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# On Inequality and the Poverty Line.

## Making the poverty line dependent on reference groups: implications for the extent of poverty in some Asian countries.[1]

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## Abstract

This paper estimates the number of poor in various countries in Asia when an "amalgam poverty line", a poverty line which is a weighted average of an absolute poverty line (such as $1.25 day) and a reference income (such as the mean or the median income), is used. The number of poor is computed under various values of the weight as well as when an absolute poverty line of $1.45 a day, a threshold which seems more adapted to the Asian case, is taken. The paper provides also estimates of the headcount ratio, income poverty gap, and average income of the poor under the various scenarios and in the different countries examined.



**Key Words**: absolute poverty, Asia, headcount ratio, income poverty gap, relative poverty.

**JEL classifications**: D31, D63, I32, O53.

## 1. Introduction

In his Wealth of Nations, Adam Smith stated that ”by necessaries I understand, not only the commodities which are indispensably necessary for the support of life, but whatever the custom of the country renders it indecent for creditable people, even of the lowest order, to be without. A linen shirt, for example, is, strictly speaking, not a necessary of life. The Greeks and Romans lived, I suppose, very comfortably, though they had no linen. But in the present times, through the greater part of Europe, a creditable day-laborer would be ashamed to appear in public without a linen shirt, the want of which would be supposed to denote that disgraceful degree of poverty, which, it is presumed, nobody can well fall into without extreme bad conduct....Under necessaries therefore, I comprehend, not only those things which nature, but those things which established rules of decency have rendered necessary to the lowest rank of people" (Smith, 1937).

In fact, absolute poverty lines are generally used in poor countries (e.g. $1.25 a day, which is an updated figure of the earlier proposal $ 1 a day). On the other hand, in rich countries, such as in Western Europe, the poverty line corresponds to some proportion (60%) of the median income. Ravallion (2011) has argued that both approaches are justified since in poor countries it makes sense that those who should not be considered as poor are those who are able to feed and clothe themselves while in rich countries the idea of social exclusion should be of prime importance(see, Sen, 2000, for more details on this concept).

In a recent paper Ravallion and Chen (2012) have actually argued that “if one thinks that it is really only social norms that differ, with welfare depending solely on own consumption, then one would probably prefer an absolute measure, imposing a common norm (though one would presumably also be drawn to consider more than one possible line). However, if one is convinced that that there are social effects on welfare then one would be more inclined to use a relative line in the consumption or income space, anchored to a common welfare standard. The problem for global poverty comparisons is that we do not know which of these two interpretations— differing social norms or social effects on welfare—is right. And we may never resolve the matter from conventional

empirical evidence. This uncertainty makes it compelling to consider both approaches when measuring global poverty."

This is why Ravallion and Chen (2011), generalizing somehow the measures proposed by Atkinson and Bourguignon (2001), suggested that there should be a positive lower bound to the costs of social inclusion so that the poverty line would rise with the mean only above some critical value and it then would do so with an elasticity less than one. A different but still combined approach to the selection of a poverty line was proposed recently by Chakravarty et al. (2014) who developed axiomatically what they called "an amalgam poverty line".

The novelty of the present paper is that it offers an empirical illustration of the proposal of Chakravarty et al. (2014). Using data on the shares in total expenditures of the deciles of the distribution of expenditures in different Asian countries around 2010, it indicates what the headcount ratio, the number of poor and the poverty gap ratio would be under various scenarios. These scenarios are a function of the absolute poverty line, which is taken as $1.25 a day or $1.45 a day, the reference expenditure, which is chosen as the mean or the median of the distribution of expenditures and the weights given respectively to the absolute poverty line and the reference expenditure.

The paper is organized as follows. Section 2 shortly summarizes the main elements of the paper by Chakravarty et al. (2014). Section 3 reviews briefly the role played by reference groups in the growing economic literature on happiness. Section 4 presents the results of the empirical investigation while concluding comments are given in Section 5.

## 2. Making the Poverty Line Dependent on Reference Groups: An Axiomatic Approach

In a recent paper Chakravarty et al. (2014) developed an axiomatic approach to the determination of what they called "an amalgam poverty line". Given a reference income, say, the mean or the median, this "amalgam poverty line" is derived as a weighted average of the existing absolute poverty line and the reference income, the choice of the weight being guided by the policy maker's preferences for aggregating the two components. The individual utility is assumed to be increasing, concave in absolute

income but decreasing, convex in the reference standard. Following Clark and Oswald (1998). Chakravarty et al. (2014) considered both an additive and a multiplicative form of the utility function, using two different sets of intuitively reasonable axioms.

The general idea of their approach is as follows. Imagine some reference income and a person with an income equal to some arbitrarily set poverty line. We then determine the level of the corresponding utility. Consider now an alternative situation where this person has an income identical to some given poverty line. Moreover suppose that for this individual his own income is actually his reference income. If we then assume that the person is equally satisfied in both cases, we may equate the utilities in both states of affairs and it is then easy to determine uniquely the arbitrary poverty line. This presumption of equal satisfaction in both situations is quite plausible because in each case the individual is at the existing poverty line income.

Chakravarty et al. (2014) then proceed as follows. Following Clark and Oswald (1998) they examine two options. They first assume that an individual's utility function depends in part on her absolute income. But they also explore the case where utility depends on the relative income, that is, income relative to some reference standard. In other words an individual's utility depends also on her relative position (or 'status') in the society in terms of some measure of well-being. Clark and Oswald (1998) had indeed suggested taking into account this relativity by making either difference or ratio comparisons.

Let $y$ and $r$ refer respectively to the absolute and references income of an individual.

The utility function written as $U(y,r)$ is assumed to be first increasing and concave in $y$. These two assumptions are common in the literature. But $U(y,r)$ is also supposed to be decreasing and convex in $r$. The intuitive explanation may be summarized as follows. Suppose a person with a low income considers that $r$ is his targeted income. An increase in $r$ may then increase the difficulty this individual has in attempting to reach the higher targeted income. This implies that the additional utility he gets from an increase in $r$ is actually negative, so that $U$ is in fact decreasing in $r$. Convexity simply means that his dissatisfaction from an increase in $r$ increases at a non-decreasing rate.

If one adopts the case of difference comparisons the utility function will be expressed as $U\big(y,(y-r)\big)$, the argument $(y-r)$ capturing dis-utility from comparison. In such a scenario relative status depends on the difference$(y-r)$.

Chakravarty et al. (2014) make then two assumptions concerning the utility function. The first one is labelled "Linear Translatibility" (LIT). Mathematically, for any real $c$ such that $y + c \in [0, \infty)$, $U\big(y + c, (y + c) - (r + c)\big) = U\big(y, (y - r)\big) + kc$, where $k > 0$ is some scalar.

Intuitively this axiom means that when the absolute and reference incomes increase by an equal amount, the relative status $(y - r)$ is not affected but since the absolute income increases, individual utility should also rise.

The second assumption is called Linear Homogeneity (LIH). Mathematically it implies that for any $c \in (0, \infty), U(cy, cy - cr) = cU(y, y - r)$.

The axiom LIT indicates that when the absolute and reference incomes are multiplied by some constant, the utility is multiplied by this constant.

Chakravarty et al. (2014) derive then the following theorem.

Proposition 1: The only utility function that satisfies LIT and LIH is of the form

$$U\big(y, (y - r)\big) = (k - a)y + ar$$

where $k > 0$ and $a < 0$ are constants.

Chakravarty et al. (2014) show also that, as a consequence, the "amalgam poverty line" will be a weighted average of the traditional absolute poverty line and the specified reference income.

