Poor trends

The pace of poverty reduction after the Millennium Development Agenda[*]

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Abstract

This paper reviews the origins of the dollar-a-day poverty line, discusses historical poverty and inequality trends, and forecasts poverty rates until 2030 using a new fractional response approach. Three findings stand out. First, global poverty reduction since 1981 has been rapid but regional trends are heterogeneous. Second, the pace of poverty reduction at $1.25 a day will slow down. Our optimistic scenarios suggest a poverty rate of 8-9% in 2030, far short of the World Bank's new 3% target. Third, rapid progress can be maintained at $2 a day, with an additional one billion people crossing that line by 2030.

Keywords: poverty, inequality, consumption growth

JEL Classification: I32, O10, O15

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1 Introduction

"We are at an auspicious moment in history, when the successes of past decades and an increasingly favorable economic outlook combine to give developing countries a chance, for the first time ever, to end extreme poverty within a generation" (Jim Yong Kim, World Bank President, speaking at Georgetown University, April 3, 2013)

Only 13 years after the Millennium Summit in September 2000 at which world leaders agreed on halving the 1990 global poverty rate at $1.25 a day by 2015, the end of extreme poverty seems to be in sight. Recent estimates suggest that the first Millennium Development Goal (MDG) was already reached in 2010 and about 700 million people were lifted out of poverty. In 2013, the World Bank declared a new organizational goal of ending extreme poverty by 2030, that is, reducing the $1.25 a day poverty rate to 3% by 2030. The last two decades clearly ushered in unprecedented success, but is 2030 really likely to mark the end of extreme poverty? Our main contribution is to demonstrate that this is unlikely.

In this paper, we review the origins of the 'dollar-a-day' poverty line, discuss progress over the last three decades, and forecast $1.25 and $2 a day poverty rates until 2030. It is well-known that regional trends in poverty alleviation are very heterogeneous. In spite of rising inequality, rapid growth in China was the driving force behind global progress over the last two decades and accounts for more than three quarters of the reduction in the number of people living below $1.25 a day. However, most of the poverty reduction potential coming from China is now exhausted. Poverty reduction in the developing world outside China has been considerably slower, although economic growth has accelerated significantly since 2000. In 2010, three-fourths of the extremely poor lived in Sub-Saharan Africa and South Asia, as opposed to approximately 40% in 1981. This changing regional composition of world poverty has important ramifications for future trends in poverty reduction. Historically fast growing countries make up less and less of the global poor.

Building on a new method for estimating poverty elasticities and predicting poverty headcount ratios developed in Bluhm, de Crombrugghe, and Szirmai (2013), we show that the pace of poverty reduction at $1.25 a day is likely to slow down significantly after 2015. Extreme poverty barely falls below 8% in the most optimistic scenario. Ravallion (2013) first suggested the 3% target relying on the assumption that consumption in developing countries would continue to grow at the average post-2000 trend, or 4.5% per year. We find this 'equal-growth' assumption too optimistic. Poverty tends to be higher in countries with rapid population growth and lower than average consumption growth. None of our scenarios predict a poverty rate near 3% once country-specific trends from 2000 to 2010 are used. However, the $2 a day poverty rate may fall below 20% in 2030, while a slowdown happens only late during the forecast period or not at all. A distinct advantage of our approach is that it is computationally inexpensive. Hence, it can easily be used for benchmarking progress as new data become available.

The paper is structured as follows. Section 2 discusses some of the controversies surrounding the setting and updating of international poverty lines. Section 3 is a data-driven review of global poverty and inequality trends with a particular focus on China, India, Brazil and Nigeria. Section 4 presents projections of global and regional poverty rates until 2030 at the $1.25 and $2 a day poverty lines using different growth and inequality scenarios. Section 5 concludes and offers some policy recommendations.

2 Drawing the line: international poverty lines

The dollar-a-day poverty line was first defined in a background paper to the 1990 World Development Report (in 1985 PPPs), then updated to $1.08 (in 1993 PPPs) in 2000, and again updated to $1.25 (in 2005 PPPs) in 2008. While the first update went by almost unnoticed, the most recent change has sparked a controversy. Redefining extreme poverty as living below $1.25 a day raised the global poverty headcount by about 10 percentage points and reclassified approximately 450 million people as extremely poor (Chen and Ravallion, 2010). In this section, we briefly review the origins of the 1$ a day measure and discuss shortcomings of the current updating procedure.

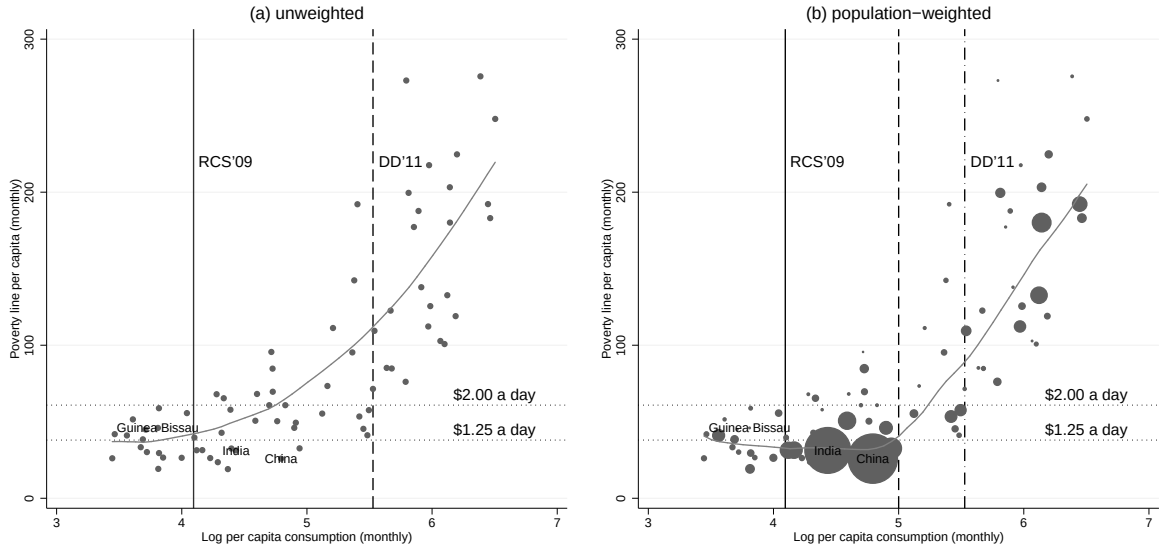
The problem of setting a global poverty line is far from trivial. Even if we could use a 'basic needs' or calorie-intake approach to devise a minimum consumption bundle for the entire world, it is inherently difficult to apply any such bundle in international comparisons. Subsistence needs, relative prices, and purchasing power vary across countries and over time. Faced with these problems, Ravallion, Datt, and van de Walle (1991, henceforth RDV) suggested an original solution. Since many national poverty lines are set using a basic needs or calorie-intake method, there should be a universal lower bound among the absolute poverty lines which may be recovered from the data. Converting 33 national poverty lines and the corresponding consumption levels from the 1970s and 1980s into international dollars, RDV showed that a poverty line of about $31 per month ($1.02 a day, in 1985 prices) was shared by the six poorest countries in their sample while those of two other countries came close. They argued that a rounded-off poverty line of 1$ a day was a sensible threshold for measuring global poverty, since any one poverty line is likely to be estimated with error and the non-food allowance included in the subsistence basket varies across countries. RDV also estimated a lower line of $23 per month (about 76 cents a day) for the poorest country in their sample. This lower line is close to India's poverty line at the time, which was widely used as the international poverty line during the 1970s and 1980s (e.g. Ahluwalia, Carter, and Chenery, 1979).

Setting the poverty line in international prices has the advantage that domestic inflation is typically taken into account when average incomes or expenditures from surveys are converted into (base year) international dollars, so that the line itself does not have to be explicitly updated annually. However, purchasing power parities (PPPs) change over time as countries grow richer (due to the Balassa-Samuelson effect). In addition, the quality of PPP estimates has been improving substantially with each round of the International Comparison Program (ICP), so that updates are needed approximately every decade. When the 1993 ICP data became available, Chen and Ravallion (2001) revised the $1 a day line to $1.08 in 1993 prices. Using the same data as in the original study, they found that $1.08 a day is the median poverty line of the ten poorest countries. However, when the 2005 ICP was completed, instead of converting the old poverty line to 2005 prices, new data were collected and the poverty line was redrawn. Ravallion, Chen, and Sangraula (2009, henceforth RCS) compiled a dataset of 74 national poverty lines to update the original analysis. They found that national poverty lines do not rise with per capita consumption until a certain turning point (about $60 per month) but increase strongly thereafter (left panel, Figure 1). RCS set the global line as the average poverty line of the 15 countries below this threshold, or $1.25 a day in 2005 prices.

