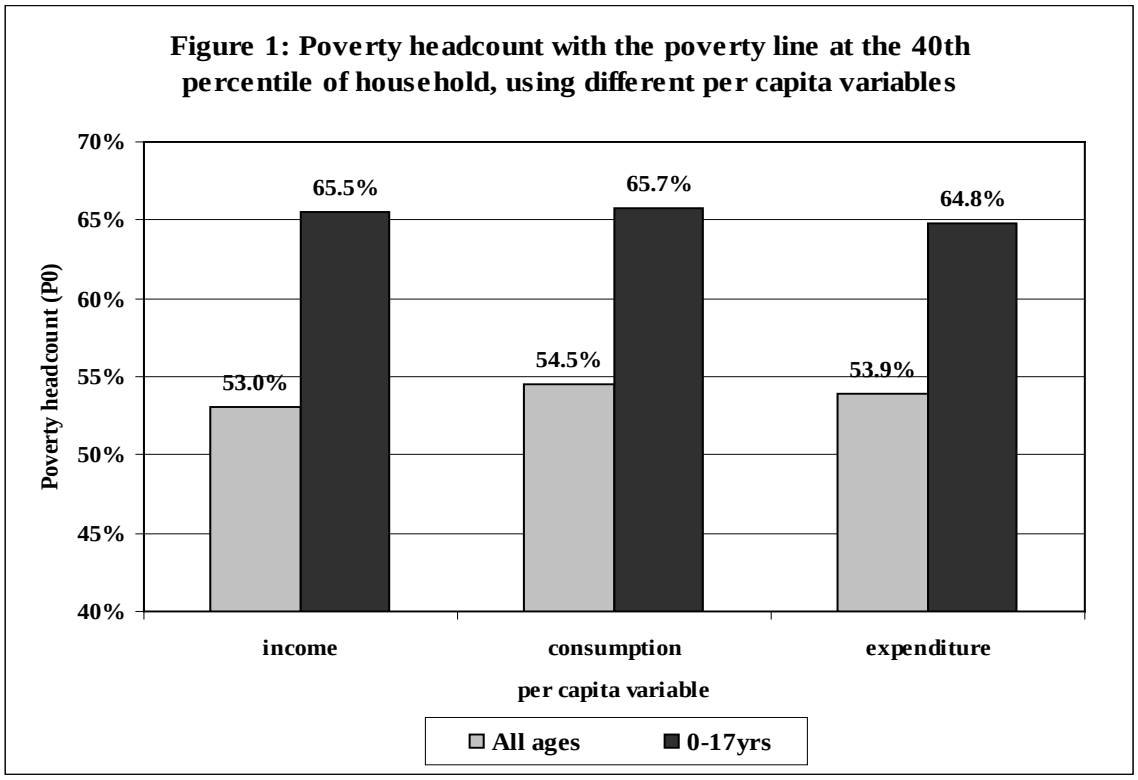
	Number of children	% of child population
By age		
0-4	4 639 196	25.7
5-14	10 169 722	56.3
15-17	3 240 767	18.0
0-17	18 049 685	100%
By racial classification		
African	15 311 484	84.9
Coloured	1 509 472	8.4
Asian	314 615	1.7
White	904 066	5.0
By gender		
Girls	8 898 180	49.4
Boys	9 123 879	50.6
By rural urban location		
Rural	8 908 757	49.4
Urban	9 140 928	50.6
By provincial location		
WC	1 551 966	8.6
EC	3 051 845	16.9
NC	339 319	1.9
FS	1 090 066	6.0
KZN	3 967 119	22.0
NW	1 456 484	8.1
GAU	2 747 345	15.2
MPU	1 277 726	7.1
LIM	2 567 815	14.2

Source: Own calculations using IES 2005 data

Testing the sensitivity of poverty measures to the equivalence scale used

Income was used as the welfare indicator, given that food expenditure is known to be under-reported in IES 2005 (Armstrong *et al.* 2008).[10] Moreover, IES 2005 uses the same measures to collect the income data as in the previous two IES surveys, whilst that used to collect the expenditure data is not. Setting the poverty line at the 40th percentile of households by each per capita welfare indicator (income, expenditure and consumption) encouragingly shows similar *patterns* of headcount poverty for individuals of all ages and of children (see Figure 1). However, compared to income poverty, only 78.1% of individuals in poor households by the income measure were "correctly" identified as poor when utilising the consumption measure, 78.8% with the expenditure measure: This is a surprisingly low correspondence between households identified as poor by the income measure compared to the other measures.

