

# Gasoline, Guns, and Giveaways: Is there New Capacity for Redistribution to End Three Quarters of Global Poverty?

**Chris Hoy and Andy Sumner**

## Abstract

Amartya Sen's famous study of famines found that people died not because of a lack of food availability in a country but because some people lacked entitlements to that food. Is a similar situation now the case for global poverty, meaning that national resources are available but not being used to end poverty? This paper argues that approximately three-quarters of global poverty, at least at the lower poverty lines, could now be eliminated—in principle—via redistribution of nationally available resources in terms of cash transfers funded by new taxation and the reallocation of public spending (from fossil fuel subsidies and 'surplus' military spending). We argue that the findings provide a rationale for a stronger consideration of some national redistribution for purely instrumental reasons: to reduce or end global poverty quicker than waiting for growth. We find that at lower poverty lines ending global poverty may now be within the financial capacities of most national governments of developing countries either in the form of potential new taxation or reallocation of existing public finances though this is not the case at higher poverty lines. In summary, reducing global poverty at lower poverty lines is increasingly a matter of national inequality.

**JEL Codes:** D30; I32; I38

**Keywords:** poverty, inequality, redistribution

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Chris Hoy  
University of Sydney

Andy Sumner  
King's College London

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**Center for Global Development**  
**2055 L Street NW**  
**Washington, DC 20036**

202.416.4000  
(f) 202.416.4050

**[www.cgdev.org](http://www.cgdev.org)**

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## Executive Summary

This paper considers what it would take to end global poverty and the national capacity for redistribution. We argue that:

1. Global poverty lines ought to be extended beyond \$1.90 to include lines at \$2.50, \$5 and \$10-per-day on the logic that these are respectively, the approximate value of the average value of national poverty lines of all developing countries, the average of national poverty lines of all countries and the daily consumption associated in longitudinal studies with permanent escape from poverty. Furthermore, contrary to popular belief, the poor, wherever they live, live at about the same level. The poor are not necessarily better off if they live in developing countries with higher average incomes or consumption. Indeed, the average poor person in Brazil is actually worse off than in the DRC. The average poor person in Ethiopia is only slightly worse off than the average poor person in China or India.
2. It is generally assumed that most or all developing countries have insufficient domestic capacity to raise taxes or reallocate public spending to fully address the national aggregate poverty gap. We find that, in general, this is no longer the case at \$1.90 or \$2.50 per day and even at \$5 per day potentially. In short, most developing countries have the financial scope to dramatically speed up the end of poverty based on national capacities without necessarily having to wait for economic growth. We find that three-quarters of global poverty could be ended via new taxation and reallocation of public spending. In terms of new taxation alone we find that, almost all countries with a GNI Atlas per capita over \$2000 per capita could end \$1.90 poverty and \$2.50 poverty. All of the above would suggest one could classify countries by their ability to end poverty in terms of domestic taxation potential. This would entail doubling the LIC-to-MIC threshold from approximately \$1000 GNI Atlas per capita to \$2000 per capita.
3. Our conclusion is that the findings demonstrate new capacity for national redistribution—in short three quarters of global poverty could be ended quite quickly in principle although the political economy of redistribution would of course not be easily navigated. We argue our findings do though mean (a) the causes of global poverty are now a question of political economy rather than resource scarcity and relate to fiscal policy which is a choice or contract that governments or elites make with the rest of the population; and (b) there is an overwhelming rationale for a stronger consideration of some form of national redistribution for purely instrumental reasons: to end global poverty quicker than waiting for growth alone to do the job. In summary, reducing global poverty at lower poverty lines is increasingly a matter of national inequality and the causes of much of global poverty are about political economy and specifically normative fiscal policy choices rather than resource scarcity. In the same way that Amartya Sen's famous study of famines found that people died not because of a lack of food availability in a country but because some people lacked entitlements to that food, we are arguing here that national resources are available but not being used to end poverty.

## 1. Introduction

Amartya Sen's (1981) famous study of famines found that people died not because of a lack of food availability in a country but because some people lacked entitlements to that food. Is a similar situation now the case for global poverty, meaning that national resources are available but not being used to end poverty? This paper argues that up to three-quarters of global poverty, at least at lower poverty lines, could now be eliminated—in principle—via redistribution of nationally available resources.

The United Nations and member states have committed to ending poverty by 2030 in “all its forms” including monetary and other dimensions. This paper makes conservative estimates of the extent to which economic growth alone is sufficient to end poverty and estimates further the capacity for national redistribution in the form of new taxes or the reallocation of public spending towards cash transfers to the poor. We focus on four global poverty lines to do this at \$1.90 (the new global poverty line); \$2.50 (the median of national poverty lines in all developing countries); \$5 (the median national poverty line of all countries) and \$10 (a line associated with permanent escape from poverty in longitudinal studies).

Once the poverty line is set (with all the usual caveats noted), ending monetary poverty is a matter of either: a certain amount of economic growth — meaning output and consumption growth to achieve a household consumption per capita where no one is below the poverty line set OR a certain amount of redistribution from those above the chosen poverty line to those below it OR a mix of these. We focus in this paper on the national capacity to redistribute. We provide in an annex a set of country-based estimates for the end of poverty based on growth alone as a *potential and caveat heavy* counterfactual. That such projections come with LARGE caveats that should not be forgotten. The primary focus of this paper is not those projections, rather it is new estimates of the national capacity for redistribution to end global poverty.

We find that up to three-quarters of global poverty at the lower poverty lines and even at \$5 per day could be eliminated with some form of nationally funded redistribution in the form of reallocation of public finances and/or new taxes. We argue that our findings imply a rationale for a stronger consideration of some national redistribution for purely instrumental reasons: to end global poverty quicker than waiting for growth.

The intended contribution of this paper is twofold. First, we discuss some of the issues in choosing the global poverty line and remap the “geography” or location of poverty at various poverty lines using the latest (2011 purchasing power parity (PPP)) PovcalNet (Oct 2015) data. It is often assumed that the severity of poverty is less acute in better off developing countries (which might be classified crudely as middle-income countries, MICs) than in the world's poorest countries which may be labelled crudely as low-income countries (LICs) or least developed countries (LDCs). We find that the relationship between poverty severity and average consumption per capita is far from linear. Surprisingly many countries that are unambiguously MICs and many upper middle-income countries (UMICs), have poverty severity, at various poverty lines, comparable to the very poorest countries, despite much higher gross national income (GNI) Atlas per capita (the basis of the World Bank country income classification) and household final consumption expenditure (HFCE) per capita than the poorest countries.

Conversely, poverty severity in some of the poorest countries is not uniformly high at any given poverty line.

Second, we consider the national capacity to end global poverty via redistribution in two forms. First, in terms of new taxation. We rerun with the latest data the estimates of Ravallion's (2009) marginal tax rates (MTRs) to end poverty. Ravallion showed that only a small number of developing countries had the capacity for redistribution based on data from around the mid-2000s. We find that this is no longer the case. We also consider the reallocation of two illustrative public "bads." Specifically, regressive fossil-fuel subsidies (see discussion of Sumner, 2016a, 2016b and similar estimates at \$1.90 and \$2.50 poverty lines therein) which are an aspect of fiscal policy that is unequivocally pro-rich and what we have termed "surplus" military spending which we define as more guns than your neighbours meaning military spending above the regional lowest per capita spent. We appreciate that reducing military spending to this level may seem radical to some as no doubt would the reallocation of fossil fuel subsidies away from cheap petrol. However, our estimates of the impact of such changes in fiscal policy show what is at stake — the end of three quarters of global poverty — and our estimates are *deliberately* conservative for a number of reasons we outline. Our intention is not to annoy those who enjoy cheap petrol for example but to illustrate the resources now available nationally to governments and the implied *opportunity costs in terms of poverty*. We include a number of caveats on each of these estimates of reallocation of public finances. The reallocation of either would not be easily achieved of course given the political economy of fiscal policy. The argument we are seeking to sustain is that it is generally assumed that most or all developing countries have insufficient domestic capacity to raise taxes or reallocate public spending to address fully the aggregate poverty gap. We find that on average this is no longer the case: The total poverty gap at \$1.90 and \$2.50 and potentially \$5 per day could be addressed by national redistribution. However, at the higher poverty line of \$10, associated with permanent escape from poverty in longitudinal data, we find that only a small share of the total poverty gap is covered. In short, most developing countries have the financial capacity to end poverty at the new global poverty line of \$1.90 or a slightly higher line of \$2.50 and potentially \$5 per day but this is not the case at poverty lines of \$10 per day.

The paper is structured as follows: Section 2 outlines the characteristics of the global poverty problem. Section 3 makes new estimates of the national capacity to redistribute via new taxes and public finance reallocation. Section 4 concludes.

## 2. The Characteristics of Contemporary Global Poverty

The “geography” or location of global poverty has triggered discussion over the last few years.<sup>1</sup> In this section we outline a logic for the use of two lower poverty lines (\$1.90 and \$2.50) and two higher poverty lines (\$5 and \$10). Using these lines we consider the geography or location of the global poverty. We discuss the relationship between poverty severity and average consumption from survey data in order to assess the assumption that the severity of poverty is necessarily worst in the world’s poorest countries.

### 2.1 Global Poverty Lines

The poverty line one chooses makes a substantial difference not only to the level and trend in global poverty observed but to the costs of ending poverty (in terms of the monetary value of the poverty gap) and furthermore the overall distribution of global poverty. Edward and Sumner (2015) discuss these matters originally raised in Deaton (2010) in more depth: in short, lower poverty lines “push” global poverty into sub-Saharan Africa and very slightly higher lines “Asianise” global poverty as Deaton put it after the 2005 PPP revision.

The “official” global poverty line or “extreme poverty” line as it is known has recently been rebased to \$1.90 in 2011 PPP from \$1.25 in 2005 PPP (see for discussion, Ferreira et al., 2015; Jolliffe and Prydz, 2015). This has not been without contention (see Lahoti and Reddy, 2015). The new line is based on the same set of 15 countries that were used to estimate the earlier \$1.25 line. It is also the median of the national poverty lines (NPLs) in the world’s LICs. More importantly, Jolliffe and Prydz (2016: 4) provide a new data set of estimates for national poverty lines in 2011 PPP, by inferring national poverty lines from the poverty rate. They note that the average poverty line produced from the set of national poverty lines that are the basis for the global \$1.90 line are very sensitive to quality of inflation data. They note that poor data quality and high inflation in the world’s poorest countries raises question marks about the use of CPI for long periods for the poorest countries?<sup>2</sup> What if one based the global poverty line on national poverty lines across all developing countries. Table 1 shows the means and the medians with and without population weighting using the Jolliffe and Prydz dataset. The table shows that the average value of national poverty lines across all developing countries is approximately \$2.50-per-day (the median is \$2.79 and population weighted mean is \$2.46). The average across all countries is \$5-per-day (the median is \$4.59 and the population weighted mean is \$5.33).

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<sup>1</sup> See for range of discussion: Alkire et al., 2011, 2015a, 2015b; Alonso 2012; Alonso et al., 2014; Clarke and Feeny, 2011; Carbone, 2013; Edward and Sumner, 2014; Glennie, 2011; Haddad, 2012, 2014; Herbert, 2012; Kanbur and Sumner, 2012; Keeley, 2012; Koch, 2015; Sumner and Mallet, 2013; Lundsgaarde, 2012; Madrueño-Aguilar, 2015; Ottersen et al. 2014; Poke and Whitman, 2011; Sumner, 2010, 2012; Tezanos and Sumner, 2013, 2016.

<sup>2</sup> For example, the 15 NPLs used for the \$1.90 data date from 1997 on average, and thus, on average, means 14 years of inflation data from the world’s poorest countries are required to bring the line to 2011. The oldest line in the sub-set is from 1988/9, for Mali and entailing some 22 years of consumer price index (CPI) data from Mali. Indeed, in three countries (Ghana, Malawi and Tajikistan), the CPI data was thought to be so questionable that household survey data was used to construct a temporal deflator. If CPI in World Development Indicators had been used for those three countries it would have added 20 cents to the international poverty line and 200m poor to global poverty counts Jolliffe and Prydz note (see also figures 1 and 2).

