

Dotter, Caroline

**Working Paper**

## Can the World Bank's international poverty line reflect extreme poverty?

Discussion Papers, No. 232

**Provided in Cooperation with:**

Courant Research Centre 'Poverty, Equity and Growth in Developing and Transition Countries',  
University of Göttingen

*Suggested Citation:* Dotter, Caroline (2017) : Can the World Bank's international poverty line reflect extreme poverty?, Discussion Papers, No. 232, Georg-August-Universität Göttingen, Courant Research Centre - Poverty, Equity and Growth (CRC-PEG), Göttingen

This Version is available at:

<https://hdl.handle.net/10419/162855>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# **Courant Research Centre**

## **‘Poverty, Equity and Growth in Developing and Transition Countries: Statistical Methods and Empirical Analysis’**

**Georg-August-Universität Göttingen**  
(founded in 1737)



Discussion Papers

**No. 232**

### **Can the World Bank's International Poverty Line reflect extreme poverty?**

**Caroline Dotter**

**July 2017**

Platz der Göttinger Sieben 5 · 37073 Goettingen · Germany  
Phone: +49-(0)551-3921660 · Fax: +49-(0)551-3914059

Email: [crc-peg@uni-goettingen.de](mailto:crc-peg@uni-goettingen.de) Web: <http://www.uni-goettingen.de/crc-peg>

# Can the World Bank’s International Poverty Line reflect extreme poverty?

Caroline Dotter\*

## Abstract

The World Bank’s international poverty line has been a success in drawing the attention of policymakers and media to the issue of poverty. This paper summarises the main critique in the literature and adds some additional insights, pointing out the weak database for the estimation of the international poverty line. The author also shows how poverty outcomes at the country level diverge when the international and respective national poverty lines are applied. For poorer countries, we observe a significant over- as well as underestimation of poverty at similar levels of mean consumption. The international poverty line can therefore not fulfil its own claim of being representative of the poverty lines of poor countries. One also needs to question whether this poverty line can be considered as a measure of “extreme poverty” in the sense of the SDGs. Summarising all the issues in the estimation process of this measure, the author argues that the simple average of fifteen poverty lines of varying quality chosen through a statistically inaccurate estimation cannot represent a global standard of extreme poverty. These issues gain momentum as the World Bank recently published new (but not improved) global poverty counts exhibiting the identical issues as earlier poverty estimations.

**Keywords:** poverty, international poverty line, poverty estimation

---

\*This chapter has benefitted from comments by seminar participants at an OPHI–University of Goettingen workshop. I would also like to thank Stephan Klasen, James Foster, Jose Manuel Roche, Isis Gaddis, and my colleagues at the chair for helpful comments.

# 1 Introduction

The World Bank's international poverty line has been successful in drawing attention to global poverty and putting the issue on the global agenda. This measure was one of the main indicators of the MDGs and is now indicator number one of the new SDGs. The international poverty line produces a clear, easily communicable, headline figure that can be tracked over time. Due to its (allegedly) clear meaning, it appeals to politicians, the media, and the lay public alike.

When using this measure one should be aware of its limitations. Many users, however, are not familiar with its estimation process and the associated problems. This paper aims to summarise the main points of critique in the literature and tries to add some additional insights. I argue that the \$1-a-day poverty line provides a rather crude estimation of global poverty and is a conceptually weak measure.

The main discussion in the literature has primarily focused on the use of Purchasing Power Parities (PPPs) in the estimation of global poverty. Problems in the estimation of the PPPs will be reflected in inaccurate poverty outcomes. There are, however, additional issues in the estimation of the global poverty line. Replicating the international poverty line, Klasen et al. (2015) show that the estimation is statistically inaccurate.

Furthermore, the dataset used to estimate the global poverty line is dated and many national poverty lines used in the estimation cannot be considered reliable. The sample contains strongly relative poverty lines for extremely poor countries, such as Mali and Niger, and for several poverty lines in the sample no information on the underlying methodology can be obtained. This is problematic, as the international poverty line is the average of only 15 countries and the value of single data points has a huge impact in such a small sample.

In this paper, I show that poverty outcomes at the country level differ, at levels of up to 49 percentage points, depending on the poverty line applied (international or respective national poverty line). For the case of Tanzania, we observe a poverty incidence of 84.57% when applying the international poverty line and a poverty headcount of 35.7% when applying the respective national poverty line for the

year 2000/2001. For richer countries in the sample<sup>1</sup> the international poverty line could potentially be considered as a lower bound poverty line. However, for poorer countries (those with a mean private consumption expenditure per month below \$200) we observe an over- as well as underestimation of poverty at similar levels of mean consumption when the international poverty line is applied (compared to actual poverty outcomes when the national poverty line is applied).

It is doubtful whether the international poverty line may be considered as the “extreme poverty line” in the sense of the SDGs for these poorer countries. While the question what “extreme poverty” should constitute is open to debate; I argue that the average of (unreliable) poverty lines of a group of countries chosen through a statistically flawed estimation cannot credibly reflect a global concept of extreme poverty. Given the prominence of the international poverty line and its importance for development policy, this poverty standard should be abandoned in favour of a more reliable and consistent measure.

In the next section I will briefly outline the history of the \$1-a-day poverty line and how the World Bank arrives at this measure. In section 3, I summarise the main points of critique and add some additional insights. Section 4 shows the divergence between poverty outcomes when the international and national poverty lines are applied. Section 5 summarises and concludes.

## 2 Estimation of the \$1-a-day poverty line

The World Bank’s \$1-a-day poverty line dates back to the 1990 World Development Report (World Bank 1990). This was the first time the World Bank provided global poverty estimates. The line has been updated several times<sup>2</sup> in the last twenty years as new data became available, but the underlying methodology largely stayed the same.

The international poverty line is determined in the following way: First, poverty lines for developing and low-income countries are collected and converted to inter-

---

<sup>1</sup>The sample collected by Ravallion et al. (2009) for the estimation of the international poverty line.

<sup>2</sup>Ravallion et al. (1991), Ravallion & Chen (1996), Chen & Ravallion (2000), Ravallion et al. (2009).

national dollars using the latest PPP estimates<sup>3</sup>. In the second step the relationship between average consumption in a country (derived from national accounts) and the level of the poverty line is estimated.

Ravallion et al. (2009) argue that all poverty lines in the sample capture an absolute and a relative component of poverty. This is the reason why we observe higher poverty lines in better-off countries, even though these poverty lines are also deemed absolute. The poor in better-off countries often consume more expensive calories and may spend more on non-food items.

The authors argue that this absolute component of the poverty line can be identified when focusing solely on poverty lines unresponsive to changes in expenditures. This applies to poverty lines found in the poorest countries (as defined through private expenditure in the national accounts). Based on these ‘absolute’ national poverty lines, a poverty line “representative of the poverty lines found amongst poor countries” (Ravallion et al. 2008, p. 12) is determined. The methods applied to identify this group of extremely poor countries differed across poverty estimations.