Deaton (2010), as well as Deaton and Dupriez (2011), take issue with this approach. They argue that updating the international poverty line based on new data leads to

"graduation effects" when countries move out of the reference group. They illustrate their case using India and Guinea Bissau as examples. India was part of the initial reference group in RDV, and both countries appear in RCS's more recent reference group. India has a relatively low poverty line ($0.90 a day in 2005 prices) and a population of more than a billion people, whereas Guinea Bissau has a higher poverty line ($1.51 a day in 2005 prices) and is home to less than 1.5 million people. As average consumption in India grew considerably until 2000, it crossed the $60 threshold and is no longer part of the reference group. Even though the average Indian has become richer, both the international poverty line and the global poverty headcount increased as a result of India dropping out of the average. With Guinea Bissau the case is reversed. Its poverty line is currently part of the average. A move out of the reference group would entail a fall in the global poverty line and a reduction in global poverty that is many times greater than the population of Guinea Bissau. The left panel of Figure 1 illustrates this relationship. The bold horizontal line marks the $60 per month threshold (labeled RCS'09).

Figure 1 – Poverty lines and consumption levels around 2000



Notes: Author's calculations using the data reported in Ravallion et al. (2009) and following the illustration of Deaton (2010). The non-linear trends are estimated using a (weighted) local linear smoother with bandwidth 0.8.

A related issue is that the ICP data are primarily designed for comparing living standards of entire populations, not just poor people. The typical consumption basket of the poor, and the associated price level, may be very different than the reference basket used for computing PPPs.

To address both the graduation issue and the PPP issue, Deaton and Dupriez (2011) propose an alternative procedure. Linking consumption surveys to ICP data for the 50 poorest countries, they simultaneously estimate the poverty line and PPPs of those near the poverty line (PPPs for the Poor, or P4s). This yields lower poverty lines in between $0.92 and $1.19 a day. However, the effect of the P4s on the global poverty counts – at similar poverty lines – is relatively small. The resulting estimates of global poverty are lower primarily due to the lower poverty lines and not due to differences in relative prices.

To an extent, the Deaton-Dupriez criticism can be addressed within the RCS approach

by (1) weighting the national poverty lines by population sizes, and (2) extending the reference group of "poorest" countries. The Deaton-Dupriez proposal, labeled DD'11 below, is to select the 50 poorest countries to constitute a fixed reference group. Clearly, the threshold of 50 countries is arbitrary. A possible alternative is to replicate the RCS approach but estimate the consumption gradient using population weights instead of equal weights (right panel, Figure 1). This is the approach proposed here. Examining the plot to find the point where the slope of consumption begins to be positive, we visually identify a threshold of about 5 log dollars or \$148.41 per month (C^*), which is just under \$5 a day. There are 39 countries below this line, suggesting an alternative reference group consisting of those 39 countries. A population-weighted average of the national poverty lines for this group implies a global poverty line of \$1.06 a day whereas the simple average is \$1.46 a day (both in 2005 prices).

Table 1 – Estimates of the international poverty line (Z^*)

	Consumption		International Poverty Lines (in 2005 PPPs)					
Estimation			*Equally-weighted*			*Population-weighted*		
Sample	$\ln(C^*)$	C^*	$\bar{Z}$	Z^*	$Q_{50}(Z)$	$\bar{Z}$	Z^*	N
RCS'09	4.09	60.00	1.25	1.25	1.27	1.17	1.17	15
Alternative	5.00	148.41	1.46	1.46	1.38	1.06	1.06	39
DD'11	5.53	251.59	1.76	1.26	1.51	1.12	1.00	50
Full sample	6.50	668.31	2.91	1.46	2.00	1.84	1.06	74

Notes: Author's calculations using the data reported in Ravallion et al. (2009). $\bar{Z}$ is the (unweighted or weighted) average poverty line. $Q_{50}(Z)$ is the (unweighted) median poverty line. The regression based columns estimate the average level of the poverty line before the consumption gradient turns positive. Following Ravallion et al. (2009), we obtain Z^* from $Z_i = Z^* I_i + (\alpha + \beta C_i) \times (1 - I_i)$, where Z_i is the national poverty line expressed in 2005 PPPs, Z^* is the mean poverty line for the reference group, C_i is average per capita consumption in 2005 PPPs, and I_i is one if $C_i \leq C^*$ and zero otherwise; that is, it indicates whether the country is in the reference group. This method imposes that the slope is zero until a monthly consumption level C^*.

Table 1 provides alternative estimates of the international poverty line using different approaches, references groups and weights. We can fully reproduce the main findings of RCS. The average poverty of the poorest 15 countries is \$1.25 a day and the full sample median is \$2 a day. Three other results stand out. First, all estimates are above or equal to 1\$ a day in 2005 prices. Second, population weights lead to universally lower estimates of the poverty line. Third, the estimated poverty line is fairly sensitive to both the choice of C^* and the summary measure (mean, median, weighted or not). While this lends some support to the notion that \$1.25 is a relatively high upward revision, the choice of method, cutoff and weights remains subjective. Moreover, updating the old \$1.08 poverty line in 1993 prices to \$1.25 in 2005 prices implies a (global) inflation rate of about 1.2% per year. Precisely this point leads Chen and Ravallion (2010) to argue that "as long as it is agreed that \$1 in 1993 international prices is worth more than \$1 at 2005 prices, the qualitative result that the new ICP round implies a higher global poverty count is robust" (p. 1612). In the following, we will consider the policy consequences of using both \$1.25 a day and the full-sample median of \$2 a day as absolute poverty lines (which is common practice in the literature, e.g. see Chen and Ravallion, 2010).

Counting the global poor involves several difficult methodological choices on top of

choosing an international poverty line that can have large effects on the estimated poverty rates.[1] The inherent difficulty of convincingly solving these issues led some to suggest that the current approach should be abandoned (e.g Klasen, 2009; Reddy and Pogge, 2010). One alternative is to set national poverty lines in local currencies using the same method in each country. While this approach tries to sidestep the issue of purchasing power parity comparisons altogether, it would certainly raise new problems. Alas, a considerable degree of indeterminacy regarding the level of extreme poverty in the world seems unavoidable (but more is known about rates of change which we discuss in the next section).

3 Taking stock: poverty reduction over the past three decades

While the global Millennium Development Goal (MGD) of halving the $1.25 a day poverty rate in 1990 by 2015 was reached in 2010 (Chen and Ravallion, 2013), progress has been very uneven across regions. Most poverty reduction over the last three decades occurred in East Asia and, to a lesser extent, in South Asia. Poverty in Sub-Saharan Africa, on the contrary, has hardly budged and the continent as a whole will – most probably – fail to meet the first MDG by 2015.

Figure 2 shows population-weighted time trends estimated for each region using the nationally-representative household surveys available in the World Bank's *PovcalNet* database (using consumption-based data if available). A pooled weighted least squares regression of the poverty headcount ratio on time for all developing countries reveals that the poverty headcount at the $1.25 a day line fell by an average 1.5 percentage points per year (cluster t^2 = -4.11). There is substantial regional heterogeneity. On average, poverty fell by 2.21 percentage points annually in East Asia and Pacific (cluster t = -10.08), by about 1 percentage point in South Asia (cluster t = -4.82), but only by 0.02 percentage points in Sub-Saharan Africa (cluster t = -0.05). In the other three developing regions progress has been slow but steady. In Europe and Central Asia, Latin America and Caribbean, and Middle East and North Africa the estimated slopes imply an expected annual fall of 0.05 (cluster t = -1.91), 0.30 (cluster t = -5.76) and 0.14 (cluster t = -2.40) percentage points, respectively. Using an alternative $2 a day poverty line, the magnitudes and differences in speeds across regions remain broadly similar.[3]