**Table 1**  
**Mean and median of national poverty lines, most recent for each country**  
**2001-2012**

	Mean		Median	
	Not weighted	Population weighted	Not weighted	Population weighted
LIC	1.88	1.68	1.78	1.62
MIC	4.18	2.54	3.88	1.91
HIC	18.63	19.05	19.85	21.7
All developing countries	3.57	2.46	2.79	1.91
All countries	7.87	5.33	4.59	1.91

Source: Data processed from Jolliffe and Prydz dataset (2016: 31-34). Note: All developing countries = LICs and MICs (non-OECD); based on current country classification. HIC = high-income country.

**Table 2**  
**Correlation of multidimensional poverty headcount to monetary poverty**  
**headcounts, 2010-2012**

Monetary poverty line	\$1.90	\$2.50	\$3.10	\$4	\$5	\$10
Correlation with multidimensional headcount	0.810	0.864	0.880	0.872	0.847	0.707

Source: Authors estimates based on data from World Bank (2015) and UNDP (2016).

A global poverty line of \$2.50 might also be linked to multidimensional poverty, as \$2.50 is the line which gives a similar headcount to estimates of multidimensional poverty of 1.6bn in 2010 for multidimensional poverty and \$2.50 poverty in the same year (Edward and Sumner, 2014). One limitation of this approach is that it may be the case that the multidimensional poor and the monetary poor are not necessarily the same 1.6bn people. Alkire et al. (2014) review numerous studies and argue that the monetary poor and the multidimensional poor are not synonymous. Table 2 shows the correlations between poverty headcounts at various monetary poverty lines (in 2011 PPP) and multidimensional poverty. The correlations are 0.8098 at \$1.90 and strengthen in the \$2.50-\$5 range (see Table 2). However, given that the underlying data is from various different years one should not read too much into this correlation and the correlation will differ from country to country based on prevailing social programmes and education and health costs and so forth. Potentially, one could simply read the following: \$1.90 per day may be too low to measure global poverty across all developing countries. At the other end of the range of poverty lines, full escape from the risk of falling back into



poverty in the future is associated with a substantially higher line of \$10 per day in longitudinal studies of Brazil, Mexico and Chile (López-Calva and Ortiz-Juarez, 2014) and Indonesia (Sumner et al., 2014). The \$10 poverty line is a proposal for a “security-from-poverty” consumption line developed and used by López-Calva and Ortiz-Juarez (2014) based on the 10 percent probability of falling back below national poverty lines (which are \$4-\$5/day in 2005 PPP) in the near future in Mexico, Brazil and Chile.<sup>3</sup>

Figure 1 shows the global poverty headcount at various poverty lines in 2011 PPP. The global poverty headcount in 2012 at \$1.90 per day is 12.7 percent or 896.7 million people in our data set. However, the global poverty headcount rises to 21.9 percent or 1.5 billion people at \$2.50, 47.4 percent or 3.3 billion people at \$5 and 67.2 percent or 4.7 billion people at \$10 per day.<sup>4</sup> Figure 2 shows how sensitive global poverty headcounts are to small changes in the value of the line. If one starts at the new global poverty line of \$1.90 per day every dime — ten cents — adds 100m people up to \$2.50 (as noted in Edward and Sumner, 2015) where the curve turns and every additional dime adds slightly less people into poverty. In short, something in the order of closer to \$5 or \$10 would be less sensitive to a dime here or there and have an underlying logic in either all national poverty lines or longitudinal poverty studies.

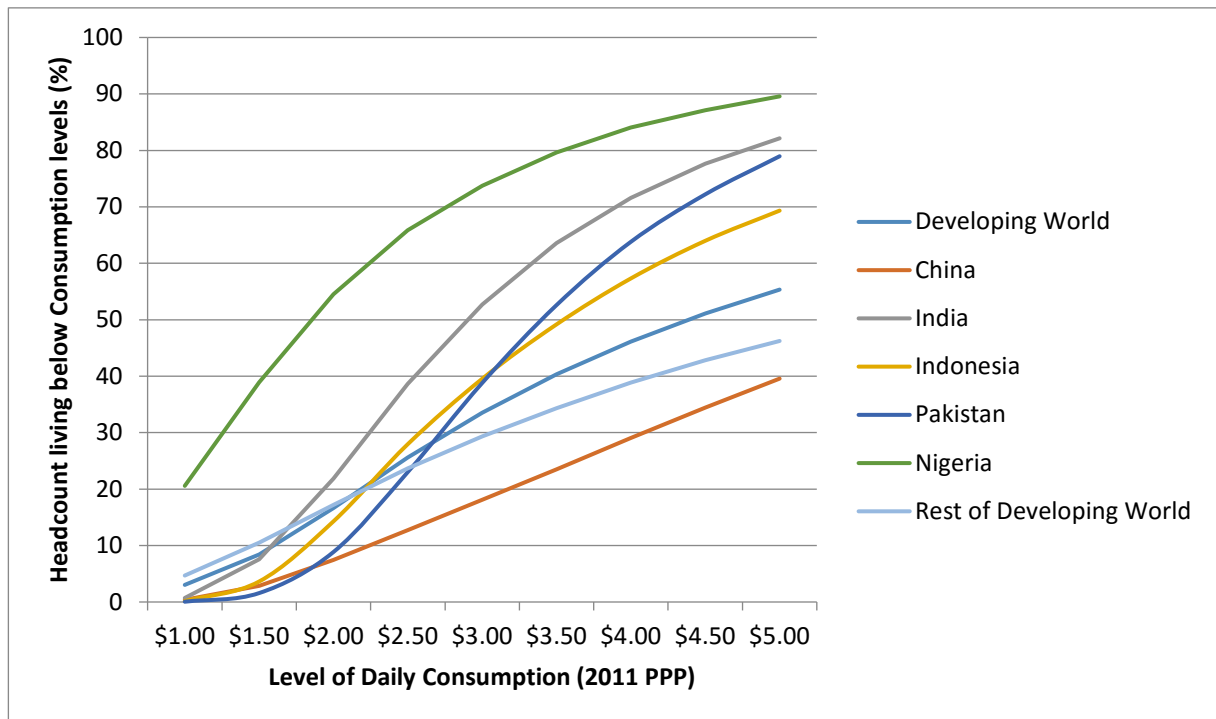
In keeping with Jolliffe and Prydz (2016), a set of poverty lines would seem sensible rather than just one line. However, rather than applying different lines for different countries we argue for applying a set of lines to all developing countries. In this paper we take \$1.90, \$2.50, \$5 and \$10 as a set of global poverty lines in order to consider the implications for ending global poverty at various lines, and to emphasise that people do not jump out of poverty into prosperity but move out of poverty at different scales of severity. Table 3 shows how much difference the choice of poverty line makes to the global geography of global poverty.

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<sup>3</sup> The 10% probability line is actually \$8.50-\$9.70 depending on whether Brazil, Mexico or Chile are used (and comparable estimates for Indonesia are \$8.37 for a \$4 national poverty line and \$13.03 at \$5, in 2005 PPP — see Sumner et al., 2014). Thus, the mean is \$9.27 and if the mean is inflated to 2011 prices it is \$10.47.

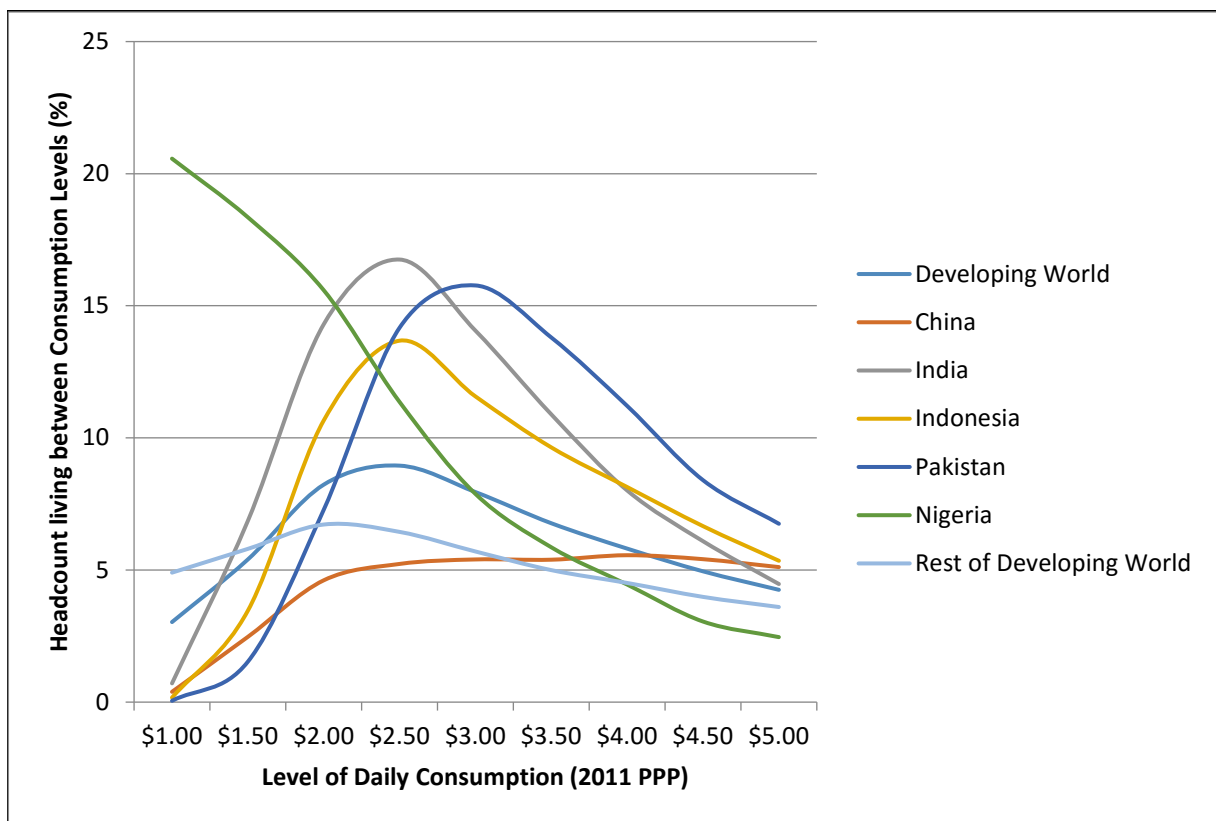
<sup>4</sup> It should be noted here for comparability that the remaining estimates in this paper, although based on the same PovcalNet Oct 2015 data set, differ slightly from the “official” World Bank aggregate figures, because estimates do not “fill” missing data for countries with regional averages (see Ferreira et al., 2015: 28). For example, at the \$1.90 2011 PPP line the World Bank estimates a global poverty headcount of 896.7 million people (Ferreira et al., 2015), or 902 million (cf. Cruz et al., 2015), whereas our data set direct from PovcalNet has a total of 856 million. The PovcalNet country-by-country data set covers 95.5% of the relevant population and the World Bank takes regional average poverty headcounts to “fill” the estimates for the missing population.

Figure 1. Poverty headcount (% of population) at different daily consumption levels, 2012



Source: Authors' estimates processed from World Bank (2015).

Figure 2. Poverty headcount (HC) rate (% of population) that live between different daily consumption levels, 2012



Source: Authors' estimates processed from World Bank (2015).

Table 3 shows the 18 developing countries where global poverty is concentrated (the specific set of countries are those that account for more than 1 percent of the lowest poverty line, the \$1.90 per day, and this set of 18 countries account for 82.8 percent of global poverty at the \$1.90 line and more at higher poverty lines). There are a sub-set of seven of these 18 countries which are classified as LICs and these seven countries account for almost one in five of the world's poor at \$1.90 but just one in ten of the world's poor at \$5 per day and only 7 percent of world poverty at \$10 per day: the DRC, Ethiopia, Madagascar, Malawi, Mozambique, Tanzania and Uganda. In contrast, there are a sub-set of 11 countries of the 18 which are classified as MICs. These 11 countries alone account for close to 60 percent of the world's poor at \$1.90 but over 70 percent at the higher lines of \$5 and \$10 per day. These countries are as follows: Bangladesh, Brazil, China, India, Indonesia, Kenya, Nigeria, Pakistan, the Philippines, South Africa and Zambia. One might be surprised to see Brazil and South Africa both account for more than one per cent of global poverty at the lowest poverty lines.