[10] Two survey methods were used in combination to gather expenditure data: The diary method required respondents to record their expenditures on food and personal care items for four weeks in the form of a diary, while the recall method entailed capturing through a questionnaire their total expenditures on other items during the eleven or twelve months prior to the survey. As with the IES 1995 and 2000, only the recall method was used to capture income data using the main survey questionnaire. Reported income is the sum of regular and irregular income for a period of twelve months each. Statistical Release No. P0100 from Statistics South Africa (2008) contains more details on the design and implementation of the survey.



Source: Own calculations using IES 2005 data.

For the empirical testing, the scales used for the test were the old and new OECD scales (see Table 1 above), and the following Cutler-Katz type scales:

- $AE = (A + 1K)^1$ (the per capita scale);
- $AE = (A + 0.5K)^1$
- $AE = (A + 0.6K)^1$
- $AE = (A + 0.75K)^1$
- $AE = (A + 0.75K)^{0.85}$ (the scale used by Woolard 2002)
- $AE = (A + 0.5K)^{0.9}$ (the scale used by May et al. 1995)

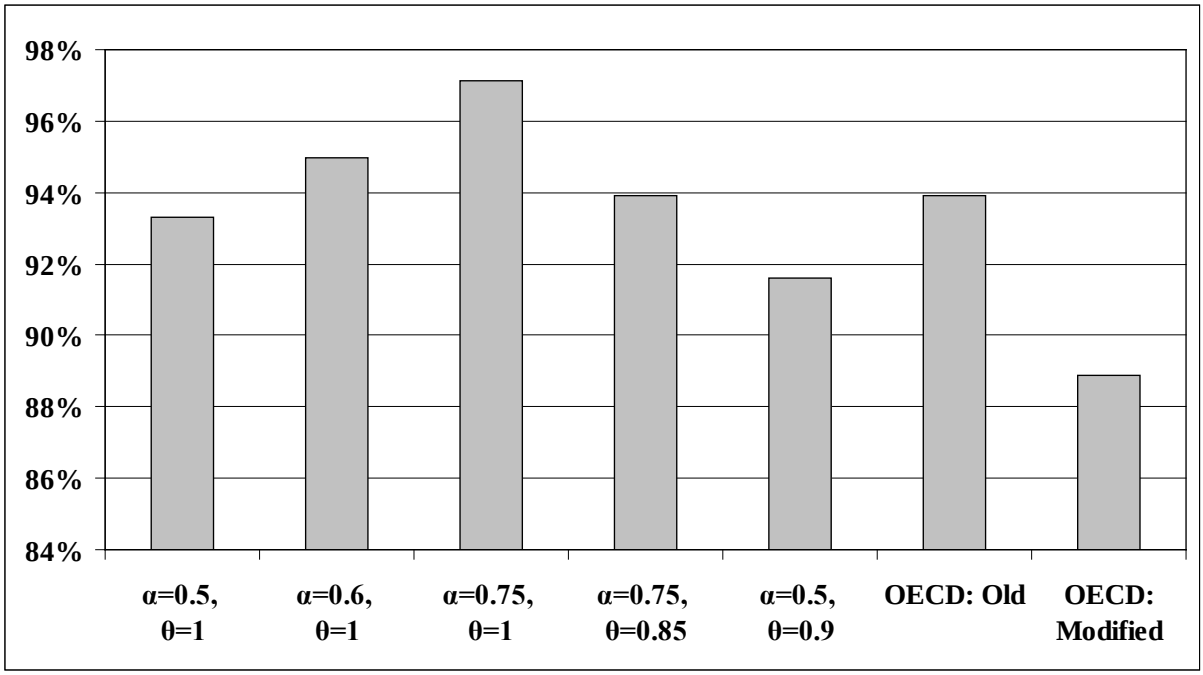
The first part of testing the sensitivity of child poverty involved correlating the measures derived by using different adult equivalence scales. In all cases, the correlation coefficient was above 0.99, indicating that any one of the derived measures can be well predicted by any one of the others. That, however, does not preclude the possibility that there may be important rank switching between households, with the result that some children in poor households by one measure would not be in the poorest households by another measure. Table 4 sets out the proportion of children 0-17 years of age who have been identified as belonging to the poorest 40% of households by one measure (shown in the rows) that are also 'correctly' identified as poor (among the poorest 40% of households) by another measure (shown in the columns). As can be seen from this table, there is generally great consistency across the measures, with many of them showing at least 95% 'correct' identification in comparison with most other measures. The major exceptions are the two OECD measures, which is not surprising given that OECD countries have very different conditions from the typical household structure and costs of a developing country population. In particular, households in these economies can be expected to have greater economies of scale, given that food makes up a smaller share of household budgets and non-food items, including household 'public goods' where economies of scale may operate, a smaller share. Also, the low child cost in these OECD scales are far removed from the empirical findings for developing countries. That the OECD scales show the least consistency with the per capita measure is also evident in Figure 2, which shows how well other measures fare at 'correctly' identifying children who are in poor households as being poor by these other measures.