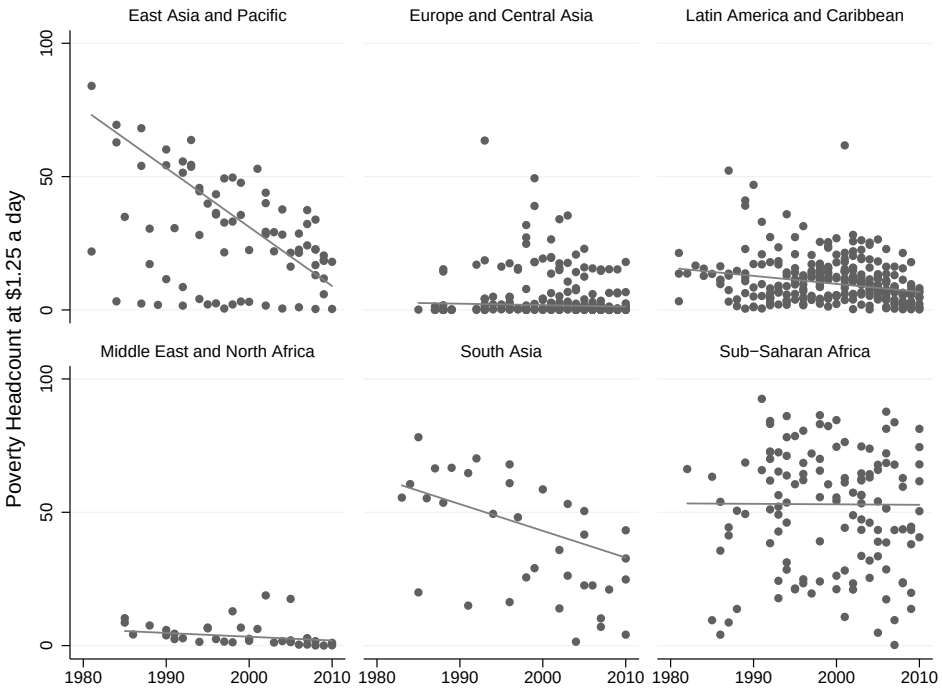
An important question is whether consumption growth or redistribution is driving the decline in poverty. Estimating the historical contributions of growth and changes in distribution during the 1980s and 1990s, Kraay (2006) found that most poverty reduction was due to income or consumption growth. Our analysis broadly corroborates this finding (although we do not explicitly estimate contributions). The population-weighted growth

[1]For example, it is not clear that the ICP 2005 provides an adequate picture of the consumption patterns in the 1980s or 1990s. Another issue is the use of survey means versus national accounts means. The use of national accounts typically leads to much lower poverty estimates. See Sala-i-Martin (2006), Pinkovskiy and Sala-i-Martin (2009), and, in particular, Dhongde and Minoiu (2013) for a comparison of different methods.

[2]Throughout the text, "cluster t" denotes a cluster-robust t-statistic, with clusters defined by countries.

[3]East Asia and Pacific (slope = -2.31, cluster t= -7.33), Europe and Central Asia (slope=-0.26, cluster t=-2.33), Latin America and Caribbean (slope=-.55, cluster t = -5.74), South Asia (slope = -0.72, cluster t= -4.92), and Sub-Saharan Africa (slope = -0.02, cluster t= -0.07).

Figure 2 – Population-weighted poverty trends by region, 1981 to 2010, $1.25 a day



Notes: Author's calculations based on surveys from *PovcalNet*.

rate of the survey means from 1981 to 2010 across all countries is a very robust 4% per year (cluster t = 3.03). Over the same period, within-country inequality, as measure by the Gini coefficient, actually increased slightly by about 0.7% per year (cluster t = 1.64). This implies that, on average, changes in distribution may have in fact moderately slowed the pace of poverty reduction. Poverty reduction over the last three decades has mostly been due to income and consumption growth. However, both the high average growth rate in the survey means and the apparent rise in within-country inequality are driven by China. Excluding China, the survey means grew about 1.8% per year (cluster t = 2.45) and inequality barely moved (increased 0.047% per year, cluster t = 0.13). In other words, poverty reduction in the developing world outside China has been steady but slow and has (on average) not been helped by improvements in distribution.[4]

These findings are also in line with estimates of poverty at the $1.25 a day poverty line reported by the World Bank (see Appendix Table A-1). Chen and Ravallion's (2010) estimates indicate rapid progress in China, little improvement in Sub-Saharan Africa, and moderate poverty reduction elsewhere. The poverty headcount ratio in Sub-Saharan Africa only fell by about three percentage points over the entire period from 1981 to 2010, and actually exceeded its 1981 value for most of the period. Combining these trends with population growth rates reveals the dire absence of a robust positive trend in terms of the number of global poor outside of East Asia. While China has lifted an astonishing 680 million people out of poverty between 1981 and 2010, the rest of the world has only about 50 million fewer extremely poor people in 2010 than in 1981. This trend is owed to persistently high poverty rates coupled with strong population growth

[4]Excluding India in addition to China from the sample does not qualitatively alter this result.

in Sub-Saharan Africa and India. This is most evident in Sub-Saharan Africa where the number of extremely poor has roughly doubled over three decades (in spite of the slight decrease in the headcount ratio). The rise of China from a poor to a middle income country also implies that the relative composition of world poverty is changing rapidly. In 1981 about 40% of the world's extremely poor lived in Sub-Saharan Africa and South Asia, by 2010 their share has risen to 75%.

A very intuitive approach to illustrating past progress (or lack thereof) is to approximate the shape of the income or expenditure distribution at various points in time and examine how the features of the distribution (esp. quantiles) shift over time. Figures 3 and 4 plot the lower tail (up to $400) of the monthly income or expenditure distribution for the most populous country of the four poorest regions – East Asia, South Asia, Latin America, and Sub-Saharan Africa – in 1985, 1990, 2000 and 2010. The vertical lines are the $1.25 and $2 a day poverty lines in terms of monthly consumption. After lining up the survey data in time, we estimate the different density functions using a log-normal approximation.[5] While the assumption of log-normality has its weaknesses[6], it usually provides a useful first estimate of the shape of the income distribution. A key advantage is that it only requires knowledge of the mean and Gini coefficient.

We can illustrate a few essential concepts with these graphs. The area under the curve to the left of the poverty line gives the fraction of the population that is poor (the poverty headcount ratio), while the spread of the distribution reflects inequality. The raw difference between two such areas under the curve is the absolute change in the poverty headcount ratio in percentage points and the relative difference gives the percent change in the poverty headcount ratio. The sensitivity of poverty reduction to changes in income or inequality is often measured in the form of elasticities or semi-elasticities. The income elasticity of poverty is the percent change in poverty for a one percent increase in incomes, and the income semi-elasticity of poverty is the percentage point difference in poverty for a one percent increase in incomes. The inequality elasticity and semi-elasticity are defined analogously. An attractive feature of the semi-elasticity is that it first increases and then decreases again during the development process. It measures the pace of poverty reduction in terms of the percentage of the population lifted out of poverty. Hence, it is usually more informative for policy-makers and more useful than reporting relative changes.[7]

Figure 3 visualizes the tremendous progress in reducing poverty rates in China over the last three decades.[8] As noted before, poverty in China at $1.25 a day fell rapidly over the entire period. The biggest gains occurred early on, between 1985 and 2000,

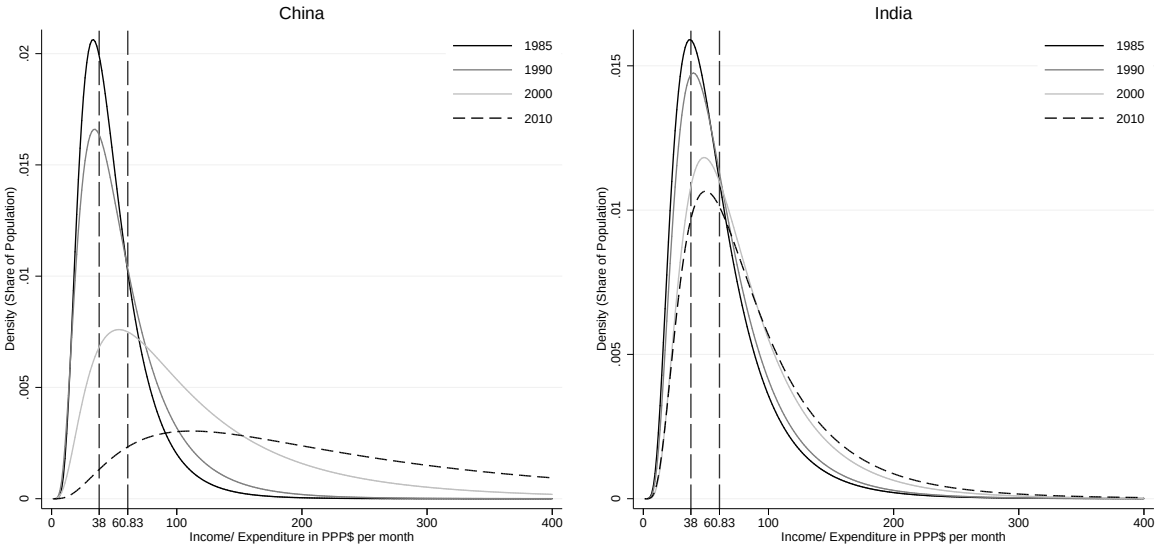
[5]We interpolate and extrapolate the data as follows. First, we project mean consumption forward and backward using the corresponding growth rates of personal consumption expenditures from the national accounts. Second, we linearly interpolate between the available Gini coefficients and extrapolate beyond the first or last available measure by keeping inequality constant. The same data set (with all countries from *PovcalNet*) is later used for computing the inequality indices in the developing world.