Table 3 also shows the mean consumption of those in poverty for each poverty line. A very clear pattern exists that there is only a relatively small difference between the average for LICs and MICs at the \$1.90 and \$2.50 per day lines. In contrast, there is quite a significant difference at the \$5 and \$10 lines. The average (mean) poor person (under \$1.90) in Brazil is actually worse off than in the DRC. And the average poor person (under \$1.90) in Ethiopia is only slightly worse off (\$1.40) than the average poor person in China (\$1.50) or India (\$1.53), and the average poor person in Ethiopia is better off than the average poor person in South Africa (\$1.34). On average the \$1.90 poor in low income countries consume almost the same as the poor in Upper Middle Income Countries (\$1.19 versus \$1.24).

Table 3

Global poverty and estimates of the mean consumption of the poor in countries which account for more than 1 percent of global poverty headcount at \$1.90, 2012

	\$1.90 per day		\$2.50 per day		\$5 per day		\$10 per day	
	% of total global poverty headcount	Mean consumption of poor	% of total global poverty headcount	Mean consumption of poor	% of total global poverty headcount	Mean consumption of poor	% of total global poverty headcount	Mean consumption of poor
<b>LICs</b>								
DRC	5.9	\$0.93	3.8	\$1.06	2.1	\$1.33	1.5	\$1.45
Ethiopia	3.1	\$1.40	3.2	\$1.73	2.6	\$2.45	2.1	\$2.80
Madagascar	2.1	\$0.96	1.4	\$1.06	0.7	\$1.26	0.5	\$1.35
Malawi	1.3	\$1.01	0.9	\$1.16	0.5	\$1.48	0.4	\$1.66
Mozambique	1.8	\$1.09	1.3	\$1.28	0.8	\$1.69	0.6	\$1.91
Tanzania	2.6	\$1.31	2.1	\$1.56	1.4	\$2.07	1.1	\$2.41
Uganda	1.4	\$1.32	1.3	\$1.61	1.0	\$2.34	0.8	\$2.91
<b>MICs</b>								
Bangladesh	6.7	-	6.3	-	4.5	-	3.5	-
Brazil	1.1	\$0.87	0.9	\$1.29	1.3	\$3.00	2.1	\$5.45
China	10.2	\$1.50	11.7	\$1.84	17.2	\$3.13	22.6	\$5.00
India	26.9	\$1.53	32.5	\$1.88	32.6	\$2.72	27.3	\$3.29
Indonesia	3.4	\$1.59	4.7	\$1.94	5.5	\$2.90	5.2	\$3.86
Kenya	1.3	\$1.27	1.2	\$1.59	1.0	\$2.48	0.9	\$3.36
Nigeria	10.2	\$1.14	7.6	\$1.36	4.9	\$1.91	3.8	\$2.32
Pakistan	1.4	\$1.63	2.8	\$2.04	4.5	\$3.10	4.0	\$3.71
Philippines	1.5	\$1.50	1.7	\$1.85	1.9	\$2.86	1.9	\$4.03
South Africa	0.9	\$1.34	0.9	\$1.66	0.9	\$2.64	0.9	\$3.83
Zambia	1.0	\$0.99	0.7	\$1.15	0.4	\$1.59	0.3	\$2.03
<b>Regions</b>								
Sub-Saharan Africa	42.8	\$1.24	33.1	\$1.51	22.6	\$2.25	18.2	\$2.98
East Asia and the Pacific	16.1	\$1.43	19.3	\$1.82	26.8	\$3.05	32.9	\$4.55
South Asia	35.5	\$1.59	42.2	\$2.03	42.6	\$3.24	35.7	\$4.51
<b>Income groups</b>								
LIC	26.8	\$1.19	20.7	\$1.42	14.0	\$1.98	10.9	\$2.38
LMIC	58.5	\$1.34	63.3	\$1.71	62.4	\$2.85	54.9	\$4.14
LMIC minus India	31.6	\$1.33	30.8	\$1.71	29.7	\$2.85	27.6	\$4.17
UMIC	14.6	\$1.24	15.9	\$1.70	23.6	\$3.36	34.2	\$6.05
UMIC minus China	4.4	\$1.24	4.2	\$1.69	6.5	\$3.37	11.6	\$6.07
All developing countries	100.0	\$1.27	100.0	\$1.65	100.0	\$2.91	100.0	\$4.66

Source: Authors' estimates based on data from World Bank (2015). Note: The full data are not available for Bangladesh in 2011 PPP but estimates are made in PovcalNet of headcounts at different poverty lines.

## **2.2 Poverty Severity and Average Consumption**

Discussion of the mean consumption of the poor raises the question of poverty severity, meaning how far the average person living in poverty is below the poverty line, and how this differs at different levels of average national income and consumption. It is often thought that poverty severity is far worse in poorer countries (taking national average income or consumption per capita). It is often also assumed that the severity of poverty is less acute in better off developing countries which might be labelled crudely as MICs than in the world's poorest countries which may be labelled crudely as low-income or least developed countries. We find, however, that the relationship between poverty severity and income per capita is far from linear. Surprisingly, many MICs have poverty severity comparable to the poorest countries despite having much higher GNI (Atlas or PPP) per capita, and HFCE PPP per capita of the poorest countries. Conversely, poverty severity in some of the poorest countries is not uniformly high. Figures 3-10 show the average consumption of people living in poverty (y-axis) versus the average consumption for the whole population in a country (x-axis). Eight countries are labelled as they have at least 2 percent of the total share of world poverty (at \$1.90). At the lower poverty lines of \$1.90 and \$2.50 it is the case that poverty severity has little discernible relationship with average consumption. In contrast at \$5 or \$10 poverty severity has a clearer relationship with average consumption, whereby at higher average consumption levels poverty severity is lower. These are, of course, cross-sectional data but these have some important implications. On average, a person living in \$1.90 or \$2.50 poverty has a surprisingly similar standard of deprivation in both low and middle-income countries.