Table 4: Proportion of children in the poorest 40% of households using the referent measure also identified as poor by the comparison measure

	Comparison measure							
Reference measure	**α=1, θ=1**	**α=0.5, θ=1**	**α=0.6, θ=1**	**α=0.75, θ=1**	**α=0.75, θ=0.85**	**α=0.5, θ=0.9**	**OECD1**	**OECD2**
A=1, θ=1		93.32%	94.98%	97.12%	93.91%	91.60%	93.92%	88.87%
A=0.5, θ=1	99.61%		99.88%	99.76%	97.56%	97.51%	98.23%	94.06%
A=0.6, θ=1	99.73%	98.25%		99.88%	97.41%	96.22%	97.92%	92.93%
A=0.75, θ=1	99.83%	96.07%	97.78%		96.18%	94.20%	96.37%	91.18%
A=0.75, θ=0.85	99.90%	97.24%	98.70%	99.55%		96.95%	99.28%	94.64%
A=0.5, θ=0.9	99.83%	99.56%	99.86%	99.88%	99.31%		99.58%	96.31%
OECD: Old	99.95%	97.94%	99.24%	99.77%	99.31%	97.24%		94.63%
OECD: Modified	99.77%	98.93%	99.36%	99.59%	99.86%	99.22%	99.83%	

Source: Own calculations using IES 2005 data.

Figure 2: Percentage of children identified as poor under the per capita method also being identified as poor using other adult equivalent scales



Source: Own calculations using IES 2005 data.

The next step was to consider the composition of child poverty by comparing poverty headcount rankings for children from different racial groups, girls versus boys, children in rural versus urban areas, children in three different age cohorts (0-4, 5-14 and 15-17), and children across different provinces.

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A child poverty profile based on the simple per capita income welfare measure was then tested using CDFs. The poverty line cut off at the 40th percentile with a per capita welfare measure translates into a poverty line of R4 560 per capita per annum (R380 per capita per month) in 2000 Rand (R6 542 per capita per annum or R545 per capita per month in 2007 rand values). The poverty profile presented below needs to be viewed bearing in mind the post 1994 government's commitment to assisting poor children and advancing child rights (Coetzee & Streak, 2004; Dawes *et al* 2007). This is reflected for example in the comprehensive justiciable

set of child specific rights afforded children in the Constitution, the law reform process to incorporate these rights, and the design and implementation of a range of programmes to support vulnerable children and their families. The most noteworthy programme in this regard is the child income support programme, known as the Child Support Grant (CSG), which was initiated on 1 April 1998. This pays a monthly grant to caregivers of children who pass a means test. When the grant was introduced its value was R100. In May 2008 it was R210 per month. It is set to rise to R220 by the end of 2008. Initially only children under seven were eligible for the grant. In 2003, the age of eligibility was raised to children less than 9 years, in 2004 to children less than 11 years, in 2005 to children under age 14 years and 2008 to children under 15 years. The CSG programme has become one of the largest child income support programmes in the world in both budget and beneficiary number terms. By May 2008 there were over 8 million child beneficiaries (Skweyiya, 2008).

Assuming an average household size of four members, the poverty line used for our analysis is very similar to the recently updated R2 200 household income monthly threshold set for determining CSG eligibility. Assuming five members it is rather above (about R100 more than) the CSG income means test.

Findings

Sensitivity of child poverty to the AES

The findings on sensitivity of the child poverty headcount, depth and severity measures to the AES are presented in Table 5. They show, as expected, that the child poverty headcount is highest when the per capita scale is used (65.5%) and lowest when the old OECD scale is used (58.3%). The differences are relatively

small, though, with the range only 7.2 percentage points. Though the range contracts with the measures when the child poverty depth index and the poverty severity index are used, it expands in *relative* terms.