In the first poverty estimation for the 1990 World Development Report, Ravallion, Datt and van de Walle (1991) collected poverty lines for 33 countries from both academic and official sources and used a poverty line shared by 6 poor countries (Indonesia, Bangladesh, Nepal, Kenya, Tanzania, Morocco) as the global poverty line. This line equated \$1.01 per day at 1985 PPP prices. Chen and Ravallion (2001) updated this line as new PPP estimates (ICP 1993) became available and used the median line of the poorest 10 countries in the original dataset. They arrive at a line of \$1.08 per day.

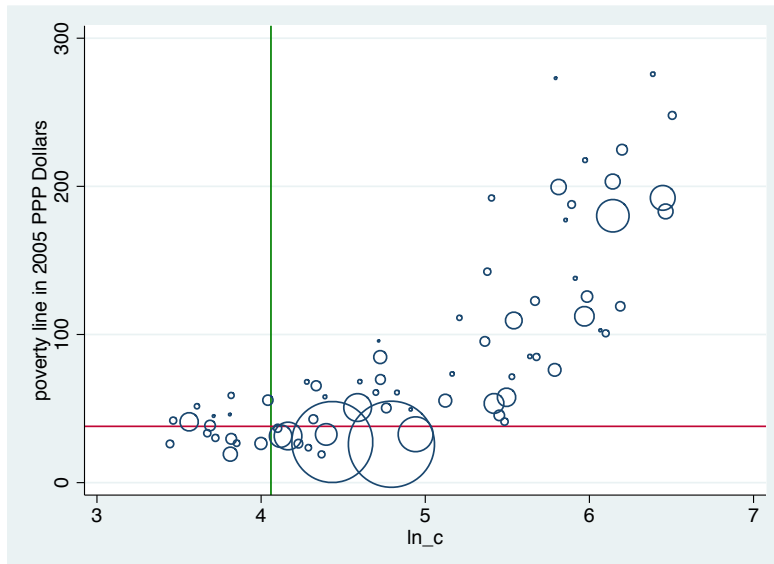
In 2009, Ravallion, Chen and Sangraula collected a new dataset for 74 countries and used newly available PPP estimates (ICP 2005) to convert the poverty lines into international dollars. They estimated a threshold model to determine the group of countries with absolute poverty lines. The relationship between mean consumption levels and national poverty lines is presented in Figure 1. There we can differentiate a relatively flat part and a part with a positive gradient.

---

<sup>3</sup>For the initial global poverty estimation, the authors used PPP estimates from the 1985 Penn World Tables (Summers & Heston 1988). Later estimations referred to the latest ICP rounds 1993 and 2005.

The threshold model identifies a group of 15 countries with national poverty lines

Figure 1: Relationship between consumption and national poverty lines



unresponsive to changes in expenditure. These are the countries left to the green vertical line in Figure 1. To average out country-specific effects and idiosyncratic errors, the mean poverty line of these 15 countries is taken as the global absolute poverty line. Their international poverty line is set at \$1.25 at 2005 PPP estimates (red horizontal line in Figure 1).

IN 2015, the World Bank has provided new poverty estimates based on the 2011 PPP estimates. To ensure maximum comparability of the international poverty line over time, the World Bank team refrained from updating the whole dataset and re-estimating the relationship between PCE and national poverty lines. They have simply updated the poverty lines of the 15 poorest countries, identified in the previous poverty line estimation, using estimates from the 2011 ICP round. The updated international poverty line is identified as the rounded average of these 15 lines, \$1.90 at 2011 PPP estimates (Ferreira et al. 2015).

With every new ICP round, we have thus witnessed the introduction of a new global poverty line and new global poverty estimates. While the frequent update of the poverty line may have created a certain amount of confusion as to whether one can still speak of the same poverty targets the World Bank argues that one

should not ignore newly available and arguably better data in the global poverty estimation.

## 3 Critique

### 3.1 General Issues

Briefly summing up the difficult task of global poverty comparisons, Ferreira et al. (2015, p.2) state that the global poverty measurement aims to compare the “standards of living of widely different peoples, consuming vastly different goods and services, all priced in different currencies”. With the method currently applied, however, the World Bank only tackles the issue of prices. Even this issue is dealt with insufficiently.

A global poverty line has to compare the extremely different living situations of a Siberian Lumberjack with a Vietnamese street cook, or a Peruvian miner with a Jamaican fisherman. These vastly different men and women have different calorific needs because of their very different constitution and their occupational choice. They consume very diverse diets due to local customs and supply. Finally, they face different food shares in expenditures: Due to a more adverse environment in Siberia and Peru, even the extremely poor need to spend a significantly higher share of their total expenditure on non-food items, such as shelter and heating.

The difficulty of such a global poverty comparison is obvious, yet the World Bank’s international poverty line does not account for the vastly different living circumstances of the poor across the world. In contrast, an identical measure is applied across countries (insufficiently accounting for price differences). However, we do know that we already observe significant differences in diet, constitution, and food shares within small countries.

Take the example of Mozambique: Using the cost-of-basic-needs (CBN) approach different poverty lines have been identified for 13 different regions to account for differences within the country. 13 region-specific food bundles have been identified that fulfil the same calorific requirement of 2150 kcal per capita. Similarly, the weighted average of non-food consumption is also calculated separately for these 13 regions. The resulting food share in the poverty line varies between 63% for



the capital Maputo city and 81% for the rural area in the region Manica and Tete. The highest total poverty line applied in Maputo city (19.515 Meticaais per person per day) is more than three times the monetary value of the poverty line in rural Nampula (5.972 Meticaais per person per day) (World Bank 2008).

These poverty lines are considered absolute and are developed using the tried and tested CBN method, yet such dramatic differences are observed for a country with less than 20 million inhabitants (at the time of the survey, 2003). The food share in the sample used to estimate the \$1-a-day line varies between a low 28% for Brazil and nearly 80% for countries such as Chad and Cambodia. Though caloric requirements for most poverty lines refer to the same WHO report (WHO 1985), they vary dramatically across countries. We observe dietary requirements as low as 1950 kcal per person for urban Pakistan, and as high as 3000 kcal per adult equivalent for Uganda. The varying requirements are due to a different demographic composition across countries and different occupational choices. Nevertheless, these differences across countries are ignored once the international poverty line is estimated.

Moreover, the global poverty line is a per capita measure and cannot account for a varying demographic composition across countries. This not only affects the expected food intake, but non-food consumption is also affected by economies of scale. In effect, poverty in countries with large households and with a younger population may be overstated relative to regions with smaller households and less children (e.g. China).

### **3.2 Problematic use of PPPs**

The main line of critique in the literature and a problem already realized by Ravallion et al. (1991, p.347) is the use of the Purchasing Power Parities (PPP) to convert national poverty lines and income levels. When estimating PPPs, one needs to make several decisions about which assumptions to follow. All of these assumptions may be reflected in the poverty outcomes.<sup>4</sup>

In estimating the global poverty line and converting this line into local currency units, the World Bank relies on PPP estimates from the International Comparison

---

<sup>4</sup>For a detailed discussion refer to Deaton & Heston (2010) and Ravallion (2010) reply to their paper.

