Quantifying the Magnitude and Severity of Absolute Poverty in the Developing World in the Mid-1980s

Martin Ravallion
Gaurav Datt
Domirique van de Walle
and
Elaine Chan

Aggregate poverty would fall fairly rapidly if moderate growth in average consumption levels could be sustained and the poor could share at least proportionally in that growth. But it would take only small adverse shifts in the world distribution of income to wipe out the potential gains to the poor from economic growth.
The authors estimate that about one in five persons in the developing world did not attain a consumption level of $23 per month in 1985 adjusted to constant $US purchasing power. About one in three persons did not attain a consumption level of $31 per month. They argue that a strong case can be made for treating the $23 figure as a reasonable lower bound for an absolute poverty line, while $31 is of interest as a common poverty line in low-income countries.

They find that the average consumption of the poor in the developing world was about 30 percent below either poverty line. This may be a very significant gap for a poor person. But, despite the large numbers of poor, the aggregate gap turns out to be a very small proportion of world consumption; for example, the aggregate poverty gap of the developing countries at the $31 poverty line is about 1.5 percent of the aggregate consumption of the non-socialist countries, falling to a mere 0.5 percent for the lower poverty line.

The authors find that aggregate poverty in the developing world will respond fairly elastically to economic growth, provided that the poor share at least proportionately in that growth. For example, a 1 percent annual growth rate at all income levels will reduce the proportion of the population that is poor by about 2 percent per year. If annual population growth rates stay at about 2 percent or lower, the total number of poor will decline.

However, the authors' results also suggest that even a seemingly modest worsening in distribution could upset this progress in poverty alleviation. For example, if the same 1 percent growth rate in average consumption was associated with only a 0.25 percent annual increase in the world Gini index of inequality, the reduction in the poverty gap attainable through growth would be virtually eliminated. Such a rate of increase in the world Gini index has been observed over recent decades, associated with the relatively low growth rates of a number of the poorest countries. In this case, the number of persons who do not attain even the most meager consumption levels would almost certainly increase.

On the other hand, a pattern of growth more favorable to the poor could rapidly accelerate global poverty reduction. The authors consider a rate of decrease in the world Gini index of 0.25 percent per year, roughly equivalent to a transfer of one-third of 1 percent of the world's mean income from the better-off half to the poorer half of the world's population. This would roughly double the rate of decrease in the aggregate poverty gap (measured against their higher poverty line) associated with a 1 percent annual growth rate in mean consumption of the developing countries. Instead of the decrease of 2.2 percent per year we could expect with distributionally neutral growth, we would see the poverty gap fall at an impressive annual rate of 4.5 percent.
Quantifying the Magnitude and Severity of Absolute Poverty in the Developing World in the Mid-1980s*

by
Martin Ravallion, Gaurav Datt,
Dominique van de Walle, and Elaine Chan

Table of Contents

1. Introduction 1
2. Approaches to Defining an "Absolute Poverty Line" 2
3. An International Comparison of Poverty Lines 4
4. Poverty Measures and their Estimation from Distributional Data 8
5. Extrapolations When Distributional Data are Unavailable 15
6. The Estimates of Aggregate Poverty in the Developing Countries 17
7. An Alternative Estimate Based on the Berry et al., World Lorenz Curve 20
8. Some Implications 21
9. Conclusions 26

Tables 31
Appendices 34
Notes 37
References 39
Figures 41

* This was prepared as a Background Paper for the World Bank's World Development Report 1990.
1. **Introduction**

In counting the poor, and measuring the severity of absolute poverty, one faces a number of difficult questions. What poverty line should be used? Should one use the same poverty line across all countries? How should one adjust for differences across countries in the purchasing power of their currencies at official exchange rates? How should one interpolate from the available grouped data on the distribution of income? How should one extrapolate to countries for which distributional data are unavailable, or are highly imperfect? And, after answering these questions: What can we really learn from the static picture of poverty about the prospects for future poverty reduction?

This paper proposes a methodology for addressing these questions, and gives aggregate results for 86 developing countries in the mid-1980s. Our aim is to make a necessarily rough but methodologically consistent assessment of the magnitude and severity of absolute poverty, based on recent available data.

The following section suggests three possible interpretations of an "absolute poverty line" which might be considered appropriate for our purpose. This is followed in section 3 by an empirical examination of poverty lines for a number of countries, both developing and developed. This is used to identify two poverty lines for the subsequent analysis. Section 4 discusses issues which arise in measuring poverty from readily available data on income distributions, while section 5 outlines our approach to measuring poverty in countries for which such data are not available. Section 6 presents and discusses our estimates of the prevalence and severity of absolute poverty in the developing countries in the mid-1980s. An alternative, largely
2. Approaches to Defining an "Absolute Poverty Line"

Different societies have different perceptions of what constitutes "poverty", reflecting (in part) different overall levels of living. Our aim here is only to quantify the extent of absolute poverty in the developing world, interpreted as the inability to attain consumption levels which would be deemed adequate in only the poorest countries. This will leave out many persons who are clearly deprived relative to others around them.