Table 5: Child poverty headcount, depth and severity using a variety of equivalence scales with overall poverty rate fixed at 40% of households

Scale used	**Poverty line (per adult equivalent) as derived from the 40th percentile of households, R2000 prices per annum**	**P_0 Child poverty headcount rate%**	**P_1 Child poverty depth index**	**P_2 Child poverty severity index**
Cutler & Katz version of the AES				
$\alpha = 1$ $\beta = 1$	4560	65.5	0.33	0.20
$\alpha = 0.5$ $\beta = 1$	5520	61.3	0.29	0.16
$\alpha = 0.6$ $\beta = 1$	5266	62.4	0.29	0.17
$\alpha = 0.75$ $\beta = 1$	4953	63.7	0.31	0.18
$\alpha = 0.75$ $\beta = 0.85$	5881	61.5	0.28	0.16
$\alpha = 0.5$ $\beta = 0.9$	6116	60.1	0.27	0.15
OECD form of AES				
Old	6190	61.5	0.29	0.16
Modified	7563	58.3	0.25	0.14

Source: Own calculations using IES 2005 data

Table 6 presents the child poverty headcount findings for children in rural versus urban areas, girls versus boys and children in different racial groups. The ranking of the groups was found to be unaffected by the scale used. Regardless of AES, the poverty headcount is:

- higher amongst children in urban than rural areas
- marginally higher amongst girls than boys (the small differences is unsurprising, as this is purely based on the welfare level of the *household* children belong to and does not consider possible inequality of resource flows within households)
- highest amongst African children, followed by Coloured, then Asian and then White children.

Table 6: Child poverty headcount among selected groups, using a variety of equivalence scales with overall poverty rate fixed at 40% of households

Scale used	Urban	Rural	Girls	Boys	African	Coloured	Asian	White
Cutler & Katz form of AES								
$\alpha=1$ $\beta=1$	48.6	82.8	49.3	50.7	72.5	41.3	24.2	2.0
$\alpha = 0.5$ $\beta = 1$	44.9	78.2	49.2	50.8	68.2	36.5	20.4	1.9
$\alpha = 0.6$ $\beta = 1$	45.7	79.4	49.1	50.9	69.3	37.8	20.4	1.9
$\alpha = 0.75$ $\beta = 1$	46.7	81.1	49.2	50.8	70.7	39.1	21.7	1.9
$\alpha = 0.75$ $\beta = 0.85$	44.3	79.3	49.1	50.9	68.5	35.7	19.7	1.9
$\alpha = 0.5$ $\beta = 0.9$	43.5	77.1	49.0	51.0	67.0	33.7	20.4	1.9
OECD form of AES								
Old	44.5	79.0	49.1	50.9	68.5	35.1	19.7	1.9
Modified	41.7	75.4	49.0	51.0	65.1	31.9	19.6	1.9

Source: Own calculations using IES 2005 data

Table 7 presents the poverty headcount findings for the AESs by age classification. There are marginal differences across AES in the *level* of the poverty headcount, but more importantly, irrespective of the AES chosen, the poverty headcount is highest amongst children age 0-4, followed by those aged 5-14 and only then those aged 15-17.

Table 7: Poverty headcount among children of different ages using different equivalence scales with overall poverty rate fixed at 40% of households

Scale used	**0-4 years**	**5-14 years**	**15-17 years**
Cutler & Katz form of AES			
α =1 β=1	66.1	65.7	63.8
α = 0.5 β = 1	62.7	61.3	59.3
α = 0.6 β = 1	63.6	62.4	60.5
α = 0.75 β = 1	64.7	63.8	61.9
α = 0.75 β = 0.85	62.3	61.7	60.0
α = 0.5 β = 0.9	61.3	60.1	58.2
OECD form of AES			
Old	62.3	61.7	60.0
Modified	59.3	58.5	56.4

Source: Own calculations using IES 2005 data

Table 8 shows that some of the rankings of poverty headcounts for the nine provinces were sensitive to the AES. Specifically, the worst poverty incidence using the headcount measure based on income is found in either Eastern Cape or Limpopo, depending on which adult equivalence measure is used.

Table 8: Provincial poverty headcount using different AESs with overall poverty rate fixed at 40% of households

	WC	EC	NC	FS	KZN	NW	G	MPA	L
Cutler & Katz form of AES									
$\alpha=1$ $\beta=1$	37.9	77.9	69.1	63.6	75.0	66.2	41.3	66.4	78.0
$\alpha = 0.5$ $\beta = 1$	33.7	73.9	65.0	57.5	71.2	63.8	37.5	63.0	72.4
$\alpha = 0.6$ $\beta = 1$	35.2	74.8	66.2	58.4	72.0	64.2	38.2	63.6	74.3
$\alpha = 0.75$ $\beta = 1$	36.0	76.5	68.5	61.2	73.3	65.0	38.9	64.4	76.3
$\alpha = 0.75$ $\beta = 0.85$	33.3	75.0	65.0	58.3	70.5	64.2	36.6	62.4	74.5
$\alpha = 0.5$ $\beta = 0.9$	31.7	72.9	63.5	56.2	69.8	62.5	36.3	61.3	71.6
OECD form of AES									
Old	32.8	74.7	64.8	57.7	70.7	64.1	37.6	62.6	73.9
Modified	30.0	71.2	60.0	54.5	67.2	61.9	35.0	59.4	70.1