As mentioned previously, these authors consider also an alternative situation, the 'ratio comparisons model' (see, Clark and Oswald, 1998) ,where utility depends on the absolute income $y$ as well as on the ratio $(y/r)$, the latter being assumed to affect the status of the individual. The utility function is then written as $U\big(y, f(y/r)\big)$ where $f$ is a positive valued and increasing transformation of the ratio $(y/r)$ . Here also it is assumed that $U$ is increasing, concave in $y$ and decreasing, convex in $r$.

Chakravarty et al. (2014) make here three assumptions concerning the utility function.

The first one is called Linear Homogeneity (LIH) and may be summarized as follows:

$U\left(cy, f\left(\frac{cy}{cr}\right)\right) = cU\left(y, f\left(\frac{y}{r}\right)\right)$, where $c > 0$.

The second one, Normalization (NOM), says that if $y = 1$, then

$$U\left(y, f\left(\frac{y}{r}\right)\right) = f\left(\frac{1}{r}\right)$$

NOM is a cardinality principle which demands that if the individual's income is 1, then corresponding utility value is given simply by the transformed value $f\left(\frac{1}{r}\right)$ of the ratio $\left(\frac{1}{r}\right)$.

Finally the CON just means that $U$ is continuous in its arguments.

Chakravarty et al. (2014) then proved the following theorem.

Proposition 2: The only utility function that satisfies LIH, NOM and CON is of the form

$$U\left(y, f\left(\frac{y}{r}\right)\right) = yf\left(\frac{y}{r}\right)$$

Chakravarty et al. (2014) then assume that the function *f* is given by $\left(\frac{y}{r}\right) = \beta - \frac{r}{y}$, where $\beta > 1$ is a constant chosen so that $f\left(\frac{y}{r}\right) > 0$. The resulting utility function then becomes

$$U = y\left(\beta - \frac{r}{y}\right) \quad (1)$$

and they then prove that in such a case again the "amalgam poverty line" $z_1$ will be a weighted average of the traditional absolute poverty line $z_0$ and the reference income $r$. More precisely they derive that

$$z_1 = wz_0 + (1 - w)r \quad (2)$$

with

$$w = \frac{\beta - 1}{\beta}. \quad (3)$$

Therefore, here again, the "amalgam poverty line" becomes a weighted average of the traditional absolute poverty line and the specified reference income.

In the empirical section of this paper, we will base our analysis on the 'ratio comparisons model' so that the choice of the weight $w$ will depend on the value taken by the parameter $\beta$. To select a specific value of $\beta$, we will rely on empirical studies in the "happiness literature" that stress the role of reference groups.

## 3. Happiness, Own Standard of Living and Reference Groups

The analysis of subjective well-being has been a growing field of inquiry during the last two decades, especially in recent years. Of particular interest in this literature is the analysis of the impact of so-called reference groups on life satisfaction or satisfaction with income. This question is evidently related to a much older hypothesis, which assumes that utility depends not only on one's own income but also on that of others. The importance of relative income had been already stressed in the work of Duesenberry (1949) who assumed that the utility of an individual is negatively affected by the income of anyone richer than him, as well as of Runciman (1966) whose focus was rather on the concept of relative deprivation.

An empirical application of these ideas may be summarized by the following equation (see, Clark et al., 2008):

$$U(t) = \beta_1 lny(t) + \beta_2 ln\left(\frac{y(t)}{y^*(t)}\right) + Z'(t)\gamma \qquad (4)$$

where $U(t)$ is the individual's utility, $y(t)$ is his income, $y^*(t)$ is some reference income , $Z'$ is a vector of additional determinants and $\gamma$ is a vector of the coefficients of these determinants ,all the variables being measured at time *t.*

There are various ways of obtaining measures for $y^*(t)$. One can estimate wage equations, controlling for individual characteristics like age, gender, education, area of residence and then plug into the value these variables for the individual and derive thus a predicted value of $y^*(t)$ for each individual. Another possibility is to compute cell averages in order of obtain an estimate of the average wage by, say, gender, education and region, on the basis of either the dataset itself or some external data source. Finally, more recently information about the reference income has been obtained directly from the survey itself. This information may be of a qualitative nature and the respondent is asked how much higher or smaller (on some ordinal scale) his/her income is with respect to his/her reference income (see, for example, Knight et al., 2007). There may even be some quantitative information on the income of the reference group like that available in a Japanese survey where those who participated in this survey were asked to estimate the income of people who had the same age, sex and educational level as theirs (see, Clark et

al., 2013). This direct source of information is still very rare although van Praag pleaded recently "for an extension of the happiness paradigm by setting up a new additional agenda for empirical research in order to get quantified knowledge about the referencing process" (van Praag, 2011).

Reference groups have also been introduced in studies of the determinants of "subjective economic ladder" where people are asked to define their position on some scale of standard of living. For instance, using some Indonesian survey, Powdthavee (2009), rather than selecting relative income as a determinant of this subjective economic ladder, introduced a variable measuring the rank of the individual in the distribution of income/wealth at the local level (see, Powdthavee, 2009).

The next question concerns the determination of the reference group. A first possibility is to consider that the reference group is made of colleagues in which case the emphasis is on "the relation between income gaps in the professional sphere and various notions of satisfaction ranging from job to life satisfaction" (Senik, 2009). Clark and Oswald (1996), for example, analysed job satisfaction on the basis of the British Household Panel Survey (BHPS) and defined the reference group of a worker as the income of employees who had the same age and level of qualification as the worker and were doing the same kind of job. Other studies have assumed that the reference group was composed of people with the same characteristics as the individual, with, for example, the same age, level of education and region of residence (see, Ferrer-i-Carbonell, 2005). Some authors have also used space-based reference incomes such as the average income of individuals of the same race in the cluster and district where the individuals surveyed live (see, Kingdon and Knight, 2007).

The objective rank of an individual in the area where he lives has also been shown to affect the satisfaction he gets from his consumption level, as stressed by Fafchamps and Shilpi (2008) in their work on subjective welfare in Nepal.

The next issue to be examined is that of the direction of the impact of the reference income on subjective well-being. The literature makes a distinction between two possible impacts, one reflecting a signalling effect, the other the role of status. The idea that other people's income may have a positive effect on satisfaction was originally introduced by Hirschman and Rothschild (1973) "Suppose that the individual has very little information

about his future income, but at some point a few of his relatives, neighbours, or acquaintances improve their economic or social position. Now, he has something to go on: expecting that his turn will come in due course, he will draw gratification from the advances of others – for a while. It will be helpful to refer to this initial gratification as the 'tunnel effect'." Evidence confirming the existence of such signalling effects was provided by Senik (2004; 2008). The more common impact of reference income seems nevertheless to be a status effect: ceteris paribus a higher reference income affects negatively satisfaction from life or income (see, for example, the studies of Senik, 2009, and Clark and Senik, 2009).