Figure 3. Poverty severity at \$1.90 compared to the mean survey consumption

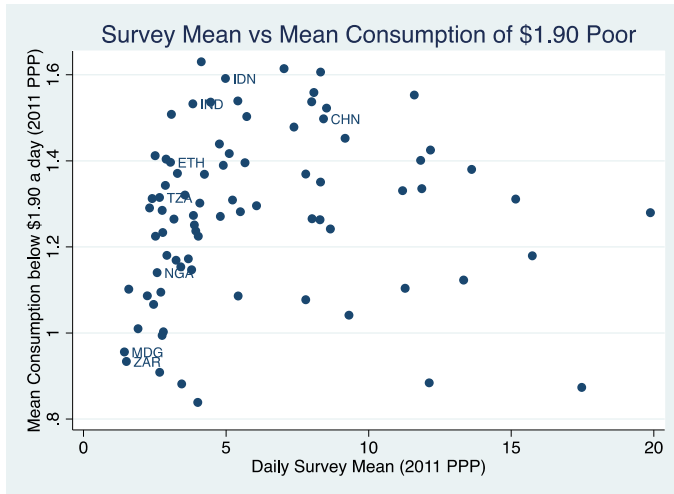


Figure 4. Poverty severity at \$2.50 compared to the mean survey consumption

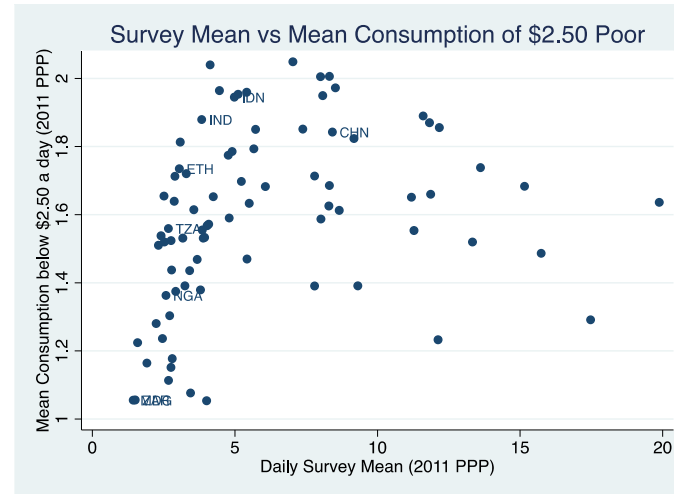


Figure 5. Poverty severity at \$5 compared to the mean survey consumption

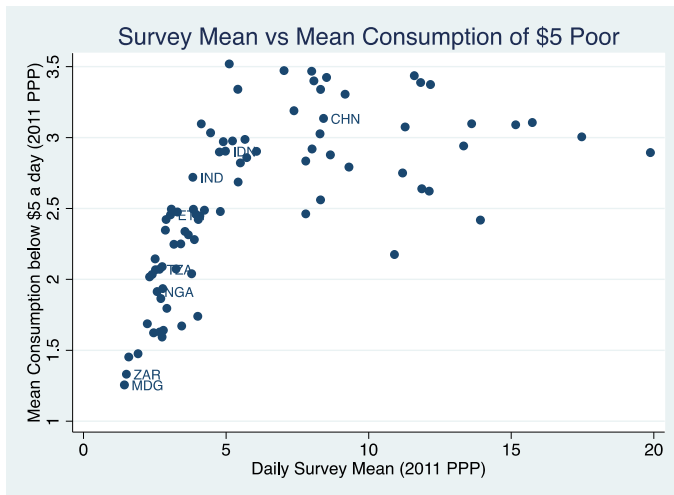


Figure 6. Poverty severity at \$10 compared to the mean survey consumption

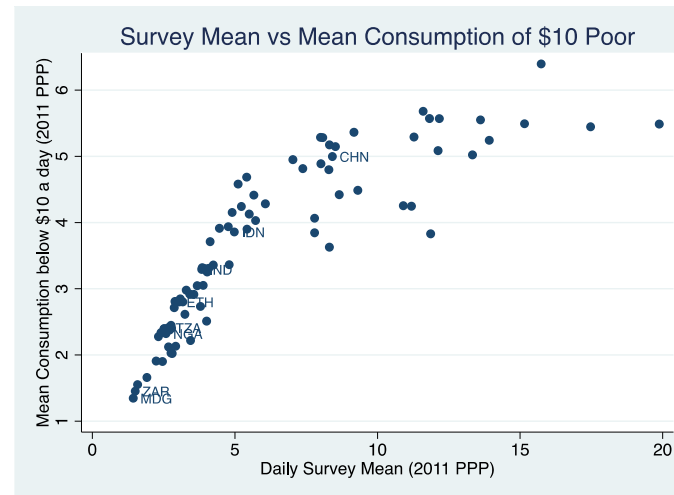


Figure 7. Poverty severity at \$1.90 compared to the mean HFCE

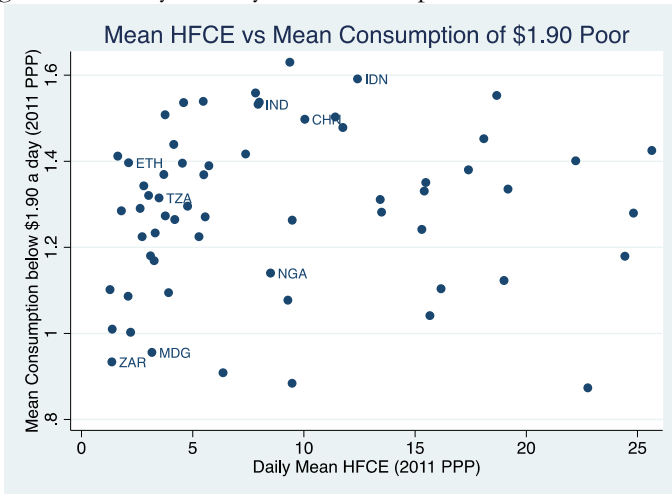


Figure 8. Poverty severity at \$2.50 compared to the mean HFCE

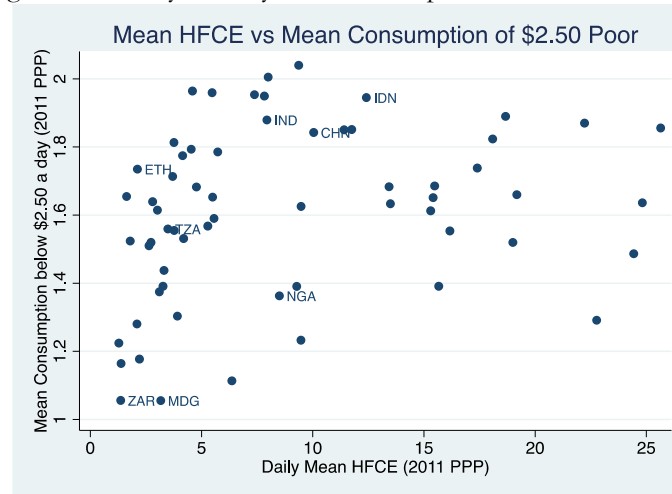


Figure 9. Poverty severity at \$5 compared to the mean HFCE

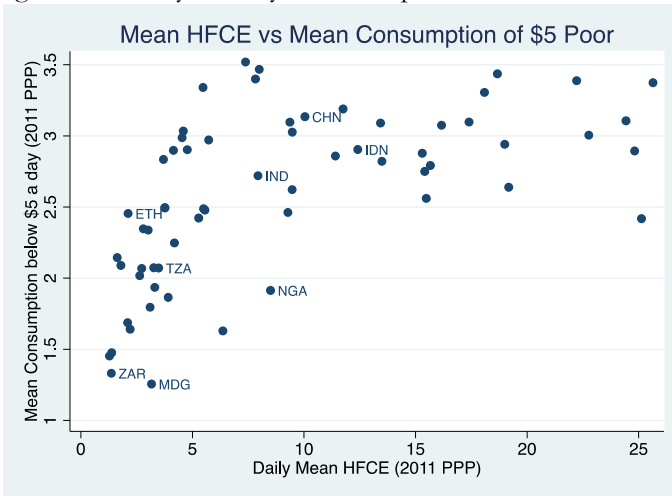
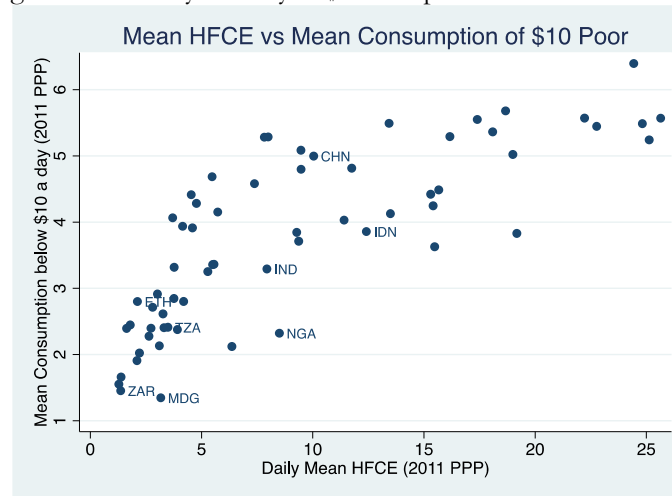


Figure 10. Poverty severity at \$10 compared to the mean HFCE



Source: Authors' estimates processed from World Bank (2015, 2016).

In other words, people living in extreme poverty have similar levels of consumption regardless of the country they are in. However, if a higher poverty line of say \$5 or \$10 is used then one would find that a higher level of average poverty severity exists in poorer countries (see Figures 3 to 6 for survey means and Figures 7 to 10 for NA means). We next consider the end of poverty for each poverty line.

### **3. National Capacities for Redistribution to End Poverty**

#### **3.1 Methodology**

In this section we discuss the national capacity to redistribute via taxes and public finance reallocation towards cash transfers to the poor, to fill the total poverty gap in each country. As recently as the early to mid-2000s, estimates of redistributive capacity suggested that the national capacity for redistribution was limited and would not cover the poverty gap unless the marginal tax rates (MTRs) on the ‘rich’ were exorbitant for most developing countries. Ravallion (2009) taking survey data for the early to mid-2000s produced estimates for the \$1.25 and \$2 poverty gap (in 2005 PPP) and the taxation necessary to cover it. Ravallion estimated the MTRs for the “rich” (which he defined as those earning more than \$13 per day in 2005 PPP which was based on an estimate of the US poverty line) that are required in order to end poverty in each country. He argued that MTRs over 60 percent would be prohibitive. While the MTRs needed to end poverty are less than 10 percent in many of the UMICs, in many LMICs they were much higher (see for estimates, Ravallion, 2009: 30-2).

We update these estimates using the latest data, which include almost another decade of growth in consumption, and thus a shrinking poverty gap and rising numbers in the “taxable” group. We replicate Ravallion’s (2009) analysis estimating the US poverty line updated to \$15 per day in 2011 PPP. Consistent with Ravallion (2009) we sourced the US Poverty line for a family of four from the US Department of Health and Human Services. This is the equivalent of \$15.31 a day per person in 2011 dollars. We also use the \$10 security-from-poverty line. As above, we sourced data about poverty levels from PovcalNET (Oct 2015 Update).

An alternative to new taxes, given that new taxes tend to be unpopular, would be to reallocate public finances towards poverty transfers (e.g. conditional or unconditional cash transfers). This raises the question of whether there are areas of public spending that might be reallocated from what might be labelled as a “public bad” (as opposed to a public good) to cash transfers to the poor. Here we take two areas purely for indicative assessments. The first is regressive fossil-fuel subsidies (see Sumner, 2016a; 2016b for further discussion). The second is what we have labelled ‘surplus’ military spending which we define as the above the regional lowest per capita spend on a logic countries military spending is determined by the spending of neighbouring counties. We use the following formulae to estimate the required marginal taxation on the ‘rich’ and the reallocation of ‘surplus’ military spending:



### **Ravallion (2009) Marginal Tax Rate on the 'Rich'**

Marginal Tax Rate =

$$\frac{PG_p PL_p}{SM - (1 - PG_R) PL_R}$$

Whereby:

$PL_p$  = Poor Poverty Line

$PL_R$  = 'Rich' Poverty Line

$PG_p$  = Poor Poverty Gap

$PG_R$  = 'Rich' Poverty Gap

$SM$  = Survey Mean

### **'Surplus' Military Spending**

'Surplus' Military Spending (as a share of GDP) =

$$\frac{MS_{pc} - LMS_{pc}}{GDP_{pc}}$$

Whereby:

$MS_{pc}$  = Military Spending per capita (2011 PPP)

$LMS_{pc}$  = Lowest Military Spending per capita (2011 PPP)

$GDP_{pc}$  = GDP per capita (2011 PPP)

Note: Military Spending was converted from current \$US to 2011 PPP using a price level ratio PPP conversion factor available on the World Development Indicators

### **Fossil Fuel Subsidies**

Fossil Fuel Subsidies as a share of GDP were compared to the total poverty gap as a share of GDP in each country.

Clements et al. (2013) provide a data set on fossil-fuel subsidies by their components for each country.<sup>5</sup> Post-tax fossil-fuel subsidies in developing countries in 2011 amounted to \$895 billion in current dollars (or almost two trillion in 2011 PPP dollars) (Clements et al., 2013). Such subsidies largely benefit the upper-middle classes and elite.<sup>6</sup> Some caveats are important to the estimates we make. First, that the calculations here are intended as indicative. Even though the cost of subsidies is conservatively estimated, oil prices have fallen at least temporarily. Which makes this an opportune movement to reduce or eliminate regressive fuel subsidies. It would, however, seem unlikely that oil prices will remain so low in 5-10 years' time.<sup>7</sup> In years of higher energy prices relative to

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<sup>5</sup> Alternative estimates by Coady et al. (2015: 19) argue that the data in Clements et al. (2013) is too conservative and provide substantially higher estimates.

<sup>6</sup> Arze del Granado et al. (2012) in a sample of twenty developing countries during the 2005-9 period, including several of the LMICs such as Indonesia, Sri Lanka, India and Ghana, find that, on average, the richest 20% of households gain six times more from such subsidies than the poorest 20% of households. The former capture, on average, 43% of the total subsidy value, the latter capture just 7%.

<sup>7</sup> Estimates of Clements et al. (2013: 42) take petroleum prices for 2000-2011 and coal and natural gas prices for 2007-2011. This would imply crude oil prices at an average of approximately \$52/bbl; Coal at

2011 the estimates here will underestimate the poverty gap covered and vice versa. There are further methodological issues on the quantification of subsidies. Furthermore, the removal of the subsidies may raise transportation costs and thus prices of other goods such as food which may then impact on poverty. In short, the purpose of this exercise is solely to show that there are potentially sufficient public resources at a *national level* — in principle — to end much of global poverty. This is a relatively new phenomenon — that most countries may have the public resources to cover the poverty gap — even if their reallocation is not necessarily easy.

The second indicative estimate we make is with “surplus” military expenditure which as noted, we define as above the regional lowest per capita spend (see formulae). We recognize this will be contentious. There are of course other potential candidates (and thresholds). We take data from the Stockholm International Peace Research Institute (2016) which provides estimates for military spending. This includes all current and capital spending on: the armed forces, including peacekeeping forces; defence ministries and other government agencies engaged in defence projects; paramilitary forces, when judged to be trained and equipped for military operations; and military space activities. We estimate “surplus” military spending in developing countries in 2014 to be \$792 billion in 2011 PPP. To reiterate, the estimates here are intended as indicative of resources now available.

The main limitation of our tax and reallocation estimates are that we assume no targeting and administrative costs (and of course the political economy of reallocating public spending). However, 57 developing countries already have conditional cash transfer programmes, and 114 developing countries had unconditional cash transfer schemes in 2014 (see data minus HICs in Honorati et al., 2015: 12). This would suggest that some of these issues are in hand. In addition, fuel subsidy programmes of course come with substantial administrative costs that would be saved.

Furthermore, the estimates for reallocation of ‘surplus’ military spending come with additional caveats which should not be forgotten. Unlike subsidies, military spending results in actual production of goods and services, and is treated differently in national accounts for that reason. In other words, it is not a direct transfer though it is a form of public spending which could be spent differently on say cash transfers to the poor who would then most likely would consume produced goods. Moreover, reducing military expenditure, like reducing fossil fuel subsidies will have indirect impacts on the poor through for example reducing demand for small businesses, such as rural street food sellers, who sell food to soldiers.

We would argue that our global estimates are conservative for several reasons (potentially with the exception of our definition of “surplus” military spending which of course can be contested as set too low). Our percentages only include in the numerator countries that can entirely eliminate the total poverty gap through redistribution. In other words, poverty reduction is only assumed to occur in countries where all poor people would be able to escape poverty through the redistribution. *As such, it is assumed that no reduction in poverty would occur in countries where redistribution would cover less than 100*

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\$92/mt and natural gas at \$6/mmbtu (Bbl = barrel; Mt = metric ton; Mmbtu = one million British Thermal Units).

*percent of the total poverty gap. This dramatically underestimates the impact of redistribution on ending poverty.* However, we choose to present a conservative estimate that does not require assumptions to be made about which individuals living in poverty would receive the benefits from distribution and which would not. Finally, our combined estimates of taxation plus reallocation of fossil-fuel subsidies and “surplus” military spending only includes countries that can entirely eliminate the total poverty gap through a combination of the forms of redistribution. In other words, it includes countries whereby a combination of a tax on those living over the US poverty line (and \$10 line) and redistributing public spending on fossil-fuel subsidies and surplus military expenditure would cover the total poverty gap. For example, the additional tax could cover 40 percent of the total poverty gap and fossil-fuel subsidies plus surplus military spending could cover 60 percent, resulting in 100 percent of the total poverty gap covered.