Note: Provincial names for these abbreviations can be found in Table 10

Source: Own calculations using IES 2005 data

Programmes directed at addressing child poverty are funded out of revenue collected at national level but implemented at provincial level hence there is a need for data on relative shares of poor children to inform the distribution of the budget across provinces. As Table 9 shows, the ranking of provinces according to shares of poor children as measured by the poverty headcount was not sensitive to choice of AES; given large differentials in the size of provinces, this is not surprising. But perhaps more surprising was how little the share of poverty changes across the different scales: It does not appear to matter much which scale is used.

Table 9: Provincial poverty shares using different AESs with overall poverty rate fixed at 40% of households

	WC	EC	NC	FS	KZN	NW	G	MPA	L
Cutler & Katz form of AES									
A=1 β=1	5.0	20.1	2.0	5.9	25.2	8.1	9.6	7.2	16.9
A = 0.5 β = 1	4.7	20.4	2.0	5.7	25.5	8.4	9.3	7.3	16.8
A = 0.6 β = 1	4.9	20.3	2.0	5.7	25.4	8.3	9.4	7.2	17.0
A = 0.75 β = 1	4.7	20.3	2.0	5.8	25.3	8.2	9.3	7.1	17.0
A = 0.75 β = 0.85	4.6	20.6	2.0	5.7	25.2	8.4	9.1	7.2	17.2
A = 0.5 β = 0.9	4.5	20.5	2.0	5.7	25.5	8.5	9.3	7.2	17.0
OECD form of AES									
Old	4.6	20.5	2.0	5.7	25.3	8.4	9.3	7.2	17.1
Modified	4.4	20.6	1.9	5.7	25.3	8.5	9.2	7.2	17.1

Note: Provincial names for these abbreviations can be found in Table 10

Source: Own calculations using IES 2005 data

In sum, our analysis suggests that whilst the choice of AES does marginally affect the poverty headcount, it does not have much impact on the composition of child poverty. It also does not affect the ranking of poverty for children of different ages, racial groups, gender or of those living in urban versus rural areas and only in one important case does it affect the ranking of poverty across provinces.

Child poverty profile

Our findings on the insensitivity of the child poverty profile to the choice of AES support the argument of Woolard & Leibbrandt (2006) that one may as well use the simple *per capita* method for profiling poverty in South Africa and testing its robustness to movement in the poverty line. In this section this strategy is

followed, with the poverty line set at the 40th percentile of household per capita income in IES 2005, which amounted to a R4 560 per capita in 2000 Rand values.

Table 10 presents a snapshot profile of child poverty in South Africa based on the per capita income welfare measure and IES 2005, with the poverty line cut off at this 40th percentile of households. As poor households tend to be larger, the poverty headcount for the population as a whole is 52.9%, if this poverty line is used. But poorer households tend to contain a disproportionate number of children: 65.5% of children are amongst the poor (this translates into 11.8 million poor children)[11] versus only 45.2% of the adult population. Child poverty is much worse than poverty amongst the adult population (18 years or above), as is also shown in Table 10: On aggregate, only 45.1% of the adult population lie below the poverty line, as against 65.5% of children. Moreover, these differences between adult and child poverty also apply for the depth and severity of poverty: In fact, the proportional differentials are larger, indicating that the children's share of the poverty headcount would tend to rise as lower poverty lines are used.

With respect to age, Table 10 illustrates that the poverty headcount and poverty shares based on the headcount are highest amongst the youngest age cohort, followed by children age 5-14 and 15-17, as are the depth and severity. The profile confirms the racial dimension of child poverty, highlighted in previous studies. The child poverty rate is found to be much higher amongst African children than other racial groups, though it is also very high amongst coloured children. African children comprise 93% of poor children and Coloured children 5.3%. The poverty depth and severity measures are also far higher for African and Coloured children

[11] This level, though somewhat arbitrary considering the equally arbitrary choice of poverty line, can be seen in the context of findings based on earlier data sets that used similar poverty cut offs. The NIEP (1996) measurement study, based on the PSLSD 1993, and which used the old OECD AES, found the poverty headcount amongst children aged 0-4 years to be 60%. Woolard (2002), using the OHS 1999, a welfare indicator of per adult equivalent income and a Cutler & Katz (1992) type AES with the child cost parameter set at 0.6 and economies of scale parameter at 0.9 found it to be 59.2% amongst children age 0-17 and 59.3% amongst children age 0-6. Thus is appears that the poverty findings here are not all that different from those in previous studies, whereas there is somewhat less child poverty if the suggested StatsSA poverty line is used.