Program (ICP). First, they convert national poverty lines and national account estimates into international dollars to estimate the global poverty line. This global poverty line must then be converted into local currency units and deflated using local CPIs before it can be applied at national household surveys. Recent ICP rounds prompted huge changes in the global poverty line and to an extent in global poverty outcomes. This is certainly one reason why the use of PPPs has been vocally criticised.

There are several issues associated with using PPPs in poverty analysis. While this section does not aim to provide a full account, I try to summarise the discussion of the most pertinent issues.

**PPPs insufficiently reflect prices faced by the poor** The ICP relies on local national account estimates to identify appropriate expenditure weights in the estimation of the price index. The quality of the national accounts data for many low-income countries remains very weak however, and it is questionable how much can be inferred from them. More importantly, when using these weights one only compares *mean* consumption. Hence, these weights may not necessarily reflect the consumption patterns of the poor.<sup>5</sup> An alternative would be to calculate PPP conversion factors based on the actual consumption patterns of the poor. These so-called PPPP (Purchasing Power Parities for the Poor) would be more appropriate for estimating poverty.

Ravallion et al. (2008) addressed this problem and used the food component of aggregate consumption PPPs, a strategy also suggested by Reddy & Pogge (2010). On re-estimating the absolute poverty line, they arrive at a lower absolute poverty line of \$0.73 per day (\$22.74 per month). However, setting the weight of consumption of non-food goods to zero is quite problematic in and of itself, as the mean food share for national poverty lines in the sample is 0.564, with the mean share for the 20 poorest countries being 0.653 (Ravallion et al. 2008).

On a global scale, the food share across countries varies a lot. In the sample<sup>6</sup> we already observe the food share varying between a low 28% for Brazil and nearly 80% for countries such as Chad and Cambodia. Thus, using food-PPPs

---

<sup>5</sup>This should pose less of a problem in very poor countries, where the mean consumer is poor.

<sup>6</sup>the food share is only available for 55 of the 74 countries.

may strongly bias (potentially underestimate) the global poverty line. A more appropriate method would be to re-weight prices according to actual consumption patterns of the poor.

Deaton & Dupriez (2011) have pursued this approach and estimated global poverty weighted PPPs using household surveys from 62 developing countries. They find that PPPs for the poor are very similar to ordinary PPPs for their sample of 62 countries. Existing differences are mostly due to data inconsistencies between household surveys and national accounts, rather than from a misled weighting procedure. Thus, the main problem appears to be the missing accuracy of national accounts and its questionable representation of actual consumption habits.

**Practical difficulties in estimating price data** Moreover, one needs to be aware of practical difficulties comparing price data. In the 2005 ICP round considerable effort has been devoted to ensuring the comparability of goods. In earlier PPP rounds, the so-called quality bias<sup>7</sup> may have underestimated PPPs in poor countries (Ravallion, 2010). This however comes at the price that the surveyed goods may be less representative for the local people, and thus may be less meaningful for comparing consumption bundles of the poor.<sup>8</sup>

This problem has been somewhat attenuated in the most recent ICP round. In this round, regional lists of representative goods were first collected and then summarised on a global list. The goods compared in this ICP round may therefore be arguably more representative of local consumption patterns (Deaton & Aten 2014).

Furthermore, the way “comparison-resistant” items were priced may also have a significant effect on comparing poverty lines. Goods and services for which it is difficult to observe market prices are referred to as “comparison-resistant”. This includes housing rents, government services, as well as health and education expenditures. Especially the way housing rents influence PPPs is problematic. For

---

<sup>7</sup>The fact that brain surgery in Cameroon may be of lower quality than brain surgery in Hong Kong.

<sup>8</sup>This has been nicely summed up by Deaton and Heston (2010), “[PPP]s may be more accurate as an estimate of the relative costs of a Hong Kong businessman posted to Cameroon than as an estimate of the relative costs of living in the two countries.”

the African and Asian regions, the 2005 ICP had to fall back on imputation. For several countries these imputed expenditures have been incredibly low however. Deaton (2010) re-estimated PPPs assuming that the expenditure share of rents was identical across countries. This raises the PPP in Africa and Asia and reduces the global poverty count by more than 100 million people. While it may be problematic to attach an identical weight to housing across countries<sup>9</sup>, Deaton's exercises shows how important it is to have an appropriate method to identify prices for comparison-resistant items.

In the 2011 ICP, great emphasis was put on obtaining rental data. However, in economies without housing markets it is difficult to provide consistent data. For that reason, for the Asia and Pacific region the ICP imputed housing prices in the same way it did in 2005. For Africa and some other regions with scant housing data<sup>10</sup> they followed the strategy proposed by Deaton (2010) and assumed the same relative price of dwelling across countries (World Bank 2015). Although increased efforts were undertaken to appropriately price these comparison-resistant items in the new ICP round, the result is still far from ideal and potentially affects global poverty outcomes.

While there are valid arguments for and against each of these choices in estimating PPPs, they undoubtedly have a significant effect on poverty outcomes.

**Price differences within countries** The PPP estimate price indexes for the different countries. However, we also observe significant price differences *within* countries. Especially in poorer countries markets are usually not well integrated and transaction costs are high. National poverty assessments take this into account and adjust poverty lines using regional price indexes. In global poverty assessments this is largely ignored.

The most recent poverty estimation tries to account for rural-urban price variation in Indonesia, India, and China (Ferreira et al. 2015). However, for all other countries price differences across regions are ignored and even for Indonesia, India, and China a simple differentiation between urban and rural may not be sufficient, as prices vary across regions (Reddy & Lahoti 2015).

---

<sup>9</sup>Among other determinants, the climate will undoubtedly affect relative housing prices.

<sup>10</sup>Latin America, Carribean, West Asia

**CPI issues** Once the global poverty line is estimated and converted to local currency units using PPPs, it is deflated using local CPIs and then applied to national household surveys in order to estimate poverty. The World Bank does this backward estimation of poverty outcomes for all available years (at least until the 1990s). This approach is questionable for two reasons:

First, as noted by Reddy & Lahoti (2015), while the PPP is representative of relative prices of the world economy in the base year, this is not the case for earlier years. Relative prices within countries and the weight of countries in the world economy change and so do their respective PPPs. This is exactly the reason why we need repeated rounds of PPP estimations and are unable to simply extrapolate them. While we usually also observe methodological improvements in more recent rounds, it is unclear as to whether these improvements should in any way “outweigh” the observed changes in the world economy.