As far as empirical results are concerned, there are hitherto very few papers in the literature on subjective welfare that estimated the impact on happiness, ceteris paribus, of an increase in one's own income, on the one hand, of a rise in the reference group's income, on the other hand. Moreover the effect of a change in the reference income, when estimated, was generally derived indirectly. Knight et al. (2007), for example, who looked at subjective well-being in China, introduced in their regression a dummy variable indicating whether the household income was much above, above, below or much below the village average. Clark and Senik (2009), using the third wave of the European Social Survey, defined two types of variables to take into account other people's income: a dummy variable indicating how important it was for the respondent to compare her own income with that of others and another dummy variable showing with what population category the comparison was made (friends, work colleagues, family members, others). In a more recent paper Clark et al. (2013) were however able to introduce a variable referring directly to the income of some reference group. They analysed an internet survey that was conducted in Japan and in which the respondent was asked to indicate what she thought was the average personal income before taxes of people of the same age, gender and educational level as hers. The authors were also able to estimate this individual reference income by looking at the mean values observed in cells corresponding to individuals with the same, age, education, gender and labour force status. Finally Clark et al. (2013) used also external sources to compute the actual income of individuals by labour force status (civil servants, self-employed, etc…). In Table 4 of their paper the authors report the results of a regression where the dependent variable

refers to satisfaction with income. It then appears that the coefficient of own income is about three times as high as that of self-reported reference income, and of opposite sign, even when a variable measuring the "comparison intensity" of the individual (how important it is for the respondent to compare her income with that of others) is introduced.

We can now attempt to use this result (a ratio of about three between the coefficient of own income and that of the reference income) and introduce it in equations (1) to (3) above. More precisely this empirical result would imply that the coefficient β in (1) would be equal to 3.

Using (1) we derive that $U = y\beta - r$, from which we derive that

$dU = \frac{\partial U}{\partial y} dy + \frac{\partial U}{\partial r} dr = \beta dy - dr$ so that for given utility level, $\frac{dr}{dy} = \beta$.

Using (3) we then can conclude that the weight $w$ would be equal to (2/3), one of the values which will be used for $w$ in the empirical section of the present paper.

The data we will be working with do not provide any information on the reference income of individuals. We actually know only the shares in total income of the various deciles as well as the mean and median of the income distribution (or rather distribution of expenditures) in the various countries for which data are available. We therefore decided that the reference income would be either the mean or the median. If the mean is selected, one implicitly assumes that the extent of poverty should also be a function of the income of those who are not poor, or more generally of the standards of living of all the individuals in the population. If the reference chosen is the median income, then, since the latter does not depend on the incomes of those who are not poor, one really assumes that the extent of poverty depends on the standards of living of those individuals who belong to the middle class, and are in the middle of the income distribution.

We are more inclined towards the choice of the median as the reference income. As Aristotle (-350) argued, 'the best political economy is formed by citizens of the middle class, and that those states are likely to be well-administered, in which the middle class is large.' A large and rich middle class contributes significantly to the welfare of a society in many ways, for instance, with respect to high economic growth, higher contribution to the country's tax revenue, a better infrastructure and higher level of education. Therefore,

a person with a low income may view the median as a reference income and be hopeful about achieving this income (see Chakravarty, 2014).

## 4. **The extent of poverty with an "amalgam poverty line": the case of Asian countries**

In this section we present several measures of the extent of poverty in various Asian countries, when an "amalgam poverty line", a weighted average of an absolute poverty line and of the mean or median income, is introduced. As absolute poverty line we have first used a monthly income of $38 (at 2005 PPP) which corresponds to $1.25 per day, as originally suggested by Ravallion et al. (2009). However, following some of the objections raised by Deaton (2001; 2010) in his criticism of a unique poverty line of $1 a day or $1.25 a day, we have also introduced, on the basis of the estimations of Han (2014), an absolute poverty line of $44, which is based only on Asian data and corresponds to $1.45 a day. We also assumed various possible weights. More precisely we supposed that the weight $w$ given to the absolute poverty line (the weight of the median or of the mean being then $(1-w)$ ), could be 1, 0.9, 0.66 and 0.5.

The database consisted of information on the income shares of ten deciles in the various countries and years for which these figures were available. Two computations methods were used. The first one is based on an algorithm originally proposed by Kakwani and Podder (1973) allowing one to estimate the Lorenz curve for each country and year on the basis of these 10 observations (income shares). On the basis of this Lorenz curve it was then easy to find out which percentage of the population had an income (or expenditure level) smaller than that corresponding to some poverty line. The second approach used an algorithm proposed by Shorrocks and Wan (2009), which allows to "ungroup" income distributions, that is, to derive, for example, the share of each centile when the only data available originally are the income shares of deciles. Since the Shorrocks-Wan approach relies on 'ungrouped' income distributions, it appears to be more refined than the Kakwani-Podder method which uses only 10 income shares.

In Table 1 we present the value of the headcount ratio (in percentage) in the different Asian countries for which data were available, under several possible scenarios. We give

two sets of results: those based on the Kakwani and Poder approach and those derived from the Shorrocks and Wan algorithm. As expected, for a given weight, the headcount ratio is higher when the weight $(1-w)$ refers to the mean rather than the median. Needless to say the headcount ratio increases with the weight $w$ and is higher with an absolute poverty line of \$44 than with one of \$38. There seem to be significant difference between the results obtained on the basis of the two approaches, although most of the time, though not always, the Shorrocks and Wan approach leads to smaller headcount rates.

We then combined the data on the headcounts given in Table 1 with data on the total population around 2010 of the countries examined to derive an estimate of the total number of poor in each country. All these results are given in Table 2. To simplify the presentation we give only results based on the Shorrocks and Wan algorithm. It is then easy to compare the number of poor under various scenarios with those obtained on the basis of a \$38 absolute poverty line and a value of $w$ equal to 1 (so that the "amalgam poverty line" is also equal to \$38).

Finally Table 3 gives the income gap ratios in the different countries under the various scenarios, the results being again based on the Shorrocks and Wan algorithm. This index is an indicator of poverty depths of different individuals. When multiplied by the poverty line and the total number of poor, this summary measure has a direct policy interpretation in the sense that the multiplied formula determines the total amount of money required to put all the poor persons at the poverty line. Now, for any country, with a given poverty line and the reference income, we determine the amalgam poverty line using a specific weighting scheme. Given an amalgam poverty line for a country, we can directly estimate the amount of money necessary to place the poor persons of the country at its poverty line using the country's income gap ratio from Table 3 and number of poor from Table 2.

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**Table 1: Headcount ratios under various scenarios.**

| Weighting scheme (weight given to the absolute poverty line) | Armenia (2010) Kakwani and Podder approach | Armenia (2010) Shorrocks and Wan approach | Azerbaijan (2008) Kakwani and Podder approach | Azerbaijan (2008) Shorrocks and Wan approach | Bangladesh (2010) Kakwani and Podder approach | Bangladesh (2010) Shorrocks and Wan approach | Bhutan (2012) Kakwani and Podder approach | Bhutan (2012) Shorrocks and Wan approach | Cambodia (2009) Kakwani and Podder approach | Cambodia (2009) Shorrocks and Wan approach |
|---|---|---|---|---|---|---|---|---|---|---|
| **Absolute poverty line: $38. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.04 | 0.02 | 0.00 | 0.00 | 0.43 | 0.43 | 0.04 | 0.02 | 0.28 | 0.19 |
| 90% | 0.11 | 0.04 | 0.00 | 0.01 | 0.43 | 0.44 | 0.11 | 0.04 | 0.31 | 0.22 |
| 66% | 0.23 | 0.16 | 0.16 | 0.09 | 0.45 | 0.46 | 0.25 | 0.17 | 0.37 | 0.30 |
| 50% | 0.30 | 0.24 | 0.26 | 0.19 | 0.46 | 0.47 | 0.32 | 0.26 | 0.40 | 0.35 |
| **Absolute poverty line: $38. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.12 | 0.06 | 0.00 | 0.01 | 0.44 | 0.46 | 0.14 | 0.06 | 0.32 | 0.25 |
| 66% | 0.28 | 0.22 | 0.22 | 0.16 | 0.48 | 0.52 | 0.31 | 0.26 | 0.41 | 0.39 |
| 50% | 0.36 | 0.34 | 0.32 | 0.29 | 0.50 | 0.56 | 0.39 | 0.38 | 0.46 | 0.48 |
| **Absolute poverty line: $44. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.11 | 0.05 | 0.00 | 0.00 | 0.50 | 0.55 | 0.09 | 0.03 | 0.34 | 0.28 |
| 90% | 0.16 | 0.09 | 0.01 | 0.01 | 0.50 | 0.54 | 0.15 | 0.06 | 0.36 | 0.30 |
| 66% | 0.27 | 0.20 | 0.18 | 0.11 | 0.50 | 0.53 | 0.27 | 0.20 | 0.40 | 0.36 |
| 50% | 0.33 | 0.27 | 0.27 | 0.21 | 0.50 | 0.52 | 0.33 | 0.27 | 0.42 | 0.39 |
| **Absolute poverty line: $44. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.17 | 0.11 | 0.03 | 0.02 | 0.50 | 0.56 | 0.17 | 0.09 | 0.37 | 0.33 |
| 66% | 0.31 | 0.26 | 0.23 | 0.18 | 0.52 | 0.59 | 0.32 | 0.28 | 0.44 | 0.44 |
| 50% | 0.38 | 0.37 | 0.34 | 0.30 | 0.54 | 0.61 | 0.40 | 0.39 | 0.48 | 0.51 |