[6]Log-normality typically works better with consumption surveys than with income surveys (Lopez and Serven, 2006), tends to underestimate the level of poverty (Dhongde and Minoiu, 2013), and overstates the pace of poverty reduction (Bresson, 2009).

[7]In relatively rich countries with low percentages of people below the poverty line, elasticities can be very misleading. Small reductions in the poverty headcount rate can manifest themselves as very high elasticities. For a more detailed discussion of the properties of elasticities and semi-elasticities of poverty see Bourguignon (2003), Klasen and Misselhorn (2008), and Bluhm et al. (2013).

[8]The implied poverty rates for China correspond well with the official World Bank estimates. At the $1.25 a day poverty line, our estimates imply a poverty rate of 60.56% in 1985, 56.92% in 1990, 31.97% in 2000 and 9.75% in 2010.

Figure 3 – Estimates of the expenditure distribution: China and India, 1985–2010



Notes: Author's calculations. China's expenditure distribution is estimated based on a weighted mean and a rural-urban ln-mixture for the Gini coefficient. China's surveys in *PovcalNet* are consumption-based after 1987 and income-based before.

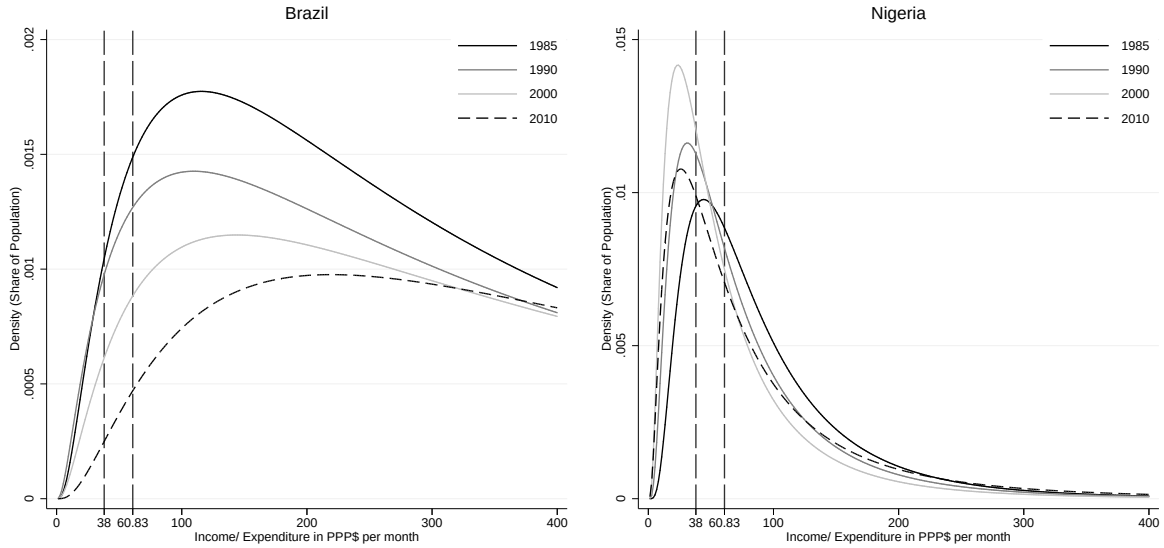
when the peak of the distribution was close to the $1.25 and $2 poverty lines. By 2010, the peak of the distribution has moved considerably to the right of both poverty lines and the overall spread has widened. A great many Chinese are now considered part of a developing country 'middle class' (if defined between $2 and $13 per day).[9] However, this also implies that the poverty reduction potential from China is largely exhausted. The income semi-elasticity of the poverty headcount is far beyond its peak and steadily approaching zero. In addition, inequality has increased remarkably over the same period. In 1985, the Gini coefficient was 0.28 and by 2010 it has risen to 0.44.

In India, on the contrary, there remains much more potential for poverty reduction in the medium-term future. While the mode of the income distribution was near the $1.25 line around 1985 and 1990, the peak of the distribution in 2000 and 2010 is located between the two poverty lines. The process of "bunching up" in front of $2 a day observed by Chen and Ravallion (2010) implies that, in the medium-term future, the pace of poverty reduction in India (defined as the absolute change in the headcount) will be particularly fast at the $2 a day line and continue at a fast but decelerating pace at the $1.25 line. Put differently, India's income semi-elasticity around 2010 is very high and a moderate rate of growth will immediately have a large (but decreasing) effect on the poverty headcount ratio at both thresholds.

Figure 4 illustrates two very different cases. The left panel shows that from 1985 to 1990 poverty reduction in Brazil was very slow, with some progress at the $2 a day line but a nearly unchanged poverty rate at the $1.25 line. Yet, on average, Brazilians were already considerably better-off in the 1990s than their Chinese or Indian counterparts in 2010. After 1990, the pace of poverty reduction accelerates and by 2010 only 4.92% of the

[9] Ravallion (2010) defines the size of the 'middle class' by developing country standards as the proportion of the population living on at least $2 per day but less than $13 per day, where the upper bound is the poverty line in the United States. Naturally, this is one of many possible definitions.

Figure 4 – Estimates of the expenditure distribution: Brazil and Nigeria, 1985– 2010



Notes: Author's calculations. Brazil's distribution is based on incomes instead of expenditures.

population were below the $1.25 a day poverty line.[10] Lifting the remaining people out of poverty will require sustained economic growth, as both the income and distribution semi-elasticities of poverty in Latin America as a whole are rather low (Bluhm et al., 2013). With a Gini of 0.56 in 1985 income inequality is initially very high in Brazil, peaks at 0.61 in 2000 and then falls again to 0.55 by 2010, thus positively contributing to poverty reduction after 2000. The right panel illustrates that poverty in Nigeria was considerably higher in 2000 or 2010 than in 1985. Nigeria's plight is characteristic for most of Sub-Saharan Africa in the 1980s and 1990s, as real consumption on the subcontinent was declining at a pace of about 0.82% per year. Only after 2000, expenditures recover and the poverty headcount ratio begins to decline. Yet even by 2010, the peak of the expenditure distribution is still noticeably to the left of the poverty line and the implied poverty rate at $1.25 a day is 65.96%.[11] In addition, inequality in Nigeria increases over the observed period, starting from a Gini of 0.39 in 1985 to 0.49 in 2010.

Taken together, these four distributions exemplify the changing composition of global poverty and broadly represent the trends in their respective regions. Over the last three decades, most poverty reduction occurred in East Asia where consumption growth was fastest, some poverty reduction occurred in India where real consumption growth was steady, and little poverty reduction occurred in Sub-Saharan Africa where real consumption growth was slow and volatile. This suggests that without significantly faster growth in Sub-Saharan Africa than in the past, possibly coupled with improvements in the income or expenditure distribution, the global pace of poverty reduction will inevitably slow down in the near future.

Another essential aspect of poverty analysis is studying the evolution of inequality. In this part, we focus only on inequality among citizens of developing countries, as our interest is the changing relative position of people in the developing world rather

[10]The World Bank estimates a poverty rate of 5.38% at $1.25 a day for Brazil in 2010.
[11]The World Bank estimates a poverty rate of 67.98% at $1.25 a day for Nigeria in 2010.

than their position vis-à-vis rich countries. Interestingly, many of the global trends are also evident even when we restrict our attention to this truncated distribution. We compute three measures of inequality by applying Young's (2011) mixture of log-normal distributions approach to the *PovcalNet* data. 'Overall inequality' is the Gini coefficient for citizens of developing countries regardless of their country of residency. 'Within inequality' is a population-weighted summary measure of inequality within each country. Last, 'between inequality' is the population-weighted Gini coefficient of average incomes among all developing countries. In other words, the first measure encompasses both the within-country and between-country components that make up overall inequality in the developing world. Naturally, global inequality – including the citizens of developed countries – is typically estimated to be considerably higher. Recent estimates of the global Gini suggest that it is around 0.65-0.70 and even higher if underreporting of top-incomes is taken into account (e.g. see Pinkovskiy and Sala-i-Martin, 2009; Milanovic, 2012; Chotikapanich, Griffiths, Rao, and Valencia, 2012; Lakner and Milanovic, 2013).