Secondly, the quality of local CPIs in non-OECD countries is often poor. They may be subject to political meddling, they are sometimes restricted to urban areas, and weights of the different items may be outdated (Deaton & Aten 2014). This may be one reason why the World Bank uses different deflators other than the CPI for some countries (Bangladesh, Cambodia, Lao, Iraq, Malawi, Tajikistan). However, their justification is somewhat weak and it is unclear why exactly these countries are chosen while the official CPI is used for others.

These problems are aggravated the older the national dataset used for estimating poverty is. First, the PPPs for the year 2011 are certainly less representative of the world economy in 1990 than say 2008. Moreover, the quality of local CPIs has been improved in recent years. Older CPIs in non-OECD countries are in general less trustworthy. Hence, the World Bank’s backward calculation of poverty outcomes is questionable and older poverty outcomes are simply less trustworthy.

### **3.3 Estimation issues**

As mentioned above (section 2), a threshold model is used to estimate the relationship between household consumption levels and the national poverty line. Applying this model, Ravallion et al. (2009) arrive at the reference group of 15 countries with “purely absolute” poverty lines.

Replicating the specification by Ravallion et al. (2009), Klasen et al. (2015) show that this estimation is inaccurate and that the claim of a simple linear relationship between consumption and the poverty line cannot be rejected. Thus, they find no evidence of a group of countries with absolute poverty lines. They go on to show that with a log-log specification there is indeed evidence of a kink in the relationship, however this would return a larger group of reference countries (19) and a slightly lower global poverty line of \$1.21 in 2005 PPP prices. Thus, the underlying estimation of the global poverty line is flawed.

Additionally, one needs to carefully discuss how to arrive at a poverty line that is representative of a group of countries (once a group of countries with poverty lines unresponsive to changes in consumption levels is identified). Without providing further justification, Ravallion et al. (2009) chose to take the simple average of these poverty lines. In fact, it is unclear as to whether a simple average is even appropriate here. For countries where the poverty line is identified at the subnational level (i.e. rural and urban poverty line or state-level poverty lines) a representative national poverty line is usually attained by taking the population-weighted average. This is also the strategy pursued by Ravallion et al. (2009) to arrive at national poverty lines for their dataset.

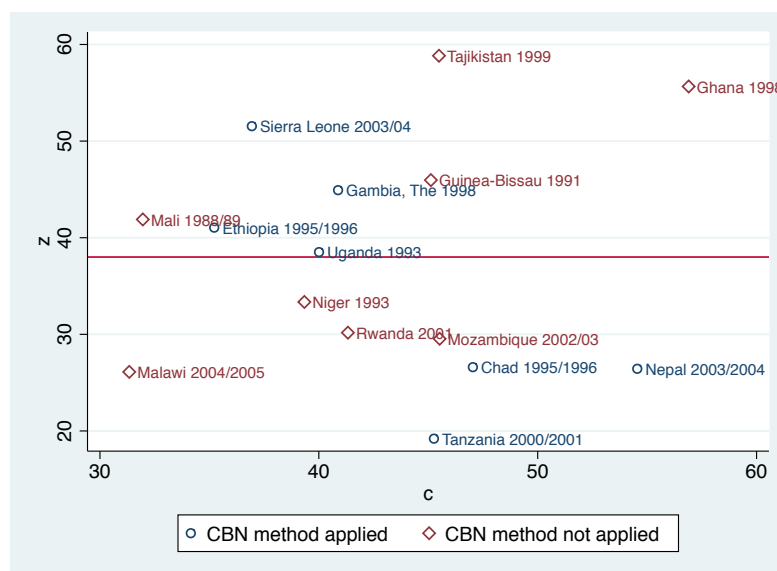
Deaton (2010) alternatively suggests weighing poverty lines by the number of poor people in each country and using all countries in the sample. This would certainly ensure that the result is a truly global poverty line, rather than an average of only 15 countries. One could also argue to weigh the poverty lines in a way that reflects their reliability and the methods used. This brings us to another point worth considering, the weak data base of the \$1-a-day poverty line.

### **3.4 Weak data base**

The new and the old global poverty lines are attained by averaging the national poverty lines of 15 countries in the sample of 74 countries. The overall sample is quite diverse. Poverty lines are as old as the one from Nigeria 1985/86, though the majority of poverty lines is from the 1990s. While the majority of the lines is developed using (some form of) the cost-of-basic needs approach, 12 % of the

sample consists of relative poverty lines and for 14 of the poverty lines the World Bank team has no information on the methodology used to arrive at these poverty lines <sup>11</sup>. This usually means that an official poverty line is used instead of one that has been determined together with the World Bank or the IMF. In some countries, these official poverty lines may be outdated or have been determined using disputable methods. Moreover, for 9 countries in the sample the urban poverty lines are used. This is problematic, as urban poverty lines are usually higher than the comparable national poverty lines.

Figure 2: Age and methods of poverty lines of the 15 poorest countries



Unfortunately, the sample of the 15 countries used in the estimation of the international poverty line is not qualitatively superior to the remainder of the dataset. The cost of basic needs method has only been applied in estimating seven of these fifteen poverty lines (cf. Figure 2). Three of these poverty lines are strongly relative: For Guinea-Bissau a poverty line has been set at 2/3 of mean expenditure (World Bank 1994); for Niger, the rural poverty line equals mean rural income, while the urban poverty line equals 77% of average urban income (World

<sup>11</sup>They have no information according to the data appendix in Ravallion et al. (2008). Checking the country reports, I can, however, assert that for three of these poverty lines (Bulgaria, Malawi, Mozambique) the CBN has been used.

Bank 1996); and in the case of Mali, the poorest 40% of the population (yearly per capita expenditure) are considered poor (World Bank 1993).

Relative poverty lines in these very poor countries are usually set lower than absolute poverty lines would. They cannot truly reflect actual poverty levels and are not anchored to a specific subsistence level. For Mali, this actually was the motivation behind choosing a relative poverty line for the national poverty assessment, as setting an absolute poverty line in such a poor country “would not be very meaningful from an operational perspective” (World Bank 1993, p.9) because it would return high poverty outcomes.

For three of these poverty lines, Malawi, Mozambique, and Tajikistan, the World Bank team has no information on the method used to determine the line. Checking the respective country reports, however, I find that in Malawi and Mozambique the cost-of-basic needs method has been applied. Only in the case of Tajikistan is there no further information on the method used to derive the poverty line provided. The poverty line used is the official poverty line provided by the state statistical agency.

The age of the poverty lines is quite mixed. Nine of these poverty lines are older than 15 years (cf. Figure 2). The problem with very old poverty lines in the sample is, that the food and non-food consumption patterns they aim to represent are rather outdated. Hence, they are less representative of consumption patterns of the poor *today* and will therefore perform worse in capturing poverty at present. The World Bank did not update the dataset to contain current poverty lines in its most recent poverty estimation. The old and the new global poverty lines may, therefore, do a fair job in capturing global poverty in the past<sup>12</sup>, but it is questionable if this poverty line can reflect poverty to date.