In general, the coverage of the data of global poverty is high (see table 8). If we were to remake Table 8 using the global poverty estimates for only countries that the World Bank provides data for, the percentages would be higher. For example, the combination of all forms of redistribution would eliminate 87 percent of \$1.90 poverty in the countries that the World Bank provides data for (these countries account for 88 percent of global poverty).

### **3.2 The National Capacity for New Taxation**

The findings are as follows: Figures 11-18 show the total poverty gap as a share of gross domestic product (GDP) using survey means and NA means in 2012. It is generally assumed that most or all developing countries have insufficient domestic capacity to raise taxes or reallocate public spending to fully address their aggregate poverty gap. We find that, in general, this is no longer the case at \$1.90 or \$2.50 per day. However, at the higher poverty lines of \$5 and \$10, we find that a small share of the total poverty gap is covered.<sup>8</sup>

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<sup>8</sup> We find it tends to be the same countries that can afford redistribution using either new taxation or reallocation of fossil-fuel subsidies or “surplus” military spending. This is why there is not a huge increase in the proportion of global poverty eliminated in the final two columns at the low poverty lines in Table 9. Further, the reason why the proportion of global poverty covered is highest at the \$5 a day line is because of the fact that a larger share of the global population living in \$5 poverty are in countries that can afford redistribution.

Figure 11. Total poverty gap (\$1.90) compared to the survey mean

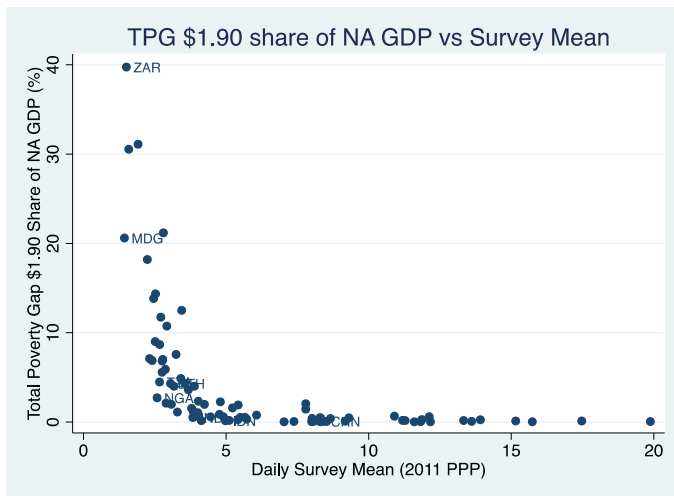


Figure 12. Total poverty gap (\$2.50) compared to the survey mean

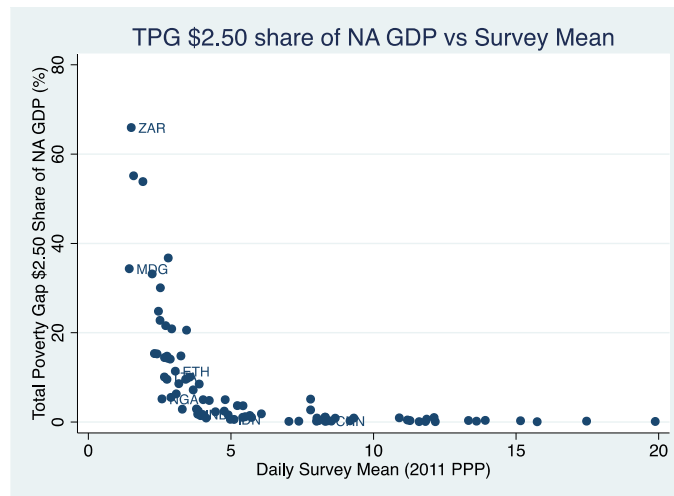


Figure 13. Total poverty gap (\$5) compared to the survey mean

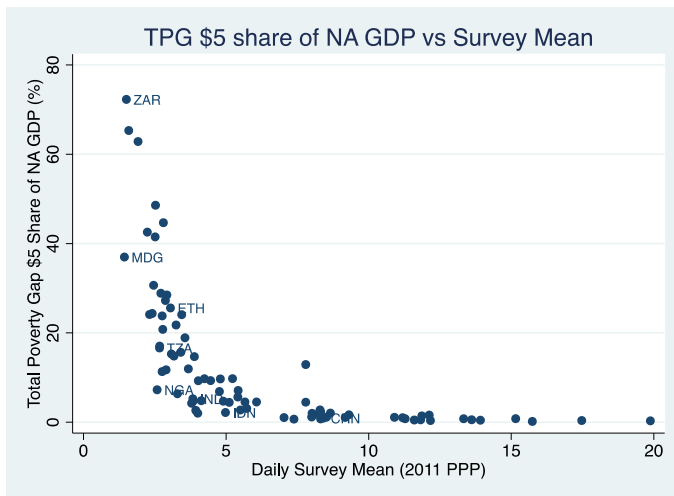


Figure 14. Total poverty gap (\$10) compared to the survey mean

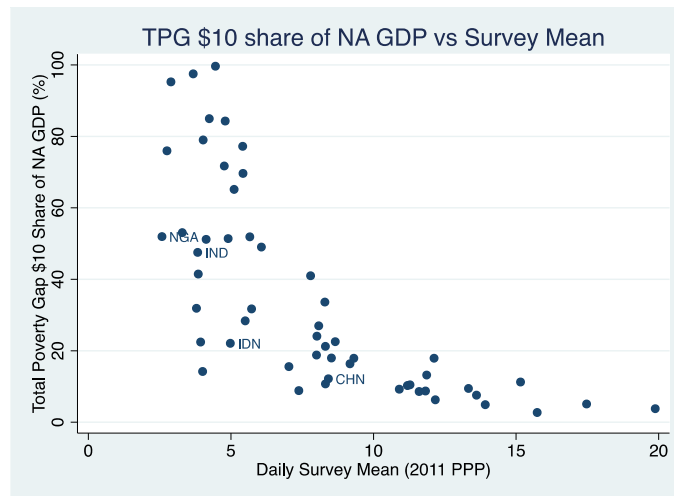


Figure 15. Total poverty gap (\$1.90) compared to the mean HCFE

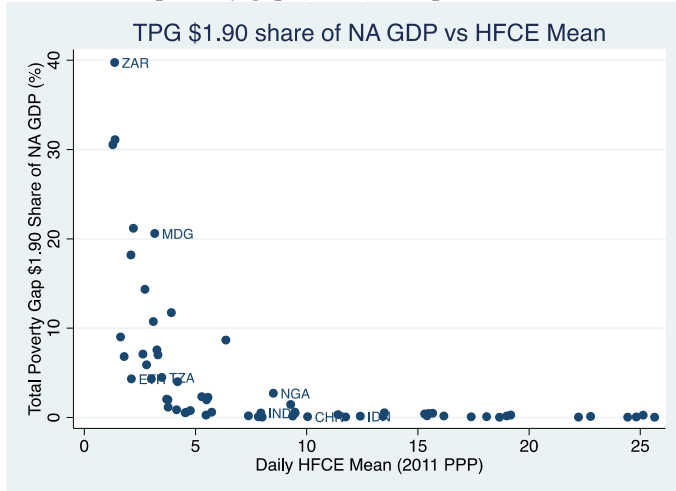


Figure 16. Total poverty gap (\$2.50) compared to the mean HCFE

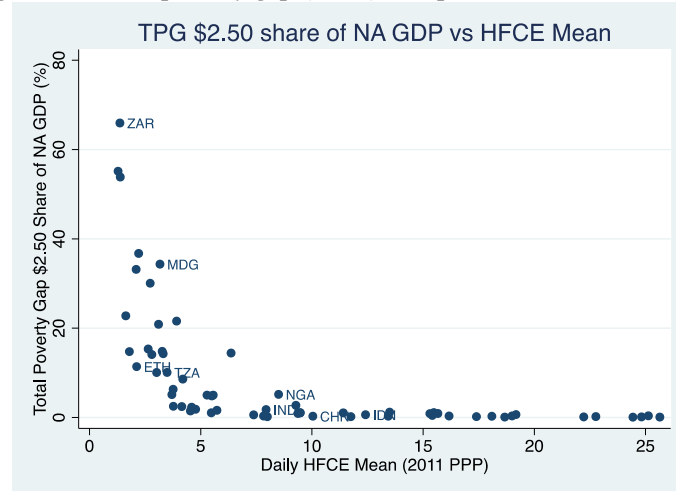


Figure 17. Total poverty gap (\$5) compared to the mean HCFE

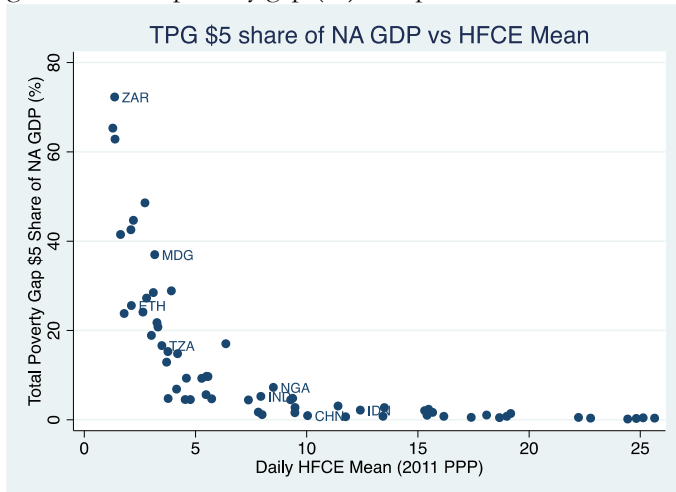
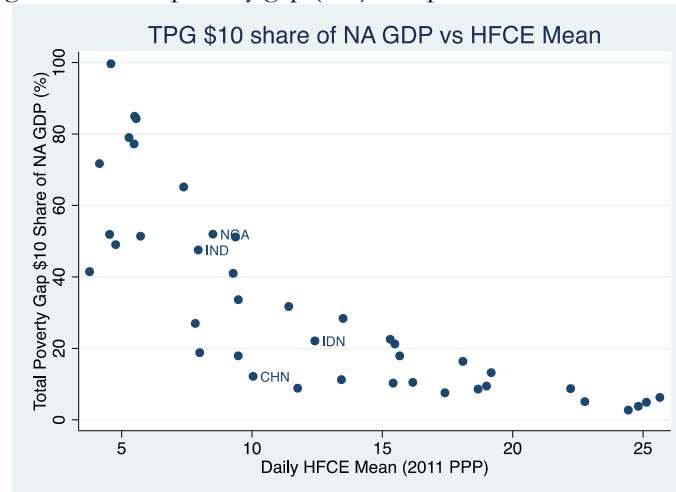


Figure 18. Total poverty gap (\$10) compared to the mean HCFE



Source: Authors' estimates based on data from World Bank (2015, 2016).

In short, most developing countries have the financial scope to dramatically speed up the end of poverty based on national capacities at the global poverty lines of \$1.90 or the \$2.50 line. The following discusses the capacity for new taxation and two examples of potential reallocation of public finances.

If we take a closer look at the MTRs on those over the US poverty line and those over \$10-per day in the countries where global poverty is focused (see Table 4) we find that unsurprisingly MTRs are prohibitive in both those above \$10 and those above the US poverty line in the set of seven LICs. However, in some of the MICs that dominate global poverty, matters are quite different. For example, Brazil and China would only need at most an MTR on those groups above \$10 or \$15 per day of 1-2 percent to end \$1.90 poverty, and Indonesia and the Philippines would need an MTR of about 6-10 percent to end \$1.90 poverty. Pakistan and Kenya would need MTRs of 10-30 percent and India would need a 20-40 percent MTR. However, the remaining countries, Nigeria and Zambia, would need prohibitively high MTRs.