than for other groups. With respect to gender, the IES 2005 reveals little difference in the measures across boys and girls. But child poverty is still more prevalent, deeper and more severe in rural areas – nearly two thirds of children identified as poor live in rural areas. Its rural face is the most prominent feature of child poverty in South Africa, and this especially applies when the depth and severity of poverty are considered: the rural poor are further below this poverty line than the urban poor, and the share of the rural child poverty headcount thus rises as the poverty line is set lower.

With respect to the provincial dimension of child poverty in South Africa, the key findings are as follows:

- There is large variation across provinces in the child poverty headcount rate, depth and severity measures.
- While the headcount poverty *rate* is highest in Limpopo when using the per capita income measure and the 40^{th} percentile of households poverty line, the poverty *share* is much higher in more populous provinces that also experience much poverty, particularly Kwazulu-Natal and the Eastern Cape, which together contain 46% of poor children.
- The rankings for the poverty severity measure are slightly different from those on the depth and headcount measures, indicating that stochastic poverty dominance does not always hold (an issue returned to later). KwaZulu-Natal has the highest poverty severity (whilst it has the second highest depth of poverty and the third highest poverty headcount). Whereas Limpopo is ranked third in terms of the severity and depth measures, the province is first on the poverty headcount measure. Northwest emerges as having a lower severity of child poverty relative to the poverty headcount and depth measures.
- Western Cape is the best performer for all three of the FGT measures – it has the lowest child poverty headcount rate, lowest depth of child poverty and lowest child poverty severity. .

Table 10: Poverty profile for children and adults using income per capita as the welfare measure and with the poverty line set at the 40th percentile of households

	Child poverty (0-17 years)					Adult poverty		
	P_0 Poverty headcount rate			P_1 Poverty depth measure	P_2 Poverty severity measure	P_0 Poverty head-count rate	P_1 Poverty depth measure	P_2 Poverty severity measure
	Rate (%)	Share (%)	Number			Rate (%)		
Age								
0-4	66.1	26.0	3 066 509	0.336	0.213			
5-14	65.7	56.5	6 681 507	0.343	0.202			
15-17	63.8	17.5	2 067 609	0.332	0.203			
0-17 (all children)	**65.5**	**100.0**	**11 822 544**	**0.328**	**0.205**			
18+ (all adults)						**45.2**	**0.213**	**0.126**
Racial group								
African	72.5	93.9	11 100 826	0.375	0.232	54.4	0.261	0.156
Coloured	41.3	5.3	623 412	0.167	0.093	30.1	0.110	0.057
Asian	24.2	0.7	76 137	0.093	0.052	13.7	0.049	0.027
White	2.0	0.2	18 081	0.012	0.008	1.2	0.006	0.004
Gender								
Girls	65.4	49.1	5 819 410	0.336	0.204	39.7	0.238	0.142
Boys	65.6	50.9	5 985 265	0.332	0.206	49.9	0.184	0.109
Urban/Rural location								
Rural	82.8	63.3	7 376 451	0.446	0.280	69.0	0.344	0.209
Urban	48.6	36.7	4 442 491	0.226	0.133	31.7	0.139	0.080
Province								