These country-specific issues are aggravated as the total data set is not very large. Only 15 countries are used to estimate the global poverty line. It is therefore questionable as to whether idiosyncratic errors can be averaged out. With such a small data set, each single data point has a huge impact.

---

<sup>12</sup>If we ignore all the other issues I discussed above.



### 3.5 Summary

Apart from the general problems in measuring global poverty (cf. section 3.1), the \$1-a-day poverty line has some issues particular to the decisions made in the estimation. While one can question the general approach the World Bank takes in developing a global poverty line, some of the decisions they take in the process of estimation could certainly be improved upon and need to be criticised carefully. These decisions may have a potentially huge impact on global poverty outcomes. The use of PPPs to convert the international poverty line to local currency units entails a slew of changes every time these PPPs are updated. The choices made in estimating PPPs are open to discussion and have a significant effect on global poverty outcomes. It is also questionable if PPPs are appropriate for converting poverty lines at all, as they do not aim to capture the consumption patterns of the poor population but reflect mean consumption. Moreover, price differences *within* countries are ignored. Finally, the World Bank deflates the international poverty line using local CPIs to apply the international poverty line to a national surveys. However, the quality of the CPI in non-OECD countries is often poor and the resulting outcome needs to be scrutinised.

Additionally, Klasen et al. (2015) show that the estimation of the global poverty line is incorrect. The group of reference countries the World Bank uses is therefore faulty. A different group of reference countries returns a new poverty line and global poverty outcomes. I argue moreover that the data base used for estimating the global poverty line is weak and that some of the national poverty lines used in the estimation are very old and/or unreliable. If one chooses the strategy of averaging poverty lines, the underlying data points should at least be reliable and representative.

## 4 Poverty levels when the international and national poverty lines are applied

In addition to the problems discussed in the previous section, I show that the global poverty line cannot fulfil its claim to measure poverty “[by] the standards of what poverty means in the poorest countries” (Ravallion et al. 2008, p. 23). I

assess whether this claim holds by comparing poverty levels in a set of countries when the \$1-a-day poverty line and respective national poverty lines are applied. As explained above (cf. section 2), the \$1-a-day poverty line is the average of poverty lines from the 15 poorest countries in the dataset. Thus, national poverty lines are used as original data points and are averaged in order to reduce measurement errors and idiosyncratic differences in the data and methods used. The underlying assumption is that the national poverty lines correctly capture the absolute poverty incidence at the country level and that the \$1-a-day poverty line is supposed to measure poverty “by the standards of the world’s poorest countries” (Ferreira et al. 2015, p.30).

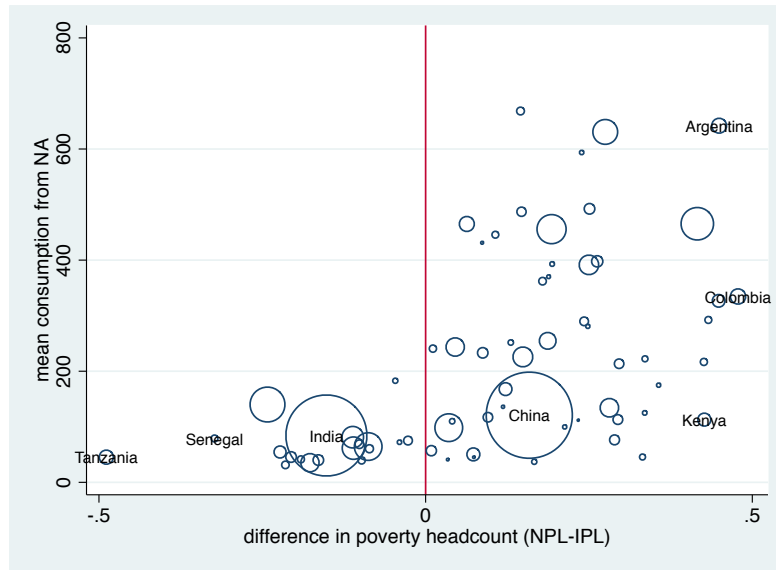
In the following analysis I will assess whether this claim holds by comparing poverty outcomes when the international poverty line and respective national poverty lines are applied. I will do so for the “old” international poverty line estimated by Ravallion et al. (2009) and will compare this to the poverty outcomes when the new global poverty line of \$1.90 is applied.

#### **4.1 Comparing poverty outcomes when the international poverty line is applied**

Figure 3 analyses the percentage point difference in the poverty headcount when the global and national poverty lines are applied. We observe that for richer countries the international poverty line appears to understate the number of the poor (compared to poverty outcomes when the national line is applied). This finding could be expected, as the international poverty line aims to be representative of poverty lines in poorer countries.

However, for countries with a mean consumption below \$200 per month, one cannot identify an obvious trend. For a similar mean consumption level we observe significant over- as well as underestimations of poverty. The divergence in the poverty headcount for these poorer countries is large. Following the line of argument of the World Bank that the international poverty line is representative of poverty lines in the poorest countries (cf. Ravallion et al. 2009, Ferreira et al. 2015), we would expect similar levels of national poverty at the same mean consumption levels.

Figure 3: Divergence in poverty headcount for whole sample



Analysing the difference in the poverty headcount for the 15 poorest countries (these are the countries with poverty lines used to derive the international poverty line), we observe a significant divergence in the poverty headcount for countries with nearly identical mean consumption levels (cf. figure 4). For the case of Tajikistan, with a mean consumption of \$45.49 we observe a poverty headcount of 49.4% if the international poverty line is applied. However, the World Bank’ national poverty assessment report finds a poverty headcount of 82.6% for the same year (1999).

In contrast, for Tanzania with a mean consumption of \$45.26 we observe a poverty headcount of 84.57% when applying the international poverty line and a poverty headcount of 35.7% when applying the respective national poverty line for the year 2000/2001. Thus, the \$1-a-day poverty line understates poverty levels by 32.7 percentage points for Tajikistan, while for Tanzania the \$1-a-day poverty overstates poverty levels by 49 percentage points.

We observe a similar pattern when the new international poverty line of \$1.90 is applied (ref. Figure 5). The World Bank used the same 15 countries as in the earlier round of poverty estimations to identify a global poverty line and claims that this global line is representative of poverty lines in these poorest countries.