There has been considerable debate on country income classifications triggered in part by the movement of the bulk of world's poor into countries classified as middle income countries (see Sumner, 2010; 2012; 2016a; 2016b) and the appropriateness or not of the country income classifications of the World Bank (see Alonso, 2012; Fantom and Serajjudin, 2016; Kanbur and Sumner, 2012; Koch, 2015; Ottersen et al. 2014; Tezanos and Sumner, 2013, 2016). Kanbur and Mukherjee (2007) outlined a means of assessing the capacity to end poverty. Ravallion (2009) in estimating MTRs operationalized this in 2005 PPP. We find in 2012 countries cluster around four groups of ranges of MTRs to end poverty (based here on the \$15 line of 'taxable' population). There is one group of countries with MTRs of 200 percent or more to end poverty at \$1.90 and \$2.50 (see Table 5). Those groups correspond with an average survey consumption per capita in 2012 of approximately \$1000 per capita to end \$1.90 poverty or \$2.50 poverty.

Interestingly the corresponding GNI Atlas per capita lines (that are used in the World Bank's country income classification) for the upper limit of each MTR range are close to or not too far from the current low income country upper threshold line (\$1,045) at \$965 (mean) and \$675 (median) to end \$1.90 poverty and \$1,426 (mean) and \$700 (median) to end \$2.50 poverty.

The average consumption per capita (survey mean) associated with the domestic capacity to end poverty, if that is defined as an MTR below 50 percent on those over \$15 per day, are approximately \$1,400 per capita to end \$1.90 poverty and \$1,750 per capita to end \$2.50 poverty. The corresponding GNI Atlas per capita upper limits on each MTR range are approximately \$2000 per capita to end \$1.90 poverty or \$2.50 poverty. All of above would suggest one could classify countries by their ability to end poverty in terms of domestic taxation potential.

**Table 4**  
**Marginal tax rate (MTR) on those living above the US poverty line (\$15/day) and over \$10 per day to end poverty in countries which account for more than 1 percent of global poverty headcount at \$1.90, 2012**

	Marginal tax rate on those living above the \$15/day to end poverty				Marginal tax rate on living above \$10/day to end poverty			
	\$1.90 per day	\$2.50 per day	\$5 per day	\$10 per day	\$1.90 per day	\$2.50 per day	\$5 per day	\$10 per day
<b>LICs</b>								
DRC	8784.61	14574.27	42041.28	100291.24	4080.43	6769.71	19528.05	46584.98
Ethiopia	223.37	588.20	3478.22	10752.54	122.73	323.18	1911.07	5907.87
Malawi	854.07	1478.26	4541.20	11137.47	490.30	848.64	2607.00	6393.77
Madagascar	3018.19	5030.06	14254.27	33502.61	1881.53	3135.73	8886.08	20885.43
Mozambique	413.68	753.97	2546.58	6517.09	268.67	489.67	1653.90	4232.57
Tanzania	433.64	975.76	4230.67	11853.83	227.01	510.80	2214.73	6205.39
Uganda	127.59	297.25	1466.65	4481.66	62.87	146.46	722.62	2208.13
<b>MICs</b>								
Bangladesh	-	-	-	-	-	-	-	-
Brazil	0.64	1.10	5.58	28.95	0.49	0.84	4.26	22.11
China	2.30	7.38	65.19	323.66	1.25	4.01	35.45	175.98
India	38.95	136.14	1063.56	3669.92	23.00	80.40	628.11	2167.36
Indonesia	10.61	45.41	425.01	1648.25	5.91	25.27	236.54	917.34
Kenya	28.52	63.23	321.74	1064.93	18.64	41.33	210.30	696.07
Nigeria	817.23	1557.08	5747.04	15645.60	364.30	694.11	2561.90	6974.46
Pakistan	18.92	108.84	1543.22	6239.61	8.84	50.82	720.59	2913.53
Philippines	10.66	34.76	273.08	1066.30	5.59	18.23	143.18	559.09
South Africa	1.79	4.28	24.29	87.25	1.45	3.46	19.65	70.57
Zambia	219.66	377.47	1174.32	2995.45	139.16	239.14	743.97	1897.70

Source: Authors' estimates based on data from World Bank (2015, 2016). Data are not available for Bangladesh in 2011 PPP.

**Table 5**

**Country classifications based on capacity to end poverty by marginal tax rates on those above \$15 (US poverty line) to end poverty at \$1.90 and \$2.50: Top of group threshold by survey means and GNI Atlas per capita, 2012**

	\$1.90 poverty				\$2.50 poverty			
	Survey Mean (2011 PPP)		GNI per capita (Atlas Method)		Survey Mean (2011 PPP)		GNI per capita (Atlas Method)	
MTRs	Mean	Median	Mean	Median	Mean	Median	Mean	Median
<5%	\$5,147	\$4,548	\$8,069	\$6,800	\$5,529	\$4,966	\$8,717	\$7,340
5-50%	\$2,099	\$1,974	\$2,654	\$1,813	\$2,897	\$2,884	\$4,368	\$3,785
50-200%	\$1,371	\$1,406	\$2,281	\$1,710	\$1,706	\$1,745	\$1,821	\$1,485
>200%	\$936	\$974	\$965	\$675	\$1,046	\$1,018	\$1,426	\$700

Source: Authors' estimates based on data from World Bank (2015, 2016). Note: Some countries do not have estimates because data were not available.



### **3.3 The National Capacity to Reallocate Public Finances to Poverty**

We focus once again on the countries that are home to much of global \$1.90 poverty. Table 6 shows the estimates for the 18 countries of the reallocation of either the national fossil fuel subsidy or ‘surplus’ military spending. These estimates are without compensation for the poor for the loss of the subsidy, because earlier estimates for fossil-fuel coverage of the \$1.90 and \$2.50 poverty gaps at national level showed that this made little difference on national level estimates (see Sumner 2016a, 2016b).

Table 6 shows that the fossil-fuel subsidies alone would easily cover the \$1.90 poverty gap and much of the \$2.50 poverty gap in many of the 11 MICs listed. Surprisingly, even in a number of the LICs such as Ethiopia, Mozambique, Tanzania and Uganda, the fossil-fuel subsidy would cover a third to a half of the total poverty gap. Interestingly, in some of the large populous countries that dominate global poverty headcounts, such as India, China, Indonesia and Pakistan, much or all of the \$5 poverty gap might be covered by reallocation of the fossil-fuel subsidy. In a somewhat similar vein, the “surplus” military spending alone would cover all or most of the \$1.90 or \$2.50 poverty gap in China, India, Indonesia, Pakistan and the Philippines, and even in some LICs such as Ethiopia, Tanzania and Uganda, it might make some substantial contribution in the order of 10-20 percent of the total poverty gap. What is common though is that the reallocation of “surplus” military spending would not make much contribution to the \$5 and \$10 poverty gaps.

Table 7 summarises our estimates (and Table 8 shows the proportion of global poverty covered in these estimates given data limitations). In terms of taxation we find that MTRs of 50 percent or less on those living above the US poverty line around the world or even those living on more than \$10 per day would cover half of \$1.90 poverty or a quarter of \$2.50 poverty. However, if one were to reallocate fossil-fuel subsidies or “surplus” military spending (as we have defined), one might hope to fund cash transfers to cover 60-70 percent of global poverty at \$1.90 or \$2.50 or a third of global poverty at \$5 poverty (though very little of \$10 poverty). If one adds together fossil-fuel subsidy reallocation and “surplus” military spending and tax on those over \$10 or \$15 per day, one could fund the end of poverty at not only \$1.90 and \$2.50 but potentially \$5 too.

**Table 6**  
**Fossil-fuel subsidy and “surplus” military spending coverage of total poverty gap (%), NA GDP, 2012**

	Fossil-fuel subsidy coverage of total poverty gap				“Surplus” military spending coverage of total poverty gap				Total (fossil fuel subsidies plus ‘surplus’ military spend) coverage of total poverty gap			
	\$1.90 per day	\$2.50 per day	\$5 per day	\$10 per day	\$1.90 per day	\$2.50 per day	\$5 per day	\$10 per day	\$1.90 per day	\$2.50 per day	\$5 per day	\$10 per day
<b>LICs</b>												
DRC	4.75	2.87	2.61	0.42	0.37	0.22	0.20	0.03	5.12	3.09	2.81	0.45
Ethiopia	44.87	17.04	7.58	0.93	10.00	3.80	1.69	0.21	54.87	20.84	9.27	1.14
Malawi	6.75	4.05	3.76	0.61	1.52	0.88	0.75	0.12	8.27	4.93	4.51	0.73
Madagascar	6.88	3.97	3.40	0.53	1.11	0.67	0.62	0.10	7.99	4.64	4.02	0.63
Mozambique	29.74	16.32	12.71	1.89	3.51	1.92	1.50	0.22	33.25	18.24	14.21	2.11
Tanzania	55.35	24.60	14.93	2.02	21.73	9.66	5.86	0.80	77.08	34.26	20.79	2.82
Uganda	33.53	14.39	7.68	0.95	20.15	8.65	4.61	0.57	53.68	23.04	12.29	1.52
<b>MICs</b>												
Bangladesh	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	177.01	103.61	53.67	3.93	1190.08	696.60	360.81	26.44	1367.09	800.21	414.48	30.37
China	4426.32	1379.85	410.84	31.45	2473.61	771.12	229.60	17.57	6899.93	2150.97	640.44	49.02
India	884.16	252.95	85.21	9.38	432.70	123.79	41.70	4.59	1316.86	376.74	126.91	13.97
Indonesia	3770.88	881.45	247.84	24.28	484.88	113.34	31.87	3.12	4255.76	994.79	279.71	27.40
Kenya	30.12	13.59	7.03	0.81	58.35	26.32	13.61	1.56	88.47	39.91	20.64	2.37
Nigeria	131.56	69.05	49.23	6.87	12.97	6.81	4.85	0.68	144.53	75.86	54.08	7.55
Pakistan	3936.46	684.42	127.02	11.94	1943.48	337.91	62.71	5.89	5879.94	1022.33	189.73	17.83
Philippines	233.44	71.59	23.98	2.33	297.24	91.16	30.54	2.97	530.68	162.75	54.52	5.30
South Africa	1572.31	656.75	304.48	32.21	414.92	173.31	80.35	8.50	1987.23	830.06	384.83	40.71
Zambia	89.03	51.81	43.83	6.53	31.10	18.10	15.31	2.28	120.13	69.91	59.14	8.81
<b>Regions</b>												
SS Africa	155.82	63.67	28.99	3.13	213.24	83.54	35.52	3.72	369.06	147.21	64.51	6.85
East Asia & Pacific	788.36	217.80	63.11	5.35	1094.23	302.17	72.59	5.41	1882.59	519.97	135.70	10.76
South Asia	3753.77	745.69	118.76	9.21	2975.19	567.84	85.71	6.54	6728.96	1313.53	204.47	15.75
<b>Income groups</b>												
LIC	13.09	5.67	3.45	0.47	15.69	7.44	4.66	0.62	28.78	13.11	8.11	1.09
LMIC	1064.98	288.46	75.85	7.14	781.01	197.58	48.89	4.34	1845.99	486.04	124.74	11.48
LMIC minus India	1070.00	289.44	75.59	7.08	794.41	200.42	49.16	4.33	1864.41	489.86	124.75	11.41
UMIC	7525.53	2006.17	591.67	43.44	1916.02	741.49	264.17	19.47	9441.55	2747.66	855.84	62.91
UMIC minus India	7680.49	2037.48	600.71	44.04	1878.85	739.52	266.47	19.60	9559.34	2777.00	867.18	63.64
All developing countries	2411.64	645.59	186.76	14.48	826.31	275.36	89.52	7.00	3237.95	920.95	276.28	21.48

Source: Authors’ estimates based on data from World Bank (2015, 2016). Note: Full data are not available for Bangladesh in 2011 PP

**Table 7**  
**Comparison of national capacity for redistribution to end global poverty at various poverty lines**

	% of global poverty eliminated by					
	Marginal tax rates of 50% or less on those living on \$15/day or more	Marginal tax rates of 50% or less on those living on \$10/day or more	Reallocation of fossil-fuel subsidy to poverty transfers	Reallocation of surplus military spending to poverty transfers	Reallocation of fossil-fuel subsidies and surplus military plus new taxation on pop'n living over over \$15/day	Reallocation of fossil-fuel subsidies and surplus military plus new taxation on pop'n living over \$10/day
\$1.90	50.47	52.39	69.08	59.38	74.98	76.95
\$2.50	23.39	24.81	69.93	66.79	71.74	71.79
\$5	6.22	25.07	38.74	32.49	77.09	77.24
\$10	5.59	7.50	8.12	8.82	16.68	17.80

Source: Authors' estimates.