Note: The complete income distributions were derived on the basis of data on the shares of the deciles in total income. Two estimation methods were used. The first one applied the Kakwani and Podder (1973) approach to the parametrization of the Lorenz curve. The second one implemented the Shorrocks and Wan (2009) proposal for "ungrouping income distributions".

The first column gives the weight (in percentage) given to the absolute poverty line (either $38 or $44), the complement (in percentage) giving the weight given to the median or the mean of the income distributions.

**Table 1 (cont.): Headcount ratios under various scenarios.**

| Weighting scheme (weight given to the absolute poverty line) | China rural (2009) Kakwani and Podder approach | China rural (2009) Shorrocks and Wan approach | China urban (2009) Kakwani and Podder approach | China urban (2009) Shorrocks and Wan approach | Fiji (2009) Kakwani and Podder approach | Fiji (2009) Shorrocks and Wan approach | Georgia (2010) Kakwani and Podder approach | Georgia (2010) Shorrocks and Wan approach | India rural (2010) Kakwani and Podder approach | India rural (2010) Shorrocks and Wan approach |
|---|---|---|---|---|---|---|---|---|---|---|
| **Absolute poverty line: $38. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.29 | 0.21 | 0.00 | 0.00 | 0.16 | 0.04 | 0.17 | 0.18 | 0.36 | 0.34 |
| 90% | 0.31 | 0.24 | 0.00 | 0.02 | 0.21 | 0.09 | 0.21 | 0.21 | 0.37 | 0.36 |
| 66% | 0.37 | 0.31 | 0.16 | 0.11 | 0.31 | 0.22 | 0.29 | 0.29 | 0.40 | 0.40 |
| 50% | 0.40 | 0.36 | 0.26 | 0.21 | 0.37 | 0.29 | 0.33 | 0.35 | 0.42 | 0.42 |
| **Absolute poverty line: $38. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.33 | 0.27 | 0.00 | 0.02 | 0.24 | 0.13 | 0.23 | 0.23 | 0.38 | 0.38 |
| 66% | 0.42 | 0.41 | 0.22 | 0.18 | 0.37 | 0.33 | 0.35 | 0.36 | 0.43 | 0.47 |
| 50% | 0.47 | 0.49 | 0.33 | 0.31 | 0.44 | 0.44 | 0.42 | 0.44 | 0.47 | 0.52 |
| **Absolute poverty line: $44. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.34 | 0.28 | 0.00 | 0.01 | 0.21 | 0.09 | 0.22 | 0.23 | 0.44 | 0.47 |
| 90% | 0.35 | 0.30 | 0.00 | 0.02 | 0.25 | 0.15 | 0.25 | 0.25 | 0.44 | 0.48 |
| 66% | 0.40 | 0.36 | 0.18 | 0.13 | 0.33 | 0.25 | 0.32 | 0.32 | 0.45 | 0.48 |
| 50% | 0.42 | 0.39 | 0.27 | 0.22 | 0.38 | 0.31 | 0.35 | 0.37 | 0.46 | 0.49 |
| **Absolute poverty line: $44. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.37 | 0.33 | 0.03 | 0.03 | 0.27 | 0.18 | 0.28 | 0.28 | 0.45 | 0.50 |
| 66% | 0.44 | 0.45 | 0.24 | 0.20 | 0.39 | 0.36 | 0.38 | 0.39 | 0.48 | 0.55 |
| 50% | 0.49 | 0.52 | 0.34 | 0.32 | 0.45 | 0.46 | 0.44 | 0.47 | 0.50 | 0.58 |

Note: The complete income distributions were derived on the basis of data on the shares of the deciles in total income. Two estimation methods were used. The first one applied the Kakwani and Podder (1973) approach to the parametrization of the Lorenz curve. The second one implemented the Shorrocks and Wan (2009) proposal for "ungrouping income distributions".

The first column gives the weight (in percentage) given to the absolute poverty line (either $38 or $44), the complement (in percentage) giving the weight given to the median or the mean of the income distributions.

**Table 1 (cont.): Headcount ratios under various scenarios.**

| Weighting scheme (weight given to the absolute poverty line) | India urban (2010) Kakwani and Podder approach | India urban (2010) Shorrocks and Wan approach | Indonesia rural (2011) Kakwani and Podder approach | Indonesia rural (2011) Shorrocks and Wan approach | Indonesia urban (2011) Kakwani and Podder approach | Indonesia urban (2011) Shorrocks and Wan approach | Kazhakstan (2009) Kakwani and Podder approach | Kazhakstan (2009) Shorrocks and Wan approach | Kyrgyz Republic (2011) Kakwani and Podder approach | Kyrgyz Republic (2011) Shorrocks and Wan approach |
|---|---|---|---|---|---|---|---|---|---|---|
| **Absolute poverty line: $38. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.34 | 0.29 | 0.24 | 0.15 | 0.28 | 0.18 | 0.00 | 0.00 | 0.03 | 0.04 |
| 90% | 0.36 | 0.31 | 0.27 | 0.19 | 0.31 | 0.21 | 0.00 | 0.00 | 0.10 | 0.08 |
| 66% | 0.40 | 0.37 | 0.34 | 0.28 | 0.37 | 0.30 | 0.10 | 0.05 | 0.22 | 0.20 |
| 50% | 0.43 | 0.40 | 0.39 | 0.34 | 0.41 | 0.36 | 0.21 | 0.16 | 0.29 | 0.27 |
| **Absolute poverty line: $38. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.38 | 0.34 | 0.29 | 0.21 | 0.33 | 0.25 | 0.00 | 0.00 | 0.12 | 0.10 |
| 66% | 0.45 | 0.46 | 0.38 | 0.36 | 0.42 | 0.41 | 0.15 | 0.10 | 0.27 | 0.25 |
| 50% | 0.49 | 0.52 | 0.44 | 0.45 | 0.47 | 0.49 | 0.27 | 0.24 | 0.36 | 0.35 |
| **Absolute poverty line: $44. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.40 | 0.38 | 0.30 | 0.23 | 0.32 | 0.24 | 0.00 | 0.00 | 0.10 | 0.08 |
| 90% | 0.41 | 0.39 | 0.33 | 0.26 | 0.35 | 0.27 | 0.00 | 0.01 | 0.15 | 0.13 |
| 66% | 0.43 | 0.42 | 0.38 | 0.33 | 0.39 | 0.34 | 0.12 | 0.07 | 0.25 | 0.22 |
| 50% | 0.45 | 0.44 | 0.41 | 0.38 | 0.42 | 0.38 | 0.23 | 0.18 | 0.32 | 0.29 |
| **Absolute poverty line: $44. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.42 | 0.42 | 0.34 | 0.29 | 0.36 | 0.31 | 0.00 | 0.01 | 0.17 | 0.14 |
| 66% | 0.47 | 0.50 | 0.41 | 0.41 | 0.44 | 0.44 | 0.17 | 0.12 | 0.30 | 0.28 |
| 50% | 0.51 | 0.55 | 0.46 | 0.48 | 0.49 | 0.52 | 0.29 | 0.25 | 0.38 | 0.38 |