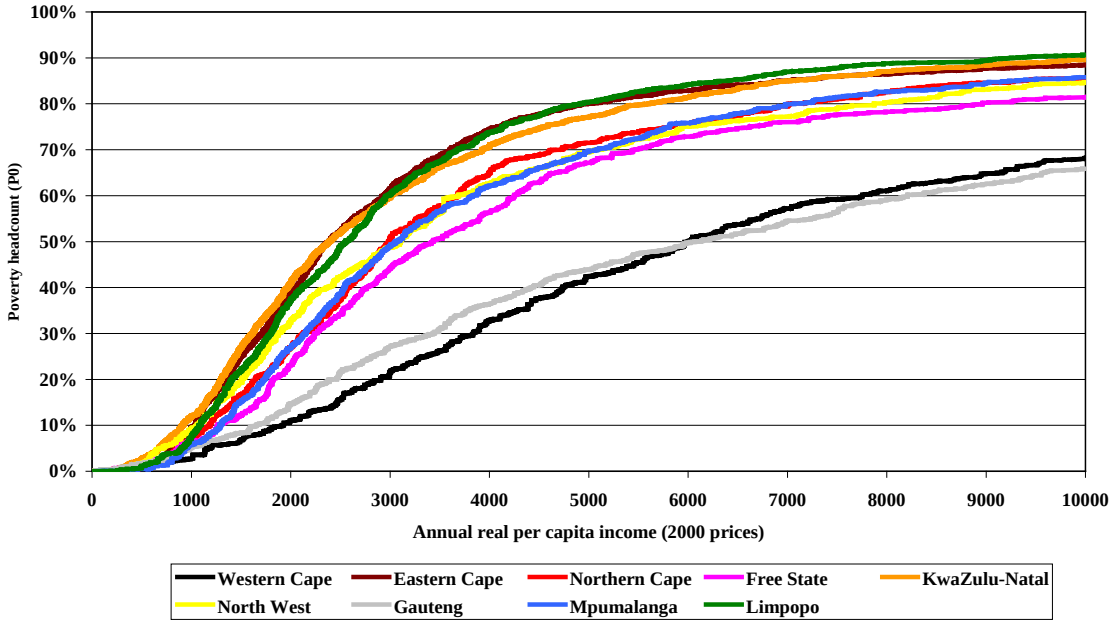
Western Cape	37.9	5.0	587 580	0.153	0.085	25.1	0.094	0.048
Eastern Cape	77.9	20.1	2 378 696	0.415	0.258	59.8	0.292	0.174
Northern Cape	69.1	2.0	235 269	0.333	0.195	48.5	0.219	0.126
Free State	63.6	5.9	695 166	0.294	0.171	44.2	0.193	0.110
Kwazulu-Natal	75.0	25.2	2 975 734	0.413	0.266	53.8	0.279	0.175
Northwest	66.2	8.1	962 355	0.345	0.216	49.3	0.239	0.143
Gauteng	41.3	9.6	1 138 511	0.186	0.110	26.0	0.111	0.065
Mpumalanga	66.4	7.2	846 494	0.322	0.187	48.6	0.218	0.123
Limpopo	78.0	16.9	2 002 739	0.400	0.242	65.6	0.313	0.183

Source: Own calculations using IES 2005 data

Testing the robustness of the child poverty profile to selection of the poverty line found the age, race, gender, and urban/rural dimensions to be robust. In the poverty-relevant range, there was clear first order dominance in each of these cases, implying that the rankings of poverty were invariant to the poverty line chosen and to whether the poverty measure used was P_0, P_1 or P_2. The results for the provincial rankings were slightly more complex and hence the provincial CDFs or poverty incidence curves are shown in Figure 3 below. The CDF arranges the population from poorest to richest using the chosen poverty measure and expresses those below any possible poverty line as a percentage of the total population (Deaton, 1997), i.e. it shows the headcount ratio of poverty at different alternative poverty lines. It is thus also known as a poverty incidence curve. Regardless of where the poverty line is drawn, Western Cape and Gauteng have the lowest child poverty headcount rates. However, up to an income level of approximately R6 000 per capita per annum, Western Cape has the lowest headcount, but thereafter there is a switch. Excepting at very low poverty lines, three provinces – KwaZulu-Natal, Limpopo and Eastern Cape – have the highest poverty headcounts. There is also a shift in the rankings of the weakest performers as alternative poverty lines are set: At very low poverty lines – of less than R2 000 per annum per capita – KwaZulu-Natal has the highest poverty headcount,

followed by Eastern Cape, then Limpopo. From about R2 000, Eastern Cape becomes the worst performer. In the poverty line range between R4 000 and R5 000 – around our poverty line cut off (at R4 560) – it becomes difficult to see which of Eastern Cape or Limpopo has most headcount poverty. At higher poverty lines Limpopo clearly is the worst performer.

Figure 3: P_0 (0-17 years) by province, per capita method



Where one CDF consistently lies above another, there is first order stochastic poverty dominance. This implies that the ranking of poverty between two such provinces remains unchanged whatever poverty line is used, and also whichever of the three FGT poverty measures (P_0, P_1 or P_2) is selected for analysis. The crossing of the lines that is observed implies that the ranking of child poverty is affected by both the poverty line chosen, and by whether the poverty measure used is the headcount, depth or severity of child poverty. That confirms the results from Table 10: At the chosen poverty line (the 40th percentile of households),

headcount child poverty is worst in Limpopo followed by Eastern Cape and only then Kwazulu-Natal; but the depth of child poverty is greatest in Eastern Cape, followed by Kwazulu-Natal and then Limpopo; and the severity of child poverty is highest in Kwazulu-Natal, followed by Eastern Cape and with Limpopo only in the third position. Thus, it matters which measure is used, and this analysis also implies that the choice of the poverty line itself is important for ranking poverty: At very low poverty lines, the severity of child poverty that KwaZulu-Natal experiences will be reflected even in the headcount index, but if poverty lines are set high, there is a danger of under-estimating Kwazulu-Natal's child poverty share when focusing on the headcount rate.