Table 2 – Inequality in the developing world, 1980–2010

	Gini coefficient					
Year	Overall	Within	Between	Mean Consumption	Population	N
1980	0.596	0.356	0.486	73.29	2907.8	83
1985	0.555	0.353	0.421	79.05	3223.2	86
1990	0.578	0.367	0.449	95.98	4049.3	104
1995	0.559	0.385	0.411	98.41	4555.2	114
2000	0.537	0.395	0.374	102.45	4931.4	121
2005	0.535	0.399	0.372	120.34	5285.6	123
2010	0.554	0.404	0.399	150.72	5625.1	123
Δ 1980-2010 (in %)	-7.19	13.63	-17.82	–	–	–
Δ 1990-2010 (in %)	-4.17	10.10	-11.08	–	–	–
Δ 2000-2010 (in %)	3.07	2.20	6.64	–	–	–

Notes: Author's calculations. The sample size varies over the years. A total of 124 countries are recorded in *PovcalNet* but we lack PCE data for West Bank and Gaza. The results are very similar if we constrain the developing world to consist out of the 104 countries from which we have (interpolated) data from 1990 onwards. Due to the lower coverage, the results for the 1980s should be interpreted with caution. For details on the ln-mixture calculations refer to Young (2011).

Table 2 reveals some interesting trends. Overall inequality in the developing world has been falling between 1990 and 2005, but it exhibits an increase in 2010. At the same time, within-country inequality has been rising steadily since the mid-1980s. Between-country inequality fell over most of the period but also shows a slight increase between 2005 and 2010. If we exclude China from the computations given that its weight is very high, then these trends are considerably muted or even non-existent.[12] Hence, two developments drive the overall change. First, inequality of incomes within China has been

[12]Overall inequality is estimated as 58.33 in 1990 and 58.36 in 2010, within-country inequality is estimated as 38.36 in 1990 and 39.12 in 2010, and between-country inequality is estimated as 45.04 in 1990 and 45.44 in 2010. Removing India in addition to China has little effect on the trends in the inequality measures.

increasing significantly and, second, its relative position among developing countries has been changing rapidly. Rising mean incomes in China from the 1980s onwards initially implied a reduction of between-country inequality as the average citizen in China was moving from the bottom towards the middle of the developing country ranks, but they now put upward pressure on overall inequality as incomes in China continue to grow and the distance to incomes in Sub-Saharan Africa increases.[13]

4 Going forward: poverty projections until 2030

As the expiration date of the MDGs is approaching quickly, new goals will have to be selected. Picking among a wide range of possible benchmarks invariably involves formulating expectations towards a fundamentally uncertain future. Thus, it becomes important to ask: what can the current data and methods tell us about the prospects for poverty alleviation over the next two decades? The list of policy-relevant questions is long. What level of poverty do we expect to prevail in 2030? Will it be feasible to truly eradicate extreme poverty by 2030? Or, how quickly do we expect poverty rates under the $2 a day poverty line to decrease? Here, we provide both a glimpse into several likely futures and some potential answers to these questions.

This section draws heavily on Bluhm et al. (2013), where we develop a 'fractional response approach' for estimating income and inequality (semi-)elasticities of poverty. Among other things, the paper shows that this new method can be used to easily forecast global poverty rates using only two variables (the survey mean and the Gini coefficient). A key advantage of this approach over, say, linear trend extrapolations is that it builds in the non-linearity of the poverty-income-inequality relationship. Neither the income or inequality elasticity nor the income or inequality semi-elasticity is assumed to be constant. The method accounts for the fact that income growth will have an increasing effect in very poor countries, where the mass of the distribution is to the left of the poverty line, and less and less of an effect in rich countries, where the mass of the distribution is far to the right of the poverty line.[14] Similarly, the effect of changes in distribution will indirectly depend on the prevailing levels of both income and inequality.

We are of course not the first to present poverty projections over the next two decades. Ravallion (2013), for example, outlines an aspirational scenario where an additional billion people are lifted out of extreme poverty by 2025-2030. Karver, Kenny, and Sumner (2012) discuss the future of the MDGs more generally and simulate poverty rates at the $1.25 and $2 a day poverty lines for 2030.[15] Yet there are some important

[13] This trend is corroborated by the literature on global inequality. According to Lakner and Milanovic (2013), average incomes in Sub-Saharan Africa were $742 in 1988 and still just $762 per year in 2008 (in 2005 PPPs), while Chinese incomes increased by 228.9% and no longer make up a large part of the lower tail of the global income distribution. They also show that inequality within China has risen between 1988 and 2008.

[14] The inability to account for countries that have relatively high incomes and zero poverty at some point in time (typically the beginning or end of a spell) is a key weakness of studies investigating poverty elasticities.

[15] Karver et al. (2012) allow for country-specific growth rates but use older data (their *PovcalNet* reference year is 2008) and disregard the difference between GDP per capita growth and growth of the survey mean. This leads them to overestimate the speed of poverty reduction relative to our forecasts. A recent study by Chandy, Ledlie, and Penciakova (2013) echoes some of our results. They use GDP per capita rather than consumption expenditure data for most of the period, but apply a conversion factor, and report lower poverty estimates.

conceptual and methodological differences between our approach and these studies. First, the assumption that the developing world will continue growing at the accelerated 2000 to 2010 pace for another twenty years (our optimistic scenario) is questionable. There is a well-known instability of growth rates across decades which should not be ignored (Easterly et al., 1993), especially since the high average growth rates in the developing world were driven by rapid growth in China. A more conservative assumption is that countries will grow at rates much closer to their individual long-run growth path. Second, the changing composition of the countries contributing to global poverty matters a lot for the expected speed of global poverty reduction. Unless there is a persistent acceleration of consumption growth in Sub-Saharan Africa on top of the post-2000 growth rates and sustained consumption growth in India, we can show that the pace of poverty reduction at the $1.25 line is likely to experience a pronounced slowdown in all of our forecast scenarios (defined below). Third, pro-poor growth can potentially make a sizable difference in the expected poverty rates, while a rise in within-country inequality will hasten the arrival of the slowdown. Fourth, our method approximates the 'official' *PovcalNet* results at a fraction of the computational cost, so that a variety of scenarios can be easily estimated (and frequently updated with the arrival of new data).

We define three different constant growth scenarios on the basis of the historical personal consumption expenditure (PCE) growth rates from the national accounts.[16] An 'optimistic' scenario uses the average PCE growth rate of each country from 2000-2010, during which period growth rates were significantly higher than before 2000. A 'moderate' growth scenario uses the average PCE growth rate of each country from 1980 to 2010 – the long run average over the entire dataset. Finally, a 'pessimistic' growth scenario uses the 1980 to 2000 average PCE growth rates. The latter scenario assumes that mean consumption in Sub-Saharan Africa is shrinking at a rate of about 0.82% per year.[17] Table A-2 in the Appendix reports the population-weighted average regional growth rates over several different periods to illustrate the implied regional income dynamics.

For each growth scenario, we also simulate three different inequality patterns. 'Pro-poor growth' implies an annual decline in the Gini coefficient of approximately -0.5%, 'distribution-neutral growth' keeps inequality constant at the level prevailing in 2010, and 'pro-rich growth' implies an increase in the Gini coefficient of approximately 0.5% per year.[18] As an illustration, if a country's Gini coefficient is 0.40 in 2010 and we apply the pro-poor pattern, then by 2030 we project a Gini coefficient of about 0.36. If we apply the pro-rich pattern, then the Gini coefficient is about 0.44 in 2030. Changes of this magnitude are in line with the population-weighted regional trends obtained from the surveys.

We forecast the poverty rates until 2030 as follows. First, we estimate the model outlined in Bluhm et al. (2013) for the $1.25 a day poverty line using all nationally-representative surveys recorded in *PovcalNet* over the period from 1981 to 2010. Next, after lining up all surveys in 2010, we apply each of the nine growth and distribution scenarios to project the income and inequality data forward to 2030, country per country.[19] Then, we predict the poverty headcount ratios in five-year intervals over

[16]The term 'national accounts' refers to data from the World Development Indicators or the Penn World Table 7.1, whichever has more data over the 30 year horizon.