Note: The complete income distributions were derived on the basis of data on the shares of the deciles in total income. Two estimation methods were used. The first one applied the Kakwani and Podder (1973) approach to the parametrization of the Lorenz curve. The second one implemented the Shorrocks and Wan (2009) proposal for "ungrouping income distributions".

The first column gives the weight (in percentage) given to the absolute poverty line (either $38 or $44), the complement (in percentage) giving the weight given to the median or the mean of the income distributions.

**Table 1 (cont.): Headcount ratios under various scenarios.**

| Weighting scheme (weight given to the absolute poverty line) | Lao PDR (2008) Kakwani and Podder approach | Lao PDR (2008) Shorrocks and Wan approach | Malaysia (2009) Kakwani and Podder approach | Malaysia (2009) Shorrocks and Wan approach | Maldives (2004) Kakwani and Podder approach | Maldives (2004) Shorrocks and Wan approach | Micronesia (20XX) Kakwani and Podder approach | Micronesia (20XX) Shorrocks and Wan approach | Nepal (2010) Kakwani and Podder approach | Nepal (2010) Shorrocks and Wan approach |
|---|---|---|---|---|---|---|---|---|---|---|
| **Absolute poverty line: $38. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.37 | 0.34 | 0.00 | 0.00 | | 0.02 | | 0.31 | 0.30 | 0.25 |
| 90% | 0.39 | 0.36 | 0.04 | 0.03 | | 0.04 | | 0.33 | 0.32 | 0.27 |
| 66% | 0.42 | 0.40 | 0.22 | 0.17 | | 0.18 | | 0.38 | 0.37 | 0.34 |
| 50% | 0.44 | 0.42 | 0.30 | 0.26 | | 0.26 | | 0.41 | 0.40 | 0.38 |
| **Absolute poverty line: $38. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.40 | 0.38 | 0.09 | 0.05 | | 0.06 | | 0.38 | 0.33 | 0.29 |
| 66% | 0.46 | 0.48 | 0.31 | 0.28 | | 0.24 | | 0.51 | 0.41 | 0.40 |
| 50% | 0.49 | 0.50 | 0.41 | 0.40 | | 0.36 | | 0.58 | 0.45 | 0.47 |
| **Absolute poverty line: $44. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.43 | 0.44 | 0.00 | 0.01 | | 0.03 | | 0.35 | 0.36 | 0.34 |
| 90% | 0.44 | 0.45 | 0.06 | 0.03 | | 0.07 | | 0.37 | 0.38 | 0.36 |
| 66% | 0.45 | 0.46 | 0.23 | 0.18 | | 0.20 | | 0.41 | 0.41 | 0.40 |
| 50% | 0.46 | 0.47 | 0.31 | 0.27 | | 0.27 | | 0.43 | 0.43 | 0.42 |
| **Absolute poverty line: $44. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.45 | 0.47 | 0.11 | 0.06 | | 0.09 | | 0.41 | 0.39 | 0.38 |
| 66% | 0.49 | 0.54 | 0.32 | 0.28 | | 0.26 | | 0.52 | 0.44 | 0.46 |
| 50% | 0.51 | 0.58 | 0.41 | 0.41 | | 0.37 | | 0.59 | 0.48 | 0.51 |

Note: The complete income distributions were derived on the basis of data on the shares of the deciles in total income. Two estimation methods were used. The first one applied the Kakwani and Podder (1973) approach to the parametrization of the Lorenz curve. The second one implemented the Shorrocks and Wan (2009) proposal for "ungrouping income distributions".

The first column gives the weight (in percentage) given to the absolute poverty line (either $38 or $44), the complement (in percentage) giving the weight given to the median or the mean of the income distributions.

**Table 1 (cont.): Headcount ratios under various scenarios.**

| Weighting scheme (weight given to the absolute poverty line) | Pakistan (2008) Kakwani and Podder approach | Pakistan (2008) Shorrocks and Wan approach | Papua New Guinea (20XX) Kakwani/ Podder approach | Papua New Guinea (20XX) Shorrocks and Wan approach | Philippines (2009) Kakwani and Podder approach | Philippines (2009) Shorrocks and Wan approach | Sri Lanka (2010) Kakwani and Podder approach | Sri Lanka (2010) Shorrocks and Wan approach | Tajikistan (2009) Kakwani and Podder approach | Tajikistan (2009) Shorrocks and Wan approach |
|---|---|---|---|---|---|---|---|---|---|---|
| **Absolute poverty line: $38. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.29 | 0.21 | | 0.36 | 0.28 | 0.19 | 0.13 | 0.03 | 0.06 | 0.06 |
| 90% | 0.32 | 0.24 | | 0.37 | 0.31 | 0.22 | 0.19 | 0.06 | 0.11 | 0.10 |
| 66% | 0.37 | 0.31 | | 0.41 | 0.37 | 0.31 | 0.29 | 0.20 | 0.23 | 0.21 |
| 50% | 0.40 | 0.36 | | 0.43 | 0.41 | 0.36 | 0.35 | 0.27 | 0.30 | 0.28 |
| **Absolute poverty line: $38. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.33 | 0.27 | | 0.41 | 0.33 | 0.26 | 0.20 | 0.09 | 0.13 | 0.12 |
| 66% | 0.40 | 0.39 | | 0.52 | 0.42 | 0.41 | 0.34 | 0.28 | 0.28 | 0.26 |
| 50% | 0.45 | 0.47 | | 0.58 | 0.48 | 0.50 | 0.41 | 0.40 | 0.36 | 0.35 |
| **Absolute poverty line: $44. It is weighted with the median.** | | | | | | | | | | |
| 100% | 0.36 | 0.33 | | 0.42 | 0.32 | 0.25 | 0.19 | 0.07 | 0.13 | 0.12 |
| 90% | 0.38 | 0.35 | | 0.43 | 0.35 | 0.28 | 0.23 | 0.12 | 0.17 | 0.16 |
| 66% | 0.41 | 0.39 | | 0.45 | 0.40 | 0.35 | 0.32 | 0.23 | 0.27 | 0.24 |
| 50% | 0.43 | 0.42 | | 0.46 | 0.42 | 0.39 | 0.37 | 0.30 | 0.32 | 0.31 |
| **Absolute poverty line: $44. It is weighted with the mean.** | | | | | | | | | | |
| 90% | 0.39 | 0.37 | | 0.47 | 0.36 | 0.31 | 0.25 | 0.16 | 0.19 | 0.17 |
| 66% | 0.44 | 0.46 | | 0.56 | 0.44 | 0.44 | 0.36 | 0.32 | 0.31 | 0.29 |
| 50% | 0.47 | 0.52 | | 0.61 | 0.49 | 0.52 | 0.42 | 0.43 | 0.38 | 0.38 |

Note: The complete income distributions were derived on the basis of data on the shares of the deciles in total income. Two estimation methods were used. The first one applied the Kakwani and Podder (1973) approach to the parametrization of the Lorenz curve. The second one implemented the Shorrocks and Wan (2009) proposal for "ungrouping income distributions".