Figure 4: Divergence in the poverty headcount for the 15 poorest countries when the \$1.25 poverty line is applied

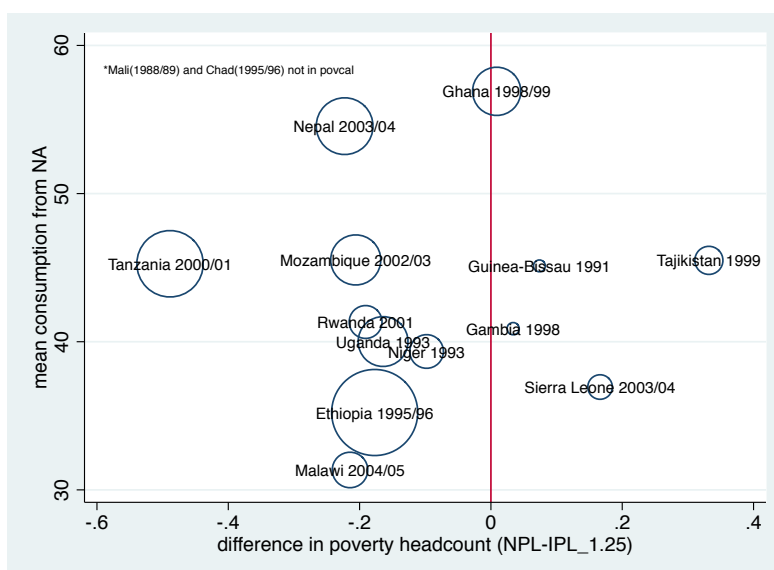
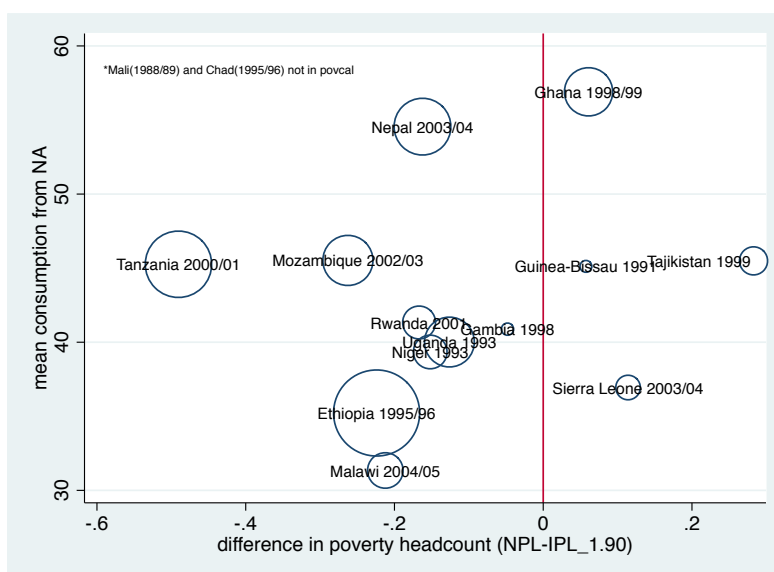


Figure 5: Divergence in the poverty headcount for the 15 poorest countries when the \$1.90 poverty line is applied



Although the global poverty line finds a higher poverty incidence in Tajikistan (54.32%), the divergence in poverty outcomes for these two cases is still significant. For Tajikistan the global poverty line understates poverty by 28.28 per-

centage points, while for Tanzania poverty is now overstated by 49.04 percentage points.

Only in the case of Gambia do we observe a reversion: While there is an underestimation of national poverty when the \$1.25-a-day line is applied (poverty headcount at 65.61%), we observe an overestimation of national poverty when the \$1.90-a-day line is applied (poverty headcount at 73.80%).

**Poverty gap** A similar picture is painted when we analyse the difference in the poverty gap instead of the poverty incidence.<sup>13</sup> The poverty gap can reflect the intensity of poverty as it measures the average depths of poverty in the population. Though the poverty gap is not available for all countries, we observe similar trends for poverty outcomes when the international and the national poverty lines are applied respectively. If the international poverty line underestimates (overstates) poverty incidence in a specific country, it also underestimates (overstates) the average poverty depths in this country. Not only are less (more) people in poverty, but they are on average closer (further away) to the poverty line.

The only exceptions in the dataset are China and Gambia where an underestimation in the poverty incidence is accompanied by an overestimation in the poverty gap. Apparently, a share of the population is located very close to the global poverty line and thus the *average* poverty depths is lower when the global poverty line is applied.

**Disaggregation by region** Disaggregating the difference in the poverty headcount by region<sup>14</sup>, one can observe that the international poverty line generally returns higher poverty levels in Asia than the national poverty lines. Moreover, applying the international poverty line “understates” national poverty levels in all other regions but Africa irrespective of mean consumption levels in these countries. Only for African countries is no general trend for over- or understating poverty

---

<sup>13</sup>The difference in the poverty gap is only available for 45 of the countries in the sample.

<sup>14</sup>The regional grouping follows the World Bank’s country and lending group classification (<http://data.worldbank.org/about/country-and-lending-groups>). The regions South and East Asia are combined into the grouping “Asia”.

Figure 6: Divergence in the poverty gap

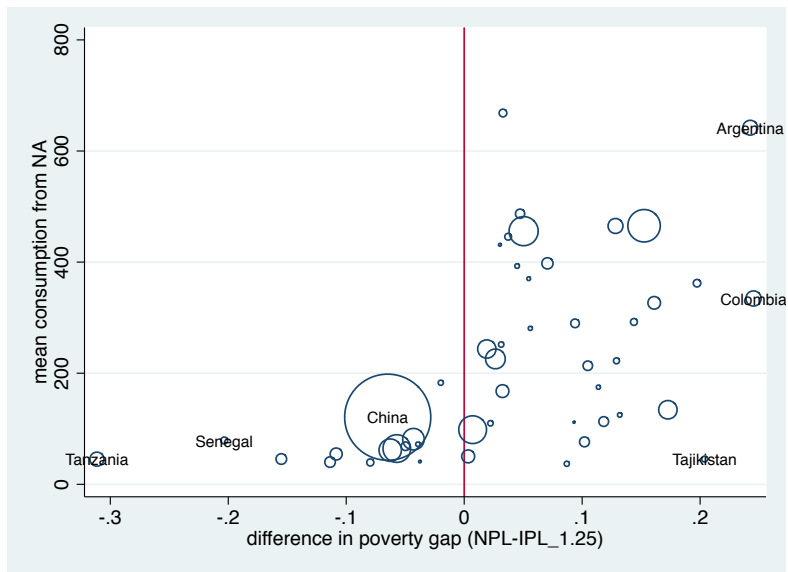
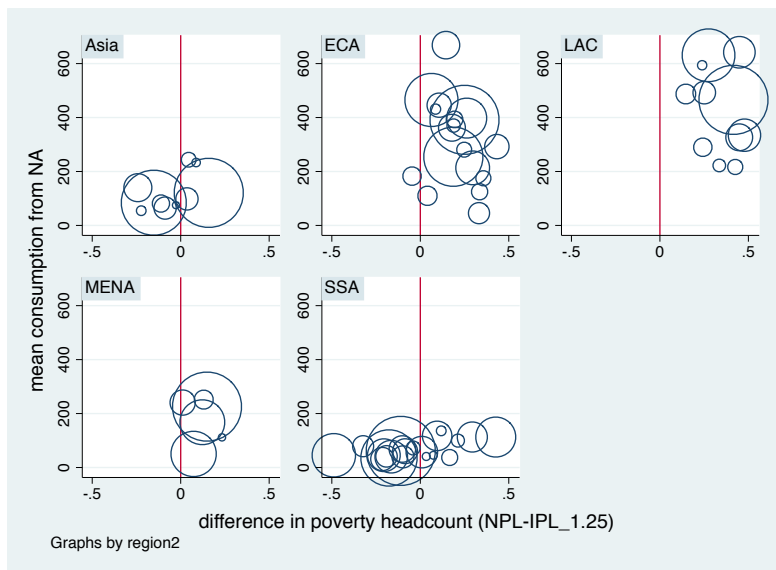


Figure 7: Divergence in poverty headcount by region



levels apparent (cf. figure 7). Nevertheless, the divergence in poverty outcomes for African countries is notable. Thus the international poverty line appears to be a “poverty line representative of the ones found in [African countries]”, rather than one representative of poverty lines found in poor countries in general.