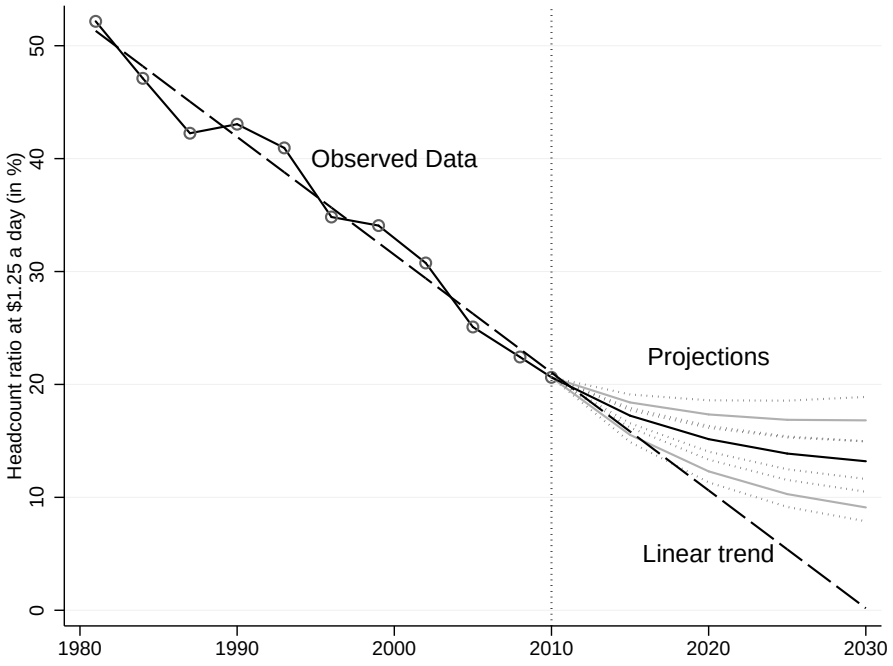
[17]Owing to the post-communist transition, consumption and incomes in Europe and Central Asia were shrinking over the same period. However, given the small number of poor in 2010, the influence of that region on the global poverty headcount in 2030 is minimal.

[18]All reported growth rates (in percent) are computed as log differences if not otherwise noted.

[19]To line up all surveys in 2010, we use the actually observed PCE growth rates from the national

the period 2015 to 2030, country per country. Finally, we calculate population-weighted regional poverty rates and apply these to the projected total population in each region. For consistency with *PovcalNet*, the population projections are also taken from the World Bank and the 'developing world' is defined as in 1990 – the countries targeted by the MDGs – no matter how high we forecast the average level of consumption to be in 2030. Contrary to the World Bank's recent redefinition of the denominator, we still focus on the percent of poor population in the developing world and *not* the entire world.

Figure 5 – Actual and projected poverty headcount ratios at $1.25 a day, 1981–2030



Notes: Author's calculations based on Bluhm et al. (2013) and survey data from *PovcalNet*. The solid black line beyond 2010 refers to the moderate (distribution-neutral) growth scenario in Table 3, while the solid grey lines represent the distribution-neutral variants of the optimistic and pessimistic scenarios. The pro-poor and pro-rich variants are shown as grey dotted lines and are located above or below a solid line.

Figure 5 plots the historical evolution of the poverty headcount from 1981 to 2010, a linear trend fitted through the observed data and then extrapolated until 2030, and our different scenarios. The linear trend serves as a reference for the non-linear projections. Several points are noteworthy. First, only the linear extrapolation predicts a poverty rate in the vicinity of zero by 2030. Regressing the global poverty rate at $1.25 a day on time one obtains a slope of about one percentage point per year (see also Ravallion, 2013).[20] As the global poverty rate is about 20.6% in 2010, the linear trend predicts that

accounts to extrapolate the survey means from the latest available survey. In doing so, we keep inequality constant at the last observed Gini coefficient. In 2010, the average year when the last survey was conducted is 2006.7, so about 3 years prior to 2010. More than 40% of the last surveys were conducted in 2009 or 2010.

[20]This differs from the 1.5 percentage points estimated in the previous section as the global poverty rate is measured by lining up and weighting all surveys at reference years (three year intervals from 1981 onwards), whereas in the previous section we were using an unbalanced panel of unequally-spaced, population-weighted survey data with a wide yet somewhat selective coverage.

extreme poverty has vanished by 2030. Second, all our projections show a decelerating rate of poverty reduction. Even in the most optimistic scenario, the pace of poverty reduction slows down. Most forecasts show a decelerating trend early on. In the optimistic scenario the slowdown only becomes noticeable by about 2020. Third, all scenarios but the optimistic pro-poor growth or optimistic distribution-neutral growth scenarios imply a poverty rate higher than 10% in 2030 at the $1.25 a day line. The optimistic pro-poor growth and distribution-neutral scenarios suggest a poverty rate in 2030 of 7.9% and 9.1%, respectively. In a nutshell, 2030 is not likely to mark the end of extreme poverty, even under very optimistic assumptions. Our projections suggest that the World Bank's goal of 3% extreme poverty in 2030 is not likely to be reached.

Table 3 provides the corresponding regional and total poverty rates in 2030 including the expected number of poor in the various scenarios. Our moderate growth estimate suggests a global poverty rate of 13.2% in 2030, implying about 950 million poor versus 1.2 billion poor people in 2010. The pace of poverty reduction will have slowed significantly both in terms of relative changes and in terms of numbers of poor people. In this scenario, about 70% of the world's poor live in Sub-Saharan Africa and about 23% in South Asia by 2030. In contrast, the (distribution-neutral) optimistic result suggests a poverty rate of 9.11%, with about 655 million people remaining extremely poor. About 76% percent live in Sub-Saharan Africa and about 17% in South Asia. The pessimistic case suggests next to no progress at all. Given an unchanged distribution, the poverty headcount ratio is estimated at 16.82% and the world is still home to 1.2 billion extremely poor people. Even if growth rates in Sub-Saharan Africa were to *double* relative to the post-2000 trend, the global poverty rate in 2030 is still projected to be 6.50% with pro-poor growth, 7.67% with distribution-neutral growth, and 8.81% with pro-rich growth.

All of these estimates imply that it will take considerably longer than 2030 to lift the remaining 1.2 billion people out of poverty. The good news is that by 2030 extreme poverty in Europe and Central Asia, East Asia, Latin America, and Middle East and North Africa may virtually disappear (projected to be less than 5% in most forecasts). However, we predict a strong increase in the (relative) share of global poverty located in Sub-Saharan Africa, which suggests that a non-trivial fraction of extreme poverty may be concentrated in 'fragile states'. Whether these countries will overcome civil strife, political instability and corruption will ultimately decide whether there is a lower bound at which extreme poverty will continue to exist.

Gradual changes in inequality raise or lower the overall headcount in between 1.2 and 2.1 percentage points and account for about 100 million poor people more or less. Contrary to suggesting that inequality does not matter (we only assume slow changes), this finding hints at two crucial points. First, if the developing world as a whole is to truly maintain the impressive record in poverty reduction of the last decades, then this requires both sustained high growth at the level experienced since 2000 and improvements in distribution. Second, any systematic worsening of within-country inequality, particularly in large and largely poor countries like India or Nigeria, will reinforce the slowdown and thus more strongly decelerate the global rate of poverty reduction.