The first column gives the weight (in percentage) given to the absolute poverty line (either $38 or $44), the complement (in percentage) giving the weight given to the median or the mean of the income distributions.

**Table 1 (end): Headcount ratios under various scenarios.**

| Weighting scheme (weight given to the absolute poverty line) | Thailand (2010) Kakwani/ Podder approach | Thailand (2010) Shorrocks and Wan approach | Timor Leste (2007) Kakwani/ Podder approach | Timor Leste (2007) Shorrocks and Wan approach | Turkmenistan (1998) Kakwani and Podder approach | Turkmenistan (1998) Shorrocks and Wan approach | Vietnam (2008) Kakwani and Podder approach | Vietnam (2008) Shorrocks and Wan approach |
|---|---|---|---|---|---|---|---|---|
| **Absolute poverty line: $38. It is weighted with the median.** | | | | | | | | |
| 100% | 0.00 | 0.00 | 0.39 | 0.37 | 0.30 | 0.25 | 0.23 | 0.17 |
| 90% | 0.06 | 0.02 | 0.40 | 0.39 | 0.32 | 0.28 | 0.26 | 0.20 |
| 66% | 0.22 | 0.11 | 0.43 | 0.42 | 0.37 | 0.34 | 0.33 | 0.29 |
| 50% | 0.30 | 0.21 | 0.44 | 0.44 | 0.41 | 0.38 | 0.37 | 0.34 |
| **Absolute poverty line: $38. It is weighted with the mean.** | | | | | | | | |
| 90% | 0.09 | 0.03 | 0.41 | 0.41 | 0.34 | 0.30 | 0.28 | 0.22 |
| 66% | 0.29 | 0.22 | 0.46 | 0.49 | 0.42 | 0.42 | 0.38 | 0.36 |
| 50% | 0.38 | 0.37 | 0.49 | 0.54 | 0.47 | 0.50 | 0.43 | 0.44 |
| **Absolute poverty line: $44. It is weighted with the median.** | | | | | | | | |
| 100% | 0.01 | 0.01 | 0.46 | 0.49 | 0.35 | 0.32 | 0.29 | 0.24 |
| 90% | 0.09 | 0.03 | 0.46 | 0.49 | 0.37 | 0.34 | 0.31 | 0.27 |
| 66% | 0.24 | 0.13 | 0.47 | 0.49 | 0.40 | 0.39 | 0.36 | 0.33 |
| 50% | 0.31 | 0.23 | 0.48 | 0.50 | 0.43 | 0.41 | 0.40 | 0.38 |
| **Absolute poverty line: $44. It is weighted with the mean.** | | | | | | | | |
| 90% | 0.12 | 0.04 | 0.47 | 0.51 | 0.38 | 0.36 | 0.33 | 0.29 |
| 66% | 0.30 | 0.24 | 0.50 | 0.56 | 0.45 | 0.46 | 0.41 | 0.40 |
| 50% | 0.39 | 0.38 | 0.52 | 0.59 | 0.49 | 0.52 | 0.45 | 0.47 |

Note: The complete income distributions were derived on the basis of data on the shares of the deciles in total income. Two estimation methods were used. The first one applied the Kakwani and Podder (1973) approach to the parametrization of the Lorenz curve. The second one implemented the Shorrocks and Wan (2009) proposal for "ungrouping income distributions".The first column gives the weight (in percentage) given to the absolute poverty line (either $38 or $44), the complement (in percentage) giving the weight given to the median or the mean of the income distributions.

**Table 2: Number of poor (in million) in each country, depending on the weighting scheme.**

| Country | $38;median;100% | $38;median;90% | $38;median;66% | $38;median;50% | $38;mean;90% | $38;mean;66% | $38;mean;50% |
|---|---|---|---|---|---|---|---|
| Armenia (2010) | 0.07 | 0.13 | 0.48 | 0.71 | 0.17 | 0.66 | 1.00 |
| Azerbaijan (2008) | 0.01 | 0.07 | 0.77 | 1.70 | 0.11 | 1.40 | 2.55 |
| Bangladesh (2010) | 65.43 | 66.49 | 68.99 | 70.63 | 69.65 | 79.10 | 84.95 |
| Bhutan (2012) | 0.01 | 0.03 | 0.13 | 0.19 | 0.04 | 0.19 | 0.28 |
| Cambodia (2009) | 2.72 | 3.13 | 4.26 | 4.99 | 3.55 | 5.53 | 6.75 |
| China Rural (2009) | 142.84 | 165.95 | 217.82 | 251.45 | 187.37 | 284.32 | 342.89 |
| China Urban (2009) | 2.05 | 9.69 | 71.79 | 131.31 | 13.97 | 116.01 | 194.79 |
| Fiji (2008) | 0.04 | 0.08 | 0.18 | 0.25 | 0.11 | 0.28 | 0.38 |
| Georgia (2010) | 0.81 | 0.94 | 1.31 | 1.54 | 1.04 | 1.62 | 1.98 |
| India Rural (2009) | 285.87 | 299.92 | 332.82 | 353.72 | 318.04 | 390.67 | 434.58 |
| India Urban (2009) | 108.67 | 116.49 | 136.55 | 149.60 | 126.85 | 169.65 | 194.15 |
| Indonesia Rural (2011) | 18.21 | 23.08 | 33.59 | 40.49 | 25.43 | 43.29 | 53.99 |
| Indonesia Urban (2011) | 21.81 | 26.00 | 37.07 | 43.89 | 30.62 | 50.06 | 60.97 |
| Kazakhstan (2009) | 0.00 | 0.04 | 0.80 | 2.61 | 0.06 | 1.61 | 3.80 |
| Kyrgyz Republic (2011) | 0.24 | 0.45 | 1.08 | 1.47 | 0.54 | 1.37 | 1.94 |
| Lao PDR (2008) | 2.10 | 2.20 | 2.44 | 2.60 | 2.36 | 2.94 | 3.29 |
| Malaysia (2009) | 0.12 | 0.75 | 4.75 | 7.26 | 1.32 | 7.64 | 11.13 |
| Maldives (2004) | 0.00 | 0.01 | 0.05 | 0.08 | 0.02 | 0.07 | 0.10 |
| Micronesia Urban (2000) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Nepal (2010) | 6.63 | 7.35 | 9.07 | 10.19 | 7.91 | 10.87 | 12.71 |
| Pakistan (2007) | 35.59 | 40.61 | 52.56 | 60.52 | 44.49 | 65.51 | 78.61 |
| Papua New Guinea (1996) | 1.73 | 1.81 | 1.99 | 2.10 | 2.00 | 2.54 | 2.83 |
| Philippines (2009) | 17.20 | 20.27 | 28.20 | 33.15 | 23.68 | 37.71 | 45.54 |
| Sri Lanka (2009) | 0.62 | 1.29 | 4.09 | 5.61 | 1.96 | 5.84 | 8.25 |
| Tajikistan (2009) | 0.45 | 0.76 | 1.54 | 2.07 | 0.87 | 1.90 | 2.62 |
| Thailand (2010) | 0.32 | 1.20 | 7.44 | 14.04 | 1.90 | 14.38 | 24.61 |
| Timor-Leste (2007) | 0.39 | 0.40 | 0.44 | 0.46 | 0.43 | 0.51 | 0.56 |
| Turkmenistan (1998) | 1.10 | 1.22 | 1.50 | 1.68 | 1.33 | 1.86 | 2.18 |
| Vietnam (2008) | 14.79 | 17.30 | 24.36 | 28.99 | 19.12 | 30.48 | 37.70 |