Conclusion

The first objective of this paper was to offer evidence on the sensitivity of South Africa's child poverty profile to changes in the AES. Income was used as the welfare indicator and the poverty line consistently held at the 40^{th} percentile of households calculated with different AESs. The results were encouraging: the magnitude and composition of child poverty was found to be relatively insensitive to the scale used. Like previous South African studies (Deaton & Paxson 1997; Woolard 2002), reducing the value of the child cost parameter in the AES and allowing for economies of scale were found to reduce the child poverty headcount, but only marginally. The rankings of children of different ages, girls versus boys, racial groupings and children living in rural versus urban areas was unaffected by choice of AES, although the ranking of some of the provinces on the poverty headcount measure *was* found to be sensitive to the scale used. The analysis revealed that the proportions of children and households correctly identified as poor for the full range of scales using alternative scales as referent and other scales for comparison was extremely high. The findings on the insensitivity of the child poverty profile to the AES support the contention of Woolard & Leibbrandt (2006)

that it may be appropriate to use a poverty line based on a *per capita* welfare measure for profiling poverty and child poverty in South Africa. This stands in contrast to the findings of Hunter *et al*. (2004:419), who find that equivalence scales matter greatly in the Australian case, and particularly that such scales have major implications for the composition of poverty between indigenous and other groups.

The second objective was to present an updated and more comprehensive profile of child poverty in South Africa. Per capita income was used as the welfare indicator for this purpose, with the poverty line cut off again set at the 40^{th} percentile of households (R4 650 per annum per capita in 2000 prices). This poverty line is in some sense arbitrary and therefore offers little 'objective' information on the extent of poverty. The profile suggests that child poverty (at 66.5%) remains more extensive than poverty of the population as a whole (52.9%) and poverty amongst adults (45.2%), confirming that children are more often to be found in poorer households. Moreover, despite the massive injection of transfers into households with poor children through the introduction and expansion of child support grants, poverty amongst children is still substantial.

The profile confirms that large variations across provinces in provincial child poverty headcounts remain. The poverty headcount rate in Limpopo (78.0%), the province with the highest rate, was nearly twice that in the Western Cape, which had the lowest rate (37.9%). KwaZulu-Natal (25.3%), followed by Eastern Cape (20.5%) and then Limpopo (17.1%) were found, as in other studies, to contain the majority of poor children. The lack of first order stochastic child poverty dominance amongst provinces implies that the ranking of poverty amongst provinces is sensitive to the choice of poverty line and the choice between the three FGT poverty measures. Eastern Cape, Western Cape and KwaZulu-Natal consistently were the poorest provinces in terms of child poverty, but the ranking of child poverty amongst them changed for different poverty lines or alternative child poverty measures. Thus, if the poverty line is set at lower levels, Kwazulu-Natal has the most

headcount poverty; not surprisingly, it also then has the highest poverty severity index. Poor children are worst off in this province. Moreover, it is also one of the largest provinces, thus it has a large share (25.3%) of child poverty.

The child poverty headcount was found to be much higher in rural (82.8%) than urban areas (48.6%), as were the depth and severity of child poverty. Rural children comprise nearly two thirds of poor children. A larger proportion of poor children than poor adults reside in rural areas. The child poverty headcount, depth and severity were all found to be far higher amongst the African and Coloured child population.

The child poverty profile shed new light on the age dimensions of child poverty. The headcount, depth and severity of poverty are all higher amongst children in the youngest age cohort (0-4) followed by children age 5-14 and then by those aged 15-17. This is surprising in view of the fact that the child support grants did not, at the time of the survey, extend to the oldest group, so one would have expected households containing only older children to perhaps experience more poverty.

No firm conclusion on trends in money-metric child poverty can be drawn from this analysis. This is firstly, because rigorous comparison with findings from earlier data sets is undermined by differences in survey data collection methods, and secondly because of different welfare measures used across studies.

The paper confirms the need for government to target spending on poor *children*. Among provinces, KwaZulu Natal, Limpopo and Eastern Cape are still most in need of resources to address child poverty. It suggests that rural areas, the African and Coloured populations, should continue to receive the bulk of attention in order to

reduce child poverty. The analysis also finds support for government's current policy stance of prioritising children in their earliest years

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