Readers may wonder why these results are so different from the projections reported in Ravallion (2013). Our results differ mainly because Ravallion (2013) uses the average growth rate of the developing world to project poverty in countries with very different track records, while we use country-specific average growth rates. Otherwise there are only minor differences in the data used and our method closely approximates results obtained using *PovcalNet*. Ravallion (2013) calculates that a PCE growth rate of 4.5%

Table 3 – Projected poverty headcount ratios and poor population at $1.25 a day in 2030, by region

	Average PCE Growth								
	Optimistic (2000-2010)			Moderate (1980-2010)			Pessimistic (1980-2000)		
	Change in Inequality (Gini)								
	pro-poor	neutral	pro-rich	pro-poor	neutral	pro-rich	pro-poor	neutral	pro-rich
Panel (a) – Headcount at $1.25 a day in 2030 (in percent)									
East Asia and Pacific	0.65	0.93	1.31	0.76	1.07	1.48	0.94	1.29	1.74
Europe and Central Asia	0.12	0.16	0.21	1.21	1.45	1.71	5.17	5.74	6.44
Latin America and Caribbean	2.27	2.74	3.28	3.46	4.12	4.91	4.59	5.46	6.48
Middle East and North Africa	0.48	0.66	0.91	1.54	2.07	2.75	3.72	4.77	6.05
South Asia	4.19	5.54	7.24	8.48	10.89	13.79	12.76	15.99	19.77
Sub-Saharan Africa	32.09	35.69	39.37	43.62	47.17	50.70	51.75	55.12	58.47
Total	7.88	9.11	10.49	11.63	13.20	14.96	14.96	16.82	18.89
Panel (b) – Poor population at $1.25 a day in 2030 (in millions)									
East Asia and Pacific	14.05	20.23	28.56	16.59	23.29	32.22	20.44	28.00	37.87
Europe and Central Asia	0.59	0.76	0.97	5.72	6.86	8.11	24.47	27.16	30.45
Latin America and Caribbean	16.15	19.44	23.32	24.61	29.30	34.86	32.61	38.77	46.05
Middle East and North Africa	2.12	2.94	4.04	6.84	9.18	12.18	16.47	21.15	26.83
South Asia	83.47	110.38	144.35	169.13	217.08	275.00	254.40	318.89	394.16
Sub-Saharan Africa	449.54	499.97	551.61	611.15	660.85	710.32	725.03	772.26	819.22
Total	567.20	655.36	754.95	836.34	949.49	1076.37	1076.35	1209.95	1359.23

Notes: Author's calculations. Population projections are from the World Bank's Health, Nutrition and Population Statistics database. The different scenarios are estimated using the fractional response approach outlined in Bluhm et al. (2013) and the survey data reported in the World Bank's *PovcalNet* database.

per year may bring the global poverty rate down to 3% by 2027. However, he makes the (in our view implausible) assumption that all developing countries will continue to grow equally fast at this common rate of 4.5%. Likewise, the linear projection of the global poverty rate on time ignores all issues of aggregation and provides an overly optimistic picture of the medium-term future.[21] Yet composition matters, even if we incorporate the optimistic assumption that the post-2000 trend will continue. The average hides that rapid growth is less likely in some countries than in others. As we have shown, this has direct consequences for when a slowdown will be observed and how strong the deceleration will be. However, even if we assume a uniform growth rate for all developing countries, a deceleration appears sooner or later within the next two decades (although it may actually be preceded by a brief acceleration if we assume growth rates in excess of 5% p.a.). It is comforting that, in line with Ravallion (2013), our method implies that if consumption in the entire developing world would grow at a distributional-neutral pace of 7.6% per year, then extreme poverty would indeed virtually disappear by 2030 (fall to 1.1%). The 3% target can be reached with a uniform distribution-neutral growth rate of approximately 5.5% per year.[22]

We repeat this exercise at the $2 a day poverty line. The results are reported in Table 4 and Figure A-1 in the Appendix. Interestingly, the linear projection is a much better approximation of progress at the $2 poverty line than at the $1.25 poverty line. This is not due to a slower historical poverty reduction record: a regression of the global poverty rate at $2 a day on time also yields a slope of approximately one percentage point per year. However, the composition of countries (or people) near the $2 a day poverty line in 2010 is more reminiscent of its $1.25 counterpart in the early 2000s. At the start of the decade in 2010, the total $2 poverty rate is 40.67% – roughly double of the $1.25 poverty rate. Fast growing East Asia and moderately fast growing South Asia still make up more than half of global poverty, implying that progress in these two regions will have a large effect on the overall poverty headcount.

Our moderate growth scenario predicts that about 1.87 billion people (26%) live on less than $2 a day in 2030 versus about 2.4 billion people in 2010. Considerably greater gains are possible. Global poverty at the $2 line falls below 20% in the optimistic distribution-neutral and pro-poor scenarios. If this occurs in 2030, then more than one billion people will have left poverty at the $2 a day line – undeniably a remarkable achievement. In most scenarios we also observe a slowdown at the $2 a day line but this slowdown tends to occur later and is less pronounced than at the lower threshold. In the most optimistic scenario, the rate of poverty reduction actually accelerates somewhat to about 1.16 percentage points per year, while the moderate growth scenario gives a trend of 0.73 percentage points per year over the projection period.

Examining the regional distribution, we find that poverty in East Asia is likely to fall to around 5% by 2030, down from 29.7% in 2010. Nearly everyone in East Asia will have entered the middle class (by developing country standards), but this forecast partially hinges on fast growth in China. In fact, some observers suggest that there is reason to believe that China runs a non-negligible risk of falling into a 'middle-income

[21] We do not mean to imply that Ravallion (2013) is not aware of the aggregation issues. In fact, he uses *PovcalNet* precisely to confirm that his 'optimistic scenario' is possible once the intrinsic non-linearity of the poverty-income-inequality relationship is accounted for. Our point is rather that he envisions "the best possible world" to be used as a benchmark for future progress while we also focus on other, more likely, scenarios.

[22] Interestingly, a recent working paper by Yoshida et al. (2014), independently and using different methods, comes to very similar conclusions.

Table 4 – Projected poverty headcount ratios and poor population at $2 a day in 2030, by region

	Average PCE Growth								
	Optimistic (2000-2010)			Moderate (1980-2010)			Pessimistic (1980-2000)		
	Change in Inequality (Gini)								
	pro-poor	neutral	pro-rich	pro-poor	neutral	pro-rich	pro-poor	neutral	pro-rich
Panel (a) – Headcount at $2 a day in 2030 (in percent)									
East Asia and Pacific	3.79	4.61	5.55	4.03	4.90	5.90	4.39	5.31	6.36
Europe and Central Asia	0.45	0.56	0.69	2.80	3.13	3.49	9.35	10.28	11.31
Latin America and Caribbean	4.00	4.73	5.59	6.29	7.39	8.66	8.57	9.99	11.60
Middle East and North Africa	2.85	3.55	4.39	7.20	8.62	10.25	12.86	14.88	17.12
South Asia	19.83	23.12	26.74	31.60	35.88	40.39	40.35	45.00	49.73
Sub-Saharan Africa	51.62	54.56	57.46	63.67	66.36	68.98	70.93	73.32	75.63
Total	17.36	19.23	21.24	23.73	25.94	28.26	28.71	31.07	33.53
Panel (b) – Poor population at $2 a day in 2030 (in millions)									
East Asia and Pacific	82.42	100.20	120.61	87.49	106.39	128.23	95.44	115.26	138.11
Europe and Central Asia	2.12	2.63	3.26	13.24	14.79	16.49	44.25	48.63	53.50
Latin America and Caribbean	28.39	33.63	39.73	44.71	52.52	61.50	60.90	70.99	82.42
Middle East and North Africa	12.64	15.74	19.47	31.94	38.22	45.46	57.02	65.95	75.91
South Asia	395.33	461.03	533.21	629.97	715.46	805.25	804.56	897.12	991.46
Sub-Saharan Africa	723.19	764.47	805.00	892.01	929.76	966.48	993.71	1027.19	1059.59
Total	1249.19	1383.61	1528.08	1707.20	1866.01	2033.35	2065.12	2235.43	2412.30

Notes: Author's calculations. Population projections are from the World Bank's Health, Nutrition and Population Statistics database. The different scenarios are estimated using the fractional response approach outlined in Bluhm et al. (2013) and the survey data reported in the World Bank's *PovcalNet* database.

trap' (Eichengreen, Park, and Shin, 2013) which might make it harder to achieve less than 10% poverty at $2 a day by 2030.[23] Progress in South Asia is also likely to be rapid. According to our moderate growth estimate the expected poverty rate is 35.9% in 2030, implying about 716 million poor, down from 66.7% and about 1.1 billion poor in 2010. In the optimistic pro-poor growth case, the headcount ratio falls by about one third to less than 20% and the number of poor decreases to less than 400 million. As a stark contrast, the $2 a day poverty rate in Sub-Saharan Africa is expected to remain very high. Our moderate growth scenario predicts a poverty rate of about 66%, down from 69.9% in 2010, which at current population projections implies almost one billion poor in Sub-Saharan Africa alone. Even in the optimistic distribution-neutral growth scenario, we project a poverty rate of about 55% and more than 750 million poor. This is underlined by the analysis in the preceding section where we suggest that the mass of the consumption distribution is far to the left of the $2 a day poverty line in 2010 for most of the subcontinent. Poverty alleviation in Sub-Saharan Africa remains the primary development challenge of the first half of the 21st century.