**Table 2 (cont.): Number of poor (in million) in each country, depending on the weighting scheme[2].**

| Country | $44;median;100% | $44;median;90% | $44;median;66% | $44;median;50% | $44;mean;90% | $44;mean;66% | $44;mean;50% |
|---|---|---|---|---|---|---|---|
| Armenia (2010) | 0.14 | 0.26 | 0.59 | 0.80 | 0.32 | 0.77 | 1.09 |
| Azerbaijan (2008) | 0.03 | 0.13 | 0.95 | 1.80 | 0.18 | 1.58 | 2.66 |
| Bangladesh (2010) | 82.77 | 82.07 | 80.37 | 79.22 | 84.78 | 89.39 | 92.30 |
| Bhutan (2012) | 0.02 | 0.05 | 0.15 | 0.20 | 0.07 | 0.21 | 0.29 |
| Cambodia (2009) | 3.90 | 4.24 | 5.04 | 5.57 | 4.61 | 6.26 | 7.23 |
| China Rural (2009) | 192.92 | 208.94 | 248.46 | 273.98 | 229.30 | 312.22 | 361.86 |
| China Urban (2009) | 4.56 | 14.97 | 83.55 | 139.77 | 20.37 | 127.37 | 203.45 |
| Fiji (2008) | 0.08 | 0.12 | 0.21 | 0.27 | 0.15 | 0.30 | 0.39 |
| Georgia (2010) | 1.00 | 1.13 | 1.44 | 1.64 | 1.23 | 1.75 | 2.07 |
| India Rural (2009) | 394.62 | 396.85 | 402.18 | 405.70 | 412.86 | 453.88 | 479.89 |
| India Urban (2009) | 140.11 | 145.15 | 156.93 | 164.54 | 155.01 | 187.16 | 206.31 |
| Indonesia Rural (2011) | 27.95 | 31.63 | 39.79 | 45.14 | 34.62 | 49.16 | 58.02 |
| Indonesia Urban (2011) | 30.16 | 33.90 | 42.33 | 47.55 | 37.95 | 54.52 | 63.94 |
| Kazakhstan (2009) | 0.01 | 0.09 | 1.09 | 2.87 | 0.12 | 1.98 | 4.06 |
| Kyrgyz Republic (2011) | 0.46 | 0.70 | 1.23 | 1.61 | 0.80 | 1.55 | 2.08 |
| Lao PDR (2008) | 2.70 | 2.74 | 2.83 | 2.89 | 2.88 | 3.29 | 3.54 |
| Malaysia (2009) | 0.23 | 0.96 | 5.04 | 7.46 | 1.70 | 7.90 | 11.29 |
| Maldives (2004) | 0.01 | 0.02 | 0.06 | 0.08 | 0.03 | 0.08 | 0.11 |
| Micronesia Urban (2000) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Nepal (2010) | 9.16 | 9.62 | 10.69 | 11.37 | 10.15 | 12.39 | 13.78 |
| Pakistan (2007) | 54.73 | 57.81 | 65.02 | 69.67 | 61.61 | 77.24 | 86.80 |
| Papua New Guinea (1996) | 2.06 | 2.09 | 2.19 | 2.24 | 2.26 | 2.69 | 2.93 |
| Philippines (2009) | 23.12 | 25.83 | 31.93 | 35.69 | 28.77 | 40.81 | 47.55 |
| Sri Lanka (2009) | 1.47 | 2.57 | 4.75 | 6.20 | 3.22 | 6.60 | 8.79 |
| Tajikistan (2009) | 0.86 | 1.17 | 1.82 | 2.29 | 1.28 | 2.19 | 2.84 |

[2] Note: The heading of each column indicates which poverty line is used ($38 or $44), which other indicator is weighted (median or mean) and which weight is given to the absolute poverty line. The computations were based on the Shorrocks and Wan (2009) approach. Results based on the Kakwani and Podder (1973) approach are available upon request from the authors.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Thailand (2010) | 0.67 | 1.82 | 8.66 | 15.11 | 2.67 | 15.80 | 25.55 |
| Timor-Leste (2007) | 0.51 | 0.51 | 0.52 | 0.52 | 0.53 | 0.58 | 0.61 |
| Turkmenistan (1998) | 1.41 | 1.49 | 1.69 | 1.82 | 1.60 | 2.04 | 2.30 |
| Vietnam (2008) | 20.39 | 22.74 | 28.29 | 31.96 | 24.57 | 34.33 | 40.40 |

**Table 3: Poverty Gap Ratio in each country, depending on the weighting scheme.**

| Country | $38;median;100% | $38;median;90% | $38;median;66% | $38;median;50% | $38;mean;90% | $38;mean;66% | $38;mean;50% |
|---|---|---|---|---|---|---|---|
| Armenia (2010) | 0.00 | 0.01 | 0.03 | 0.05 | 0.01 | 0.05 | 0.08 |
| Azerbaijan (2008) | 0.00 | 0.00 | 0.01 | 0.04 | 0.00 | 0.03 | 0.07 |
| Bangladesh (2010) | 0.11 | 0.11 | 0.12 | 0.13 | 0.12 | 0.15 | 0.17 |
| Bhutan (2012) | 0.00 | 0.01 | 0.04 | 0.07 | 0.01 | 0.07 | 0.12 |
| Cambodia (2009) | 0.03 | 0.04 | 0.07 | 0.09 | 0.05 | 0.10 | 0.14 |
| China Rural (2009) | 0.05 | 0.06 | 0.09 | 0.11 | 0.07 | 0.13 | 0.17 |
| China Urban (2009) | 0.00 | 0.00 | 0.02 | 0.05 | 0.00 | 0.04 | 0.09 |
| Fiji (2008) | 0.01 | 0.02 | 0.05 | 0.08 | 0.02 | 0.09 | 0.15 |
| Georgia (2010) | 0.06 | 0.07 | 0.11 | 0.13 | 0.08 | 0.14 | 0.18 |
| India Rural (2009) | 0.08 | 0.08 | 0.09 | 0.10 | 0.09 | 0.12 | 0.14 |
| India Urban (2009) | 0.07 | 0.08 | 0.11 | 0.12 | 0.09 | 0.15 | 0.18 |
| Indonesia Rural (2011) | 0.02 | 0.03 | 0.06 | 0.08 | 0.04 | 0.09 | 0.13 |
| Indonesia Urban (2011) | 0.03 | 0.04 | 0.08 | 0.10 | 0.06 | 0.13 | 0.17 |
| Kazakhstan (2009) | 0.00 | 0.00 | 0.01 | 0.03 | 0.00 | 0.01 | 0.05 |
| Kyrgyz Republic (2011) | 0.01 | 0.02 | 0.04 | 0.07 | 0.02 | 0.06 | 0.10 |
| Lao PDR (2008) | 0.09 | 0.10 | 0.11 | 0.12 | 0.11 | 0.15 | 0.18 |
| Malaysia (2009) | 0.00 | 0.01 | 0.05 | 0.09 | 0.01 | 0.09 | 0.16 |
| Maldives (2004) | 0.00 | 0.01 | 0.04 | 0.07 | 0.01 | 0.07 | 0.12 |
| Micronesia Urban (2000) | 0.16 | 0.18 | 0.21 | 0.23 | 0.20 | 0.29 | 0.33 |
| Nepal (2010) | 0.05 | 0.06 | 0.09 | 0.10 | 0.07 | 0.11 | 0.14 |
| Pakistan (2007) | 0.03 | 0.04 | 0.06 | 0.08 | 0.05 | 0.09 | 0.12 |
| Papua New Guinea (1996) | 0.12 | 0.13 | 0.15 | 0.16 | 0.15 | 0.22 | 0.26 |
| Philippines (2009) | 0.04 | 0.05 | 0.09 | 0.11 | 0.06 | 0.14 | 0.18 |
| Sri Lanka (2009) | 0.00 | 0.01 | 0.04 | 0.06 | 0.01 | 0.07 | 0.11 |
| Tajikistan (2009) | 0.01 | 0.02 | 0.05 | 0.07 | 0.02 | 0.06 | 0.10 |
| Thailand (2010) | 0.00 | 0.00 | 0.02 | 0.05 | 0.01 | 0.05 | 0.11 |
| Timor-Leste (2007) | 0.09 | 0.09 | 0.11 | 0.11 | 0.10 | 0.13 | 0.16 |
| Turkmenistan (1998) | 0.07 | 0.08 | 0.11 | 0.13 | 0.09 | 0.15 | 0.18 |
| Vietnam (2008) | 0.03 | 0.05 | 0.07 | 0.10 | 0.05 | 0.10 | 0.14 |