**Table 8**  
**Estimate of global poverty coverage**

Poverty Line	\$1.90	\$2.50	\$5	\$10
Marginal tax rate on populations over \$15/day and \$10/day	92.92	93.29	94.91	95.93
Reallocation of fossil-fuel subsidies	89.35	90.41	92.17	92.95
Reallocation of "surplus" military spending	88.44	89.35	91.37	92.10

Source: Authors' estimates. Notes: PovcalNet covers 92.4-95.5 percent of relevant population depending on poverty line; Ferreira et al. (2015) "fill" the remainder in global poverty estimates with regional averages (thus, for example, adding about 40m more \$1.90 poor). Estimates in this table then take PovcalNet as 100 percent of global poverty on this basis and estimate additional gaps in our estimates.

## 4. Conclusions

It is generally assumed that most or all developing countries have insufficient domestic capacity to raise taxes or relocate public spending to address fully the aggregate poverty gap. This paper finds that on average this is no longer the case at lower poverty lines. The primary conclusion of this paper is nuanced: much of global poverty at the lower global poverty lines of \$1.90 (the new World Bank global poverty line) or \$2.50 (an alternative extreme poverty line we argue for) and potentially \$5 per day could now be ended via higher taxes on “richer” citizens or redistribution of national public expenditures currently allocated to regressive fossil-fuel subsidies and or “surplus” military spending (defined as above the regional lowest per capita). In short, at lower poverty lines, global poverty is now a matter of national inequality and thus domestic political economy as the national redistributive capacity to end poverty emerges. That said, at the \$10 poverty lines, which is associated with permanent escape from poverty, global poverty remains a matter of global inequality, as while national resources could address global poverty at the lower lines, such resources would not be enough to end poverty at \$10 per day.

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## Annex: How Long Would It Take to End All Poverty by Growth Alone?

Existing projections of the end of poverty typically focus on the lower poverty lines and estimate poverty headcounts typically in 2030 or another date in the not-too-distant future based on various assumptions on growth and distribution. For a range of those projections see Edward and Sumner (2014); Karver et al. (2012); Ravallion (2013). As far as the authors are aware no study has sought to estimate the complete end of all poverty in terms of years. We do so here with the usual large caveats. We keep inequality static in order to estimate the length of time based on *growth alone*. An important issue to flag at the outset is the long tail — countries that will take a long time to end poverty. We thus estimate the mean end of poverty for the set of countries as well as the final end of all poverty. One should note the mean and final differ considerably due to the long tail. We source data about poverty levels at each of the poverty lines discussed in this paper from the most recently available data from PovcalNET (Oct 2015 Update). In addition, we source projections of per capita growth rates (national accounts data) from the IMF World Economic Outlook (Oct 2015 Update), which makes growth projections for 2013-2020 and we take the annual average for this period.

The approach we use to estimate the end of poverty by growth in each country is as follows: first, we take, as the starting point, the consumption floor based on Ravallion (2015) formula (see below). Figures A1 and A2 show the consumption floor based on the latest data (2012) using survey and NA means respectively. The figures show, consistent with the discussion in the paper, that the minimum level of consumption in a country is not related to average consumption. In other words, on average, the poorest people in a country have similar levels of consumption regardless of the average standard of living of the country they live in. We show the year that people currently living on the consumption floor would cross the poverty lines, assuming their consumption grows in line with the average (growth rates estimated by either surveys or NA data). There are two scenarios as noted earlier. To reiterate, one scenario uses historical growth of survey means. Survey growth is based upon the average growth rate of mean consumption over the last decade (2002-2012). A second scenario is based on IMF WEO projections of NA growth minus the average historical error of IMF growth projections of one percentage point. *It should be noted these are not predictions of the future. They are potential scenarios based on a set of assumptions.* We use the following formula to estimate the end of poverty via growth alone:

### The Ravallion (2015) Consumption Floor Formula

Consumption Floor (CF) =

$$PL \left(1 - \frac{SPG}{PG}\right)$$

Whereby:

PL = Poverty Line

PG = Poverty Gap

SPG = Squared Poverty Gap

### Time taken to end poverty through growth alone

Years until end of poverty =

$$\frac{\log\left(\frac{PL}{CF}\right)}{\log(1 + GR)}$$

Whereby:

PL = Poverty Line

GR = Growth Rate

CF = Consumption Floor



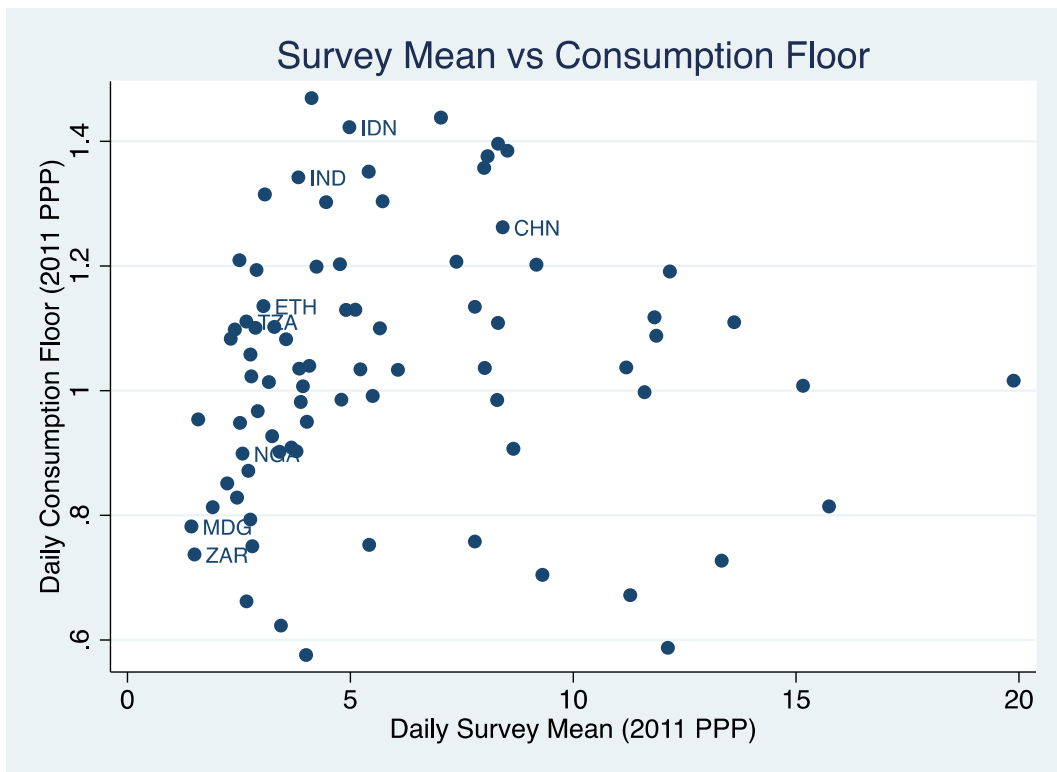
These estimates come with large caveats. First, the 2011 PPP numbers are not sacrosanct across a long period of time. The PPP data are comparable at a point in time, and have less meaning the further away they are from the year of comparison. This is a common challenge facing any projections of future poverty. This is one of the reasons, why, for example, the 2011 and 2005 PPP numbers give very different levels of poverty in different countries (see discussion of Edward and Sumner, 2014). There is evidence to suggest that as countries grow their purchasing power relative to the United States declines, which means that it is more difficult to end poverty than projections suggest (see discussion of Ravallion, 2010). As such the estimates we present, along with other existing projections should be taken as optimistic. They highlight the earliest countries will end poverty if growth continues as it has in the last decade or as is projected by the IMF WEO.

Second, we have posited a simple relationship between growth and poverty, by holding inequality constant in order to consider growth alone to end poverty. Growth is likely to be uneven across the distribution in any given country though on average growth has been approximately equal across developing countries over the last thirty years (Hoy and Samman, 2015). Furthermore, Ravallion (2015) shows that on average the consumption floor has been growing substantially slower than the mean. As such our estimates of the year that poverty would end in each country are again likely to be optimistic, as we assume that the consumption floor will grow in line with the mean. This is deliberate choice in order to assess growth alone.

Third, these estimates of the end of poverty by growth alone are also likely to be optimistic for another reason. This is that they are only based on countries where there was positive growth in survey means over the last ten years or in projected positive growth rates because it is not possible to estimate the end of poverty using negative growth rates. Approximately 6 percent of global \$1.90 poverty is currently (2012) is in countries with negative growth per capita and a further 2 percent of global \$1.90 poverty is in countries with very low growth rates which we defined—arbitrarily—as less than 0.5 percent per capita per year.

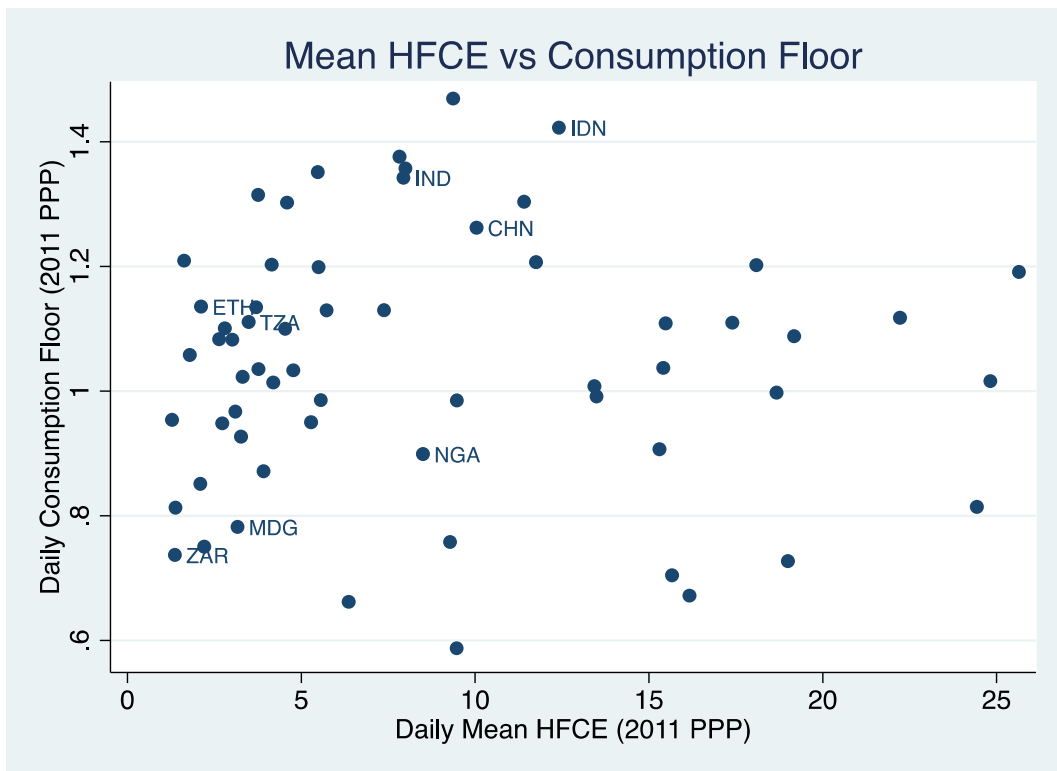
Finally, it is essential to note that the estimates we present for the end of poverty in all developing countries are based upon the last country eliminating poverty. There are a long tail — a small number of countries that are projected to not eliminate poverty until well after most countries. This can be seen by the fact that the average developing country is projected to end poverty significantly earlier than all developing countries (around 2050-2060 is the mean at the \$1.90 and \$2.50 lines and 2100-2130 at the higher poverty lines). We find that left to growth alone the end of poverty even at the lower poverty lines would take the *average* developing country 30 or 45 years at \$1.90 and \$2.50 respectively but the end of *all* global poverty via growth alone could take until 2200-2250 at \$1.90 poverty (depending on use of survey or NA growth) and 2250-2230 for \$2.50 poverty (see later, Table A3 below for a summary of estimates). At the higher lines of \$5 or \$10 the projections suggest on average around 80 or 115 years respectively to end poverty, and the end of global poverty about 2300-2400 for \$5 poverty and 2500-2600 for \$10 poverty. In short, for the average developing country the end of poverty in all its forms might be expected by 2040-2060 at the lower poverty lines or 2100-2130 at the higher poverty lines. And the actual end of all poverty in countries where we can project is 2200-2250 at \$1.90 poverty, 2250-2230 for \$2.50 poverty, 2300-2400 for \$5 poverty and 2500-2600 for \$10 poverty.