5 Conclusion and policy recommendations

The main contribution of this paper is to forecast global poverty rates until 2030. To set the stage, we first highlight that there is a fundamental uncertainty about the precise levels of extreme poverty. For the sake of comparison, we select the standard poverty lines of $1.25 and $2 a day (in 2005 PPPs). We then discuss a robust set of global poverty and inequality trends. The global MDG of halving the 1990 extreme poverty level was reached in 2010 but this apparent progress hides substantial regional heterogeneity. Most of the global success was driven by rapid growth in China. Inequality among the citizens of developing countries and between developing countries was declining until 2005, while average within-country inequality was rising steadily until 2010.

The changing composition of global poverty has profound implications for the medium-term future. After 2010, fast growing East Asia will contribute less and less to global poverty reduction, while the share of the global poor residing in Sub-Saharan Africa and South Asia will continue to rise. All of our projections show that the global rate of poverty reduction at $1.25 a day will slow down markedly between 2020 and 2025. None of our nine scenarios predicts a poverty rate near zero by 2030. This stands in stark contrast to earlier studies and the '3% by 2030' target recently announced by the World Bank. The Bank's target can only be reached if we make the unrealistic assumption of equally rapid growth in all developing countries. Once country-specific growth rates are used, even our most optimistic scenarios suggest a poverty rate between 7.9% and 10.5%, depending on the evolution of inequality. At $2 a day, the slowdown will occur much later and remarkable gains are possible if the post-2000 growth trends continue. An optimistic estimate suggests that the $2 a day poverty rate may fall below 20% by 2030, implying one billion fewer poor people than in 2010.

We propose two new 'twin targets' on the basis of these findings. An aspirational but realistic benchmark for progress would be to *"reduce the proportion of the population living below $1.25 to 8% by 2030 and reduce the proportion of the population living below $2 a day poverty rate below 18% by 2030."* Both of these targets are firmly anchored

[23] However, our estimates suggest that this would require an exceptionally large slowdown. For poverty in East Asia to remain above 10% at $2 a day, growth needs to be less than half of the 2000-2010 trend.

in our optimistic pro-poor growth scenarios. The $2 a day poverty line should receive more attention in the future to better track continued progress in East Asia and, later on, South Asia. Partly for the same reason, China has recently raised its own national poverty line to about $1.80 a day.

These targets can be reached in a variety of ways but not only through a continuation of the current path. They will require either an additional acceleration of growth in poorer countries, or improvements in distribution. Reversing the trend of rising within-country inequalities would speed up the pace of poverty reduction and still ensure progress at more moderate growth rates. The returns to redistribution are increasingly high in East and South Asia, and remain relatively large in Latin America. However, in some regions growth takes precedent. Rapid poverty alleviation in Sub-Saharan Africa still requires a significant and sustained acceleration in consumption growth.

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Appendix A

Table A-1 – World Bank poverty estimates by region, 1981 to 2010 (selected years)

	Year				
	1981	1990	1999	2005	2010
Panel (a) – Headcount ratio at $1.25 a day (in percent)					
East Asia and Pacific	77.18	56.24	35.58	17.11	12.48
China	84.02	60.18	35.63	16.25	11.62
Europe and Central Asia	1.91	1.91	3.79	1.33	0.66
Latin America and Caribbean	11.89	12.24	11.86	8.66	5.53
Middle East and North Africa	9.56	5.75	5.01	3.45	2.41
South Asia	61.14	53.81	45.11	39.43	31.03
India	59.83	51.31	45.62	40.82	32.67
Sub-Saharan Africa	51.45	56.53	57.89	52.31	48.47
Total	52.16	43.05	34.07	25.09	20.63
Panel (b) – Poor population at $1.25 a day (in millions)					
East Asia and Pacific	1096.5	926.42	655.59	332.08	250.90
China	835.07	683.15	446.35	211.85	155.51
Europe and Central Asia	8.21	8.87	17.83	6.26	3.15
Latin America and Caribbean	43.33	53.43	60.10	47.60	32.29
Middle East and North Africa	16.48	12.96	13.64	10.47	7.98
South Asia	568.38	617.26	619.46	598.26	506.77
India	428.68	448.34	472.74	466.30	400.08
Sub-Saharan Africa	204.93	289.68	375.97	394.78	413.73
Total	1937.83	1908.45	1742.53	1389.2	1214.98
Total excl. China	1102.76	1225.30	1296.18	1177.35	1059.31

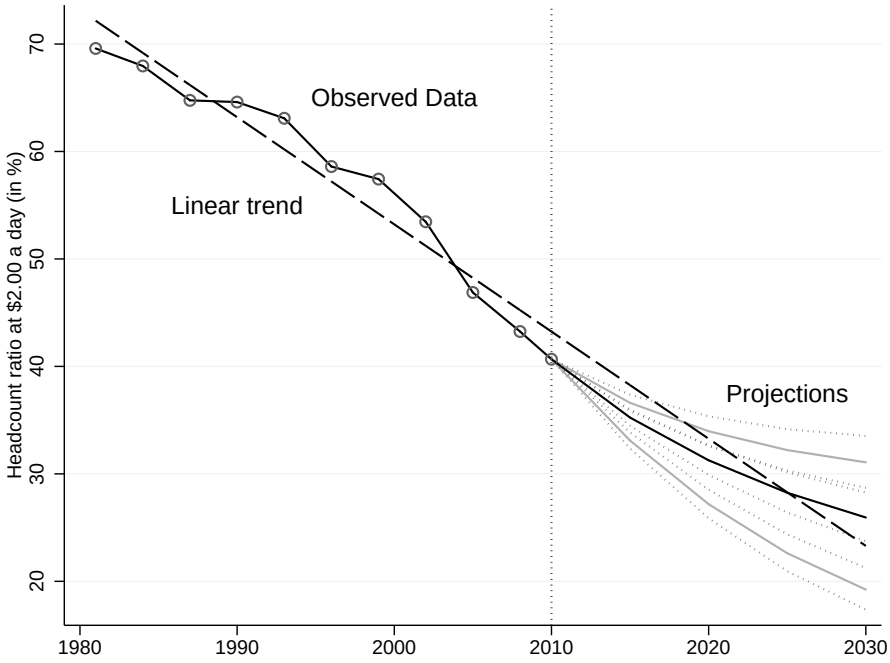
Notes: Based on *PovcalNet* and Chen and Ravallion (2010, 2013).

Table A-2 – Population-weighted regional PCE growth rates over various periods

	Period				
	2000 – 2010	1990 – 2010	1980 – 2010	1980 – 2000	1990 – 2000
East Asia and Pacific	5.906	5.772	5.598	5.377	5.608
	(0.813)	(0.653)	(0.725)	(0.677)	(0.508)
Europe and Central Asia	6.085	2.755	2.558	-0.769	-1.225
	(0.989)	(0.412)	(0.411)	(0.916)	(1.027)
Latin America and Caribbean	2.444	2.219	1.445	0.677	1.931
	(0.239)	(0.140)	(0.098)	(0.171)	(0.337)
Middle East and North Africa	3.495	2.532	1.851	0.495	1.253
	(0.443)	(0.440)	(0.293)	(0.545)	(0.648)
South Asia	4.448	3.612	3.179	2.173	2.511
	(0.489)	(0.388)	(0.351)	(0.284)	(0.294)
Sub-Saharan Africa	2.382	1.419	0.698	-0.818	0.016
	(0.689)	(0.470)	(0.472)	(0.540)	(0.688)
Overall average	4.544	3.809	3.437	2.565	2.862
	(0.152)	(0.132)	(0.114)	(0.161)	(0.225)
N	123	123	123	122	122
$\bar{T}$	10.99	20.64	27.16	16.30	9.730
$N \times \bar{T}$	1352	2539	3341	1989	1187

Notes: Author's calculations. We use growth in per capita consumption from World Development Indicators or Penn World Table 7.1, depending on which series is longer. Cluster-robust standard errors are reported in parentheses.

Figure A-1 – Actual and projected poverty headcount ratios at $2 a day, 1981–2030



Notes: Author's calculations based on Bluhm et al. (2013) and survey data from *PovcalNet*. The solid black line beyond 2010 refers to the moderate (distribution-neutral) growth scenario in Table 4, while the solid grey lines represent the distribution-neutral variants of the optimistic and pessimistic scenarios. The pro-poor and pro-rich variants are shown as grey dotted lines and are located above or below a solid line.