**Table 3(cont.): Poverty Gap Ratio in each country, depending on the weighting scheme[3].**

| Country | $44;median;100% | $44;median;90% | $44;median;66% | $44;median;50% | $44;mean;90% | $44;mean;66% | $44;mean;50% |
|---|---|---|---|---|---|---|---|
| Armenia (2010) | 0.14 | 0.11 | 0.09 | 0.09 | 0.11 | 0.10 | 0.12 |
| Azerbaijan (2008) | 0.14 | 0.10 | 0.06 | 0.07 | 0.09 | 0.07 | 0.09 |
| Bangladesh (2010) | 0.23 | 0.22 | 0.20 | 0.19 | 0.22 | 0.22 | 0.22 |
| Bhutan (2012) | 0.14 | 0.11 | 0.09 | 0.10 | 0.10 | 0.11 | 0.14 |
| Cambodia (2009) | 0.16 | 0.15 | 0.14 | 0.14 | 0.15 | 0.16 | 0.18 |
| China Rural (2009) | 0.17 | 0.17 | 0.16 | 0.16 | 0.17 | 0.19 | 0.21 |
| China Urban (2009) | 0.14 | 0.10 | 0.07 | 0.08 | 0.09 | 0.08 | 0.11 |
| Fiji (2008) | 0.14 | 0.12 | 0.11 | 0.12 | 0.12 | 0.14 | 0.18 |
| Georgia (2010) | 0.18 | 0.17 | 0.17 | 0.17 | 0.18 | 0.19 | 0.21 |
| India Rural (2009) | 0.19 | 0.19 | 0.17 | 0.16 | 0.19 | 0.19 | 0.19 |
| India Urban (2009) | 0.19 | 0.19 | 0.18 | 0.17 | 0.19 | 0.21 | 0.22 |
| Indonesia Rural (2011) | 0.15 | 0.14 | 0.13 | 0.13 | 0.14 | 0.15 | 0.17 |
| Indonesia Urban (2011) | 0.16 | 0.15 | 0.15 | 0.15 | 0.16 | 0.18 | 0.21 |
| Kazakhstan (2009) | 0.14 | 0.10 | 0.05 | 0.05 | 0.09 | 0.05 | 0.07 |
| Kyrgyz Republic (2011) | 0.14 | 0.12 | 0.11 | 0.11 | 0.12 | 0.12 | 0.14 |
| Lao PDR (2008) | 0.21 | 0.20 | 0.19 | 0.18 | 0.21 | 0.21 | 0.22 |
| Malaysia (2009) | 0.14 | 0.09 | 0.08 | 0.11 | 0.08 | 0.12 | 0.17 |
| Maldives (2004) | 0.14 | 0.11 | 0.09 | 0.10 | 0.10 | 0.11 | 0.14 |
| Micronesia Urban (2000) | 0.27 | 0.27 | 0.26 | 0.26 | 0.28 | 0.32 | 0.35 |
| Nepal (2010) | 0.18 | 0.17 | 0.16 | 0.15 | 0.17 | 0.18 | 0.19 |
| Pakistan (2007) | 0.16 | 0.15 | 0.14 | 0.13 | 0.15 | 0.16 | 0.16 |
| Papua New Guinea (1996) | 0.24 | 0.23 | 0.22 | 0.22 | 0.24 | 0.27 | 0.30 |
| Philippines (2009) | 0.16 | 0.16 | 0.15 | 0.16 | 0.16 | 0.19 | 0.22 |
| Sri Lanka (2009) | 0.14 | 0.12 | 0.10 | 0.10 | 0.11 | 0.12 | 0.14 |
| Tajikistan (2009) | 0.14 | 0.12 | 0.11 | 0.11 | 0.12 | 0.12 | 0.13 |

[3] Note: The heading of each column indicates which poverty line is used ($38 or $44), which other indicator is weighted (median or mean) and which weight is given to the absolute poverty line. The computations were based on the Shorrocks and Wan (2009) approach. Results based on the Kakwani and Podder (1973) approach are available upon request from the authors.

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|---|---|---|---|---|---|---|---|
| Thailand (2010) | 0.14 | 0.10 | 0.07 | 0.08 | 0.09 | 0.09 | 0.13 |
| Timor-Leste (2007) | 0.20 | 0.20 | 0.18 | 0.17 | 0.20 | 0.20 | 0.21 |
| Turkmenistan (1998) | 0.19 | 0.18 | 0.18 | 0.17 | 0.19 | 0.20 | 0.22 |
| Vietnam (2008) | 0.16 | 0.15 | 0.14 | 0.14 | 0.16 | 0.16 | 0.18 |

## 4. Conclusions:

Given the growing literature on the influence of reference groups on life satisfaction or satisfaction with income, this paper, following previous work (see, Chakravarty et al., 2014) of a more theoretical nature linking the poverty line to reference groups, attempted to estimate to what extent measures of poverty such as the headcount ratio or the poverty gap index would be affected when an absolute poverty line is adjusted to take into account the existence of reference groups. Given the scarcity of available data on reference groups it was assumed that either the median or the mean income would be the reference income but several scenarios were considered which differed by the weight given respectively to the absolute poverty line ($38 or $44) and to the reference income (the median or the mean). This empirical analysis covered many Asian countries, generally around the year 2010. Given the well-known asymmetry of an income distribution the adjustment of the poverty line was evidently higher when the reference income was the mean rather than the median and the adjusted headcount ratios were clearly higher when the absolute poverty line was $44 rather than $38 a month. This paper presented the results of only four weighting schemes (giving a weight of 100%, 90%, 66% and 50% to the absolute poverty line), other weights can easily be introduced. The choice of these weights should clearly be guided first by the empirical evidence , at this stage very scarce, about the importance individuals give to the income of other individuals, second by budgetary and political constraints which policy makers face, since increasing the number of poor has evident financial as well as political consequences.

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