## 4.2 Comparing poverty outcomes when the weakly relative poverty line is applied

Ravallion & Chen (2011) further developed the concept of a global relative poverty line, originally introduced by Atkinson & Bourguignon (2001). The weakly relative poverty line relaxes the assumptions of strong relative poverty lines which are typically anchored to the mean or median income.

They argue that it is implausible that poverty levels are not affected by distribution neutral growth, which is the case when strongly relative poverty lines are applied. In their opinion, neither welfarist, nor capabilities-based arguments are fully convincing justifications for strongly relative poverty lines. The welfarist approach attaches an implausibly high weight on the relative position, and the non-welfarist, capability-based, justification would assume the cost of social inclusion approaches zero in the limit as a person becomes very poor.

Data on poverty lines from 74 developing countries support their argument: National poverty lines for these countries are increasing with mean income, but the economic gradient is less than unity. Thus relativity in poverty lines is observed, though the dataset mostly contains absolute poverty lines. Only 12% of the poverty lines in the sample are strongly relative.

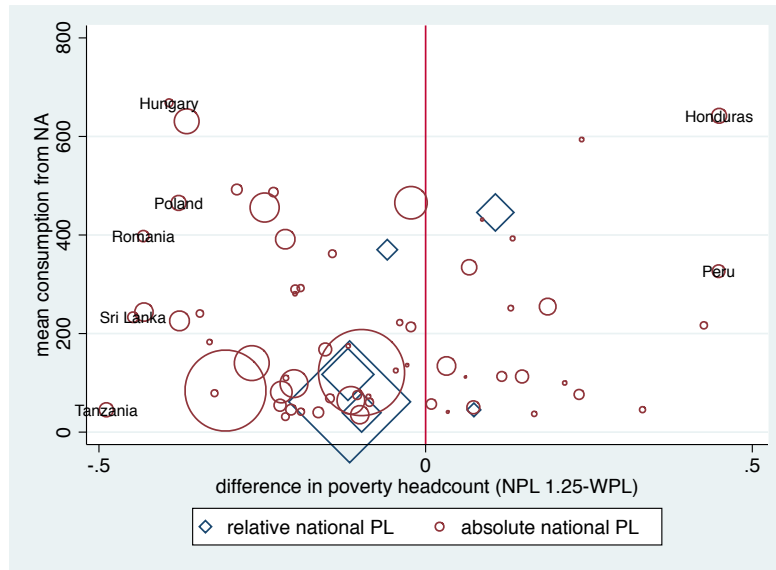
Using data on poverty lines from 74 developing countries (rather than using only the 15 poorest countries, as for the \$1-a-day measure), they estimate a global weakly relative poverty line of the form:

$$\begin{aligned} Z_i &\equiv \max(Z^*, \alpha + k \times M_i) \\ Z_i &\equiv \max(\$1.25, \$0.60 + \frac{M_i}{3}) \end{aligned} \tag{1}$$

The \$1-a-day line constitutes the lower bound of their weakly relative poverty line to ensure physical survival, and the poverty line increases by a third with a one unit increase in mean income.

Applying this weakly relative poverty line, we find that poverty levels diverge up to 50 percentage points depending on the poverty line applied. In contrast to the \$1-a-day poverty line, we do not observe a general trend for richer countries. We observe a similar over- as well as underestimation of poverty outcomes for

Figure 8



rich *and* poor countries. The divergence in poverty outcomes (variance in the sample) increases when the weakly relative poverty line is applied as opposed to the absolute \$1-a-day line. However, for countries where national poverty lines are considered relative the variance is relatively small (cf. figure 8).

### 4.3 Irrelevance of the international poverty line?

To sum up, poverty levels differ significantly depending on what poverty line (national, international, or weakly relative) is applied. Differences in the poverty headcount are up to 49 percentage points (Tanzania). In general, the global poverty line understates poverty in better-off countries, for poorer countries (mean consumption below 200\$) we observe a similar over- as well as underestimation of poverty. A regional disaggregation also shows that the international poverty line overstates poverty in Asia and understates poverty in European, Latin American, and MENA countries. Only for African countries no general trend is observable. Applying the global weakly relative poverty line, the divergence in poverty outcomes even increases. We now observe a similar over- as well as underestimation of poverty for poor and rich countries alike. However, the weakly relative poverty line reflects national (strongly) relative poverty lines better.



Thus, it must be questioned whether the claim that the international poverty line is a “poverty line representative of the ones found in poor countries” (Ravallion, Chen, and Sangraula, 2008, p. 12) can be upheld. Poverty outcomes at the country level differ significantly even for the countries deemed to be the 15 poorest countries in the dataset. The international poverty line thus cannot accurately represent national poverty lines of poor countries.

While there are good reasons to apply a comparable poverty line across countries, some of the country-level outcomes (especially for the 15 poorest countries in the sample) are not credible and may not be accepted at the country-level. Hence, the international poverty line is irrelevant for national poverty assessments. This poverty line cannot even be accepted as a lower bound poverty line or as a measure of extreme poverty in the poorest countries. Even though the \$1-a-day measure is not intended as a measure to be used for national poverty assessments, the reliability of a measure that gives inconclusive results at the country level must be questioned.

## 5 Conclusion

In this paper, I summarised some of the fundamental problems with the global poverty estimation and analysed how this line performs at the national level. The international poverty line is the average of poverty lines from 15 poor countries. Several issues accrue in the estimation process of this line and in arriving at the global poverty count. First the use of PPPs and local CPIs to convert national poverty lines into international dollars is problematic, as issues with these will be reflected through an inaccurate conversion of poverty lines. The estimation of PPPs is discussed controversially and local CPIs (though discussed much less prominently) are of varying quality. Incorrect CPIs and/or PPPs affect the poverty estimation in two ways: First, national poverty lines are converted to international dollars to estimate the international poverty line. In a second step, this poverty line is then converted back into local currency units to apply the line to national household surveys.

Moreover, Klasen et al. (2015) showed that the original World Bank estimation of the international poverty line is inaccurate and statistically flawed. Additionally,

the database used to estimate the global poverty line is dated and not all data points can be considered reliable.