**Figure A1**  
**Relationship between the consumption floor and survey mean**



Source: Authors' estimates processed from World Bank (2015, 2016).

**Figure A2**  
**Relationship between the consumption floor and mean HFCE**



Source: Authors' estimates processed from World Bank (2015, 2016).

Of further interest here, beyond the year of ending poverty, is the wildly differing average consumption necessary in different countries to end global poverty. In terms of the 18 countries we focus on, Nigeria, on growth alone could take until 2090 to eradicate \$1.90 based on the NA means. Taking the higher poverty lines pushes the end of poverty into the distance not surprisingly, though alarmingly so. For example, the end of \$10 poverty in Brazil would be 2100. Tables A1 and A2 show for the set of 18 countries previously noted where global poverty is focused currently (those with more than 1 percent of global \$1.90 poverty) the consumption per capita necessary to end poverty and the year each country would end poverty at each poverty line. The most extreme country listed is in fact Brazil which will need a mean consumption per capita of \$70 per person per day to end \$1.90 per person per day poverty and a mean consumption per capita of approaching \$400 per person per day to end \$10 per person per day poverty. If one takes ending \$1.90 poverty, many of the LICs listed such as the DRC, Tanzania, Ethiopia and Mozambique will need a survey mean of just under \$4-\$5 per person per day to end poverty at \$1.90. In India and Indonesia the figures are \$5-\$6 per person per day to end \$1.90 poverty. In contrast, China will need a survey mean of \$12.50 per person per day to end \$1.90 poverty. In short, some countries will need much more consumption growth to end poverty because of prevailing levels of inequality.

Why do our estimates of ending global poverty differ so much to the well-known projections of Ravallion (2013)? There are two reasons (apart from the change in PPPs and our data being more recent). First, we are looking at a country level whereas Ravallion (2013) uses an aggregate of developing countries. The Ravallion (2013) projection appears more optimistic because it applies the developing world survey mean growth rate of 4.3 percent to all developing countries. That 4.3 percent survey mean growth rate is largely driven by rapid growth since 1999 in China, India, Indonesia and a few other high population countries. We look, instead, at country specific growth rates and country specific consumption floors, which provides a different take on when extreme poverty will end in all countries. In short, our methodology differs to Ravallion.

Second, the end goal is not the same. The reason why the difference in number of years is so significant is because we refer to how long it will take the last country to end poverty, and there is a long tail of countries who could take a very long time and (noting even that is optimistic as currently 8 per cent of global poverty is in countries with very low, no or negative growth so ending poverty cannot be projected in those countries). Ravallion (2013) in contrast, estimates how long it would take for the world to reach a 3 per cent extreme poverty rate (\$1.25 in 2005PPP). Of course all projections into the future are not predictions but simply scenarios based upon a set of assumptions. What we are saying in our estimates is that if you make these assumptions then it *could* take 200 years to *completely* end extreme poverty (\$1.90-per-day in 2011PPP).

**Table A1**

**Estimates of survey mean consumption associated with end of poverty and year to end poverty assuming historical average growth in survey means continues, 2012**

	\$1.90 per day			\$2.50 per day			\$5 per day			\$10 per day		
	Survey Means pc	Survey Median pc	Mean Year	Survey Means pc	Survey Median pc	Mean Year	Survey Means pc	Survey Median pc	Mean Year	Survey Means pc	Survey Median pc	Mean Year
<b>LICs</b>												
DRC	\$3.78	\$2.77	2027	\$5.14	\$3.76	2032	\$10.11	\$7.40	2043	\$19.89	\$14.54	2054
Ethiopia	\$5.04	\$3.89	2031	\$6.75	\$5.20	2042	\$13.44	\$10.35	2068	\$26.75	\$20.61	2094
Madagascar	-	-	-	-	-	-	-	-	-	-	-	-
Malawi	-	-	-	-	-	-	-	-	-	-	-	-
Mozambique	\$5.06	\$3.05	2034	\$6.55	\$3.95	2041	\$13.24	\$7.99	2060	\$26.77	\$16.15	2079
Tanzania	\$4.64	\$3.48	2022	\$6.12	\$4.59	2027	\$11.90	\$8.92	2039	\$24.44	\$18.33	2052
Uganda	\$6.34	\$4.46	2026	\$8.13	\$5.71	2032	\$16.40	\$11.52	2049	\$33.10	\$23.25	2066
<b>MICs</b>												
Bangladesh	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	\$71.29	\$46.51	2052	\$94.44	\$61.62	2060	\$184.19	\$120.18	2079	\$372.05	\$242.76	2099
China	\$12.53	-	2017	\$17.21	-	2021	\$32.51	-	2029	\$66.47	-	2038
India	\$5.37	-	2022	\$7.03	-	2030	\$14.26	-	2051	\$28.92	-	2072
Indonesia	\$6.65	-	2019	\$8.88	-	2026	\$17.21	-	2042	\$34.76	-	2059
Kenya	\$9.28	\$5.02	2074	\$12.23	\$6.62	2100	\$24.39	\$13.21	2165	\$48.67	\$26.36	2230
Nigeria	\$5.53	\$3.85	2034	\$7.29	\$5.08	2042	\$14.55	\$10.15	2062	\$29.07	\$20.26	2082
Pakistan	\$5.37	\$4.49	2020	\$6.98	\$5.57	2028	\$13.88	\$11.08	2049	\$28.53	\$22.79	2071
Philippines	-	-	-	-	-	-	-	-	-	-	-	-
South Africa	\$20.89	\$8.10	2021	\$26.86	\$10.42	2025	\$53.64	\$20.80	2036	\$107.10	\$41.52	2047
Zambia	-	-	-	-	-	-	-	-	-	-	-	-
<b>Regions</b>												
Sub-Saharan Africa	\$7.72	-	2048	\$10.14	-	2062	\$20.22	-	2099	\$40.63	-	2136
East Asia and the Pacific	\$9.13	-	2052	\$12.15	-	2067	\$23.98	-	2104	\$48.05	-	2142
South Asia	\$6.63	-	2022	\$8.72	-	2031	\$17.45	-	2053	\$30.18	-	2075
<b>Income groups</b>												
LIC	\$5.58	-	2056	\$7.33	-	2072	\$14.64	-	2113	\$29.32	-	2154
LMIC	\$10.47	-	2047	\$13.80	-	2062	\$27.42	-	2097	\$55.22	-	2133
LMIC minus India	\$10.65	-	2048	\$14.05	-	2063	\$27.91	-	2099	\$56.20	-	2135
UMIC	\$37.87	-	2040	\$49.89	-	2050	\$99.67	-	2077	\$200.57	-	2103
UMIC minus India	\$39.28	-	2041	\$51.70	-	2052	\$103.40	-	2080	\$208.02	-	2107
All developing countries	\$16.78	-	2048	\$22.10	-	2061	\$44.09	-	2096	\$88.71	-	2131

Source: Authors' estimates processed from World Bank (2015, 2016). Note: Some countries do not have estimates because their historical consumption growth has been negative, which means it is not possible to project forward as to when poverty will be eliminated. Full data are not available for Bangladesh in 2011 PPP.

Table A2

Estimates of survey means per capita associated with end of poverty and year countries projected to reach that level taking IMF WEO growth projections average minus one percentage point (2013-2020), 2012

	\$1.90 per day		\$2.50 per day		\$5 per day		\$10 per day	
	Survey Means pc	Year	Survey Means pc	Year	Survey Means pc	Year	Survey Means pc	Year
<b>LICs</b>								
DRC	\$3.83	2044	\$5.12	2054	\$10.32	2078	\$20.19	2101
Ethiopia	\$5.20	2022	\$6.78	2027	\$13.57	2040	\$27.13	2053
Madagascar	-	-	-	-	-	-	-	-
Malawi	\$4.47	2073	\$5.91	2093	\$11.70	2142	\$23.47	2192
Mozambique	\$4.99	2027	\$6.53	2032	\$13.08	2045	\$26.23	2058
Tanzania	\$4.52	2026	\$6.10	2034	\$12.02	2052	\$23.67	2070
Uganda	\$6.27	2047	\$8.25	2064	\$16.53	2107	\$33.12	2150
<b>MICs</b>								
Bangladesh	-	-	-	-	-	-	-	-
Brazil	-	-	-	-	-	-	-	-
China	\$12.95	2021	\$16.45	2026	\$33.71	2041	\$65.87	2055
India	\$5.44	2019	\$6.98	2024	\$14.05	2038	\$28.28	2052
Indonesia	\$6.74	2022	\$8.85	2031	\$17.75	2054	\$34.56	2076
Kenya	\$9.26	2035	\$12.33	2045	\$24.48	2069	\$48.62	2093
Nigeria	\$5.43	2085	\$7.15	2112	\$14.30	2180	\$28.59	2248
Pakistan	\$5.34	2027	\$7.02	2043	\$14.16	2084	\$28.08	2124
Philippines	\$8.42	2024	\$10.89	2032	\$22.09	2054	\$43.40	2075
South Africa	-	-	-	-	-	-	-	-
Zambia	\$6.60	2077	\$8.74	2098	\$17.33	2149	\$34.82	2201
<b>Regions</b>								
Sub-Saharan Africa	\$7.13	2053	\$9.40	2070	\$18.77	2112	\$37.51	2154
East Asia & Pacific	\$9.76	2029	\$12.69	2039	\$25.70	2063	\$50.74	2088
South Asia	\$7.51	2022	\$9.97	2032	\$19.80	2055	\$40.15	2078
<b>Income groups</b>								
LIC	\$5.57	2057	\$7.33	2075	\$14.64	2120	\$29.24	2165
LMIC	\$10.28	2052	\$13.58	2069	\$27.14	2111	\$54.23	2153
LMIC minus India	\$10.45	2053	\$13.82	2070	\$27.61	2113	\$55.16	2156
UMIC	\$28.92	2057	\$38.11	2073	\$76.07	2112	\$151.63	2152
UMIC minus India	\$30.06	2059	\$39.66	2076	\$79.10	2117	\$157.75	2159
All developing	\$13.06	2054	\$17.22	2072	\$34.39	2114	\$68.63	2157

Source: Authors estimates based on data from World Bank (2015, 2016). Note: Some countries do not have estimates because data were not available. Full data are not available for Bangladesh in 2011 PPP.

**Table A3**  
**Comparison of years to end poverty at various poverty lines**

	End of global poverty on growth alone (survey-based):	End of global poverty on growth alone (survey-based):	End of global poverty on growth alone (NA-based):	End of global poverty on growth alone (NA-based):
	Average (mean) year	Final year	Average (mean) year	Final year
\$1.90	2048	2244	2055	2224
\$2.50	2061	2297	2072	2248
\$5	2096	2431	2114	2333
\$10	2131	2566	2157	2451

Source: Authors' estimates. Notes: This is likely to be an underestimate as it is only based on countries where there was positive growth in survey means over the last ten years. It is not possible to estimate the end of poverty using negative growth rates.

**Table A4**  
**Estimate of global poverty coverage**

Poverty Line	\$1.90	\$2.50	\$5	\$10
End of poverty by growth alone (survey means)	84.42	86.45	89.52	91.02
End of poverty by growth alone (NA-based)	86.23	88.15	90.20	89.62

Source: Authors' estimates.