There are a number of possible interpretations of an "absolute poverty line" for cross-country comparisons. Three possibilities can be suggested:

i) One can pick the cost of a bundle of goods which is reasonably well recognized as constituting an absolute minimum by international standards. The poverty line of India has been widely used for this purpose, and that alone makes its continued use compelling. But why India's poverty line, and not that of some other country? We should at least know how sensitive poverty counts may be to that choice. One might also argue that the poverty line for any country should reflect standards of that country. Two less arbitrary approaches can be suggested.

ii) In principle, one can think of the real poverty line as comprising an "absolute" component which is constant across all countries, and a "relative" component, which is specific to each country. In seeking to measure the extent of absolute poverty one might simply ask: What is the lowest real
poverty line observed in any country? This would seem to be a good indicator of the minimum acceptable poverty line in assessing absolute poverty. However, the answer may be quite sensitive to the particular countries surveyed and the inevitable measurement errors in assessing local poverty lines, and in comparing them across countries. It will also be influenced by inter-country differences in non-income factors; a country with good public services benefiting the poor, or a relatively low-cost climate, will naturally have a lower income poverty line. In the light of these considerations, a better approach is to try to assess a "typical" poverty line amongst the poorest countries. To implement this approach empirically, we can assume that the relative component for any country is largely determined by its mean income, though we allow the possibility of other factors (such as access to public services) which may also influence the poverty line. Thus we write the poverty line \( z \) as:

\[
z = z(\mu, \epsilon)
\]

where \( \mu \) is the mean income and \( \epsilon \) denotes an unobserved random variable with zero mean, reflecting the non-income factors and measurement errors in \( z \). A natural interpretation of the "absolute poverty line" is \( z(\mu_{\text{min}}, 0) \), where \( \mu_{\text{min}} \) is the lowest observed mean income. Equation (1) might also be used to define local poverty lines, including for those countries for which \( z \) has not been estimated, but \( \mu \) is known.

iii) Building on the above argument, one can suggest a rather different interpretation of an "absolute poverty line" for cross-country comparisons. Suppose, in particular, that there exits a unique fixed point of equation (1), denoted \( z^* \), such that
\[ z^* = z(z^*, 0) \quad \text{and} \quad z \geq \mu \quad \text{if and only if} \quad z \leq z^* \]

The meaning of \( z^* \) can be understood as follows. Consider countries with "typical" values of the non-income factors \((\varepsilon = 0)\), and with \( \mu > z^* \). A resident with the average income in such a country is not poor by the standards of that country. Or, equivalently, if the average income could be equally distributed, nobody would be poor in that country. Consider instead a resident with the mean income of some country with \( \mu < z^* \); that person is poor by the standards of that country - if the average income could be equally distributed everyone would be poor. For cross-country comparisons, \( z^* \) is thus one possible candidate for an absolute poverty line, interpreted as the level of income below which a "typical" citizen of a country would be deemed "poor" by the standards of that country.¹

In the empirical work we will quantify each of these approaches to the definition of an absolute poverty line.

3. **An International Comparison of Poverty Lines**

Many countries now have reasonably well established (though rarely uncontroversial) local poverty lines. From a wide range of sources within and outside the World Bank, we have compiled the local poverty lines for 33 countries, both developing and developed. These should not be considered as "official" poverty lines, either of the governments or the Bank. Many are the estimates of independent researchers. Nor has our survey been exhaustive; there are undoubtedly credible poverty lines we do not know about. When more than one poverty line was found (such as for urban and rural areas), the lowest was used. Appendix 1 gives the results and sources.
There are very likely to be measurement errors in our series on poverty lines, either because of the incompleteness of our survey, or errors in the primary data. However, to the best of our knowledge, those errors are random and, in particular, uncorrelated with average incomes. Thus we do not believe that these errors will bias our econometric estimates, and hence, our estimates of the absolute poverty line for cross-country comparisons.

In converting local poverty lines to a common currency, and indeed for all such comparisons in this study, we have used the estimates presented by Summers and Heston (1988) of the adjustments to official exchange rates needed to give purchasing power parity (PPP). Ideally one would like to construct new PPP rates for the prices most relevant to the absolute poor, in which the prices of food-staples would clearly carry a high weight.

The results of our survey of poverty lines are plotted against mean incomes in Figure 1. Mean income is measured by private consumption per capita, and both variables are for 1985 and are measured at PPP, using local CPI's when necessary. Figure 2 gives a "blow-up" of the part of Figure 1 for developing countries only. India's poverty line is $0.4 per person per month.

There is a clear tendency for the local poverty line to increase with mean income, though dispersion in poverty lines at most income levels is also evident, presumably reflecting non-income factors and/or measurement errors. The poverty line is below the mean in all cases. The Figure also gives our fitted values of the poverty lines. In modelling the variation in poverty lines we assume the following semi-log functional form for equation (1):

\[ \log(z_i) = \beta_0 + \beta_1 \mu_i + \beta_2 (\mu_i)^2 + \epsilon_i \quad i=1,...,33 \]  

(3)