While one may disagree with the general approach of the World Bank to attain a global poverty line; this approach could certainly be improved upon if one uses appropriate methods and data. The extent these decisions have on global poverty outcomes are unfortunately unknown and will interact with each other. Taking the prominence of the global poverty counts and the importance they have for development policy into account, these issues can, however, not be ignored.

More generally, the World Bank's approach blatantly ignores several other important issues in setting a comparable poverty line across countries. Among many other relevant factors, a poverty line should reflect the demographic composition of a country, the environment, and culture. Setting a comparable and consistent poverty line across a large group of countries is certainly no piece of cake, but possible as (Reddy & Pogge 2010) and (Klasen 2013) discuss.

In this paper, I also show that poverty outcomes differ significantly when the international and respective national poverty lines are applied at the country level. The divergence in the headcount ratio goes up to 49 percentage points depending on the poverty line applied. While for richer developing countries the international poverty line understates national poverty levels (as could be expected), for poorer countries no general trend is observable. We observe a similar over- as well as underestimation of poverty levels for similar mean consumption levels.

Thus, the international poverty line cannot fulfil its own claim of being representative of poor countries' poverty lines. It does not hold much meaning at a national level and cannot even be considered as a meaningful lower bound for national poverty assessment in these countries. Certainly, this line cannot be considered as a concept of "extreme poverty" in the sense of the SDGs for these countries.

This is due to a combination of several issues; not least but probably most importantly, because a very low standard is applied in the collection of data and estimation of the international poverty line. In essence, the international poverty line is the simple average of national poverty lines of only fifteen countries. The choice of these countries is statistically inaccurate and national poverty lines are of varying qualities. This is not only incomprehensible, given the intellectual and potentially monetary resources available to estimate such a line, but is also un-

justifiable, given the importance this line has in the realm of development policy (being one of the MDGs and now SDGs).

Notwithstanding, the success this line had in drawing attention to global poverty, this poverty line is conceptually extremely weak. For a global poverty measure that potentially affects billions, one should apply even stricter standards than for national poverty measures. This is certainly not the case with the current approach. It is therefore high time to abandon this poverty line and develop a new consistent and reliable global poverty line.

## References

## References

Atkinson, A. B. & Bourguignon, F. (2001), Poverty and Inclusion from a World Perspective, *in* J. Stiglitz & P.-A. Muet, eds, ‘Governance, Equity and Global Markets’, Oxford University Press.

Chen, S. & Ravallion, M. (2000), ‘How Did the World’s Poorest Fare in the 1990s?’, *World Bank Policy Research Working Paper No 2409*.

Deaton, A. (2010), ‘Price Indexes, Inequality, and the Measurement of World Poverty’, *American Economic Review* **100**(1), 5–34.

Deaton, A. & Aten, B. (2014), ‘Trying to Understand the PPPs in ICP2011: Why are the Results so Different?’, *National Bureau of Economic Research No 20244*.

Deaton, A. & Dupriez, O. (2011), ‘Global Poverty and Global Price Indexes’, *American Economic Journal: Applied Economics* **3**(2), 137–166.

Deaton, A. & Heston, A. (2010), ‘Understanding PPPs and PPP-based National Accounts’, *American Economic Journal: Macroeconomics* **2**(4), 1–35.

Ferreira, F. H. G., Chen, S., Dabalen, A., Dikhanov, Y., Hamadeh, N., Jolliffe, D., Narayan, A., Prydz, E. B., Revenga, A., Sangraula, P., Serajuddin, U. &

- Yoshida, N. (2015), 'A Global Count of the Extreme Poor in 2012. Data Issues , Methodology and Initial Results', *World Bank Policy Research Working Paper No 7432*.
- Klasen, S. (2013), Measuring Levels and Trends in Absolute Poverty in the World: Open questions and possible alternatives, *in* G. Betti & A. Lemmi, eds, 'Poverty and Social Exclusion: New Methods of Analysis', Taylor and Francis, London.
- Klasen, S., Krivobokova, T., Greb, F., Lahoti, R., Pasaribu, S. & Wiesenfarth, M. (2015), 'International Income Poverty Measurement: Which Way Now?', *Courant Research Centre Discussion Papers No 184*.
- Ravallion, M. (2010), 'Understanding PPPs and PPP-based National Accounts: Comment', *American Economic Journal: Macroeconomics* **2**(4), 46–52.
- Ravallion, M. & Chen, S. (1996), 'What can new survey data tell us about recent changes in distribution and poverty?', *World Bank Policy Research Working Paper No 1694*.
- Ravallion, M. & Chen, S. (2011), 'Weakly Relative Poverty', *Review of Economics and Statistics* **93**(4), 1251–1261.
- Ravallion, M., Chen, S. & Sangraula, P. (2008), 'Dollar A Day Revisited', *World Bank Policy Research Working Paper No 4620*.
- Ravallion, M., Chen, S. & Sangraula, P. (2009), 'Dollar a day revisited', *The World Bank Economic Review* **23**, 163–184.
- Ravallion, M., Datt, G. & van de Walle, D. (1991), 'Quantifying Absolute Poverty in the Developing World', *Review of Income and Wealth* **37**(4), 345–361.
- Reddy, S. G. & Lahoti, R. (2015), \$ 1.90 Per Day : What Does it Say ?  
**URL:** <http://ineteconomics.org/uploads/general/WBPovBlogOct6PostinFinal.pdf>
- Reddy, S. G. & Pogge, T. (2010), How not to count the poor, *in* S. Anand, P. Segal & J. E. Stiglitz, eds, 'Debates on the Measurement of Global Poverty', Oxford University Press.

- Summers, R. & Heston, A. (1988), 'A new set of international comparisons of real product and price levels estimates for 130 countries, 1950-1985', *Review of Income and Wealth* **34**(1), 1–25.
- WHO (1985), *Energy and Protein Requirements. Report of a joint FAO/WHO/UNU Expert Consultation*, Vol. 724.
- World Bank (1990), *World Development Report 1990: Poverty*.  
**URL:** <https://openknowledge.worldbank.org/handle/10986/5973> License: CC BY 3.0 IGO
- World Bank (1993), *Mali: Assessment of Living Conditions; Report No. 11842-MLI*.
- World Bank (1994), *Republic of Guinea-Bissau: Poverty Assessment and Social Sectors Strategy Review; Report No 13155-GUB*.
- World Bank (1996), *Niger: Poverty assessment. A resilient people in a harsh environment; Report No 15344-NIR*.
- World Bank (2008), *Mozambique Beating the Odds : Sustaining Inclusion in a Growing Economy A Mozambique Poverty, Gender, and Social Assessment*.
- World Bank (2015), *Purchasing Power Parities and the Real Size of World Economies - Comprehensive Report of the 2011 International Comparison Program*, World Bank.  
**URL:** <http://siteresources.worldbank.org/ICPEXT/Resources/ICP-2011-report.pdf>